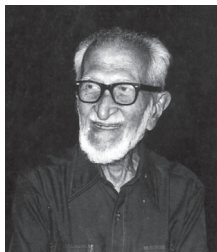


## INTRODUCTION

### BIRDS OF THE INDIAN SUBCONTINENT

AN OVERVIEW BY CAROL AND TIM INSKIPP



Dr. Salim Ali



Dr. S Dillon Ripley



Spotted Creeper



Pale Rockfinches

The Indian subcontinent has a great wealth of birds, making it a paradise for the birdwatcher. The classic *Handbook of the Birds of India and Pakistan* by Salim Ali and S Dillon Ripley, which covers the whole region and was first published in 1968-1975, lists over 1,200 species. With additional recording and following the more up-to-date nomenclature in the *Howard and Moore Complete Checklist of Birds of the World* edited by E. C. Dickinson (2003) the current species total for the subcontinent stands at 1,375 species – 13 per cent of the world's birds. A further relevant reference is *Birds of South Asia: the Ripley Guide* by Pamela Rasmussen and John Anderton, which has adopted much narrower species limits and, consequently, the latest edition (2012) recognises 1451 species in the region. Note that less than 800 species are found in all of North America.

The Indian subcontinent is species-rich partly because of its wide altitudinal range extending from sea level up to the summit of the Himalayas, the world's highest mountains. Another reason is the region's highly varied climate and associated diverse vegetation. The extremes range from the almost rainless Great Indian or Thar Desert, where temperatures reach over 55°C, to the wet evergreen forests of the Assam Hills where 1,300 cm of rain a year have been recorded at Cherrapunji – one of the wettest places on Earth, and the Arctic conditions of the Himalayan peaks where only alpine flowers and cushion plants flourish at over 4,900 m.

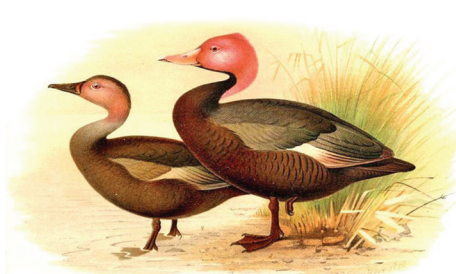
The other major factor contributing to the subcontinent's species-richness is its geographical position in a region of overlap between three biogeographic provinces – the Indo-malayan (South and South-East Asia), Palearctic (Europe and Northern Asia), and Afro-tropical (Africa) realms. As a result, species typical of all three realms occur. Most species are Indo-malayan, for example the ioras and minivets; some are Palearctic, including the accentors, and a small number, such as the Spotted Creeper *Salpornis spilonotus*, originate in Africa.

New species are continually being added to the region's list. For example, J. K. Tiwari recently found a flock of Pale Rockfinches *Carpospiza brachydactyla* in Gujarat – a bird previously recorded only in the Middle East. Even more exciting, in 2006 Ramana Athreya first described for science the multi-coloured Bugun Liocichla *Liocichla bugunorum*, from the Himalayan forests of Arunachal Pradesh.

Two species from the subcontinent are probably now extinct. The Pink-headed Duck *Rhodonessa caryophyllacea* was formerly locally distributed in pools and swamps in the elephant grass jungles of north-eastern India, Bangladesh, Nepal and Myanmar. It was last definitely seen in Bihar in 1935, but there are



Himalayan Quail



Pink-headed Duck

Quail [Mountain Quail] *Ophrysia superciliosa* has not been recorded since the end of the last century, despite intensive searching, but some ornithologists think it might still be surviving. It was only found in Uttarakhand in the Western Himalayas, where it inhabited long grass and scrub. Rahul Kaul indicated that this habitat is similar to that occupied by the more widespread Cheer Pheasant *Catreus wallichii*, and advocated searches over a wider area. Another species that was long considered to be extinct is the Forest Owlet [Forest Spotted Owlet] *Athene blewitti*, because there had been no confirmed sightings since 1914. However, it was rediscovered in 1997 in the Satpura mountains in Central India, where it frequents moist deciduous forest and wild mango groves, usually near streams.

BirdLife International annually produce a world list of bird species threatened with extinction. In 2012 a total of 1,313 species has been listed (13 per cent of the world's avifauna), including 90 species which regularly occur in the Indian subcontinent. A book, the *Threatened Birds of Asia*, was published in 2001, which describes all Asian species at risk of extinction, highlighting the threats they face and the conservation measures proposed to save them. Similarly BNHS has recently published *Threatened Birds of India* edited by Dr. Asad Rahmani.

Overall, the subcontinent supports 164 (or 199 - Rasmussen & Anderton) endemic species, those found nowhere else, a total of over ten per cent of the region's avifauna. BirdLife International has identified eight centres of endemism lying within or mainly in the region, often called Endemic Bird Areas or conservation hotspots. These areas were identified throughout the world by analysing patterns of distribution of birds with restricted ranges, that is with breeding ranges below 50,000 sq.km. (about the size of Sri Lanka). The analysis showed that restricted range species tend to occur in places which are often islands or isolated patches of a particular habitat. These natural groupings of species are regarded as Endemic Bird Areas and are especially important for bird conservation. BirdLife published *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation* in 1998.

The wet lowland and montane rainforests of the Eastern Himalayas in India, Nepal and Bhutan (also extending into Myanmar and south-west China), form one Endemic Bird Area in the subcontinent, as they are extremely species-rich. Other isolated endemic-rich areas of rainforest are on the coastal flanks of the Western Ghats and in the Eastern Ghats.



Forest Owlet



Cheer Pheasant



Chestnut-breasted Partridge

are the Western Himalayas in India, Nepal and Pakistan, the Central Himalayas, the Assam plains which lie in the floodplain of the Brahmaputra in Bangladesh and India, and the Andaman and Nicobar Islands in the Bay of Bengal.

A total of 19 restricted range species occur only in the Eastern Himalayas. Half of them are considered at risk from loss or fragmentation of their habitat, and some are also threatened by hunting. Many of the birds are relatively poorly known because much of the area has long been inaccessible for political and logistical reasons. More bird surveys have been made in recent years and it is perhaps the most exciting area in the region for future work. One threatened species which would certainly benefit from further study is the enigmatic Chestnut-breasted Partridge [Red-breasted Hill Partridge] *Arborophila mandellii* which has only been recently reported from two or three localities in Arunachal Pradesh and one in Bhutan. It frequents dense undergrowth in broad leaved evergreen forest, and its habits have never been recorded in the wild.

The Rusty-throated Wren Babbler [Mishmi Wren] *Spelaeornis badeigularis* was, until recently, only known from a specimen collected in 1947 from the wet subtropical forests of the Mishmi Hills in eastern Arunachal Pradesh. It was recently rediscovered in the same area and its song and habits are now being documented. The Dark-rumped Swift [Darkbacked Swift] *Apus acuticauda* is a threatened species which is a breeding endemic in the region (and there are other records from Myanmar and Thailand) It is only known to breed at two sites in the Khasi Hills, Meghalaya, in cliffs and gorges and is presumed to breed in Mizoram. The true status and threats to this species are unknown.

There are 11 restricted range species in the Western Himalayas, including the probably extinct Himalayan Quail and three which are thought to be at risk of extinction: Western Tragopan *Tragopan melanocephalus*, Cheer Pheasant and Kashmir

Flycatcher [Kashmir Red-breasted Flycatcher] *Ficedula subrubra*. All three are threatened by habitat loss and deterioration, while the two pheasants also suffer from the effects of hunting. The rare and magnificent Western Tragopan inhabits dense undergrowth in temperate forests in Northern Pakistan and north-west India and occurs in at least seven protected areas. The Cheer Pheasant occurs very locally from Northern Pakistan and north-west India to west-central Nepal. It seems to favour early successional habitats, such as recently cleared areas with secondary scrub. It is found in several protected areas, but its future is by no means certain. The Kashmir Flycatcher breeds in mixed deciduous forests in Kashmir and the Pir Panjal range in north-west India and Pakistan, and winters in forest edges, gardens and tea estates in Sri Lanka and the Western Ghats. Once it was common in its breeding range, but it appears to have declined.

The Central Himalayas Endemic Bird Area supports three restricted range species, the Himalayan Monal Pheasant *Lophophanes nipalensis*, whose



Western Tragopan



Hoary-throated Babbler

range extends into the Eastern Himalayas, Spiny Babbler *Turdoides nipalensis*, and Nepal Wren Babbler *Pnoepyga immaculata*, which was described in 1991 from Nepal but is now known to occur west to Himachal Pradesh.

Sri Lanka has more endemic species, 26 (-33) than any other area in the region. Forest loss and disturbance have resulted in two of these species becoming seriously threatened and a number of others are in significant decline. Two species are endangered – the Serendib Scops Owl *Otus thilobhoffmanni* and the Sri Lanka Whistling Thrush [Ceylon Whistling Thrush] *Myophonus blighi*. The discovery of Serendib Scops Owl, which inhabits rain forests in the south-west of the island, was published in 2004 after several years of research by Deepal Warakagoda. The Sri Lanka Whistling Thrush is a shy bird inhabiting mountain streams running through fern-clad ravines and gorges in dense, moist hill forest. It is now rare and declining, and like a number of other Sri Lankan species has probably suffered from replacement of natural forests by monoculture plantations which lack the undergrowth it needs.

The Western Ghats support 17 - 22 restricted range species, of which seven are thought to be at risk of extinction; most are suffering to some extent from habitat damage and loss, mainly of forests. These species include the Nilgiri Wood Pigeon *Columba elphinstonii* and Black-chinned Laughingthrush *Garrulax cachinnans*, which are threatened by forest loss; and Nilgiri Pipit *Anthus nilghiriensis* and Broad-tailed Grassbird *Schoenicola platyurus*, which are threatened by changes in the upland grasslands.

The Andaman and Nicobar Islands form two Endemic Bird Areas and possess 18 (- 26) endemic bird species. Based on the latter figure 15 are found only on the Andamans, eight on the Nicobars and three on both groups of islands. The main conservation concerns are settlement by people from the mainland, who have cleared forest to farm, the development of infrastructure for the main-landers and commercial exploitation of the islands. BirdLife International considers that there are three globally threatened species on the islands: Nicobar Megapode [Megapode] *Megapodius nicobariensis*, Narcondam Hornbill *Rhyticeros narcondami*, and Nicobar Sparrowhawk *Accipiter butleri*. The Nicobar Megapode is a terrestrial bird, about the size of a domestic hen, which lives in undergrowth in thick forest adjacent to sandy beaches, and now appears to be restricted to the Nicobar Islands. The only immediate threat facing the megapode is habitat loss on the Nancowry group of islands. The Narcondam Hornbill is only found in evergreen forests on Narcondam Island in the Andamans. The island is less than 7 km<sup>2</sup> in area and currently uninhabited. A recent proposal to build a radar surveillance station on the island would have been a serious threat to the survival of the species, but was thankfully averted. The Nicobar Sparrowhawk is only definitely known from a few records from Car Nicobar and Katchall, where it is threatened. For general queries, contact [webmaster@press.princeton.edu](mailto:webmaster@press.princeton.edu)



Sri Lanka Whistling Thrush



Nilgiri Wood Pigeon







Manipur Bush Quail



Black-breasted Parrotbill



Bengal Florican



Black-necked Crane

All three species endemic to the Assam lowlands Endemic Bird Area are threatened. There have been no fully accepted published reports of the Manipur Bush Quail *Perdica manipurensis* since 1938, although a small group was reported in 2006. Formerly, this bush quail was described as “local” but not very rare in the tall damp grass and scrub of the foothills in Northeast India and Bangladesh. It may have suffered from drainage and destruction of its habitat and perhaps hunting. The other two species, the Marsh Babbler [Marsh Spotted Babbler] *Pellorneum palustre* and the Black-breasted Parrotbill [Gould’s Parrotbill] *Paradoxornis flavirostris* both

occur in reed beds and tall grass alongside rivers and marshes and must have suffered from damage and loss to their wetland and grassland habitats. Formerly, they were locally common, but there are very few recent records of either. The Assam lowlands are also a refuge for two globally endangered species: the Greater Adjutant [Adjutant] *Leptoptilos dubius*, a large stork, and the Bengal Florican *Houbaropsis bengalensis*, a bustard occupying wet grassland. Very few breeding sites of the stork are now known, the largest being in the Assam lowlands.

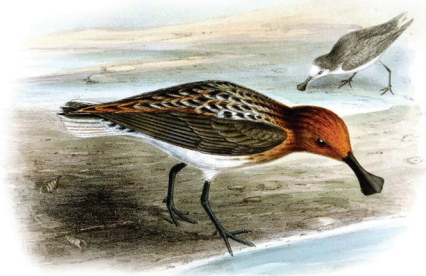
The bird habitats of the Indian subcontinent can be roughly divided into forests, scrub, wetlands (inland and littoral), marine, grasslands and agricultural. There is overlap of some habitats, for example mangrove forests can also be considered as wetlands, as can seasonally flooded grasslands. Many bird species require mixed habitat types, for example the Black-necked Crane *Grus nigricollis* which requires marshy grassland. The forests of the region are vitally important for many of its birds. Seven of the subcontinent’s eight Endemic Bird Areas are largely forested. Over half of the region’s globally threatened birds and two-thirds of its endemic birds are dependent on forests.

There is an immense variety of forest types in the region. Tropical forests range from coastal mangroves to wet, dense evergreen, dry deciduous and open desert thorn forests. In the Himalayas temperate forests include those of mixed broadleaves, moist oak and rhododendron draped with epiphytic mosses and lichens and dry coniferous forests of pines and firs. Forest resources are significantly declining throughout most of the region. The major threats are overexploitation for fuel wood, timber and fodder, overgrazing, conversion to agriculture or monoculture tree plantations and dam construction. Both the extent and quality of forest have declined. Forest with a crown density of 40 per cent or more covered 12.3 per cent of India in 2012, although this figure is disputed. In 2005 25.4 per cent of Nepal was covered with forest. Bhutan, however, still retains much of its forests relatively intact, with 69 per cent of its land area under forest in 2010, including 12.7 per cent of primary forests. The country possesses some of the best forest habitats left in the Himalayas.

Wetlands in the region are abundant and support a rich array of waterfowl, including grebes, pelicans, cormorants, ducks, geese, herons, egrets, storks, spoonbills, flamingos, cranes, rails, waders, gulls and terns. As well as providing habitats for breeding resident species, the subcontinent’s wetlands include

Northern Asia. The region possesses a wide range of wetland types distributed almost throughout, including mountain glacial lakes, freshwater and brackish marshes, large water storage reservoirs, village tanks, saline flats and coastal mangroves and mudflats. Wetland destruction and degradation in the region are reducing the diversity of wetlands and population numbers of many bird species. Major direct threats are over-exploitation of wetland resources, hunting, dam-building, and pollution from sewage and industrial effluents, siltation and agricultural fertilisers and pesticides. A total of 22 of the subcontinent's wetland bird species is globally threatened including the Spoon-billed Sandpiper *Eurhynorhynchus pygmeus* and Baer's Pochard *Aythya baeri*, which are Critically Endangered. Awareness of the problems facing wetlands is increasing. In India, for example, this has resulted in the setting up of a National Commission on Wetlands, Mangroves and Coral Reefs to advise the government on wetland conservation. A detailed directory of Indian wetlands compiled by WWF India and the Asian Wetland Bureau describing the values, threats and conservation measures was published in 1993.

The subcontinent's most important wetland sites include Chilika Lake, a brackish lagoon in Odisha on the east Indian coast, which supports one of the largest concentrations of migrant waterfowl in the region. Wetlands in the Indus valley in Pakistan form another major wintering refuge and staging area for a wide variety of waterfowl, notably the Chashma Barrage reservoir and Haleji Lake. The Sundarbans in the Ganges-Brahmaputra delta in the Bangladesh and India include one of the largest contiguous areas of mangrove forest in the world. The mangroves support a rich and diverse avifauna. Although no data are available, the coastal mudflats and estuaries are thought to be of great importance as staging and wintering areas. The extensive seasonally flooded manmade lagoons of Keoladeo Ghana in Rajasthan are particularly diverse – at least 332 bird species have been recorded there. Keoladeo is internationally renowned, especially for its wintering flock of the endangered Siberian Crane *Grus leucogeranus*, where it was the only known site for the species in the region. Very sadly, this flock declined from 125 in the 1960s to just six birds in the winter of 1991/1992, and none has been reported in the region since. Hunting in Afghanistan may have caused the decline, although the species' feeding habitat at Keoladeo has been invaded by a thick growth of grasses. The vast saline flats of the Rann of Kutch in north-west India are important for migratory waterfowl and support breeding colonies of the Lesser Flamingo *Phoenicopterus minor*, herons and egrets. Wetlands in the moist tropical and subtropical forests of Assam and Arunachal Pradesh support two globally endangered species: the shy and little known White-bellied Heron [Great Whitebellied Heron] *Ardea insignis* for which there are very few records and the White-winged Duck *Ardea insignis*.



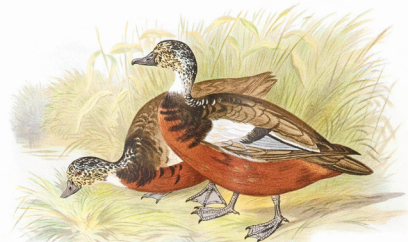
Spoon-billed Sandpiper



Baer's Pochard



Siberian Crane





Lesser Florican

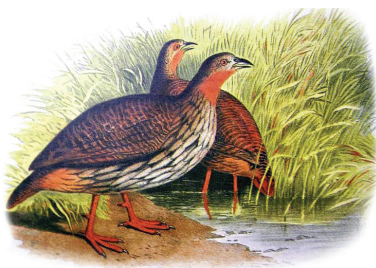
*Cairina scutulata*, which was formerly common in parts of Northeast India, but has suffered a major decline this century and is now rare. Other wetlands in the region valuable for birds include the extensive and largely untouched mangroves of the Andaman and Nicobar Islands; the marshes, *jheels* and Terai swamps of the Gangetic plain; Point Calimere and Pulicat Lake on India's east coast; the Haor Basin of Sylhet and east Mymensingh in north-east Bangladesh; and the Brahmaputra floodplain in the Assam lowlands.

The most important grasslands for birds in the subcontinent are the seasonally flooded ones occurring across the Himalayan foothills and in the floodplains of the Indus and Brahmaputra rivers; the arid grasslands of the Thar Desert, and grasslands in peninsular India. These lowland grasslands support distinctive bird communities with a number of specialist endemic species. They have been greatly reduced, fragmented and degraded by large scale expansion of agriculture, drainage, changes in land use and overgrazing. As a result most of the region's endemic grassland birds are seriously at risk.



Great Indian Bustard

These threatened species include two bustards: the Lesser Florican *Sypheotides indicus* and the Great Indian Bustard *Ardeotis nigriceps*. Once the Lesser Florican was the most common and widespread of Indian bustards, but it is now the most threatened; it is restricted as a breeding bird to Western India. The late Ravi Sankaran, who carried out extensive studies on its ecology, distribution and status, spearheaded conservation measures to save both the florican and its grassland habitat. He emphasised that the grasslands used by the breeding floricans are crucial to the rural economy. An action plan was developed with specific recommendations for the sustainable utilisation of grassland resources, reconciling human needs and conservation of the Lesser Florican.



Swamp Francolin

The stately great Indian bustard inhabits wide open grasslands and cultivated areas in semi-desert. A century ago it ranged from Pakistan east to West Bengal and south through the peninsula to Madras, but now it is confined to grasslands mainly in protected areas in Western India. A Bombay Natural History Society (BNHS) team carried out detailed studies of the status, ecology and needs of the species during the 1980s and made comprehensive recommendations for its conservation. Sadly, the Great Indian Bustard has continued to decline and by 2008 was reduced to about 300 individuals.

The primary cause has been habitat destruction.

Another endemic grassland species is the Swamp Francolin [Swamp Partridge] *Francolinus gularis*, which is confined to the Ganges and Brahmaputra river basins, where it occupies tall wet grasslands and swamps.

The other threatened grassland birds restricted to the subcontinent are Bristled Grassbird [Bristled Grass Warbler] *Chaetornis striata* and Finn's Weaver [Finn's Baya] *Ploceus megarhynchus*. Both inhabit wet grasslands and are threatened by destruction and modification of their habitat.

Scrub has developed in the region where trees are unable to grow either for general queries, contact webmaster@princeton.edu, such as at the edges

of wetlands or in seasonally inundated floodplains. Scrub also grows naturally in extreme climatic conditions, such as in semi-desert or at high altitudes in the Himalayas. In addition, there are now large areas of scrubland in the region where forests have been over-exploited by fodder and fuel collection or grazing.

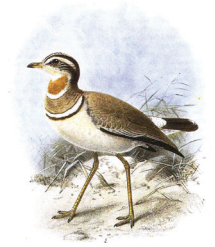
Relatively few birds in the subcontinent are characteristic of scrub habitats alone, but many are found in scrub mixed with grasslands, in wetlands or at forest edges. Rather less than a third of endemic birds in the region occupies habitats wholly or partly comprising scrub. One of the most interesting is the endangered Jerdon's Courser *Rhinoptilus bitorquatus*, known historically from a few records in Andhra Pradesh. It was presumed to be extinct until it was rediscovered in 1986 by BNHS biologist Bharat Bhushan. Since then, small numbers have been located at sites in the Lankamalai and Veliconda hills in Andhra Pradesh, where it inhabits scrub on rocky foothills. Bharat Bhushan has highlighted the conservation issue facing the species. Development activities pose major problems. As a result of lobbying, a planned irrigation scheme which would have affected the courser's range has been diverted. Two protected areas have been gazetted there, but comprehensive management for the courser's habitat in these areas is needed.

Stoliczka's Bushchat [Stoliczka's Whinchat] *Saxicola macrorhynchus* occupies scrub habitats in desert. It is virtually endemic to the region, with records from north-west India, Pakistan (where it may now be extinct) and two old records just over the border in Afghanistan. Systematic searches by a team led by Asad Rahmani in Rajasthan, in 1993 and 1994, showed that the species was fairly common in some areas, so it may not be as threatened as previously thought. However, it no longer occurs in semi-arid areas, and its stronghold is now the waterless sandy plains of the Thar Desert. The reasons for its range contraction are unclear, but could partly be due to habitat alteration, as improved irrigation has converted large tracts of semi-desert to cultivation; however, other factors must be involved, as uncultivated semi-desert areas are unoccupied by the bushchat. Asad Rahmani concluded that more work was needed to determine the species' ecological requirements and local movements (if any), to enable a conservation strategy to be developed.

Seabirds in the region comprise the skuas, petrels, shearwaters, frigatebirds and boobies, most of which are passage migrants or vagrants, gulls (mainly winter visitors), terns and noddies (mainly resident, winter or summer visitors or passage migrants), tropicbirds (residents and passage migrants), and phalaropes (one winter visitor and one vagrant). As a result of increased watching several seabirds have been added to the region's avifauna in recent years, notably the threatened Barau's Petrel *Pterodroma baraui*, which was first described for science only in 1963. It is known only from the Indian Ocean, where it breeds on the Mascarene Islands. In recent years there have been sightings between the Maldives and Lakshadweep and off the Sri Lankan coast. Seabird breeding colonies in the subcontinent are chiefly concentrated in the Maldives and Lakshadweep but, sadly, intense persecution and egg collection is significantly reducing breeding success. Terns and noddies are by far the most numerous breeding species, with the commonest being the Brown Noddy [Noddy Tern] *Anous stolidus* and Sooty Tern *Onychoprion fuscatus* in Lakshadweep and Black-naped Tern *Sterna sumatrana*.



Finns' Weaver



Jerdon's Courser



Ferdinand Stoliczka



Barau's Petrel





Sooty Tern



Speckled Wood Pigeon



Grandala



Pied Thrush



European Bee-eater

The large majority of species in the region (about 1000 species) are resident, although the numbers of some of these are augmented by winter visitors breeding further north. Some residents are sedentary throughout the year, while others undertake irregular movements, either locally or more widely in the region depending on water conditions or food supply. The Speckled Wood Pigeon *Columba hodgsonii*, for example, appears wherever its favoured trees have ripe fruit. Many Himalayan residents are altitudinal migrants, the level to which they descend in winter frequently depending on weather conditions. For instance, the Grandala [Hodgson's Grandala] *Grandala coelicolor* summers up to 5,500 m and chiefly winters down to 3,000 m., but has been recorded as low as 1,950 m. in bad weather. A number of other residents in the subcontinent breed in the Himalayas and winter further south in the region, including the endemic Pied Thrush [Pied Ground Thrush] *Zoothera wardii* which spends the winter in Sri Lanka.

There are 18 species that are exclusively summer visitors to the region. Most of these, such as the Lesser Cuckoo [Small Cuckoo] *Cuculus poliocephalus* and Common Swift [swift] *Apus apus* winter in Africa. Several species breed chiefly to the north and west of the subcontinent and just extend into Pakistan and north-west India, for instance the European Bee-eater *Merops apiaster*. Some species move south-eastwards, perhaps as far as Malaysia and Indonesia, for example the White-throated Needletail [White-throated Spinetail Swift] *Hirundapus caudacutus* and Asian Emerald Cuckoo [Emerald Cuckoo] *Chrysococcyx maculatus*.

The subcontinent attracts about 150 winter visitors, some of which are also passage migrants. There is also a small number of species which are *only* known as passage migrants. The winter visitors originate chiefly in Northern and Central Asia and include grebes, ducks, geese, herons, storks, pelicans, birds of prey, cranes, waders, rails, gulls and terns. Passerines include pipits, wagtails, accentors, thrushes, shrikes, warblers, finches and buntings.

Information on migration routes in the region is still patchy but ringing recoveries have shown that the majority of winter visitors to the subcontinent enter via the Indus plains. The Indus valley has been internationally acknowledged as the fourth major migratory flyway for waterfowl in the world. There is less information about migration routes in the north-east of the region, but the Brahmaputra river and its tributaries are thought to form a flyway for birds from north-east Asia. There is increasing evidence suggesting that some birds breeding in the Palearctic, mainly non-passerines, migrate across the Himalayas to winter in the subcontinent. Birds have been seen flying over the highest regions of these ranges, for example a flock of Bar-headed Geese *Anser indicus* was recorded flying as high as 9,375 m. over Sagarmatha in Nepal. Other birds follow the main valleys, such as those of the Kali Gandaki, Dudh Kosi and Arun valleys in Nepal. Birds of prey, especially *Aquila* eagles have also been found to use the Himalayas as an east-west pathway in autumn. The wintering area of these birds is poorly known but is assumed to be the plains of north-west India and Pakistan. The Spot-winged Starling [Spotted-winged Stare] *Saroglossa spiloptera* also undertakes east-west movements along the Himalayas, and it is possible that other species undergo similar migrations. A number of pelagic and coastal passage migrants and wintering species travel by oceanic or coastal routes. One identified coastal

and Pulicat Lakes. Migration patterns of seabirds are especially poorly understood, but there is now evidence that some species occur more regularly than previously thought, especially around the time of the south-west monsoon. In Sri Lanka a mass migration of Bridled Terns [Brown-winged Tern] *Onychoprion anaethetus*. takes place in autumn; an estimated half a million or more move southwards off the south-west coast within sight of land every year. A few species which breed outside the region and winter in East Africa migrate through Pakistan and north-west India; for example, the Rufous-tailed Rock Thrush [Rock Thrush] *Monticola saxatilis* and Red-backed Shrike *Lanius collurio*. As they mainly occur on autumn passage; they presumably use a different route in spring. In addition to the subcontinent's residents, summer and winter visitors and passage migrants, about 100 species of vagrants have been recorded.

The numbers and distribution of bird populations in the Indian subcontinent are changing, largely because of pollution and land use changes, which have often resulted in the losses of natural habitats, such as forests and wetlands.

In Europe, such factors have been shown to cause widespread declines in numerous bird species, including many which were previously common. Could the same be happening in the Indian subcontinent? This seems likely, but we can only speculate on the changes. Apart from the annual waterfowl counts organised by Wetlands International and some studies on rare species, there is a lack of data for most birds, especially for common and widespread species. The Indira Gandhi Nahar Project, the largest irrigation canal system in the world, in the Thar Desert, has undoubtedly had a profound effect on many desert birds. Asad Rahmani has shown that the canal and associated seepage wetlands and plantations alongside canals have provided suitable habitats for generalist species such as some waterfowl, herons, babblers, munias and parakeets, but the specialist species of the desert such as the Great Indian Bustard and sandgrouse have been edged out.

The protection of wildlife has a long tradition in the history of much of the region. Indeed one of the world's first wildlife sanctuaries was established in the third century BC by King Devanampiyatissa in Sri Lanka. Despite the enormous pressures created by being the second most populated country on Earth, wildlife conservation in India is of great national concern. Particular emphasis is being given to protecting sites of high species diversity and endemism, such as the Western Ghats, as well as ecologically fragile areas. The recently revised protected areas system in Bhutan is especially impressive, covering 22 per cent of the country and representing all of the country's major ecosystems. Large proportions of Nepal (23 per cent) and Sri Lanka (14 per cent) are also covered by protected areas. The enlightened and benevolent attitudes to wildlife of Hinduism and Buddhism have undoubtedly helped to conserve the rich natural heritage of the Indian subcontinent, which still remains today.

Note: The English names used are those preferred by the authors; the alternative names in square brackets are from *Ripley's Synopsis of the Birds of India*.



Asian Emerald Cuckoo



Rufous-tailed Rock Thrush



Red-backed Shrike



Red Avadavat

The maps in the book give the range of the species in the subcontinent. The red areas indicate resident birds. The blue area denotes non-breeding winter visitors.

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