

**Handbook on
Indian Wetland Birds
and their Conservation**

**Arun Kumar
J.P. Sati
P.C. Tak
J.R.B. Alfred**





Photo : J. Wijpekema

Malayan Night Heron

Handbook on Indian Wetland Birds and their Conservation



**Arun Kumar
J.P. Sati
P.C. Tak
and
J.R.B. Alfred***

Zoological Survey of India, 218 Kaulagarh Road, Dehra Dun 248 195

*Zoological Survey of India, M-Block, New Alipore, Kolkata 700 053



Zoological Survey of India
Ministry of Environment and Forests
Government of India
Kolkata-700 053

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Red-footed Booby



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मा निषाद प्रतिष्ठात्वमागमद् शाश्वतीसमा ।
यद् क्रौञ्च मिथुनादेकम् अवधिकाम मोहितम् । ।

*“ ma nishad pratishthatwamagmad shashwatisama
yad krouncha mithunadekam awadhikam mohitam ”*

A Shloka from the Ramayana where Maharishi Valmiki is cursing the hunter
who killed the Sarus in courtship



Photo: K. S. Gopi Sundar

Pair of Sarus Cranes giving a unison call



जहाँ है हनियाली ।
वहाँ है नुशाहली ॥



Picture of Flock of Pink-headed Duck is of November 1929, possibly by the famous Indian Ornithologist Salim Ali, at Alfred Ezra's waterfowl collection in England. It seems that the last Pink-headed Duck died in 1936 in Delacour's collection, Cleres, France. The black and white photograph was coloured for the book of Frank Todd (1996).

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BirdLife International, Wellbrook Court, Girton Road, Cambridge CB3 0NA, UK
Tel. +44 (0)1223 277318 Fax +44 (0)1223 277200 Email birdlife@birdlife.org
www.birdlife.org

FOREWORD

India is a wonderful place for waterbirds! Visitors are often amazed at the ability of wildlife, including large waterbirds and birds-of-prey, to co-exist with man in intensively utilised landscapes. Species such as Spot-billed Pelican *Pelecanus philippensis*, Greater Adjutant *Leptoptilos dubius*, Black-bellied Tern *Sterna acuticauda* and Indian Skimmer *Rynchops albicollis* were formerly widespread in tropical Asia, but have declined drastically in South-East Asia and southern China, leaving India and neighbouring countries as their main strongholds. Many other species occur in greater abundance in India than anywhere else. The protection and management of wetlands in India is therefore vital for the long-term survival of many wetland species, and for the maintenance of waterbird populations.

The Zoological Survey of India and the authors of the book are to be congratulated on the production of this new handbook. It not only includes the plates, distribution maps and text required to identify and enjoy watching wetland birds, but also provides a wealth of information relevant to their conservation. Many hundreds of birdwatchers in India regularly participate in the Asian Waterfowl Census, and this handbook will be of great benefit to their efforts. It will both help them to identify the birds that they are counting, especially to pick out some of the more 'difficult' species, but will also make clear how their efforts can feed into wetland conservation. At the local level, high-quality information on the numbers and distribution of waterbirds can help guide wetland management. At the national and global levels, it is vital for the successful implementation of the Ramsar Convention on Wetlands, the Convention on Biological Diversity and other international agreements.

As India's economy grows, and its human population increases, the pressures on the natural environment will become greater than ever before. Many wetlands are being converted for agriculture and other uses, increasing use of agrochemicals is causing pollution, and excessive extraction of water from waterways is causing many wetlands to dry up more frequently than in the past. The challenge to conservationists is huge, but this handbook will be an invaluable new tool in our work.

Michael J. Crosby
Research and Data Manager
BirdLife International Asia Division
BirdLife International, U.K.

Honorary President: HIH Princess Takamado of Japan
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Wetlands International - South Asia
A-25 (2nd Floor), Defence Colony
New Delhi- 110 024
India

Ph. : +91-11-24338906, 30927908
Fax. : +91-11-24338906
e-mail : wisaind@del2.vsnl.net.in
wisa@hathway.com
URL : <http://www.wetlands.org>

FOREWORD

The distinctive call of a Redwattled Lapwing as it flies overhead in the moonlight, a flock of cranes bathing at the edge of a lake at midday and the cry of a River Tern flapping along the river in search of a fish; waterbirds have a mysterious way of influencing the way I think and act. Some people are moved by colourful ducks floating gracefully across the water and others by multitudes of shorebirds twisting and turning across the sky in military precision. The world of waterbirds is truly an amazing and beautifully diverse one adding colour and spirit to our lives.

While it is important that we enjoy their beauty, we need to realise that across India and indeed the rest of the world, numbers of many waterbird species are declining and becoming regionally or globally threatened due to our direct and indirect actions. We appear to have lost the famous Pink-headed Duck in the last century and need to take measures to prevent other species from following suite.

Increasing awareness of waterbirds is a crucial step in promoting their conservation. Learning more about the world of these wonderful creatures and understanding their habits becomes a pleasure when information is presented in a form that captures our interest and educates us at the same time. In presenting good quality photographs to guide in species identification and information on their habit, distribution and conservation, this book will certainly meet the needs of people in India. The Zoological Survey of India and the authors have also aptly demonstrated the need to co-operate and share our knowledge by producing a book with contributions from people around the globe.

As an organisation that promotes the conservation of wetlands and their biodiversity through research and information exchange, Wetlands International values the contribution of the Zoological Survey of India in producing this excellent reference book, and recommends it to all those who are interested in learning about waterbirds and wetlands and playing a role in their conservation. We foresee this book providing valuable support to the development of local initiatives to conserve waterbirds and to monitor waterbirds through programmes such as the Asian Waterbird Census. As new initiatives in promoting migratory waterbirds in the Central Asian Flyway and their wetlands take off, this book will provide a valuable tool for people in India and its neighbours.

Taej Mundkur
Coordination Officer,
Asia-Pacific Migratory Waterbird
Conservation Strategy
Wetlands International

Mission : To sustain and restore wetlands, their resources and biodiversity for the future generations through research, information exchange and conservation activities, worldwide.





AUTHORS' PREFACE

The birds which inhabit wetlands for nesting, feeding and roosting are broadly defined as waterbirds. This includes groups popularly known as the waterfowl, waders/shorebirds and seabirds. In addition, there are numbers of other birds, such as kingfishers, raptors and some passerines, which also ecologically depend on wetlands and are known as wetland dependent and associated birds. In the present Handbook, the above defined waterbirds, wetland dependent and associated birds have been termed together as '*wetland birds*'

Wetland birds play a significant role in human lives culturally, socially, scientifically and as a food resource, besides being ideal indicators of the health of a wetland. These birds have obviously attracted man since time immemorial and find mention in many ancient epics.

Wetland birds are an important component of wetland ecosystem, as they form vital links in the food webs. Though some wetland birds are considered to be crop pests, nevertheless many of them play an important role in the control of agricultural pests. Waterbirds often occur in amazing numbers on wetlands and are the best indicators of the biodiversity richness of these productive ecosystems. Waterbirds are probably the most prominent groups which attracts people to wetlands.

Many waterbirds are migratory, undertaking annual movement in generally well defined flyways, between their breeding and non-breeding grounds. This along with various other facts such as their attractive colouration, numerical abundance, and value as food, have made these birds a favoured subject for research, survey, education and recreation throughout the world. During their long annual migration, the waterbirds regularly cross national and inter-national boundaries. The network of experts on every continent contribute to co-ordinated waterbird monitoring programmes, which makes waterbirds one of the most comprehensively studied animal groups on earth. The first to be mentioned in the title of an important inter-governmental treaty: "*The Convention on Wetlands of International Importance, especially as Waterfowl Habitat*", now better known as the Ramsar Convention on Wetlands (Wetlands Int., 2002). The convention makes it obligatory on member nations to preserve the ecological functions of the wetlands and their economic, cultural, scientific and recreation values. India became a signatory to this convention in 1981.

It is well documented that earlier civilizations were closely associated with wetland habitats such as the flood plains of the Indus, Ganga and Brahmaputra rivers, because of their significance for food, livelihood, navigation and the security of the human habitations near them. Nevertheless, like the tropical forests, the wetlands in tropical countries are also one of the most threatened habitats due to unrelenting human activities such as agriculture and development.

Clearance, conversion and degradation of natural forests, grasslands and wetlands are by far the most important causes of endangerment in the Asian region, affecting nearly all species classified as Critical, Endangered, and Vulnerable and all other species that are relatively more common, but are also declining. Exploitation for human use is the most common category of threat. The main pressure on Asian waterbirds is wetland drainage and conversion, including the infilling (or 'reclamation') of intertidal coastal wetlands, principally for agriculture and aquaculture.

Approximately, 12% of Asian birds are globally threatened with extinction. At least 20% of the threatened bird species inhabit wetlands in Asia. This is far more than the 10% of globally threatened waterbirds.

During the last three decades or so, however, increased attention to the conservation of wetlands has resulted in immense research, especially on the ecology of wetland birds: *one of the best indicators of the health of a wetland habitat*. This has been instrumental in the publication of many books on the wetland birds of many countries in Europe, Asia and the Americas.

Both the Ramsar Convention on Wetlands and the Convention on Migratory Species depend heavily on objectively collected data on waterbird populations around the globe, which the wetland international has been chronicling as global waterbird population estimates every two years. It provides the ground information to be used in important criteria for protecting sites, such as 1%, threatened species and the management of populations within the member countries. These data are generated by an annual waterfowl census across the globe by a network of volunteers. The Asian Waterfowl Census (AWC) initiated in 1987 has caught the fancy of hundreds of birdwatchers in India, as in many Asian countries, and has become a regular prominent annual event. This zeal cannot be only a rich source of baseline data on population and distribution of wetland birds but also an effective tool for monitoring and protecting wetlands. It is all the more relevant in a tropical country like India where vast populations of migratory waterbirds abound during the winter.

Recently, Manakadan *et al.* (2003) have chronicled the post-independence history of Indian ornithology, with a detailed account of the ornithological researches carried out during more than fifty years. The foremost contribution has obviously been by Salim Ali and Ripley in their ten volume compendium on the birds of India and Pakistan (Ali and Ripley, 1968-74). Subsequently, many books published under the auspices of the Bombay Natural History Society further added to our knowledge of Indian birds. Recently, Grimmett *et al.* (1998) updated the account of birds in the Indian subcontinent. Another recent noteworthy addition to the birds of the Indian sub-region has been "A field guide to the birds of India, Sri Lanka..." by Kazmierczak and van Perlo (2000). Both these publications have dealt extensively with the birds of south Asia.

Watching wetland birds is equally fascinating and educative for professional ornithologists as well as amateurs, resulting in many of us flocking to bird watching to the nearest wetland. Nevertheless, due to innumerable variations in colour pattern and plumage of adults (male and female) and juveniles during their breeding and non-breeding seasons, changes in their habitat preferences, behaviour and season of occurrence, etc., it is not easy to identify these birds, and need for a good field guide is always felt. Therefore, the first attempt by the authors to bring out a field guide on Waterbirds of Northern India (Alfred *et al.*, 2001) was well taken by bird watchers. The encouragement from fellow birders further prompted us to venture into the present publication, *Handbook on Indian Wetland Birds and their Conservation*.

The Handbook provides extensive information on 310 wetland bird species, including 243 waterbirds and 67 wetland dependent and associated birds listed from India; of these, 51 species are globally threatened. Diagnostic field characters, habitats, habits, food, voice, status and distribution in India and south Asia, as well as their biogeographical range, have been covered in the present study. Each species is provided with photograph (s), not necessarily taken in India, and drawing (s), highlighting the diagnostics, and a coloured distribution map, not necessarily to scale.

Key wetlands for threatened birds have been described. Values of wetlands and threats to them and wetland birds have been discussed. A chapter has been devoted to the Wetland Protected Area Network in India that includes Wetland Sanctuaries, National Parks, Ramsar, Montreux and World Heritage Sites in India, as well as Important Bird Areas (IBAs), and Sacred Wetlands. National policies and legislation and international conventions/agreements on the conservation of birds have been discussed under Framework for Waterbird Conservation. These include the Convention on Conservation of Wetlands, Convention on Migratory Species, Convention on Biodiversity, CITES and Bilateral Agreements with Russia on migratory species.

Conservation strategies have been discussed in accordance with Wetlands International, and a chapter on saving threatened birds of India has been provided. Information on Government and Non Government Organizations working on Wetlands and bird conservation in India has also been provided for easy reference.

The handbook is a true example of co-operation by birders internationally who have freely contributed their time and material, including photographs, in its preparation. The Zoological Survey of India in accordance with its aims and objectives is contributing by subsidising the cost of this Handbook.

March, 2005

Authors
Zoological Survey of India



Photo: Bhimesh Bhandari

Pinkish Stone and Ash Regent Jay, Dera, Durr

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The acceptance of our earlier efforts in preparing the book on the *Waterbirds of Northern India* encouraged us to undertake the present study. As we progressed on this project, we realized that perhaps without the unstinted support from fellow birders across the globe, it would not have been possible to produce the handbook in its present form. In right earnest this handbook belongs to each one of them.

The treatise of Baker (1922-30) and Ali & Ripley (1968-74) provided the basic data source, which has been further updated from Grimmett *et al.* (1998), Kazmierczak and ven Perlo (2000), BirdLife International, U. K. (2001, 2003) and Wetlands International, The Netherlands (2002).

Taej Mundkur and David Li, Wetlands International helped in many ways and permitted the free use of material from the following Wetlands International's publications, namely, *Asia-Pacific Migratory Waterbird Conservation Strategy 2001-2005*, *Waterbird Population Estimates 3rd Edition*, *results of the Asian Waterbird Census: 1997-2001*, and *Socio-economics of Wetlands*. Taej Mundkur went through the entire draft manuscript critically, made exhaustive comments and offered many of his unpublished observations, besides contributing a *Foreword*.

Richard Thomas and M. J. Crosby, BirdLife International have kindly provided support throughout the project and reviewed the draft manuscript. Further, Mike Crosby not only provided the *Foreword* but also permitted us to use the material from BirdLife International book on *Saving Asia's threatened birds : a guide for government and civil society*. Our deep thanks are due to both.

S. Balachandran, Bombay Natural History Society kindly went through the draft manuscript and readily accepted our request to contribute a note on importance of Bird Ringing in ecological studies on waterbirds. B. C. Choudhury, Wildlife Institute of India (WII), Dehra Dun reviewed the draft manuscript and gave many suggestions. K. S. Gopi Sundar, Indian Cranes and Wetlands Working Group, New Delhi checked the chapters on cranes and storks and helped the authors in getting permission from International Crane Foundation (ICF) and IUCN for using cranes' photographs and updated route maps. Rishad Naoroji kindly reviewed the text on raptors. Yogesh Gokhale, Indian Institute of Sciences, Bangalore readily agreed to our request to contribute a write up on sacred wetlands. From WII Qamar Qureshi, J. S. Kathayat and Panna Lal, very patiently exceeded to our whims of creating a database in GIS domain on the wetland protected areas in India, while V. B. Mathur provided the maps of biogeographical zones and provinces in India. S. A. Hussain gave many valuable suggestions. Asad R. Rahmani, Bombay Natural History Society, and member 4th Session of Indo-Russian Working Group provided its protocol and the list of migratory wetland bird species under the revised agreement.

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Rati Ram, Publication and Production Officer, Zoological Survey of India, Kolkata over saw the printing of the book. Colleagues at Zoological Survey of India, Dehra Dun helped in various ways. We appreciate the patience and keenness of our printer, Shiva Offset Press, Dehra Dun who have taken extra care to print the Handbook. For this we would like to thank Abhimanyu Gehlot and his team.

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Authors

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The first objective of this handbook is to help birders in field as an effective guide for the identification of Indian Wetland Birds. To achieve this goal, the authors are greatly thankful to generous and extensive contribution of excellent photographs by internationally renowned bird photographers. Richard Thomas, BirdLife International very kindly co-ordinated with various photographers across the globe for arranging the photographs for the Handbook. The first author is personally extremely grateful to him and Gina Pfaff for this favour. Krys Kazmierczak, through Oriental Bird Club allowed the use of a large number of photographs, which have been contributed to OBC Image Database. Alison Brown, Royal Society for Protection of Birds, U.K. arranged images of two species for which grateful thanks are due to her. IUCN, Gland, Switzerland and International Crane Foundation, Wisconsin, USA permitted us to use their photographs and migratory route maps of Indian crane species. Gehan de Silva Wijeyeratne, Jetwing, Sri Lanka and Jon Hornbuckle largely contributed their bird images for the handbook for which special thanks are due to both. We are especially grateful to Frank Todd for having contributed the picture of the flock of Pink-headed Duck taken by eminent Indian ornithologist Salim Ali in 1929 in England at Alfred Ezra's famous waterfowl collections. Lalitha Vijayan, SACON, has contributed perhaps the first ever photograph of the endemic Andaman Crake. Vijay Cavale contributed photographs from his website www.Indiabirds.com.

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Authors



How to use this book

(i) Data presentation

Though many nomenclatures are in use for the birds of the Indian subcontinent, the present authors have followed that of Manakadan & Pittie (2001) '*Standardised Common and Scientific Names of the Birds of the Indian Subcontinent*'. For working convenience of readers, however, the nomenclature of Indian birds [Inskipp, Lindsey and Duckworth, 1996 (*An Annotated Checklist of the Birds of the Oriental Region*)] has also been provided where it differs from Manakadan & Pittie (*l.c.*).

Species header : A colour-coding system is used to indicate the status of each species, for example: *Red header* for globally threatened species; *Orange header* for near threatened species; and *Black header* for the rest. Each header begins with a serial number in the present handbook, followed by its serial number in *Handbook of the Birds of India and Pakistan...* by Ali and Ripley (volumes 1-10; 1968-1974). Common name and scientific name are after Manakadan and Pittie (2001); however, wherever it differs from Inskipp *et al.* (1996), that name is given, too, since this nomenclature is still widely prevalent in India. This is followed by an indication of size by comparing it with another common bird, its approximate length in centimetres (*which refers to length from tip of bill to tip of tail*), multifold status (conservation, residential and abundance), and feeding habit. The threat status of each species is detailed by using various IUCN threat categories (2001). The residential and abundance status is with their various sub and sub-sub categories. The plate and figure number is presented within bracket at the end of the header.

The description of each species begins with its diagnostics, followed by its voice, habitat, habits, food, status and distribution, remarks (if necessary), and threshold number (wherever available).

The identification of a bird is generally based on a combination of various characteristics. Even experts do not depend on plumage alone but also take into account many other characteristics, such as overall colour, habitat, season and behaviour when feeding, flying, displaying or flocking. This handbook displays and gives information on as many as possible of these essential clues for identifying waterbirds.

Photographs highlighting bird's diagnostics, sexual dimorphism, seasonal morphs, juveniles and adults have also been provided.

Line drawings with key parts of the waterbirds have been given to facilitate understanding of the common scientific terms used in diagnostics of each species.







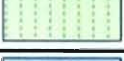
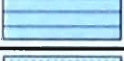













At least one profile of every species is illustrated by a drawing to a marked scale. This standard illustration shows the bird in a characteristic pose; in some cases the flight posture of the species, showing both dorsal and ventral views, is painted on a smaller scale. Important variations in the appearance of the species are included, whether between male and female, adult or juvenile.














(ii) Distribution maps

Coloured distribution maps have been provided for each species. The purpose of the maps is to illustrate the geographical range occupied by each species in India. Although care has been taken to provide precise extent of occurrence, however, the small size of the maps does not allow extreme precision. The maps are not to scale.

Four colours are used on the maps: red represents the geographical area normally used by the species for breeding (summers), blue represents the geographical area used in the non breeding season (winters), and green indicates areas where the species is present all year round, while orange represent the areas where species is in passage either in autumn or spring. The following different symbols are used to indicate the extent of distribution and extent of population.

Symbols used :

	Probably extinct
	Critical
	Vagrant
	Very Rare
	Rare
	Resident
	Occasional Resident population
	Winter migrant
	Occasional winter migrant population
	Summer visitor
	Passage migrant
	Isolated population (resident)
	Isolated population (winter)
	Isolated population (summer)
	Isolated population (passage)
	Isolated record (resident)
	Isolated record (winter)
	Isolated record (summer)
	Isolated record (passage)
	Isolated record (unspecified season)
	Small isolated population

	Isolated records without specific locality (resident)
	Isolated record(s) without specific locality (winter)
	Isolated record(s) without specific locality (summer)
	Isolated record(s) without specific locality (passage)
	Isolated record(s) without specific locality and season
	Occasional breeding/ has bred
	Possible breeding
	Mass summer influx
	Occasional small winter migrant population
	Occasional small summer migrant population
	Occasional small resident population
	Globally Threatened (GT)
	Near Threatened (NT)

(iii) Terms and abbreviations used

♂	Male
♀	Female
C	Carnivorous
H	Herbivorous
O	Omnivorous
juv.	Juvenile
imm.	Immature
br	Breeding
nbr	Non-breeding

(I) Inskipp, T. *et al.* (1996) *An Annotated Checklist of the Birds of the Oriental Region.*

GT	Globally Threatened
Cr	Critical
En	Endangered
Vu	Vulnerable
CD	Conservation Dependent
NT	Near Threatened
DD	Data Deficient
DEC	Declining

EXT	Extinct
INC	Increasing
STA	Stable
E	Endemic
RRS	Restricted-Range Species
BRS	Biome-Restricted Species
R	Resident
R/LM	Resident with local movements
R/LM/SM	Resident with local as well as summer movements
R/AM	Resident with altitudinal movements
R/AM/WM	Resident with altitudinal movements as well as with winter influx
R/SM	Resident with summer influx
R/SM/WM	Resident with summer and winter movements
R/WM	Resident with winter influx
R/WM/AM	Resident with winter influx as well as altitudinal movements
R/WM/SM	Resident with winter influx as well as summer movements
R/WM/LM	Resident with winter influx as well as local movements
R/WM/PM	Resident with winter influx as well as passage movements
R/AM/WM/PM	Resident with altitudinal, winter and passage movements
WM	Winter migrant
WM/R	Largely winter migrant and partly resident
WM/PM	Winter migrant as well as passage migrant
PM	Passage migrant
VCom	Very common
Com	Common
LCom	Locally common
UnCom	UnCommon
Ra	Rare
VRa	Very rare
Va	Vagrant
?	Status not known
2	Andaman
6	Assam Plains
05	Eurasian High Montane (Alpine and Tibetan)
08	Sino-Himalayan Sub-tropical Forest

09 Indo-Chinese Tropical Moist Forests

11 Indo-Malayan Tropical Dry Zone

(iv) Glossary

R/LM denotes a species resident in India throughout the year which, however, undertakes local movements depending on water conditions.

R/AM denotes a species resident in India throughout the year which, however, undertakes altitudinal migration from the plains of India to the Himalayas in different seasons.

R/WM or **WM/R** denotes a species which is also resident in India; however, influx of the migratory population from the Palaearctic takes place in winter.

WM a winter migrant to India which breeds in Eurasia and visits India in winter.

Cr taxons facing an extremely high risk of extinction in the wild in the immediate future.

GT a species listed threatened at Global level as per IUCN criteria

NT a species listed as Near threatened that falls just outside the threat criterion but which requires monitoring for early evidence of deteriorating status.

En a taxon is Endangered when it is not Critical but facing a very high risk of extinction in the wild in the near future.

Ex a taxon is Extinct when there is no reasonable doubt that its last individual has died.

Vu a taxon is Vulnerable when it is not Critical or Endangered but is facing a high risk of extinction in the wild in the medium-term future.

Va a very rare or vagrant species which has been recorded from India on only a few occasions in the last fifty years or so.

VRa only very few birds recorded regularly.

Ra flocks of 5-20 birds recorded regularly.

UnCom flocks of 20-50 birds recorded regularly.

Com flocks of more than 50 birds recorded regularly.

V Com flocks of hundreds, or thousands of birds, though sometimes, seasonally recorded regularly.

Adult: a bird that has attained its definitive plumage.

Altitudinal migrant: a species that breeds in high altitudes and moves to lower altitudes in non-breeding season.

Alula: the small 'bastard' wing on the leading edge of the wing used to control stall tendency at very low speed.

Aquatic: frequenting water.

Axillaries: feathers of the 'armpit' at the base of the underwing or under the wings near the body.

Biotope: an area with uniform environment, flora and fauna.

Breeding plumage: a different plumage acquired by many species during the breeding season.

Cap: a well-defined patch of colour or bare skin on top of the head.

Carpal joint: the small bones of the 'wrist' joint.

Circumpolar: of or inhabiting the Arctic (or Antarctic) regions in both the Eastern and Western hemisphere.

Collar: a well-defined band of colour which encircles or partly encircles the neck.

Colonial: nesting in groups or colonies rather than in isolated pairs.

Contour feather: any feather forming part of the outer surface of the bird's plumage.

Cosmopolitan: Worldwide in distribution, or at least occurring on all continents except Antarctica.

Coverts: the contour feathers that overlap the main wing or tail feathers.

Crepuscular: active at dusk.

Crest: a tuft of elongated feathers on the crown.

Crown: the top of the head.

Cryptic: of form or colouring that serves to conceal.

Culmen: the ridge of the upper mandible.

Cursorial: adapted to running, a ground-dwelling species.

Decurved or downcurved: curved downward.

Dimorphic: of species or sexes having two colour forms.

Diurnal: active during the day.

Eclipse: dull female-like plumage of male ducks (drakes) for a period after the breeding season.

Edges: outer feather margins, which can frequently result in distinct colour on wings or tail.

Endemic: restricted to a certain area or region.

Eyebrow or supercilium: a conspicuous stripe of colour running above but not through the eye.

Eye ring: feathered ring immediately surrounding the orbital ring.

Eye stripe: a stripe that runs horizontally from the base of the bill through the eye and beyond.

Feral: escaped from captivity and now established and self-supporting in the wild.

Filoplume: a thin, hair-like feather.

Flight feathers: the long well-developed feathers of the wings and tail used during flight. The flight feathers of the wings are divided into primaries and secondaries.

Fringes: complete feather margins, which can frequently give a scaly appearance to body feathers or wing coverts.

Frontal shield: a fleshy, featherless and often brightly coloured area on the forehead.

Fulvous: tawny, dull yellowish-red or red wine coloured.

Gape: the mouth and fleshy corner of the bill, which can extend back below the eye.

Gregarious: a species often found in flocks when feeding in the non-breeding period.

Gular pouch: a loose and pronounced area of skin extending from the throat.

Holarctic: occurring in both the Palearctic and Nearctic regions, i.e., in northern and temperate regions of both New and Old Worlds.

Immature: a bird in plumage in between juvenile and adult.

Iris: the coloured membrane which surrounds the pupil of the eye and which can be brightly coloured.

Jheel: a shallow lake in a low-lying natural depression, usually with floating and submerged vegetation, reed beds and partly submerged trees.

Juvenile: a bird in its first plumage that replaces the downy one.

Leading edge: the front edge of the forewings.

Leg projection: indicates that part of the legs project beyond the tail when the bird is in flight.

Local: occurring or common within a small or restricted area.

Lores: the area between the eye and the base of the bill, sometimes distinctively coloured.

Mandible: the lower or upper half of the bill.

Mantle: the back of a bird together with the upper surface of the wings.

Mask: a dark area of plumage surrounding the eye and often covering the ear-coverts.

Migrant: a bird that regularly passes through an area on its way to or from its normal breeding range.

Mirrors: white spots or areas in the black wing tips.

Moult: the process of shedding and replacing feathers.

Nape: back of the neck.

Nocturnal: a species active at night.

Nomadic: wandering or erratically occurring species, with no fixed territory when not breeding.

Non-breeding plumage: plumage worn by birds when not breeding.

Nuchal: relating to the hind neck, used with reference to a patch or collar.

Nuptial: pertaining to breeding season.

Ochre: yellowish-brown.

Omnivorous: eating almost any kind of plant and animal food.

Ornithology: the study of birds.

Palearctic: the zoogeographical region of Eurasia.

Passage migrant: a species that regularly passes through an area during migration without remaining there for either breeding or non-breeding seasons.

Pelagic: frequenting the deep or open ocean.

Phase: also **morph:** denotes a particular form of the species where a colour variation exists, e.g. dark phase, grey phase.

Plume: a feather larger or longer than the feathers around it, generally used in display.

Polygamy: the formation of a sexual bond between one male and more than one female.

Primaries: the outermost and longest flight feathers on a bird's wing, usually numbering eleven.

Race or subspecies: a geographical population of a species that is slightly different from other populations of that species.

Range: the geographical area or areas inhabited by a species.

Rectrices: the tail feathers.

Recurved or upcurved: bent upwards.

Remiges: the primary and secondary wing feathers.

Resident: staying in one place all the year, non-migratory.

Ring (banding): the marking of bird by placing rings of metal or coloured plastic on their legs for future individual recognition.

Roosting: the bird is said to be roosting when either actually sleeping or resting for more than a brief nap.

Rufous: reddish-brown.

Rump: lower back and base of tail.

Scapulars: a group of feathers on the shoulder.

Secondaries: the large flight feathers along the rear edge of the wing, inward from the primaries.

Sedentary: resident, but scarcely moving from the immediate vicinity of its birthplace.

Spatulate: spoon-shaped.

Speculum: a distinctively coloured area on the wings of a bird, especially the metallic-coloured patch on the secondaries of some ducks.

Subadult: young birds, with a mixture of immature and adult plumage, the last stage before full adult plumage.

Subarctic: superficially arctic regions (not necessarily within the Arctic Circle) where the ground is not permanently frozen and which can support small trees.

Sub-terminal band: a dark or pale band, usually broad, at the tip of a feather or feather tract (especially the tail).

Tarsus: the lower, usually featherless, part of a bird's leg above the feet.

Taxonomy: the science of the classification of organisms.

Tertials or tertiaries: the innermost flight feathers on a bird's wing, immediately adjacent to the body.

Trailing edge of wing: the rear edge of an extended wing.

Tundra: vast, treeless regions that make up most of Northern Russia, with arctic climate and vegetation.

Underparts: under surface of body from throat to undertail-coverts.

Upperparts: upper surface of body including wings and tail.

Vagrant or accidental: a definition of scarcity applied to birds which leave their normal range to make infrequent visits to the area in question.

Vent: the area around the cloaca (anal opening) just behind the legs (should not to be confused with the under-tail-coverts).

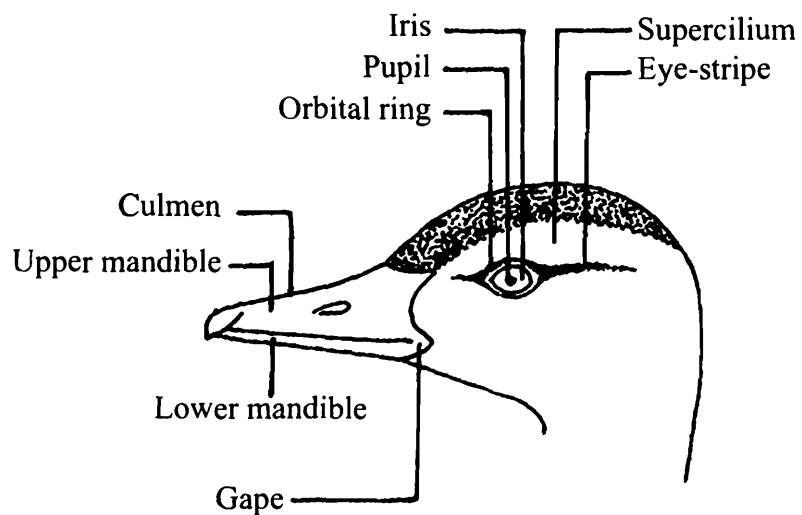
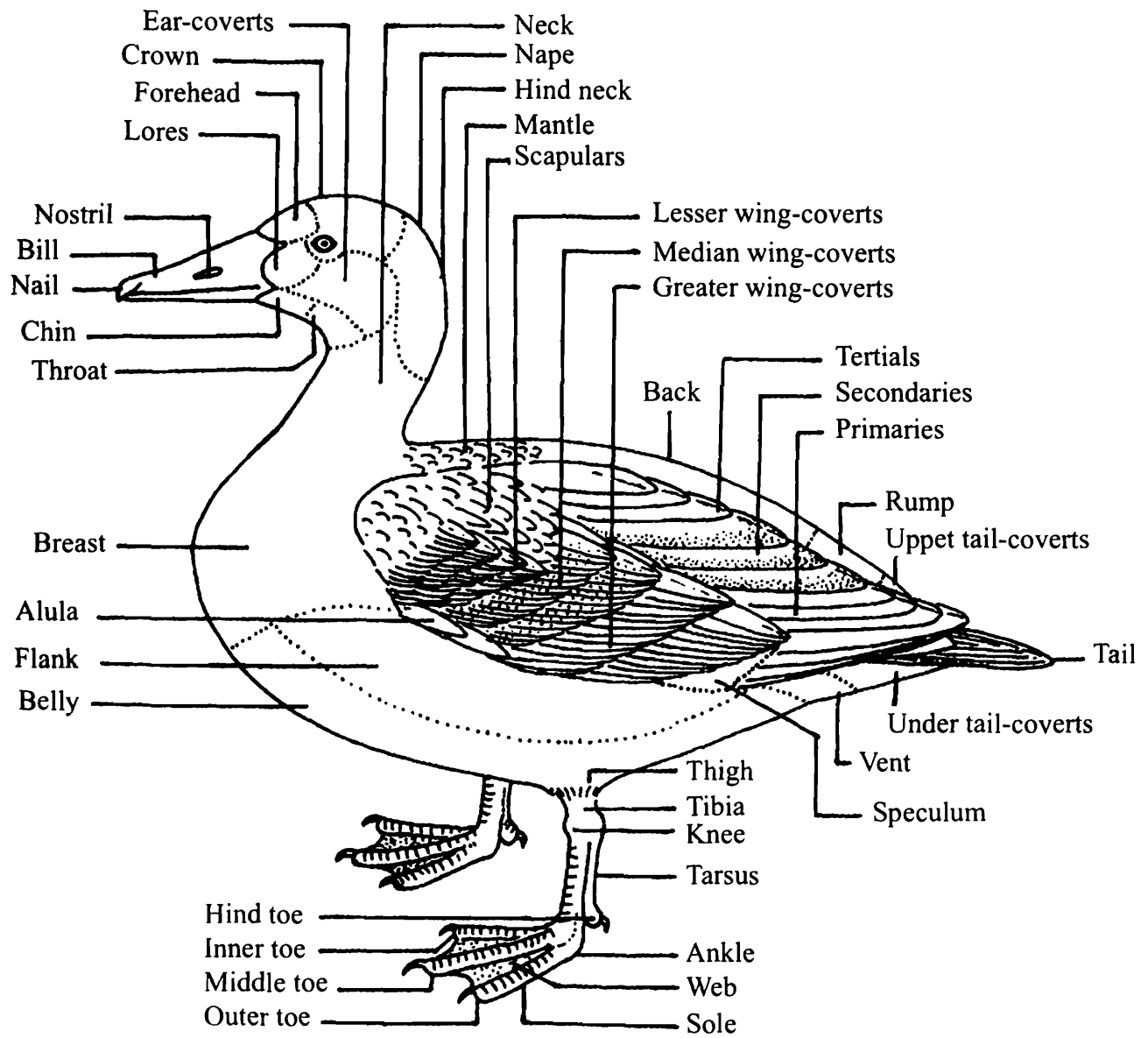
Vermiculation: irregular, wavy marking, reminiscent of tracks made by worms.

Vinaceous: red wine-coloured.

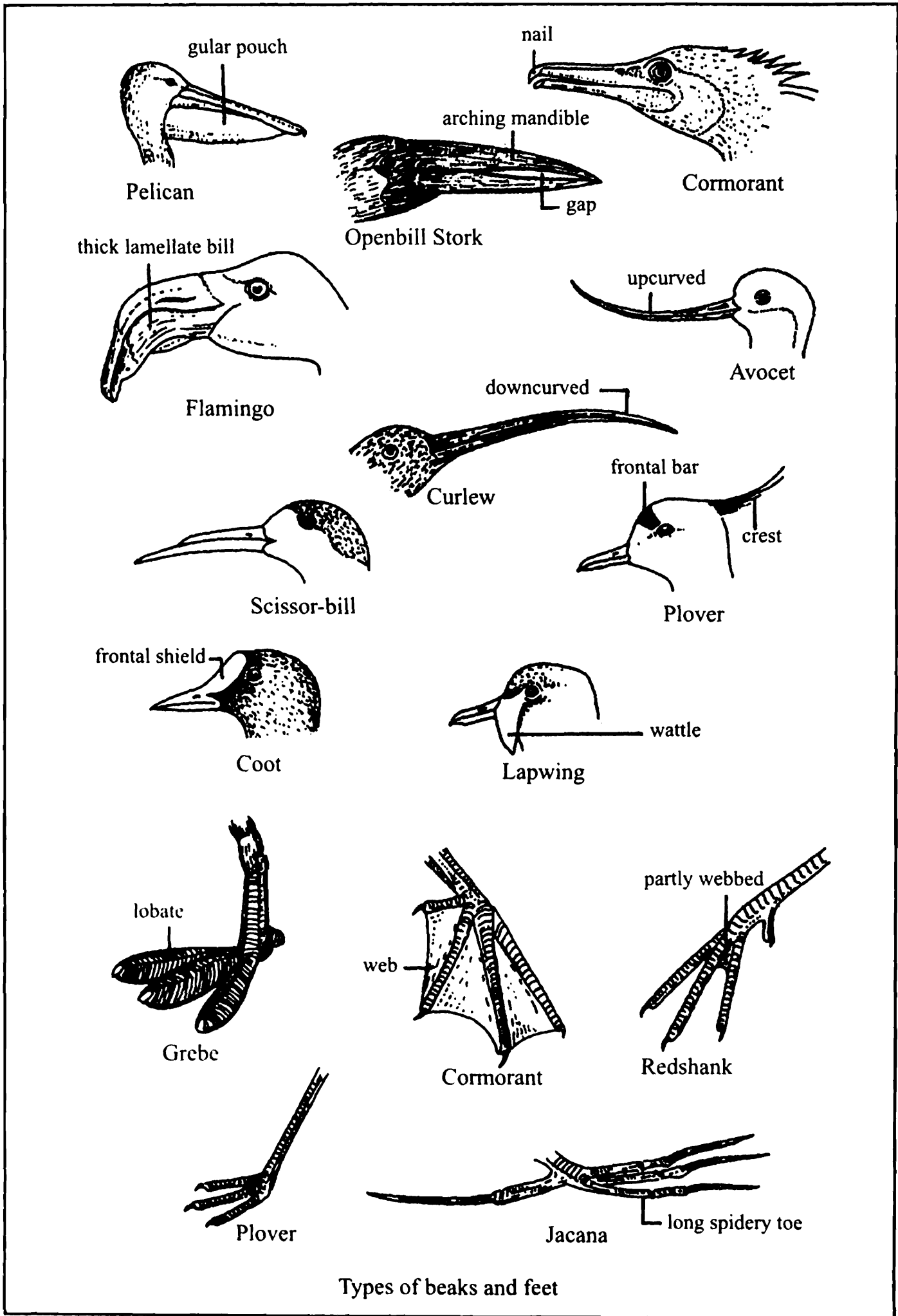
Wattle: a lobe of bare, often brightly coloured skin attached to the head.

Wing-bar: a line across the wing contrasting in colour with the rest of it.

Wing projection: used to describe the projection of the tip of the primaries beyond the tail when a bird is at rest.



Bird Topography



Types of beaks and feet

1. INTRODUCTION

1.1 Biogeography of India

Ecology and Biogeography

The mainland of India stretches from east to west nearly 3000 km, from 68°07' to 97°25' E longitude, about 3200 km from north to south and lies entirely north of equator. Kanniyakumari the southernmost point of India, is 8° 4' north of the Equator and the Tropic of Cancer roughly cuts the country into two halves. India is the seventh largest country in the world with an area of some 32, 87,263 km², which is about 2.4% of the world land area. It has a coastline of about 7516 km.

The northern boundary reaches to approximately 37°6' N latitude, thus both the northern and southern ends are almost equidistant from the Tropic of Cancer. Though nearly half of India lies outside the tropics in the middle latitudes and within the temperate zone, it is traditional to consider India a tropical country. This is mainly because the Himalayas in the north shield the region from the plateau of Central Asia, resulting in a tropical monsoon climate throughout almost all the land. However, the variation in elevation and local climate is extreme and includes transitions from the rainless Thar Desert to the rainiest place on earth in the Khasi Hills, Meghalaya, and from the hottest places to the alpine and arctic conditions of the Himalayas. Geologically, too, India has stable and ancient areas of the Peninsula with senile topography to the unstable and recent areas of the young topography of Himalaya.

Within the geographical limits of India, the Palearctic, Ethiopian, Indo-Chinese, Malayan and endemic flora and fauna meet and mix

together resulting in fascinating peculiarities in India's biogeographical evolution.

The monsoon rainfall has a tremendous effect on the ecology of the whole country except perhaps the higher Himalaya above the timberline, which is characteristically temperate. The dominance of the monsoon rainfall in the climate ecology of India is caused chiefly by the channelling effects of the Himalaya on the monsoon currents.

Therefore, the vast areas of the country with monsoon dominated ecology support tropical flora and fauna though they also contain several pockets of temperate elements of biodiversity.

Physiographically, India can be split into following three major divisions (Mani, 1974).

1. The Peninsula,
 2. The Extra-Peninsula,
 3. The Indo-Gangetic Plains.
1. The Peninsula: The Peninsular Plateau is the highest in the south and west and slopes eastwards. Large areas in the south exceed 600 m in elevation and sometimes even 900 m. The Western Ghats rise abruptly from the coastal plains to an average height of 1200 m, and run parallel to the sea coast. The Eastern Ghats, with a broken edge, stretch from the Mahanadi river valley up to the Nilgiris and form the eastern edge of the plateau. They have an average height of 450 m and rarely exceed 1200m.
 2. The Extra-Peninsula: It extends for about 2500 km from the eastern edge of Arunachal Pradesh to Kashmir with an

average width in the west varying from 240 to 320 km. It comprises the Hindukush, the Karakoram and the Himalaya. The Himalayan mountains can be divided into four zones, the *Siwalik Zone*, the foothills of Himalaya with a width of 8 to 48 km; the *Lesser Himalayan Zone*, has an average height of 3050 m and is about 65 to 80 km wide; the *Great Himalaya* and the *Central Himalaya* comprise high snow-capped peaks rising above 4500 m; the *Trans-Himalayan Zone* is the northern extremity of this and ultimately merges with the Tibetan Plateau.

3. The Indo-Gangetic Plains: They are about 3000 km long from east to west between Arabian Sea to Bay of Bengal, and 240-320 km wide. This great plain is remarkable for its flatness, gentle slope towards the sea and the immense thickness of the alluvium. It is composed of unconsolidated sands, silt and clays and is drained by three major river systems, namely, the Indus, the Ganges and the Brahmaputra. It is the most fertile part of the country, suitable for agriculture. Topographically, the Indo-Gangetic plains are homogenous for hundreds of kilometres, except the ravines and badlands along the course of the river Chambal. Along the outer slopes of the Siwaliks, there are several steep gravel slopes called *Bhabar* in which all the streams debouch and seep out lower down in the marshy and terai area.

The Indo-Gangetic plains may be split into the following sub-divisions, namely, the upper Ganga region representing the states of Uttar Pradesh and Delhi; the average rainfall is less than 100 cm per annum, the soil is fertile. The middle Gangetic plains comprising the state of Bihar with variable rainfall from 100 cm (western half) to 150 cm (eastern half). The

lower Gangetic plains lying in the state of West Bengal, this is a wet region with over 200 cm rainfall. The Punjab and Haryana plain in the Indo-Gangetic region is nearly dry. The Thar Desert roughly begins from the southern edge of the Punjab continuing through north western Rajasthan up to the Aravalli range.

River Systems and Lakes

The natural drainage of India is an important component in the ecology and biogeography of India. The Rivers of India broadly fall into two natural major groups, namely, the *Peninsular rivers* and the *Extra-Peninsular rivers* or the *Himalayan rivers*. These two categories basically differ from each other in their history and other characteristics.

1. The Peninsular Rivers: The Peninsular Rivers are entirely fed by monsoon rains and are, thus, generally dry in summers.

The Indian Peninsula has a typical radial drainage pattern comprising the north-flowing rivers Chambal, Banas, Sindh, Betwa, Ken and Son; the east-flowing Damodar; the southwesterly flowing Wainganga, Wardha; and the westerly flowing Narmada and Tapti. The south peninsular rivers and their tributaries rise on the slopes of the Western Ghats. The western rivers flow between the mountain ridges, and therefore their catchment areas are elongated and narrow lacking delta formation at their mouths.

2. The Extra-Peninsular Rivers (Himalayan Rivers): These nineteen rivers belong to the drainage system of the Himalaya. They do not depend on the monsoon rain since they are fed by the melting snow in Himalaya. Though the volume of water may vary, they never dry up completely. Of these nineteen rivers, six belong to the Indus system: *Indus*, *Jhelum*, *Chenab*,

Ravi, Beas and Sutlej; nine belong to the Ganges system: *Ganga, Yamuna, Ramganga, Sarada, Karnali, Rapti, Gandak, Baghmata and Kosi*; four belong to the Brahmaputra system: *Brahmaputra (Tsangpo), Tista, Raidak and Manas*. The rivers of the Indus system follow a north-westerly course, while the Ganges takes a south-eastern course, and the Brahmaputra system flows east at first and then southerly.

Lakes and Swamps

India has many lakes due to its unique geographical position and diverse climatic conditions varying from cold arid Ladakh to the hot arid desert of Thar. Some important lakes of India are: *Pangong Tso* and *Tso Moriri* in Ladakh, *Dal* and *Wular Lake* (Jammu and Kashmir), *Harike* and *Kanjli* (Punjab), *Sambhar, Pinchola* and *Pachpadra* (Rajasthan), *Nalsarovar* (Gujarat), *Renuka* (Himachal Pradesh), *Naini Tal* and *Bhim Tal* (Uttaranchal), *Kabartal* (Bihar), *Bhoj* (Madhya Pradesh), *Lonar* and *Ujni* (Maharashtra), *Chilika* (Orissa), *Kolleru* and *Pulicat* (Andhra Pradesh), *Ashthamudi, Santhamkotta* and *Vembanad* (Kerala), *Chho Lahamo* and *Gurudongmar* (Sikkim) and *Loktak* (Manipur).

Swamps generally occur along the flood-plains of rivers and low lying sea shores. The salt lake swampy areas in West Bengal lie within the flood-plain and delta of the Ganges. The vast tracts of the low land lying along the western coast of India called *Rann of Kutch* in Gujarat and *Vedaranayam salt swamp* in Tamil Nadu are worthy examples of coastal swamps.

Weather and Climate

The climate of India is characterised by the highest and most widespread mountain system in the world. The Himalaya block the moisture laden monsoon winds from the south,

causing them to shed their moisture as abundant rains along the sub-montane areas north of the Indo-Gangetic Plains, and as snowfall in the mountains further north. This immense mountain barricade is also most effective in protecting India from the direct incursion of the extremely cold temperate winds from the north temperate Asian plateau. The peninsula is bordered by the Arabian Sea in the west and the Bay of Bengal in the east. It is further flanked by the Western Ghats along the west coast and to a lesser extent by the Eastern Ghats along the east coast. These two obstructions also play very important part in ensuring abundant rainfall on their windward sides.

Climatically India has the following four seasons, namely:

- winter from December to February,
- summer or pre-monsoon from March to May,
- southwest monsoon from June to September,
- post-monsoon from October to November

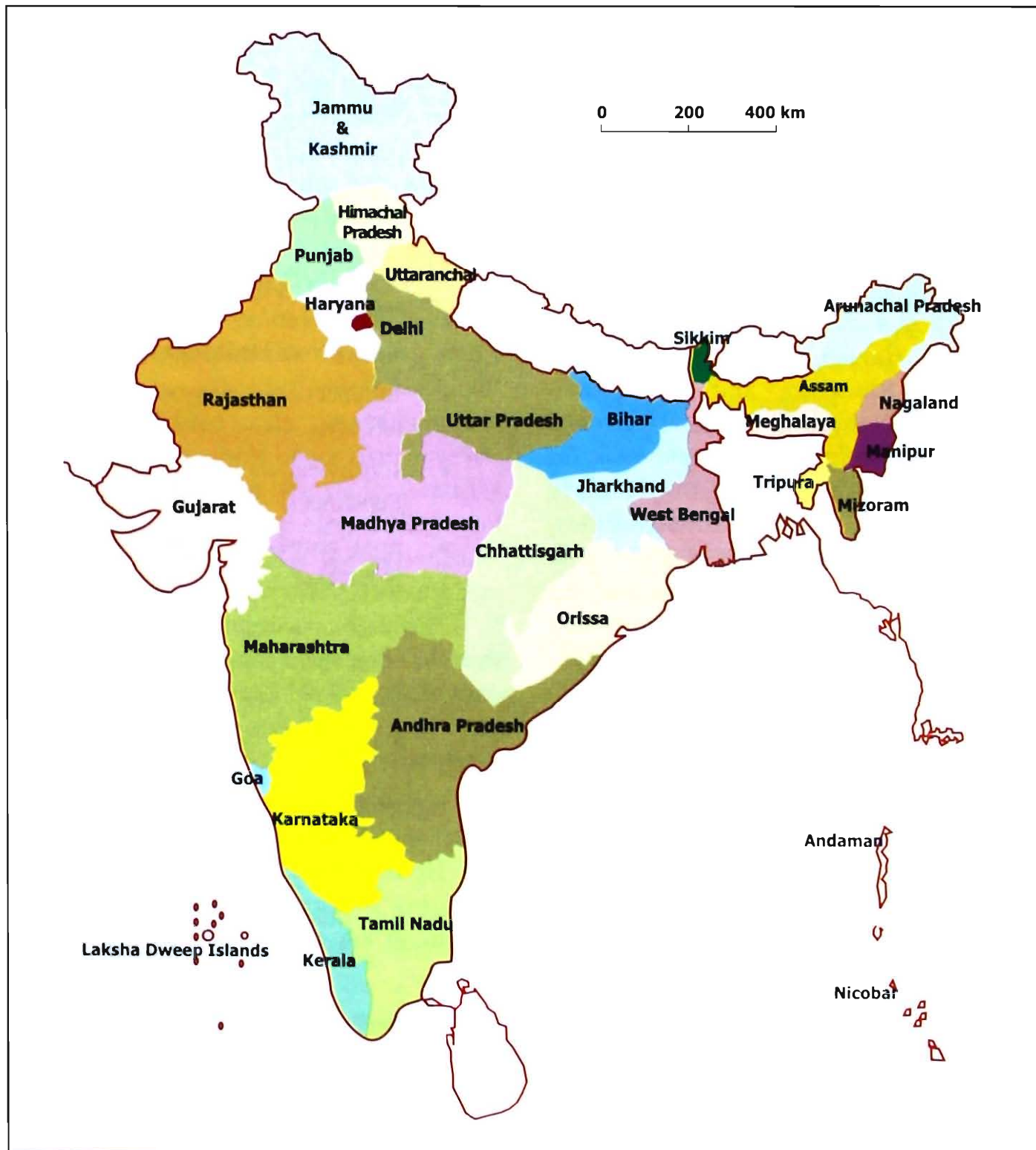
The major occurrence of the monsoon therefore dominates the whole country from June to September.

Temperature

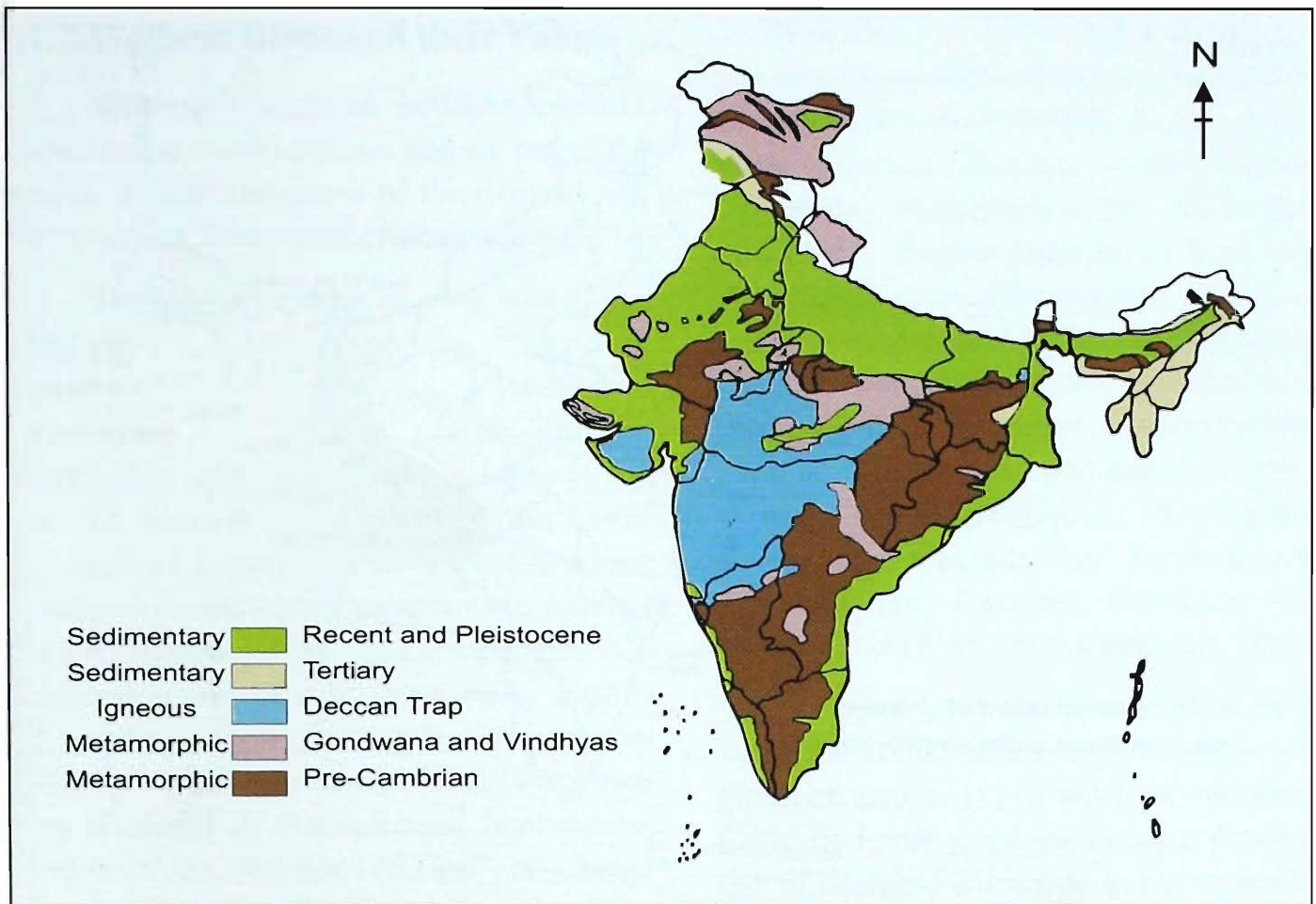
Temperature is the most important factor in the climate. India situated between 8⁰ and 37⁰ North latitudes gets its maximum solar radiation during May and June and the minimum amount during December and January.

The mean annual temperature exceeds 24⁰C over the whole country, except in the hilly areas and the extreme northwest. On the basis of temperature India may be divided into the following zones :

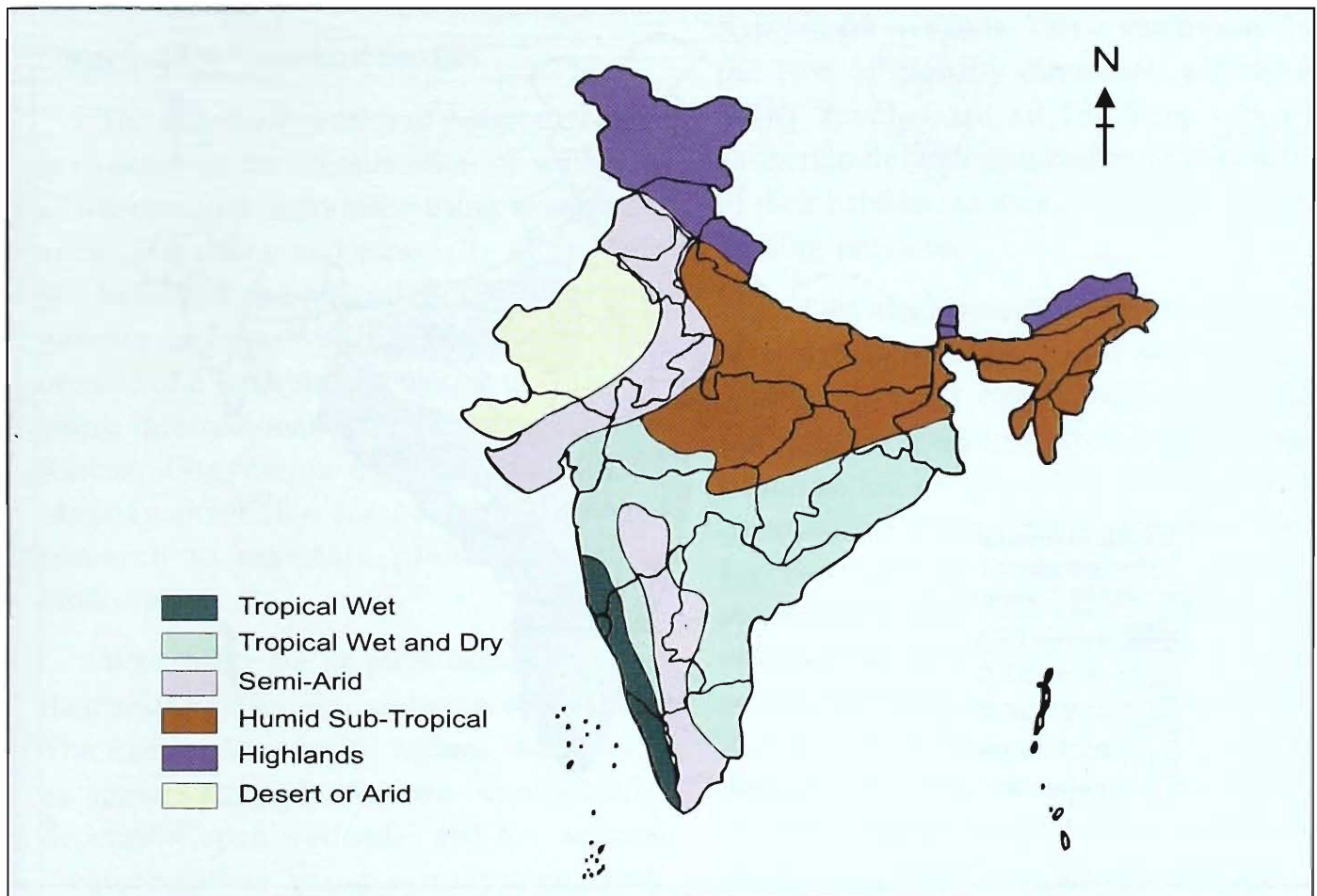
Zone	Mean Annual Temperature	Mean January Temperature	Winter
Tropical	Over 24°C	Over 18°C	None - no frost
Sub-Tropical	17-24°C	10-18°C	Not severe - frost rare
Temperate	7-17°C	1-10°C	Marked - with frost and a little snow
Alpine	Under 7°C	Below 1°C	Severe - with a great deal of snow



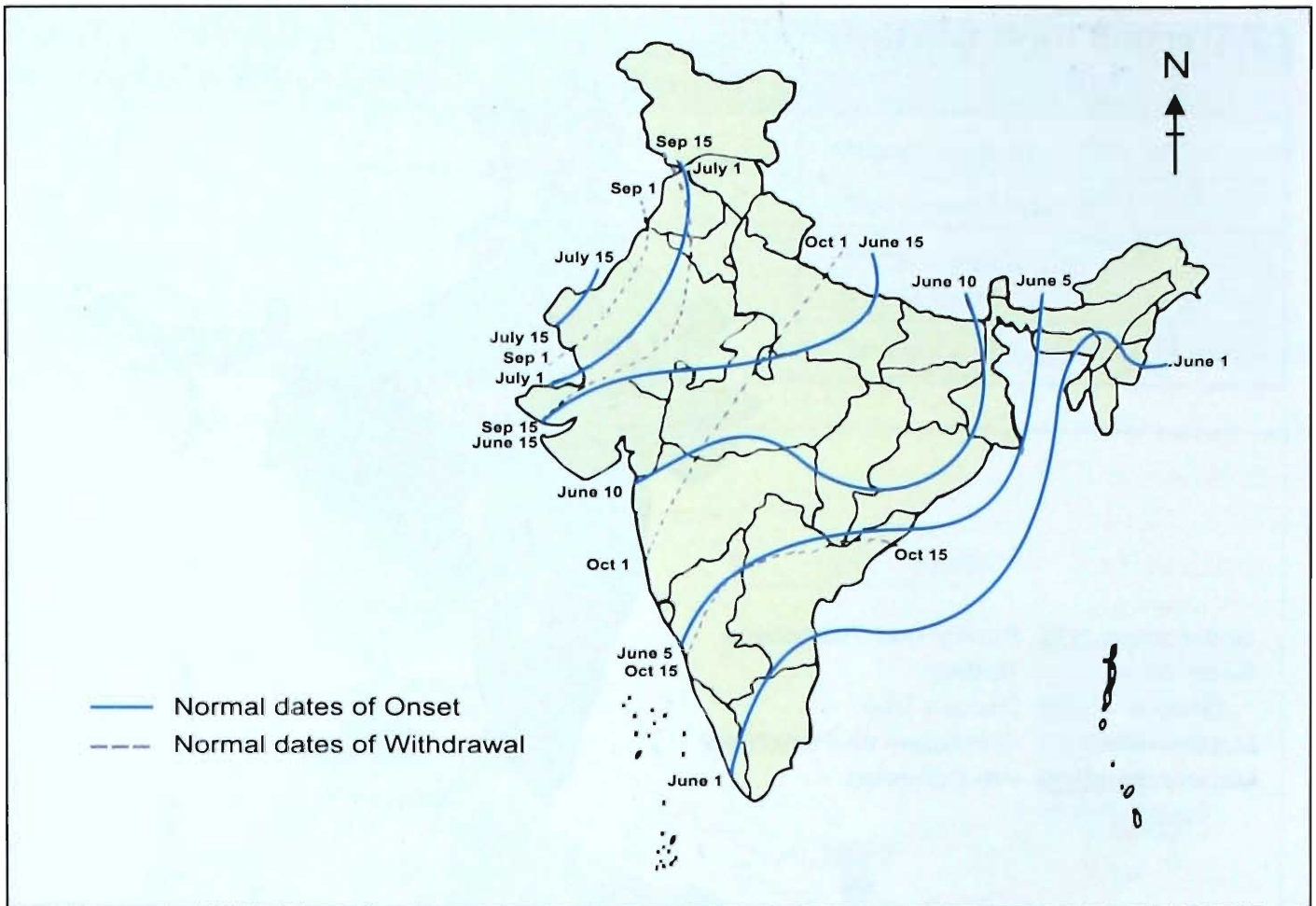
Map 1.1 Political map of India



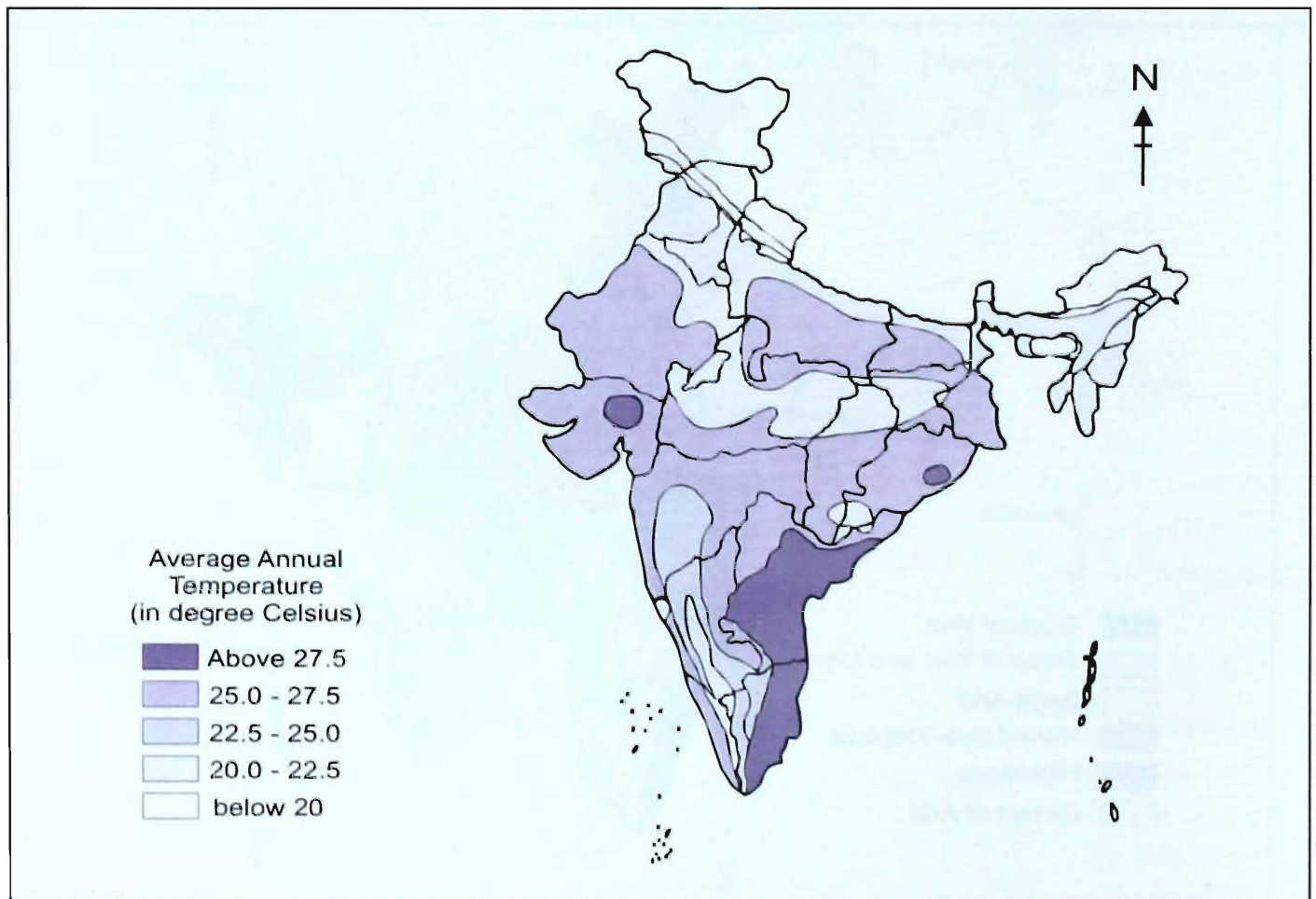
Map 1.2 Geological map of India



Map 1.3 Climatic Regions of India



Map 1.4 South-West Monsoon pattern in India.



Map 1.5 Mean Annual Temperature of range in India

1.2 Wetland Birds and their Values

Waterbirds occur on wetlands, often in spectacular concentrations, and are one of the most obvious indicators of the richness and diversity of these productive ecosystems.

The long migrations of some waterbirds, and the fact that some species are the prized quarry of hunters, have made these birds a favoured subject for research, survey, education and recreation throughout the world. Networks of experts from every continent contribute to a co-ordinated waterbird monitoring programme, making waterbirds one of the most comprehensively studied groups of animals on earth, and the first to be mentioned in the title of an important inter-governmental treaty: “*The Convention on Wetlands of International Importance, especially as Waterfowl Habitat*”, now better known as the Ramsar Convention on Wetlands.

Objectives of Waterbird Studies

The primary objective of waterbird study is to assist in the identification of wetlands of international importance using waterbirds as bio-indicators, and especially to provide the basis for the so-called 1% criterion, whereby any site which regularly holds 1% or more of a waterbird population qualifies as being internationally important under the Ramsar Convention on Wetlands; and to identify priorities for conservation and research to maintain global waterbird biodiversity.

Waterbirds are of great importance for their aesthetic, sporting and economic values. The Ramsar Convention defines ‘waterfowl’ as species of birds that are “ecologically dependent upon wetlands” and has defined “waterbird” as being synonymous with “waterfowl”

However, in the second edition of *Waterfowl Population Estimates*, ‘waterfowl’ were defined more precisely as all species of the families Gaviidae, Podicipedidae, Pelecanidae, Phalacrocoracidae, Anhingidae, Ardeidae, Balaenicipitidae, Scopidae, Ciconiidae, Threskiornithidae, Phoenicopteridae, Anhimidae, Anatidae, Pedionomidae, Gruidae, Aramidae, Rallidae, Heliornithidae, Eurypygidae, Jacanidae, Rostratulidae, Dromadidae, Haematopodidae, Ibisornithidae, Recurvirostridae, Burhinidae, Glareolidae, Charadriidae, Scolopacidae, Thinocoridae, Laridae, Sternidae and Rynchopidae (Wetlands International, 2002).

A total of 1,186 bird species (12% of the world’s avifauna) are currently threatened with global extinction, 182 of which are considered Critically Endangered and facing a very high risk of complete extinction in the immediate future. Wetlands are particularly important since 20% of the threatened bird species in Asia inhabit wetlands. This is much more than the 10% of globally threatened waterbirds. Many species are edging very close to extinction through disturbance or conversion of their habitats, as well as through intensive hunting pressure.

Of the major waterbird families, the family Anatidae (*the ducks, swans and geese*) is among the most extensively studied and holding the greatest attraction for man. Illustrations of geese are found in five-thousand-year-old Egyptian tombs. Many legends have evolved around wildfowl; swans particularly have been regarded, since ancient times all over the world, as sacred and possessing magical qualities. It is believed that the swan sings just before it dies and Aristotle mentions swans flying out to sea to die. These beliefs in many countries of Europe made these birds most sacred and they are completely protected for emotional reasons.

Most of us remember the famous story of the eleven princes and the swan by Hans Christian Andersen.

India has always held geese in the greatest reverence and the ancient scriptures mention the birds' long migratory flight and family loyalties. The Trans-Himalayan migration of the 'hamsa' (Hans), the *Bar-headed Goose*, is mentioned as a religious pilgrimage, though the translation of Sanskrit scripture generally indicates that a "hamsa" as swan or flamingo, though neither of them is common in India. Similarly the Ramayana by Maharishi Valmiki depicts the killing of courting Sarus by a hunter, in turn the hunter is cursed by the Maharishi. Ducks and geese have been very popular subjects for paintings, photography and occur very frequently in children's stories. Of course, pride of place undoubtedly goes to Walt Disney's *Donald Duck* (domestic Mallard), who has been entertaining children and adults all over the world for many decades.

Since waterfowl are large birds they have been a major source of food and clothing for man, especially in the temperate regions of the world. It is well known that Canadian Eskimos and the Samoyeds of Siberia extensively poach on eggs and moulting geese and swans and stock goose meat in enormous quantities, resulting in major losses to their populations. The skins and feathers of waterfowl are used extensively for clothing in cold-inhabiting human populations. For instance, the people of Siberia extensively make jackets of waterfowl (swan) down, sewn into cloth for insulation. Through with enforcement of the various Wildlife Protection Acts all over the world, waterbird harvesting during breeding season and moulting has largely stopped, but a very large number of waterfowl are still poached by shooting either during migration or in their winter homes. Most waterbirds are

treated as a delicacy and favourite food item. In Europe and North America waterfowl shooting for sport is still a popular and favourite pastime.

The taming and domestication of anatids has been recorded for several thousand years, and the Greylag Goose was perhaps the first species domesticated by man. The other popular species are the Mallard, Swan, Goose and the Mute Swan. Waterfowl farming is thus common practice in many European countries.

Often, in countries like India, waterbirds are accused of damaging large quantities of arable winter crops such as wheat and grams particularly by migrating populations of anatids. Cormorants are known to cause considerable damage to fish fries in the reservoirs of the sub-Himalayan terai and Indo-Gangetic plains, the favourite wintering areas of these birds.

In the light of the above, waterbird conservation all over the world is well accepted through International co-operation and conventions such as the '*Convention on Wetlands of International Importance Especially as Waterfowl Habitat*' - Ramsar Convention (1971).

It is, therefore, of the utmost importance to understand the conservation, residential, and abundance status as well as distribution of Indian waterbirds to evolve appropriate conservation strategies.

***1.3 Habitats**

The Indian region extends from the tropics to the Himalayas, the highest mountain ranges in the world. The great diversity of climates and habitats is reflected in the large diversity of birds (and other animals and plants), with about 1,230 species occurring in India, of these, 310 species are wetland birds.

A high proportion of these birds are confined to forests, particularly the tropical rainforests and dry forests in the south, although the subtropical and temperate forests further north support many characteristic species. India's grasslands, wetlands and seas also support groups of birds that are special to these habitats.

Wetlands are under great pressure in the Asiatic region, with c. 20% of threatened bird species found in such habitats (compared to c. 10% globally), including freshwater lakes, rivers, marshes, coastal lagoons and intertidal flats. Many large waterbirds are edging very close to extinction through the disturbance or conversion of their habitats, as well as intense hunting in most areas, involving disproportionately large numbers of storks, herons, ibises, ducks, geese, cranes, gulls, waders and terns. Although artificial habitats (such as plantations, arable land, and artificial wetlands) apparently feature quite highly, they are also of minor importance for the great majority (88%) of threatened species occurring in them, meaning that it is unlikely that these species could survive without adjacent natural or semi-natural habitats for feeding and/or breeding.

Clearance, conversion and degradation of natural forests, grasslands and wetlands are by far the most potent causes of endangerment in the Asia region, affecting nearly all species classified as Critical, Endangered, and Vulnerable. Exploitation for human use is the second most common category of threat, affecting more than 50% of all threatened bird species; of these, c. 70% are hunted for food and sport and c. 30% are captured for the wild bird trade. The main pressure on Asian waterbirds is wetland drainage and conversion, including the infilling (or 'reclamation') of intertidal coastal wetlands, principally for agriculture and aquaculture. Dams and irrigation projects are

also negatively affecting wetlands (BirdLife Int., 2003).

Most threatened bird species in Asia are specialised in their habitat requirements, and are totally dependent for their survival on a particular type of forest, grassland or wetland. The continuing loss and damage to these habitats is by far the most powerful threat that they face. *Threatened Birds of Asia: the BirdLife International Red Data Book* (2001) includes information on every site where threatened species have been recorded, as well as maps showing their known ranges. A total of nine forest regions, three grassland regions and twenty wetland regions have been identified. All of these habitat regions support groups of threatened birds, which occur in the same habitats and share broadly similar distributions. The twenty wetland regions in Asia support between two and 21 threatened waterbirds, few of which are confined to a single wetland region, as Asia's threatened waterbirds tend to have relatively large ranges and many of them are migratory. Some of the habitat regions are entirely confined to a single country, but most are shared between several different countries (BirdLife Int., 2003).

The analysis and documentation of threatened species within habitat regions has a number of advantages:

- Many of the threatened birds in the habitat regions share broadly similar conservation needs, and it is therefore more efficient to consider the conservation of these 33 regions rather than to cover the 303 species that they support individually;
- This approach allows a direct focus on the major land use issues affecting the habitats of threatened birds, thereby giving greater accessibility to users less immediately concerned with bird or biodiversity conservation issues;



Map 1.6 Key wetland region for threatened birds in Asia (Source: BirdLife International, 2003)

- The habitat regions are accurately mapped, which makes it easier to relate the conservation of threatened birds with land-use planning processes (e.g. EIAs) and other projects (e.g. sustainable development and livelihood projects with a particular geographical scope);
- This analysis provides a clear geographical focus on policy and advocacy approaches to conservation;
- The habitat regions provide a framework for relating the conservation requirements of threatened birds with those of other taxonomic groups (e.g. threatened primates) and other area-based conservation priority setting analyses.

Several international conservation organisations have completed analyses to identify priority areas for conservation, which are comparable to the forest, grassland and wetland regions. BirdLife International's Endemic Bird Areas (1- EBA) are an integral part of the habitat region analysis of a recent review— eight of the nine forest regions contain EBAs, as do single grassland and wetland regions. All six of Conservation International's (CI) Hotspots (2-CI) in Asia overlap one of the forest regions, the Indo-Burma Hotspot overlaps part of a grassland region and five wetland regions, and the Western Ghats and Sri Lanka, Sundaland and Wallacea Hotspots all overlap a wetland region. All nine forest regions include one or more of the WWF Global 200 Eco-regions (3), as do two of the three grassland regions, and eleven of the twenty wetland regions (BirdLife Int., 2003).

Based on the analysis of the key habitats for threatened birds (GT & NT), the distribution and status of geographical populations of threatened Indian wetland birds indicates that 51 species occur in wetlands, six in forests, five in grasslands, and one is a Seabird. Of the 51 wetland birds, five species are found in the wetlands of the Tibetan Plateau (W09), 15 in the North Indian

Wetlands (W12), five in the South Indian and Sri Lankan Wetlands (W13), 16 in the Assam and Sylhet Plains (W14), and 10 in the Bay of Bengal Coastal area (W15). While of the six forests dwelling species, one occurs in the Sino-Himalayan Mountain Forests (F04), two on the Indian Peninsula and Sri Lankan Forests (F05), and three in the Indo-Burmese Forests. Of the five grassland species, four are found in the Indo-Gangetic Grassland (G02) and one in South Asian Arid Habitats (G03); while one species is a Sea Bird (S01) (*cf* chapter 6.4 for details).

1.4 Heronries

The nesting colonies of the waterbirds that represent spatial and temporal clumping of nests are popularly referred to as '*heronries*' Subramanya (1996) has considered 26 species of birds nesting colonially (in heronries) in India and among them the *Indian Pond Heron*, *Cattle Egret*, *Little Cormorant*, *Black-crowned Night Heron*, and the *Little Egret* was the most abundant nesting species.

The occurrence of heronries in a particular region is dependent on the availability of suitable feeding conditions for waterbirds. According to Subramanya (l.c.), mapping of the heronries in India, indicated a distinct concentration of sites in southern India, western and north central India and Assam in the North-East. The distribution of heronries indicates a clear concentration along the coasts and coastal plains (especially along the east and west coasts) of India, arid and semi-arid regions, Brahmaputra floodplain and Western Ghats. Coastal wetlands like lagoons, backwaters, estuaries, mangroves, mudflats etc., occurring within about 35 km from the coasts seem to have a strong influence on the distribution of nesting sites along the coasts. Central India, south of the Himalayas, eastern India including interior Orissa and West Bengal appears to be impoverished of these nesting sites (Fig.1.1).

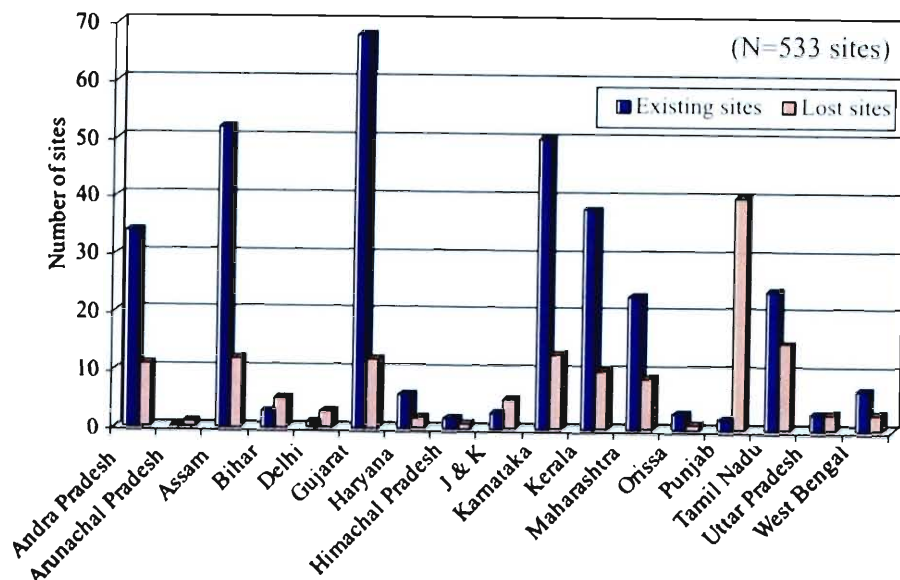


Fig. 1.1 Number of Existing and lost Heronries in different states of India (Subramanya, 1996)

Reference to century-old heronries prior to re-organisation of Indian states are abundant in ornithological literature. For example, the large heronry with thousands of nesting birds located halfway between a place known as Tangalle and Mathura referred to by Hume and Oates (1890), could well be the present day Keoladeo National Park. Searching for some of the old heronries could be a tedious task. The number of birds nesting in heronries varies greatly and only a few sites qualify to be considered as large heronries. These include Telikunchi Village, Andhra Pradesh, and Keoladeo National Park in Rajasthan, Raiganj and Sajnakhali in West Bengal, Bhitarkanika Wildlife Sanctuary in Orissa, Ranganathittu Bird Sanctuary and Gudvi Bird Sanctuary in Karnataka, Kumarakam and Nooranad in Kerala, Luna Village in Gujarat.

An analysis of the frequency and distribution of bird species currently nesting in heronries across different states revealed four distinct groups. While the Little Cormorant, Indian Pond Heron, Black-crowned Night Herons, Cattle, Little, Median and large Egrets were the most widespread nesting species in India, the group with highly restricted distribution of species included Spot-billed Pelican, Greater and

Lesser Adjutant Stork, White-necked Stork, Glossy Ibis and the Western Reef Egret. The group with partly restricted distribution included the Great Cormorant, Purple Heron, Indian Shag, Darter and the Black Ibis (Fig.1.2).

Lost heronries

The information on sites where birds once nested is scattered through the literature. The majority of these sites referred to in literature.

According to Subramanya (l.c.),

while information is available on 147 former sites, 26 nesting sites have disappeared due to various reasons. The vast swamps of the Brahmaputra floodplains and its associated beels once supported a large number of heronries (Baker 1935, Hume and Oates 1890), but little information is now available on the existence of these old heronries (Fig. 1.1).

Threats and disturbances

Continued survival of heronries is threatened by several factors. While some of the factors are common to many heronries, a few are specific to individual heronries. Available information shows that nearly 50 sites are threatened by human induced factors; 21 sites are threatened with natural factors. Destruction of nesting substrate is a major factor contributing to the loss of heronries. Developmental activities are often not in favour of nesting birds. A number of heronries have disappeared due to removal of nesting substrate or disturbance consequent to developmental activities.

Conservation of heronries

Protection to the heronries should be an important conservation issue. The survival of a heronry depends, in addition to the availability of safe nesting sites, on the

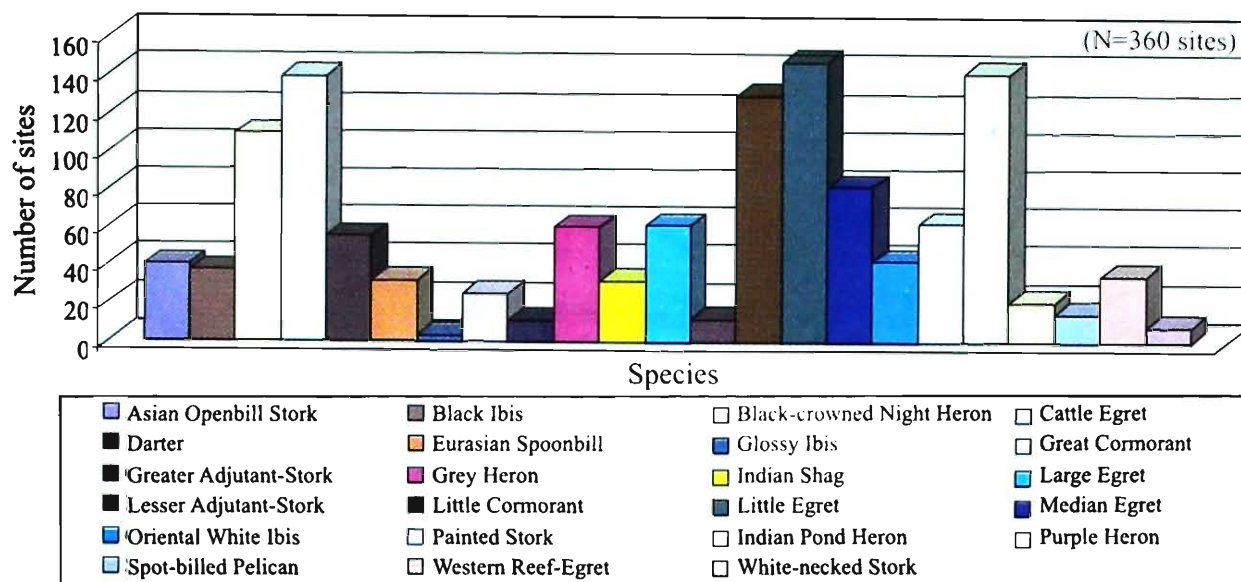


Fig. 1.2 Number of sites recorded for different bird species nesting in Heronries (Subramanya, 1996)

continued availability of suitable feeding conditions.

1.5 Migration

The continent of Asia, the largest on earth, has all the major ecosystems from arctic tundra to deserts, temperate to tropical rain-forests and coral reefs. These extremely variable climatic conditions in Asia play a fundamental role in determining the suitability of waterbird habitat and their annual movements to and from their breeding grounds.

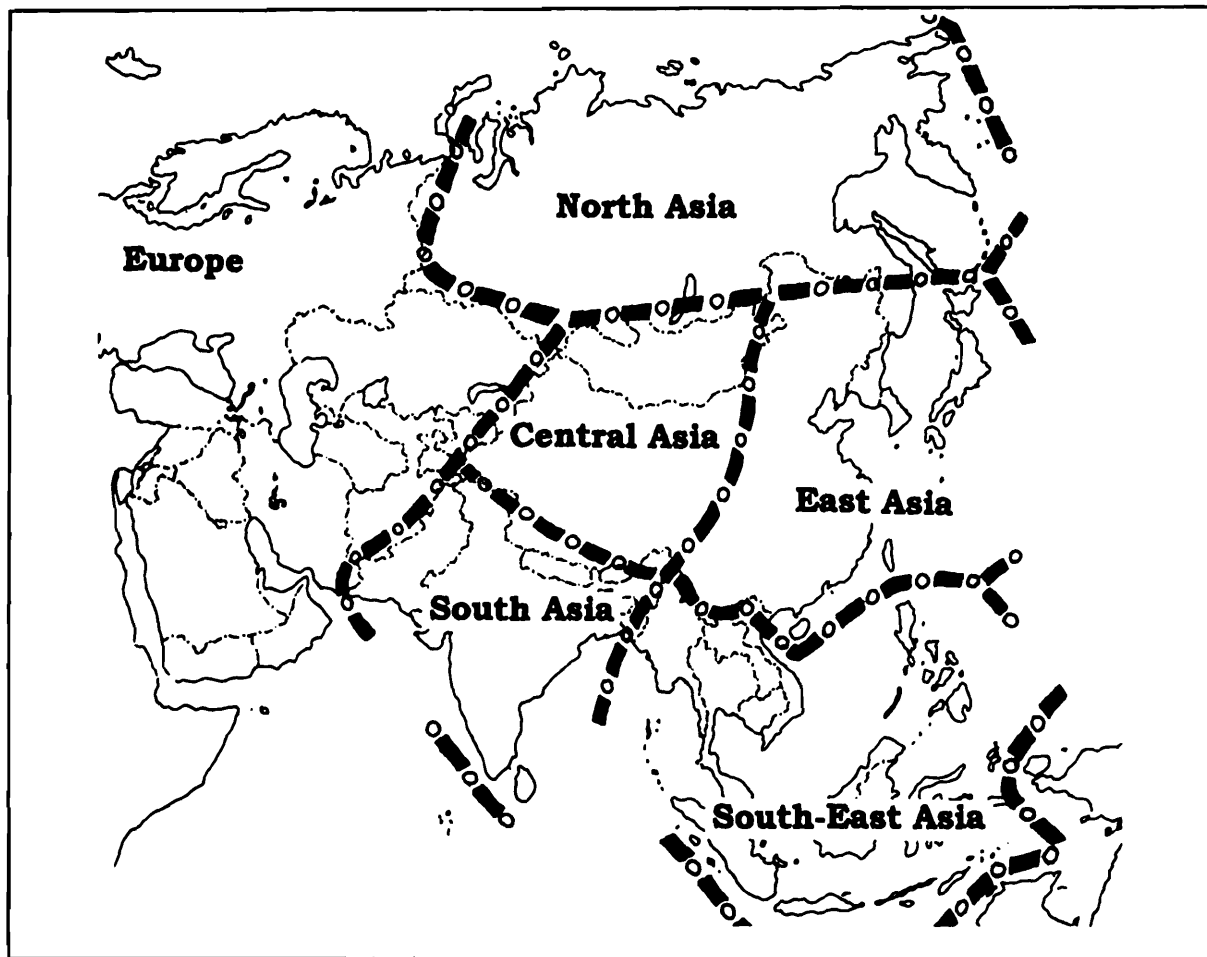
Since time immemorial the seasonal arrival and departure of birds in India generally from the north has existed, but until recently the mystery of this annual coming and going of these birds was not uncovered.

The migratory waterbirds breed in Europe and northern Asia in early summer, when the days are long and food abundant, and raise their young during the short temperate summer. With the approach of autumn, the wetlands where they have bred start freezing and become unsuitable for shelter and adequate food supply. So they make long southward journeys into warmer tropical conditions until the climate becomes ambient again for their return. It leads to the arrival of millions of waterbirds at the onset of autumn

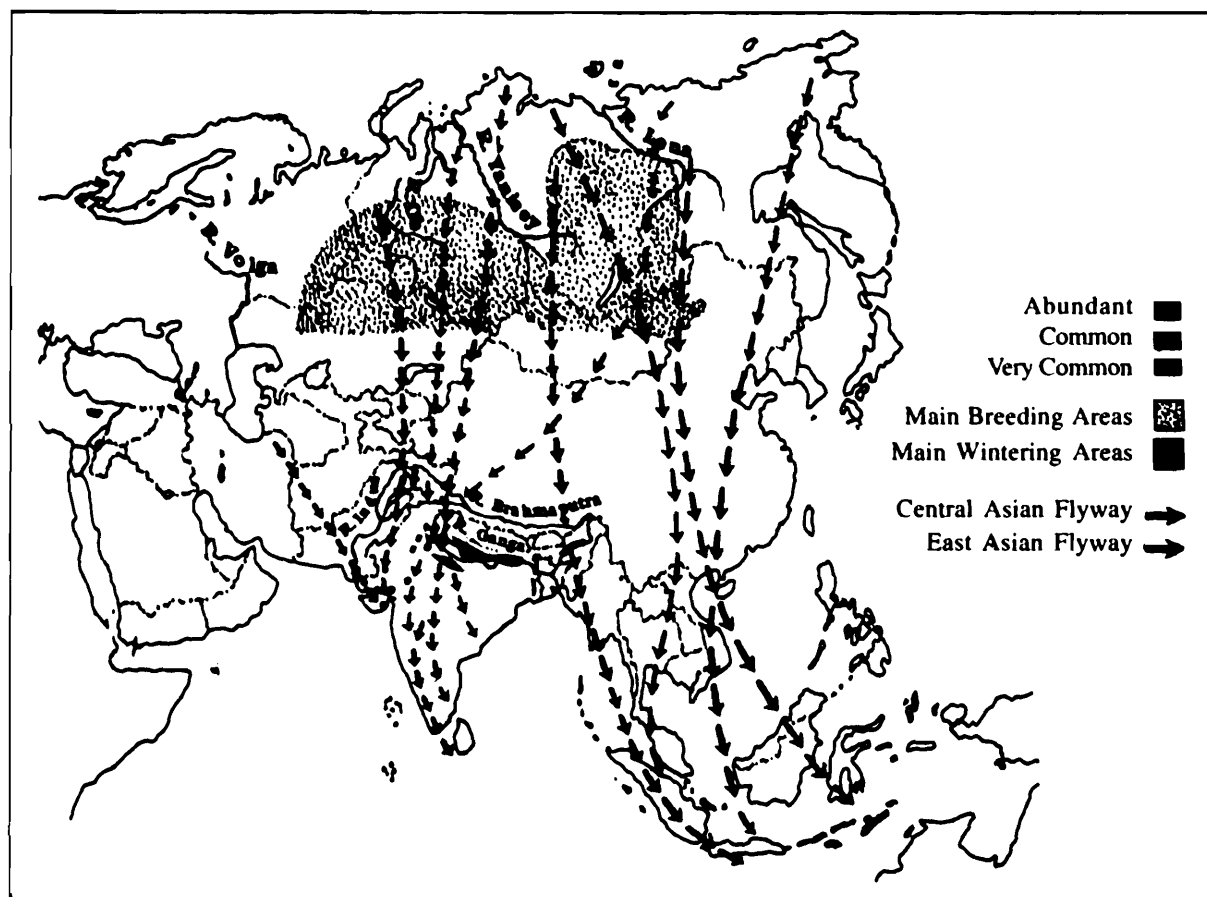
(August to December) to spend the winter in the warm subtropical wetlands of the Indian subcontinent. They return northwards (from March onwards) towards their homing grounds in Eurasia as the weather warms up again.

This annual movement of the waterbirds is very taxing and obligatory, involving many complicated processes including replacement of their plumage by shedding the old feathers and growing new ones, one of their most important physiological functions. This phenomenon is often associated with their migration. Some species moult immediately after breeding, while others moult rapidly before undertaking migration. In still others the process of moulting is delayed during the period of migration and is completed at their winter homes, a process called suspended moult. Some species moult halfway between their breeding and non-breeding areas while a few species moult leisurely over many weeks only on reaching their non-breeding areas. To undertake these long flights, which often last many days at altitudes of several kilometres, they feed excessively to accumulate reserve fat before undertaking the journey.

To economise on the high energy cost of migration, these birds fly under model weather conditions and mostly make good use of tail



Map 1.7 Biogeographic Regions of Eurasia (Source: Sonobe and Usui (1993); Alfred *et al.* (2001))



Map 1.8 Major Waterbird Flyways (Source: Sonobe and Usui (1993); Alfred *et al.* (2001))

winds. The migration starts when the winds are favourable, mostly at dusk though early morning departures are not unknown in species like cranes and pelicans. The exodus is a spectacular sight as hundreds of birds rise from their breeding grounds, slowly arrange themselves in a V-shape and then disappear towards their destination.

It is known that birds use many natural clues for migration, *for example* the position of the sunset to the moon and stars, and even changes in earth's magnetic field to simple geographic features on the ground. It is further believed that the general migration patterns are hereditary as the juveniles often depart from the breeding ground many weeks after their parents. A fascinating migratory character of some waterbirds is the predisposition of the individual to use the same wetland during the winter over the years. Thus, the locations of such wetlands, which are used for staging, are critically important for the survival of waterbirds and need to be protected.

Recent studies have shown that the continent of Asia and the Western Pacific region are on the major migratory passages of these birds, especially the waterbirds, often covering thousands of kilometres. The available data on their regular seasonal movements indicate that the main migratory routes between Eurasia on the one hand and South and South-East Asia on the other, have two well defined major flyways, namely, 1. Central Asian-Indian Flyway and 2. East Asian-Australian Flyway. The first is a major route between Siberia and Central Asia on the northern side and the Indian peninsula in the south.

Ornithological studies indicate that, of the 1230 species found in the Indian subcontinent, about 350 are migrants that include both terrestrial and waterbirds. Out of 310 Indian wetland birds 107 species are winter migrants.

Mostly these birds breed outside the

subcontinent in the Palaearctic region. The most abundant and spectacular winter migrants to the Indian subcontinent are the ducks and geese (Anatidae) [which constitute about 85% of migrant winter populations of approximately three million birds], followed by wading or shorebirds (Charadriidae) and cranes (Gruidae). In addition to these numerous extralimital migrants, there are some species of waterbird whose southernmost Palaearctic breeding range extends across boundaries in Ladakh, Kashmir (Brahminy Shelduck, Bar-headed Goose and Mallard) and sometimes in central and eastern Himalayas. Nevertheless, they behave like a true winter migrant in spreading over northern and peninsular India. Like many other migrants from far away, they also depart to their northern breeding grounds before the onset of summer. Despite such a massive influx of migratory waterbirds in India it is noteworthy that very little precise information is available about the migration of waterbirds in our country.

It is widely accepted that the western Himalayas and Indus Valley is one major migration route into India (Central Asian-Indian Flyway). The birds enter the Indian subcontinent through the Indus valley in the north-west. The influx branches off partly and deviates in a south-eastern direction in to the plains of northern India through Kashmir and Punjab. However, it is important to recognize that there appears to be a lot of migration across many areas along the length of the Himalayas right from Kashmir to Arunachal Pradesh.

After coming across or between the mountains, one would expect that the birds are flying across the length and breadth of country and some would even go down to Sri Lanka depending on the species. Other birds flying south through the eastern part of the country, must rest then go on to Bangladesh; while others go on to Myanmar (such as Bar-headed Goose, and Common Crane).

The remainder continue southwards

down to the peninsula through the great Rann of Kutch and north Gujarat though they avoid the Thar Desert. This inflow is further joined and augmented by the winter migrants from the Mediterranean and Middle East regions - recognized as the fourth most important flyway. Similarly the Tsangpo or Brahmaputra river provides the route which connects north-east Asia to the south-east Asian peninsula.

The different species use different routes depending on their ability to climb over the Himalayas and adequate staging areas in the Tibetan Plateau to the north and the Indian plains to the south. Therefore, some species are keeping to the lower passes and river valleys, while others (like the Bar-headed Goose and Demoiselle Crane) perhaps going across at higher points as well. It may be pertinent to mention the instance of a dead Tufted Duck reported in the high Himalayas by Lavkumar Khacher.

The following three examples of different species groups substantiate this.

Demoiselle Crane: Migrating to India have been followed and observed flying through the mountain passes in Nepal. Demoiselle Cranes breeding as far east as 50° 05' N, 115° 40' E at Lake Barun-Torey in Chita, southern Russia have been recorded in Gujarat by travelling approximately 4,917 km (Varu and Trivedi, 2003). These birds must use the Himalayas to cross over. Simba Chan of the Wild Bird Society of Japan has plotted the migration route of a satellite-marked Demoiselle Crane into India from Mongolia - over the Himalayas.

Great Cormorant: Birds ringed at Qinghai Hu in China have been recovered in Arunachal Pradesh and Meghalaya. These must come straight down through the passes (Sureshkumar, 2003).

Bar-headed Goose: Recent studies by Wildlife Institute of India and Aligarh Muslim University on the migration of Bar-headed Geese through satellite marking of a bird at

Bharatpur and its migration into China was recorded over the Himalayas (Javed *et al.*, 2003).

Lacking or large network of people studying migration of waterbirds in the region, however, we are unable to understand the importance of this central eastern Himalayan region, though using ringing and recovery and limited satellite telemetry work, for the entry of migratory waterbirds into India.

One of the most important and common techniques used by scientists to study bird migration is 'banding' or "ringing" It involves tying a numbered or coded light metal band on the leg of a bird. Each band contains a unique number with information regarding the date and place of banding of the bird. Another popular method is the use of colour markers as leg bands and flags, neck collars or wing tags. Sometimes more than one colour band is tagged to a bird. The advantage of this method is that these markers are very conspicuous and can be seen even when the bird is in flight. Details of the name of the species, date and location of sighting and the colour combination are coded. The credit for the available knowledge on migratory behaviour goes primarily to the Bombay Natural History Society, which has been carrying out field studies on these aspects, including regular ringing of birds, since the beginning of the twentieth century.

The role of bird ringing in the study of waterbird ecology

S. Balachandran, Bombay Natural History Society, Mumbai

Migratory birds, especially waterbirds (waders and ducks) are relatively interesting and challenging groups to study as they migrate from the arctic tundra to tropical Asia and to southern temperate latitudes. Some nest in one country, migrate through others and spend the non-breeding (winter) period

in yet others, often on a different continent. BNHS is the only organization in India which has undertaken bird migration studies during the last four decades by ringing over 400,000 birds. Based on these studies the breeding zones, migratory routes and stopover sites of over forty species have been well documented. The birds ringed in India have been recovered in fourteen countries, including Australia and South Africa in the Southern Hemisphere. The study also yielded other information pertaining to migration, such as arrival and departure dates, the period for which birds pause on their journey to feed and rest, the degree of regularity with which individual birds return to the summer and winter quarters used in previous years. All these interesting findings would not have been possible without bird ringing. However, we are not in a position to pinpoint the migratory routes and breeding origins of most migratory species wintering and passing through India. This was mainly due to the lack of consistent and intensive bird ringing in India.

Today, bird ringing is accepted as a vital tool of ornithology, particularly important for studying the life histories, population dynamics and movements of birds. Besides the scientist's contribution, much of the data for this work can be gathered by well-trained amateur ornithologists whose motivation is not money but the simple privilege of working with birds for the ultimate purpose of conservation. A major task of ringing is to provide biological data upon which sound conservation policies can be based.

Scope of bird ringing

1. To discover the routes normally followed by migrants and the important resting areas for each species;
2. To map, in as much detail as possible, the winter quarters of every breeding population and vice versa;

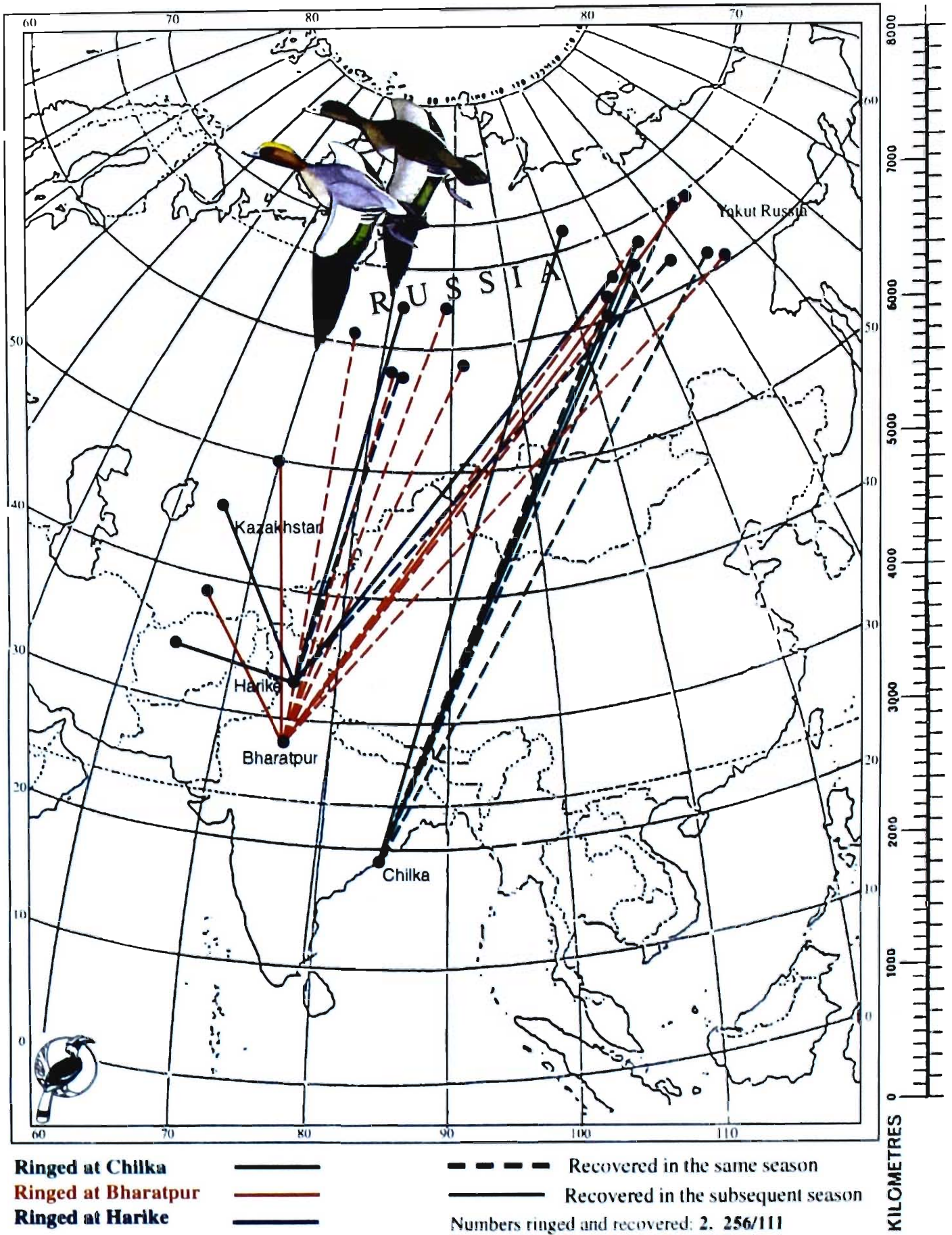
3. To differentiate the partial, long distant, passage and wintering migrants among the migratory species;
4. To investigate juvenile dispersal and colonization in new areas, and territory of individual pairs;
5. To discover the average life expectancy of each species and such related features as the age at which breeding first occurs, whether breeding continues into old age and maximum life span;
6. To monitor the major population changes in certain common species by measuring: (a) annual variation in the numbers, cause and seasonal distribution of deaths; (b) the varying proportion of young birds in the population from season to season and year to year.

Bird ringing

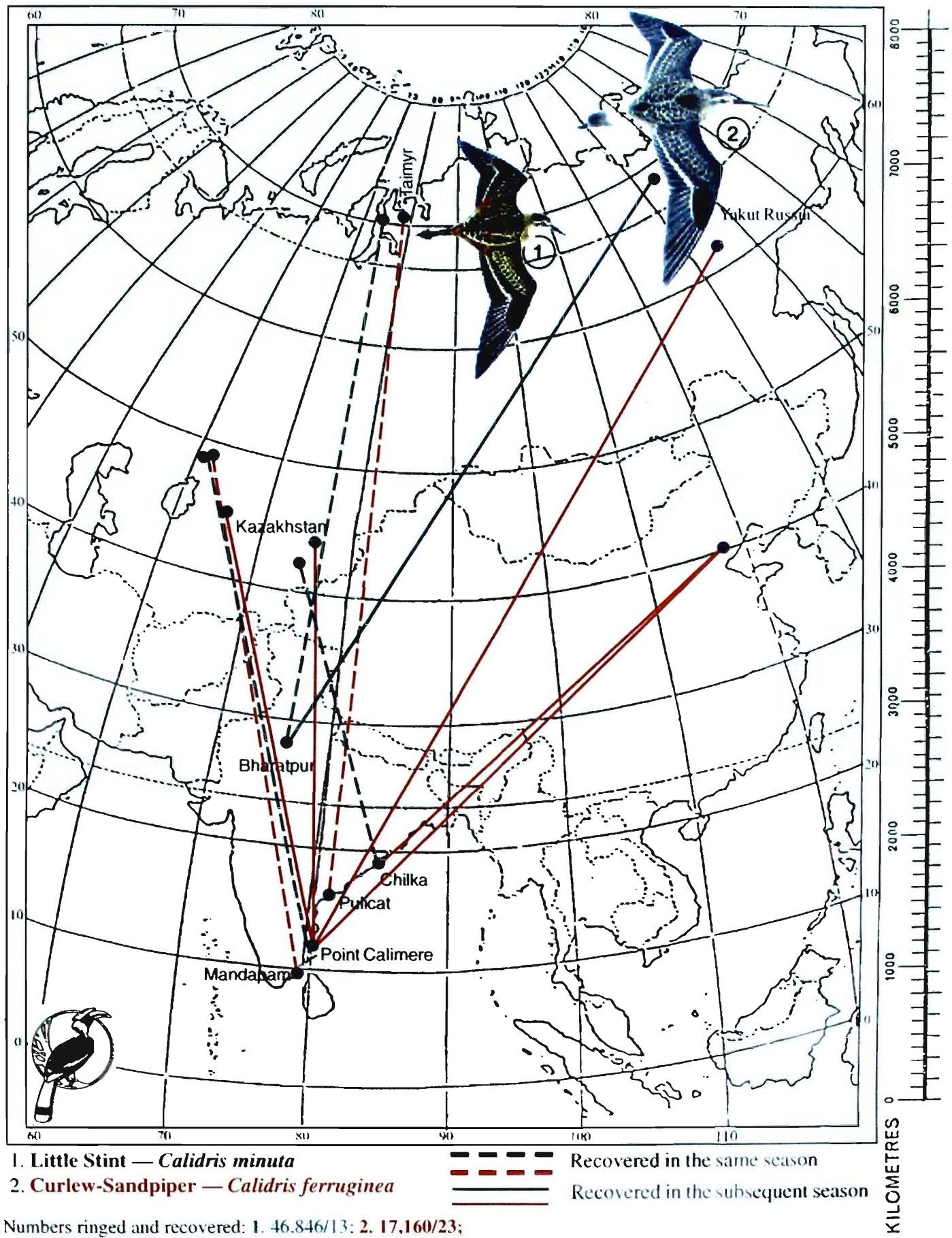
Bird ringing is a research method based on the individual marking of birds by putting a numbered ring on the leg. Any record of a ringed bird, either through recapture or subsequent release, or on the occasion of its final recovery as a dead bird, will tell us a lot about its life, particularly its movements. Tracking back the journey of ringed birds allows us to define their migratory routes and staging areas, so providing crucial information for the planning of integrated systems of protected areas for our birds. Other information obtained from recoveries and recaptures include population parameters (e.g. survival estimates, lifetime reproductive success), which are essential to determine the cause of changes in the population sizes.

Information provided by bird ringing

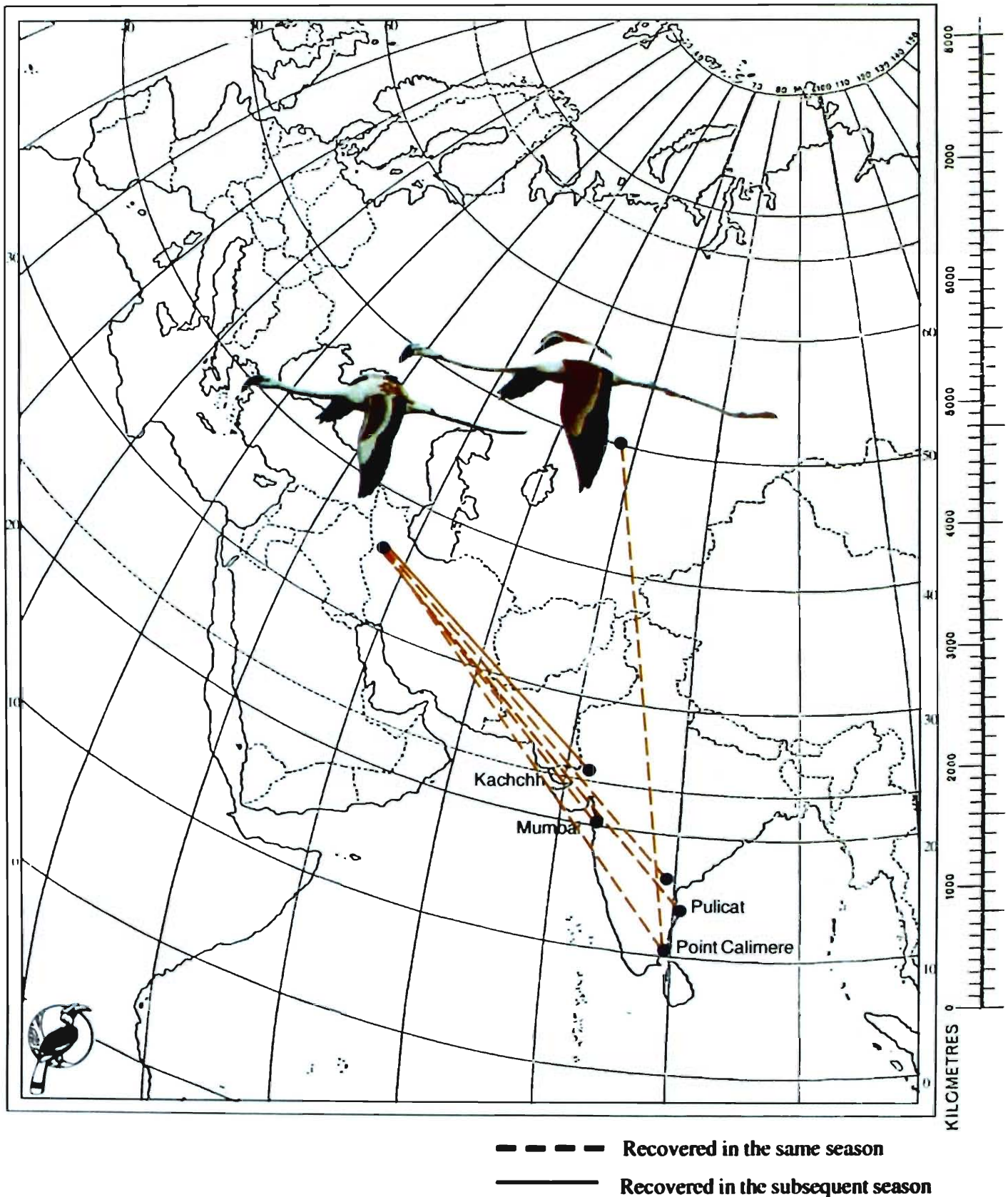
Different types of useful information can be recorded when birds are caught for the purpose of ringing. These include the age, the sex of the bird and a variety of measurements (Bio-metrics) which can be used to characterize different populations, the amount



Map 1.9 Recovery pattern of Eurasian Wigeon *Anas penelope* (Source: Bombay Natural History Society, Mumbai)



Map 1.10 Recovery pattern of Sandpiper *Calidris* (Source: Bombay Natural History Society, Mumbai)



Map 1.11 Recovery pattern of Flamingo *Phoenicopterus roseus* (Source: Bombay Natural History Society, Mumbai)

of fat stored by migratory species, the state of feather moult, as well as the habitat in which the birds were caught. Single birds can be recaptured by other ringers, resighted or recovered by members of the public in a variety of different ways (dead, car hits, shot).

If a bird is subsequently recaptured by another ringer, repeated measurements make it possible to study different aspects of the annual life-cycles, such as body mass, changes prior to migration or the seasonal progression of moult.

Ringling currently provides the only way to monitor the survival rates of a wide range of migratory species in the long term. Thus, the estimation of survivals can be considered a “keystone” contribution towards conservation.

Environmental changes directly affect the demographic rates of bird population (e.g. breeding success, survival rates), and these changes, in turn, determine population changes. The monitoring of survival rates is one of the most important conservation functions of ringing, since it can alert conservationists to incipient population decline and indicate their demographic causes.

Habitat use

Many migrants depend upon particular habitats during the migrant season, which may be different from their original habitats. Migrants require suitable feeding sites located along their migration routes. Standardized mist netting of birds at migration stopover sites is a good method for assessing the habitat preferences of migrating birds.

Fat reserves for migration

The energy costs of migration are very high. The migration of ducks or arctic shorebirds regularly exceed 5,000 kilometres in each direction from the summer breeding areas to their south Indian wintering grounds. These and other migrants must cross large areas of inhospitable terrain, such as deserts or open seas. In order to perform these extraordinary endurance flights long-distance migrants require considerable energy reserves. Only a few birds such as swallows, are able to collect food while actually migrating. For most birds the main fuel for migratory flight is fat. Some species of birds put on a small amount of fat at a series of fattening sites spread along their migration

routes, while others store large amount of fat and then undertake very long journeys. Birds that have to cross wide deserts or seas must start the journey with enough fuel for the entire journey and this can require huge amounts of fat.

Migrants who fail to acquire sufficient fuel along their migration route will perish. The identification and protection of important fuelling areas are a prerequisite for the effective conservation of migrants. Unfortunately, even this basic knowledge is lacking for most species. An added complication for conservation planning is the variety of migration strategies employed by various migrants. Those species which migrate by a series of short flights need to carry less fat, but depend upon a network of suitable stopover sites en route. The disappearance of one site is unlikely to be catastrophic because these ‘hoppers’ can easily move to the next site. Long haul migrants, on the other hand, need to carry a lot of fat and may depend upon one key stopover site (or a few) for refuelling. If this site were to be destroyed then large numbers of birds might die. Information about body mass and visible fat reserves at successive stopover sites are of great importance for the study of migration strategies and the identification of the important fuelling sites. Such information can easily be collected during co-ordinated ringing operations.

Moult

Since the feathers of birds are exposed to wear and tear, birds renew their plumage at least once a year, a process known as moulting. The timing and location of moult vary enormously between species. Some replace all feathers in a short period whilst others may divide the moult into two or three phases and may moult parts of the plumage twice a year. Such birds may use several sites for moulting.

Periods of moulting are particularly stressful for birds. The growth of new feathers costs energy, the temporary loss of body feathers leads to decreased insulation and the loss of flight feathers reduces manoeuvrability in flight. Knowledge of the locations and timing of moult is another indispensable piece of information for effective conservation measures. During the handling of birds for ringing, the status of feather growth, especially the flight feathers (wing and tail feathers), could easily be documented. From the pattern of moult young birds can be easily distinguished from adult birds, especially on the migrant waders. This will help to determine the recruitment rate and the status breeding at the breeding sites.

The acquisition of fat stores for migration and the process of moult require suitable habitats along the bird migration routes. The identification of migratory routes and fuelling and moulting areas is a prerequisite for effective conservation measures. For most birds, however, we have fragmented knowledge. These gaps in the knowledge of bird migration can be bridged only through undertaking extensive bird ringing involving both amateurs and professionals in different parts of the country.

Satellite tracking in studies of waterbird migration

The importance of conventional radio telemetry in documenting the migratory routes of birds like cranes is well known. The use of satellite telemetry transmitters with very high frequency signals from weather satellites has been found very effective since they can locate the position of a migratory bird with an accuracy of 150 m. Satellite telemetry is now used extensively for the conservation of cranes in Asia. The end-user can receive his data from earth stations through the processing centre. The earth station gets the signals from a weather satellite that uses the

signal from 'Platform Transmitter Terminals' (PTTs) attached to the birds.

This system allows us to track birds equipped with transmitters around the world (Fig. 1.3), indicating their migration routes and the homing ranges. Satellite-tracking surveys have also helped with formulating conservation strategies, as they show migration routes and important breeding and rest-sites. The use of this technology has been successfully demonstrated by studies on Cranes. It is now possible to track bird species weighing only 1 kg, using compact transmitters devised by NTT/Toyocom (T-2060, 15 g), and Microwave Telemetry (PTT-100, 20 g), and the migration routes of many other bird species have been studied using the Argos system (Ueta, 2000).

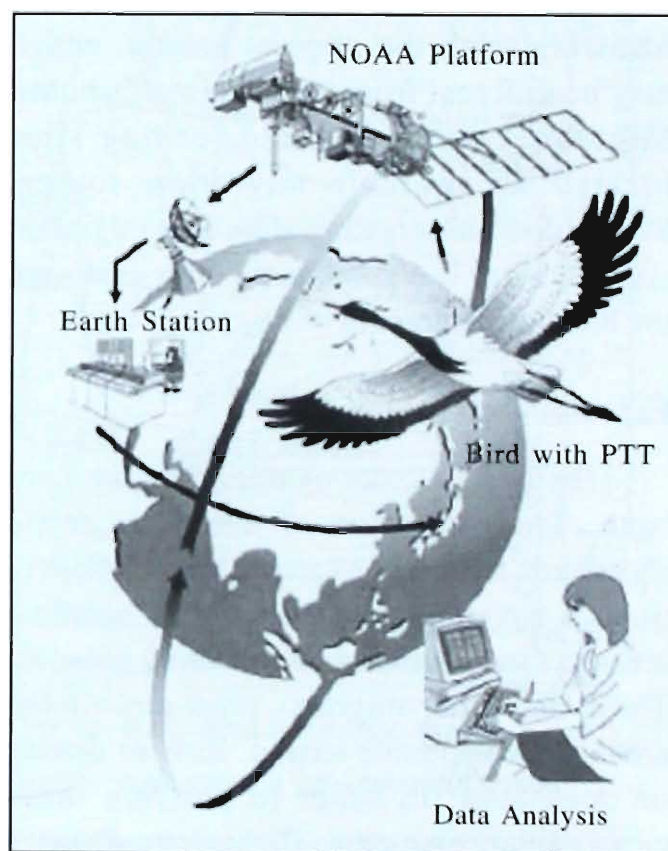


Fig. 1.3 Argos System (Source: Ueta, 2000)

Scope of satellite telemetry studies

The behavioural pattern of many migrant waterbirds is different on their wintering grounds from their breeding areas; for instance Cranes on their breeding terrain are

suspicious, spaced wide apart in distant areas. While in wintering areas they are gregarious and found in large flocks, often foraging in agricultural fields, commonly with Demoiselles. Therefore, it is significantly easier to capture and deploy transmitters on them in their wintering areas rather than in breeding areas.

It is desirable to document all aspects of the ecology of such birds for effective conservation strategies, and satellite telemetry is quite an effective device to do it. In many species the migration routes and behaviour between autumn and spring migration vary; it is therefore worth putting transmitters on birds in breeding areas as well as wintering areas.

Satellite telemetry studies on wetland birds in India

Though more than hundred wetland birds are winter migrants to India from across the Himalaya, very little is known about their migration routes due to lack of information and inadequate application of satellite telemetry studies in our country. Contrary to this, such studies have been taken up extensively in Europe, Asia, Africa and North America (Table 1). Enhanced information on satellite tracking from India would be extremely useful in wetland conservation measures.

The use of this technology in the Indian subcontinent was limited to one study in 1994. In 1998–1999, the first long-term project using satellite tracking in India was started on cranes, when three Eurasian cranes (*Grus grus*) were fitted with satellite transmitters or platform terminal transmitters (PTTs) in Keoladeo National Park (KNP), Bharatpur and tracked to their Siberian breeding grounds (Javed *et al.*, 2003). Recently, the application

of the technology was demonstrated in a workshop with the capture of a Bar-headed Goose (*Anser indicus*), which was tracked to its likely breeding areas in Tibet (Fig. 1.4) (Javed *et al.*, 2000).

Table 1.1 Some Indian Wetland Bird species that were tracked in their migration routes by satellite-tracking

English name	Scientific name
Black Stork	<i>Ciconia nigra</i>
White Stork	<i>Ciconia ciconia</i>
Osprey	<i>Pandion haliaetus</i>
White-tailed Sea-Eagle	<i>Haliaeetus albicilla</i>
Lesser Spotted Eagle	<i>Aquila pomarina</i>
Greater Spotted Eagle	<i>Aquila clanga</i>
Steppe Eagle	<i>Aquila nipalensis</i>
Imperial Eagle	<i>Aquila heliaca</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Whooper Swan	<i>Cygnus cygnus</i>
Bean Goose	<i>Anser fabalis</i>
White-fronted Goose	<i>Anser albifrons</i>
Snow Goose	<i>Anser caerulescens</i>
Common Crane	<i>Grus grus</i>
Black-necked Crane	<i>Grus nigricollis</i>
Hooded Crane	<i>Grus monacha</i>
Siberian Crane	<i>Grus leucogeranus</i>
Demoiselle Crane	<i>Anthropoides virgo</i>

Source: Ueta (2000).

*1.6 Major Waterbird Flyways

The waterbirds of Asia we know are truly international travellers undertaking long and sustained north-south movements annually. The available data on their regular seasonal movements indicate that the main migratory

*Source: Asia-Pacific Migratory Waterbird Conservation Committee (2001).

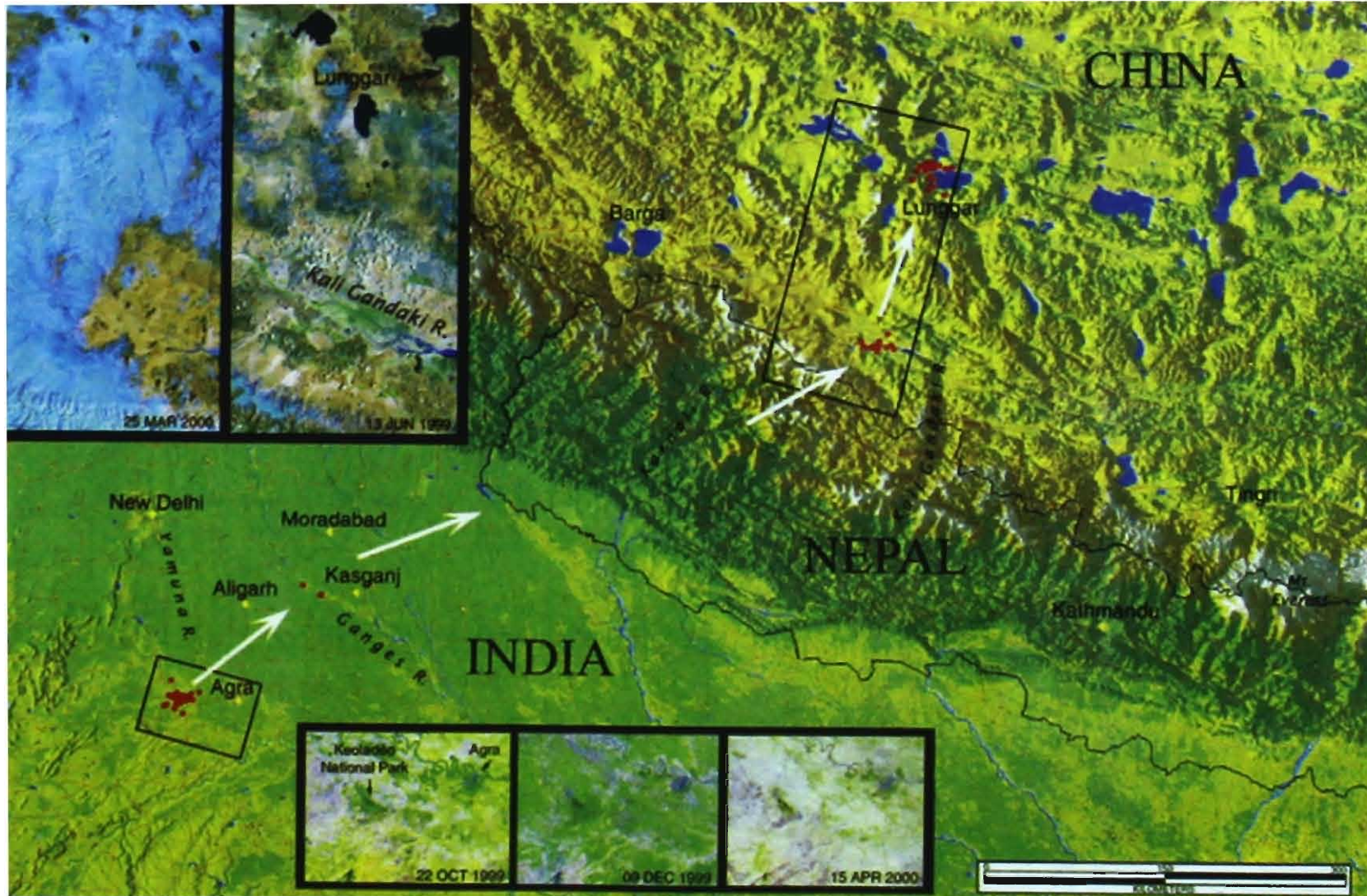


Fig. 1.4 The spring migration and possible breeding area of a Bar-headed Goose marked at Keoladeo Ghana National Park (KNP), Bharatpur, India. Red circles indicate different locations, although some circles overlap. White arrows describe the general migration route from KNP to a stopover near Kasganj, India (24 Mar.) a staging area near Parang, Tibet (25 Mar.) and a possible area near Lunggar, Tibet (3 Apr.). *Source:* Choudhury, B.C. (personal communication) from a report by Javed, S., Takekawa, J.Y., Douglas, D.C., Rahmani, A.R., Choudhury, B.C., Landfried, S.L., and Sharma, S. (2000) Documenting Trans-Himalayan migration using satellite telemetry. A report on the capture, deployment and tracking of Bar-headed Geese (*Anser indicus*) from India. Department of Wildlife Sciences, AMU, Aligarh and Wildlife Institute of India, Dehra Dun, p.44.

routes between Eurasia on the one hand, and South and South-East Asia on the other, have two well-defined pathways, that is, the Central Asian-Indian flyway and the East Asian-Australian flyway. The first is the major route between Siberia and central Asia on the northern side and the Indian peninsula in the south.

Due to such large scale and long-distance waterbird migration through Eurasia, crossing many international boundaries, the efforts of one country alone to protect their wetland habitats is not possible. It was felt that active co-operation between Eurasian and Pacific countries is needed if the waterbirds are to fly unhindered 'up' and 'down' their flyways.

This resulted in the promulgation of the 'Convention on Wetlands of International Importance Especially as Waterfowl Habitat' - the Ramsar Convention. It came into force in December 1975 with seventy countries as state parties. The convention lays down specific guidelines for the conservation of wetlands within the territory of individual states and co-operation in their management.

Asia-Pacific Conservation Initiative

In recognition of the threats to migratory waterbirds and the need for action to conserve all waterbirds and their habitats, the Asia-Pacific Migratory Waterbird Conservation Strategy: 1996-2000 was developed. The Strategy has been actively supported by the governments of Australia and Japan and co-ordinated by Wetlands International.

The Strategy has been very successful in promoting international co-operation and an awareness of the need to work together to promote conservation. A number of international and national activities have been undertaken, primarily through the implementation of three regional migratory waterbird conservation action plans (shorebirds, cranes and Anatidae) including

establishing of three networks of sites of international importance for these groups of waterbirds in the East Asian-Australasian Flyway. The networks (as at December 2004) comprised 82 sites in 13 countries with new sites being added each year.

Based on the successes of the Strategy over the past five years, the Migratory Waterbird Conservation Committee (MWCC) recommended the development and implementation of this second Strategy for the period 2001-2005.

The Asia-Pacific Migratory Waterbird Conservation Strategy: 2001-2005 aims to continue and expand on the successes of the previous Strategy by providing the international framework for the conservation of migratory waterbirds and their habitats in the Asia-Pacific region into the 21st century.

The Strategy outlines eight key elements in promoting the conservation of migratory waterbirds and their habitats:

1. Action plans for species-groups and globally threatened species.
2. Effectively managed networks of sites that are internationally important for migratory waterbirds.
3. Raised awareness of waterbirds and their link to wetland values and functions throughout the region and at all levels.
4. Increased capacity of government agencies and non-government organisations to implement conservation action for migratory waterbirds.
5. An enhanced knowledge base and increased information exchange for the sound management of migratory waterbirds and their habitats.
6. Harmonised national and state policies and legislation as a foundation for the conservation of migratory waterbirds and

their habitats.

7. Enhanced organisational relationships at all levels to increase cooperation and deliver greater conservation benefits.
8. Adequate planning and resources to implement the Strategy.

Over the next five years the Strategy aims to have done the following:

- achieved implementation of Action Plans for three species-groups in the East Asian-Australasian Flyway, selected globally threatened species, and the Central Asian-Indian Flyway;
- established effective networks of sites in the flyways to conserve migratory waterbirds and their important habitats;
- built and strengthened capacity of governments and NGOs to sustainably manage waterbirds and wetlands primarily by providing training to managers of important sites;
- promoted conservation education, public and community awareness at the international, national and local level through the development of products and programmes;
- enhanced programmes to monitor waterbird diversity and abundance at important sites; through improving our knowledge base of wetlands by contributing to regional inventories;
- improved our understanding of migration patterns and conservation needs of waterbirds;
- promoted the implementation of improved national policy and legislation to ensure management of waterbirds and their habitats;
- improved links between local communities at important sites;

- promoted the sharing of knowledge and skills through various fora (meetings, publications, newsletters, web sites, and so on);
- and mobilised at least USD 5 million to achieve these activities.

Implementation of the Strategy will require co-operation between governments, conventions, international and national corporations, bilateral and multilateral donor agencies, international and national non-governmental organisations and local communities.

1.7 Watching Wetland Birds

Birds are also known as ‘glorified reptiles with feathers’ Birds were not the first group of flying creatures. With the development of feathers, however, their unique feature, birds were able to evolve flexible and effective wings from the forelimbs alone, thus making the hind limbs free. In the process they overcame the most serious impediment of their predecessors such as pterosaurs.

The true ability to fly gave birds immense value in escaping danger from predators; thus they are, therefore, able to carry on their activities in broad daylight in full view of the observer. Though many other animals, such as mammals, are much more varied and fascinating in their behaviour, at the same time they are secretive and generally nocturnal. Therefore, their study remains a specialised activity. In contrast birds can be observed, studied and enjoyed anywhere, be it in a woodland or a wetland, by both amateurs and experts alike, thus making bird-watching such a popular activity all over the world.

The key to fruitful and satisfactory bird watching lies in their identification. Therefore, the first step lies in learning the basic techniques of bird observation (identification),

though some species are always difficult to name even for an experienced bird watcher. The major problem is that the bird watcher either fails to record the diagnostic features which are present or observe the absence of others, when one gets only a fleeting glimpse of the bird in nature. Observing birds correctly, therefore, needs much patience, and a basic knowledge of bird plumage, habits, habitats and seasons.

The first step towards the right determination of bird species would be to study its important features such as size, shape, profile, colour, bill, legs, plumage and pattern. The pattern and style of flight including its landing behaviour are also very important for identification. At the same time the habitat and the flight season must always be noted for cross-checking the identification. In addition to the physical appearance, the song or call, flight pattern and behaviour are also useful clues.

A well-equipped bird watcher should always carry with him a good binocular (preferably 8 x 40); a telescope along with illustrated field guides, notebook, pencil and census data sheets. Waterproof dull olive green/khaki clothing is also desirable. Waterfowl watching becomes easier by quietly using 'hides' along an embanked road or a footpath out of the sight of the birds. An enthusiastic bird watcher, especially for migratory anatids, should venture out at night in adjoining fallows and arable cropland around the wetlands to watch these birds foraging nocturnally on crops since many species such as Brahminy Shelduck and Bar-headed Goose, disperse daily from the wetland at dusk.

The practice of regularly recording observations in the field, which may include the habits, habitat and outline sketch of the bird showing major features will be handy in the lab or library for such species where field identification is not possible. The size

estimation, where the chances of error are always high, must be done very carefully and it is advisable that one should develop the habit of comparing the size with a familiar species.

Regular seasonal counts of birds are often of immense value in monitoring a wetland and formulating the management plan for conserving the species, though these studies should be undertaken preferably in consultation with an experienced ornithologist. Lakes, jheels, reservoirs, tanks, rivers and marshes provide the main wetland habitats in varying proportions. During the breeding season waterside reeds like *Typha* and *Ipomoea* together with scattered trees furnish the main area for nesting. Though these niches are most difficult to approach, providing excellent cover for inhabitant activities. Use of hide and 'sit and watch' are the best techniques for bird-watching in such areas, since most of such species are skulkers, though sometimes they may betray their presence with loud calls.

For studying migratory species, especially during winter (November to March), open water and sand banks of lakes, reservoirs and rivers become areas of major interest to bird watchers. A variety of ducks and waders suddenly appear in very large numbers, as they either pause in their long migratory journeys to feed and rest or use the wetland longer as a winter home. Therefore, during winters large flocks of ducks and geese will be of major interest to bird watchers, though the persistent ones may also be rewarded by the sighting of rare and/or vagrant species. Thus, in a tropical country like ours the best season to watch waterbirds is winter when one can see both the resident and migratory species in plenty, though bird-watching in India is a rewarding experience any time of the year. In high altitudes of the Himalayas, where many species of waterbirds breed, May and June are good times for bird-watching; in the trans-Himalayan

region which falls in the rain-shadow zone, the SW monsoon from July to September could be an ideal time to explore birds.

Photographing birds is a challenging and painstaking job in the field. This involves not only a thorough knowledge of photographic techniques but also of bird behaviour. Special equipment like Zoom lenses (from 300 mm to 1000 mm focal lengths) is often needed in addition to single lens reflex cameras to overcome the distance problem between the bird and the photographer. Since these lenses are not only heavy but also have limited depths of field, no aperture adjustment and there is limited control over exposure time, it is advisable to use Converters (1.5X or 2X) to overcome this handicap at least during the daytime. Invariably a sturdy tripod must be carried in the field.

Digiscoping or Digital Photography

Banard Lau, Malaysia

Digiscoping is just the combination of Digital Camera and Spotting Scope, using the Afocal method of photography. Cameras like the Nikon Coolpix Series, the CP 990, CP 995, and the CP 4500 are eminently suitable for digiscoping; as their small diameter objective lenses of 28 mm diameter are either of the same size or smaller than the lens diameter of the eyepieces of most spotting scopes. Cameras with the large objective lens diameter of 37 mm, 43 mm, 55 mm have vignetting problems that are difficult to surmount. Vignetting is the halo of darkness that surrounds the focused subject in a picture. Digicams and even Video Cameras can be attached to a spotting scope via a

suitable adapter. Most reputable makes of spotting scopes come with adapters for the attachment of the more popular digicams.

To avoid vignetting, the optical zoom of the digicam is employed with the eyepiece of the scope and the objective lens of the camera optimally positioned - in most cases, as close as possible. It is recommended to use Infinity Mode setting or Macro setting, or even both, if the camera allows it, to cancel the effects of vignetting. The Nikon CP series is most suitable for Digiscoping because of its rotatable LCD, so one need not contort body to view through the LCD.

Digiscoping is a more economical way to take high resolution photographs of birds. The quality telephoto lenses of 400mm and above are costly and the magnifying power of such lenses cannot come close to that of a spotting scope of focal length 12500 mm, with a variable zoom eyepiece of 20 - 60X. Couple that to the Optical zoom of the camera, 3-4X, cropping the image on the computer to enlarge 2-4 times, and the average magnification comes to $40 \times 3 \times 4 = 480$ times. If the picture is recorded on high image quality the resolution is preserved.

The digital dark room has to be mastered by the Digiscoper. Most digiscopers use Adobe PhotoShop to enhance and correct the deficiencies of their pictures. However, there is no substitute for a well-composed, well-exposed shot. The best PhotoShop is no PhotoShop. The Digiscoper has to discipline himself to adjust to the correct settings particularly, shutter speeds and EV (exposure value) compensation.

2. BIONOMICS OF WETLAND BIRDS

2.1 Checklist

Sl. No.	HBI No.	Common name	Scientific name	Conservation Status				Residential Status	Abundance Status	Population trend	SAPE 2002 (1%)
				Globally threatened	CITES (2002) Appendix	CMS Appendix	W(P)Act 1972 Schedule				
1	2	3	4	5	6	7	8	9	10	11	12
Waterbirds											
Diver		Gaviidae									
1	(1)	Black-throated Diver	<i>Gavia arctica</i> (Linnaeus, 1758)			II		WM	Va		-
Grebes		Podicipedidae									
2	(5)	Little Grebe	<i>Tachybaptus ruficollis</i> (Pallas, 1764)				IV	R/LM	Com	INC	10,000
3	(4a)	Red-necked Grebe	<i>Podiceps griseigena</i> (Boddaert, 1783)			II	IV	WM	UnCom		100
4	(3)	Great Crested Grebe	<i>Podiceps cristatus</i> (Linnaeus, 1758)				IV	R/WM	UnCom	INC	250
5	(N)	Horned Grebe	<i>Podiceps auritus</i> (Linnaeus, 1758)				IV	WM	Va		250
6	(4)	Black-necked Grebe	<i>Podiceps nigricollis</i> Brehm, 1831				IV	WM/R	Ra	INC	250
Petrels & Shearwaters		Procellariidae									
7	(6)	Cape Petrel	<i>Daption capense</i> (Linnaeus, 1758)						Va		-
8	(N)	Barau's Petrel	<i>Pterodroma baraui</i> (Jouanin, 1964)					SM	Va		-
9	(13b)	Bulwer's Petrel	<i>Bulweria bulwerii</i> (Jardine & Selby, 1828)					SM	Va		-
10	(13a)	Jouanin's Petrel	<i>Bulweria fallax</i> Jouanin, 1955					SM	Ra		-
11	(7)	Streaked Shearwater	<i>Calonectris leucomelas</i> Temminck, 1835						Ra		-
12	(9)	Wedge-tailed Shearwater	<i>Puffinus pacificus</i> (Gmelin, 1789)					SM	Va		-
13	(8)	Flesh-footed Shearwater	<i>Puffinus carneipes</i> Gould, 1844					PM	LCom		-
14	(11)	* Audubon's Shearwater	<i>Puffinus lherminieri</i> Lesson, 1839					R?	Com		-

1	2	3	4	5	6	7	8	9	10	11	12
15	(12)	* Persian Shearwater	<i>Puffinus persicus</i> Hume, 1872					WM	Va		-
		Storm-Petrels	Hydrobatidae								
16	(14)	Wilson's Storm-Petrel	<i>Oceanites oceanites</i> (Kuhl, 1820)					SM	LCom		-
17	(N)	White-faced Storm-Petrel	<i>Pelagodroma marina</i> (Latham, 1790)					PM	Ra		-
18	(15)	Black-bellied Storm-Petrel	<i>Fregetta tropica</i> (Gould, 1844)					SM	Va		-
19	(16)	* Swinhoe's Storm Petrel	<i>Oceanodroma monorhis</i> (Swinhoe, 1867)					SM	Va		-
		Tropicbirds	Phaethontidae								
20	(17)	Grey-backed Tropicbird	<i>Phaethon aethereus</i> Linnaeus, 1758					WM	Ra		-
21	(18)	Red-tailed Tropicbird	<i>Phaethon rubricauda</i> Boddaert, 1783					R	Ra		-
22	(19)	Yellow-billed Tropicbird	<i>Phaethon lepturus</i> Daudin, 1802					R	Ra		-
		Pelicans	Pelecanidae								
23	(20)	Great White Pelican	<i>Pelecanus onocrotalus</i> Linnaeus, 1758			I, II	IV	R/WM	LCom		230
24	(21)	* Spot-billed Pelican	<i>Pelecanus philippensis</i> Gmelin, 1789	GT/Vu			IV	R/LM	LCom	DEC	40
25	(22)	* Dalmatian Pelican	<i>Pelecanus crispus</i> Bruch, 1832	GT/Vu	I	I, II	IV	WM	Ra	STA	110
		Boobies	Sulidae								
26	(23)	Masked Booby	<i>Sula dactylatra</i> Lesson, 1831					R	Ra		-
27	(24)	Red-footed Booby	<i>Sula sula</i> (Linnaeus, 1766)					R	Va		-
28	(25)	Brown Booby	<i>Sula leucogaster</i> (Boddaert, 1783)					R	Va		-
		Cormorants/Shags	Phalacrocoracidae								
29	(28)	Little Cormorant	<i>Phalacrocorax niger</i> (Vieillot, 1817)				IV	R/LM	Com		1,500
30	(27)	Indian Shag	<i>Phalacrocorax fuscicollis</i> Stephens, 1826				IV	R/LM	Com		300
31	(26)	Great Cormorant	<i>Phalacrocorax carbo</i> (Linnaeus, 1758)				IV	R/WM	Com		1,000
		Darter	Anhingidae								
32	(29)	Darter	<i>Anhinga melanogaster</i> Pennant, 1769	NT			IV	R/LM	LCom	DEC	40
		Frigatebirds	Fregatidae								
33	(31)	Great Frigatebird	<i>Fregata minor</i> (Gmelin, 1789)					SM	Va		-
34	(32)	Lesser Frigatebird	<i>Fregata ariel</i> (G. R. Gray, 1845)					SM	Va		-
35	(30)	Christmas Island Frigatebird	<i>Fregata andrewsi</i> Mathews, 1914	GT/Cr	I				Va	DEC	-
		Herons, Egrets & Bitterns	Ardeidae								
36	(49)	Little Egret	<i>Egretta garzetta</i> (Linnaeus, 1766)				IV	R/LM	Com		600
37	(50)	Western Reef-Egret	<i>Egretta gularis</i> (Bosc, 1792)				IV	R/LM	Ra		-

1	2	3	4	5	6	7	8	9	10	11	12
38	(51)	Pacific Reef-Egret	<i>Egretta sacra</i> (Gmelin, 1789)				IV	R	LCom		10,000
39	(35-36)	Grey Heron	<i>Ardea cinerea</i> Linnaeus, 1758				IV	R/WM	LCom		200
40	(34)	Goliath Heron	<i>Ardea goliath</i> Cretzschmar, 1827				IV		Va		1
41	(33)	White-bellied Heron	<i>Ardea insignis</i> Hume, 1878	GT/En			IV	R	VRa	DEC	6
42	(37-37a)	Purple Heron	<i>Ardea purpurea</i> Linnaeus, 1766				IV	R/LM	LCom	STA	250
43	(45-46)	Large Egret	<i>Casmerodius albus</i> (Linnaeus, 1758)				IV	R/LM	LCom	STA	250
44	(47, 48)	Median Egret	<i>Mesophoyx intermedia</i> (Wagler, 1829)				IV	R/LM	LCom		250
45	(44)	Cattle Egret	<i>Bubulcus ibis</i> (Linnaeus, 1758)				IV	R/AM	Com		–
46	(42-42a)	Indian Pond-Heron	<i>Ardeola grayii</i> (Sykes, 1832)				IV	R/LM	Com		10,000
47	(43)	Chinese Pond-Heron	<i>Ardeola bacchus</i> (Bonaparte, 1855)				IV	R/LM	Ra	STA	–
48	(38-41)	Little Green Heron	<i>Butorides striatus</i> (Linnaeus, 1758)				IV	R	Ra	DEC	250
49	(52)	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i> (Linnaeus, 1758)				IV	R/LM	LCom	STA	1,000
50	(53-54)	Malayan Night-Heron	<i>Gorsachius melanolophus</i> (Raffles, 1822)				IV	R	Ra		100
51	(55)	Little Bittern	<i>Ixobrychus minutus</i> (Linnaeus, 1766)				IV	R/LM	Ra		250
52	(57)	Yellow Bittern	<i>Ixobrychus sinensis</i> (Gmelin, 1789)				IV	R/LM	UnCom		–
53	(56)	Chestnut Bittern	<i>Ixobrychus cinnamomeus</i> (Gmelin, 1789)				IV	R/LM	LCom		–
54	(58)	Black Bittern	<i>Dupetor flavicollis</i> (Latham, 1790)				IV	R/LM	UnCom		1,000
55	(59)	Great Bittern	<i>Botaurus stellaris</i> (Linnaeus, 1758)			II	IV	WM	Ra		–
Storks			Ciconiidae								
56	(60)	Painted Stork	<i>Mycteria leucocephala</i> (Pennant, 1769)	NT			IV	R/LM	LCom	DEC	150
57	(61)	Asian Openbill-Stork	<i>Anastomus oscitans</i> (Boddaert, 1783)				IV	R/LM	LCom		1,250
58	(65)	Black Stork	<i>Ciconia nigra</i> (Linnaeus, 1758)		II	II	IV	WM/PM	UnCom		100
59	(62)	White-necked Stork	<i>Ciconia episcopus</i> (Boddaert, 1783)			II	IV	R	Ra	DEC	250
60	(63)	* European White Stork	<i>Ciconia ciconia</i> (Linnaeus, 1758)			II	IV	WM	LCom	INC	45
61	(64)	* Oriental White Stork	<i>Ciconia boyciana</i> Swinhoe, 1873	GT/En	I	I	I	WM	Ra	DEC	30
62	(66)	Black-necked Stork	<i>Ephippiorhynchus asiaticus</i> (Latham, 1790)	NT			IV	R	Ra	DEC	10
63	(68)	Lesser Adjutant-Stork	<i>Leptoptilos javanicus</i> (Horsfield, 1821)	GT/Vu			IV	R/LM	Ra	DEC	50
64	(67)	Greater Adjutant-Stork	<i>Leptoptilos dubius</i> (Gmelin, 1789)	GT/En			IV	R/LM	Ra	DEC	7
Ibises & Spoonbills			Threskiornithidae								
65	(71)	Glossy Ibis	<i>Plegadis falcinellus</i> (Linnaeus, 1766)			II	IV	R/WM/LM	UnCom	DEC	250
66	(69)	Oriental White Ibis	<i>Threskiornis melanocephalus</i> (Latham, 1790)	NT			IV	R/LM	LCom	STA	100

1	2	3	4	5	6	7	8	9	10	11	12
67	(70)	Black Ibis	<i>Pseudibis papillosa</i> (Temminck, 1824)	BRS (11)			IV	R	UnCom		100
68	(72)	Eurasian Spoonbill	<i>Platalea leucorodia</i> Linnaeus, 1758		II	II	I	R	LCom	STA	230
		Flamingos	Phoenicopteridae								
69	(73)	Greater Flamingo	<i>Phoenicopus ruber</i> Linnaeus, 1758				IV	R/WM/LM	LCom	STA	2,900
70	(74)	Lesser Flamingo	<i>Phoenicopus minor</i> (Geoffroy, 1798)	NT			IV	R/LM	LCom	INC	1,500
		Swans, Geese & Ducks	Anatidae								
71	(89)	Large Whistling-Duck	<i>Dendrocygna bicolor</i> (Vieillot, 1816)				I	R/LM	LCom	DEC	200
72	(88)	Lesser Whistling-Duck	<i>Dendrocygna javanica</i> (Horsfield, 1821)				IV	R/LM	LCom	DEC	10,000
73	(123)	White-headed Duck	<i>Oxyura leucocephala</i> (Scopoli, 1769)	GT/En	II	I	IV	WM	Ra	DEC	1
74	(87)	Mute Swan	<i>Cygnus olor</i> (Gmelin, 1789)				IV	WM	Va		250
75	(86)	Whooper Swan	<i>Cygnus cygnus</i> (Linnaeus, 1758)				IV	WM	Va		200
76	(84-85)	* Tundra Swan	<i>Cygnus columbianus</i> (Ord, 1815)				IV	WM	Va		5
77	(76-77)	Bean Goose	<i>Anser fabalis</i> (Latham, 1787)				IV	WM	Va		550
78	(79)	Greater White-fronted Goose	<i>Anser albifrons</i> (Scopoli, 1769)				IV	WM	Ra		150
79	(80)	Lesser White-fronted Goose	<i>Anser erythropus</i> (Linnaeus, 1758)	GT/Vu		I	IV	WM	Ra	DEC	110
80	(81)	Greylag Goose	<i>Anser anser</i> (Linnaeus, 1758)				IV	WM	Com	INC	150
81	(82)	Bar-headed Goose	<i>Anser indicus</i> (Latham, 1790)				IV	R/WM	LCom		560
82	(83)	Snow Goose	<i>Anser caerulescens</i> (Linnaeus, 1758)				IV	WM	Va		3
83	(75)	Red-breasted Goose	<i>Branta ruficollis</i> (Pallas, 1769)	GT/Vu (marginal to region)	II	I	IV	WM	Va	INC	880
84	(90)	Brahminy Shelduck	<i>Tadorna ferruginea</i> (Pallas, 1764)				IV	R/WM/PM	LCom		500
85	(91)	Common Shelduck	<i>Tadorna tadorna</i> (Linnaeus, 1758)				IV	WM	Ra		1,000
86	(116)	White-winged Duck	<i>Cairina scutulata</i> (S. Muller, 1842)	GT/En	I		I	R	Ra	DEC	5
87	(115)	Comb Duck	<i>Sarkidiornis melanotos</i> (Pennant, 1769)		II		IV	R/LM	UnCom	DEC	60
88	(114)	Cotton Teal	<i>Nettapus coromandelianus</i> (Gmelin, 1789)				IV	R/LM	LCom		1,000
89	(113)	Mandarin Duck	<i>Aix galericulata</i> (Linnaeus, 1758)				IV	WM	Va		200
90	(101)	Gadwall	<i>Anas strepera</i> Linnaeus, 1758				IV	WM	Com		1,500
91	(102)	Falcated Duck	<i>Anas falcata</i> Georgi, 1775				IV	WM	Ra		350
92	(103)	Eurasian Wigeon	<i>Anas penelope</i> Linnaeus, 1758				IV	WM	Com	INC	2,500
93	(100)	Mallard	<i>Anas platyrhynchos</i> Linnaeus, 1758				IV	R/WM	UnCom		750

1	2	3	4	5	6	7	8	9	10	11	12
94	(97-99)	Spot-billed Duck	<i>Anas poecilorhyncha</i> J.R. Forester, 1781				IV	R/LM	Com		500
95	(105)	Northern Shoveller	<i>Anas clypeata</i> Linnaeus, 1758				IV	WM	Com	DEC	10,000
96	(96)	Andaman Teal	<i>Anas gibberifrons</i> (Muller, 1842)	E			I	R	UnCom		8
97	(93)	Northern Pintail	<i>Anas acuta</i> Linnaeus, 1758				IV	WM	VCom	DEC	-
98	(104)	Garganey	<i>Anas querquedula</i> Linnaeus, 1758				IV	WM	VCom		2,500
99	(95)	Baikal Teal	<i>Anas formosa</i> Georgi, 1775	GT/Vu	II	I	IV	WM	Ra	INC	3,000
100	(94)	Common Teal	<i>Anas crecca</i> Linnaeus, 1758				IV	WM	VCom	DEC	4,000
101	(92)	Marbled Teal	<i>Marmaronetta angustirostris</i> (Ménétrières, 1832)	GT/Vu		I	IV	WM	Ra		50
102	(106)	Pink-headed Duck	<i>Rhodonessa caryophyllacea</i> (Latham, 1790)	GT/Cr	I		I	R	Probably Extinct	EXT	1
103	(107)	Red-crested Pochard	<i>Rhodonessa rufina</i> (Pallas, 1773)				IV	WM	LCom	DEC	1,000
104	(108)	Common Pochard	<i>Aythya ferina</i> (Linnaeus, 1758)				IV	WM	LCom	STA	10,000
105	(109)	Ferruginous Pochard	<i>Aythya nyroca</i> (Guldenstadt, 1770)	NT		I	IV	R/WM	LCom	DEC	-
106	(110)	Baer's Pochard	<i>Aythya baeri</i> (Radde, 1863)	GT/Vu			IV	WM	Ra	DEC	150
107	(111)	Tufted Pochard	<i>Aythya fuligula</i> (Linnaeus, 1758)				IV	WM	LCom	INC	10,000
108	(112)	Greater Scaup	<i>Aythya marila</i> (Linnaeus, 1761)				IV	WM	Va		3,000
109	(117)	Long-tailed Duck	<i>Clangula hyemalis</i> (Linnaeus, 1758)				IV	WM	Va		7,500 (E Asia)
110	(118)	Common Goldeneye	<i>Bucephala clangula</i> (Linnaeus, 1758)				IV	WM	Ra		250
111	(119)	Smew	<i>Mergellus albellus</i> Linnaeus, 1758				IV	WM	Ra		300
112	(122)	Red-breasted Merganser	<i>Mergus serrator</i> Linnaeus, 1758				IV	WM	Va		100
113	(120-121)	Common Merganser	<i>Mergus merganser</i> Linnaeus, 1758				IV	R/WM	LCom	STA	60
Cranes			Gruidae								
114	(325)	Siberian Crane	<i>Grus leucogeranus</i> Pallas, 1773	GT/Cr	I	I	I	WM	VRa	DEC	1
115	(323-324)	Sarus Crane	<i>Grus antigone</i> (Linnaeus, 1758)	GT/Vu	II		IV	R/LM	LCom	DEC	90
116	(326)	Demoiselle Crane	<i>Grus virgo</i> (Linnaeus, 1758)				IV	WM	LCom	INC	1,000
117	(320)	Common Crane	<i>Grus grus</i> (Linnaeus, 1758)				IV	WM	LCom		700
118	(322)	Hooded Crane	<i>Grus monacha</i> Temminck, 1835	GT/Vu	I	I	I	WM	Va	DEC	10
119	(321)	Black-necked Crane	<i>Grus nigricollis</i> Przevalski, 1876	GT/Vu BRS (05)	I	I		R/WM	VRa	STA	60

1	2	3	4	5	6	7	8	9	10	11	12
		Rails, Crakes, Moorhens & Coots	Rallidae								
120	(333)	Andaman Crake	<i>Rallina canningi</i> (Blyth, 1863)	E DD RRS (2)			IV	R	Ra		250
121	(331)	Red-legged Crake	<i>Rallina fasciata</i> (Raffles, 1822)				IV	R	Ra		–
122	(332)	Slaty-legged Crake	<i>Rallina eurizonoides</i> (Lafresnaye, 1845)				IV	R/LM	UnCom		–
123	(329-330)	Blue-breasted Rail	<i>Gallirallus striatus</i> Linnaeus, 1766				IV	R/LM	UnCom		–
124	(327-328)	Water Rail	<i>Rallus aquaticus</i> Linnaeus, 1758				IV	R/WM	LCom		–
125	(334)	Corn Crake	<i>Crex crex</i> (Linnaeus, 1758)	GT/Vu (Marginal to region)		II	IV	WM	Va	DEC	–
126	(342)	Brown Crake	<i>Amaurornis akool</i> (Sykes, 1832)				IV	R/LM	UnCom		–
127	(343-345)	White-breasted Waterhen	<i>Amaurornis phoenicurus</i> (Pennant, 1769)				IV	R	Com		=
128	(341)	Elwes's Crake	<i>Porzana bicolor</i> (Walden, 1872)	BRS (08)			IV	R	Ra		–
129	(335, 336)	Little Crake	<i>Porzana parva</i> (Scopoli, 1769)			II	IV	WM	Ra		–
130	(337)	Baillon's Crake	<i>Porzana pusilla</i> (Pallas, 1776)			II	IV	R/WM	LCom		–
131	(338)	Spotted Crake	<i>Porzana porzana</i> (Linnaeus, 1766)			II	IV	WM	Ra		–
132	(339-40)	Ruddy-breasted Crake	<i>Porzana fusca</i> (Linnaeus, 1766)				IV	R/WM	UnCom	DEC	–
133	(346)	Watercock	<i>Gallicrex cinerea</i> (Gmelin, 1789)				IV	R/LM	LCom	DEC	–
134	(348-349)	Purple Moorhen	<i>Porphyrio porphyrio</i> (Linnaeus, 1758)				IV	R/LM	LCom		–
135	(347-347a)	Common Moorhen	<i>Gallinula chloropus</i> (Linnaeus, 1758)				IV	R/WM	Com	STA	–
136	(350)	Common Coot	<i>Fulica atra</i> Linnaeus, 1758				IV	R/WM	VCom	STA	15,000
		Finfoots	Heliornithidae								
137	(351)	Masked Finfoot	<i>Heliopais personata</i> (G.R. Gray, 1849)	GT/Vu BRS (09)				R	VRa	DEC	60
		Jacanas	Jacanidae								
138	(358)	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i> (Scopoli, 1786)				IV	R/LM/SM	UnCom	DEC	1,000
139	(359)	Bronze-winged Jacana	<i>Metopidius indicus</i> (Latham, 1790)				IV	R	LCom		–
		Painted-Snipes	Rostratulidae								
140	(429)	Greater Painted-Snipe	<i>Rostratula benghalensis</i> (Linnaeus, 1758)					R/LM	LCom		–
		Oystercatcher	Haematopodidae								
141	(360-361)	Eurasian Oystercatcher	<i>Haematopus ostralegus</i> Linnaeus, 1758				IV	WM	Ra	STA?	1,500

1	2	3	4	5	6	7	8	9	10	11	12
		Plovers, Dotterels & Lapwings	Charadriidae								
142	(372)	European Golden Plover	<i>Pluvialis apricaria</i> (Linnaeus, 1758)				IV	WM	Va		–
143	(373)	*Pacific Golden-Plover	<i>Pluvialis fulva</i> (Gmelin, 1789)				IV	WM	UnCom		750
144	(371)	Grey Plover	<i>Pluvialis squatarola</i> (Linnaeus, 1758)				IV	WM	UnCom		300
145	(378)	Common Ringed Plover	<i>Charadrius hiaticula</i> Linnaeus, 1758				IV	WM	Ra		2,100
146	(383)	Long-billed Ringed Plover	<i>Charadrius placidus</i> J.E. Gray, 1863				IV	WM	Ra		100
147	(379-380)	Little Ringed Plover	<i>Charadrius dubius</i> Scopoli, 1786				IV	R/WM	Com		1,000
148	(381-382)	Kentish Plover	<i>Charadrius alexandrinus</i> Linnaeus, 1758				IV	R/WM	LCom		1,000
149	(384-384a)	Lesser Sand Plover	<i>Charadrius mongolus</i> Pallas, 1776				IV	R/WM	LCom		1,000
150	(374)	Greater Sand Plover	<i>Charadrius leschenaultii</i> Lesson, 1826				IV	WM	UnCom		1,000
151	(376)	*Caspian Plover	<i>Charadrius asiaticus</i> Pallas, 1773				IV	WM	Va		480
152	(377)	*Oriental Plover	<i>Charadrius veredus</i> Gould, 1848				IV	WM	Va		700
153	(375)	Black-fronted Dotterel	<i>Euseyornis melanops</i> (Vieillot, 1818)				IV		Va		160 (Australian population)
154	(364)	Northern Lapwing	<i>Vanellus vanellus</i> (Linnaeus, 1758)				IV	WM	LCom		250
155	(370)	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i> (Boddaert, 1783)	BRS (11)			IV	R/LM	LCom		–
156	(369)	*River Lapwing	<i>Vanellus duvaucelii</i> (Lesson, 1826)				IV	R/LM	LCom		250
157	(365)	Grey-headed Lapwing	<i>Vanellus cinereus</i> (Linnaeus, 1758)				IV	WM	UnCom	DEC	1,000
158	(366-368)	Red-wattled Lapwing	<i>Vanellus indicus</i> (Boddaert, 1783)				IV	R/LM	Com		–
159	(363)	Sociable Lapwing	<i>Vanellus gregarius</i> (Pallas, 1771)	GT/Cr		I	IV	WM	Ra	DEC	2
160	(362)	White-tailed Lapwing	<i>Vanellus leucurus</i> (Lichtenstein, 1823)				IV	WM	LCom	INC?	1,000
		Sandpipers, Stints, Snipes, Godwits & Curlews	Scolopacidae								
161	(411)	Eurasian Woodcock	<i>Scolopax rusticola</i> Linnaeus, 1758				IV	R/AM/WM	LCom		–
162	(404)	Solitary Snipe	<i>Gallinago solitaria</i> Hodgson, 1831	BRS (05)			IV	R/AM/WM	Ra		1,000
163	(405)	Wood Snipe	<i>Gallinago nemoricola</i> Hodgson, 1836	GT/Vu BRS (05)			IV	R/AM/WM	Ra	DEC	60
164	(406)	Pintail Snipe	<i>Gallinago stenura</i> (Bonaparte, 1830)				IV	WM	LCom		–
165	(407)	Swinhoe's Snipe	<i>Gallinago megala</i> Swinhoe, 1861				IV	WM	Ra		1,000

1	2	3	4	5	6	7	8	9	10	11	12
166	(408)	Great Snipe	<i>Gallinago media</i> (Latham, 1787)	NT			IV	WM	Va	STA	350
167	(409)	Common Snipe	<i>Gallinago gallinago</i> (Linnaeus, 1758)				IV	R/WM	Com		–
168	(410)	Jack Snipe	<i>Lymnocyptes minimus</i> (Brünnich, 1764)				IV	WM	UnCom		–
169	(389-390)	Black-tailed Godwit	<i>Limosa limosa</i> (Linnaeus, 1758)				IV	WM	LCom	INC	1,000
170	(391-391a)	Bar-tailed Godwit	<i>Limosa lapponica</i> (Linnaeus, 1758)				IV	WM	UnCom		1,300
171	(385-386)	Whimbrel	<i>Numenius phaeopus</i> (Linnaeus, 1758)				IV	WM	UnCom		1,000
172	(387-388)	Eurasian Curlew	<i>Numenius arquata</i> (Linnaeus, 1758)				IV	WM	UnCom		1,000
173	(392)	Spotted Redshank	<i>Tringa erythropus</i> (Pallas, 1764)				IV	WM	LCom		2,50
174	(393- 394)	Common Redshank	<i>Tringa totanus</i> (Linnaeus, 1758)				IV	R/WM	Com		10,000
175	(395)	Marsh Sandpiper	<i>Tringa stagnatilis</i> (Bechstein, 1803)				IV	WM	LCom		–
176	(396)	Common Greenshank	<i>Tringa nebularia</i> (Gunner, 1767)				IV	WM	LCom		1,000
177	(399)	Spotted Greenshank	<i>Tringa guttifer</i> (Nordmann, 1835)	GT/En	I	I	IV	WM	Va	DEC	6
178	(397)	Green Sandpiper	<i>Tringa ochropus</i> Linnaeus, 1758				IV	WM/PM	LCom		–
179	(398)	Wood Sandpiper	<i>Tringa glareola</i> Linnaeus, 1758				IV	WM	LCom		10,000
180	(400)	Terek Sandpiper	<i>Xenus cinereus</i> (Guldenstadt, 1774)				IV	WM/PM	UnCom		1,000
181	(401)	Common Sandpiper	<i>Actitis hypoleucos</i> Linnaeus, 1758				IV	R/WM	LCom		–
182	(402)	Ruddy Turnstone	<i>Arenaria interpres</i> (Linnaeus, 1758)				IV	WM	LCom		1,000
183	(N)	Long-billed Dowitcher	<i>Limnodromus scolopaceus</i> (Say, 1823)				IV	WM	Va		–
184	(403)	Asian Dowitcher	<i>Limnodromus semipalmatus</i> (Blyth, 1848)	NT			IV	WM	Ra	DEC	230
185	(413)	Great Knot	<i>Calidris tenuirostris</i> (Horsfield, 1821)				IV	WM	UnCom		3,800
186	(412)	Red Knot	<i>Calidris canutus</i> (Linnaeus, 1758)				IV	WM	Va		3,400 (w African population)
187	(414)	Sanderling	<i>Calidris alba</i> (Pallas, 1764)				IV	WM	LCom		1,000
188	(423)	Spoonbill Sandpiper	<i>Calidris pygmeus</i> (Linnaeus, 1758)	GT/En			IV	WM	Ra	DEC	30
189	(416)	Little Stint	<i>Calidris minuta</i> (Leisler, 1812)				IV	WM	LCom		2,000
190	(415)	Rufous-necked Stint	<i>Calidris ruficollis</i> (Pallas, 1776)				IV	WM	Ra	INC	3,200
191	(417)	Temminck's Stint	<i>Calidris temminckii</i> (Leisler, 1812)				IV	WM	LCom		1,000
192	(418)	Long-toed Stint	<i>Calidris subminuta</i> (Middendorff, 1853)				IV	WM	UnCom		1,000
193	(420, 421)	Dunlin	<i>Calidris alpina</i> (Linnaeus, 1758)				IV	WM	UnCom		1,000
194	(422)	Curlew Sandpiper	<i>Calidris ferruginea</i> (Pontoppidan, 1813)				IV	WM	UnCom		1,000

1	2	3	4	5	6	7	8	9	10	11	12
195	(424-425)	Broad-billed Sandpiper	<i>Limicola falcinellus</i> (Pontoppidan, 1763)				IV	WM	UnCom		630
196	(425a)	Buff-breasted Sandpiper	<i>Tryngites subruficollis</i> (Vieillot, 1819)	NT		I	IV	WM	Va	DEC	150 (S.American population)
197	(426)	Ruff	<i>Philomachus pugnax</i> (Linnaeus, 1758)				IV	WM/PM	LCom		1,000
		Ibisbill, Avocets & Stilts	Recurvirostridae								
198	(433)	Ibisbill	<i>Ibidorhyncha struthersii</i> Vigors, 1832	BRS (05)			IV	R/AM	UnCom		-
199	(430-431)	Black-winged Stilt	<i>Himantopus himantopus</i> (Linnaeus, 1758)				IV	R/LM	Com	STA	10,000
200	(432)	Pied Avocet	<i>Recurvirostra avosetta</i> Linnaeus, 1758				IV	WM/R	LCom	INC	1,000
		Phalaropes	Phalaropodidae								
201	(428)	Red-necked Phalarope	<i>Phalaropus lobatus</i> (Linnaeus, 1758)					WM	Ra		-
202	(427)	Red Phalarope	<i>Phalaropus fulicaria</i> (Linnaeus, 1758)					WM	Va		-
		Crab-Plovers	Dromadidae								
203	(434)	Crab-Plover	<i>Dromas ardeola</i> Paykull, 1805			II		WM	Ra		700
		Stone plovers/Thick-knees	Burhinidae								
204	(437)	* Great Stone-Plover	<i>Esacus recurvirostris</i> (Cuvier, 1829)			II	IV	R/LM	UnCom		-
205	(438)	*Beach Stone-Plover	<i>Esacus magnirostris</i> (Vieillot, 1818)	NT	-		IV	R	LCom	DEC	250
		Pratincoles	Glareolidae								
206	(442)	*Collared Pratincole	<i>Glareola pratincola</i> (Linnaeus, 1766)			II		WM	Ra		240
207	(443)	*Oriental Pratincole	<i>Glareola maldivarum</i> J.R. Forster, 1795					R/LM/SM	LCom		-
208	(444)	Small Pratincole	<i>Glareola lactea</i> Temminck, 1820					R/LM	LCom		1,000
		Jagers and Skuas	Stercorariidae								
209	(445-446)	* Brown Skua	<i>Catharacta antarctica</i> (Lesson, 1831)					SM	Va		-
210	(446a)	* South Polar Skua	<i>Catharacta maccormicki</i> (Saunders, 1893)					SM	Va		-
211	(447)	Pomarine Jaeger	<i>Stercorarius pomarinus</i> (Temminck, 1815)					WM	Ra		-
212	(448)	Parasitic Jaeger	<i>Stercorarius parasiticus</i> (Linnaeus, 1758)					WM	Va		-
		Gulls, Terns & Noddies	Laridae								
213	(449)	Sooty Gull	<i>Larus hemprichii</i> Bruch, 1853			II	IV	S/WM	Va		2,300

1	2	3	4	5	6	7	8	9	10	11	12
214	(N)	Mew Gull	<i>Larus canus</i> Linnaeus, 1758				IV	WM	Va		10,000
215	(450)	* Heuglin's Gull	<i>Larus heuglini</i> Bree, 1876				IV	WM	Ra		-
216	(451)	* Yellow-legged Gull	<i>Larus cachinnans</i> Pallas, 1811				IV	WM/PM	UnCom		10,000
217	(453)	Pallas's Gull	<i>Larus ichthyaetus</i> Pallas, 1773			II	IV	WM	LCom		1,000
218	(454)	Brown-headed Gull	<i>Larus brunnicephalus</i> Jerdon, 1840	BRS (05)			IV	WM/R	LCom		1,000
219	(455)	Black-headed Gull	<i>Larus ridibundus</i> Linnaeus, 1766				IV	WM	LCom		-
220	(456)	Slender-billed Gull	<i>Larus genei</i> Brème, 1839				IV	WM	Ra	INC	1,500
221	(457)	Little Gull	<i>Larus minutus</i> Pallas, 1776				IV	WM	Va		1,000
222	(460-461)	Gull-billed Tern	<i>Gelochelidon nilotica</i> (Gmelin, 1789)			II	IV	R/WM	LCom	STA	1,000
223	(462)	Caspian Tern	<i>Sterna caspia</i> Pallas, 1770			II	IV	WM/R	UnCom	STA	1,000
224	(463)	River Tern	<i>Sterna aurantia</i> J.E. Gray, 1831				IV	R	LCom	DEC	1,000
225	(479)	Lesser Crested Tern	<i>Sterna bengalensis</i> Lesson, 1831			II	IV	R/WM	LCom		1,700
226	(478)	Large Crested Tern	<i>Sterna bergii</i> Lichtenstein, 1823			II	IV	R/WM	LCom		-
227	(480)	Sandwich Tern	<i>Sterna sandvicensis</i> Latham, 1787			II	IV	WM	LCom		1,100
228	(466)	Roseate Tern	<i>Sterna dougallii</i> Montagu, 1813				IV	R	UnCom		100
229	(468-469)	Black-naped Tern	<i>Sterna sumatrana</i> Raffles, 1822				IV	R	LCom		-
230	(464-465)	Common Tern	<i>Sterna hirundo</i> Linnaeus, 1758			II	IV	R/WM	LCom		1,000
231	(466a)	Arctic Tern	<i>Sterna paradisaea</i> Pontoppidan, 1763				IV		Va		-
232	(475-476)	Little Tern	<i>Sterna albifrons</i> Pallas, 1764			II	IV	WM/R	LCom		1,000
233	(477)	Saunders's Tern	<i>Sterna saundersi</i> Hume, 1877			II	IV	R/SM	UnCom		400
234	(467)	White-cheeked Tern	<i>Sterna repressa</i> Hartert, 1916			II	IV	R/SM	LCom		6,000
235	(470)	Black-bellied Tern	<i>Sterna acuticauda</i> J.E. Gray, 1831	NT			IV	R	LCom	DEC	250
236	(471,72,73)	Bridled Tern	<i>Sterna anaethetus</i> Scopoli, 1786				IV	R/WM	LCom		1,500
237	(474)	Sooty Tern	<i>Sterna fuscata</i> Linnaeus, 1766				IV	R	LCom		20,000
238	(458)	Whiskered Tern	<i>Chlidonias hybridus</i> (Pallas, 1811)				IV	R/WM/PM	LCom		1,000
239	(459)	White-winged Black Tern	<i>Chlidonias leucopterus</i> (Temminck, 1815)			II	IV	WM/PM	UnCom		-
240	(459a)	Black Tern	<i>Chlidonias niger</i> (Linnaeus, 1758)			II	IV	PM	Va	DEC	4,000
241	(481)	Brown Noddy	<i>Anous stolidus</i> (Linnaeus, 1758)				IV	R	LCom		750
242	(482)	* Black Noddy	<i>Anous minutus</i> Boie, 1844				IV		Va		-

1	2	3	4	5	6	7	8	9	10	11	12
		Skimmers	Rynchopidae								
243	(484)	Indian Skimmer	<i>Rynchops albicollis</i> Swainson, 1838	GT/Vu				R/LM	UnCom	DEC	60
Wetland Dependent and Associated Birds											
		Eagles, Kites & Harriers	Accipitridae								
244	(135)	Brahminy Kite	<i>Haliastur indus</i> (Boddaert, 1783)				I	R/LM	LCom		-
245	(173)	White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i> (Gmelin, 1788)				I	R	Ra		-
246	(174)	Pallas's Fish-Eagle	<i>Haliaeetus leucoryphus</i> (Pallas, 1771)	GT/Vu	I	I	I	R/WM	Ra	DEC	-
247	(172a)	White-tailed Sea-Eagle	<i>Haliaeetus albicilla</i> Linnaeus, 1758	NT	I	I	I	WM	Ra	DEC	-
248	(177)	Lesser Grey-headed Fish-Eagle	<i>Ichthyophaga humilis</i> (S. Muller & Schlegel, 1841)	NT			I	R/AM	Ra	DEC	-
249	(175-176)	Greater Grey-headed Fish-Eagle	<i>Ichthyophaga ichhyaetus</i> (Horsfield, 1821)	NT			I	R	UnCom	IND	-
250	(193)	Western Marsh-Harrier	<i>Circus aeruginosus</i> (Linnaeus, 1758)				I	WM	LCom		-
251	(194)	Eastern Marsh-Harrier	<i>Circus spilonotus</i> Kaup, 1847				I	WM	LCom		-
252	(170)	Greater Spotted Eagle	<i>Aquila clanga</i> Pallas, 1811	GT/Vu	II	I	I	WM/R	Ra	DEC	-
253	(169)	*Steppe Eagle	<i>Aquila nipalensis</i> Hodgson, 1833				I	WM	LCom		-
254	(167)	Eastern Imperial Eagle	<i>Aquila heliaca</i> Savigny, 1809	GT/Vu	I	I	I	WM	Ra	DEC	-
		Osprey	Pandionidae								
255	(203)	Osprey	<i>Pandion haliaetus</i> (Linnaeus, 1758)			II	I	WM/R	UnCom		-
		Falcons	Falconidae								
256	(209-211)	Peregrine Falcon	<i>Falco peregrinus</i> Tunstall, 1771		I		I	R/WM	UnCom		-
		Partridges	Phasianidae								
257	(247)	Swamp Francolin	<i>Francolinus gularis</i> (Temminck, 1815)	GT/Vu			IV	R	LCom	DEC	-
		Owls	Strigidae								
258	(631-2)	Brown Fish-Owl	<i>Ketupa zeylonensis</i> (Gmelin, 1788)				IV	R	UnCom		-
259	(633)	Tawny Fish-Owl	<i>Ketupa flavipes</i> (Hodgson, 1836)					R	UnCom		-

1	2	3	4	5	6	7	8	9	10	11	12
260	(633a)	Buffy Fish-Owl	<i>Ketupa ketupu</i> (Horsefield, 1821)					R	Va		–
		Kingfishers	Alcedinidae								
261	(721)	Blyth's Kingfisher	<i>Alcedo hercules</i> Laubmann, 1917	NT BRS (08)			IV	R	Ra	STA	–
262	(722-724)	Small Blue Kingfisher	<i>Alcedo atthis</i> (Linnaeus, 1758)				IV	R/WM/SM	Com		–
263	(725-726a)	Blue-eared Kingfisher	<i>Alcedo meninting</i> Horsfield, 1821				IV	R	Ra		–
264	(727-728)	Oriental Dwarf Kingfisher	<i>Ceyx erithacus</i> (Linnaeus, 1758)				IV	R/LM	Ra		–
265	(730-732)	Stork-billed Kingfisher	<i>Halcyon capensis</i> (Linnaeus, 1758)				IV	R	LCom		–
266	(729)	Brown-winged Kingfisher	<i>Halcyon amauroptera</i> Pearson, 1841	NT			IV	R	LCom	DEC	–
267	(733-734)	Ruddy Kingfisher	<i>Halcyon coromanda</i> (Latham, 1790)				IV	R/LM	Ra		–
268	(735-738)	White-breasted Kingfisher	<i>Halcyon smyrnensis</i> (Linnaeus, 1758)				IV	R/LM	Com		–
269	(739)	Black-capped Kingfisher	<i>Halcyon pileata</i> (Boddaert, 1783)				IV	R/LM	LCom		–
270	(740-743)	Collared Kingfisher	<i>Todiramphus chloris</i> (Boddaert, 1783)				IV	R	LCom		–
271	(717-718)	Greater Pied Kingfisher	<i>Megaceryle lugubris</i> (Temminck, 1834)				IV	R	LCom		–
272	(719-720)	Lesser Pied Kingfisher	<i>Ceryle rudis</i> (Linnaeus, 1758)				IV	R	Com		–
		Bee-eaters	Meropidae								
273	(747)	Blue-cheeked Bee-eater	<i>Merops persicus</i> Pallas, 1773					SM/PM	LCom		–
274	(748)	Blue-tailed Bee-eater	<i>Merops philippinus</i> Linnaeus, 1766					R/WM	LCom		–
275	(744-745)	Chestnut-headed Bee-eater	<i>Merops leschenaulti</i> Vieillot, 1817					R	LCom		–
		Swallows & Martins	Hirundinidae								
276	(911)	*Sand Martin	<i>Riparia riparia</i> (Linnaeus, 1758)					R/WM	LCom		–
277	(910)	*Pale Martin	<i>Riparia diluta</i> (Sharpe & Wyatt, 1893)					R/WM	LCom		–
278	(912)	Plain Martin	<i>Riparia paludicola</i> (Vieillot, 1817)					R/LM	Com		–
279	(916-918)	Common Swallow	<i>Hirundo rustica</i> Linnaeus, 1758					R/WM	LCom		–
280	(921)	Wire-tailed Swallow	<i>Hirundo smithii</i> Leach, 1818					R/SM	LCom		–
281	(923-928)	Red-rumped Swallow	<i>Hirundo daurica</i> Linnaeus, 1771					R/SM/WM	LCom		–
282	(922)	Streak-throated Swallow	<i>Hirundo fluvicola</i> Blyth, 1855					R/SM	LCom		–

1	2	3	4	5	6	7	8	9	10	11	12		
		Wagtails & Pipits	Motacillidae										
283	(1885-90)	White Wagtail	<i>Motacilla alba</i> Linnaeus, 1758				IV	R/WM/PM	Com		-		
284	(1891)	Large Pied Wagtail	<i>Motacilla maderaspatensis</i> Gmelin, 1789				IV	R	LCom		-		
285	(1881-83)	Citrine Wagtail	<i>Motacilla citreola</i> Pallas, 1776				IV	R/AM/WM	LCom		-		
286	(1875-80))	Yellow Wagtail	<i>Motacilla flava</i> Linnaeus, 1758				IV	R/AM/WM/ PM	LCom		-		
287	(1884)	Grey Wagtail	<i>Motacilla cinerea</i> Tunstall, 1771				IV	R/AM/WM	LCom		-		
288	(1864)	Red-throated Pipit	<i>Anthus cervinus</i> (Pallas, 1811)				IV	PM	Ra		-		
289	(1865)	Rosy Pipit	<i>Anthus roseatus</i> Blyth, 1847				IV	R/AM/WM	LCom		-		
290	(1871)	*Water Pipit	<i>Anthus spinoletta</i> (Linnaeus, 1758)				IV	WM	LCom		-		
291	(1872)	*Buff-bellied Pipit	<i>Anthus rubescens</i> (Tunstall, 1771)				IV	WM	Ra		-		
		Dippers	Cinclidae										
292	(1772-74)	White-throated Dipper	<i>Cinclus cinclus</i> (Linnaeus, 1758)					R/AM	UnCom		-		
293	(1775-76)	Brown Dipper	<i>Cinclus pallasii</i> Temminck, 1820					R/AM	LCom		-		
		Wrens	Troglodytidae										
294	(1769-71)	Winter Wren	<i>Troglodytes troglodytes</i> (Linnaeus, 1758)				IV	R/AM	LCom		-		
		Thrushes, Shortwings, Robins, Forktails, Wheatears	Turdinae										
295	(1678)	Guldenstadt's Redstart	<i>Phoenicurus erythrogaster</i> (Guldenstadt, 1775)				IV	R/WM/AM	LCom		-		
296	(1716)	White-capped Redstart	<i>Chaimarrornis leucocephalus</i> (Vigors, 1831)				IV	R/AM/WM	Com		-		
297	(1679)	Plumbeous Redstart	<i>Rhyacornis fuliginosus</i> (Vigors, 1831)				IV	R/AM	LCom		-		
298	(1684)	Little Forktail	<i>Enicurus scouleri</i> Vigors, 1832				IV	R/AM	LCom		-		
299	(1684)	Black-backed Forktail	<i>Enicurus immaculatus</i> (Hodgson, 1836)				IV	R	LCom		-		
300	(1686)	Slaty-backed Forktail	<i>Enicurus schistaceus</i> (Hodgson, 1836)	BRS (08)			IV	R/AM	LCom		-		
301	(1687)	Leschenault's Forktail	<i>Enicurus leschenaulti</i> (Vieillot, 1818)				IV	R/LM	UnCom		-		
302	(1688-89)	Spotted Forktail	<i>Enicurus maculatus</i> Vigors, 1831				IV	R/AM	LCom		-		

1	2	3	4	5	6	7	8	9	10	11	12
303	(1699)	White-tailed Stonechat	<i>Saxicola leucura</i> (Blyth, 1847)				IV	R/LM	LCom		–
		Babblers	Timaliinae								
304	(1160)	Marsh Babbler	<i>Pellorneum palustre</i> Gould, 1872	GT/Vu RRS (6)/ E			IV	R	Ra	DEC	–
305	(1233-34)	Jerdon's Babbler	<i>Chrysomma alirostre</i> Jerdon, 1862	GT/Vu/E			IV	R	Ra	DEC	–
		Parrotbills	Panurinae								
306	(1251)	Black-breasted Parrotbill	<i>Paradoxornis flavirostris</i> Gould, 1836	GT/Vu RRS (6)/E			IV	R	VRa	DEC	–
		Prinias, Warblers	Sylviinae								
307	(1531-1532)	Long-tailed Prinia	<i>Prinia burnesii</i> (Blyth, 1844)	E			IV	R	LCom		–
308	(1534)	Rufous-rumped Grass-Warbler	<i>Graminicola bengalensis</i> Jerdon, 1863				IV	R	LCom		–
309	(1546)	Broad-tailed Grass-Warbler	<i>Schoenicola platyura</i> (Jerdon, 1844)	GT/Vu E			IV	R	Ra	IND	–
		Whistlers	Pachycephalinae								
310	(1470)	Mangrove Whistler	<i>Pachycephala grisola</i> (Blyth, 1843)					R	UnCom		–

Source : Manakadan and Pittie (2001), Jhunjhunwala, *et al.* (2001), Islam and Rahmani (2002), BNHS, *Buceros* (2002), Kumar *et al.* (2003), Wetlands International 2002, BirdLife International (2001, 2003), Islam & Rahmani (2004).

Note: There are some waders such as Eurasian Thick-knee, Coursers etc. that are not included in the above list as they are essentially the birds of arid habitats.

Abbreviations

(N)	New: Indicates that the species is a recent record for the Indian region, and thus, will not have a Synopsis No.
*	An asterisk preceding the common name indicates cases of 'splits' or 'lumps', after recent taxonomic changes
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora (List as per 2002)
WL(P)A 1972	Wildlife (Protection) Act 1972 (as amended up to 2003)
SAPE	South Asia Population Estimates (as in Waterbird Population Estimates 3 rd edition, Wetland International 2002)
1%	1% of a Biogeographic Population of a congregatory waterbird species
–	Not set (1% of the Biogeographic Population in south, SE asia)]

2.2 Waterbirds

Divers (Family Gaviidae)

World: 5 species; Asia: 4; India: 1

Streamline body; legs short and set far back, toes fully webbed; skilled divers and swimmers; plumage dense, compact and rather harsh; wings of 11 primaries, the outermost minute; rectrices 18 or 20. Tarsi reticulate and laterally compressed. Sexes alike (winter), dimorphic (summer); breeding extralimital.

1(1). **Black-throated Diver.** *Gavia arctica* (Linnaeus, 1758); **Black-throated Loon** (I); domestic duck \pm : 65 cm; WM/Va C (Plate 1.1)

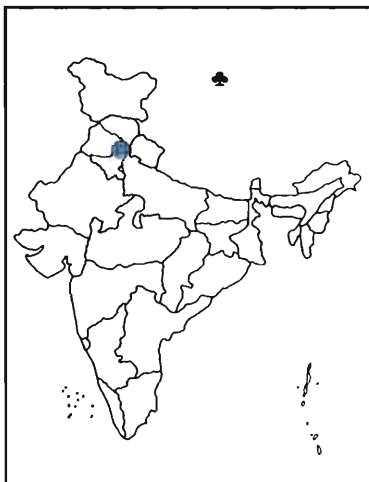


Photo: Svein Bekkum

Black-throated Diver (br)

Diagnostics: Sexes alike, practically a tailless bird with pointed and straight bill. **Adult breeding:** Throat black, upperparts chequered black-and-white, head and nape uniformly grey, and black-and-white streaking on down sides of neck.

Adult non-breeding: In winter, without black throat but with dark grey upperparts and white underparts. Compared with Red-throated Diver, appears black-and-white



rather than grey-and-white. Wings sparingly spotted with white. **Voice:** A deep, barking 'kwow' in flight. **Habitat:** Inland flooded plains, lakes and coastal waters. **Habits:** Expert divers, generally remain submerged and capture prey under water. **Food:** Carnivorous, mainly fish. **Status and Distribution:** Winter vagrant in India, essentially marine. Breeds W Siberia to E Central Asia, winters Caspian Sea. **Remarks:** Single record, one specimen, flooded land, W. Yamuna Canal, Jagadhri, Haryana (Ali & Ripley, 1978).

Grebes (Family Podicipedidae)

World: 22 species; Asia: 6; India: 5

Plumage dense and silky; primaries 12, the first from outside rudimentary; tail soft and rudimentary; bill compressed and sharply pointed; legs placed far back, specially adapted for diving and swimming; tarsi scutellated in front, laterally compressed; front toes with broad lateral vane-like lobes; hind toe small, raised, and vertically lobed; nails broad and flattened. Sexes seasonally dimorphic; young are nidifugous (able to swim at once).

2(5). **Little Grebe.** *Tachybaptus ruficollis* (Pallas, 1764); tailless pigeon \pm ; 25-29 cm; R/LM/Com C (Plate 1.2)



Photo: K. Chaiyan

Little Grebe (br)

Diagnostics: *Adult:* Sexes alike. A small, squat and tailless bird with short pointed bill and backwardly placed legs. It rides the water with rear end raised and dives frequently. In flight, a white wing patch of secondaries conspicuous. *Breeding* (summer): Forehead, crown and nape blackish-brown; lores, face, and chin chestnut; upper plumage lighter than the crown; flanks dusky brown and underparts silky smoky-white. *Non-breeding* (winter): Light brown with whitish chin, pale rufous neck and whitish underparts. *Juvenile:* Paler, the chestnut on the sides of the head and lower neck is either absent or a trace of it, the lower plumage is white with very little brown. **Voice:** High whinnying trill; *whit, whit.* **Habitat:** Stays in loose flocks in open waters during non-breeding season, but singly or in pairs in vegetation during breeding season. **Habits:** Keeps singly or in pairs among aquatic vegetation, dives for safety when disturbed, breeds throughout the year, nest (like a pad of weeds) either floating or bedded on waterweeds. **Food:** Mollusca, fish, tadpoles, crustaceans and aquatic insects. **Status and Distribution:** Resident, widespread, locally common throughout India, except extreme NW, NE and Himalaya, from plains up to 1800 m (Kashmir); Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka. SW, S Asia. **Threshold number:** 10,000.

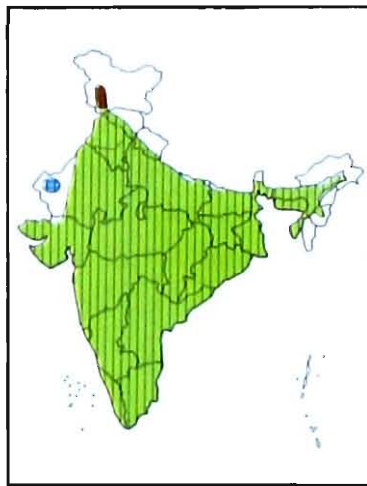
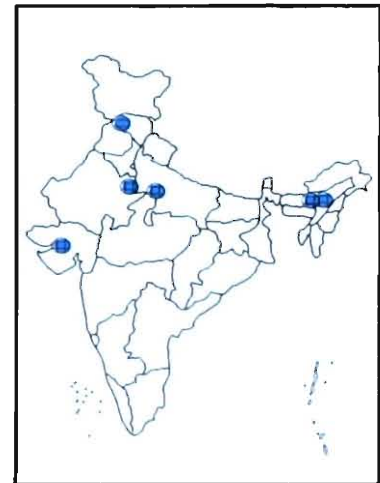


Photo: Nick Lowton

Red-necked Grebe (nbr)

Non-breeding: Similar to Great Crested Grebe, but with less defined black crown reaching to eyes; lores black; cheeks pale with dusky wash; neck and flanks dusky with prominent white flash at rear. In flight, white bars on forewings and secondaries. Yellow base of bill and dusky cheeks are prominent. **Voice:** Usually silent in winter. **Habitat:** Prefers freshwater lakes and reservoirs, also on coastal waters. **Habits:** Like typical grebes; very similar to Great Crested Grebe. **Food:** Mainly fish, frogs, tadpoles, aquatic insects, shrimps, etc.



Status and Distribution: Uncommon winter migrant to N and NW India, Himachal Pradesh, Uttaranchal, Uttar Pradesh, Rajasthan, Gujarat and Assam; Pakistan. Breeds in C Asia, winters in S Asia. **Threshold number:** 100.

4(3). Great Crested Grebe. *Podiceps cristatus* (Linnaeus, 1758); domestic duck -; 46-51 cm; **R/WM/UnCom C/H** (Plate 1.4)

Diagnostics: Sexes alike. *Adult breeding:* Black crown with short crest, contrasting greyish-white cheeks and reddish foreneck.

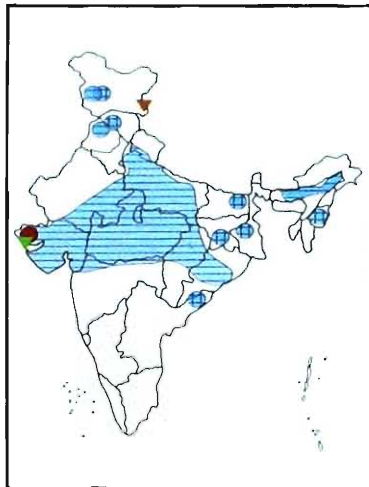
Diagnostics: Sexes alike, but the diagnostics less developed in female. *Adult:* A tailless aquatic bird characterised by slender white neck and straight pointed bill; two upstanding, backwardly directed ear tufts above head and

Photo: Michelle & Peter Wong's



Great Crested Grebe (br)

a frill of chestnut-and-black elongated feathers below the head. In winter (non-breeding) these 'ear tufts' much reduced, and in young birds absent. However, it has the black forehead, crown and crest; a blackish line from gape to eye; white lores and sides of the head, chin and throat; dark nape and back; mottled brown and rufous flanks and white underparts. **Juvenile:** Similar to non-breeding but has brown striping on cheeks. **Voice:** Usually silent in winter. **Habitat:** Prefers open water lakes, reservoirs, jheels and saltpans. **Habits:** Swims with body low and erect neck, both male and female perform elaborate courtship display. Breeds in Ladakh between 4700 and 5200 m from June to August, also known to breed in Gujarat, winter migrant up to Vindhya. **Food:**



Fish, frogs, tadpoles, aquatic insects, occasionally macrophytes. **Status and Distribution:** Occurs in small numbers in NW and C India from October to April, more common in coastal areas; Pakistan; Nepal; Bhutan; Bangladesh; breeds in C Asia, winters in S Asia. **Threshold number:** 250.

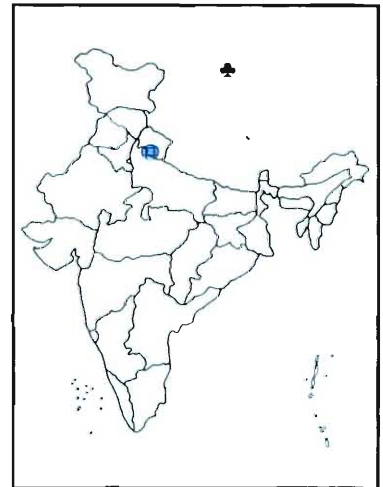
5(N). Horned Grebe. *Podiceps auritus* (Linnaeus, 1758); 31-38 cm; **WM/Va** (Plate 1.5)



Photo: Gill Cardy

Horned Grebe (br)

Diagnostics: Sexes alike. Like Black-necked Grebe, but with white tipped straight bill and a pale stripe from base of bill to eyes. **Adult breeding** (summer): Head black with yellow ear tufts sweeping back from eyes, neck and flanks rufous. **Non-breeding** (winter): black cap extends down up to eyes, foreneck white, and hind neck dark. **Juvenile:** similar to non-breeding birds but with faint dark stripes on cheeks. **Voice:** Usually silent in winter.



Habitat: Prefers shallow lakes and jheels with emergent vegetation, also coastal waters. **Habits:** Keeps singly or in pairs amidst aquatic vegetation, occasionally found in open water in small loose flocks. **Status and Distribution:** Vagrant winter migrant, only a few records available from India. Breeds in E Europe, C Asia; moves to Caspian Sea and S Asia in winters. **Remarks:** Single record from north India (Grimmett, *et al.* 1998). **Threshold number:** 250.

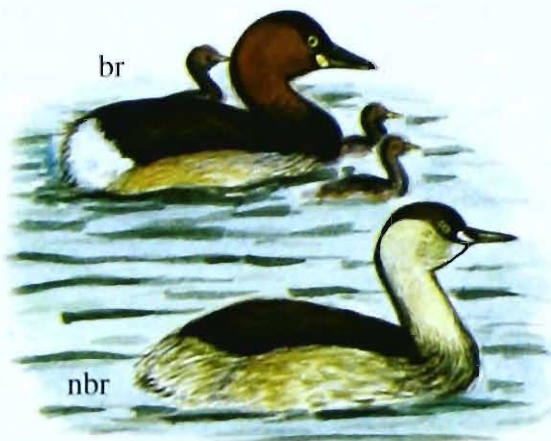
6(4). Black-necked Grebe. *Podiceps nigricollis* Brehm, 1831; Dabchick +; 28-34 cm; **WM/R/Ra C** (Plate 1.6)

Diagnostics: Sexes alike. A small dark brown grebe with a slender pointed and slightly up-tilted bill, white underparts and silvery white

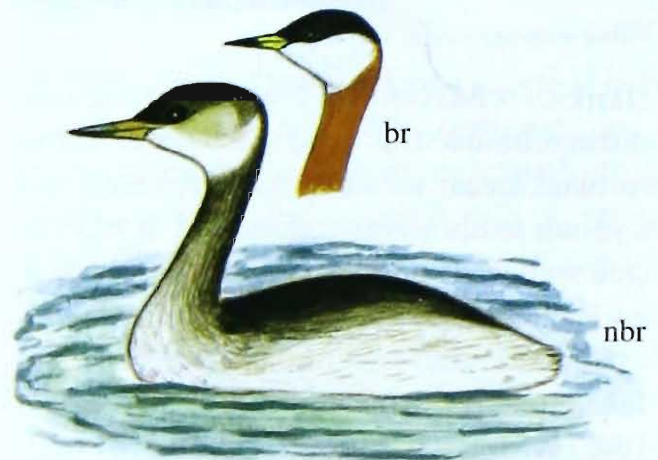
Plate 1



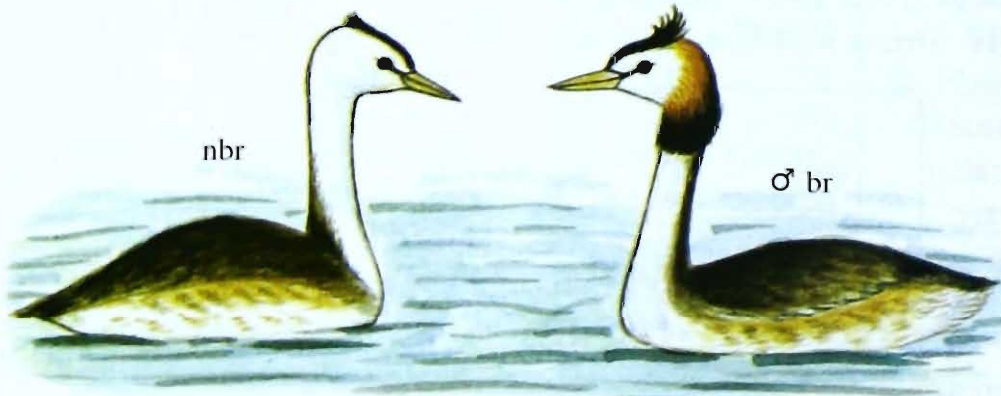
1. Black-throated Diver



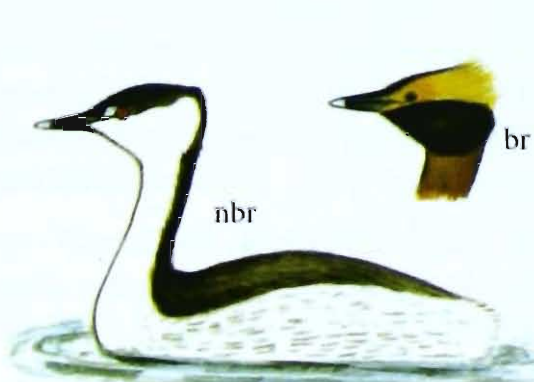
2. Little Grebe



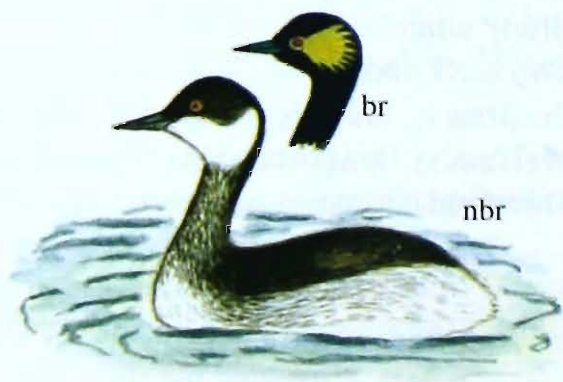
3. Red-necked Grebe



4. Great Crested Grebe



5. Horned Grebe



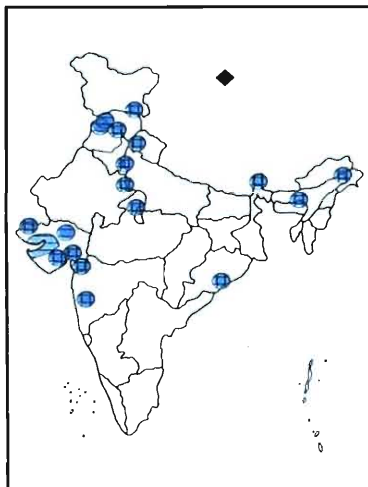
6. Black-necked Grebe

Photo: Otto Pfister



Black-necked Grebe (br)

flanks. **Non-breeding:** In winter, distinguishable from very similar Little Grebe by blackish cap to below the eyes, mixed black and white chin and throat, and dark brown foreneck. **Breeding (summer):** Black head and neck, and a golden tuft, of feathers behind the eyes are the diagnostics. **Voice:** Usually silent in winter. **Habitat:** Prefers shallow lakes or reservoirs with patches of emergent vegetation. **Habits:** Prefers reed-bordered jheels with floating vegetation and shallow water; occurs in company with Dabchicks, sometimes in large flocks. **Food:** Fish, tadpoles, frogs, shrimps and its own feathers. **Status and Distribution:** Uncommon winter migrant to N & NW India from plains to 3050 m; Nepal; Pakistan. Breeds in W & C Asia (also breeds in small numbers in W Pakistan hills); winters in SW, S Asia, Caspian Sea, Persian Gulf.



Threshold number: 250.

Petrels & Shearwaters
(Family Procellariidae)

World: 80 species; Asia: 10; India: 8

They are also known as tubenoses due to their salt-filtering nostrils being located in a

tube on top of the hook-tipped bill. Indian Shearwaters have relatively long, slender bills and straight, rigidly held wings, while the petrels have short stubby bills and bowed wings, which are flexed at the wrist. These pelagic birds come to land only to breed. They are often nocturnal at breeding places. Often nest in colonies, on coasts or islands, usually in burrows, sometimes on cliffs. Sexes alike, though in some species have two or more colour phases.

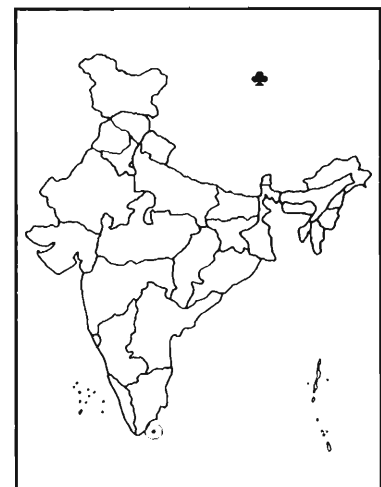
7(6). Cape Petrel. *Daption capense* (Linnaeus, 1758); Pigeon; 38-40 cm; **Va C** (Plate 2.7)



Cape Petrel

Photo: Chris Barnes

Diagnostics: Sexes alike. A stocky black and white pelagic petrel with dark head conspicuously checkered back, two large round patches on upper surface of each wing. Adult has sooty brown head, neck and back, small white streak below eye, broad black terminal band on white tail, and white underparts. **Habitat:** Pelagic. **Habits:** A float high in the water and invariably feeds from surface. Also beats on water surface. Often follow ships to pick up garbage. **Food:** Zooplankton, cephalopods, fish and offal. **Status and Distribution:** Vagrant, breeds in Antarctic zone, and widely distributed over the southern cirumpolar



Oceans. **Remarks:** Only one specimen recorded from Gulf of Manaar between Indian mainland and Sri Lanka in 19th century (Ali & Ripley, 1978).

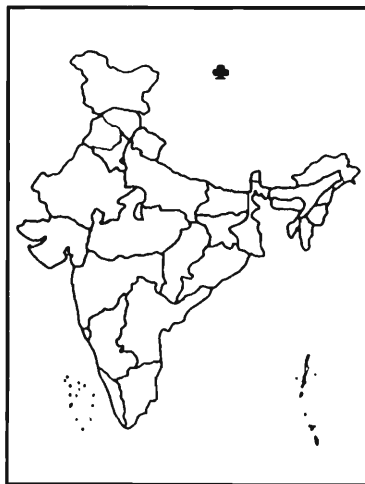
8(N). **Barau's Petrel.** *Pterodroma barau* (Jouanin, 1964); 38 cm; SM/Va C (Plate 2.8)

Photo: Phil Hansbro



Barau's Petrel (Adult)

Diagnostics: Whitish forehead and dark grey cap, prominent blackish M-mark across upperwing, dark rump, tail contrasting with grey lower mantle and black dark patches on sides of breast, white underwing with black rebound shaped patch. **Habitat:** Pelagic. **Habits:** Generally feed in company of other seabirds near fishing boats. **Food:** Feeds by seizing prey from surface or by dipping. **Status and Distribution:**



Vagrant, recorded from India in the Nine Degree Channel between Maldives and Lakshadweep; Indian Ocean.

9(13b). **Bulwer's Petrel.** *Bulweria bulwerii* (Jardine & Selby, 1828); Pigeon -; 26-27 cm; SM/Va C (Plate 2.9)

Diagnostics: A small brownish black gadfly petrel with paler chin and edges of greater wing coverts, short slim bill, short legs and



Photo: Richard Porter

Bulwer's Petrel (Adult)

long wedge-shaped tail. Wings long, in flight held forward and bowed. **Habitat:** Pelagic. **Habits:** Fly close to waves, tail is generally held slightly raised; do not follow ships.

Repeatedly circles and meander low over surface when feeding. **Food:**

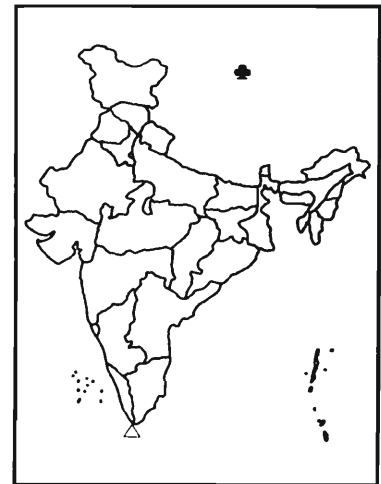
Squids, small fish and zooplankton.

Status and Distri-

bution: Vagrant,

summer migrant to Cape Comorin in Tamil Nadu; Sri Lanka; Maldives;

breeds, off the coast, on the islands of China and various island groups of Atlantic and Pacific Oceans.



10(13a). **Jouanin's Petrel.** *Bulweria fallax* Jouanin, 1955; Pigeon -; 30-32 cm; SM/Ra C (Plate 2.10)



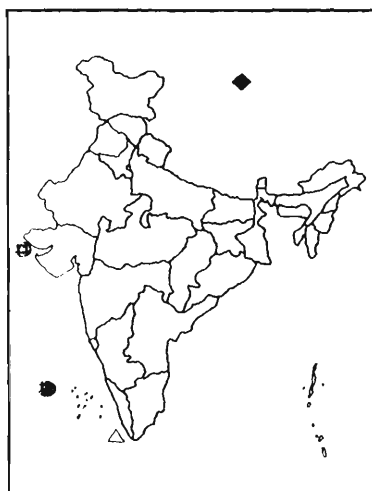
Photo: Phil Hansbro

Jouanin's Petrel

Photo: Richard Porter



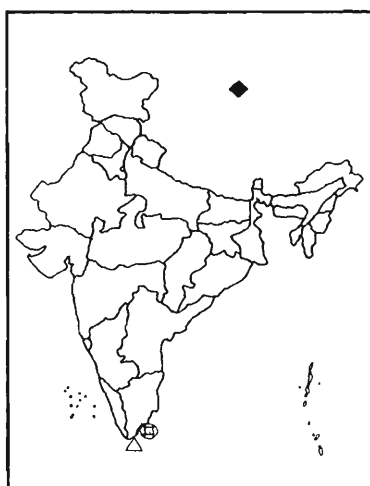
Jouanin's Petrel



Diagnostics: Sexes alike. Brownish black petrel with large and stout bill; bigger head; large and broad wings; long pointed tail; pale band across greater coverts. **Habitat:** Pelagic. **Habits:** Feeds alone far from land, flies fast and strongly in wide weaving sweeps close to the sea surface, glides into the channel between the waves from 15-20m above the sea. **Food:** Squids. **Status and Distribution:** A rare summer migrant off Cape Comorin, S Tamil Nadu, off S Kerala, in Lakshadweep and Gulf of Kachchh in India; Pakistan; Sri Lanka; common in Arabian Sea and Gulf of Aden.

11(7). Streaked Shearwater. *Calonectris leucomelas* Temminck, 1835; Brown-headed Gull ±; c 48 cm; **Ra C** (Plate 3.11)

Diagnostics: Sexes alike; a large shearwater with variable dark streaking on white head, dark tipped pale grey bill, white underparts and underwing-coverts and dark brown upperparts. **Habitat:** Pelagic. **Habits:** Follows fishing boats, makes shallow dives, normally



in flocks with other seabirds, seizes fish and squid from the surface. **Food:** Fish and squids. **Status and Distribution:** Rare visitor off Cape Comorin, S Tamil Nadu, also recorded in the Gulf of Manar; Sri Lanka.

12(9). Wedge-tailed Shearwater. *Puffinus pacificus* (Gmelin, 1789); Brown-headed Gull ±; 41-46 cm; **SM/Va C** (Plate 3.12)



Wedge-tailed Shearwater

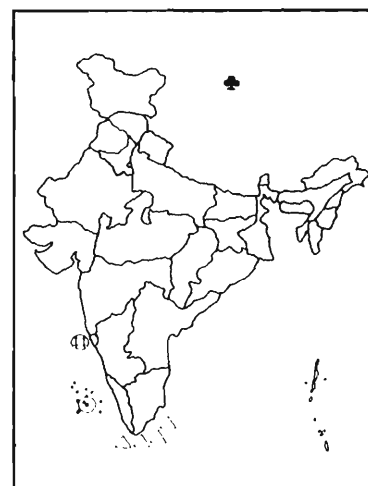
Photo: Tony Palliser

Diagnostics: Sexes alike; a large, broad winged shearwater with long and wedge-shaped tail, brownish grey face and throat, black primaries, and two colour morphs. **Dark morph:** Entirely grayish underwing, dark bill, long and pointed tail, rounded wing tips. **Light morph:** Less frequent than dark morph, longer, slender and pointed tail, and whitish underwings.



Photo: Jon Hornbuckle

Habitat: Pelagic, warmer parts of Indian Ocean. **Habits:** Generally known to follow fishing boats, feed on wings, occasionally takes head on dive for food, flight slow and laazy. **Food:** Small fish, squids.



Status and Distribution: A vagrant summer migrant off Goa and Lakshadweep in India; Sri Lanka; Maldives; warmer parts of Indian and Pacific Oceans.

13(8). Flesh-footed Shearwater. *Puffinus carneipes* Gould, 1844; Brown-headed Gull ±; 41-45 cm; **PM/L.Com C** (Plate 3.13)

Photo: Tom Tarrant



Flesh-footed Shearwater

Diagnostics: Sexes alike. A large, sooty brown shearwater with pale fleshy pink bill with dark tip, fleshy pink legs and feet; commonly a silvery grey patch at the base of primaries; dark underwing, shorter and rounded tail. **Habitat:** Generally offshore waters, also pelagic. **Habits:** mainly feeds by diving after the prey underwater, occasionally by surface capturing. **Food:** Small fish. **Status and Distribution:** A locally common passage migrant to S coast and Lakshadweep in India; Sri Lanka; Maldives; Central and South Pacific, breeds in Australia and New Zealand.



14(11). Audubon's Shearwater. *Puffinus lherminieri* Lesson, 1839; Pigeon -; 30 cm; **R?/Com C** (Plate 3.14)

Diagnostics: Sexes alike. Small and stout shearwater with short and broad wings; dirty



Photo: Richard Porter



Photo: Phil Hansbro

Audubon's Shearwater

black with greyish neck above, white below; undertail coverts black and white. **Habitat:**

Generally offshore waters also pelagic. **Habits:** Mainly feeds by diving after the prey underwater, follow fishing boats, sometimes in mixed flocks with other seabirds. **Food:** Small fishes,



squids and other suspended animals. **Status and Distribution:** Possibly resident in Lakshadweep, India; Sri Lanka; Maldives; Tropical Indian, Atlantic and Pacific oceans.

15(12). Persian Shearwater. *Puffinus persicus* Hume, 1872; Pigeon -; c. 31 cm; **WM/Va C** (Plate 4.15)



Photo: Phil Hansbro

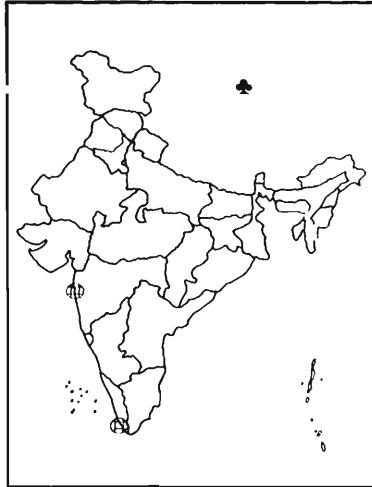
Persian Shearwater

Diagnostics: Slightly larger than Audubon's Shearwater; bill larger; narrow white ring

Photo: Phil Hansbro



Persian Shearwater



around eyes; white streak behind eye; light grey neck; brownish axillaries and flanks. **Habitat:** Mainly offshore waters, also pelagic. **Habits:** Mainly feeds by pursuit after the prey underwater; follows fishing boats. **Food:** Generally small fish. **Status and Distribution:** Vagrant in India; Pakistan regular off Makran coast; also Atlantic and Pacific oceans. **Remarks:** Two specimens collected on Bombay coast and one in Kerala (Ali & Ripley, 1978).

Storm-Petrels (Family Hydrobatidae)

World: 22 species; Asia: 9; India: 4

Relatively small pelagic birds with a rapid fluttering flight, long pointed wings and square or forked tail; predominantly dark- or greyish-brown plumage with more-or-less white/pale features; often seen following ships; feed on planktonic organisms which they snatch from the water surface; nest in colonies usually on offshore or oceanic islands; nocturnal at breeding colony; occur throughout the oceans of the world.

16(14). Wilson's Storm-Petrel. *Oceanites oceanicus* (Kuhl, 1820); Bulbul; 15-19 cm; **SM/LCom C** (Plate 4.16)

Diagnostics: Sexes alike. A small dull black storm petrel distinguished by white rump and pale wing-bars. Underparts dark, undertail-coverts white, legs long slender black, toes (web) lemon yellow, tail square-ended. In flight, feet project beyond tail. **Habitat:**

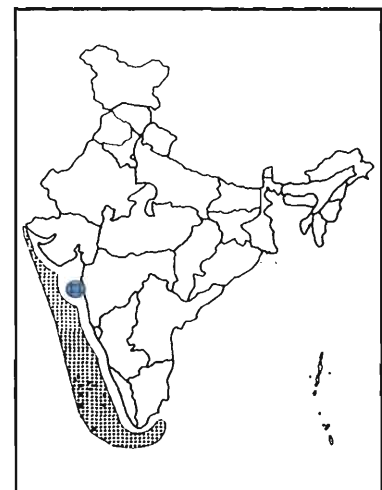


Wilson's Storm-Petrel

Photo: Tony Palliser

Pelagic. **Habits:** Keeps singly or in small parties; sometimes 200 or more in a flock; common and widespread summer migrant off S and W coasts of Mumbai.

Food: Mainly zooplankton
Status and Distribution: Locally common off W



and S coasts, extends up to W Bengal; prominent southward migration from S coast, common in coastal waters off Mumbai during September. India; Pakistan; Sri Lanka; Maldives; also Atlantic Ocean; breeds on Antarctic and sub-antarctic islands.

17(N). White-faced Storm-Petrel. *Pelagodroma marina* Latham, 1790); 20 cm; **PM/Ra C** (Plate 4.17)



White-faced Storm-Petrel (Adult)

Photo: Tony Palliser

Photo: Phil Hansbro



White-faced Storm-Petrel

Diagnostics: Has white underparts, underwing-coverts, and supercilium; dark crown and ear coverts; brownish grey upperparts; grey rump, jagged black tail; broad and oval-shaped wings. Has characteristic flight pattern, which is hurried and jumpy. **Habitat:** Pelagic. **Habits:** Pelagic, seldom follow ships, hold wings horizontally and legs hanging in glide, also hops on surface, occasionally dips breast in the water. **Food:** Small fish and squids. **Status and Distribution:** Rare on passage to SW coastal waters and Lakhadweep in India; Sri Lanka; Maldives; Atlantic and Australian seas.



18(15). Black-bellied Storm-Petrel. *Fregatta tropica* (Gould, 1844); Bulbul ±; 20 cm; SM/Va C (Plate 4.18)

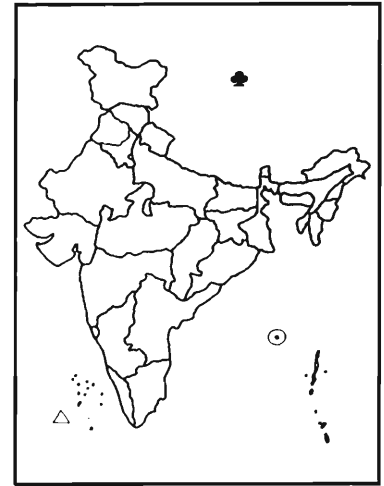
Photo: Chris Barnes



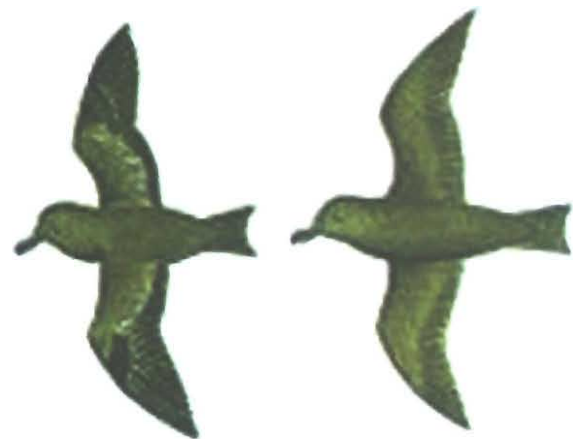
Black-bellied Storm-Petrel (Adult)

Diagnostics: Above dirty black, rump white, under side and middle of underwings white, a black band along middle of belly, which differentiate this species from all other petrels,

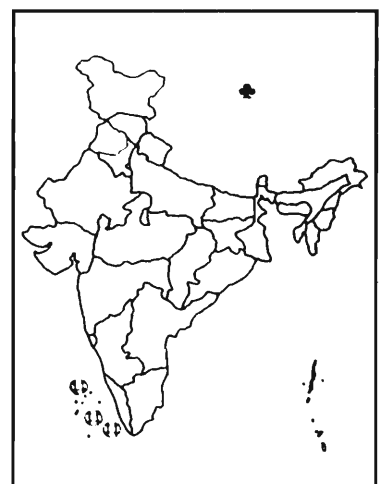
legs all black, tail rounded. Weak and zigzag flight from side to side. **Habitat:** High seas. **Habits:** Often follow ships, whales and dolphins up to the mouth of the rivers, glides lazily with horizontally held wings and dangling legs. **Status and Distribution:** Rare straggler, Vagrant in SW coastal waters and Lakhadweep in India; Sri Lanka; breeds in colonies on Antarctic and sub-antarctic zones (seas south of Australia). **Remarks:** Single specimen collected in Bay of Bengal in 1895 (Ali & Ripley, 1978), vagrant in SW coastal waters and in Lakshadweep (Grimett, *et al.* 1998).



19(16). Swinhoe's Storm-Petrel. *Oceanodroma monorhis* (Swinhoe, 1867); Bulbul ±; 20 cm; SM/Va C (Plate 4.19)



Diagnostics: Sexes alike. The only all-dark storm-petrel with grayer on neck and underparts, dark rump, pale bar on upperwing-coverts, small narrow angular wings, forked tail,



and short black legs and feet. Has fast, swooping flight with some bouncing and gliding. **Habitat:** Open sea, also coastal waters; generally do not follow ships. **Habits:** Tap and rest on water surface, chiefly feed by dipping. **Status and Distribution:** Vagrant, S and SW coastal waters, Lakshadweep in India; Sri Lanka; breeds islands off Japan, Korea and Taiwan.

Largely white pelagic birds with black markings on head and wings; long wings and two extremely long central tail feathers; occur throughout tropical oceans, breed on islands; feed on fish and squid; poor swimmers, seldom resting on water surface.

20(17). Grey-backed Tropicbird. *Phaethon aethereus* Linnaeus, 1758; **Red-billed Tropicbird** (I); Black-headed Gull or large tern; c. 48 cm plus tail (c. 30 cm); **WM/Ra C** (Plate 5.20)

Photo: Jon Hombuckle



Grey-backed Tropicbird (juv)

Diagnostics: Sexes alike; chiefly white, tern-like, seabird with two elongated ribbons in the wedge-shaped tail. **Adult:** Black bars on upper parts, black line through eye down to nape; bill red, tail streamers white, black wingbars prominent in flight; underparts white. **Juvenile:** Has black tipped yellow bill, denser barring on upperparts than adults, the black eye-stripe almost joins across hind crown but

lacks tail-streamers. **Voice:** loud monosyllabic. **Habitat:** Pelagic, occasionally coastal waters. **Habits:** Often solitary, sometimes in flock with feeding terns; flight strong and steady; may follow ships. **Food:** Chiefly fish and squids. **Status and Distribution:** Rare winter migrant to W Coast, Lakshadweep, Andaman Islands, India; Pakistan; Sri Lanka; N Indian Ocean.



21(18). Red-tailed Tropicbird. *Phaethon rubricauda* Boddaert, 1783; Black-headed Gull ± or large tern; c. 36 cm plus tail (c. 48 cm); **R/Ra C** (Plate 5.21)



Photo: Jon Hombuckle

Red-tailed Tropicbird

Diagnostics: Sexes alike; silky white, tern-like, sea bird with stiff red tail-streamers. **Adult:** With red bill, black streak through eye to nape, black shafts on wings and tail feathers, red tail-streamers that project spike-like rather than trail

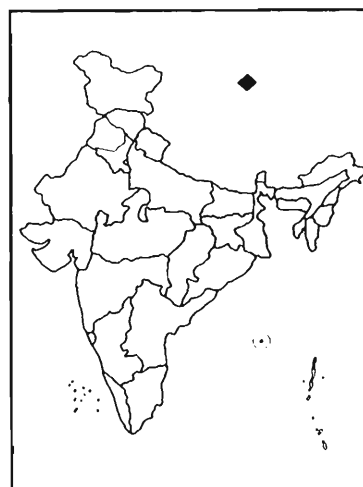
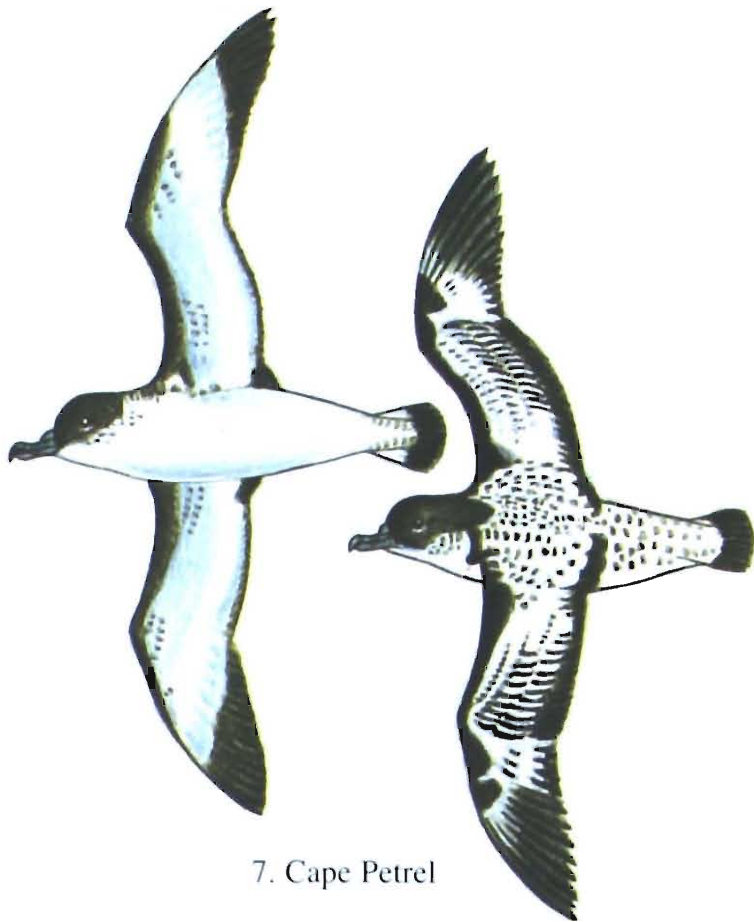


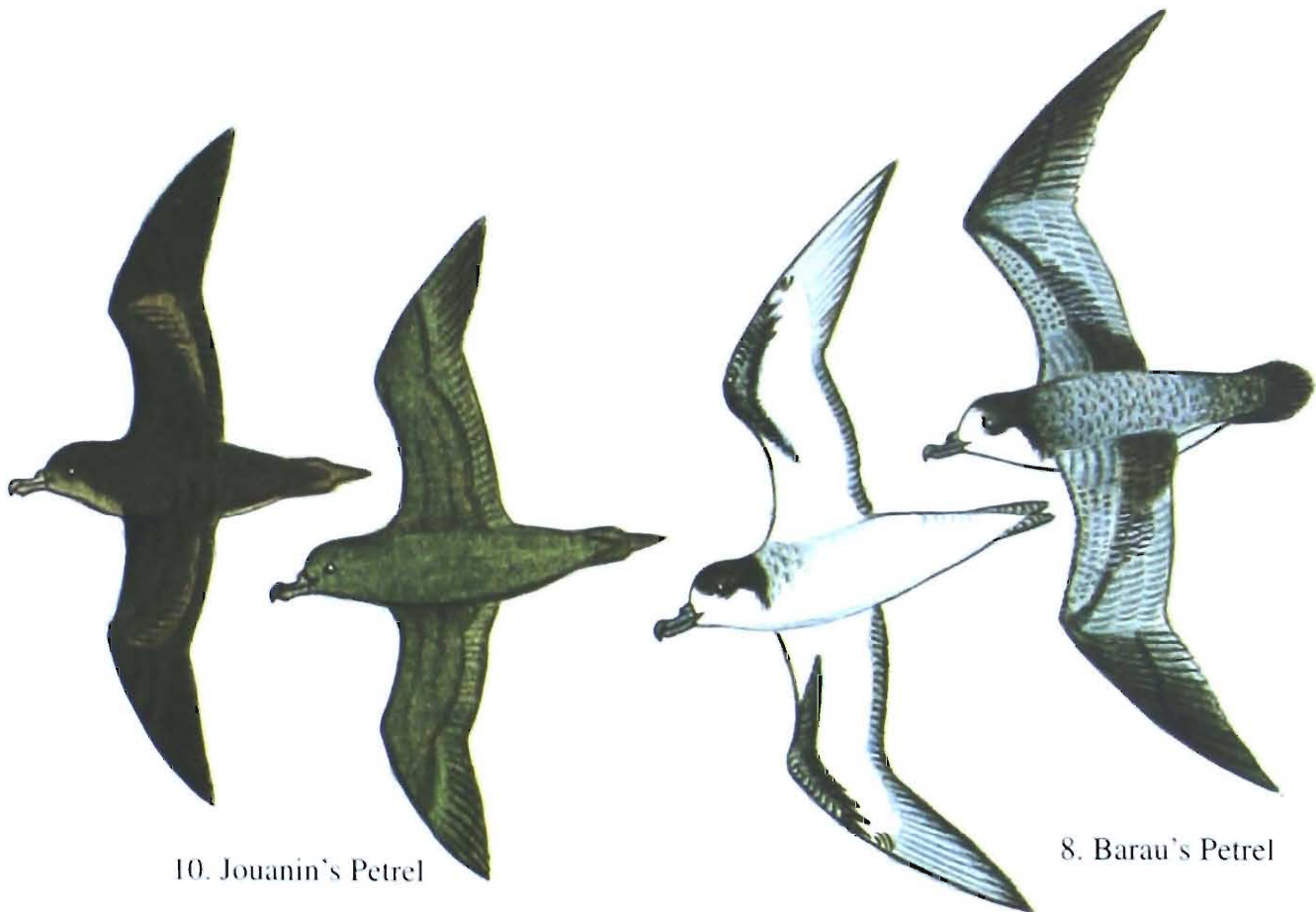
Plate 2



7. Cape Petrel



9. Bulwer's Petrel



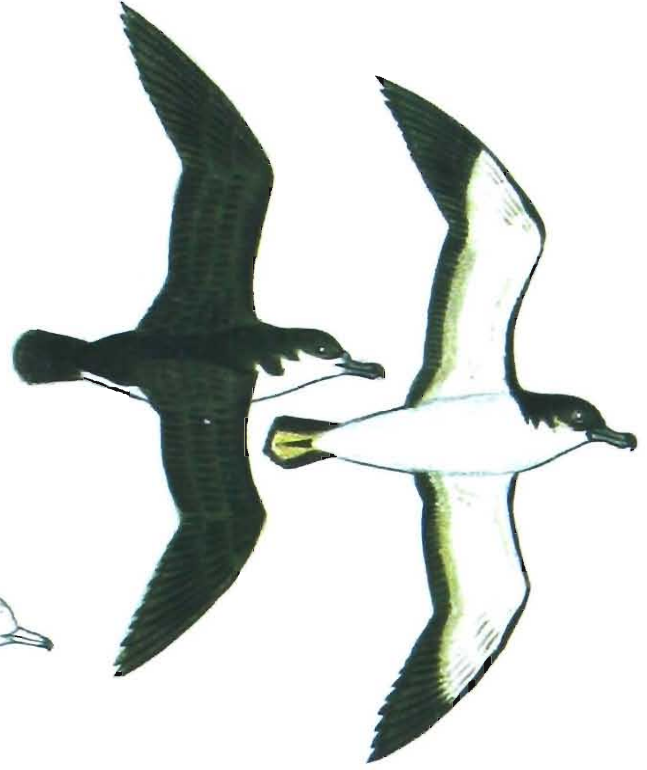
10. Jouanin's Petrel

8. Barau's Petrel

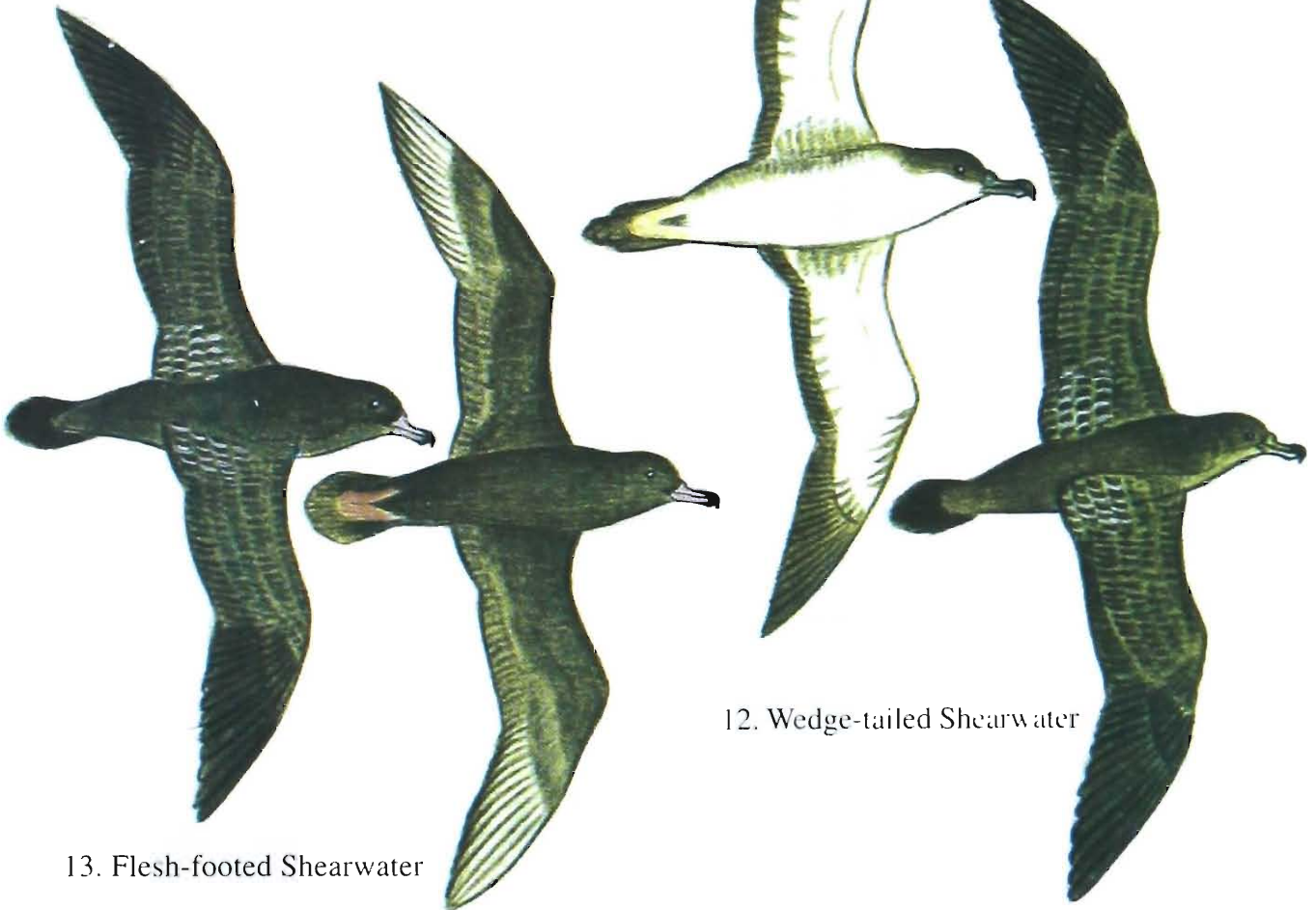
Plate 3



11. Streaked Shearwater



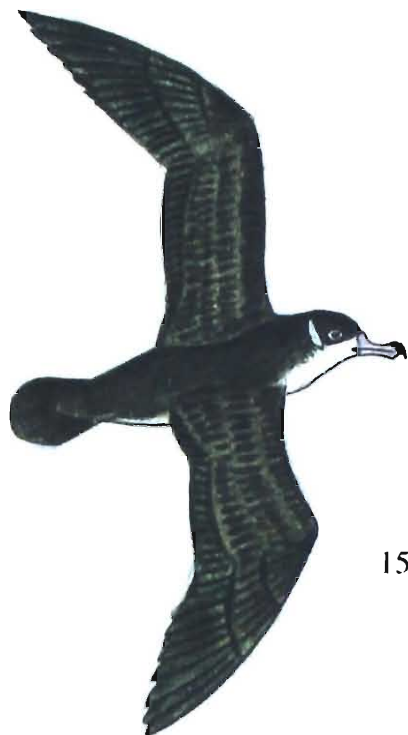
14. Audubon's Shearwater



13. Flesh-footed Shearwater

12. Wedge-tailed Shearwater

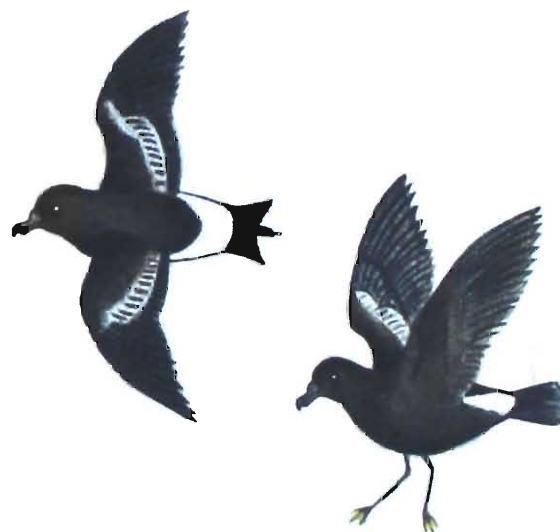
Plate 4



15. Persian Shearwater



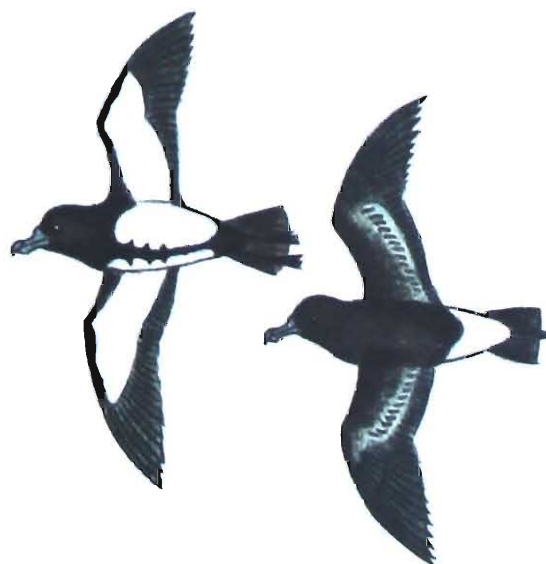
17. White-faced Storm-Petrel



16. Wilson's Storm-Petrel

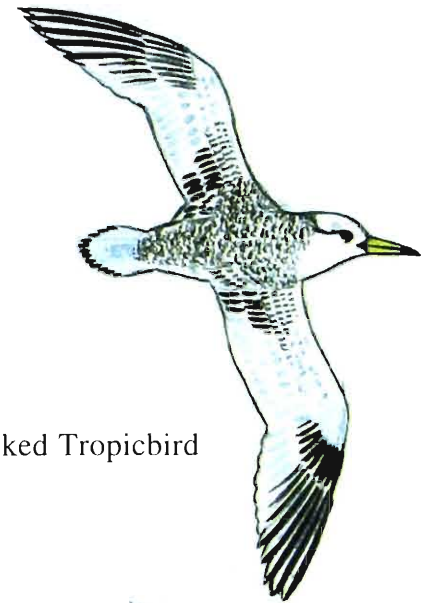
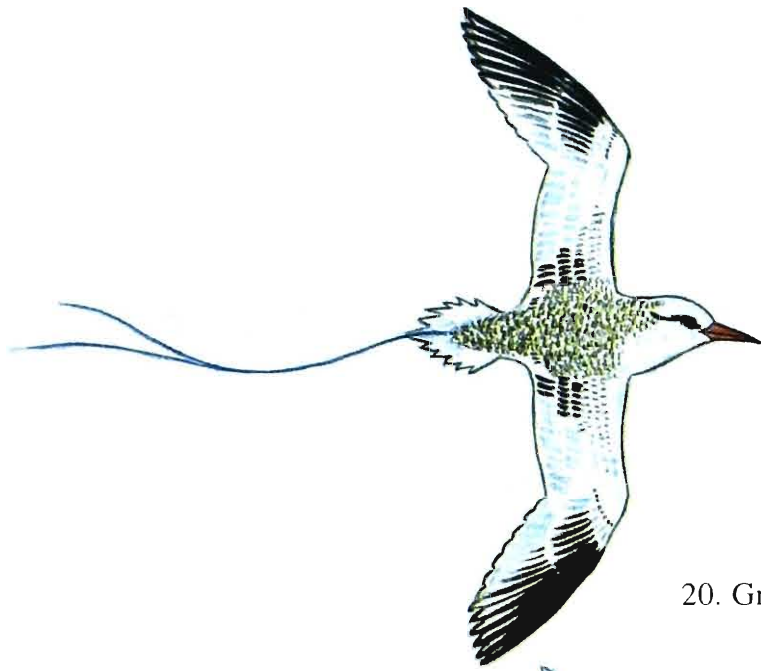


19. Swinhoe's Storm Petrel

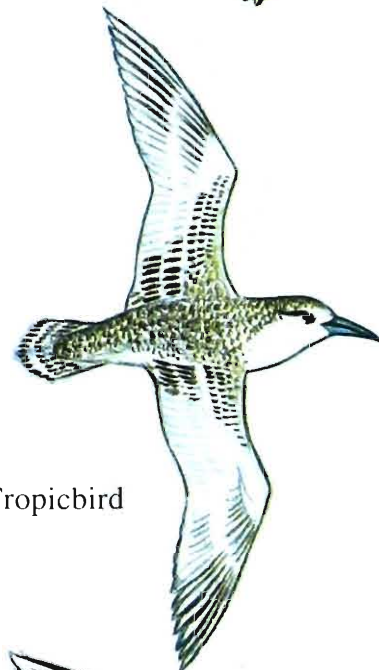
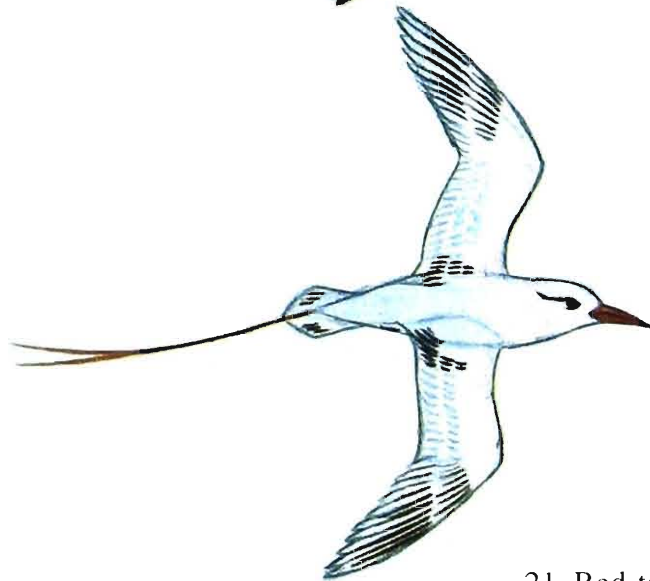


18. Black-bellied Storm-Petrel

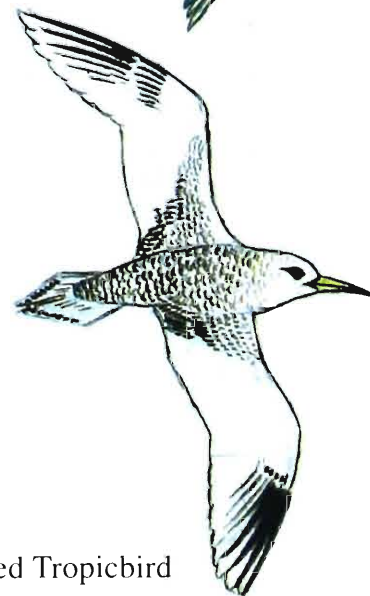
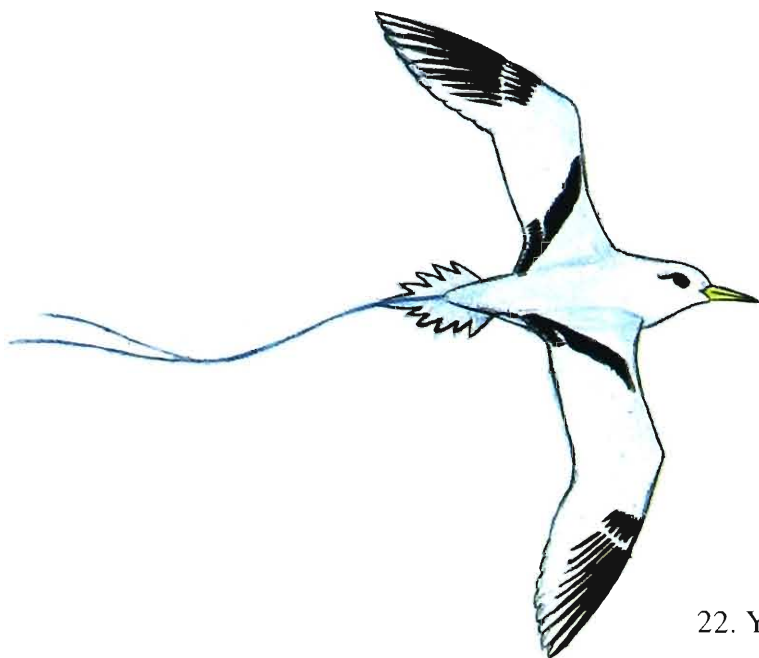
Plate 5



20. Grey-backed Tropicbird



21. Red-tailed Tropicbird



22. Yellow-billed Tropicbird

ribbon-like in flight, largely white upperwing, mantle and rump. **Juvenile:** Has grey or black bill and lacks tail-streamers. **Habitat:** Pelagic, occasionally seacoast. **Habits:** Generally solitary or in pairs, rarely follow ships, but circles above them. **Food:** Fish and squids. **Status and Distribution:** A rare resident, breeds on Nicobar Is., straggler in Bay of Bengal; Indian and Pacific Oceans.

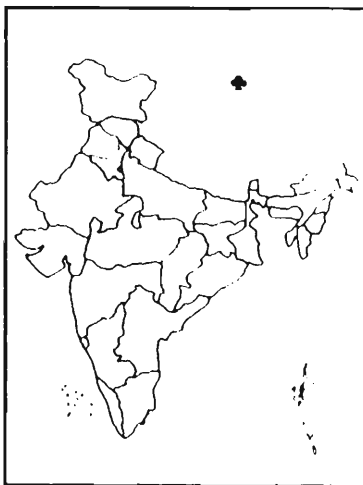
22(19). Yellow-billed Tropicbird. *Phaethon lepturus* Daudin, 1802; **White-tailed Tropicbird** (I); Black-headed Gull ± or large tern; c. 38 cm plus tail (c. 45 cm); **R/Ra C** (Plate 5.22)

Photo: S. Guliano & S. Somazzi



Yellow-billed Tropicbird

Diagnostics: Sexes alike. A smaller, elegant and white, tern like, sea bird with yellow bill and two very long white tail streamers. **Adult:** Diagonal black bars on upperwing, eye-stripe black, bill yellow or orange, white mantle and rump, black wing tips. **Juvenile:** Lacks diagonal black bars on upperwing and tail-streamers. **Habitat:** Pelagic, sea coast. **Habits:** Generally solitary or in pairs on high seas, often follow ships. **Food:** fish and squids. **Status and Distribution:** Rare visitor to Indian coasts; Sri Lanka; Maldives; breeds in



Andaman Islands; Maldives; Tropical oceans.

Pelicans (Family Pelecanidae)

World: 8 species; Asia: 4; India: 3

Gregarious; Fish eating, large birds with broad and powerful wings. Bill enormous; upper mandible terminates in a strongly hooked nail; the lower consists of two flexible rami supporting a large gular pouch. Retracted neck bends back in a flat S. Legs short and strong with large webbed feet; Sexes alike. Young nidicolous (remaining long in the nest) because naked on hatching, becoming downy later. Flight either characteristic V-shaped or long straggly ribbons with a wide front.

23(20). Great White Pelican. *Pelecanus onocrotalus* Linnaeus, 1758; Vulture ±; 140-183 cm; **R/WM/LCom C** (Plate 6.23)



Photo: Bhumes Bharti

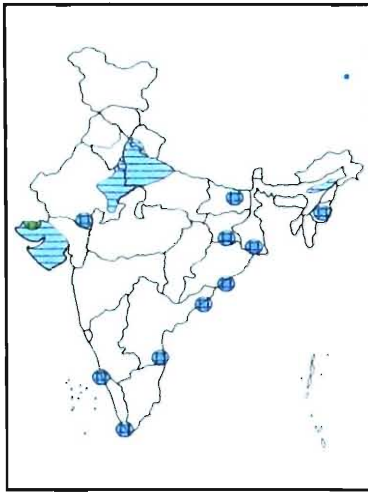


Photo: P. C. Tak

Great White Pelican

Diagnostics: **Adult:** Sexes alike, female smaller. Large white bird with yellowish pouch attached to the lower mandible. Bill lead-blue, mottled with white along the centre and with the nail and edges of both mandibles red;

lower mandible is blue on the basal, yellow on the terminal half; forehead feathers terminate in a point over the bill; slight crest on the back of the head. Plumage mostly white tinged with rose; yellowish breast feathers, black primaries and underside of secondaries; feet fleshy-pink, with yellow webs. *Juvenile*: Largely white, head and neck overspread with dull iron-rust; remaining plumage dull pale brown; ashy tinged webs. **Voice**: Usually silent away from breeding colonies. **Habitat**: Found in congregations in large jheels, heronries, lagoons, salt pans and tidal creeks. **Habits**: May be found in small flocks as in N India or huge concentrations on large lakes as in the Great Rann of Kachchh; breeds from February to April; colonial nesting. **Food**: Chiefly fish. **Status and Distribution**: Local winter migrant to NW, N and NE India. Common in Gujarat and Assam during winters; Pakistan; Nepal; Bangladesh; Maldives; Breeding in W & C Asia (also in Gujarat), winters in S Asia. **Threshold number**: 230.



24(21). Spot-billed Pelican. *Pelecanus philippensis* Gmelin, 1789; Vulture +; 140-152 cm; GT/Vu R/LM/LCom C (Plate 6.24)

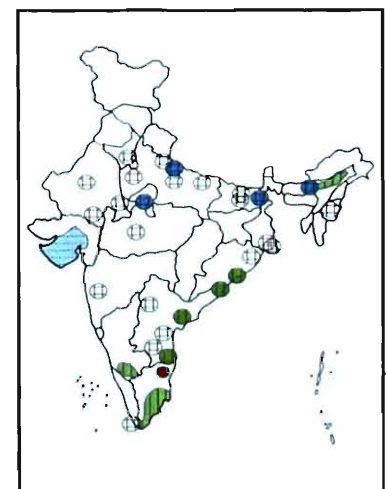
Photo: Gehan de Silva Wijeyeratne



Spot-billed Pelican

Diagnostics: *Adult*: Sexes alike. Head, neck and upperparts grey; underparts greyish-white, under tail-coverts mottled with brown; bill and gular pouch flesh-coloured, blue spots on upper mandible and blackish marking on pouch; nuchal crest brown, composed of white-tipped elongated feathers; legs and feet dark brown. In summer, under wing-coverts and under tail-coverts slightly wine-coloured; in winter lower back, rump and flanks tinged with vinaceous. *Juvenile*: Pale brown above and white below. **Voice**: Usually silent. **Habitat**: Frequents a variety of deep or shallow wetlands, man-made and natural, freshwater and saline, including marshes, lakes, rivers, estuaries, reservoirs, flooded fields, brackish lagoons, tidal creeks and along coasts. **Habits**: Gregarious; often found in association with egrets and cormorants; breeds from September to April. **Food**: Mainly fish in large quantity. **Status and Distribution**: *Globally threatened/ Vulnerable*. Locally common in breeding season in Assam, Karnataka, Andhra Pradesh and Tamil Nadu; Nepal; Bangladesh; Sri Lanka; Maldives. **Remarks**: The Spot-billed Pelican was generally common throughout India in the nineteenth and early twentieth centuries. This species was

known from the states of Andhra Pradesh, Assam, Bihar, Delhi, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. The north of India was visited seasonally by "vast numbers", the majority of which were thought to breed in Myanmar. In the latter half of the twentieth century, the Indian population of this species was in swift decline. The most significant disaster was the abandonment around 1964 of



the Kolleru (Aredu–Sarapelle) colony, at that time the largest known in the world. The pelicanry at Buchupalle, Andhra Pradesh, also disappeared along with around 10 other major colonies nationwide. During these decades of dismal fortune for the species, Assam remained a precarious stronghold. The decline of this species is most strongly related to the disturbance or destruction of colonies. Being dependent on wetlands for foraging and tall trees for nesting, the species has inevitably retreated in the face of the chronic twin problems of wetland conversion (through drainage, encroachment, over fishing, etc.) and woodland conversion (through logging, fire, exploitation, etc.). **Measures Taken:** *Legislation:* The species is granted legal protection in India (Schedule IV, Wildlife Act 1972). *Protected areas:* In India, the species occurs in 10 protected areas in Assam: Dibru-Saikhowa, Kaziranga, Laokhowa, Manas and Orang National Parks, and Bordoibam-Bilmukh Sanctuary, Burhachapori Wildlife Sanctuary, Deepor Beel Sanctuary, Panidihing Sanctuary and Pobitora Wildlife Sanctuary (BirdLife Int., 2001). Presently a total of 11,500 individuals are estimated in the world, of which about 2,500-5,000 birds are known from the Indian subcontinent. **Threshold number:** 40.

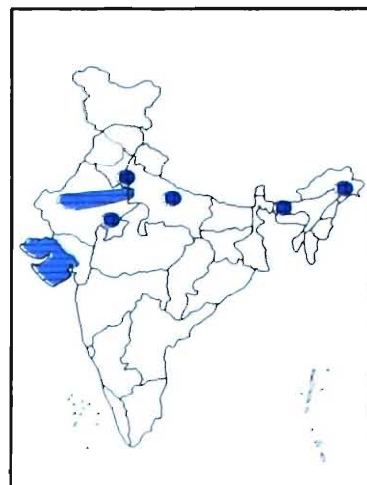
25(22). Dalmatian Pelican. *Pelecanus crispus* Bruch, 1832; Vulture +; 160-183 cm; **GT/Vu WM/Ra C** (Plate 6.25)



Photo: Ron Saldino

Dalmatian Pelican

Diagnostics: *Adult:* Sexes alike. Plumage silvery-white, except black primaries and dusky secondaries; feathers on forehead end in a concave line instead of a point; a short curly tuft of feathers on back of head; bill grey with yellow nail; gular pouch pinkish-grey; legs and feet dark grey. *Juvenile:* Upper plumage brownish-grey; under plumage pure white; gular pouch greyish. **Voice:** Usually silent. **Habitat:** Flocks in large lakes, marshes, rivers, lagoons



and salt pans. **Habits:** Occurs singly or in pairs or in small flocks, population is declining. **Food:** Almost exclusively fish. **Status and Distribution:** *Globally threatened/Vulnerable.* The species is a winter visitor to the country in small numbers; the main influx arrives from the west, while very small numbers are recorded in Assam; common during winters in Gujarat (small numbers of Dalmatian Pelican still occur, principally in the wetlands of Gujarat, including the Kathiawar peninsula) and Rajasthan; Pakistan; Bangladesh. Breeds in SW & C Asia, winters in SW, S Asia. **Remarks:** There has been a drastic decline in the number of birds since the 19th century due to large-scale persecution by fishermen and contamination of food due to poisonous pesticides. The global population of this species has stabilised at 15,000–20,000 individuals (including 4,000–5,000 breeding pairs). **Threats:** Wetland drainage, shooting and persecution by fishermen primarily caused past declines in the global population of this species. Continuing threats include disturbance, wetland alteration and destruction, water pollution, collision with power-lines and over-exploitation of fish stocks. The threats to this species in Asia

include habitat loss and modification, hunting, disturbance and pollution. **Measures Taken:** **Legislation:** Dalmatian Pelican is listed on Appendix I of CITES and both Appendix I and Appendix II of the CMS. In India the species is protected under the Indian Wildlife Act (1972). **Protected areas and habitat management:** Birds regularly visit Keoladeo National Park, Sultanpur National Park and Kaziranga National Park in small numbers. Khijadia lakes, Gujarat, have been declared a bird sanctuary in which all hunting is prohibited; although no management occurs, an attempt has been made to fence the area and ensure that illegal grazing, cutting of firewood and poaching are controlled. Nalsarovar Lake is a bird sanctuary in which a core zone of 1 km² is kept entirely free from disturbance (BirdLife Int., 2001). **Threshold number:** 110.

Boobies (Family Sulidae)

World: 9 species; Asia: 4; India: 3

Although related to the cormorants, darters and pelicans have adapted to live in a strictly marine environment. They are Goose-sized birds with 'cigar-shaped'/streamlined body; long, narrow, pointed wings; wedge-shaped tail and webbed feet. Feed on fish by plunging down vertically from a height and pursuing the fish under water and catching it in the serrated conical bill. Air sacs under the facial skin cushion inflate on impact with water. Flight is normally direct with powerful flaps of the wings interspersed with gliding. They breed on coasts and islands, often in enormous colonies. Like other pelagic birds their sightings are infrequent: mostly from islands, mainland coasts and ships, though storm-driven individuals may venture inland.

26(23). Masked Booby. *Sula dactylatra* Lesson, 1831; Bar-headed Goose +; 81-92 cm; **R/Ra C** (Plate 6.26)

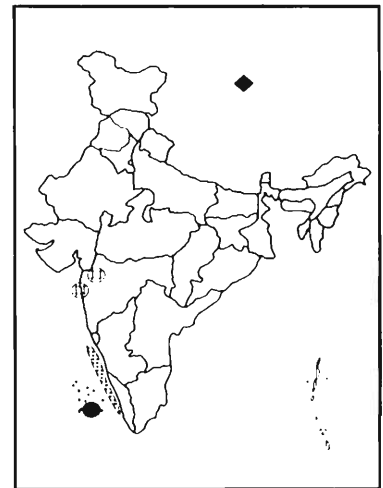
Diagnostics: Sexes alike. **Adult:** Bill yellow or orange or greenish yellow, face and gular



Masked Booby

Photo: S. Guliano & S. Somnazi

pouch (face-mask) blackish, upperparts mainly white, wing feathers and tail black, legs and feet yellow, orange, or greenish. **Juvenile:** Has brown head, neck and upperparts; whitish hind-collar; whitish scaling on upperparts; white underparts and underwing-coverts. **Habitat:** Pelagic, occasionally offshore. **Habits:** Found solitary or in small flocks, plunge down vertically from a height and pursue the fish under clear water. **Food:** Mainly squids and fish. **Status and Distribution:** Rare monsoon visitor to W Coast during storms; breeds in



Lakshadweep, India; Pakistan; Sri Lanka; Maldives, where also breeds; Indian ocean.

27(24). Red-footed Booby. *Sula sula* (Linnaeus, 1766); Large gull; 66-77 cm; **R/Va C** (Plate 6.27)

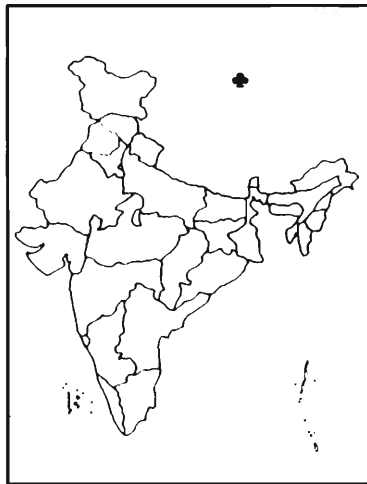
Diagnostics: Sexes alike. It is the smallest booby with red legs and feet; white and blackish to greyish-brown body plumage. **Adult: White morph:** Largely white with greyish-brown primaries, carpal black, underwing-coverts grey, bill light blue with brownish tip and red base, tail white, legs and feet red. **Dark morph:** Brownish, largely dark grey brown, grey brown underparts, blue grey

Photo: S. Guliano & S. Sommazi



Red-footed Booby

bill, pink face and red legs. **Habitat:** Pelagic, generally occur over deep seas. **Habits:** Usually solitary, or in small flocks. Hunts in flocks of five to fifteen in single file, dives from above for hunting fish and pursues underwater, nocturnal to a certain extent, generally hunt in the late evening. Perch on ships, nest on trees and bushes. **Food:** Squids and fishes. **Status and Distribution:** Resident on Lakshadweep, vagrant to Indian coasts; possibly breeds at



Lakshadweep and Maldives; Sri Lanka; Maldives; Indian ocean, W & C Pacific oceans.

28(25). Brown Booby. *Sula leucogaster* (Boddaert, 1783); Large gull; 64-74 cm; **R/Va C** (Plate 6.28)

Diagnostics: Sexes alike, male smaller. **Adult:** Dark brown head, upper breast and upperparts contrasting with white body and underwing-coverts; bill yellow. **Juvenile:** Similar to adult but has dusky brown underbody, which becomes paler on immatures. **Habitat:** Pelagic, also in coastal waters during monsoons. **Habits:** Generally solitary, but groups of a dozen or so also



Brown Booby

found, hunts alone; dives for capturing food;

feeds inshore, frequently alight on rocks and floats; nest on cliff or ground. **Food:** Chiefly flying fish and squids. **Status and Distribution:** Resident, possibly breeds in Lakshadweep, vagrant off the

Indian coasts; Sri Lanka; Maldives; Indian, Pacific Ocean and Arabian sea.

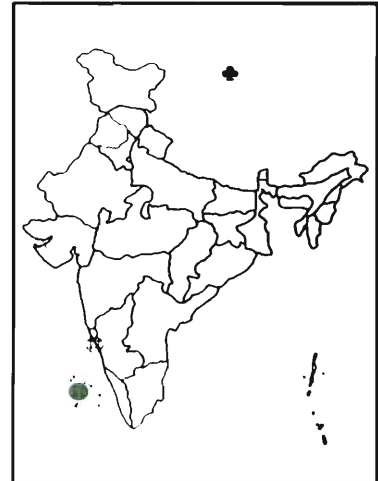


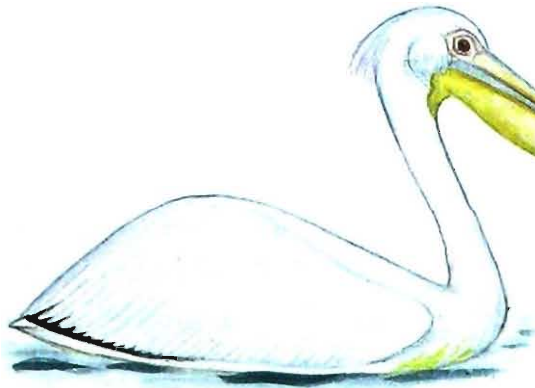
Photo: B. P. Conservation Programme, U. K.

Cormorants & Shags (Family Phalacrocoracidae)

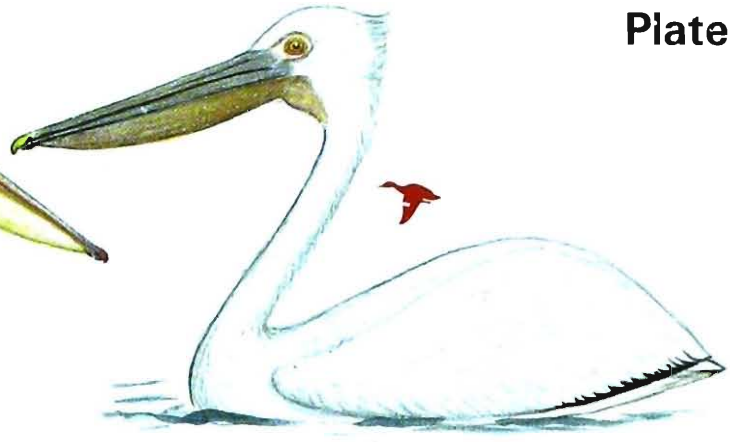
World: 37 species; Asia: 11; India: 3

Gregarious, fish eating and colonial nesting birds; plumage black in all Indian species; body long and spindle-shape; bill serrated, laterally compressed and hooked at tip in cormorants; tail long and stiff; legs short, feet large, peleaniform with all four toes united in a web for swimming. Flight either V-shaped or in wavy diagonal lines. Sexes alike; Young nidicolous.

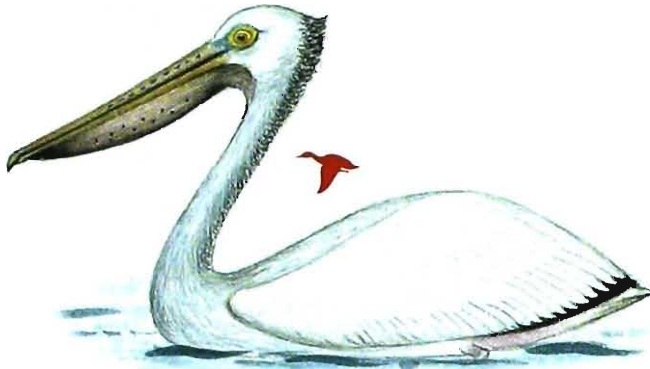
Plate 6



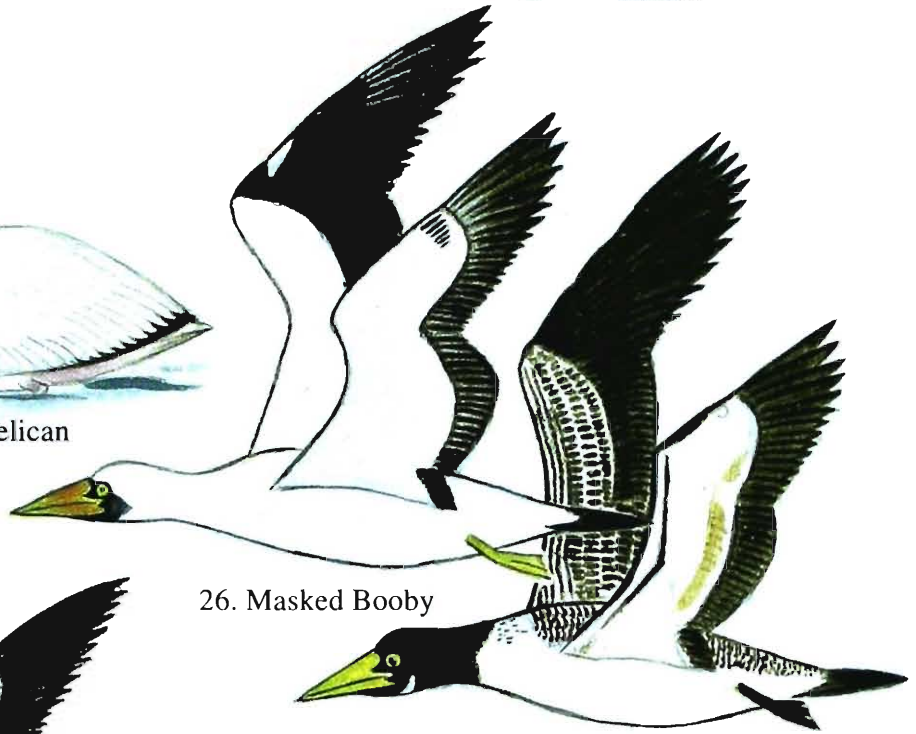
23. Great White Pelican



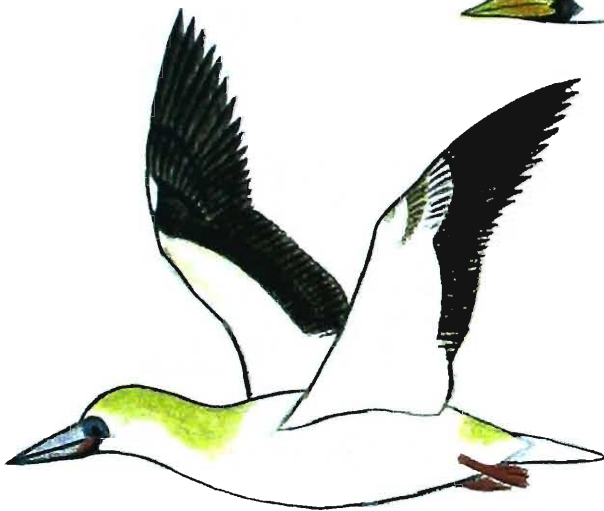
25. Dalmatian Pelican



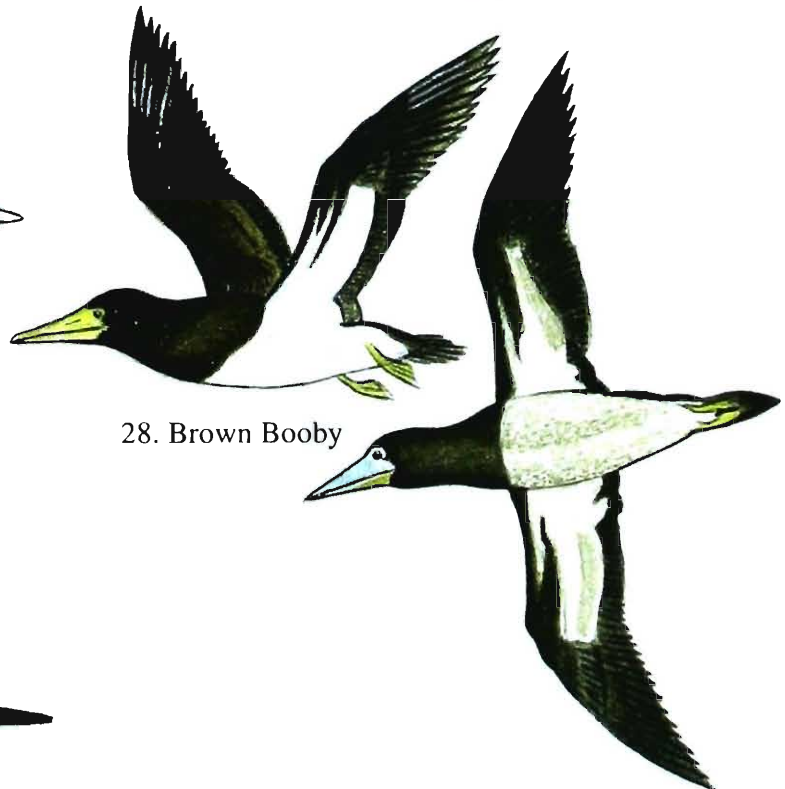
24. Spot-billed Pelican



26. Masked Booby



27. Red-footed Booby



28. Brown Booby

29(28). Little Cormorant. *Phalacrocorax niger* (Vieillot, 1817); Jungle Crow +; 51 cm; R/LM/Com C (Plate 7.29)

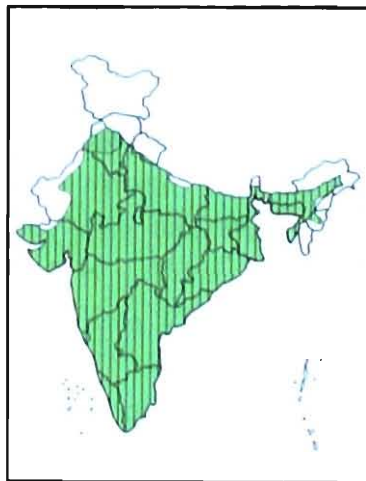


Photo: Gehan de Silva Wijeyeratne



Little Cormorant

Diagnostics: *Adult:* Sexes alike. Has small and black body with stout and hooked bill, blackish at tip and bluish purple at base; domed forehead; stiff tail; and without yellow gular skin. *Breeding:* Black with glistening blue-green; upper back and wing-coverts dark silvery grey; short occipital crest, a few white silky feathers on forecrown, sides of head and neck. *Non-breeding:* Crest and white feathers disappear, and feathers at base of lower bill appear white, sometimes extending to throat. *Juvenile:*



Brown above and paler below with white throat and central abdomen. **Voice:** Usually silent. **Habitat:** Found in lakes, rivers, irrigation reservoirs, canals, prefers village tanks, estuaries, etc. **Habits:** Often found in large flocks in lakes and reservoirs; also occurring singly or in small groups in rivers, etc.; hunts on fish in groups; breeds in mixed colonies from July to September. **Food:** Largely fish, also tadpoles, frogs and crustaceans. **Status and Distribution:** A resident species, widespread and common in plains of India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; SE Asia. **Threshold number:** 1500.

30(27). Indian Shag. *Phalacrocorax fuscicollis* Stephens, 1826; Indian Cormorant (I); Duck +; 63 cm; R/LM/Com C (Plate 7.30)



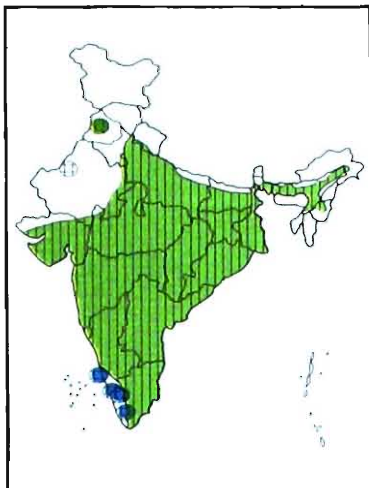
Photo: Gehan de Silva Wijeyeratne

Indian Shag

Diagnostics: *Adult:* Sexes alike. Chiefly a black waterbird with blue-green eyes; dark brown bill; yellow gular skin; white speckled throat; black legs and feet; scaly effect on back and wings visible on a closer look. *Breeding* (July-February): Upper plumage iridescent bronze-black; under plumage glossy black; a white tuft of feathers on each side of the neck behind eyes, a few specks on head; face black-purplish. *Non-breeding:* Plumage without gloss. *Juvenile:* Scaly bronze-brown

above with black primaries and tail; white below; flanks mottled with brown and white.

Voice: Usually silent. **Habitat:** Freshwater lakes, jheels, reservoirs, rivers, estuaries, and mangroves. **Habits:** Found in large flocks, more gregarious than Large Cormorant; sometimes feeds with Little



Cormorant. Locally common; undertake local movements depending on water conditions; breeds gregariously from August to October, generally July to February. **Food:** Chiefly fish. **Status and Distribution:** A resident species occurring almost throughout India, except extreme NW, NE and Himalaya; Pakistan; Bhutan; Bangladesh; Sri Lanka; Myanmar. SE Asia. **Threshold number:** 300.

31(26). Great Cormorant. *Phalacrocorax carbo* (Linnaeus, 1758); Large duck; 80-100 cm; R/WM/Com C (Plate 7.31)

Photo: Gehan de Silva Wijeyeratne

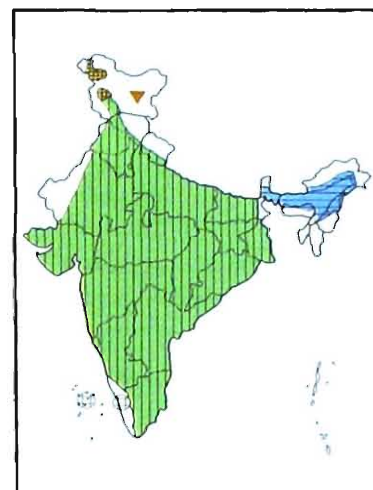


Great Cormorant

Diagnostics: *Adult:* Sexes alike. Black waterbird with a slender bill, hooked at tip and stiff longish tail. *Breeding:* Glossy black plumage with metallic blue-green sheen; throat and front half of face white; gular pouch bright yellow; silky white plumage on head and neck; a broad white patch on posterior flanks. *Non-breeding (winter):*

Yellow gular pouch less bright; silky white of head and neck and the white patch on posterior flanks disappear. *Juvenile:* Brown above and white below. **Voice:** Usually silent. **Habitat:** Reservoirs, lakes (high altitude lakes in Himalaya up to 3500 m) and large rivers; coastal wetlands. **Food:** Carnivorous, voracious fish feeder. **Habits:** Occurs in small groups generally

in the deeper waters for fishing, forms large flocks during breeding season, breed in large heronries from September to February. **Status and Distribution:** Locally common resident almost



throughout India, part population of winter migrants in NW India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka. Breeds in C & S Asia, winters in S Asia. S Asia. **Threshold number:** 1,000.

Darter (Family Anhingidae)

World: 4 species; Asia: 3; India: 1

Bill long thin pointed (stiletto-like); neck longer, slimmer, snake-like, hence, the alternative of Snakebird, especially when the bird swims with body submerged; wings long and tail very long.

32(29). Darter. *Anhinga melanogaster* Pennant, 1769; Duck +; 85-97 cm; NT R/LM/LCom C (Plate 7.32)

Diagnostics: *Adult:* Sexes alike. Like cormorant but with long slender snake-like neck; narrow head; pointed and small dagger-shaped bill and fan-shaped stiff tail. A white streak from eye to sides of the neck; white chin and throat, remaining head and neck velvety chocolate-brown; black above; back and wings longitudinally streaked and speckled with silver-grey; entirely black

Photo: Vijay Cavale



Darter (basking in sun)

Photo: BPB

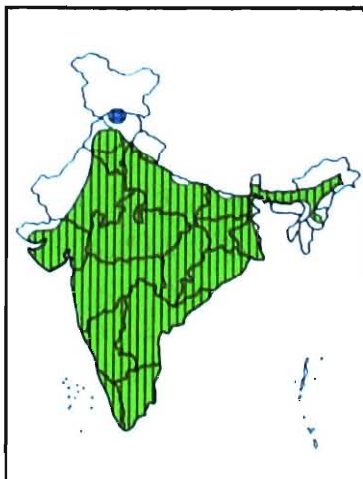


Photo: Gehan de Silva Wijeyeratne



Darter

below, including legs. **Juvenile:** Head and neck pale brown; lower back to upper tail-coverts dark brown; mantle narrowly streaked rufous and silver-grey; brown below; pale tail-tip. **Voice:** Usually silent. **Habitat:** Lakes, jheels, reservoirs, rivers, ponds, marshes and mangroves, also coastal waters. **Habits:** Occurs singly, in twos or small flocks, rarely in large flocks; swims with submerged body with only snake-like head and neck protruding, which the bird turns from side to side; breeds gregariously in heronries from July to December. **Food:** Chiefly on fish, occasionally swallows too large ones. **Status and Distribution:** *Near threatened*. It is a resident species almost throughout



India, locally common in Assam, uncommon elsewhere; Pakistan; Nepal; Bangladesh; Sri Lanka. **Remarks:** The species is generally uncommon and declining throughout Asia, although an estimate of 4,000 for South Asia may be too low. It inhabits shallow inland wetlands including lakes, rivers, swamps and reservoirs, as well as estuaries, tidal inlets, mangroves and coastal lagoons, ascending to 1,400 m, at least in India and Java. In common with many other Asian waterbirds, it is primarily threatened by habitat loss, disturbance (at feeding grounds and colonies), hunting and pollution (BirdLife Int., 2001). **Threshold number:** 40.

Frigatebirds (Family Fregatidae)

World: 5 species; Asia: 4; India: 3

Large black or black and white pelagic birds with long pointed wings, deeply forked tail, long hooked bill and raptor-like flight; extremely aerial; flight long and sustained; exact pattern of white on the underparts and presence or absence of white 'spurs' on axillaries are the important diagnostics for specific identification; adult males distinguished by their bright red gular pouches which are inflated during courtship display; females with blackish heads without the red throat-patch; takes several years to reach maturity; feed chiefly on fish and squid pirated from other birds (boobies), also seabird chicks, young turtles and eggs; occur throughout tropical seas.

33(31). Great Frigatebird. *Fregata minor* (Gmelin, 1789); Kite +; 85-105 cm; SM/Va C (Plate 7.33)

Diagnostics: Large and heavy frigatebird. **Adult male:** Glossy black above, brown band on median wing-coverts and innermost secondaries; underparts black; gular pouch red. **Adult female:** Larger than male, with black head and neck, brown hind collar, light brown band on wings, white throat, foreneck, breast and sides, black cap, pink eye ring.

Photo: Tun Pin Ong



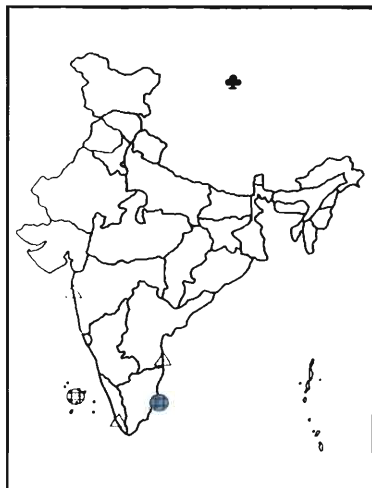
Male Great Frigatebird Female

Habitat: Pelagic, also in coastal waters. **Habits:** Generally solitary, catch food in mid-air and by diving vertically into the water. **Food:** Fish and squids. **Status and Distribution:** Vagrant summer migrant to W and E coasts and Lakshadweep in India; Sri Lanka; Maldives; breeds on Seychelles and Aldabra Islands in

Photo: Jon Hornbuckle



Great Frigatebird



Indian Ocean. **Remarks:** Vagrant, only Indian specimen is a storm blown example from near Quilon, Kerala (Ali & Ripley, 1978).

34(32). Lesser Frigatebird. *Fregata ariel* (G R. Gray, 1845); Kite +; 70-80 cm; SM/Va C (Plate 7.34)

Diagnostics: Smallest frigatebird with distinct white patch under the wing on glossy black body. **Adult male:** Metallic black above; underparts black with white spur extending from breast sides to axillaries; gular pouch red.

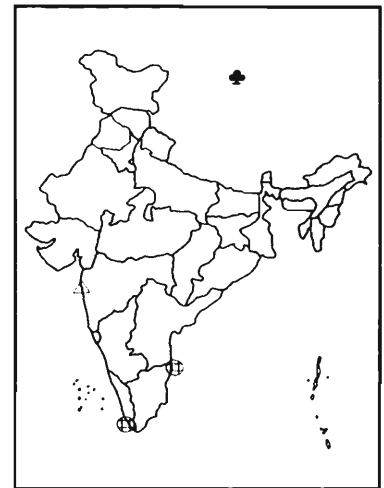
Adult female: Larger than male; glossy black above with chestnut collar on hind neck; brown patch on wing coverts; black throat and a b d o m e n ; white breast narrowing at



Photo: John Holmes

Lesser Frigatebird

center, and anterior flanks. **Habitat:** Pelagic. **Habits:** Usually solitary, catch food in mid-air and by diving vertically into the water. **Food:** Fish and squids. **Status and Distribution:** Vagrant summer migrant to W and E coasts in India; Sri Lanka; Maldives. Indian ocean. **Remarks:** Only two records from India: west coast near Trivendrum (1904) and one near Mumbai in 1960 (Ali & Ripley, 1978); and east coast (Grimett *et al.*, 1998).



35(30). Christmas Island Frigatebird. *Fregata andrewsi* Mathews, 1914; Kite +; 90-100 cm; GT/Cr Va C (Plate 7.35)

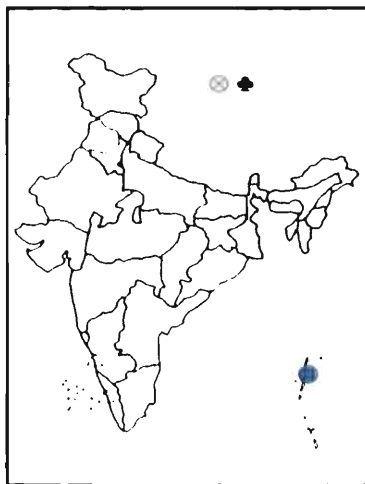
Diagnostics: Large and heavy frigatebird with white belly and black body. **Male:** Separable from all other frigatebirds by combination of black head and breast and white semi-circular patch on lower belly, spurs absent, red gular pouch. **Female:** Larger than male, below only throat black, rest of underparts white which spread as collar on sides of neck. **Habitat:** Pelagic, some times storm driven to coastal areas. **Habits:** Outstanding fliers and capable of soaring hours at a time, generally solitary

Photo: Tun Pin Ong



Christmas Island Frigatebird

but may gather around fishing boats for scavenging refuse of caracase, also feeds by attacking boobies and forcing them to eject fish, which they capture in mid-air. **Food:** Fish and squids. **Status and Distribution:** *Globally threatened/Critical*; vagrant. **Remarks:** The species is not always identifiable at sea, especially in immature phases, owing to the variability of the pattern of white on *Fregata*. As a result, some of the records listed might involve mis-identifications. This species is restricted to a tiny area on one small island. It is predicted to undergo a rapid decline of more than 80% over the next 30 years (three generations) as a result of the introduction of a species of ant. As a breeding species the Christmas Island Frigatebird is confined to Christmas Island (to Australia) in the Indian Ocean, but in the non-breeding season it is found in many parts of Indonesia, ranging northwards in numbers to Malaysia and peninsular Thailand, occurring as a vagrant on the Andamans and Nicobars (India,



Andaman Islands Rangat bay jetty, Middle Andaman, one juvenile, November 1989) and possibly southern India and Vietnam. The Christmas Island Frigatebird is primarily oceanic, preferring warm, low-salinity waters of the South Equatorial Current, and only coming to land to roost at night and to breed. **Population:** Total numbers at the three breeding colonies have been judged at around 1,600 pairs, with around 4,500 individuals in the entire population; numbers are thought to be stable, although a full census has not been undertaken since the 1980s. **Threats:** This species is highly threatened because its population is small, confined to one small area of land, and potentially at risk from an invasive species of ant. The restriction of its entire breeding population to a single island elevates the potential impact of natural disaster or disease. Numbers of breeding frigatebirds on Christmas Island have declined in some areas, although the overall population is thought to be stable; habitat destruction, disturbance and human predation of birds and eggs have been the main causes of decline. The species is also, and perhaps most seriously, threatened by an invasive species, the Yellow Crazy Ant (*Anoplolepis gracilipes*), which is spreading across the island; this insect is likely to prey directly on nestlings and to alter the island's ecology by farming scale insects that damage trees and killing the Red Crab (*Gecaroidea natalis*), the dominant life-form on the island. **Measures Taken:** The species is listed on CITES Appendix I (although trade is not a recorded threat). A national park was established on Christmas Island in 1989 (within which most frigatebirds nest), phosphate mining was discontinued in 1987, and no further removal of forest is permitted; meanwhile, legal protection for the species has been granted, island inhabitants have improved standards of living and a sizeable exodus of people has occurred, all factors contributing to the greater security of the species. **Measures Proposed:** There is a need to control the Yellow Crazy Ant, so that

Plate 7



29. Little Cormorant



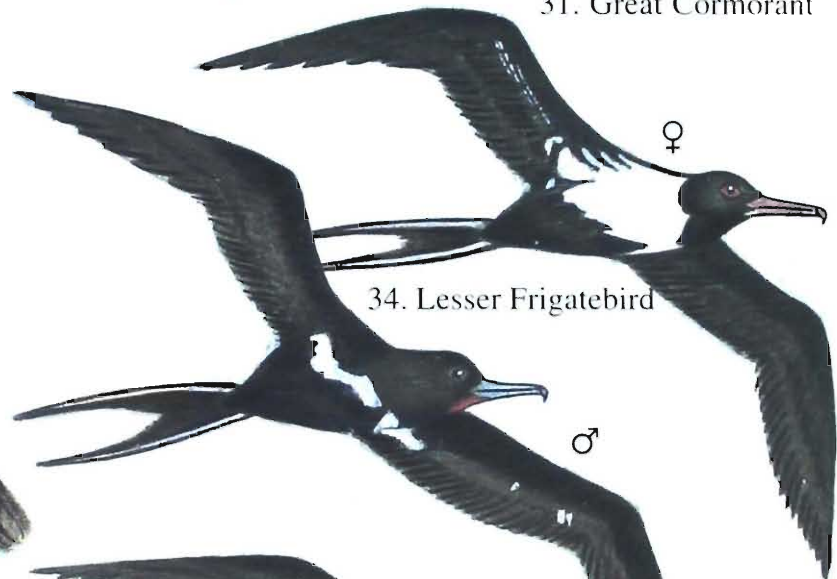
30. Indian Shag



31. Great Cormorant



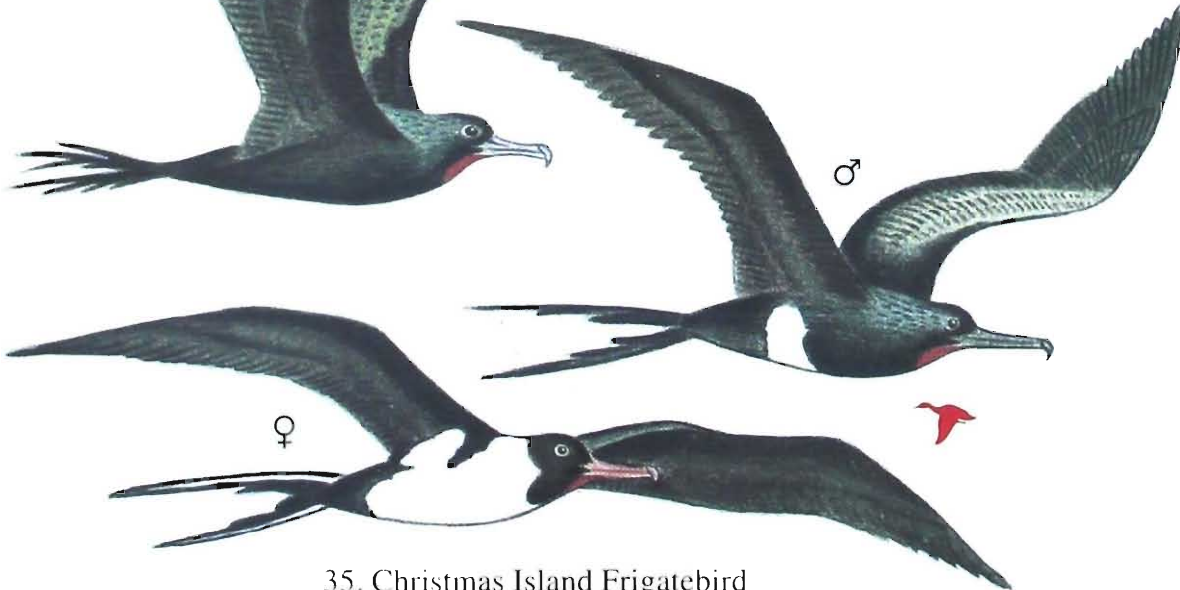
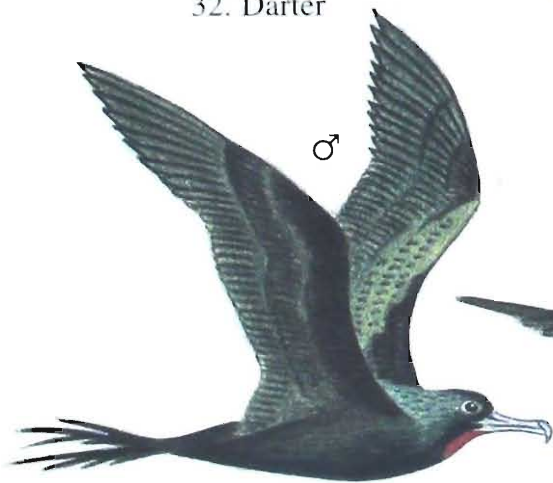
32. Darter



34. Lesser Frigatebird



33. Great Frigatebird



35. Christmas Island Frigatebird

its population, and the threats it poses, can be checked. The breeding population of the Christmas Island Frigatebird should be surveyed and monitored on a regular basis. Along with Abbott's Booby, *this species breeds only on Christmas Island with limited available habitat*. It is believed to be still in decline owing to the continuing effects of past habitat clearance. In addition, the introduction of an ant species is predicted to cause a rapid decline at a rate of more than 80% in 90 years (= three generations). This species has, therefore, been upgraded to Critical. All known and potential nesting habitat should be protected, and further forest areas regenerated if possible (BirdLife Int., 2001).

Herons, Egrets & Bitterns (Family Ardeidae)

World: 62 species; Asia: 30; India: 20

Usually gregarious; waders with long legs, neck and bill; legs projecting well beyond short tails during flight. Necks retracted into S-curve enable these birds to extend the neck with speed and great force to catch or pierce the prey; bill straight, sharp-pointed and dagger-like; nostrils oval, close to the base. Most species have specialised feathers, i.e. powdery down, on each side of breast and rump; these are never shed, but continue to grow from the base and give off a powder for preening feathers. Many species acquire filamentous ornamental plumes ('aigrettes') during the breeding season. Middle and outer toes united by a small web at their base; middle toe pectinate or comb-like; sexes alike or nearly so; breeding colonial; young nidicolous.

36(49). Little Egret. *Egretta garzetta* (Linnaeus, 1766); domestic hen \pm ; 55-63 cm; R/LM/Com C (Plate 8.36)

Diagnostics: *Adult:* Sexes alike. A pure white bird like the other egrets, but smaller with black bill and legs, and yellow feet. *Breeding*



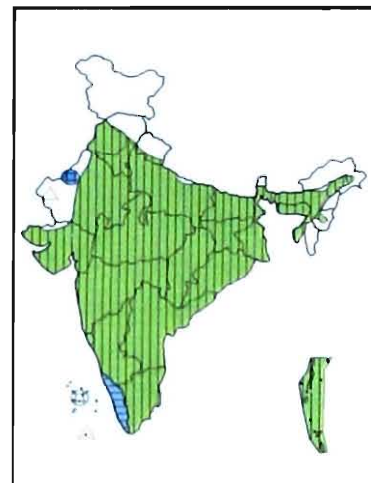
Little Egret (nbr)

Photo: Gehan de Silva Wijeyeratne

(July-September): A drooping nuchal crest of two long narrow plumes; filamentous ornamental feathers on breast and scapulars; a thick bunch of decomposed dorsal plumes extends beyond the tail. *Non-breeding:* The ornamental plumes are dropped though



Photo: Gehan de Silva Wijeyeratne



Little Egret (hr)

occasionally some of the scapular plumes are retained. **Voice:** Usually silent. **Habitat:** Marshes, jheels, lakes, rivers, paddy fields, mudflats, etc. **Habits:** Generally found in flocks, more gregarious than the two large species, roosts communally on trees, breeds in colonies, often in mixed heronries from July to September. **Food:** Fish, frogs, crustaceans and aquatic insects. **Status and Distribution:** Throughout India up to 900 m, except NW and NE; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives. **Threshold number:** 600.

37(50). Western Reef-Egret. *Egretta gularis* (Bosc, 1792); **Western Reef Egret (I); Little Egret =;** 55-65 cm; **R/LM/Ra C** (Plate 8.37)

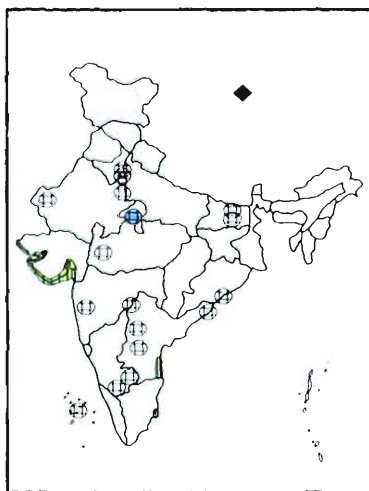
Photo: Gehan de Silva Wijeyeratne



Western Reef-Egret

Diagnostics: *Adult:* Like Little Egret, but dimorphic has two colour phases, viz., pure white and slaty-grey. The latter may vary up to slaty-blue-black. Throat and upper foreneck glistening white in slaty-grey phase; sexes alike in both colour phases. Breeding birds develop two elongated narrow plumes on hind crest (nuchal crest), and same sort of plumes on back and breast.

Juvenile: Pale ashy-grey above and white below except grey upper foreneck. **Voice:** Usually silent. **Habitat:** Generally found at sandy and rocky seashores, estuaries, mangroves and lagoons, rarely affects fresh waters. **Habits:** Solitary and crepuscular, sits by hunching, runs around for hunting and



stalks its prey; breeds in colonies along the western coast. **Food:** Fish, crab and molluscs. **Status and Distribution:** Resident but undertakes local movements, mainly on NW and SE coasts, rare inland; more common on northern shores of Arabian seas in Pakistan; Sri Lanka; Maldives.

38(51). Pacific Reef-Egret. *Egretta sacra* (Gmelin, 1789) 58cm; **R/LCom C** (Plate 8.38)



Photo: Pete Morris/ Birdquest

Pacific Reef-Egret

Diagnostics: Sexes alike. *Adult:* Dimorphic. One phase pure white, other slaty-black; bill yellow to blackish in dark phase and usually yellow in white; iris yellow. Legs pale yellowish green in white and nearly black in dark. A bushy nuchal crest and shorter plumes on breast and mantle identify breeding birds in both the colour phases.

Juvenile: Pied or mottled, in intermediate colour stages. **Voice:** Occasional *ork* when



Photo: Peter Ericsson

Pacific Reef-Egret

Usually silent. **Habitat:** Generally found at sandy and rocky seashores, estuaries, mangroves and lagoons, rarely affects fresh waters. **Habits:** Solitary and crepuscular, sits by hunching, runs around for hunting and

feeding, a longer harsher *arrk* when alarmed. **Habitat:** Rocky coast, sandy shores, mudflats and Coral beds. **Habits:** Solitary, intermittently in twos and threes; roosts communally;

generally diurnal; active, captures prey by stalking; during high tide sits in hunched posture; breeds in colonies from May to September. **Food:** Fish, crabs and occasionally insects. **Status**

and Distribution: Resident, common in Andaman & Nicobar Islands; Bangladesh; Myanmar; Australasia; New Zealand and Pacific islands. **Threshold number:** 10,000.

39(35-36). Grey Heron. *Ardea cinerea* Linnaeus, 1758; 90-98 cm; R/WM/LCom C (Plate 8.39)

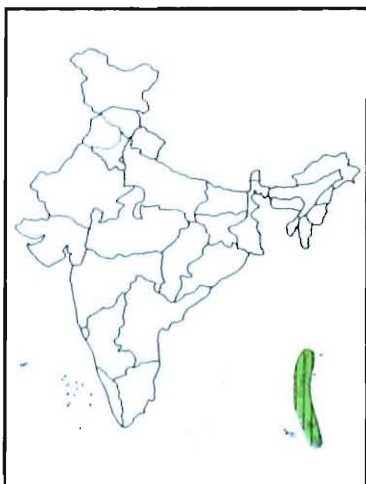


Photo: Svein Bekkum

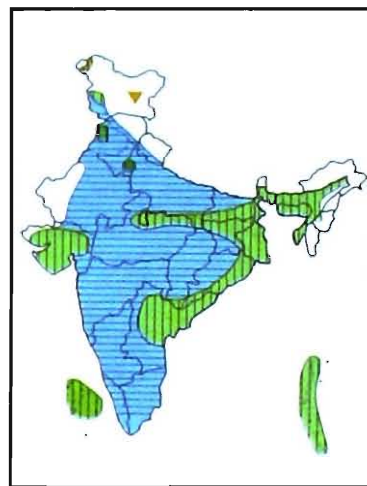
Grey Heron

Diagnostics: *Adult:* Sexes alike, but female smaller with less developed occipital crest and pectoral plumes. A long-legged and long-necked ashy-grey bird with yellow bill; long black occipital crest; white crown and neck; black dotted line down middle of foreneck; elongated black-streaked white feathers on breast; underparts greyish-white; ashy-grey above; darker central feathers with black tips;

primaries, outer secondaries, primary coverts and bastard wing almost black; tail grey. *Juvenile:* Browner and darker grey with foreneck more conspicuously black-streaked and without lengthened scapulars and breast plumes. **Voice:** Loud *frank* while in flight.

Habitat: Affect jheels, marshes, rivers, lakes, estuaries, mangroves, coral reefs and offshore islands. **Habits:** Diurnal, generally solitary, though roosts communally in winter, breeds in colonies almost throughout the year; generally nests among reeds. **Food:** Fish, frog, aquatic invertebrates such as insects, crustaceans and molluscs; known to cause considerable damage to hill trout in Himalaya.

Status and Distribution: Widespread resident in India, winter migrant in small pockets; locally common; breeds throughout the year, up to 1750 m in Kashmir from March to June; recorded up to 4500 m in Ladakh; Pakistan; Nepal; Bangladesh; Bhutan; Sri Lanka; Maldives. **Threshold number:** 200.



40(34) Goliath Heron. *Ardea goliath* Cretzschmar, 1827; Grey Heron +; 140-150cm; Va C (Plate 8.40)

Diagnostics: Sexes alike. *Adult:* A gigantic purple heron-like bird; bill horny-slaty with



Photo: Jugal Tiwari

Goliath Heron

Photo: Gill Cardy

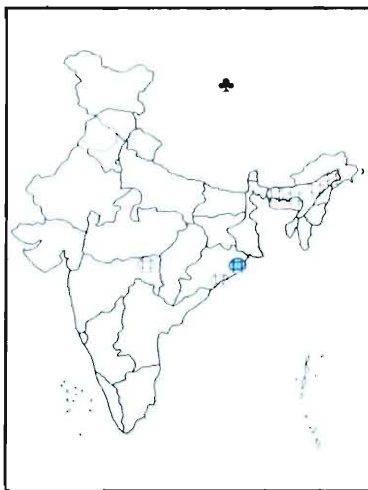


Goliath Heron

yellowish lower mandible. Crown and crest deep vinous chestnut; neck rufous-cinnamon; upper parts, wings and tail slaty-grey; iris yellow with an outer red rim. Chin, cheeks and throat white; breast plumes elongated, streaked white and slaty-black; underparts deep

chestnut; legs and feet dark slaty-black.

Juvenile: With black forehead and crown, paler rufous hind neck, indistinct neck stripes, rufous edged grey upperparts and white underparts streaked with brown. **Voice:** Gargling and bellowing. **Habitat:** Rivers. **Habits:** Solitary, shy, diurnal, generally hunt in shallow waters. **Food:** Fish.



Status and Distribution: Vagrant; NE India; Pakistan to Bangladesh; S to Sri Lanka.

Threshold number: 1.

41(33). White-bellied Heron. *Ardea insignis* Hume, 1878; Grey Heron +; c. 127cm; GT/En R/VRa C (Plate 8.41)

Diagnostics: Sexes alike. **Adult:** Chiefly a dull grey heron with shiny white belly and whitish chin and throat, slaty-black bill, crown, tail, and primaries; remaining upperparts greyish. The longest crest feathers tipped grey; lower breast, abdomen, flanks, axillaries, under wing-coverts and tail-coverts pure white. Thigh-coverts white in front, grey behind;



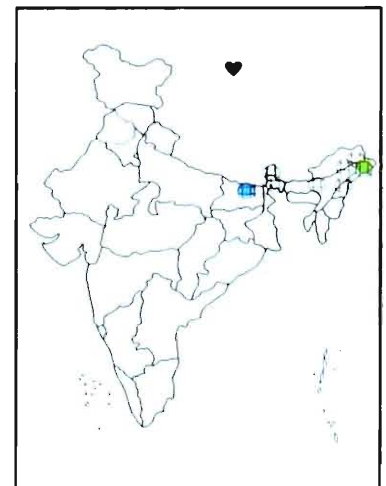
Photo: Steven Gollady

White-bellied Heron

legs and feet black with horny patches.

Juvenile: Dark brown above with pale rufous-brown head and neck white-streaked. **Voice:** Loud and deep. **Habitat:** Occurs near large inland swamps, lakes and rivers, often surrounded by subtropical forest. **Habits:** Diurnal occurs singly or in pairs, very wary. The species was reported to breed in July and August. **Food:** Carnivorous. **Status and Distribution:** *Globally threatened/Endangered:* Very rare; recent records only from Assam, Arunachal Pradesh and Nagaland; Bangladesh; Nepal; Bhutan; Myanmar. **Remarks:** A cursory tally of sightings made in the latter half of the twentieth century gives serious cause for concern: there were none from Nepal, one from Bangladesh, and only very few from Myanmar, India and Bhutan. As this is a relatively conspicuous bird confined to a linear habitat, it appears that overall numbers might be very small indeed. In India at the outset of the twentieth century the species

was seen with some regularity on the rivers draining from the eastern Himalaya and outlying ranges into the duars and lowlands of West Bengal, Assam and Arunachal Pradesh. India



quite possibly hosts the largest single population of the species in the world; estimation of its size is not straightforward, although it probably lies in the very low hundreds. **Threats:** *Habitat loss:* Its dependency on mature trees in association with wetlands links it to a habitat complex that is threatened throughout its range either by wetland destruction or by forest destruction. The remote swamplands of the Indian terai and duars have largely been drained and cleared to make way for agriculture and settlements, causing a reduction in the area of habitat available to the species. **Measures taken:** In India it probably breeds in Namdapha National Park and has occurred in several other protected areas such as Kaziranga and Dibru-Saikhowa National Parks and Pobitora Wildlife Sanctuary during the non-breeding season. **Measures suggested:** An intensive, specifically targeted survey of northeast Indian states is required to clarify the distribution, ecology, status and seasonal movements of this scarce species (BirdLife Int., 2001). **Threshold number:** 6.

42(37-37a). Purple Heron. *Ardea purpurea* Linnaeus, 1766; Grey Heron -; 78-90 cm; **R/ LM/LCom C** (Plate 8.42)

Photo: Gehan de Silva Wijeyeratne



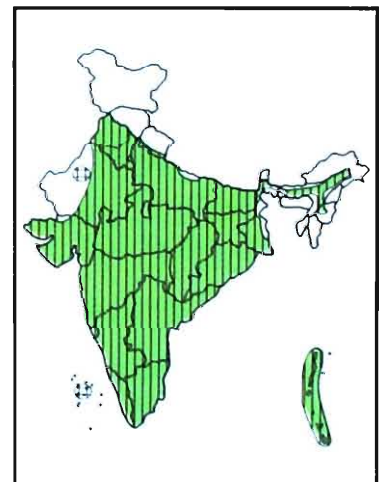
Purple Heron

Diagnostics: *Adult:* Sexes alike, female with less developed crest and pectoral plumes; a lanky marsh bird with long slender snake-like neck; slaty-purple above; chestnut and black below. Bill dark yellow; drooping crest black; crown, crest and a line down hind neck black; a second up-running black line from gape to crest; a third black line down whole length of side of neck; rest of head and neck rufous with another black streak down fore-neck. Chin and throat white; long drooping plumes on upper breast buff white with black and chestnut streaks; rest of upperparts slaty black and rich chestnut; underparts chiefly chestnut and black; legs reddish-brown. *Juvenile:* Cinnamon-brown. **Voice:** Loud *frank* while in flight. **Habitat:** Marshes with elephant grass, lakes, jheels, rivers and paddy fields. **Habits:** Generally solitary, shy, feeds in dense aquatic vegetation, active in morning and evening. Breeds almost round the year. **Food:** Chiefly fish, frog, also water insects. **Status and Distribution:** A resident and locally common species throughout the plains of India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives. **Threshold number:** 250.



Photo: Satpal Gandhi

Purple Heron



and locally common species throughout the plains of India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives. **Threshold number:** 250.

43(45-46) Large Egret. *Casmerodius albus* (Linnaeus, 1758); **Great Egret** (I); Grey Heron ±; c. 91-96 cm; **R/LM/LCom C** (Plate 9.43)

Photo: Gehan de Silva Wijeyeratne



Large Egret (br)

Photo: Gehan de Silva Wijeyeratne

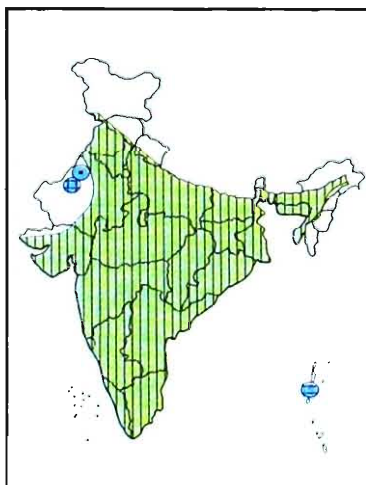


Large Egret (nbr)

Diagnostics: *Adult:* Sexes alike; a snow-white bird with yellow beak and black legs. Breeding birds with black beak; edge of gape, naked lores and orbital skin behind eyes bright green; three sets of long, transparent, white plumes growing from scapulars extending beyond tail. *Juvenile:* Pure white.

Voice: Usually silent,

occasionally utters low *kraak*. **Habitat:** Jheels, marshes, rivers, lakes, estuaries, mangroves and coral reefs. **Habits:** Diurnal, unsocial, generally solitary though roosts and feeds communally, breeds in mixed heronries of storks, darters and cormorants, etc. Generally breeds from May to November. **Food:** Fish, frogs,



aquatic insects and crustaceans. **Status and Distribution:** Resident throughout India shifts locally depending on availability of water, Sri Lanka; Nepal; Maldives; Caspian, C & SW Asia. **Threshold number:** 250.

44(47 48). Median Egret. *Mesophoyx intermedia* (Wagler, 1829); **Intermediate Egret** (I); 65-72 cm; **R/LM/LCom C** (Plate 9.44)



Photo: Satpal Gandhi

Median Egret (br)

Diagnostics: *Adult:* Sexes alike; comparatively medium-size snow-white egret. *Non-breeding:* Often indistinguishable. *Breeding:* Develops filamentous plumes on breast as well as back,



Median Egret (nbr)

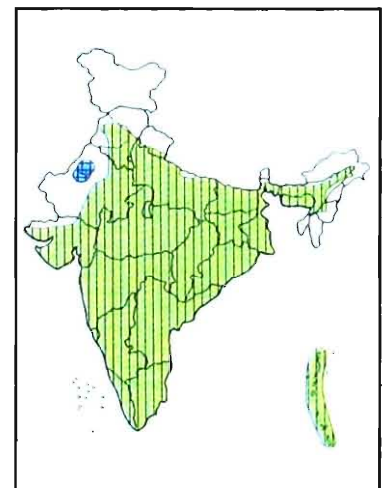


Photo: James Eaton

and the yellow bill (non-breeding) turns black. **Voice:** Normally silent, makes buzzing calls during display. **Habitat:** Lakes, reservoirs, marshes, pools with vegetation, jheels, inundations, estuaries, mangroves and tidal creeks. **Habits:** Diurnal, occurs in small flocks, roosts and feeds communally, often solitary when hunting, breeds in colonies in mixed heronries from May to November. **Food:** Fish,

frogs and aquatic insects. **Status and Distribution:** Resident, locally common throughout India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives. **Threshold number:** 250.

45(44). Cattle Egret. *Bubulcus ibis* (Linnaeus, 1758); Hen =; 48-53 cm; R/AM/Com C (Plate 9.45)



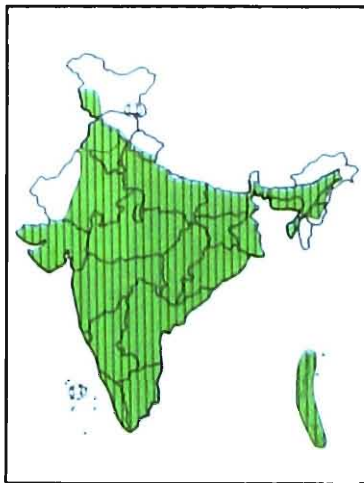
Photo: ZSI, Jabalpur

Cattle Egret (br)

Diagnostics: *Adult:* Sexes alike; lanky snow-white bird. *Non-breeding:* Like Little Egret, but always identified by yellow bill contra black.

Breeding: Golden-buff plumes on head, neck and back. **Voice:** Generally silent.

Habitat: Damp grassland, fallow, paddy fields, and periphery of canals, lakes, and reservoirs. **Habits:** Gregarious when



feeding and roosting, invariably accompanying grazing village livestock, feeds on insects disturbed by animals. Breeds almost round the year, though mainly from June to August in N India, breeds in mixed colonies on



Photo: Gehan de Silva Wijeyeratne

Cattle Egret (nbr)

large trees, often away from water. **Food:** Chiefly insects such as beetles and grasshoppers, besides earthworms. **Status and Distribution:** A common resident species throughout India, up to 1500 m in Himalaya; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives.

46(42-42a). Indian Pond-Heron. *Ardeola grayii* (Sykes, 1832); **Indian Pond Heron** (T); Hen +; 42-45 cm; R/LM/Com C (Plate 9.46)



Photo: P. C. Tak

Indian Pond-Heron (br)

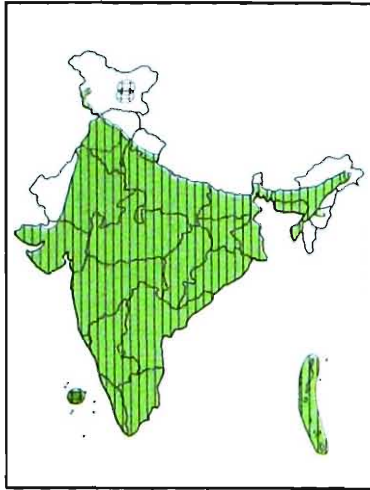


Photo: BPB

Indian Pond-Heron (nbr)

Diagnostics: *Adult:* Sexes alike. A thickset, earthy-brown at rest and largely snow-white in flight waterbird has yellow bill, which is black at tip and bluish at base; white chin, throat and foreneck; horny-green legs. **Breeding:** Long recumbent white or buff occipital crest of lanceolate plumes; ashy-brown upper breast; deep maroon and long decomposed feathers on back; white underparts. **Non-breeding:** Dark brown head and neck with buff streaks of sides of neck prominent; brown mantle; white streaks on

scapulars; white underparts. **Voice:** Harsh croak when flushed, at nest utter human-like *wa-koo*. **Habitat:** Streams, jheels, marshes, ponds, rice fields, village tanks, ditches, wells and mudflats. **Habits:** Generally solitary or in small groups when hunting, gregarious when roosting, nests in colonies; collects in large numbers in drying ponds to feast on frogs and fishes, breeds almost throughout the year. **Food:** Voracious feeder on frogs and fish, besides aquatic insects. **Status**



and Distribution: A common and widespread resident species, undertakes local movements; throughout India up to 1500 m in Himalaya, Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Myanmar; Maldives; SW Asia. **Threshold number:** 10,000.

47(43). Chinese Pond Heron. *Ardeola bacchus* (Bonaparte, 1855); Indian Pond-Heron +; 45-52 cm; **R/LM/Ra C** (Plate 9.47)

Photo: Kwan Po-Kuen

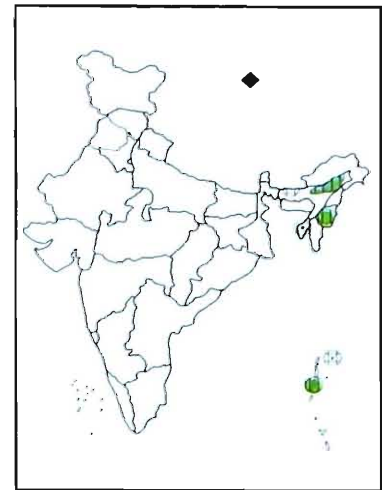


Chinese Pond Heron (br)

Diagnostics: *Adult:* Sexes alike; very similar to Indian Pond-Heron but slightly larger. **Breeding:** Distinguished from Indian Pond-Heron by chestnut head, neck, breast, long lanceolate nuchal crest and dark slaty back. **Non-breeding:** It is difficult to distinguish it from Indian Pond-Heron, except size. **Voice:**



Photo: Alistair Benn



Chinese Pond Heron (nbr)

Presumably as that of Indian Pond-Heron. **Habitat:** Marshes, paddy fields, jheels, village tanks and tidal waters. **Habits:** Generally solitary, roosts communally, tame, breeds May-August in small mixed heronries. **Food:** Fish, frog and crab. **Status and Distribution:** Resident shows local movements, chiefly in NE India (Assam and Manipur) and Andamans; Bhutan; Bangladesh and Sri Lanka; E, SE Asia.

48(38-41). Little Green Heron. *Butorides striatus* (Linnaeus, 1758); **Little Heron** (I); Indian Pond-Heron =; 40-48 cm; **R/Ra C** (Plate 9.48)



Photo: James Eaton

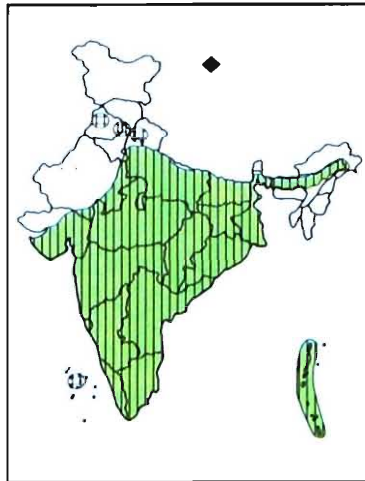
Little Green Heron

Diagnostics: *Adult:* Sexes alike; chiefly a black, grey and dark metallic green heron with black bill; glossy greenish-black forehead, crown and longish occipital crest; white chin, cheeks and central throat; grey head and neck. Upper parts slaty-grey glossed with bronze-green; lower parts ashy-grey and under tail-coverts white with blackish edges;

Photo: Alistar Benn



Little Green Heron



legs dull green or plumbeous green. **Juvenile:** Brownish above, white below; dark streaks at sides; wings with white spots. **Voice:** Usually silent; when flushed utters alarm note *k'yow* or *k'yek*. **Habitat:** Rivers, lakes, marshes with dense vegetation on the banks, also backwaters, mangroves and tidal creeks. **Habits:** Solitary, frequents the same area, crepuscular, usually remains in thick vegetation, occasionally active during day, often perches on overhanging branches. Apparently breeds twice a year from March to September. **Food:** Chiefly fish, frogs, crustaceans (crabs) and aquatic insects. **Status and Distribution:** Resident, widely spread almost throughout Indian plains, except NW portions; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives; SE Asia. **Threshold number:** 250.

49(52). Black-crowned Night-Heron. *Nycticorax nycticorax* (Linnaeus, 1758); **Black-crowned Night Heron** (1); Indian Pond-Heron =; 58-65 cm; R/LM/LCom C (Plate 9,49)

Photo: Satpal Gandhi



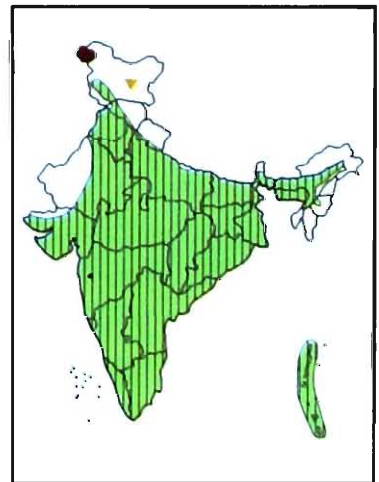
Black-crowned Night-Heron (adult)



Black-crowned Night-Heron (juv)

Photo: Gehan de Silva Wijeyeratne

Diagnostics: *Adult:* Sexes alike; strongly built grey, white and black heron with stout black bill. Crown, nape and occipital crest black with two or three very long, narrow white plumes; forehead and a streak over eye white; sides of neck, wings, rump and tail greyish; eyes blood-red; underparts white; legs and feet pale-green, in breeding season turn pinkish and bill blacker. *Juvenile:* Pale-smoky brown with bright yellow eyes and resembles adult Indian Pond-Heron except for white wings. **Voice:** Usually silent, *weck* or *kwock* in flight. **Habitat:** Reservoirs, jheels, tanks, streams, ponds, rivers, mangroves, estuaries, creeks and lagoons. **Habits:** Nocturnal or crepuscular except in breeding season. Generally gregarious, during daytime roosts in dense trees, often at dusk, breeds in pure colonies from December to September, April to May in Kashmir and June-July to September in N India. **Food:** Chiefly fish, frog, aquatic insects such as Odonata



larvae. **Status and Distribution:** Resident, nomadic, patchily distributed throughout India up to 1700 m, Andaman and Nicobar

islands; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives. **Threshold number:** 1,000.

50(53-54). Malayan Night Heron. *Gorsachius melanolophus* (Raffles, 1822); Indian Pond-Heron +; 51 cm; **R/Ra C** (Plate 10.50)



Photo: J. Wijpekema

Malayan Night Heron

Diagnostics: *Adult:* Sexes alike; an unmistakable relation of the Pond and Night Herons, with stocky body and thick neck; stout fleshy-yellow bill with horny-brown tip; golden yellow iris with blue-green lores; ashy black crown and long bushy nuchal crest. Upperparts chestnut cinnamon finely vermiculated with black. Chin and throat white; foreneck and upper breast sandy-rufous with black streaks. Remaining underparts white blotched with black and rufous. Legs and feet dull green. *Juvenile:* Head almost black; nape and long crest feathers streaked with white; chin and throat white with central dark brown streak; remaining parts rufous-buff, barred and vermiculated all over with dark brown. **Voice:** Usually silent. **Habitat:** Around streams and swamps in broadleaved forests. **Habits:**

Nocturnal, shy and skulk in dense undergrowth.

Food: Fish, frog, lizard, molluscs and aquatic insects.

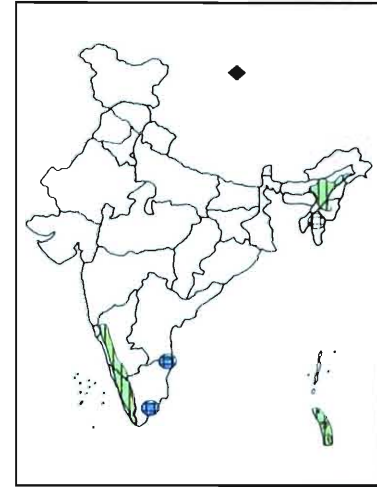
Status and Distribution:

Resident in S Western Ghats, NE India and Nicobar

Is.; Sri Lanka;

Bangladesh; Nepal; SE Asia.

Threshold number: 100.



51(55). Little Bittern. *Ixobrychus minutus* (Linnaeus, 1766); Indian Pond-Heron -; 33-36 cm; **R/LM/Ra C** (Plate 10.51)



Photo: James Eaton

Little Bittern (male)

Diagnostics: *Adult:* Sexually dimorphic. *Male:*

A 'hunchbacked' and buff bird with purplish-yellow bill and greenish-horny legs. Crown to tail black, buff wing patch visible in flight only; sides of head and neck greyish-pink or vinous; throat and neck whitish; upper breast and flanks ochre;



Photo: Gill Cardy

Little Bittern (male)

lower breast blackish-maroon; central abdomen, vent and under tail-coverts almost white. *Female*: Chestnut-brown above, including shoulder patch; chestnut-rufous below and rufous streaked. *Juvenile*: Heavily streaked above and below. **Voice**: Occasional *wuk*, deep *krok*, or *keck eck eck eck*. **Habitat**: Jheels, marshes, lakes and streams with tall reeds at edges. **Habits**: Solitary, rarely in pairs, most active at dusk, remains hidden in thick vegetation at the edges of water bodies, when disturbed feigns freezing, breeds singly from May to September, nests usually in dense reed bed. **Food**: Fish, frog, crustaceans, molluscs and aquatic insects. **Status and Distribution**: Resident, nomadic, mainly distributed in plains; up to 1800 m in Kashmir where it commonly breeds, and also in Assam; Pakistan; Bangladesh; C Asia. **Threshold number**: 250.

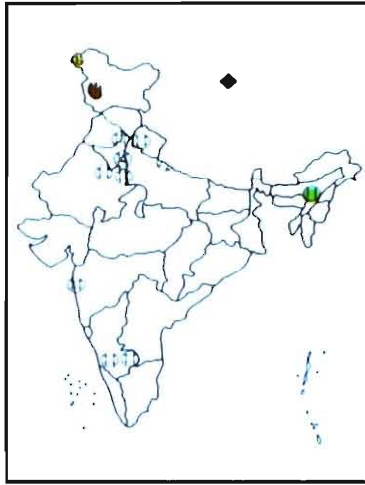
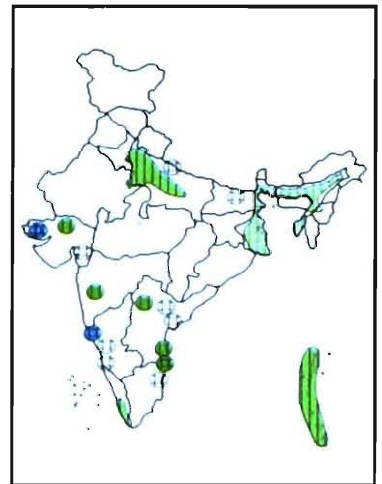


Photo: Gehan de Silva Wijeyeratne

Yellow Bittern (juv)

feathers; remaining back chiefly yellowish-brown; rump dark ashy; tail slaty-black; bill yellowish-horny; chin, throat and foreneck pale yellowish; sides of upper breast with buff streaks; rest of underparts buff; legs and feet yellow. *Female*: Almost similar except for a buff mesial line down the throat. *Juvenile*: More rufous-brown above with broad buff fringes on all feathers; streaked below; the mesial line more pronounced. **Voice**: Usually silent. **Habitat**: Scrubby swamps with reeds, inundated paddy fields in company with Chestnut



Bittern. **Habits**: Generally crepuscular and nocturnal, active on cloudy day; also feigns freezing, breeds from June to September, nests in reed bed or bushes at the edges of pond. **Food**: Very voracious feeder on fish, frog and aquatic insects. **Status and Distribution**: Resident, nomadic, scattered, uncommon, absent in peninsula; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives.

53(56). Chestnut Bittern. *Ixobrychus cinnamomeus* (Gmelin, 1789); **Cinnamon Bittern** (I); Indian Pond-Heron-; 38-40 cm; **R/LM/LCom C** (Plate 10.53)



Yellow Bittern (adult)

Diagnostics: Adult: Sexually dimorphic. *Male*: Crown and crest black with dark flight

Photo: Pisith Singjai



Chestnut Bittern (adult)

Diagnostics: Adult: Sexually dimorphic. **Male:** Upper plumage chestnut-cinnamon, wing-coverts paler; chin, throat and upper

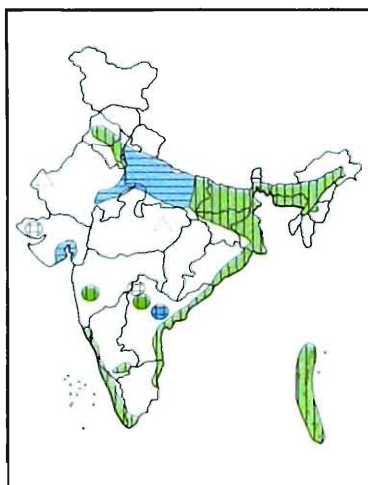
foreneck white with a dark median stripe down the foreneck; a patch of black, buff-edged feathers on each side of upper breast largely concealed by elongated breast feathers; remaining under plumage and wings pale



Photo: John Holmes

Chestnut Bittern (juv)

chestnut; bill yellow; legs and feet yellowish-green. **Female:** Darker; chestnut-brown above with blackish crown; wings mottled buff and brown; buff-rufous below with dark brown striation from chin to vent and a streak down middle of foreneck and breast. **Juvenile:** Like female, but mottled above and heavily streaked below. **Voice:** Normally silent, utters a loud *kok-kok*. **Habitat:** Reedy beds of jheels and marshes, paddy fields, mangroves etc. **Habits:**



Non-gregarious, crepuscular, generally occurs in company of Yellow Bittern, seen during day only upon emerging from long grasses, breeds from May to September, nests on bent-over reeds about one metre above water. **Food:** Consumes a large quantity of fish, frog, molluscs and aquatic insects. **Status and Distribution:** Resident, nomadic, scattered throughout India, Andaman and Nicobar Islands, Saurashtra; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives; SE Asia and NE China; S Japan.

54(58). Black Bittern. *Dupetor flavicollis* (Latham, 1790); Indian Pond-Heron +; c. 58 cm; **R/LM/UnCom C** (Plate 10.54)



Photo: Gehan de Silva Wijeyeratne

Black Bittern

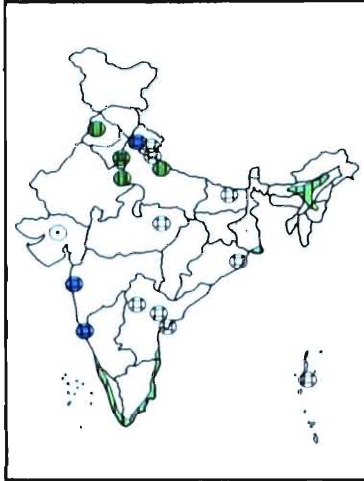
Diagnostics: Adult: Sexually dimorphic. **Male:** Upper plumage slaty-grey to black with bluish sheen. Bill reddish-horny with yellowish tip and terminal half of lower mandible; chin and throat white with rufous dotted line down the middle; yellowish patch on either side of neck; upper breast dark slate with buff-white margins on feathers; breast, abdomen and remaining under plumage slaty-grey to brownish-black; legs and feet dark brown. **Female:** Brown above and paler below with streaks on breast. **Juvenile:** Crown blackish; upperparts dark brown with rufous scalloping; underparts mottled chestnut and buff. **Voice:** Usually silent, harsh *queh*, a loud booming during breeding season. **Habitat:** Occur in reedy swamps and ditches in forest with overgrown seepage and submerged bushes.

Habits: Generally crepuscular (active in early morning and dusk) and nocturnal, non-gregarious, feigns freezing, breeds from May to September; nests in reeds or in a dense thicket in a marsh.

Food: Devours large fish, frog, molluscs and aquatic insects.

Status and Distribution:

Resident, nomadic and widespread; but uncommon throughout India; Pakistan; Nepal; Bangladesh; Sri Lanka. **Threshold number:** 1,000.



55(59). Great Bittern. *Botaurus stellaris* (Linnaeus, 1758); Indian Pond-Heron +; 70-80 cm; WM/Ra C (Plate 10.55)



Photo: Jugal Tiwari

Great Bittern

Diagnostics: *Adult:* Sexes alike. Crown, nape and upper back black; sides of head yellowish-orange, faintly dotted with black; remaining back, rump and tail yellowish-buff, profusely barred and mottled with black. Bill greenish-yellow; lores green to bluish; chin and throat white with a conspicuous buff and black median line that continues down the overhanging yellowish plumes; remaining underparts yellowish-buff with narrow brownish bars on sides of breast; legs and feet greenish-yellow. *Juvenile:* Upperparts

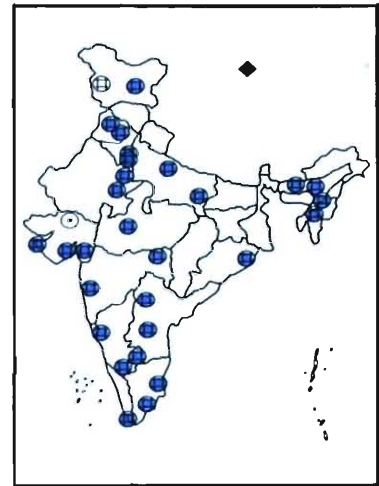
pale chestnut to reddish-brown and underparts reddish-buff, except for whitish chin and throat.

Voice: Silent during winter, *aurr* in flight.

Habitat: Inland jheels, marshes and swamps with thick overgrown beds of *Phragmites* and *Typha*.

Habits: Found singly, crepuscular,

nocturnal and shy, remains hidden in reed beds, feeds alone, feigns freezing. **Food:** Chiefly fish, frog, aquatic invertebrates, occasionally small birds and rodents. **Status and Distribution:** Winter migrant, rare, mainly from NW to NE India; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives; breeds in C Asia, winters in S Asia.



Storks (Family Ciconiidae)

World: 19 species; Asia: 11; India: 9

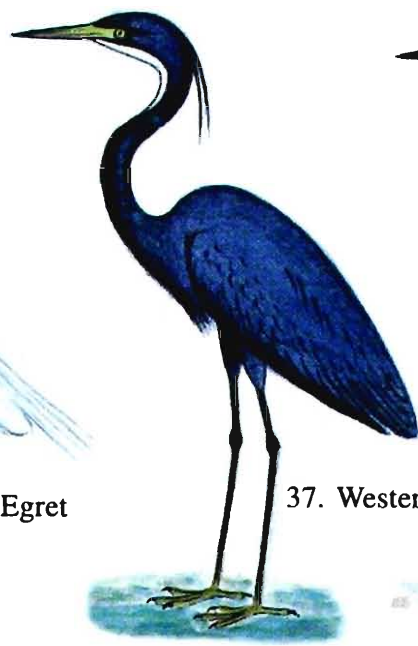
Large, long-legged and diurnal waders. Chiefly terrestrial and marsh hunting large bird has long, massive, pointed, straight or nearly so, ungrooved bill; wings long and broad; tail rather short; legs very long, the tibia partly naked. The three anterior toes united by webs at their base. Due to absence of tracheo-bronchial muscles in the larynx, adults lacking voice. In most species the noise produced is either by hissing or by snapping of mandibles. In characteristic flight, neck and legs fully outstretched, except in Adjutants. Sexes similar, except Black-necked Storks, where females have yellow iris and males have a dark iris; but males usually larger; young nidicolous.

56(60). Painted Stork. *Mycteria leucocephala* (Pennant, 1769); Vulture ±; 93-100 cm; NT R/LM/LCom C (Plate 11.56)

Plate 8



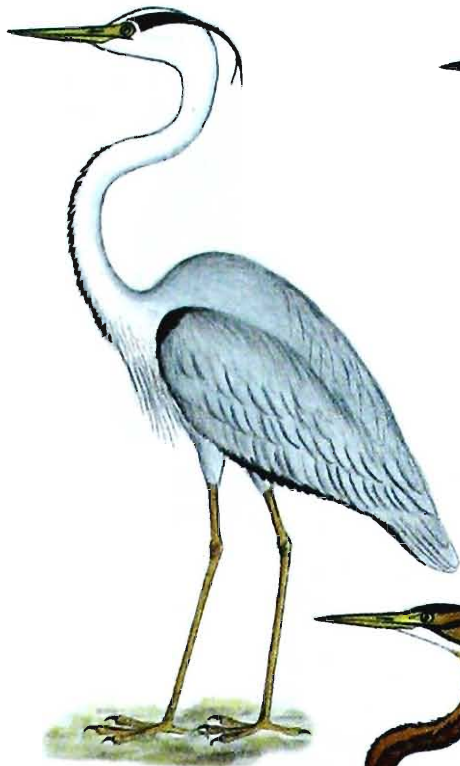
36. Little Egret



37. Western Reef-Egret



38. Pacific Reef-Egret



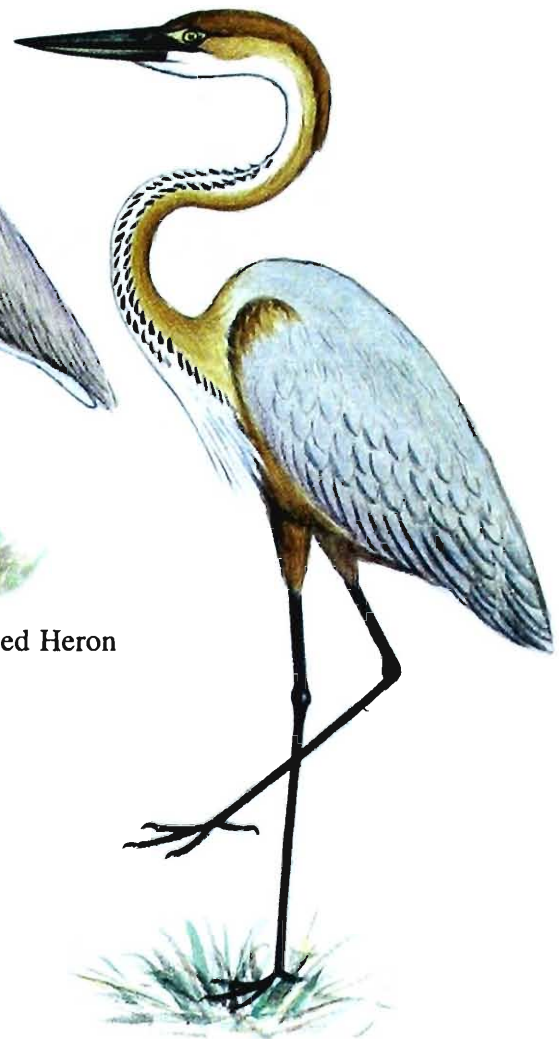
39. Grey Heron



41. White-bellied Heron



42. Purple Heron



40. Goliath Heron

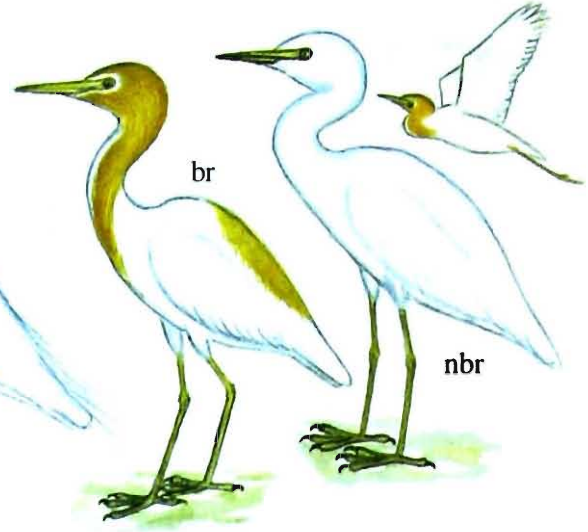
Plate 9



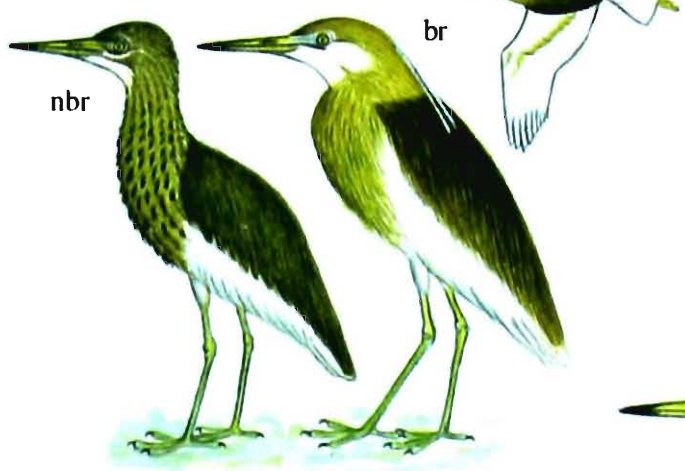
43. Large Egret



44. Median Egret



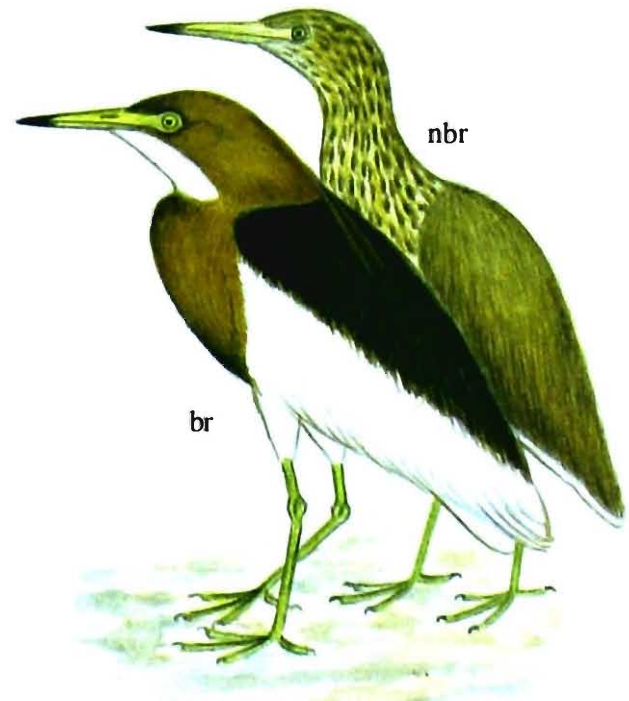
45. Cattle Egret



46. Indian Pond-Heron



49. Black-crowned Night-Heron

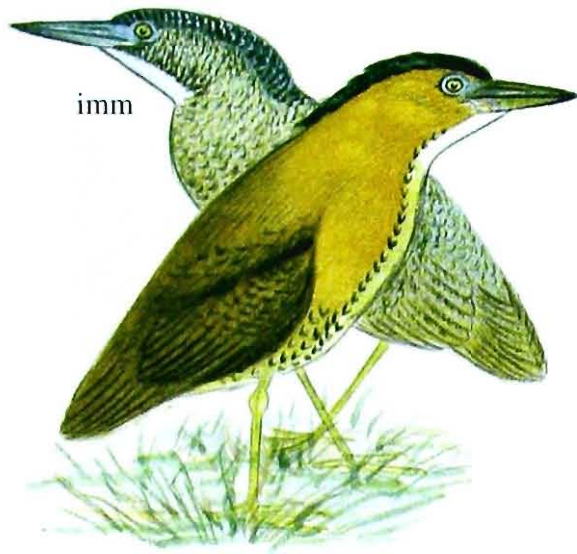


47. Chinese Pond-Heron



48. Little Green Heron

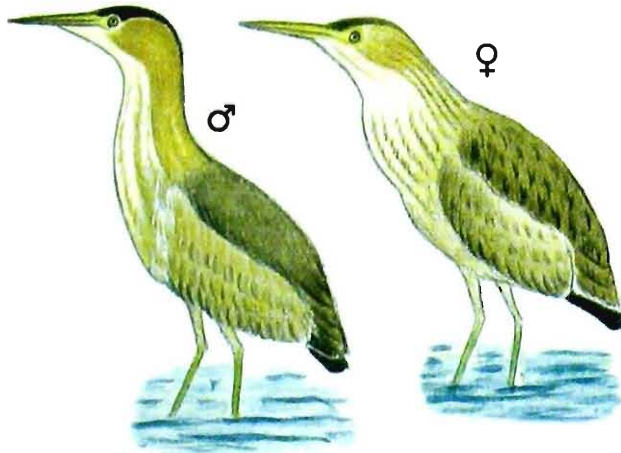
Plate 10



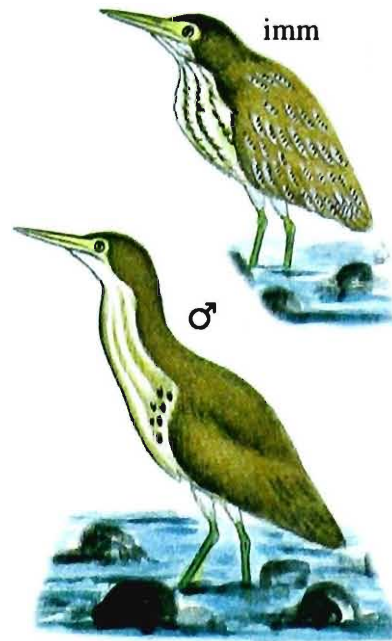
50. Malayan Night-Heron



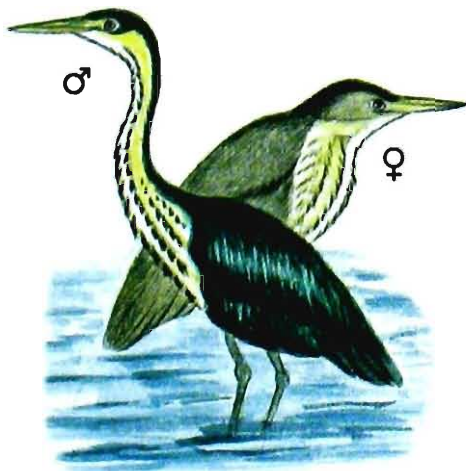
51. Little Bittern



52. Yellow Bittern



53. Chestnut Bittern



54. Black Bittern



55. Great Bittern

Photo: Satpal Gandhi



Painted Stork



Photo: Satpal Gandhi

Painted Stork (with chicks)

Photo: Bhumesh Bharti



Painted Stork (at rest)

Diagnostics: Adult: Sexes alike; long-legged, long-necked, large black and white bird with orange-yellow bill and face; plumage white; wings blackish-green and white, breast band and tail-quills black; wing-coverts with rich rosy-pink wash; legs and feet fleshy-brown. **Voice:** Adults silent except bill rattling. **Habitat:**

Inland lakes, reservoirs, marshes, inundated fields and riverbanks. **Habits:** Generally found in small groups; breeds in large colonies from August to March when flocks with chicks may be found roosting in trees in mixed heronries; roosts gregariously in trees, also on

sandbanks and mudflats. **Food:** Chiefly fish, frog, occasionally aquatic insects and reptiles. **Status and Distribution:** Resident, nomadic, widespread and locally common in plains, non-breeding summer migrant to Himalayan foothills; Pakistan; Nepal; Bangladesh; Sri Lanka. **Remarks:** There are an estimated 15,000 individuals in South Asia and fewer than 10,000 in South-East Asia, with populations declining throughout. Although it is thus considered “one of the most numerous and secure of Asian storks”, this is more a reflection of the rarity and endangerment of most other storks in the region than of the security of this species. The increasing impact of habitat loss, disturbance, pollution and hunting of adults and collection of eggs and nestlings from colonies is cause for concern (BirdLife Int., 2001). **Threshold number:** 150.

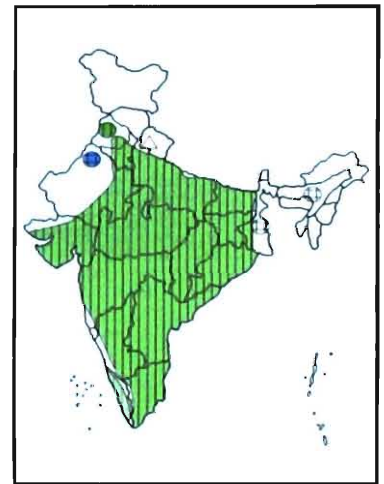


Photo: Talat Khalid



Painted Stork (in flight)

57(61). Asian Openbill-Stork. *Anastomus oscitans* (Boddaert, 1783); **Asian Openbill (I);** large duck =; 68-81 cm; **R/LM/LCom C** (Plate 11.57)

Diagnostics: Adult: Sexes alike; a small stork with white plumage; greenish-black scapulars,

Photo: Takat Khalid

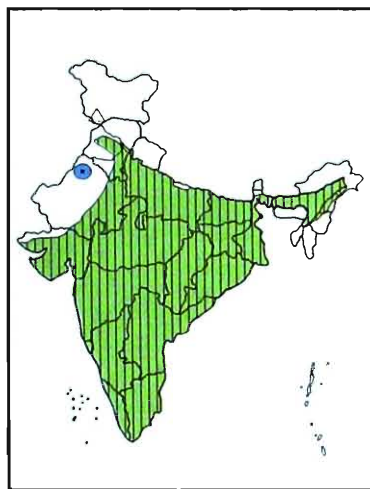


Photo: Gehan de Silva Wijeyeratne

Asian Openbill-Stork

wings and tail; dull greenish-horny bill with arching mandibles, showing a gap in-between at close range. In non-breeding season the white plumage of the upperparts is replaced with pale smoky-grey. *Juvenile*: Smoky brown-grey with blackish-brown mantle; gap in bill develops slowly. **Voice**: Silent. **Habitat**: Jheels, marshes, shallow wetlands, such as lakes and reservoirs, paddy fields, riverbeds, etc. **Habits**: Found singly or in small flocks, congregates at the

time of nesting; breeds in large mixed heronries from July to April; nests in trees near water. **Food**: Feeds in shallow water on molluscs, frogs, fishes and other small animals. **Status**



and Distribution: Resident, nomadic, locally common, widely distributed in India; Pakistan; Nepal; Bangladesh; Sri Lanka; SE Asia. **Threshold number**: 1,250.

58(65). Black Stork. *Ciconia nigra* (Linnaeus, 1758); White Stork ±; 90-100 cm; **WM/PM/UnCom C** (Plate 11.58)

Diagnostics: Adult: Sexes alike; a black stork with contrasting white underparts; scarlet bill

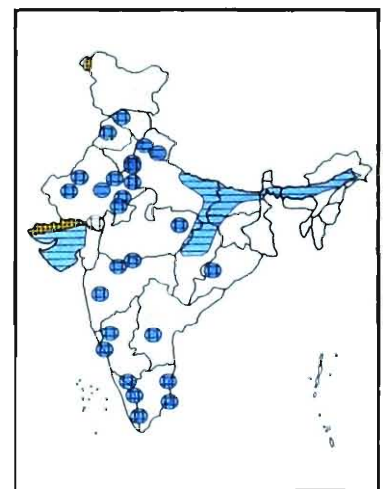


Photo: Gill Cardy

Black Stork

and legs; plumage black with varying sheen; purple, green and bronze on upperparts; brilliant green on neck; mixed green and purple on breast except underparts. *Juvenile*: Head, neck and upper breast with pale-tipped dark brown feathers; mantle brownish-black; underparts white. **Voice**: Invariably silent. **Habitat**: Marshes, river banks, freshwater lakes, etc. **Habits**:

Generally in pairs or in small flocks, shy and prefers Riverine areas. **Food**: Chiefly frog,



Status and Distribution: Winter migrant, widespread, uncommon, more common from NW to NE

Photo: Satpal Gandhi



Black Stork

India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; breeds in W & C Asia, winters in Pakistan and India to Myanmar. **Threshold number:** 100.

59(62). White-necked Stork. *Ciconia episcopus* (Boddaert, 1783); **Woolly-necked Stork** (I); Goose \pm ; 75-92 cm; **R/Ra C** (Plate 11.59)

Photo: Talat Khalid



White-necked Stork

Diagnostics: *Adult:* Sexes alike; a large black and white stork with conspicuous white neck, black cap and red legs. Bill black, tinged crimson-red at tip and gape; crown black with green sheen; rest of plumage black, glossed purple or greenish-blue, except lower abdomen, under tail-coverts and tail which are white. *Juvenile:* Has neck feathers longer and stuffer; glossy black replaced by dark brown. **Voice:** Silent. **Habitat:** Flooded grasslands, fallow, irrigated ploughed fields, rain-filled ponds, marshes, marshy stream, rivers, etc. near open forests or groves. **Habits:** Generally

solitary, in pairs or sometimes in small groups; seldom wades in water; roosts on tall trees at night; breeds individually from July to April; builds a solitary nest at the top of a tree. **Food:**

Chiefly frogs, reptiles and aquatic invertebrates, occasionally fish, also on swarming termites. **Status and Distribution:** Resident, sparsely distributed in the well-watered parts of India, more frequent in Peninsula; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka. SE Asia. **Threshold number:** 250.

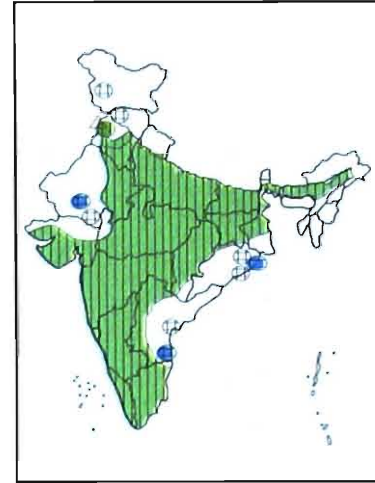
60(63). European White Stork. *Ciconia ciconia* (Linnaeus, 1758); **White Stork** (I); Goose \pm ; 100-125 cm; **WM/LCom C** (Plate 11.60)



European White Stork

Diagnostics: *Adult:* Sexes alike; chiefly white storks with black primaries; red bill and legs; long and lanceolate feathers on head, neck and breast. *Juvenile:* Like adult, but black parts replaced by brown. **Voice:** Silent.

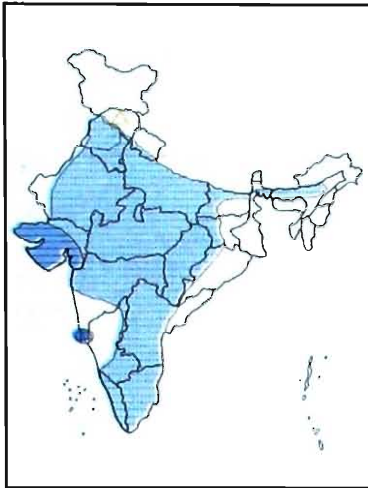
Photo: K. S. Gopi Sundar



Habitat: Dry and wet grassland, damp ploughed or fallow fields.

Habits: Stalks quietly in search of food in marshy grasslands, fresh fallow or ploughed fields, solitary or in small flocks.

Arrives by September/October and departs by March/April. **Food:** Generally frogs, reptiles and crustaceans, occasionally fish, voraciously feed on swarming population of locusts, which makes it a specially protected bird in many countries. **Status and Distribution:** Winter migrant, locally common in NW & S India; Pakistan; Nepal; Bangladesh; Sri Lanka; breeds in C Asia, winters in S Asia. **Threshold number:** 45.



61(64). Oriental White Stork *Ciconia boyciana* Swinhoe, 1873; **Oriental Stork (I);** 110-150 cm; **GT/En WM/Ra C** Plate 11.61)



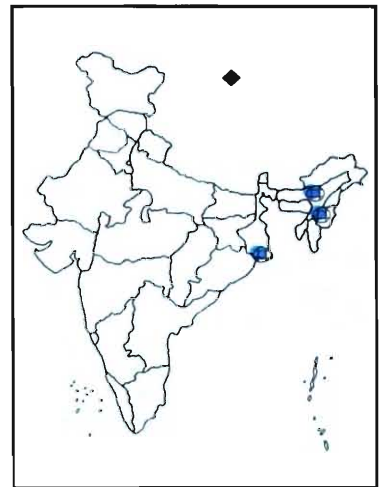
Photo: John Holmes

Oriental White Stork

Diagnostics: *Adult:* Sexes alike. Distinguished from White Stork by its large size; thick and long (slightly upturned towards tip) and blackish bill; and red lores. *Breeding:* Iris

blue; legs orange. *Non-breeding:* Iris yellow and legs reddish-orange. *Juvenile:* Like adult but greater coverts browner and bill and legs duller. **Habitat:** Details not known from India, elsewhere recorded from marshes, cultivation and rivers. **Habits:** Usually occur singly, shy, wades in shallow water. **Voice:** Generally silent. **Food:** Fish. **Status and Distribution:** *Globally threatened/Endangered*, rare winter migrant to West Bengal, Assam and Manipur.

Breeds in SE Siberia and NE China, winters in S & SE China, Japan, Korea. **Remarks:** It was reported to be a wintering species by Baker (1922–1930), but there have been very few records since the mid-



twentieth century and it is probably at best now only a vagrant to India, with few recent acceptable records. During 1985-86, 250 individuals were counted; it is “occasionally found” in Kaziranga National Park as “passage migrant” Records (by state) are: *Assam:* Sibsagar district, one, undated; unspecified localities, undated and *Manipur:* Loktak lake, six to seven birds, undated (BirdLife Int., 2001). **Threshold number:** 30.

62(66). Black-necked Stork. *Ephippiorhynchus asiaticus* (Latham, 1790); Painted Stork +; 129-150 cm; **NT R/Ra C** (Plate 11.62)

Diagnostics: *Adult:* Sexes alike except for colour of iris, brown in male and yellow in female. A black and white stork with black neck and bill and coral red legs; black head and neck with varying sheen; copper-bronze on occiput and nape, and purple-green-blue on rest; back, scapulars, innermost secondaries and median wing-coverts black with green sheen; remaining plumage white.

Photo: Satpal Gandhi



Black-necked Stork

Photo: Gehan de Silva Wijeyeratne



Black-necked Stork

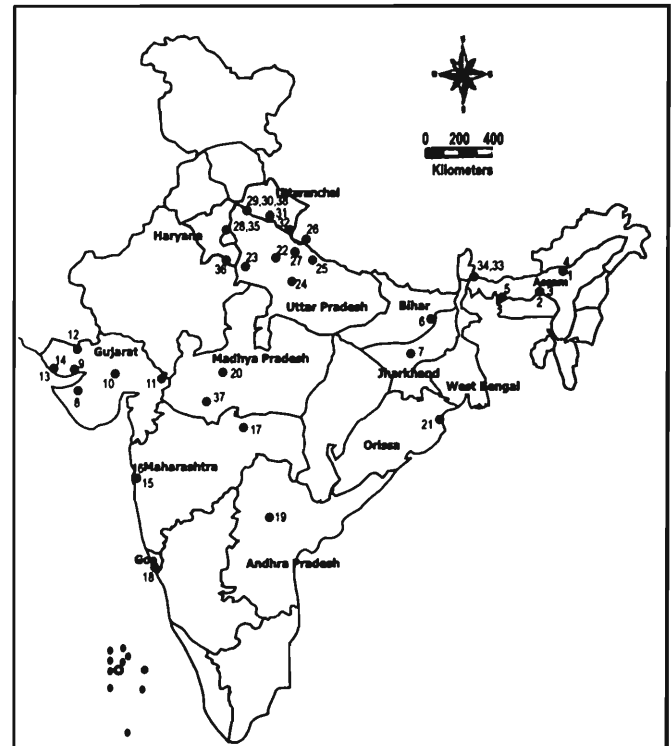
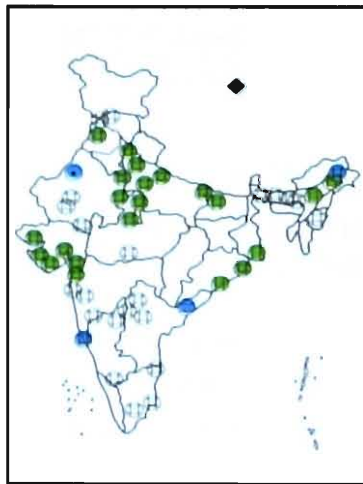
Juvenile: A dull replica of adult. **Voice:** Silent.

Habitat: Lowland freshwater marshes, jheels, large rivers, occasionally mangrove swamps and coastal mudflats, and flooded crop fields.

Habits: Invariably solitary or in well-separated

pairs or with family after breeding season, wary; wade in shallow water, squat on dry ground at the edge. Breeds from September to December, and rarely in January; solitary nest on

large trees in large marshes; also frequents habitation and canals in agricultural areas with low or no persecution by humans (Sundar 2003). **Food:** Mainly fish, occasionally frog, reptiles and crabs. **Status and Distribution:**



Map showing the distribution (black circles) of Black-necked Storks in India in 1996-2003.

Sites numbered:

- | | |
|------------------------|--------------------------|
| 1. Kaziranga NP | 2. Orang NP |
| 3. Jengdia Beel | 4. Misamari Beel |
| 5. Pobitara WS | 6. Vikramshira |
| 7. Topchanchi Lake | 8. Bentnsalayan Gaunj |
| 9. Khijadia BS | 10. Baskarapara |
| 11. Mohamadpura | 12. Bakoda Creek |
| 13. Jakhau Creek | 14. Chakrakala Salt Pans |
| 15. Thane Creek | 16. Pawana Dam |
| 17. Baslapur Reservoir | 18. Cotigao WS |
| 19. Ravirala Lake | 20. Chambal WS |
| 21. Bhitarkanika NP | 22. Patna BS |
| 23. Soor Sarovar BS | 24. Sandi BS |
| 25. Baghmarital | 26. Dudwa NP |
| 27. Jhadital | 28. Okhla BS |
| 29. Asan Barrage | 30. Haridwar |
| 31. Ramganga | 32. Tumeria Reservoir |
| 33. Mahananda Barrage | 34. Chapramari WS |
| 35. Basai | 36. Bhindawas WS |
| 37. Bilawali Tank | 38. Rajaji NP. |

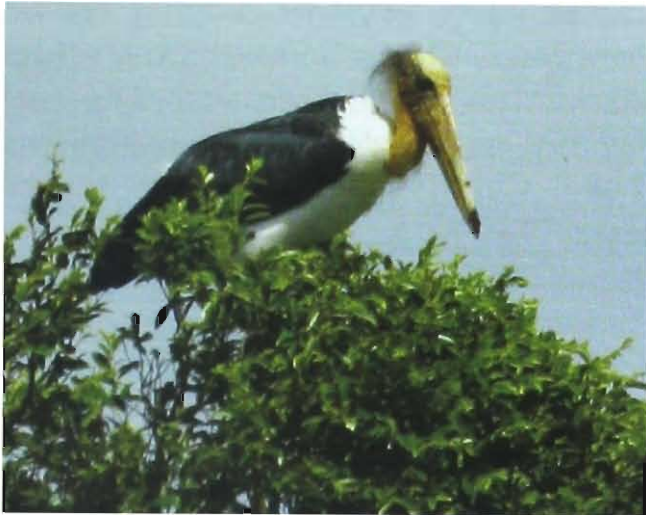
Source: Maheswaran, G., Rahmani, A. R. & Coulter, M. C. (2004)

Resident, rare, found in north, northwest and northeast plains; Pakistan; Nepal; Sri Lanka. SE Asia. **Remarks:** The combined populations of South and South-East Asia are thought not to exceed 1000 individuals. The former is in steep decline. The species is threatened by a variety of factors across its

range, including drainage of wetlands, felling of nest trees, development, encroachment of agriculture or aquaculture, over-fishing, overgrazing, hunting and excessive capture for zoos (BirdLife Int., 2001; Wetland Int., 2002). **Threshold number:** 10.

63(68). Lesser Adjutant-Stork. *Leptoptilos javanicus* (Horsfield, 1821); **Lesser Adjutant** (I); Vulture +; 110-120 cm; GT/Vu R/LM/Ra C (Plate 12.63)

Photo: Gehan de Silva Wijeyeratne



Lesser Adjutant-Stork

Diagnostics: *Adult:* Sexes alike. Head and neck reddish-yellow, nearly naked, with sparse hair-like feathers; gular pouch absent; upper plumage, including wings and tail, black with green sheen, closely barred and with a copper spot on the larger secondary coverts near their tip; under-plumage white. In non-breeding plumage, the copper spots absent. *Juvenile:* Head and neck better feathered; upper plumage less glossy. **Voice:** Silent. **Habitat:** Jheels, marshes, forest pools, flooded fields, mangroves and out skirts of habitations. **Habits:** Generally solitary; very shy; less scavenger than Adjutant Stork; feeds while walking slowly in shallow puddles; breeds from July to January in small colonies; nest 15-30 m up in trees. **Food:** Chiefly fish, frog, reptiles, aquatic invertebrates (crustaceans) and also locusts. **Status and Distribution:** *Globally threatened/Vulnerable.* Resident, nomadic; Assam; Nepal; Bangladesh; Myanmar; Sri Lanka; SE

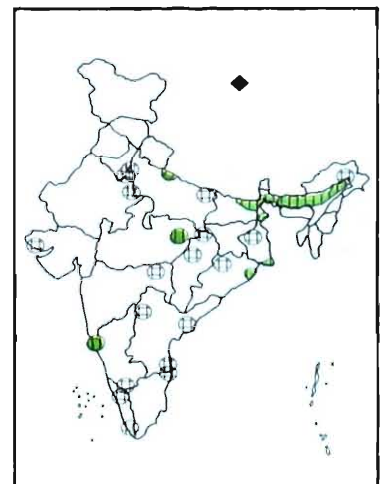
Asia. **Remarks:** The species was originally resident in central and northeastern India in all well-watered and thinly populated areas. **Threats:** Although broadly distributed from India to Indonesia, the Lesser Adjutant is becoming locally scarce, rare or extinct because of habitat loss, hunting and disturbance of colonies; it was once much more abundant than at present, although in India and Myanmar a century or less ago it was “not nearly so common” as the Greater Adjutant. Originally a widespread and locally common species, the Lesser Adjutant has experienced rapid recent declines and become rare in all but a few parts of its huge range. In Assam, one of the major population centres, loss of nesting trees is the key threat. The extent of suitable breeding habitat is constantly declining as tall trees are cut for commercial match production or firewood in brick factories, while wetland feeding sites are drained or developed. Government logging operations and the lopping of trees (particularly *Bombax ceiba*) during seed harvesting are also causing a reduction in available nesting sites. **Measures Taken:** The species is legally protected in India, Bangladesh and Myanmar. **Protected areas:** The species regularly occurs in Dibru-Saikhowa National Park, Kaziranga National Park (430



Lesser Adjutant- Stork

Photo: Yen Loong Lean

Lesser Adjutant-Stork



km²), Manas National Park (391 km²), Nameri National Park, Sundarbans National Park, Orang National Park, Bhitarkanika Wildlife Sanctuary, Bordoibam-Bilmukh Sanctuary, Deepor Beel Sanctuary, Laokhowa Wildlife Sanctuary, Panidihing Sanctuary, Pobitora Wildlife Sanctuary and D'Ering Wildlife Sanctuary. Small population of only around 10,000 birds is estimated worldwide. In India 135 nests were recorded from Assam in 1992 (BirdLife Int., 2001). **Threshold number:** 50.

64(67). Greater Adjutant-Stork. *Leptoptilos dubius* (Gmelin, 1789); Greater Adjutant (I); Vulture +; 120-150 cm; GT/En R/LM/Ra O (Plate 12.64)



Photo: Satpal Gandhi

Greater Adjutant-Stork



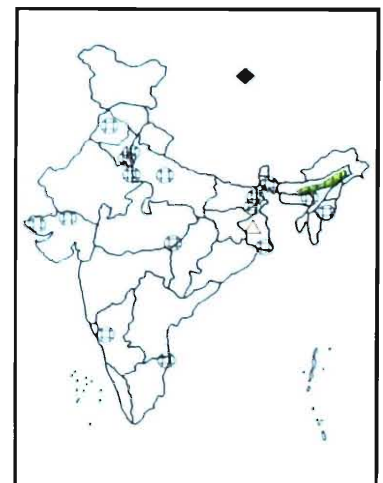
Photo: Jon Hornbuckle

Greater Adjutant-Stork

Diagnostics:

Adult: Sexes alike. The largest Indian stork with a long (25-35 cm), naked pinkish gular pouch hanging from base of neck, and naked reddish and yellow head, neck and bill. *Breeding:* Has a ruff of white feathers round base of neck; upper plumage, including wings and tail, blackish

slaty-grey with slight green sheen; innermost secondaries and greater wing-coverts silvery-grey, forming a broad wing-band; under plumage white with soft under tail-coverts. *Non-breeding:* The silvery-grey wing-band absent. *Juvenile:* Naked parts poorly covered with feathers; inner secondaries and coverts dark brown. **Voice:** Generally silent. **Habitat:** Jheels, marshes and agricultural fields, outskirts of human habitations in NE India. **Habits:** Solitary or in small flocks near the habitat where the water is drying and fish have concentrated, also collect with vultures and kites on carrion; when not feeding stands hunched up or squatting; nest on large trees. **Food:** Chiefly fish, frogs, reptiles and crustaceans, generally omnivorous. **Status and Distribution:** *Globally threatened/Endangered;* resident and nomadic in Assam, India; Nepal; Bangladesh. **Remarks:** At the beginning of the twentieth century, the Greater Adjutant occurred, often in huge numbers, in much of South and South-East Asia from Pakistan through northern India, Nepal and Bangladesh to Myanmar, Thailand, Laos, Vietnam and Cambodia. A massive decline over the following hundred years has, however, left only two very small and highly disjunct breeding populations of the species, one in Assam and the other in Cambodia. Records come from the Brahmaputra and Gangetic plains, Gujarat, and central India. It has now disappeared from much of this range, with the main breeding and non-breeding population restricted to Assam, where, however, the species recently appeared to be expanding its breeding range. Given recent information from Cambodia and Assam, this was revised



upward to 500–600, then to nearly 700 and possibly to 750–800 individuals; based on the evidence accumulated in this account, the actual figure perhaps approaches or slightly exceeds 1,000 individuals. During the course of a century, therefore, this large stork has experienced a decline commensurate with at least 1% a year, resulting in a population of at best 1%, and conceivably 0.1%, of the numbers that saw the start of the twentieth century: thus it has descended from being one of the commonest storks in the world to perhaps (with the possible exception of Storm's Stork *Ciconia stormi*) the rarest (BirdLife Int., 2001). **Threshold number:** 7.

Ibises & Spoonbills (Family Threskiornithidae)

World: 35 species; Asia: 9; India: 4

Gregarious. A marsh birds with long bill, laterally compressed and decurved in Ibises and spatulate in Spoonbills. Nostrils placed at base of narrow groove on each side of culmen. Flight with extended neck. Sexes alike or nearly so.

65(71). Glossy Ibis. *Plegadis falcinellus* (Linnaeus, 1766); domestic hen \pm ; 52-65 cm; **R/WM/LM/UnCom C** (Plate 12.65)

Photo: Gehan de Silva Wijayeratne



Glossy Ibis

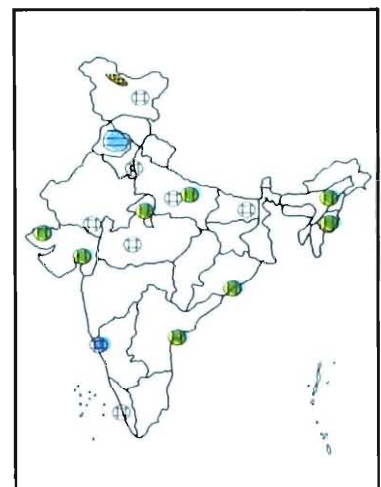
Diagnostics: *Adult:* Sexes alike; a dark Ibis with long, decurved plumbeous-brown bill, feathered head and bronze-brown feet. *Breeding:* Upperparts maroon-brown with



Photo: Saipal Gandhi

Glossy Ibis

green and purple dark sheen on head, neck, chin, throat, lower back, and rump; tail black glossed with green and purple; underparts chestnut, axillaries and under tail-coverts deep purple. *Non-breeding:* Head and neck brown, white-streaked; scapulars and innermost wing-coverts glossy green-blue. *Juvenile:* Like adult in winter, but unglossed ashy-brown above and all brown below. No white streaks on neck. **Voice:** Generally silent. **Habitat:** Large lakes, marshes, flooded grasslands and paddy fields. **Habits:** Gregarious and shy; small to large flocks of 40 to 50 birds; feed in shallow waters; breeds colonially in mixed heronries from May to July; nest on trees in or near water. **Food:** Chiefly molluscs, crustaceans and aquatic insects.



Status and

Distribution: Resident, nomadic, partly winter migrant; occurs mainly in S India; Assam, Gangetic plains, Gujarat, Orissa, Madhya Pradesh, Rajasthan, West Bengal, Manipur; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives; C & SE Asia. **Threshold number:** 250.

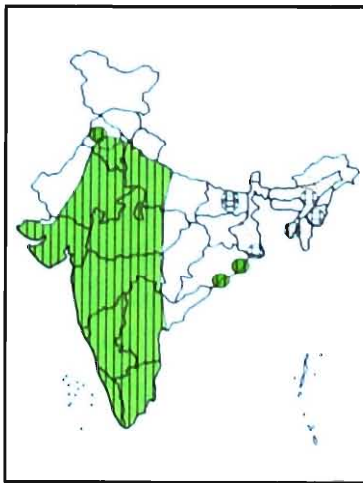
66(69). Oriental White Ibis. *Threskiornis melanocephalus* (Latham, 1790); **Black-headed Ibis** (I); Hen \pm ; 75 cm; **NT R/LM/LCom C** (Plate 12.66)

Photo: Gehan de Silva Wijeyeratne



Oriental White Ibis

Diagnostics: *Adult:* Sexes alike; an unmistakable white bird with long decurved black bill, naked bluish-black head and neck, and glossy black legs and feet. In flight, blood red patches of bare skin on flanks and underwing conspicuous. *Breeding:* Long ornamental plumes round base of neck; elongated disintegrated inner secondaries; some slaty-grey in wings. *Non-breeding:* Neck-plumes elongated inner secondaries and ordinary feathers replace slaty-grey ones in wings. *Juvenile:* Head and neck feathered except face and patch around eye; patch of bare skin under wing black, not blood-red as in adult. **Voice:** Normally silent. **Habitat:** Rivers, jheels, freshwater marshes, reservoirs, tanks, paddy fields, occasionally tidal mudflats and lagoons, etc. **Habits:** Generally gregarious, occurs in moderate to large flocks in company with storks, egrets and spoonbills; strolls actively in mud and shallow water; breeds in mixed colonies from June to March; nest- a stick platform on trees in or near water. **Food:** Carnivorous, chiefly fish, frogs, molluscs and aquatic insects. **Status and Distribution:** *Near threatened.* Resident, nomadic, uncommon, widespread and locally



common in the west, scarce in the east; possibly increasing locally due to spread of man-made wetlands; Pakistan; Nepal; Bangladesh; Sri Lanka. **Remarks:** It is vulnerable to drainage, disturbance, pollution, agricultural conversion, hunting and collection of eggs and nestlings from colonies. **Threshold number:** 100.

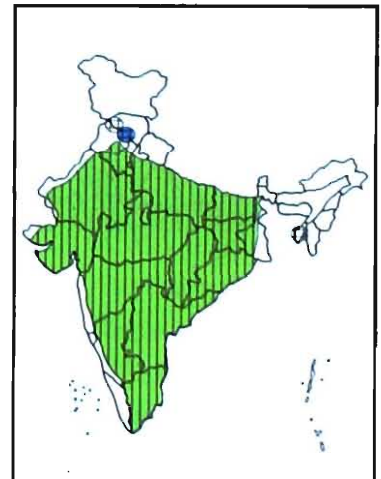
67(70). Black Ibis. *Pseudibis papillosa* (Temminck, 1824); domestic hen \pm ; 68 cm; **BRS(11) R/UnCom C** (Plate 12. 67)



Photo: Rakesh Kumar

Black Ibis

Diagnostics: *Adult:* Sexes alike. Blackish-brown bird with long decurved dull green bill, a small white shoulder patch and brick-red legs. Head black, with a triangular patch of brilliant red warts; upper plumage brown with bronze-green sheen on scapulars and back; remaining plumage black with purple-blue sheen; tail black, glossed with blue-green. *Juvenile:* Dull brown. **Voice:** Generally silent. **Habitat:** Dry grasslands, cultivated agricultural fields, lakes, marshes and riverbeds, sometimes around rubbish dumps. **Habits:** Generally forages on margins of lakes and reservoirs in small flocks of 4-10, gregarious; breeds individually or in small groups of 3-5 pairs from June to



March; nests in large trees. **Food:** Generally frogs, fish and aquatic insects, occasionally lizards, scorpions. **Status and Distribution:** *Biome Restricted Speceis*. Resident, widespread in India; Pakistan; Nepal; Bangladesh. **Threshold number:** 100.

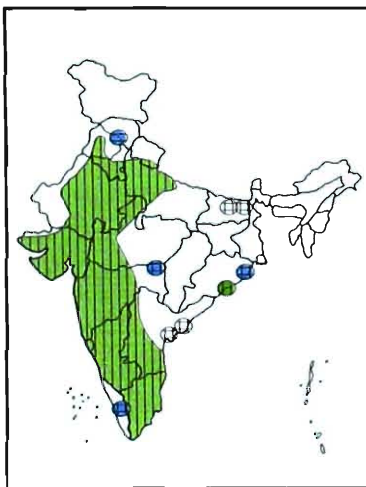
68(72). Eurasian Spoonbill. *Platalea leucorodia* Linnaeus, 1758; 60 cm; Duck +; **R/LCom C** (Plate 12.68)

Photo: Gehan de Silva Wijeyeratne



Eurasian Spoonbill

Diagnostics: *Adult:* Sexes alike, female slightly smaller; a snow-white bird with characteristic long, flat, spatula-shaped black bill, the terminal half of the spoon yellow; tawny patch on lower foreneck; black legs and feet. *Breeding:* A pure white nuchal crest of pointed plumes. *Non-breeding:* The crest has moulted. *Juvenile:* Primaries black-tipped and black-shafted, the first three largely mottled with black. **Voice:** Very silent. **Habitat:** Large lakes, marshy jheels, reservoirs, rivers, swamps, lagoons and creeks. **Habits:** Gregarious, occur in small to medium mixed flocks of up to 50 or more birds, forages in early morning or evening or at night, spends most of the day resting or sleeping with the bill tucked under the wings. Breeds in colonies in large mixed heronries



generally from July to January, nest a platform of sticks on trees standing in water. **Food:** Chiefly small fishes, frogs and aquatic invertebrates, occasionally phytoplankton. **Status and Distribution:** Mainly resident, partly local migrant; almost all through the plains except C and E India, Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. C, SW& S Asia. **Threshold number:** 230.

Flamingos (Family Phoenicopteridae)

World: 5 species; Asia: 2; India: 2

Gregarious; elegant marsh birds with excessively long legs, long sinuous necks and unique thick lamellate bills sharply decurved or 'broken' in middle; plumage largely pinkish-white and crimson, with black wing-quills; tibiae bare; toes short and webbed; Sexes alike, but female smaller and paler. Flights: diagonal wavy ribbons, single file or in V formation with long neck and legs extended. Young are nidifugous (leaving nest soon after hatching).

69(73). Greater Flamingo. *Phoenicopterus ruber* Linnaeus, 1758; *Raj hans*; Vulture +; 125-145 cm; **R/WM/LM/LCom C/H** (Plate 13.69)



Photo: Satpal Gandhi

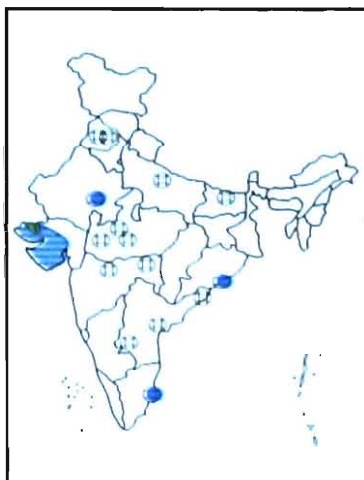
Greater Flamingo

Diagnostics: *Adult:* Sexes alike, female smaller and generally with less pronounced rose colour. A tall, white, stilt-legged and long-necked bird with a large sharply decurved massive pink bill, edge of upper mandible and



Greater Flamingo

terminal third black; legs and feet pinkish-red. Plumage rose and white, wings black and scarlet. In flight, the long neck and legs stretched to full length with contrasting black and scarlet underwing. **Juvenile:** Greyish-brown with brownish bill and dark plumbeous legs. **Voice:** Goose-like honk. **Habitat:** Large shallow brackish water lakes, saltpans, estuaries, lagoons and also freshwater jheels. **Habits:** Highly gregarious; occurs in small groups to huge flocks numbering into the thousands; feeds in shallows by emerging its head with inverted bill; breeds in colonies from July to April; nest conical mound of mud with shallow pan-like depression at top. **Food:** Mainly comprising chironomid larvae, small molluscs, crustaceans and seeds of aquatic plants, seldom fish. **Status and Distribution:** Widespread but uncommon from E of Pakistan to Uttar Pradesh; common in the coastal and inland regions of Gujarat, salt pans, Gulf of Kutch (where it



breeds in large numbers from September to April) and Gulf of Khambhat. Also about two thousand birds visit Pulicat Lake (Andhra Pradesh) and Chilika Lake (Orissa). A few birds occasionally recorded from Keoladeo National Park; the species has also been visiting Sambhar Lake (Rajasthan) regularly; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives; E Mediterranean, SW Asia. **Threshold number:** 2,900.

70(74). Lesser Flamingo. *Phoenicopterus minor* (Geoffroy, 1798); large duck =; 90-105 cm; NT R/LM/LCom H/C (Plate 13.70)

Diagnostics: **Adult:** Sexes more or less alike, female smaller and paler, without crimson on scapulars, back or breast; comparatively smaller flamingos with much deeper rose-pink plumage, dark bill with crimson-red centre and crimson feathers around base, and red legs and feet. In flight, the contrasting crimson and black underwing is prominent. **Juvenile:** Greyish-brown with darker bill. **Voice:** Goose-like hoot higher than Greater Flamingo. **Habitat:** Prefers more saline waters than Greater Flamingo; brackish water lakes and lagoons, saltpans. **Habits:** Gregarious, frequently found in company with Greater Flamingo, however, differs in feeding habits



Photo: Sanjeev Kumar

Lesser Flamingo

from former, as it sieves the diatoms from water surface when walking or swimming. Breeds in Little and Great Rann of Kutch during June-July but may take place up to January; nest like those of Greater Flamingo. **Food:** Chiefly algae and plankton, occasionally insect larvae, regularly drinks fresh water. **Status and Distribution:** *Near threatened* Resident and locally common in Great and Little Rann of Kutch (Gujarat), in non-breeding season partly disperse to Sambhar lake (Rajasthan), rare in western Gangetic plains, Chilika lake (Orissa), Andhra Pradesh; Pakistan. **Remarks:** The global population is c. 5,000,000, including c.150,000 (stable or even increasing) in Asia, but declines have been suggested for much of



Photo: B. M. Parasharya

Lesser Flamingo



Photo: V. P. Uniyal

A nesting site of Lesser Flamingo in Rann of Kutch.



Photo: Sanjeev Kumar

A close view of nests of Flamingo in Rann of Kutch.

Africa. It breeds in huge colonies on large, undisturbed alkaline and saline lakes, and is adapted to respond to local environmental changes in sites by moving elsewhere, and thus depends on a network of suitable areas; however, proposed soda-ash mining and hydroelectric power schemes in what is in effect the only breeding site in the Rift Valley, Lake Natron in Tanzania, could cause rapid overall population declines and permanently alter the ecosystem on which the species depends. Other threats include land claim, water pollution, and disturbance. **Threshold number:** 1,500.

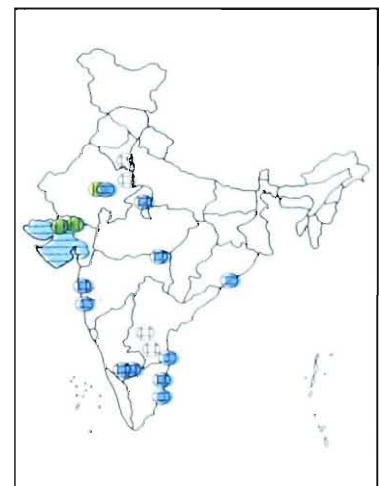
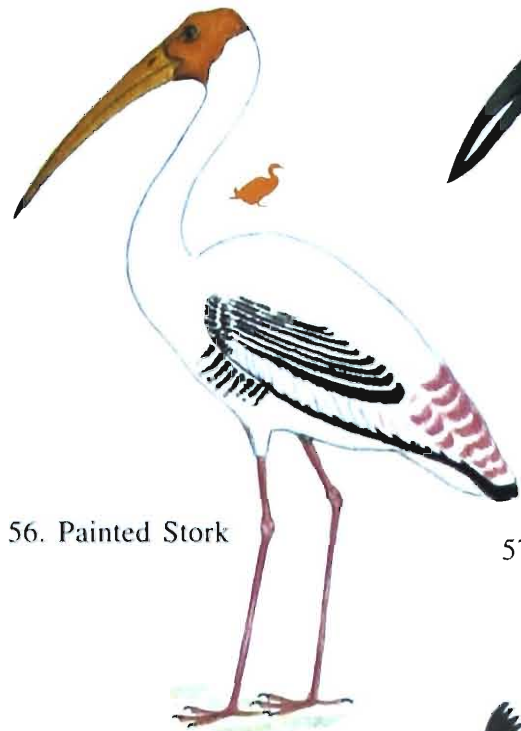


Plate 11



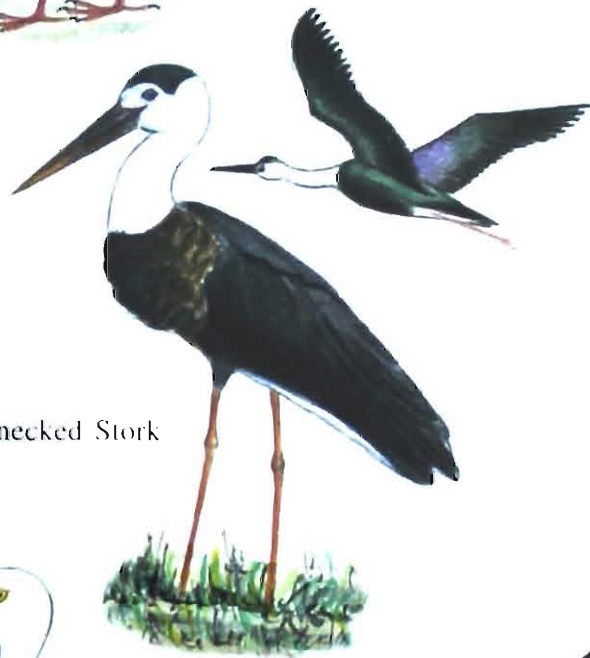
56. Painted Stork



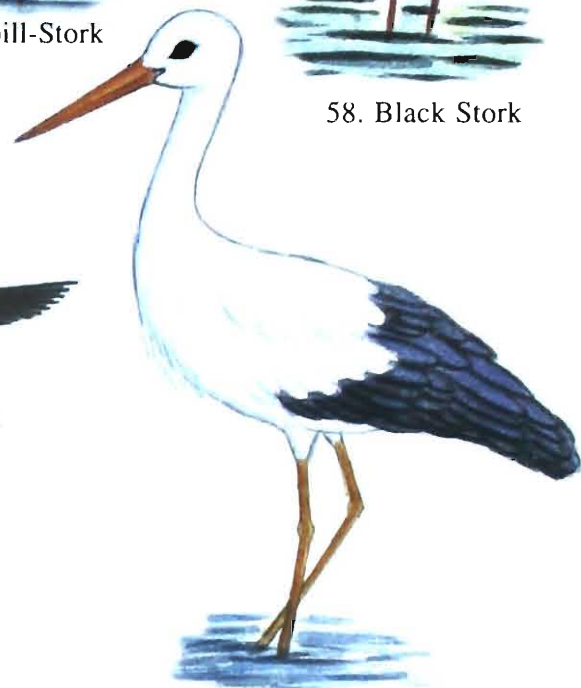
57. Asian Openbill-Stork



58. Black Stork



59. White-necked Stork



60. European White Stork



61. Oriental White Stork

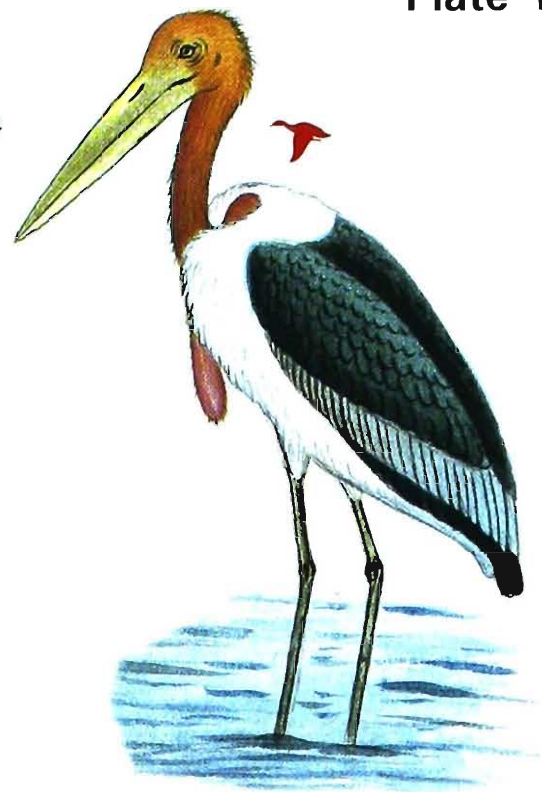


62. Black-necked Stork

Plate 12



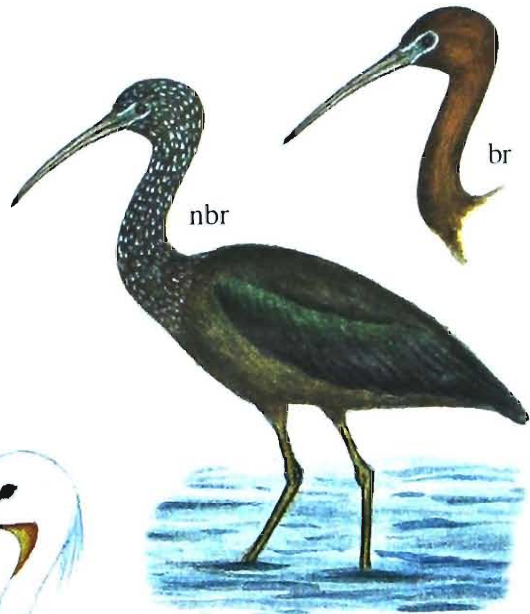
63. Lesser Adjutant-Stork



64. Greater Adjutant-Stork



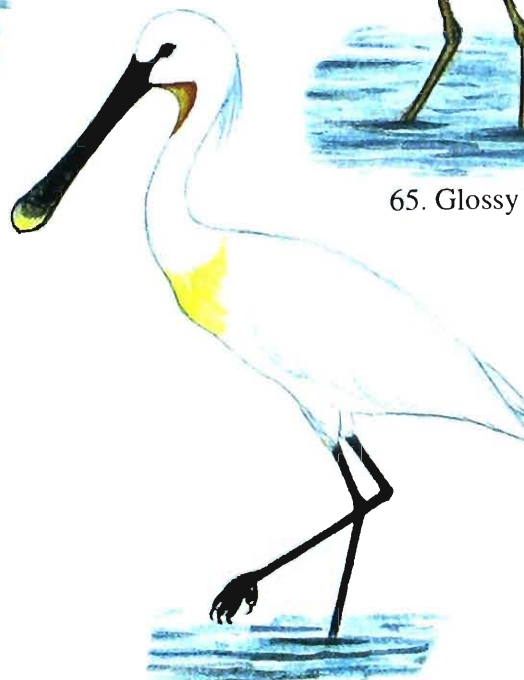
66. Oriental White Ibis



65. Glossy Ibis



67. Black Ibis



68. Eurasian Spoonbill

Plate 13



69. Greater Flamingo



70. Lesser Flamingo

Ducks, Geese & Swans (Family Anatidae)

World: 160 species;
Asia: 62, except sea ducks; India: 43

Plump waterbirds with considerable diversity in size and colouration; swans are generally larger and heavier than geese, while geese are larger and heavier than ducks. Bill typically broad, flat, rounded at tip, and with a comb-like fringe or lamellae; wings mostly narrow and pointed; tail and legs short; feet webbed; young nidifugous. Most of the species are migratory.

71(89). Large Whistling-Duck. *Dendrocygna bicolor* (Vieillot, 1816); **Fulvous Whistling-Duck (I); domestic duck -; 51 cm; R/LM/LCom H (Plate 14.71)**



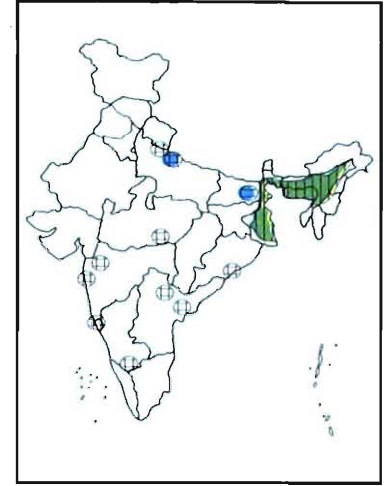
Photo: Frank Todd

Large Whistling-Duck

Diagnostics: Adult: Sexes alike; similar to the Lesser Whistling Teal, but larger with creamy white upper tail-coverts; blackish-brown stripe on nape; pale rufescent-white centre of neck with black streaks; dusky-black bill; dusky plumbeous to bluish-slate legs. **Juvenile:** Duller; the chestnut portions more brown. **Voice:** Very noisy with wheezy shrill. **Habitat:** Reedy and vegetation covered jheels with partly submerged trees, flooded paddy

fields, ponds and shallow lakes in plains.

Habits: Found in small flocks on secluded weed-covered tanks, shy and wary, generally feeds at night, during day roosts near water body. Breeds from June to October, nest of sticks built in tree holes. **Food:**



Chiefly vegetarian, comprising aquatic plants. **Status and Distribution:** Resident, nomadic, earlier scattered widely, now mainly (scarce) in Assam, Manipur, West Bengal; Pakistan; Sri Lanka; Nepal; Bangladesh; Myanmar. **Threshold number:** 200.

72(88). Lesser Whistling-Duck. *Dendrocygna javanica* (Horsfield, 1821); domestic duck -; 40-45 cm; **R/LM/LCom H/C (Plate 14.72)**



Photo: Gehan de Silva Wijeyeratne

Lesser Whistling-Duck

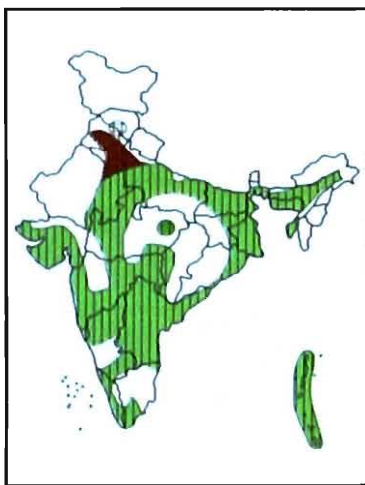
Diagnostics: Adult: Sexes alike; small brown and chestnut ducks with slaty-grey bill and plumbeous-blue legs. Forehead and crown brown; remaining head and neck fulvous-grey; hind neck reddish-brown changing into

Photo: K. Chaiyan



Lesser Whistling-Duck

brown on the scapulars and back; flanks chestnut; rump black, upper tail-coverts uniformly chestnut; tail brown; underparts chestnut. **Juvenile:** Duller in colour. **Voice:** wheezy whistling shrill. **Habitat:** Generally found in reedy freshwater marshes, shallow pools, lakes with emergent vegetation and submerged trees in plains. **Habits:** Gregarious, sociable, keeps in groups of 10 to 15, sometimes in large flocks as well, in and around weedy tanks, roosts on trees during daytime near water. Breeds from June to October, in natural hollow of ancient tree trunks. **Food:** Mainly vegetarian comprising aquatic plants, arable crops and also frogs, fish, molluscs and insects. **Status and Distribution:** Resident, nomadic, all India, including Andaman and Nicobar Islands; Nepal; Pakistan; Sri Lanka; Bangladesh; E & SE Asia up to W Indonesia. **Threshold number:** 10,000.



73(123). White-headed Duck. *Oxyura leucocephala* (Scopoli, 1769); domestic duck; 43-48cm; **GT/En WM/Ra H/C** (Plate14.73)

Diagnostics: A tubby duck with unique large bill and big stiff tail; bill very high and much swollen at base, sinking abruptly and

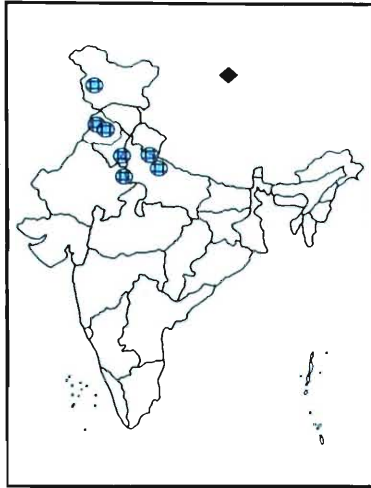


Photo: Tony Martin

White-headed Duck

broadening towards tip; tail composed of stiff, narrow and pointed feathers, appearing like a bunch of wires artificially stuck in, often carried upright when swimming. **Male:** Head of breeding male chiefly white except for a black patch on crown; blackish ring round the neck just below the nape and upper throat. Back, scapulars, rump and sides of body chestnut-rufous, finely vermiculated and speckled black. Upper tail-coverts dark chestnut, finely pencilled with black; tail blackish; wings grey; upper breast rusty-grey; underparts silvery-white mottled grey; legs plumbeous-black. **Female:** Brown with pale cheeks divided by a conspicuous whitish line below eye from bill to nape; throat and sides of upper neck whitish; remaining plumage as in breeding male, somewhat greyer and paler, with fine barring. **Male (in eclipse):** Like female, but more richly tinted above. **Voice:** Silent. **Habitat:** Large freshwater lakes, brackish lagoons with extensive submerged aquatic vegetation. **Habits:** Keeps singly or in small flocks of 6-30 birds, a very reluctant flier, prefers to dive, feeds by diving. **Food:** Chiefly vegetarian, comprising aquatic plants, seeds, also molluscs, crustaceans, insect larvae. **Status and Distribution:** *Globally threatened/Endangered.* The species is a rare, very local and declining winter visitor to northern India south to eastern Rajasthan and central Uttar Pradesh; Pakistan. Breeds in C Asia, winters south of Egypt to S Asia. **Remarks:** Vagrant in most of its range, having become extinct

as breeding species in many European countries. The global population of the White-headed Duck was probably over 100,000 in the early twentieth century, falling to an estimated 19,000 birds in 1991, since when numbers have probably declined to fewer than 10,000 individuals. Baker



(1908) stated that “in India it is undoubtedly a very rare duck” and there appear to have been no recent records from any regions. **Threats:** Major threat has been attributed to extensive drainage and pollution. Outside the “Asian” region, approximately 50% of breeding habitat was drained during the twentieth century; remaining sites are vulnerable to pollution. **Measures Taken:** The species is listed in Appendix I of the CMS (Bonn Convention) and in Appendix II of CITES; its populations in Asia need to be fully catered for within an international action plan, or at least fieldwork on the ecology of Central Asian and Asian birds needs to be developed as a cooperative venture (BirdLife Int., 2001; Li & Mundkur, 2003). **Threshold number:** 1.

74(87). Mute Swan. *Cygnus olor* (Gmelin, 1789); Vulture +; 125-155 cm; WM/Va H (Plate 14.74)

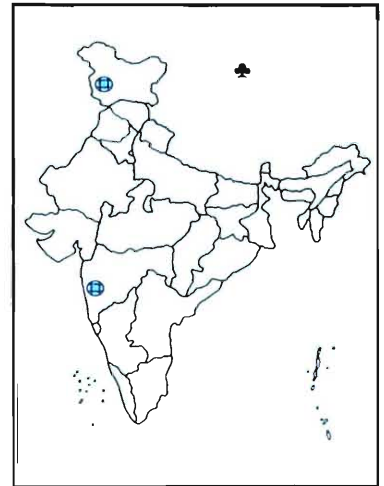


Photo: Svein Bekkum

Mute Swan

Diagnostics: Sexes alike, female slightly smaller. A large swan with pure white plumage, prominent black knob on forehead at base of long and pointed pinkish-orange bill, and slender neck carried in an S-shaped curve.

Juvenile: Chiefly grey with either slightly developed or without knob and feathers of forehead extended to a point. **Voice:** Generally silent. **Habitat:** Lakes, large rivers and reservoirs, etc.



Habits: Recorded in India only as vagrant individually at large rivers or open waters, spends much time swimming, feeds by submerging its head or neck or by upending, occasionally grazes. **Status and Distribution:** Winter migrant, vagrant in India, also recorded from Pakistan.



Photo: Svein Bekkum

Mute Swan

Breeds in C Asia, winters in S Central Asia. **Remarks:** only single record from near Pune in 1922 (Ali & Ripley, 1978). **Threshold number:** 250.

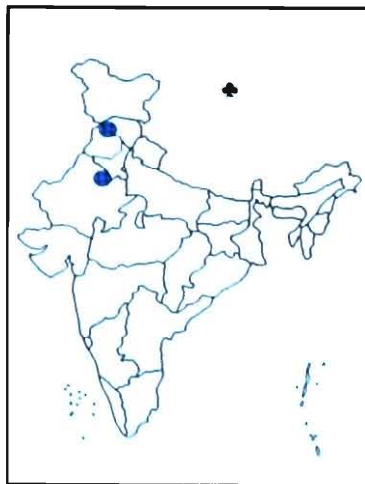
75(86). Whooper Swan. *Cygnus cygnus* (Linnaeus, 1758); Vulture +; 150-156cm; **WM/Va H** (Plate 14.75)



Photo: Pete Morris/Birdquest

Whooper Swan

Diagnostics: *Adult:* Sexes alike but female slightly smaller; large swan with entirely white plumage; black-tipped bill with yellow base and lores, the yellow extending forward laterally to the nostrils; black legs, toes and webs. **Voice:** Make deep trumpeting sound *hoop-hoop*. **Habitat:** Large rivers, open lakes and jheels, marshes and estuaries. **Habits:** Very rare winter straggler in severe winters, generally to NW part of the subcontinent; shy and wary, found singly, spends most of its time in swimming. **Food:**



Chiefly vegetarian, comprising aquatic plants, algae, grasses, etc. **Status and Distribution:** Very rare winter vagrant, Kashmir and Punjab in India; Pakistan; Nepal. Breeds across N & Central Asia, winters in C Asia. **Remarks:** In last century one record each from Kashmir,

Punjab and Rajasthan (Ali & Ripley, 1978). **Threshold number:** 200.

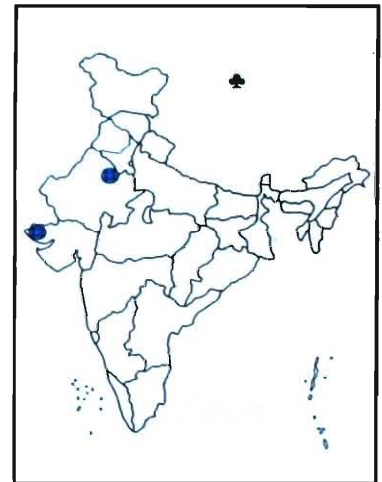
76(84-85). Tundra Swan. *Cygnus columbianus* (Ord, 1815); Vulture +; 120-140 cm; **WM/Va H** (Plate 14.76)



Photo: Jon Hornbuckle

Tundra Swan

Diagnostics: *Adult:* Sexes alike, female slightly smaller. The smallest of the white swans; plumage pure white; bill black with a yellow patch on its base, the extent of the yellow varies according to individuals; culmen depressed in the middle; legs, toes and webs black. **Voice:** make deep trumpeting sound *hoop-hoop*. **Habitat:** Lakes, marshes, rivers and estuaries. **Habits:** In the Indian subcontinent this swan is a rare vagrant, shy and wary, generally found singly, mostly spends time swimming, sometimes grazing on land. **Food:** Chiefly aquatic plants, algae, land plants, grasses.



Status and Distribution: Very rare winter vagrant, once recorded from Delhi; Pakistan; Nepal. Breeds in C & Eastern Siberia, winters in E Asia. **Remarks:** Only two records from India in last century from Delhi and Bhuj, Rann of Kutch (Ali & Ripley, 1978). **Threshold number:** 5.

77(76-77). Bean Goose. *Anser fabalis* (Latham, 1787) Domestic Duck ±; 66-84cm; WM/Va H (Plate 14.77)



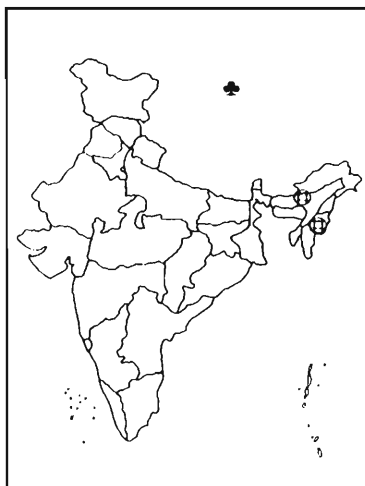
Bean Goose

Photo: Jyn Morohashi

Diagnostics: *Adult:* Sexes alike; A large blackish-brown goose with darker head and neck, contrasting with paler breast; dark bill, with orange-yellow band; browner underparts, with distinct white fringes; and fleshy-red legs and feet. *Juvenile:* Like adult, but with head and neck not so dark and contrasting; less fringes on upperparts and more scaly appearance on breast and belly.

Voice: Deep nasal shriek. **Habitat:** Grassland and arable crops, occasionally on water. **Habits:** Shy and cautious, details not known from India. **Food:** Arable crops.

Status and Distribution: Vagrant, winter



migrant. Baker recorded the species from Assam in India (Ali & Ripley, 1978). Breeds in Siberia, winters in E & Central Asia. **Remarks:** Only three records from Assam in last century (Ali. & Ripley, 1978). **Threshold number:** 550.

78(79). Greater White-fronted Goose. *Anser albifrons* (Scopoli, 1769); Greylag Goose -; 66-86 cm; WM/Ra H (Plate 14.78)

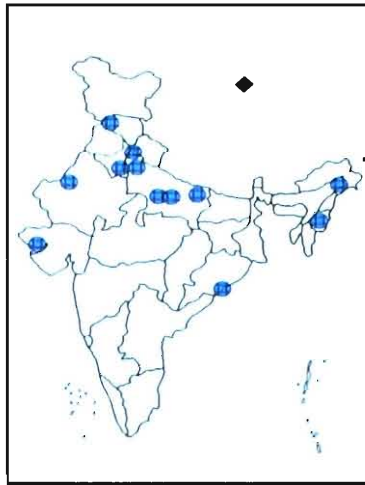


Greater White-fronted Goose

Photo: Jyn Morohashi

Diagnostics: *Adult:* Sexes alike. A brown goose with a characteristic white patch on forehead, from gape to gape, sometimes extending to chin also; white-tipped pinkish bill; heavy black blotches on breast and abdomen; white vent and under tail-coverts; orange-yellow legs and feet. **Voice:** High-pitched honking. **Habitat:** Large lakes and rivers. **Habits:** Gregarious, arrives in large flocks on lakes during winter especially in NW Himalaya and Kashmir in October-November, spends daytime floating with head tucked in feathers, rises almost vertically from ground on being disturbed. **Food:** Chiefly

vegetarian, comprising grasses, arable crops, grains and algae. **Status and Distribution:** Rare, winter migrant to NW India, Rajasthan, Orissa, Assam, Manipur; Pakistan; Bangladesh. Breeds in Arctic coasts of Russia and NW Siberia, winters in W Asia. **Threshold number:** 150.



79(80). Lesser White-fronted Goose. *Anser erythropus* (Linnaeus, 1758); Duck \pm ; 53-66 cm; **GT/Vu WM/Ra H** (Plate 14.79)

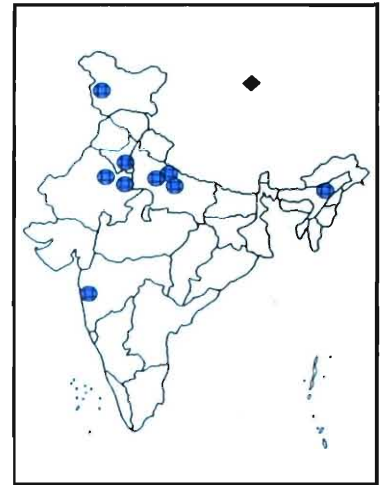
Photo: Marten Van Dijk



Lesser White-fronted Goose

Diagnostics: *Adult:* Sexes alike. Comparatively smaller (53 cm) and dark brown goose with a diagnostic more extensive white patch on forehead, reaching to top of head between eyes; pinkish bill; blotchy black bars on lower breast and belly; orange-yellow legs. **Voice:** High-pitched honking. **Habitat:** Found in marshes, grasslands and lakes. **Habits:** In India recorded only in ones and twos or in small groups in company with Greylag Geese, though congregates in large flocks in other countries. **Food:** Chiefly land plants, grasses, arable crops and seeds. **Status and Distribution:** *Globally threatened/Vulnerable:* Rare winter visitor mainly to north and east, Assam, Bihar, Maharashtra, West Bengal; Pakistan. Breeds in N Europe and

Siberia, winters in SE Europe and Caspian. **Remarks:** The total mid-winter population of this species is probably 25,000–30,000 individuals; this includes 8,000–13,000 individuals in autumn in its western Palearctic range and 14,000–16,000 wintering individuals from the East Asian flyway. There are only a few records of small numbers from Pakistan and India. **Threats:** Hunting is a potential threat to birds wintering in South Asia. **Measures Taken:** The enforcement of legislation has reduced the level of hunting pressure in Asia, particularly at passage and wintering sites.



Satellite tracking, which has already been used to study the western population of this species, could be used to determine and monitor its movements in the eastern part of its range, and possibly identify further important breeding, passage or wintering sites (BirdLife Int., 2001). **Threshold number:** 110.

80(81). Greylag Goose. *Anser anser* (Linnaeus, 1758; domestic goose \pm ; 75-90cm; **WM/Com H** (Plate 15.80)



Photo: Vijay Cavale

Greylag Goose

Diagnostics: *Adult:* Sexes alike. A large, grey-brown goose with pink bill and legs; a very narrow white rim of feathers at base of bill;



Photo: Talat Khalid

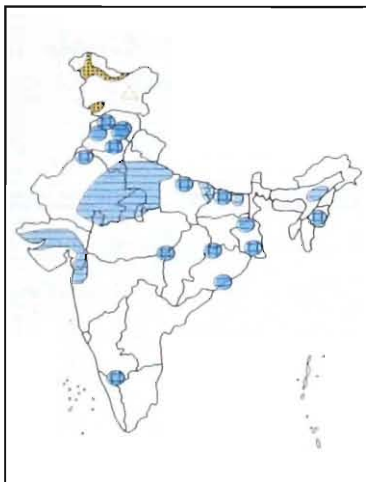
A flock of Greylag Geese



Photo: Satpal Gandhi

A flock of Graylag Geese

ash-brown head and neck; pale or grey back and rump; white upper tail-coverts and vent. **Voice:** Loud honking with repeated *aahng-ung-ung* while in flight and *gag-gag-gag* when feeding. **Habitat:** Lakes, reservoirs, large rivers, tanks, grasslands and arable crops in neighborhood of wetlands. **Habits:** Shy and reserved; assembles in large numbers where food is in abundance generally on large jheels; feeds by grazing on wet grasslands or crops mainly during the night, daytime is spent swimming or resting; arrives through NW India and Kashmir in October and November. **Food:** Major source is land plants, grasses and arable winter crops such as wheat and



gram. **Status and Distribution:** Mostly passage winter migrant, common in NW India, rare in Assam, Manipur, Orissa, Gujarat, Rajasthan, Madhya Pradesh, Karnataka; Pakistan; Bhutan; Bangladesh; Sri Lanka. Breeds in C Asia, winters in C & South Asia. **Threshold number:** 150.

81(82). Bar-headed Goose. *Anser indicus* (Latham, 1790); Greylag Goose -: 71-76 cm; **R/WM/LCom H** (Plate 15.81)



Photo: P. C. Tak

Bar-headed Goose

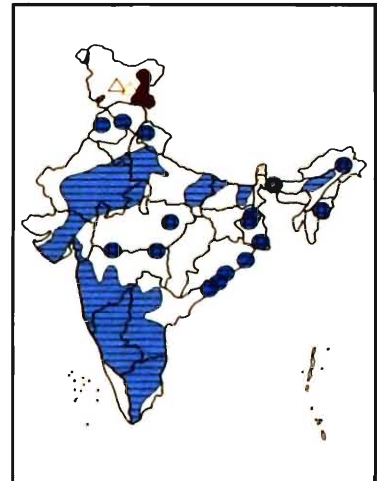


Photo: Vijay Cavale

A pair of Bar-headed Geese

Diagnostics: *Adult:* Sexes alike; an ashy-grey, white and brown goose; head white with two black bars, one across the forehead from eye to eye and the other shorter below on nape; neck brown with a white stripe on each side; face, throat, chin, vent and under tail-coverts white; breast ashy; bill yellow with black tip; upper plumage pale ashy, each feather with whitish edge; scapulars darker; flanks brown; lower back, primaries and rump grey; tail grey with white tip; legs yellow. *Juvenile:* Like adult but paler and without black bars on head and white stripes on neck. **Voice:** Like that of Greylag Goose. **Habitat:** Generally occurs on large jheels and rivers, breeds in swampy high-altitude lakes in Ladakh, winters on rivers, reservoirs and jheels in plains, also coastal islands. **Habits:** Generally gregarious; nocturnal feeder in grasslands on riverbanks, often raiding arable crops, especially gram, mustard and wheat; this at times leads to their shooting by farmers. Birds rest on sandbanks in daytime, wary and shy in winter because of hunting. Breeds in high-altitude lakes in C Asia including Tibet, in Ladakh around 4300 m, viz, Pangong Tso, Tso Moriri and Tsokar lakes from May to June, slight depression in ground on grassy islets in the lakes. **Food:** Exclusively vegetarian, comprising arable winter crops, grasses, tubers and paddy stubble. **Status and Distribution:** Common throughout Northern India to Rajasthan,

Gangetic plains, Assam, Orissa, Gujarat, Karnataka; arrives in Northern India by October/ November and present up to April; Pakistan; Nepal; Bhutan; Bangladesh; Myanmar. Breeds in C Asia including Ladakh; winters in China, S Asia. **Remarks:** The species is referred to as 'Hamsa' or 'Rajhans' in ancient Indian epics, and its Trans-Himalayan migration is equated to a religious pilgrimage. Like cranes, geese also have strong pair bonds. Main threat to the species is due to hunting, egg collecting and habitat loss. **Threshold number:** 560.



82(83). Snow Goose. *Anser caerulescens* (Linnaeus, 1758); 65-84 cm; WM/Va (Plate 15.82)

Diagnostics: Sexes alike but dimorphic, with two-colour phases viz., 'white or snow' and 'blue' Only the former has been recorded from India. *Adult:* Has white plumage, contrasting black primaries, and pink bill and legs. *Juvenile:* Like juvenile Bar-headed Goose but with pinkish-grey bill and legs,

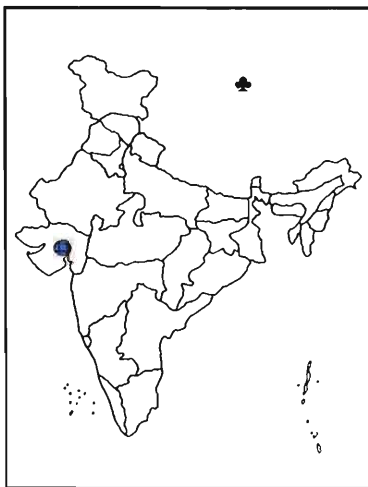


Photo: Frank Todd

Snow Goose

pale brownish-grey crown and hind neck, and white tail, neck and underparts. **Voice:** Nasal and high pitched. **Habitat:** Grassy edges of reservoir. **Habits:** Observed grazing with Barheaded Geese. **Status and Distribution:** Winter migrant, vagrant in India. Only single valid record from India. Breeds in N Far East Asia, winters in E China, Korea, and Japan. **Remarks:** The first reference to Snow Goose from India was based on a single bird shot from a flock of nine Greylag Geese from Haigam Lake, Kashmir in 1950. It was later found to be a partial albino Greylag Goose (*Anser anser*).

Thereafter, it was eliminated from the list of Indian avifauna. Subsequently, in 1989 the Snow Goose was recorded from Sundernagar district in Gujarat along with a flock of Bar-headed Geese (*Anser indicus*) (Mundkur *et al.*, 1991). Thus, it was again added to the list of Indian avifauna (Grimmett *et al.*, 1998; Manakadan and Pittie, 2001). **Remarks:** Recorded only once from Gujarat in 1989 (Mundkur *et al.*, 1991). **Threshold number:** 3.



83(75). Red-breasted Goose. *Branta ruficollis* (Pallas, 1769) domestic duck \pm ; 61 cm; **GT/Vu** (marginal to region) **WM/Va H** (Plate 15.83)

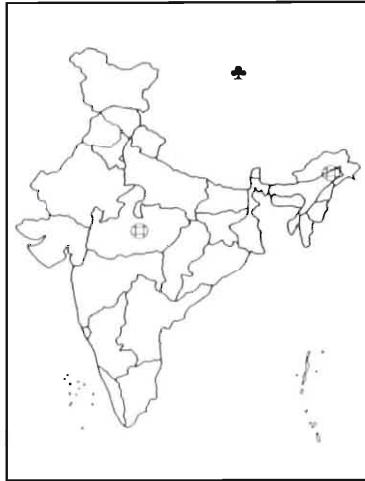


Photo: Gill Cardy

Red-breasted Geese

Diagnostics: *Adult:* Sexes alike; an unmistakable black and chestnut goose with striking white markings and black bill and legs; crown, nape, sides of neck and back black; cheek patch, foreneck and breast reddish-chestnut; a prominent white patch between bill and eyes. The cheek patch is surrounded by white, which descends in a line down to the neck; a white band separates the chestnut breast from the black belly; flanks, vent, upper and undertail-coverts white. *Juvenile:* With black parts browner and duller and the chestnut parts paler and more cinnamon. **Voice:** *Kik-yoik, kik-yik* in flight. **Habitat:** Not recorded from India. **Habits:** Not recorded from India. **Food:** Not recorded from

India. **Status and Distribution:** *Globally threatened/Vulnerable (marginal to the region)*. Vagrant in India, no recent records (recorded in 1836 from MP, in 1907 from Assam); breeds in Siberia. This species has a small wintering range with 80–90% of the population concentrated in just five roost sites (Black Sea at Shabla and Durankulak in Bulgaria and Romania), and the remainder occurring in a few other areas. This range continues to decline because of land-use changes to nearby feeding areas (BirdLife Int., 2001). **Remarks:** Recorded once from Madhya Pradesh (1836) and twice from Assam 1907 (Ali & Ripley, 1978). **Threshold number:** 880.



84(90). Brahminy Shelduck. *Tadorna ferruginea* (Pallas, 1764); **Ruddy Shelduck** (I); large domestic duck =; 61-67 cm; **R/WM/PM/LCom O** (Plate 15.84)

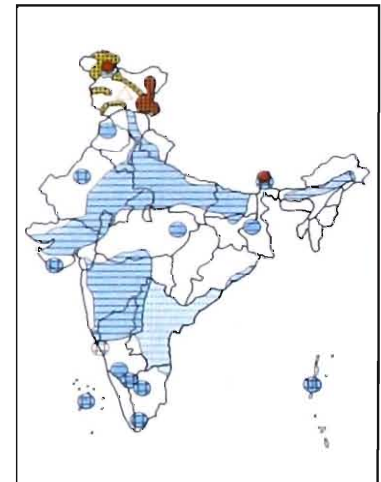
Diagnostics: *Adult:* A large bright orange-brown duck with pale buff head and neck; black beak, feet and tail; white wing-coverts and a prominent metallic green speculum. *Male:* In breeding season develops a narrow black collar on lower neck. *Female:* Whiter



Photo: Satpal Gandhi

Brahminy Shelduck

head and without black collar. *Juvenile:* Like female but duller with a grey wash on scapulars and tertiaries. **Voice:** Loud clanging *aang-aang*, both on ground as well as flight. **Habitat:** Breeds around high altitude brackish water lakes in Ladakh, Sikkim and Nepal; common winter migrant to large open lakes and rivers with



extensive shingle banks and mudflats across the country. **Habits:** Generally found in pairs or small flocks, but large congregations can be seen on northern lakes and reservoirs, feeds by grazing on banks; breeds around high-altitude lakes and swamps in May and

Photo: J. P. Sati



A flock of Brahminy Shelduck

June; nest a thick pad of white down in a hole or fissure in a cliff far from water. Arrives in plains of India by October/November and most depart by April, though stray birds may be found even up to June. **Food:** Almost omnivorous, comprising grains, aquatic plants, algae and aquatic invertebrates. **Status and Distribution:** Mainly winter migrant all over India, Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka. Breeds over huge area from Morocco to C Siberia and N China, also around high-altitude lakes and swamps above 4000 m in Ladakh, viz., Pangong, Tsokar and Tso Moriri Lakes, Sikkim and Nepal; winters in southern half of its breeding range; SE Asia. **Remarks:** The bird is also popularly known as “*Surkhaab*” or “*Chakwa-Chakwi*” in folklore. **Threshold number:** 500.

85(91). Common Shelduck. *Tadorna tadorna* (Linnaeus, 1758); domestic duck ±; 58-67 cm; **WM/Ra C/H** (Plate 15.85)



Photo: Gill Cardy

Common Shelduck

Diagnostics: *Adult:* A distinctive white and black duck with a broad chestnut breast-band, glistening greenish-black head and neck, glossy green speculum bordered above with chestnut, black tail-tip, bright red bill and pink legs. *Male:* Has a conspicuous red knob above base of bill and a broad black band from breast to vent. *Female:* Is considerably smaller, dull coloured and without red knob. *Male (in eclipse):* Head dull blackish with little sheen; feathers of lower black band with white tips. *Juvenile:* Chestnut breast-band absent,

sometimes sides slightly suffused with chestnut.

Voice: Almost silent. **Habitat:** Open lakes, large rivers, mudflats and coastal waters. **Habits:** Generally more gregarious than Brahminy, occurs

in small flocks, feeds by walking on mudflats, which it often frequents. **Food:** Chiefly carnivorous, comprising molluscs, aquatic arthropods, also algae, seeds. **Status and Distribution:** Uncommon and irregular winter migrant to India up to 15° N, mostly in NE; Pakistan; Sri Lanka; Nepal; Bhutan; Bangladesh. Breeds in C Asia, winters in S Asia. **Threshold number:** 1,000.

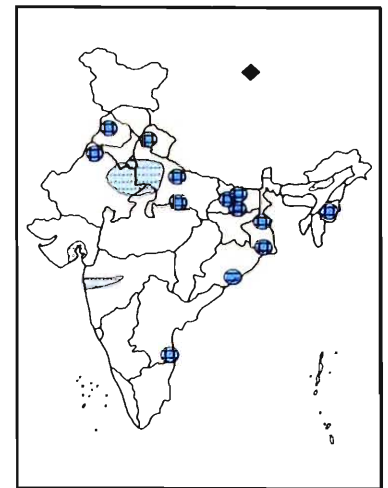
86(116). White-winged Duck. *Cairina scutulata* (S. Muller, 1842) domestic duck +; 66-81cm; **GT/En R/Ra H** (Plate 15.86)



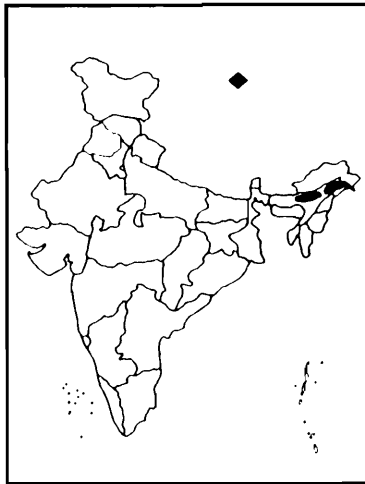
Photo: J. Wijpekema

White-winged Duck

Diagnostics: *Adult:* Sexes similar, but female is smaller and duller, with more heavily speckled head. *Male:* Head and neck white, variably speckled with black as in Comb Duck; bill orange-yellow, with black nail and base; iris blood red; upperparts glossy black with green sheen; underparts dark chestnut brown; a large white patch on wing-shoulder and a



bluish grey speculum bordered anteriorly by a broad black band; legs and feet orange-yellow. Sumatran population, which is also recorded in Assam, has entirely white head, neck and breast. *Juvenile*: Duller and browner. **Voice**: Distinctive whistle in flight. **Habitat**: Waterlogged depressions in forests, jheels, streams and ditches in tropical moist forest. **Habits**: occurs in pairs or small flocks of 5-6, feeds by dabbling in shallow waters in morning and evening; breeds from March-July, nests in forests in tree holes. **Food**: The species has been noted feeding in wet grass areas and shallow pools.



Status and Distribution: *Globally threatened/ Endangered*. India; Bangladesh; Myanmar. **Remarks**: The species was "formerly widespread" in northeastern India, particularly in districts and states bordering the Brahmaputra river and its major tributaries. It has been recorded from Arunachal Pradesh, Assam (mainly in the east and patchily elsewhere), Meghalaya, Nagaland and Manipur (no recent records from the latter two states, with its distribution currently centered on the eastern lowlands of Assam and Arunachal Pradesh). **Population**: The estimates of populations in the northeastern states, suggest that the total Indian population may be over 400. Tinsukia district is its stronghold and populations are apparently stable in Nameri National Park and Namdapha National Park. The Indian population is at 300-350, of which c.200 would be in the Tinsukia-Dibrugarh area, but still declining. Destruction of forest is the main cause of the decline in this species. The major limiting factor in Assam and Arunachal Pradesh is the clearance and occupation of suitable habitat

for human settlements and tea plantations (most of Tinsukia district). **Threats**: Hunting of this (and other waterfowl) species (with guns, bows and arrows, nets and traditional snares), and the collection of its eggs and nestlings, has intensified with the increase in human population in north-east India. It is easy to catch by setting numerous nooses at specific places along the water's edge where it habitually enters or leaves forest pools. **Measures Taken**: The species is listed under Appendix I of CITES and is legally protected from hunting and collection in seven countries: Bangladesh, India, Myanmar, Thailand, Indonesia, Cambodia and Laos. It has been seen recently in Dibru-Saikhowa National Park (c.640 km²), Garampani Wildlife Sanctuary (6 km²), Gibbon Wildlife Sanctuary (21 km²), Nambor Wildlife Sanctuary (37 km²), Nameri National Park (200 km²) and Sonai-Rupai Wildlife Sanctuary (220 km²) (all in Assam), Namdapha National Park (2,162 km²), D'Ering Memorial (90 km²), Mehao (281.5 km²) and Pakhuli (862 km²) Wildlife Sanctuaries (all in Arunachal Pradesh) and Balpakram National Park (339 km²) and Siju Wildlife Sanctuary (Meghalaya). Dibru-Saikhowa National Park in Assam is the only protected area established because of its importance to White-winged Duck (Mukherjee, 1961). The Indian Oil Corporation and Oil India have initiated moves to declare the Digboi oil fields a protected area (BirdLife Int., 2001). **Threshold number**: 5.

87(115). Comb Duck. *Sarkidiornis melanotos* (Pennant, 1769); domestic duck +; 56-76 cm; **R/LM/UnCom H/C** (Plate 16.87)

Diagnostics: A large glossy blue-black and white duck. *Male*: Head and neck white, speckled with black, coalescing on crown, nape and hind neck; bill and comb (swollen fleshy knob) black; a black demicollar on each side of upper breast; another broad black band in front of under tail-coverts; remaining underparts white; upper back black glossed

Photo: Satpal Grandhi



Comb Duck

with green and blue, except scapulars, which are glossed with purple; speculum bronze; lower back grey; tail dark brown; legs and feet plumbeous. Eclipse plumage absent. *Female*:

Smaller, duller and without comb on bill, demicollar on upper breast and black band near tail. *Juvenile*: Black upperparts less glossy than in

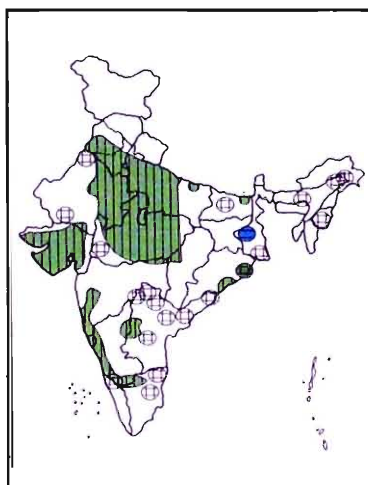
Photo: Vijay Cavale



female; lower back and rump dull greyish-white; upper tail-coverts and tail dull brown.

Voice: Generally silent. **Habitat:** Reedy tanks, jheels, irrigation tanks with plenty of aquatic vegetation, lowland pools in wooded areas.

Habits: Usually occurs in small flocks of 5 to 30 birds, rarely up to a hundred; feeds by grazing in marshes and wet grasslands, readily perches on trees. Breeds during SW monsoon (July-September), nest in a large hollow in ancient tree near water. **Food:** Chiefly vegetarian, aquatic plants, shoots, seeds, arable crops, also aquatic



insects. **Status and Distribution:** Resident, nomadic; but uncommon almost all over India; Pakistan; Nepal; Bangladesh; Sri Lanka; Myanmar; SE Asia. **Threshold number:** 60.

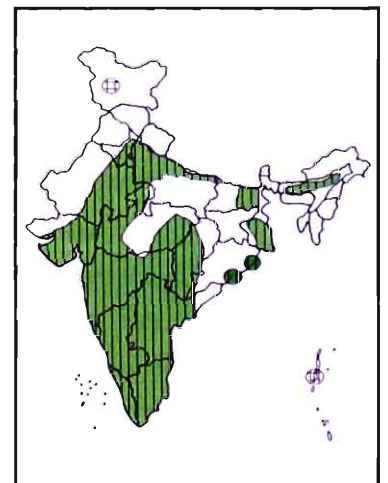
88(114). **Cotton Teal.** *Nettapus coromandelianus* (Gmelin, 1789); **Cotton Pygmy-goose** (I); Partridge =; 30-37cm; **R/LM/LCom H/C** (Plate 16.88)



Photo: Gehan de Silva Wijeyeratne

Cotton Teal

Diagnostics: The smallest Indian duck. *Male*: Chiefly black and white with a prominent black collar round the lower neck. Head and neck white with blackish, green-glossed crown; bill black; iris crimson-red; back blackish-brown, completely overlaid with dark green gloss slightly mixed with purple, distinct white wing-bar prominent in flight; underparts white; tail brown; legs black. *Female*: Dull brown, a dark line through eyes, indistinct white wing-bar. *Male (in eclipse)*: Like female but darker above, distinct white wing-bar. **Voice:** Short, sharp cackle *quack*, *quack-quacky* on wing. **Habitat:**



Village tanks, ponds, vegetation covered pools and channels. **Habits:** Usually in pairs during breeding season, otherwise small flocks up to 50 to 500 birds, sometimes perch

on overhanging branches. Breeds during June-September, nest a natural hollow in a tree trunk near water. **Food:** Chiefly vegetarian, comprising aquatic plants, arable crops, but also crustaceans and insect larvae. **Status and Distribution:** Resident, almost throughout India up to 300 m, though only locally common in peninsula; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. **Threshold number:** 1,000.

89(113). Mandarin Duck. *Aix galericulata* (Linnaeus, 1758); domestic duck -; 41-49 cm; WM/Va H/C (Plate 16.89)

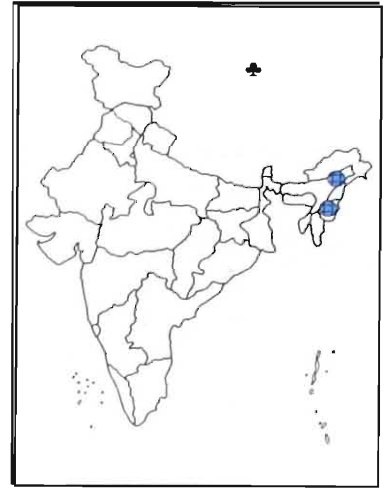
Photo: Jon Hornbuckle



Mandarin Duck

Diagnostics: *Adult (breeding):* A distinctive little duck with a unique combination of feather structure and colour - white tipped red bill; white band sweeping back behind the eye; long and metallic purple nuchal crest; orange 'Mane' (elongated cheek and neck feathers); brilliant purple copper lower neck and sides of breast; broken pectoral band of 3 black and 2 white stripes; white tipped orange 'Sails' (enormously broadened fan-shaped tertiary feathers); and orange legs and feet. *Male (eclipse):* Like female, but more glossy with reddish bill and yellow legs. *Female:* With white tipped grey bill; white ring round the eye continued as a streak behind it; white chin, throat and upper neck; olive brown lower neck, breast, sides of flanks, broadly mottled paler; olive-brown upperparts; deep blue speculum with black and white margins; white remaining

underparts. *Juvenile:* Like female but with browner head, less distinct facial pattern and more diffusely spotted breast and flanks. **Voice:** Silent. **Habitat:** Rivers. **Habits:** Occurs singly or in small groups, perches on trees, feeds by dabbling. **Food:** Both animal and vegetable matter. **Status and**



Distribution: Winter vagrant India; Nepal; Bangladesh. **Remarks:** Exceptional vagrant, only two records from India (Lakhimpur, Assam; and Mayangthang, Manipur) in early last century (Ali & Ripley, 1978). Breeds in E Russia, China, winters in China, Korea and Japan. **Remarks:** In last century one record each from Lakhimpur, Assam and Mayangthang valley, Manipur in 1934 (Ali & Ripley, 1978). **Threshold number:** 200.

90(101). Gadwall. *Anas strepera* Linnaeus, 1758; domestic duck-; 45-51cm; WM/Com H/C (Plate 16.90)

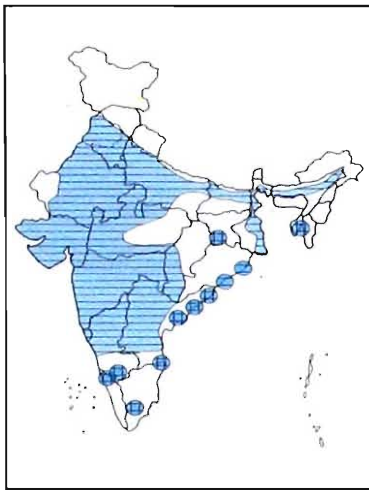


Gadwall

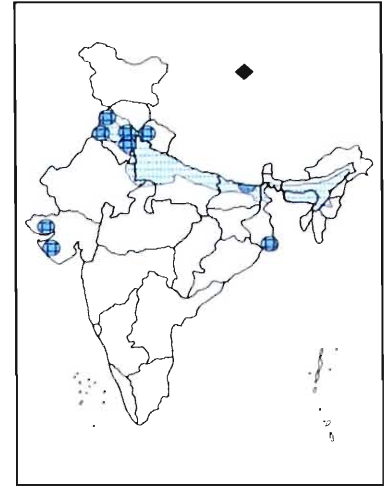
Photo: P. C. Tak

Diagnostics: *Male:* Body generally dark brown and grey; belly whitish; tail velvety-black; breast with crescent markings; chest nut patch with the black-and-white speculum etc. are diagnostics. *Female:* Like female Mallard, but duller and smaller with white

inner secondaries, chestnut on wing and orange-yellow legs. *Male (in eclipse)*: Like female, but greyer and less heavily marked above. **Voice**: Loud *quack* when alarmed. **Habitat**: Freshwater reedy marshes and jheels with extensive aquatic and emergent vegetation, open water spread of dams and reservoirs. **Habits**: Gregarious, usually found in small flocks of 10-30 birds. Surface feeding duck, predominantly vegetarian; shy and wary, keeps near emergent vegetation. **Food**: Primarily vegetarian, comprising aquatic plants and grains of arable crops, occasionally molluscs and aquatic insects. **Status and Distribution**: Commonly and widely distributed winter migrant all over India, though more frequent in SW India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka. Breeds in C Asia, winters S Asia. **Threshold number**: 1,500.



bill black; inner secondaries very long and falcated (sickle-shaped); stern buff-edged black; upper tail-coverts black, overtopping tail; legs grey. *Female*: Resembles female Gadwall; however, mottled dark and light brown with white-edged greenish-black speculum; 14 rectrices instead of 16 (*cf.* female Gadwall); grey (not orange-yellow) legs. *Male (in eclipse)*: Like female but less coarsely mottled, has some green gloss on head and darker cheeks. **Voice**: Loud, piercing whistle in flight. **Habitat**: Lakes, marshes and rivers. **Habits**: A dabbling duck, shy and wary, occurs singly or in pairs, but flocks up to 80 recorded, keeps close to emergent vegetation. **Food**: Chiefly vegetarian. **Status and Distribution**: Rare winter migrant to Northern India, Assam, Manipur, Bihar, Gujarat vagrant; Pakistan; Nepal; Bangladesh. Breeds in SE Siberia, southern Kuril Island, NE China, winters in SE Asia. **Threshold number**: 350.



91(102). Falcated Duck. *Anas falcata* Georgi, 1775; domestic duck-; 48-54cm; **WM/Ra H** (Plate 16.91)



Falcated Duck (male)

Diagnostics: *Male*: Head bronze-green with chestnut crown, lores and cheeks; throat white contrasting with finely pencilled body;

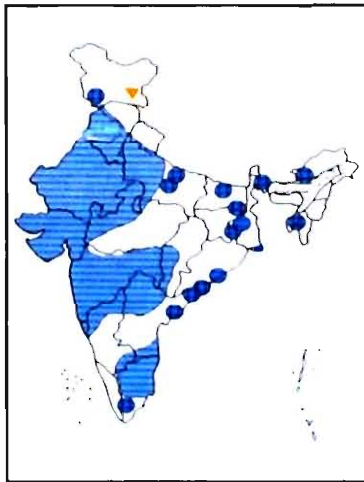
92(103). Eurasian Wigeon. *Anas penelope* Linnaeus, 1758; domestic duck/Gadwall -; 45-51 cm; **WM/Com H/C** (Plate 16.92)



Eurasian Wigeon (male & female)

Diagnostics: *Male:* Distinctive creamy patch on forehead contrasting with rusty-red head and neck; finely pencilled grey body; blue-grey bill with black tip; vinous-red breast; metallic green speculum bordered with black; white under plumage; black tail-coverts. *Female:* Mottled brown; similar to male in eclipse but much duller, less reddish-brown, the dark vermiculation less coarse, the lesser wing-coverts grey. The more rufous plumage and metallic green speculum differentiate it from rather similar female Gadwall (speculum-contrasting white and black). *Male (in eclipse):* Reddish-brown with black vermiculation above and chiefly white below. **Voice:** Male *whee-oo*, both on wings and in water, female short *quack*. **Habitat:** Freshwater shallow reedy jheels, marshes, open lakes, reservoirs, rivers and also pools, avoid deep waters overgrown with vegetation. **Habits:** Highly gregarious, large flocks are common, feeds chiefly by grazing on edges, sometimes dabbles at water surface. **Food:** Chiefly vegetarian, comprising aquatic plants, algae, grasses, seeds, arable crops, occasionally aquatic animals.

Status and Distribution: Widespread and common winter migrant in north, Assam, Manipur, Orissa; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka. Breeds in C Asia, winters in S Asia. **Threshold number:** 2,500.



93(100). Mallard. *Anas platyrhynchos* Linnaeus, 1758; domestic duck =; 50-65 cm; R/WM/UnCom H/C (Plate 17.93)

Diagnostics: *Male:* Head and upper neck glistening metallic dark green separated from chestnut breast by narrow white collar; bill dull olive-yellow; above and below largely



Photo: J. P. Sati

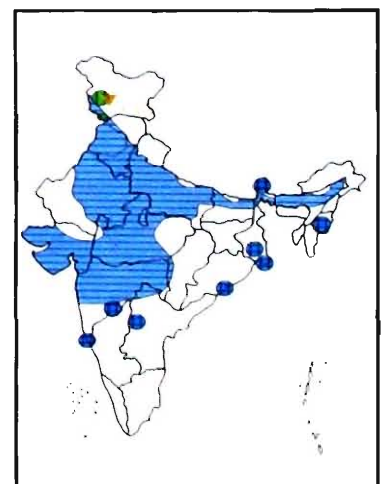
Mallard



Photo: Rakesh Kumar

In captive breeding

grey; rump, tail-coverts and two up curled central tail-feathers black; speculum glossy bluish-purple. *Female:* Brown and buff, streaked and spotted with black; chin, throat and foreneck plain buff; irregular dark line through eye; orange legs; distinguished from the very similar female Shoveller by bill shape and purple-blue speculum (vs. green). *Male (in eclipse):* Like female; however, head darker; upper plumage back to tail much like the breeding plumage; moulted curly tail feathers. **Voice:** Male: soft *kreep*, female laughing *quack-quack*. **Habitat:** Occurs in shallow freshwater jheels, marshes, reservoirs, lakes, rarely rivers and ponds. **Habits:** A gregarious dabbling duck, keeps in



small flocks, sometimes up to 50, mostly feeds at night, usually wary; breeds in very small numbers in lakes of Kashmir (Hokarsar and Anchar) from May-July; nest bed of dry grass, leaves and bird's own down. **Food:** Chiefly vegetarian, comprising arable winter crops such as wheat and gram, aquatic plants, sometimes molluscs, fish fry and tadpoles. **Status and Distribution:** Winter migrant, almost throughout India; though uncommon, becoming rare in peninsula; Pakistan; Nepal; Bhutan; Bangladesh. Breeds in C Asia, winters in S Asia. **Remarks:** Being far the best known and most widespread of all ducks as well as highly specialised, particularly the northern bird, the ancestor of domestic ducks, the behaviour and the display of Mallards has been well studied.

As a popular and common game bird, Mallards have a special importance. They are residents wherever climatic conditions are not too severe and they will readily breed in almost any kind of habitat where water is present, if they are not too ruthlessly persecuted. They have been able to adapt themselves better to man's world than any species of any other duck. Therefore, Mallards have probably been reared and domesticated earlier than any other birds. They have strong inclination to become tame and settle down in confinement (Delacour and Scott, 1954-64; 2: 40-53).

In India, many a time it is seen that ducklings of such domesticated ducks brought up in semi-natural conditions (which also attracts wild ducks) may take to wing quite easily and once fledged regularly visit neighbouring waterbodies. **Threshold number:** 750.

94(97-99). Spot-billed Duck. *Anas poecilorhyncha* J.R.Forster, 1781; domestic duck =; 58-63 cm; R/LM/Com H/C (Plate 17.94)

Diagnostics: *Male:* A large, blackish-brown duck with scaly-patterned plumage; bill black



Spot-billed Duck

Photo: Satpal Gandhi



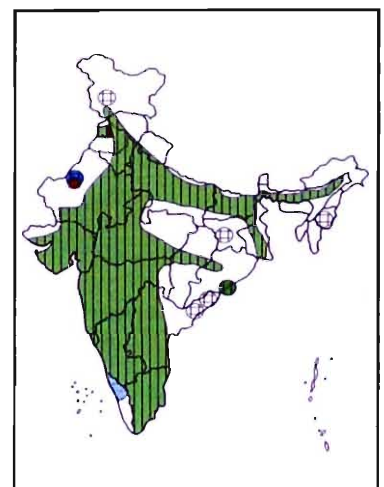
Photo: Rakesh Kumar

and yellow (terminal third or less), tip black; two swollen orange-red spots at the base of bill on either side of forehead; crown from forehead to nape dark brown; remaining head and neck buff-white; eye-stripe dark and broad; pale edged feathers; speculum glossy green with narrow black-and-white margins; tail darker; legs and feet coral-red.

Female: Has less conspicuous loreal spots, slightly smaller and duller than male.

Juvenile: Like adult but paler, without red spots at base of bill and less spotted

below. **Voice:** Like Mallard, male *hoarse*, female loud *quack*. **Habitat:** Freshwater vegetation covered jheels, lakes, reservoirs, marshes and tanks with extensive emergent vegetation, rarely on rivers. **Habits:** Sociable, usually occurs in pairs though during breeding



season females with chicks are not a rare sight, in non-breeding period flocks up to 50 are found; feeds by dabbling or by walking in marshy vegetation; breeds from July to December, nest: pad of grass and weeds in dense vegetation at margins. **Food:** Mainly vegetarian, comprising aquatic plants, their seeds and arable crops such as rice, occasionally aquatic insects. **Status and Distribution:** Widespread Resident throughout India up to 1800 m in Kashmir; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka. Breeds in C Asia, winters in S Asia. **Threshold number:** 500.

95(105). Northern Shoveller. *Anas clypeata* Linnaeus, 1758; Northern Shoveler (I); domestic duck -; 44-52cm; WM/Com C/H (Plate 17.95)



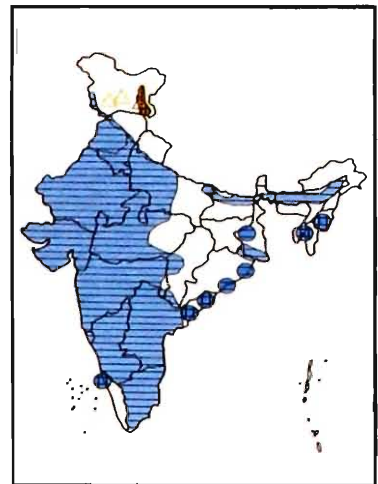
Northern Shoveller (male)



Northern Shoveller (in eclipse)

Diagnostics: *Male:* Head and neck glossy green; bill large, flat, greyish-black; eyes yellow; breast white; abdomen and flanks chestnut with white-edged black stern;

speculum metallic green. *Female:* Mottled dark brown and buff, with greyish-blue shoulder patch; faint green speculum bordered above and below with white; bill broad, flat, greenish-brown tinged with orange. *Male (in eclipse):* Like female but largely with adult male wing coloration. **Voice:** Generally silent, otherwise like Mallard. **Habitat:** Occurs in almost all types of shallow freshwater like jheels, lakes, rivers, reservoirs, irrigation and village tanks. **Habits:** Gregarious, usually keeps in small flocks, feeds by sweeping sideways, also upends, and sometimes on surface. Arrives by late October and one of the last to depart, stray birds may stay behind up to May/June. **Food:** Chiefly aquatic animals such as molluscs, crustaceans, insect larvae, worms, occasionally aquatic plants. **Status and Distribution:** A rather common winter migrant to whole of India, widespread up to 1300 m; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives. Breeds in C Siberia and C Asia, winters in S Asia. **Threshold number:** 10,000.



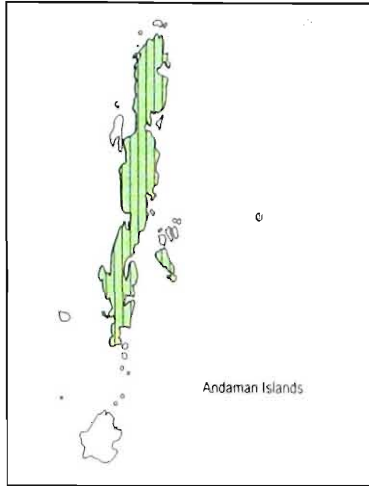
96(96). Andaman Teal. *Anas gibberifrons* (Muller, 1842); Sunda Teal (I); Common Teal +; 43 cm; E R/UnCom H (Plate 17.96)



Andaman Teal (male)

Diagnostics: *Adult:* Sexes similar, but female smaller and duller; bill plumbeous with black

nail; crown and nape blackish-brown, variably speckled with brown; iris red; eye surrounded by a ring of white feathers; throat and chin greyish-white; remaining plumage greyish, with brownish edging to feathers on back and dark blotches on underparts; speculum green and bordered in front and behind by whitish bands, the former being broad and conspicuous; legs and feet greenish or plumbeous. *Juvenile*: Like female but with narrow white eye-ring and less distinct dusky markings on underparts. **Voice**:



Soft whistle, mainly calls at night. **Habitat**: Fresh water jheels, pools, paddy fields, marshes, also tidal creeks. **Habits**: Occur in small flocks of 20-30 birds; feeds mainly at night; spends day time roosting perched mangrove trees; one record of breeding in August; nest tree hole. **Food**: Vegetarian, also insects. **Status and Distribution**: Endemic, resident and local migrant in Andaman Islands. **Threshold number**: 8.

97(93). Northern Pintail. *Anas acuta* Linnaeus, 1758; domestic duck-; 56-75cm; WM/VCom H/C (Plate 17.97)



Photo: Satpal Gandhi

Northern Pintail (male)

Diagnostics: *Male*: Head, face and neck chocolate-brown; nape black; bill plumbeous; either side of neck with white-stripe joining down to white neck and breast; neck finely pencilled silver-grey; speculum metallic bronze-green; upper tail-coverts grey edged with black; undertail-coverts black with broad buff patch in front. Tail long, pointed pin-like. *Female*: Mottled brown and buff with pointed but pinless tail and without prominent speculum. *Male (in eclipse)*: Resembles female, but lacks distinctive pale edges to feathers on its back;

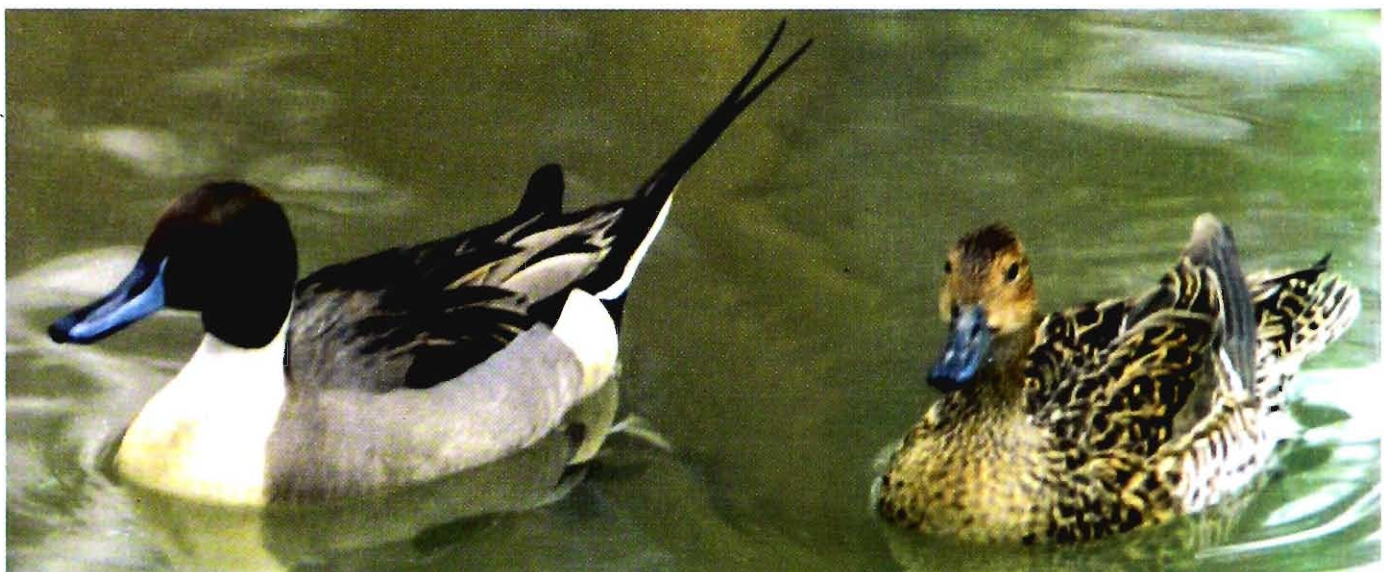
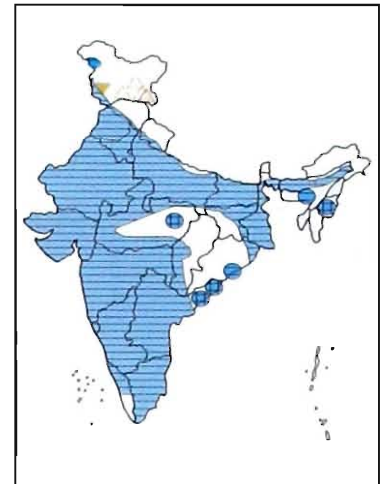


Photo: J. P. Sati

Northern Pintail (male & female)

dark ashy-grey or greyish-white coarsely vermiculated mantle. **Voice:** Silent. **Habitat:** Lakes, marshes, reedy and vegetation-covered jheels, wet paddy fields, and rivers. **Habits:** One of the commonest migratory species; highly gregarious, keeps in flocks of hundreds; largely crepuscular; feeds at night and roosts during day; shy and very wary; arrives in India by September-October and mostly departs by end of March. **Food:** Chiefly vegetarian, plant seeds, arable winter crops such as wheat and gram, aquatic plants, and also molluscs as well as other invertebrates. **Status and Distribution:** Common and widely distributed winter migrant to India; Pakistan; Sri Lanka; Nepal; breeds in C Siberia and C Asia.

98(104). Garganey. *Anas querquedula* Linnaeus, 1758; domestic duck -; 37-41 cm; **WM/VCom H/C** (Plate 18.98)



Photo: Vijay Cavale

Garganey (male)



Photo: Gehan de Silva Wijeyeratne

Garganey (female)

Diagnostics: Male: A small brown teal with conspicuous white eyebrows; bluish-grey forewings, prominent in flight; head and neck pinky-brown; bill brownish-black with black nail; upper plumage blackish-brown with pale edges; scapulars long, drooping and glossy black with white median ribs; speculum green between two white bands; breast light brown, speckled black, underparts white, finely waved on sides and black spotted near vent.

Female: Mottled brown above and white below with whitish eyebrows.

Male (in eclipse): Like female, but with adult male wing coloration.

Voice: Generally silent but female quack like Common Teal.

Habitat: Frequents almost all types of wetlands including jheels, marshes, lakes, reservoirs, rivers and village ponds with plenty of vegetation. **Habits:** Gregarious, flocks in thousands at certain wetlands, non-diving duck, nocturnal feeder, shy and wary, generally keeps in emergent vegetation. **Food:** Primarily vegetarian, comprising seeds, arable crops, occasionally aquatic insect larvae, worms and molluscs. **Status and Distribution:** All India, one of the commonest winter migrants, occurring up to 4000 m; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives; breeds in W & Central Siberia. **Threshold number:** 2,500.

99(95). Baikal Teal. *Anas formosa* Georgi, 1775; Common Teal +; 39-43cm; **GT/Vu WM/Ra H** (Plate 18.99)

Diagnostics: Male: A remarkably beautiful teal with rather round head and body. The breeding male exhibits complex head pattern of black, yellow, bottle-green and white. Breast pinkish spotted with black; white line down

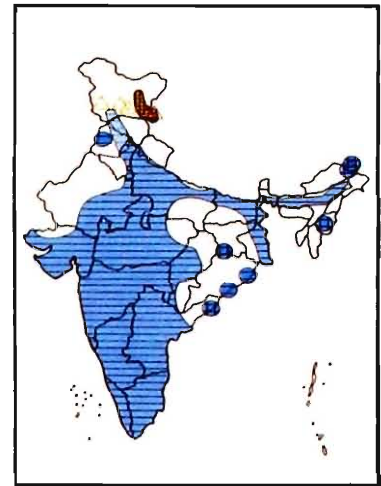
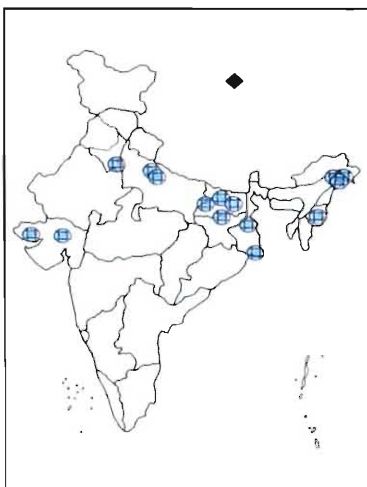


Photo: Kozi Tagi



Baikal Teal

sides of breast and flanks; black undertail-coverts; long black, white and chestnut scapulars. *Female*: Has less conspicuous loreal spots, slightly smaller and duller than male. *Juvenile*: Like adult but paler, without red spots at base of bill and less spotted below. **Voice**: Like loud clucking of hen. **Habitat**: Large rivers. **Habits**: Generally single or in flocks of eight to ten, feeds by dabbling. **Status and Distribution**: Rare winter migrant to Haryana, Gujarat, SW Bengal, Assam, Manipur; Pakistan; Nepal; Bangladesh; Myanmar. Breeds in E Siberia, winters in E China and Japan. **Remarks**: Derives its name from Latin "Formosa" meaning *beautiful*. This species always appears to have been a rare visitor to the Indian subcontinent, and a vagrant in Pakistan, Nepal and Bangladesh. The Baikal Teal used to be common in many parts of its range, and extremely abundant in some places, but its numbers declined rapidly in the second half of the twentieth century, apparently with a particularly sharp drop in the 1970s. It is now much less numerous than before in many parts of its breeding range in Russia, and in its non-breeding range in Japan, Mainland China and South Asia (BirdLife Int., 2001).



Mundkur (*pers. com.*) informed that "the species is rapidly increasing again in the last few years, over 600,000 birds currently estimated. main wintering ground is S Korea". **Threshold number**: 3,000.

100(94). Common Teal. *Anas crecca* Linnaeus, 1758; half-grown domestic duck ±; 34-38cm; **WM/VCom H** (Plate 18.100)



Common Teal (male)

Photo: Audevard Aurelien



Common Teal (female in background)

Photo: Soon Kyoo

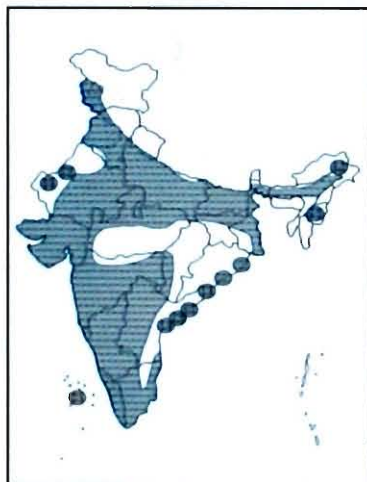
Diagnostics: *Adult*: A small duck with a distinctive tricoloured (black, metallic green, and buff) speculum - particularly conspicuous in flight; black bill; olive-grey to deep slaty-blue legs. *Male*: Pencilled grayish; head dark chestnut with a broad metallic green band surrounding the eye and running back to the nape. A narrow whitish line from the bill running back towards the eye and then dividing to surround the green band; breast and flanks vermiculated dark brown and white; abdomen white or pale buff; tail brown; feathers pale edged; undertail-coverts buff laterally, black in centre. *Female*: Has mottled

Photo: Audevard Aurelien



Common Teal at rest

brown and buff plumage with pale belly; black and green speculum. *Male (in eclipse)*: Crown and nape blackish-brown. *Juvenile*: Belly spotted; secondaries shorter. **Voice**: Male, musical *krit, krit*; female short sharp *quack*. **Habitat**: Freshwater shallow inland wetlands like tanks, jheels, marshes, pools, reservoirs and rivers. **Habits**: One of the commonest and most abundant species in India, found in flocks of up to 200 or more ducks, feeds in the fields at night with other dabbling ducks. One of the earliest species to arrive by middle or end of August and continues until November (many birds moult in India), mostly departs by end of March, though may stay as late as May. **Food**: Chiefly vegetarian, comprising aquatic plants, their seeds and arable winter crops. **Status and Distribution**: Rather common winter migrant all over India, including A and N Islands; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives; breeds in W & Central Siberia. **Threshold number**: 4,000.



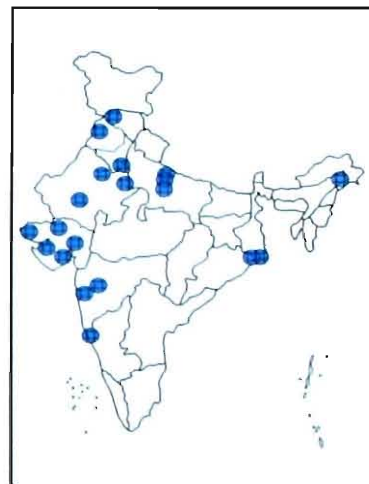
101(92). Marbled Teal. *Marmaronetta angustirostris* (Menetries, 1832); **Marbled Duck** (1); domestic duck -; 39-48 cm; **GT/Vu WM/Ra H/C** (Plate 18.101)



Photo: Mike Prince

Marbled Duck

Diagnostics: Adult: Sexes alike, female slightly smaller; small greyish-brown duck with a distinct dark brown patch from eye to nape; a slight nuchal crest; bluish-grey bill, and horny-brown legs. Above, spotted or marbled with pale greyish buff and blackish; below, more or less transversely barred brown-barred. **Voice**: Silent. **Habitat**: Occurs in shallow freshwater lakes, matted jheels, favouring shallow brackish waters rich in emergent and submerge vegetation with extensive emergent vegetation, avoid open waters. **Habits**: Generally occurs in pairs or small flocks, occasionally large flocks in winter, drops for cover after a short flight, shy and secretive, spend day hiding in vegetation.



Food: Mainly comprise aquatic plants, and partly aquatic invertebrates. **Status and Distribution**: *Globally threatened/Vulnerable*. A rare winter migrant to N India, Madhya Pradesh, Rajasthan, Gujarat, West Bengal, Assam, Maharashtra; Pakistan; Bangladesh; breeds in SW Asia, C Asia, Extreme W China. Breeds in C Asia; winters in S Asia. **Remarks**: The species is a rare winter visitor (Grimmett *et al.*, 1998), with most records, as might be expected, from the

northwest of the country, although there are now several reports from Assam. **Population:** Prior to 1991, the estimated world population of the Marbled Teal was 34,000–40,000 birds. Although count data are poor, a more recent estimate of 14,000–24,000 birds indicates a rapid population decline. The Indian population is only about 2,000 birds. **Threats:** Although the bulk of the Marbled Teal's population is centred in and on the Middle East, it is undergoing a rapid decline throughout its range, the most important causes of this being destruction of habitat and hunting. In Europe, North Africa, the Middle East and Central Asia, over 50% of suitable habitat, i.e. chiefly seasonal wetlands, may have been destroyed during the twentieth century, and the species is not well adapted to exploit the permanent wetlands (e.g. reservoirs) that may replace them. Drainage for agriculture and other purposes occurs across its range, most significantly in the formerly huge marshes of southeast Iraq, and hydrological work has severely affected breeding sites in Tunisia, Turkey, Morocco and Spain (BirdLife Int., 2001). **Threshold number:** 50.

102(106). Pink-headed Duck. *Rhodonessa caryophyllacea* (Latham, 1790); domestic duck =; 60 cm; GT/Cr/ R/Probably Extinct O (Plate 18.102)



Pink-headed Duck

Painting: BirdLife International, U.K.

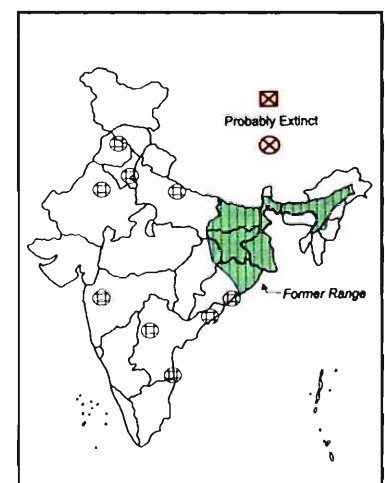
Diagnostics: *Adult:* A brownish-black duck with narrow bill, long and thin neck, thick body, short tail and reddish-black legs. *Male:* Head partly tufted on the occiput; bill, head and hind neck rose-pink; a blackish line on the forehead and a black band from chin, broadening gradually down to the breast; speculum pinkish-buff; rest of upper and under plumage brownish-black. *Female:* Similar to male but blackish-brown; head and neck grayish-pink and not sharply demarcated as in male; speculum pale brownish-buff. **Voice:** Male low *weak whistle*, female low *quack*. **Habitat:** Secluded ponds and marshes with elephant grass in the Himalayan terai, earlier found in jheels. **Habits:** Very shy and secretive; records indicate that this duck was seldom seen unless flushed; flocks up to 30-40 birds were recorded. **Food:** Comprises both aquatic plants and animals. **Status and Distribution:** *Globally threatened/ Critical.*

Resident. In India last sighted in 1935 from Bihar, earlier common in



Pink-headed Duck

Photo: Salim Ali (Reproduced by Frank Todd)



NE, Manipur, West Bengal, Bihar, Orissa (stragglers were recorded in winter from Lucknow, Uttar Pradesh, Ropar, Punjab and Delhi in Northern India); Nepal; Bangladesh; Myanmar. **Remarks:** Ali and Ripley (1978) record that the species was presumably always very rare and local (in all, 80 skins of this species are available in museums around the world), now believed to be extinct in the wild in India. It was “pushed back by increasing cultivation from places where it was once almost common”, this referring to forest clearance (“cultivation has beaten back the jungle and driven the birds to yet remoter and less trodden jungles”) more than wetland drainage (Baker, 1922–1930). The phenomenal growth and spread of the human population in the bird’s erstwhile habitats, and the consequent reclamation for cultivation of more and more of the swampy grass jungles inhabited by the species, appears to have contributed to its disappearance. It seems likely that hunting contributed to the decline and presumed extinction of the species. Early accounts of duck hunting in its range are commonplace. Since 1956, the species has been protected by Indian law - against capture, killing or egg collection (Ali, 1960), and it is listed on Appendix I of CITES. On the basis of the records compiled above, it is clear that the region bordering the north bank of the Ganges from opposite Bhagalpur down to the barrage at Farakka, and in particular the area around Karagola, represents what was, 150 years ago, the best and perhaps only major stronghold of the species (BirdLife Int., 2001). Extinction of the species needs confirmation as recently there are reports of its possible sightings in N Myanmar (where the last *Pink-headed Duck* was sighted in 1910) by the members of BirdLife International Expedition to N Myanmar in November-December 2004 (Eames, 2004). The team proposes to return for a follow-up survey of a large area of wetland and grassland in autumn 2005. **Threshold number:** 1.

103(107). Red-crested Pochard. *Rhodonessa rufina* (Pallas, 1773); Red-Crested Pochard (♂); domestic duck-; 53-57cm; WM/LCom H/C (Plate 18.103)



Photo: Satpal Gandhi

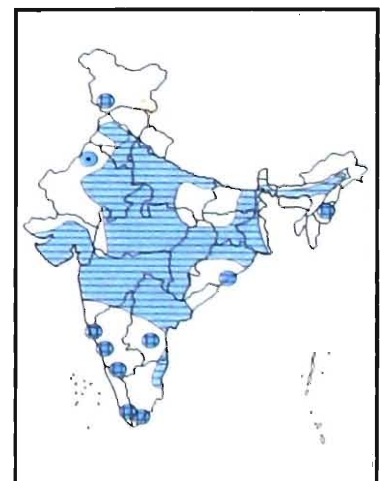
Red-crested Pochard



Photo: P. C. Tak

Flock of Red-crested Pochard

Diagnostics: *Male:* Head golden-orange with silky chestnut crest; bill bright crimson; neck, rump and upper tail-coverts blackish-brown; wing bases next to scapulars with white band; tail silvery-grey-brown; legs and feet dull fleshy-red. *Female:* Above pale greyish-brown; crown dark; bill dusky black with red tip, wings like male but paler and duller, white replaced by grey. *Male (in eclipse):* Like female but browner on underparts; crest bushy; the brightness of eyes, bill and feet retained. **Voice:** Silent. **Habitat:** Inhabits large



jheels, reservoirs, marshes and wetlands with plenty of submerged and fringe vegetation, occasionally on rivers. **Habits:** A diving duck which prefers deep open waters, generally shy and wary, feeds in small groups though large flocks also common, feeds by diving. Arrives by October and generally departs by mid-March. **Food:** Chiefly vegetarian, comprising aquatic plants, algae, seeds, also aquatic animals. **Status and Distribution:** Winter migrant, occurs throughout the country from October to March, very common in NW India, fewer in peninsula; Pakistan; Nepal; Bhutan; Bangladesh. Breeds in W & Central Asia, winters in SW & S Asia. **Threshold number:** 1,000.

104(108). Common Pochard. *Aythya ferina* (Linnaeus, 1758); domestic duck-; 42-49cm; WM/LCom H/C (Plate 18.104)

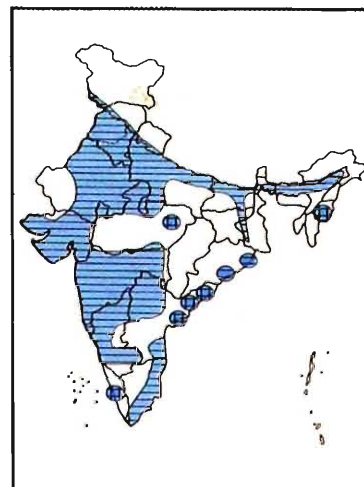


Photo: J. P. Sati

Common Pochard (male)

Diagnostics: *Male:* Head and neck deep chestnut; bill black with pale grey band near tip; upper back grey; breast black; remaining underparts light grey; sides largely greyish-white; rump, upper and under tail-coverts dull black; legs slaty-blue. *Female:* Has rufous brown head, neck, upper back and breast; and dark grey-brown rump, upper and under tail-coverts. *Male (in eclipse):* Dull and more brownish than non-breeding plumage. **Voice:** Silent. **Habitat:** Frequents open parts of jheels, lakes and irrigation reservoirs with deep waters and submersed aquatic vegetation. **Habits:** One of our commonest diving ducks

forming very large flocks from a few hundred to thousands of birds; feeds under water, mainly nocturnal feeder. Arrives in N India fairly late by mid-October and departs by end of March. **Food:**



Chiefly vegetarian, comprising aquatic plants, algae, seeds, also occasionally molluscs, insect larvae, fish and tadpoles. **Status and Distribution:** Very common winter migrant in NW & NE India, up to 5000 m in Sikkim; Assam, Manipur, Karnataka, Kerala, Tamil Nadu; Pakistan; Nepal; Bhutan; Bangladesh. Breeds C Asia, winters in S Asia and S China. **Threshold number:** 10,000.

105(109). Ferruginous Pochard. *Aythya nyroca* (Guldenstadt, 1770); domestic duck -; 38-42 cm; NT R/WM/LCom O (Plate 18.105)



Photo: Frank Todd

Ferruginous Pochard (male)

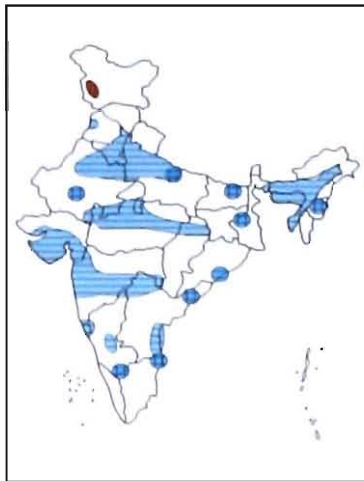
Diagnostics: *Male:* Head, neck and breast deep chestnut; nape darker; bill bluish-black; iris white; upper plumage blackish-brown; speculum white; belly with a large white oval patch; under tail-coverts white; legs dark slaty. *Female:* Duller with brownish iris and less contrasting off-white belly. *Male (in eclipse):* With brown mantle and dull reddish head, neck and breast. The deep chestnut

Photo: Jon Hornbuckle



Ferruginous Pochard (female)

colour, white oval belly-patch, white under tail-coverts and broad white crescent band on flight feathers are diagnostics of both sexes in flight. **Voice:** Harsh *kirr-kere*, silent away from breeding grounds. **Habitat:** Occurs in weedy and vegetation covered jheels, open irrigation tanks, reservoirs with thick marginal vegetation, coastal backwaters and lagoons. **Habits:** A shy and secretive duck, which occurs in pairs or in small groups, feeds mainly by diving at night, hides in reeds on being disturbed. In India, it breeds in Kashmir and Ladakh (around 1500 m) from May to June/July. **Food:** Aquatic vegetation (seeds, plants, algae) and animals (molluscs, larvae, fish). **Status and Distribution:** *Near threatened*. Common in North India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives; breeds in C Asia to W China & W Mongolia, also in Kashmir and Ladakh in our limits; winters in S, E & SE Asia. **Remarks:** The main population occurs in Asia, common in the Tibetan plateau. The estimated S, E and SE Asian population is 15,000. The number is declining rapidly due to wetland drainage and hunting all over the world (BirdLife Int., 2001).



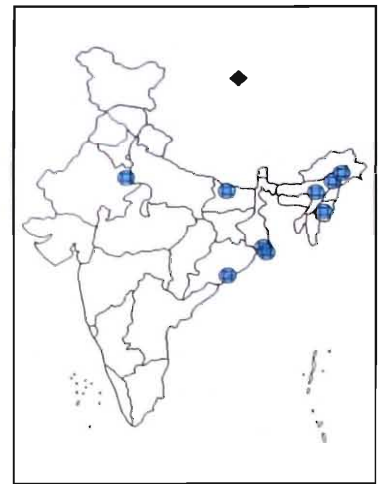
106(110). Baer's Pochard. *Aythya baeri* (Radde, 1863); domestic duck -; 46 cm; **GT/Vu WM/Ra** (Plate 19.106)



Photo: Tim Loseby

Baer's Pochard

Diagnostics: *Male:* Similar to Ferruginous Pochard but head and neck black glossed with green; iris golden yellow; small white spot on chin; breast rich rufous-chestnut; flanks duller chestnut-brown; upperparts dark brown; undertail-coverts white. *Male (eclipse):* Like female but with unglossed head and neck and white iris. *Female:* Head, breast and upperparts dark brown; pale brown oval patch at the base of bill; iris and flanks brown; belly white. **Habitat:** Large rivers and lakes, also coastal waters. **Habits:** Generally shy, usually found in pairs or small flocks, feeds by diving. **Voice:** Silent. **Food:** Feeds mainly on aquatic plants and seeds.



Status and Distribution: *Globally threatened/Vulnerable*. Winter migrant, rare; it occurs regularly (but locally) in Northeast India, erratic elsewhere, Pakistan; Nepal; Bhutan; Bangladesh. Breeds in SE Siberia, NE China, winter in SE Asia & NE India. **Remarks:** Ali and Ripley (1968–1974) stated that the species was an uncommon and erratic winter visitor

to Manipur (fairly regular), Assam, West Bengal and Bangladesh. Various estimates of the global population of this species have recently been made, including more than 10,000 individuals, fewer than 25,000 and possibly fewer than 10,000, and 10,000-20,000 birds. Its current status in Manipur is unknown, but conservation problems at Loktak Lake suggest that the wintering population in the area is probably very small. It has recently been clarified that the largest count yet recorded in Assam is c.250 birds at Deepor beel in January 1990. January counts in Assam totalled 544 Baer's Pochards in 1990, three in 1991, 473 in 1992, 110 in 1993, 262 in 1994, 109 in 1995 and 30 in 1996 (AWC data); these are thought to be substantial underestimates (because only a few sites were visited) and the total winter population in the state is placed at c.1,000 individuals. Northeast India is clearly very important for the species at this season. The species is not listed in Schedule I of the Wildlife Act (1972), but is included under the general (and presumably ineffectual) heading of "Ducks" in Schedule IV, which should be raised to Schedule I (BirdLife Int., 2001). **Threshold number:** 150.

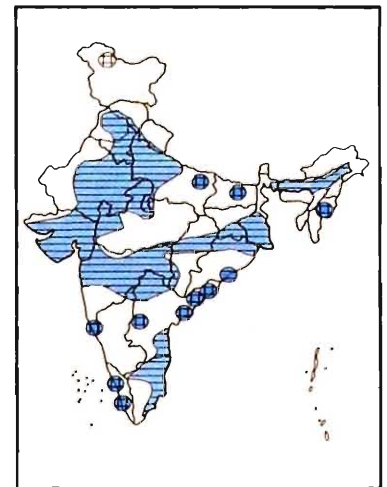
107(111). Tufted Pochard. *Aythya fuligula* (Linnaeus, 1758); **Tufted Duck** (I); domestic duck -; 40-47cm; WM/LCom C/H (Plate 19.107)



Tufted Pochard (male)

Diagnostics: Male: The only Pochard with a long occipital crest; and boldly contrasting black and white plumage. Head, neck, breast, back, tail and vent jet-black; sides of body and flanks pure white; belly greyish; iris golden-yellow; bill, legs and feet greyish-blue. **Female:** Dark brown with rudimentary occipital crest; belly white; often a white ring of feathers at base of bill. **Male (in eclipse):** Darker than female; flanks with white moulting; underparts uniformly brown; touch of white at base of bill. **Voice:** Silent. **Habitat:** Prefers open and deep tanks, irrigation reservoirs, lakes and marshes.

Habits: Generally gregarious, occurs in large flocks of hundreds; a diving duck, feeds during daytime; arrives by mid-October and departs by end of March. **Food:**



Predominantly aquatic animals such as molluscs, also plant seeds. **Status and Distribution:** Winter migrant, common all over India, occurring up to 5000 m (Sikkim), but rare in Kashmir; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives. Breeds W & Central Siberia, winters in Central & S Asia. **Threshold number:** 10,000.

108(112). Greater Scaup. *Aythya marila* (Linnaeus, 1761); domestic duck-; 40-51cm; WM/Va C/H (Plate 18.108)

Diagnostics: Male: Head, neck, breast, upper back, rump and upper tail-coverts black, the first two with green sheen. Back pale grey, tail blackish-brown; flanks and abdomen white, posterior abdomen mixed with brown, vent and under tail-coverts dark brown or black; iris golden-yellow; greyish-blue bill with black tip; legs and feet greyish-blue. **Female:** Resembles the female Tufted Pochard, dark

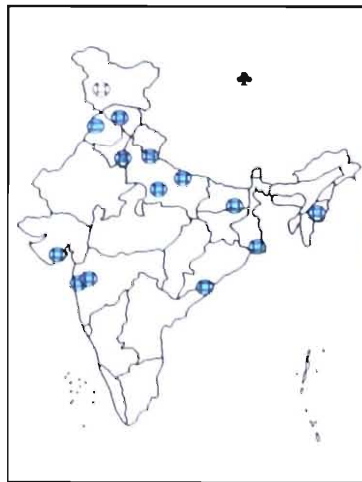


Greater Scaup (male)



Greater Scaup (female)

brown with a broad white ring around base of bill, and speculum white. *Male (in eclipse)*: Like adult female, but with no white band round bill; upperparts more vermiculated with white and white speculum more pronounced than in female. **Voice**: Silent. **Habitat**: Occurs in coastal areas, and also large freshwater lakes and rivers. **Habits**: Gregarious in winter habitats; feeds by diving, moves around freely in open water. **Food**: Aquatic molluscs and invertebrates constitute major food, also plant seeds. **Status and Distribution**: Rare winter migrant generally from Kashmir to Maharashtra and E India; Pakistan; Bangladesh. Breeds in E Siberia, winter in East and South Asia. **Threshold number**: 3,000.

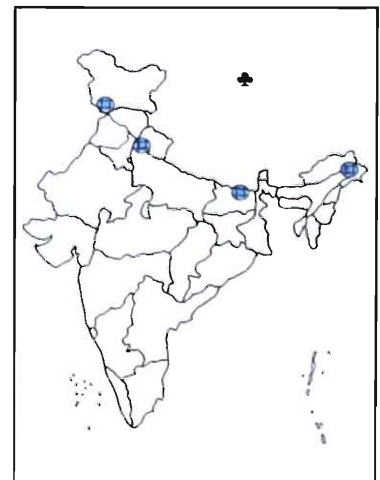


109(117). Long-tailed Duck. *Clangula hyemalis* (Linnaeus, 1758); domestic duck-; 36-47cm; **WM/Va C** (Plate 19.109)



Long-tailed Duck (male)

Diagnostics: Male: Chiefly a dark chocolate-brown and white duck with small head, short bill, and long pointed tail. Head, neck, upper breast, scapulars, flanks, and vent pure white; a patch on either side of neck behind ear-coverts, a broad band along spine on back, pointed central tail, and a collar descending from upper back widening below in to a broad pectoral band covering upper abdomen dark brown. In summer, head, neck and upper breast blackish-brown and back scalloped chestnut-buff. *Female*: In winter, dark brown entirely on back, scalloped fulvous; white head with dusky crown, and dusky patches on either side of upper neck; brownish lower foreneck and upper breast, forming a diffuse pectoral band; remaining underparts white; in summer, upperparts duller than in winter, the scalloping less conspicuous. **Voice**: Silent. **Habitat**: Chiefly maritime, a very rare winter straggler on freshwater lakes, jheels and large rivers. **Habits**: Feeds by diving, remains under water for many seconds, while flying swings from side to side. **Food**: Carnivorous on molluscs



and crustaceans. **Status and Distribution:** Very rare winter vagrant to India, Pakistan; Nepal. Circumpolar, E Asian population breeds in E Siberia, winter in Seas of E Asia. **Remarks:** Within Indian limits only three records from Kashmir, Assam and Dehra Dun. In seas of E Asia estimated population: 5,00,000-1,000,000. **Remarks:** From India, recorded thrice in last century, once each from Kashmir (Hokarsar, 1939), Assam (1934) (Ali & Ripley, 1978), and Dehra Dun (Singh, 1991). **Threshold number:** 7,500 (Seas of E Asia).

110(118). Common Goldeneye. *Bucephala clangula* (Linnaeus, 1758); domestic duck -; 42-50 cm; WM/Ra C (Plate 19.110)



Photo: Svein Bekkum

Common Goldeneye (male)

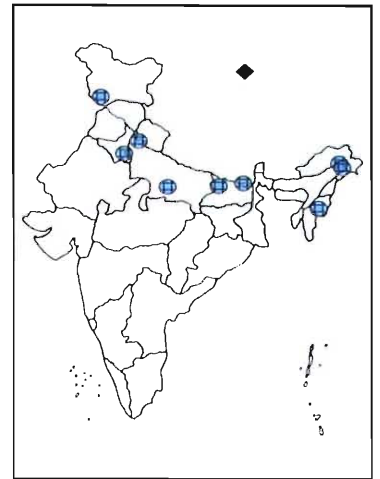
Diagnostics: Male: Breeding bird with a distinctive oval white cheek-patch at base of upper mandible. Head, nape, chin and throat black with metallic green gloss on the first two; upperparts black with elongated white markings on scapulars; neck and underparts



Photo: Jyn Morohashi

Common Goldeneye (male & female)

white, except grey vent and thighs spotted with white; iris golden-yellow; bill black; legs and feet yellow with black webs. **Female:** Head chocolate; neck with white collar round the base; back and tail



grey. **Male (in eclipse):** Like female, but larger and brighter. **Voice:** Silent. **Habitat:** Swift flowing rivers, freshwater lakes, avoids shallow water with extensive vegetation. **Habits:** A diving duck, feeds diurnally, occasionally dabbles, occurs in small parties of 5-6 birds in winter. **Food:** Chiefly carnivorous on aquatic insects, molluscs and crustaceans. **Status and Distribution:** Rare winter migrant mainly to N& NE India from Kashmir to Assam, Manipur; Nepal; Bangladesh; uncommon in Pakistan. Breeds in W Siberia, NE Europe, winter in Black and Caspian Seas. **Threshold number:** 250.

111(119). Smew. *Mergellus albellus* Linnaeus, 1758; domestic duck -; 38-44 cm; WM/Ra C (Plate 19.111)

Diagnostics: Male: Predominantly a white duck with black eye-patch having green reflections; a broad black band from behind eye to nape; short drooping nuchal crest; black back with two black streaks diverging from its anterior end down each side of white breast. Grey body sides and tail; white flanks, finely barred with black; pale grey on underside of tail; dark slaty bill; slaty-

Photo: Soon-Kyoo



Smew (male)

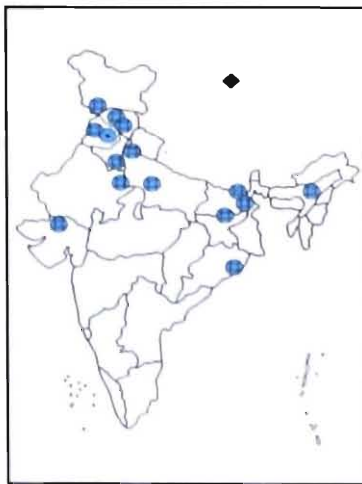
Photo: Frank Todd



Smew

black legs, feet and webs. *Female*: Forehead, crown, nape and short nuchal crest chestnut-red. Throat and sides of head white; back greyish-brown; breast and flanks grey, remaining underparts white. *Male (in eclipse)*: Differs from female in larger white wing-bar; darker lesser wing-coverts; and two black crescent bands on sides of breast. **Voice**: Usually silent. **Habitat**: Open jheels, freshwater lakes, and streams as they descend from hills to plains.

Habits: Sociable occurs in small flocks, only occasionally large groups, fast swimmer, and diurnal feeder by diving, swift flier. **Food**: Carnivorous, chiefly fish, molluscs, crustaceans, aquatic insects.



Status and Distribution: Rare and largely sparse winter migrant to N and NW India, Assam, Bihar, West Bengal, Orissa, Gujarat; Pakistan; Nepal; Bangladesh. Breeds in W Siberia, winter in C & SW Asia. **Threshold number**: 300.

112(122). Red-breasted Merganser. *Mergus serrator* Linnaeus, 1758; domestic duck -; 55-58 cm; WM/Va (Plate 19.112)



Red-breasted Merganser

Photo: K. Chaiyan

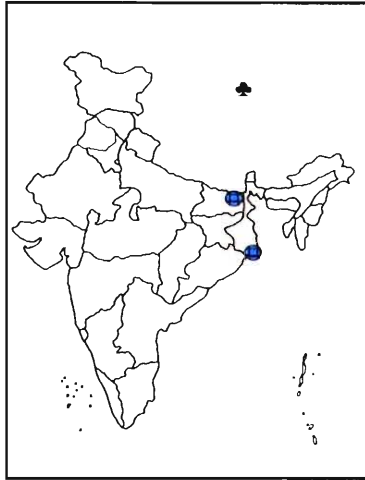


Red-breasted Merganser

Photo: Frank Todd

Diagnostics: *Male*: Head greenish-black with scraggy backward-directed crest; neck collar white and broad; upper breast dark chestnut blotched with black; upperparts white; iris red-brown; bill orange-red, edge of culmen and nail black; legs and feet orange-red. *Male (eclipse)*: Like female but with dark mantle and more or less similar wings as in breeding males. *Female*: Head and neck pale chestnut with scraggy crest; ill-defined white throat; dark greyish-brown upper parts, with pale scalloping; white underparts; and ashy-brown

mottled sides and breast. **Voice:** Generally silent. **Habitat:** Inshore coastal waters, large rivers and lakes. **Habits:** Sociable, occur in small flocks, diurnal, feeds by diving. **Food:** Carnivorous, mainly fish. **Status and Distribution:** Vagrant; winter migrant to India; Nepal; rare in Pakistan; breeds in W Siberia, winter in SW & C Asia. **Remarks:** Only two records from India, W Bengal in 1889 & 1961. **Threshold number:** 100.



113(120-121). Common Merganser. *Mergus merganser* Linnaeus, 1758; domestic duck =; 58-72 cm; R/WM/LCom C (Plate 19.113)

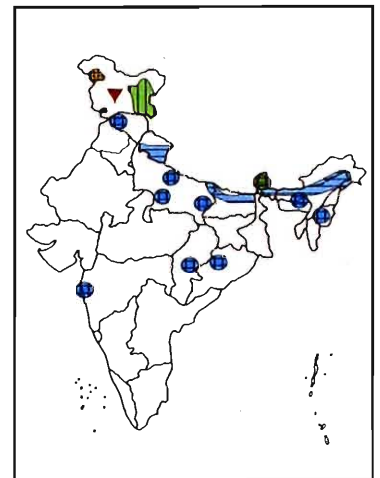


Common Merganser (male)



Common Merganser (male & female)

Diagnostics: Generally a black and white (male) or grey and white (female) duck with slender neck, narrow pointed red bill and red legs. **Male:** Head, upper neck and long crest of narrow feathers black glossed with metallic green; upper back glossy black; lower back, rump and upper tail-coverts grey, vermiculated with white; extreme upper back, lower neck and underparts white with pronounced salmon-pink tinge on underparts; tail silvery-brown. **Female:** Chin and throat white; head, crest and neck chestnut and cinnamon-brown; upperparts grey-brown, with blue blotches; speculum white; underparts white, flanks with grey stripes; legs and feet orange-red. **Male (in eclipse):** Like female, but retains white wing-coverts. **Voice:** Occasional croak, *kreh-kreh*, deep *karr*. **Habitat:** Large rivers, lakes, fast-flowing hill streams as they descend from hills



into plains, rarely coastal waters. **Habits:** Gregarious, usually occurs in small flocks, feeds by diving, diurnal, an expert swimmer and diver. **Food:** Carnivorous, almost exclusively on fish. **Status and Distribution:** Locally common winter migrant in eastern Himalaya, rare in Northern India; Bhutan; Pakistan; Nepal; Myanmar. Breeds in W & C Siberia, Mountains of C Asia; between 3000-4500 m in Ladakh (Tso Moriri, Pangong lake, Indus and Tankse rivers), winter in C, SW & S Asia. **Remarks:** Estimated South Asian population around 2,500-10,000. Hunting and habitat loss are the primary threats (BirdLife Int., 2001). **Threshold number:** 60.

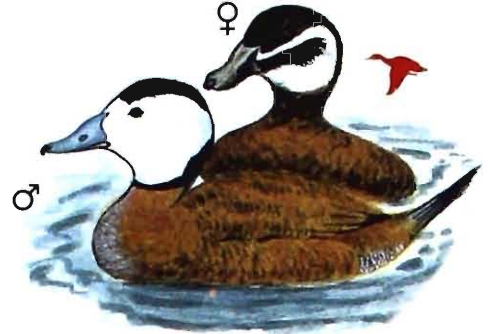
Plate 14



71. Large Whistling-Duck



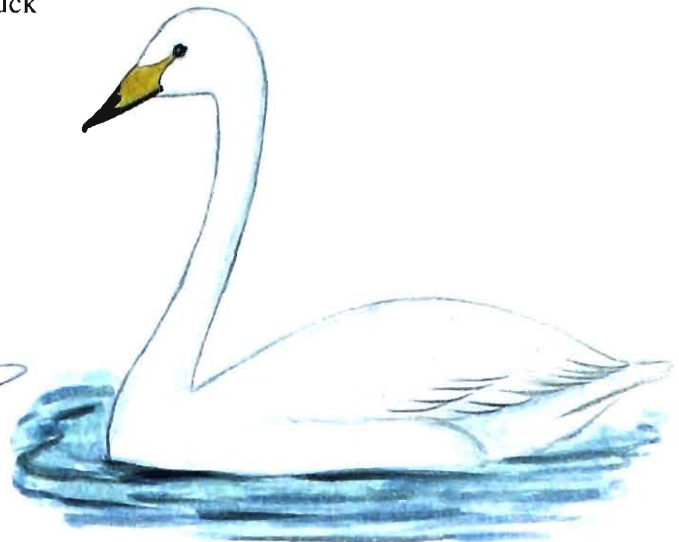
72. Lesser Whistling-Duck



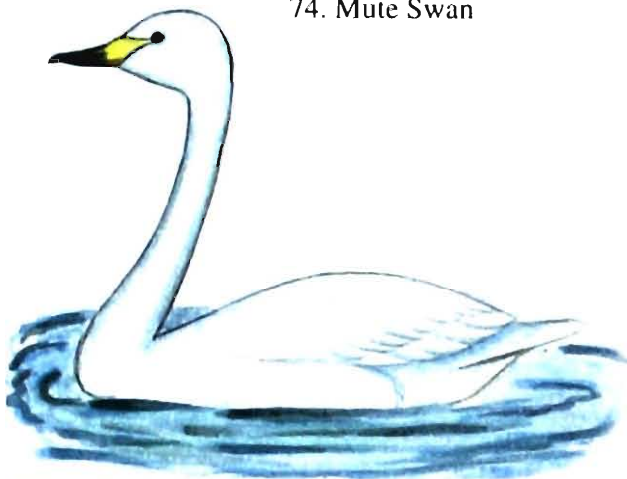
73. White-headed Duck



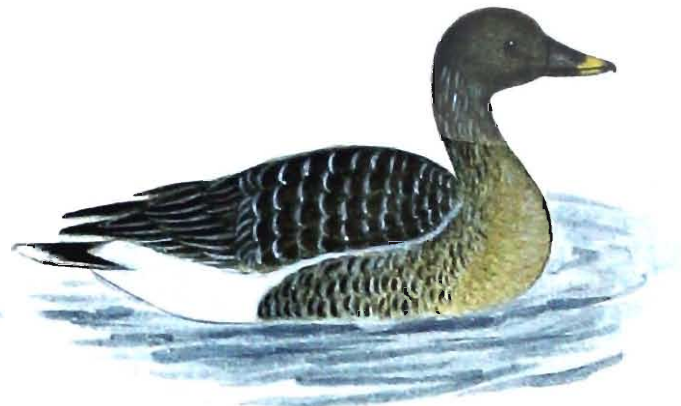
74. Mute Swan



75. Whooper Swan



76. Tundra Swan



77. Bean Goose

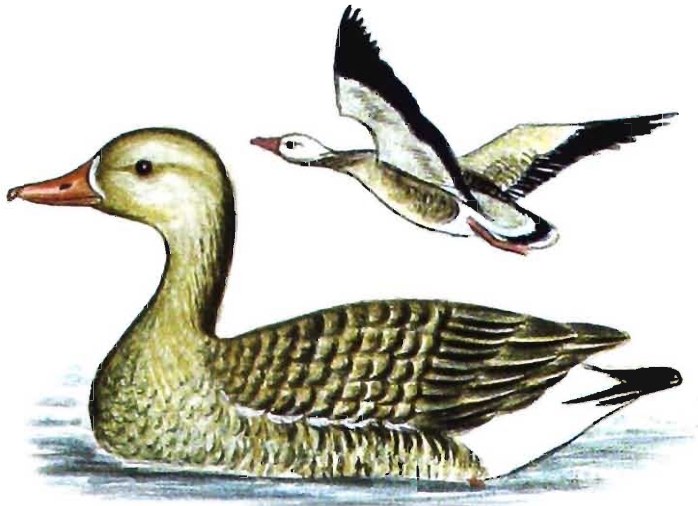


78. Greater White-fronted Goose

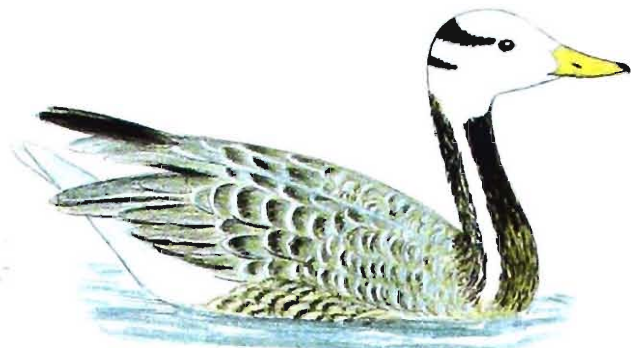


79. Lesser White-fronted Goose

Plate 15



80. Greylag Goose



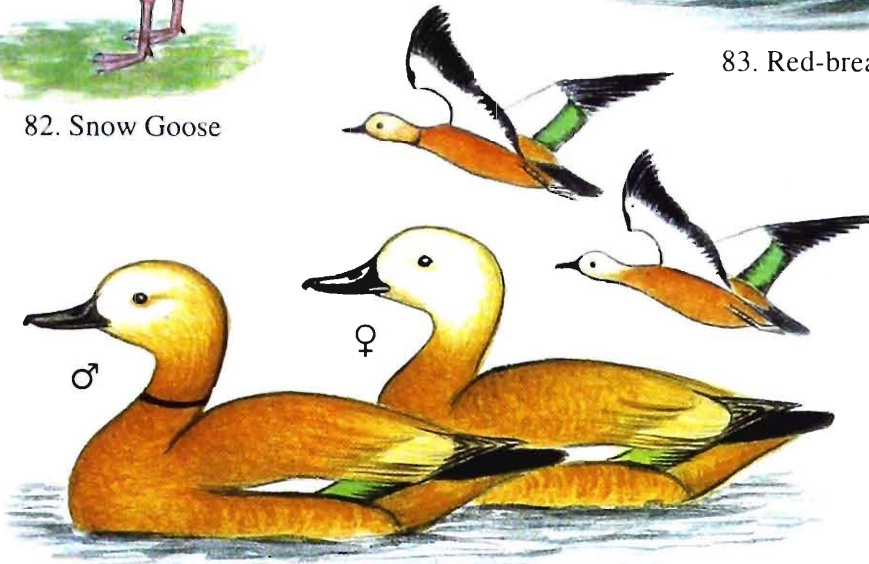
81. Bar-headed Goose



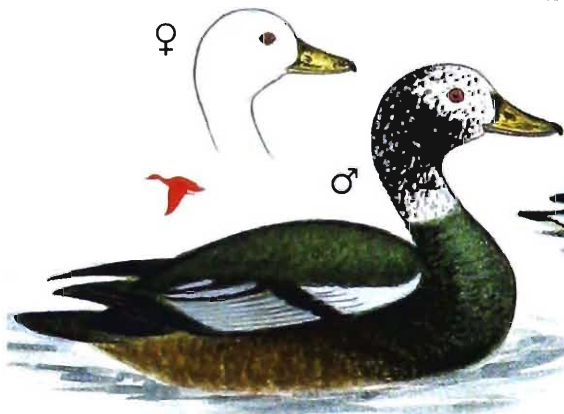
82. Snow Goose



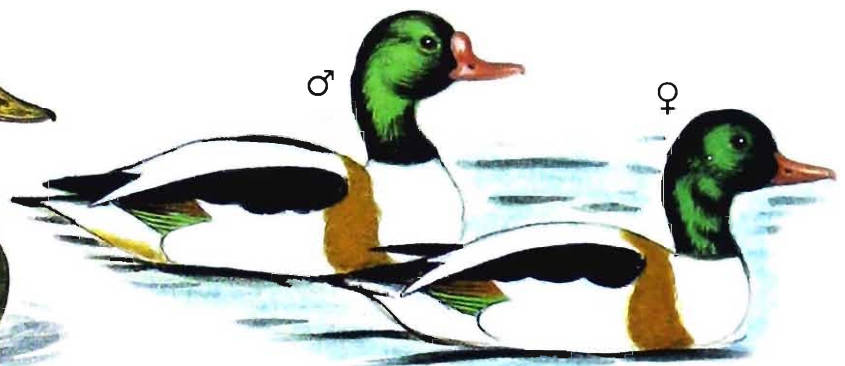
83. Red-breasted Goose



84. Brahminy Shelduck

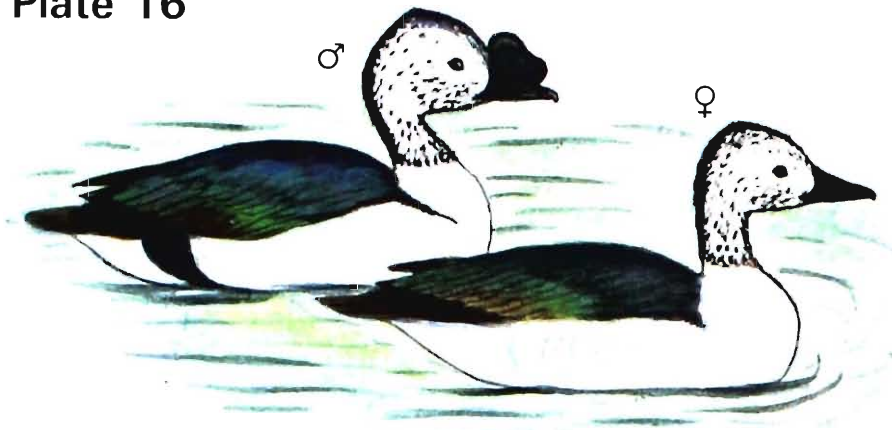


86. White-winged Duck

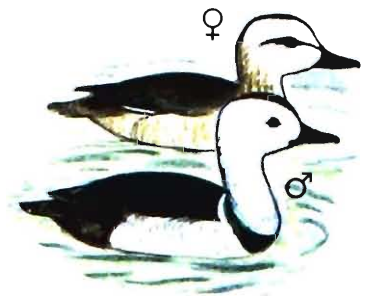


85. Common Shelduck

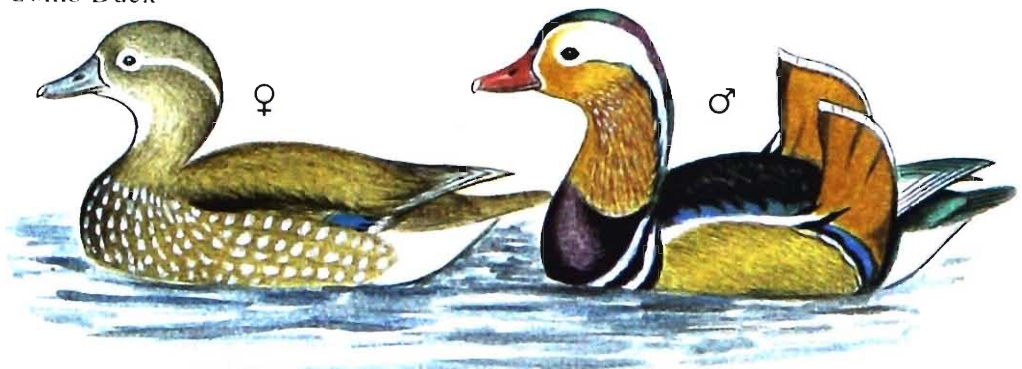
Plate 16



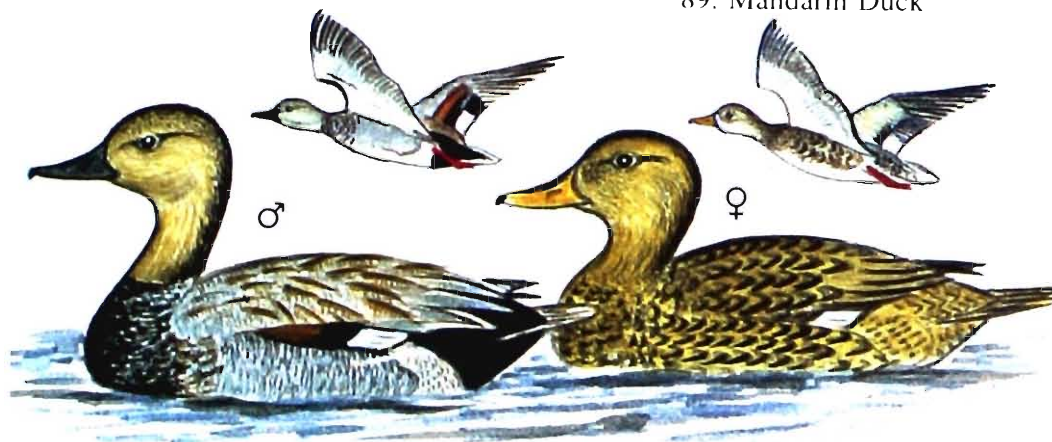
87. Comb Duck



88. Cotton Teal



89. Mandarin Duck



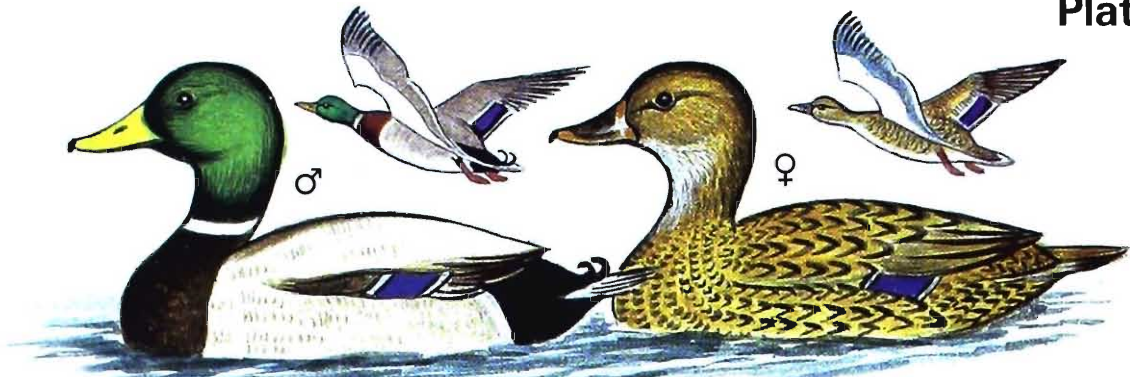
90. Gadwall



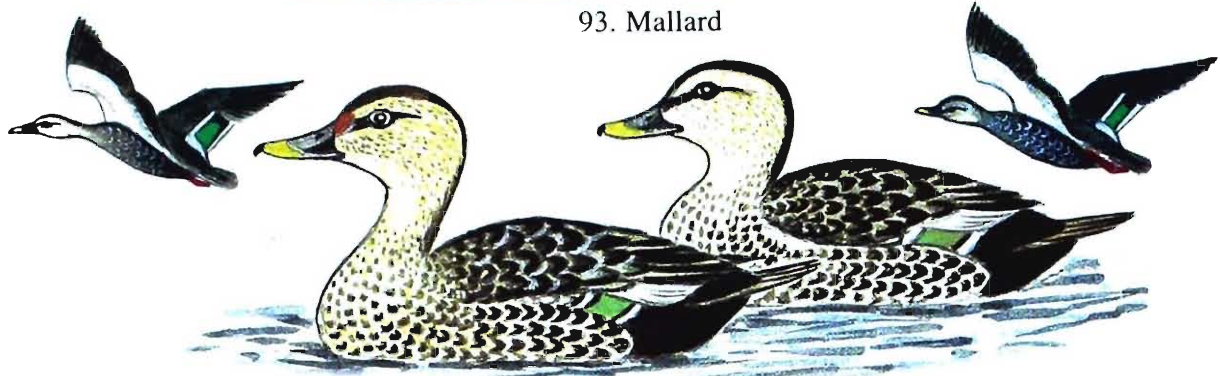
91. Falcated Duck

92. Eurasian Wigeon

Plate 17



93. Mallard



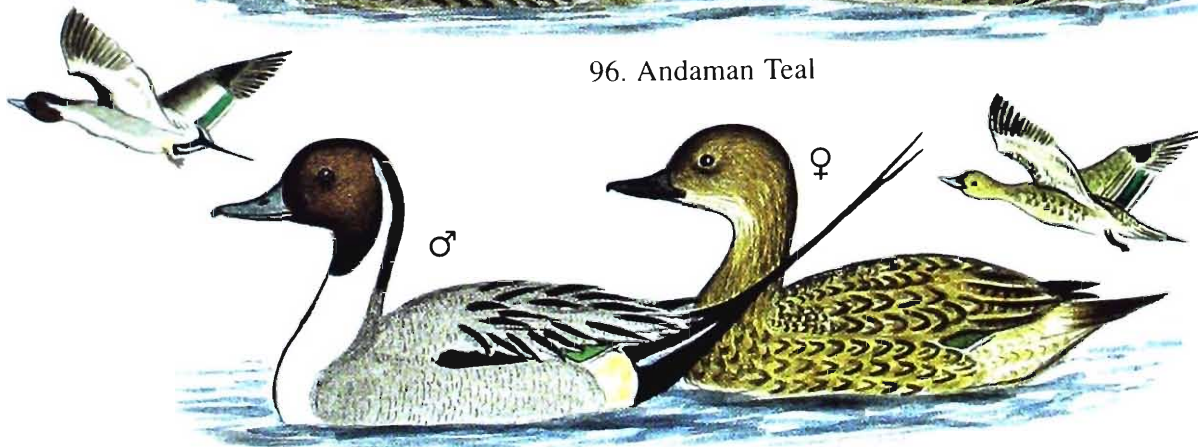
94. Spot-billed Duck



95. Northern Shoveller

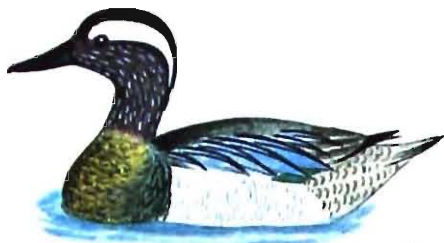


96. Andaman Teal

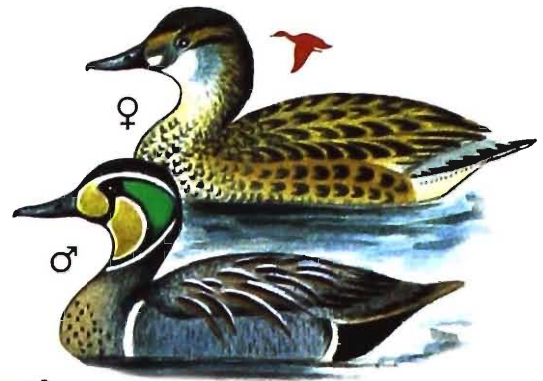


97. Northern Pintail

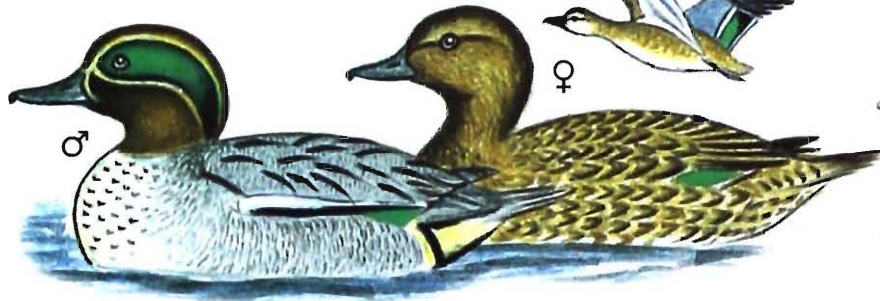
Plate 18



98. Garganey



99. Baikal Teal



100. Common Teal



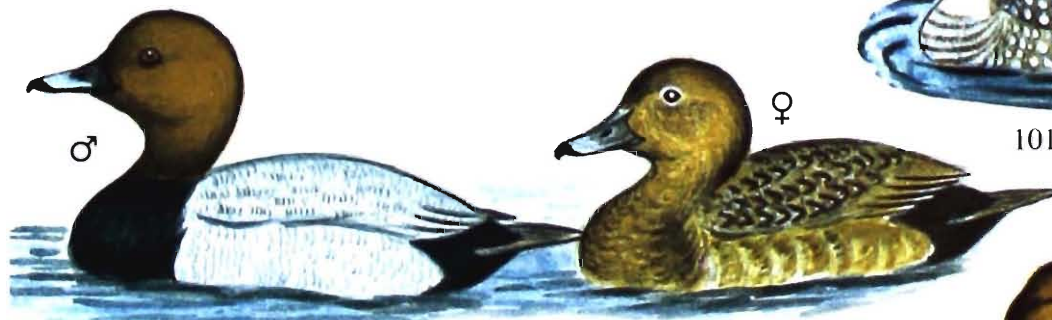
102. Pink-headed Duck



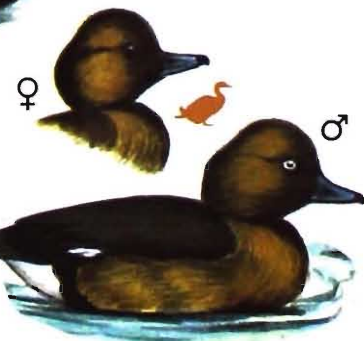
103. Red-crested Pochard



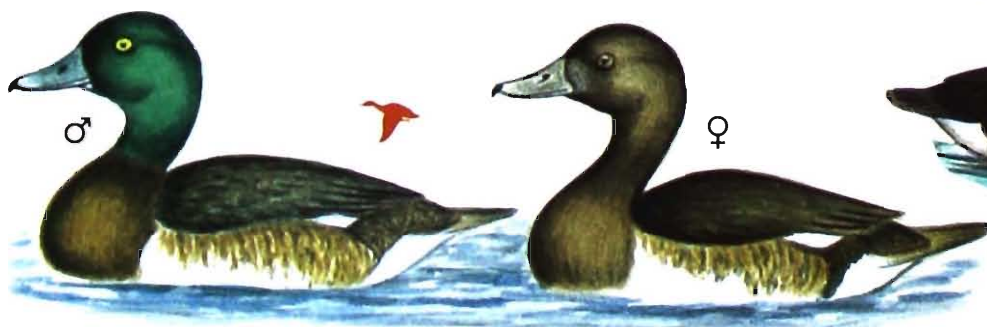
101. Marbled Teal



104. Common Pochard

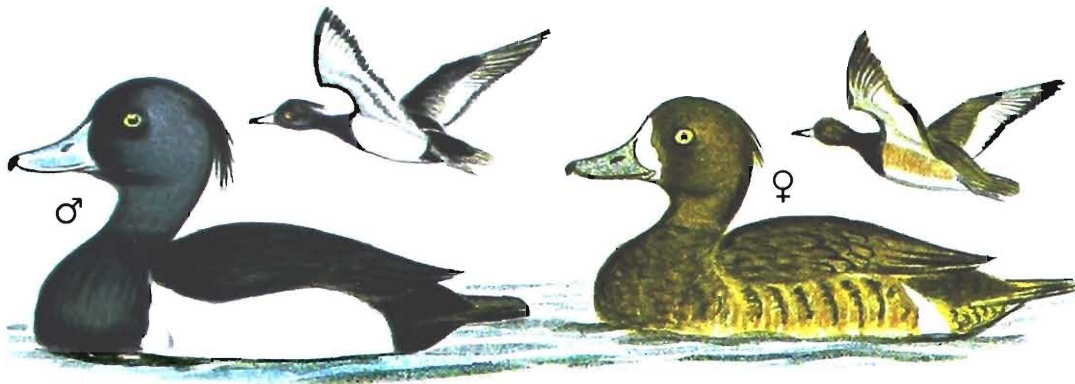


105. Ferruginous Pochard

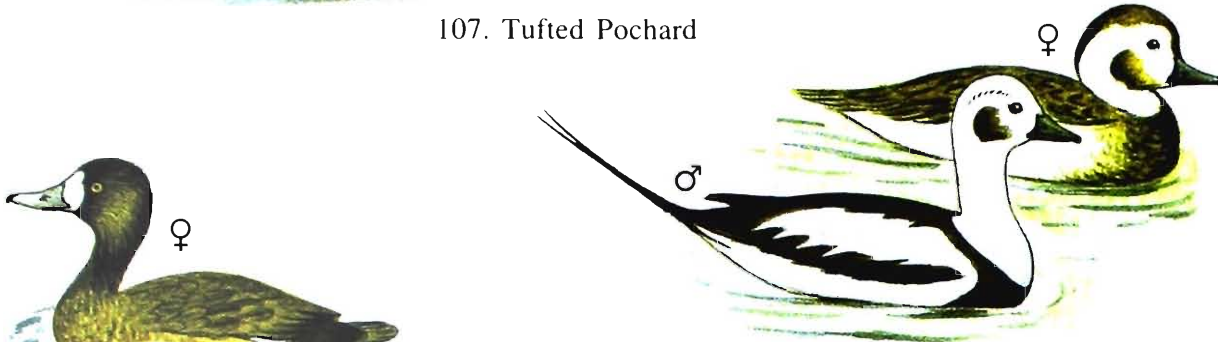


106. Baer's Pochard

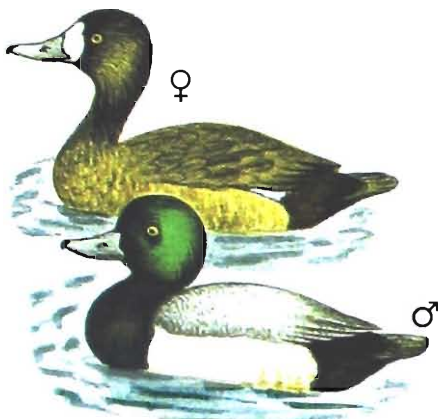
Plate 19



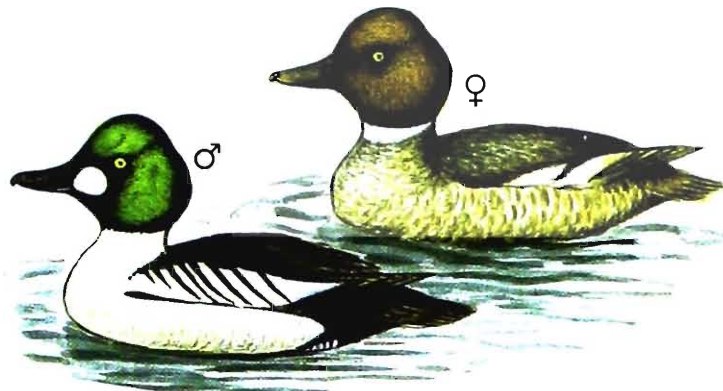
107. Tufted Pochard



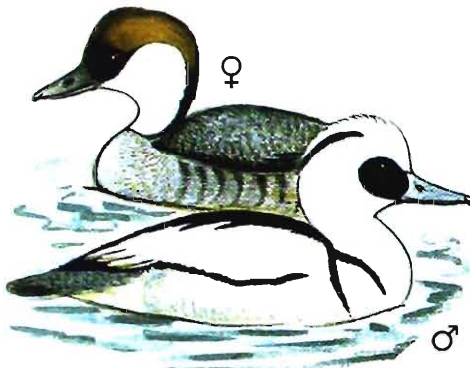
109. Long-tailed Duck



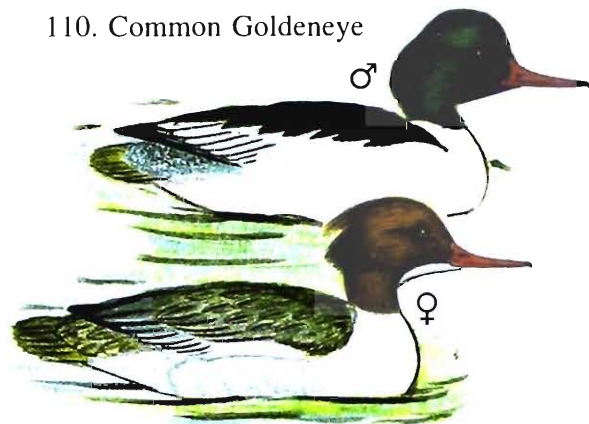
108. Greater Scaup



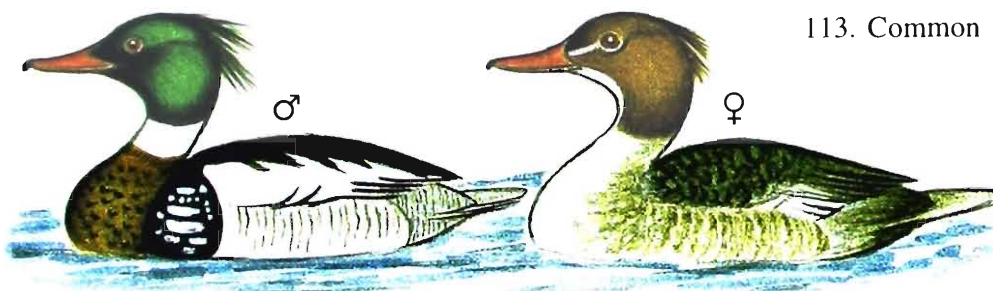
110. Common Goldeneye



111. Smew



113. Common Merganser



112. Red-breasted Merganser

Cranes (Family Gruidae)

World: 15 species; Asia: 9; India: 6

Large elegant birds with long neck and long legs superficially resembling storks but with bill either equal or little longer than head. Nostril covered by a membrane on the posterior side and placed above halfway of the mandible. Wings broad, with eleven primaries; inner secondaries much lengthened, drooping over tail; tail short with twelve feathers. Tibiae partly bare; toes short, strong and unwebbed; hind toe raised (*contra* Storks). Flight is powerful, in V-formation or in line with outstretched head, neck and legs; calls powerful, trumpet-like; young nidifugous.

114(325). Siberian Crane. *Grus leucogeranus* Pallas, 1773; Common Crane \pm ; 120-140 cm; GT/Cr WM/VRa H (Plate 20.114)

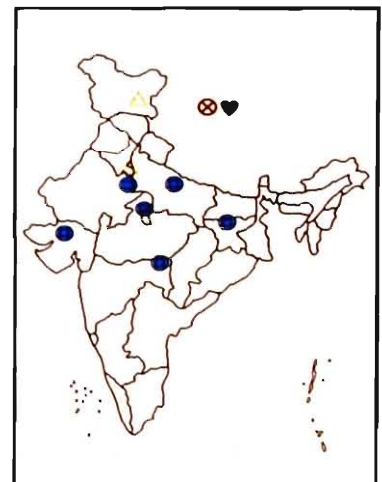


Photo: Bhumesh Bharti

Siberian Crane

Diagnostics: *Adult:* Sexes alike; a striking snow-white Crane with naked red face and forecrown; dark brown bill; reddish-pink legs and feet. *Juvenile:* Buff-brown-cinnamon,

head covered with white feathers. **Voice:** Pleasant, soft and musical *koonk-koonk*. **Habitat:** This species is the most specialised crane in terms of its habitat requirements, and the most aquatic, exclusively using wetlands for nesting, feeding, and roosting, preferring wide expanses of shallow fresh water with good visibility. In India and Iran the wintering birds use artificially maintained wetlands. **Habits:** Small family groups comprising parents and one or two young ones feed by probing for aquatic plants while wading. Feeds with submerged head, rests in shallow waters. **Food:** On the wintering grounds in India, the species feeds mainly on vegetable matter such as the tubers of *Scirpus tuberosus*, *S. littoralis*, *Cyperus rotundus*, *Eleocharis dulcis*, *Hydrilla verticillata* and *Nymphaea*, and the basal parts of the leaves of *Lymnophyton* and the tips of the culms of *Eleocharis dulcis*; they also eat some animal matter, including aquatic insects (water bugs, beetles), molluscs, worms and probably fish. **Status and Distribution:** *Globally threatened/ Critical*. The Siberian Crane has three separate populations, all of which nest in NW Russia. The relatively large eastern (“Yakutia/ China”) population breeds in Yakutia and winters in eastern China, the tiny central (“Ob’/ India”) population breeds in the Ob’ valley in Western Siberia and winters in North-west India, and the tiny western (“Tyumen’/Iran”) population also breeds in Western Siberia but winters in Iran (UNEP/CMS 1999). **Remarks:** In the nineteenth century, the Siberian Crane was regularly reported in the Gangetic Basin of northern India, and in the early twentieth century Baker (1922–1930) described it as “not uncommon in North-west India but





Major migration route: Siberian Crane

always in small flocks” Since 1937 most records in India have been from Keoladeo National Park, but the numbers there declined from c.200 birds in 1965 to 33 in winter 1980/1981, increased to 41 in 1984/1985, and then decreased again to only five in 1992/1993 and none in the following two winters. However, four birds (including one chick) returned in February 1996. Their number has come down to two in 1999 and 2000, and finally disappeared in the winter of 2002, not seen in the winters of 2003 and 2004, suggesting that the population is now extinct. **Population:** The global population was recently estimated at 2,900–3,000 birds, including about 2,900–3,000 wintering in China (mainly at Poyang Hu lake), nine in Iran and four in India. However, an aerial census in early 1999 located only 2,004 Siberian Cranes throughout the Poyang Hu lake area, indicating that there may have been a real decline in the eastern population, and the total global population in the late 1990s was therefore estimated at just 2,500 birds. Reports of 9–10 birds in the Kunovat basin in Russia in summer 1994, on the breeding grounds of the central population, support the theory that there were other wintering grounds of this population, perhaps elsewhere in India or in western China (BirdLife Int., 2001). **Threats:** The wintering grounds of the central population at Keoladeo National Park are situated in one of India’s most populated regions, and pressure from

fishing, burning, firewood-cutting and other activities has risen in recent decades, although significant progress has been made in controlling and even eliminating these types of disturbance. Nevertheless, the few surviving individuals at Keoladeo National Park, Bharatpur, each winter were often disturbed by grass-cutters (over 300 of which are apparently present in the park on a daily basis) and possibly dogs. **Hunting and persecution:** The increase in the human population in the Kurram valley in the last few decades has vastly expanded the number of potential hunters in the area. Crane hunting has become increasingly popular among tribals in Pakistan, and it has spread from Bannu to new areas in Zohab district of Baluchistan, and to remote areas near Dera Ismail Khan and to western Punjab along the Indus wetlands. These areas include the Zhob district, which lies on a direct line from Keoladeo National Park (Bharatpur) to Ab-i-Istada lake in Afghanistan, where the species rests for 2–3 weeks on migration. **Measures Taken:** At Keoladeo National Park maintenance of adequate water level has been an acute problem, but measures undertaken since the early 1980s have reduced pressures to drain and utilise the wetlands, and management strategies have been adopted that maintain water supplies in a portion of the reserve for the benefit of the resident Sarus Cranes, *Grus antigone*. The grass *Paspalum distichum* is encroaching upon some of the park’s wetlands. International conservation efforts for the Siberian Crane have expanded greatly since the 1970s, and attempts to establish a Siberian Crane Recovery Team (modelled on the team established for the Whooping Crane *Grus americana*) have been underway since 1992. The satellite-tracking project has helped to initiate a network for the conservation of cranes in North-East Asia. A Global Environment Facility (GEF) programme has



been developed by the International Crane Foundation, in consultation with the Secretariat of the Convention on Migratory Species (CMS, Bonn Convention) for the conservation of the wetlands and migration corridors required by this species. The traditional wintering grounds of the central population have been protected in Keoladeo National Park, Bharatpur, since 1981, which is now also a Ramsar site and World Heritage

Site. The migratory movements of this species have been studied using satellite-tracking. All three populations are counted on a regular basis on their wintering grounds. Given that one of the three populations of this species is on the brink of extinction and one of them is extinct, the propagation and re-introduction of captive birds is considered to be critical for its survival. A captive breeding programme was therefore established in Russia and at the

International Crane Foundation starting from 1977, using eggs collected in Yakutia. Captive-raised birds were released in an effort to maintain the central (Ob'/India) population and releases are also planned for the western (Tyumen'/Iran) population. Two captive reared chicks were released in Keoladeo National Park, but both died due to unknown reasons. Subsequently, no effort was made to refurbish the population with captive reared chicks. **Education and awareness:** Education and public awareness programmes, including the production and organisation of a calendar, school programme, crane booklet, monsoon bird video and "wetland week" (UNEP/CMS 1999), commemorative postage stamps of Siberian Crane in Pakistan and India, and mass media releases about this bird, have increased public awareness. **Legislation:** The Siberian Crane is listed on Appendix I of CITES, and on Appendix I of CMS. It is legally protected under Schedule I of India's Wildlife (Protection) Act of 1972. **Threshold number:** 1 (Ob/India population).

115(323-324). Sarus Crane. *Grus antigone* (Linnaeus, 1758); Vulture +; 156 cm; **GT/Vu R/LM/LCom H/C** (Plate 20.115)

Diagnostics: *Adult:* Sexes alike, female slightly smaller. The largest Indian Crane with naked red head and upper neck, grey plumage,



Photo: K. S. Gopi Sundar

Pair of Sarus Cranes giving unison call

greenish-horny bill, and red legs. *Juvenile:* Brownish-grey with rusty-brown on head and neck. **Voice:** Loud trumpeting. **Habitat:** The species frequents a variety of wetland habitats, cultivation and meadows. Due to the shrinkage of natural wetlands, the species has been forced into man-made wetlands. It is more able to utilise dry habitats than many other crane species. **Habits:** Generally keeps in pairs or small flocks, flocks up to 200 birds are not uncommon; also found in company with common crane. Sarus pair for life and the faithfulness and devotion of the couple is legendary in India. Courtship display very elaborate in breeding season; breeds from

April to June and again from July to October; nests are usually in exposed positions in temporary or permanent shallow swamps or paddy fields, allowing a good view of the surroundings. **Food:** Omnivorous, seeds, grains and small fruit of various kinds, vegetable matter including shoots of grasses, the roots of aquatic plants and the



Photo: K. S. Gopi Sundar

Sarus Crane

pods of ground nuts *Aracharis*, various cereals, potatoes, eggs of birds, crabs, amphibians (mainly frogs), and reptiles. **Status and Distribution:** Resident, nomadic and locally common in C and NW India, Uttar Pradesh, Gujarat, Rajasthan, Assam, north Andhra Pradesh; Pakistan; Nepal; Bangladesh; Myanmar; breeds in Pakistan, N India, Nepal and Myanmar. **Remarks:** On the basis of early reports it seems likely that 150 years ago the Indian population of this species was in the order of hundreds of thousands of birds. A survey in the 1980s, however, suggested that only 10,000–12,000 survived (Gole, 1989a). Further declines took place during the 1990s leading to a sense of unease about the status of the species in India (Choudhury, 1998; Sundar and Choudhury, 1999). Between May 1998 and March 1999, two fairly comprehensive surveys were conducted throughout the country, covering a total of 112 districts in 11 states. The first survey enumerated 772 birds, and the second 989 birds (Sundar *et al.*, 2000). More recently, a nationwide census of the species was organised by the Wildlife Institute of India: the first count (June 1999) produced a total of 1,991 throughout India (Choudhury *et al.*, 1999). It is not clear what proportion of the national total of Sarus Cranes this comprises, but it certainly suggests that the overall total is well below 10,000 individuals (BirdLife Int. 2001). **Threats:** The primary threat is the conversion of wetlands to agricultural use, a factor that reduces the number and extent of sites suitable for feeding and breeding (Gole, 1989, 1991). During the 1999 Sarus Crane census throughout India, the major threat

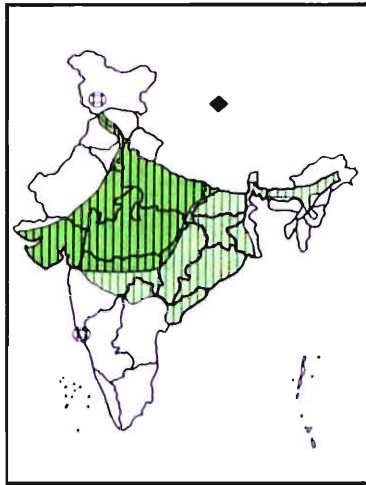
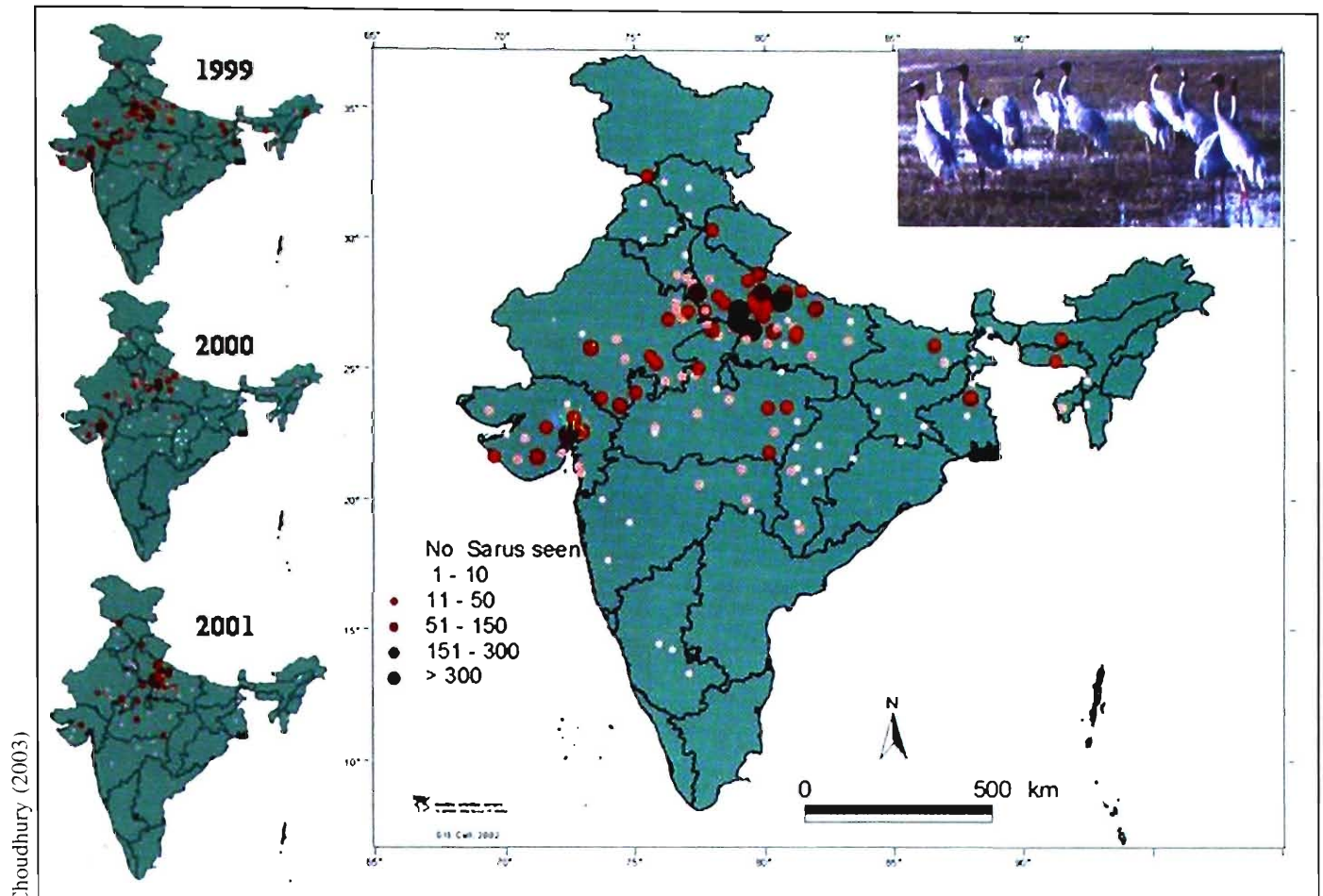


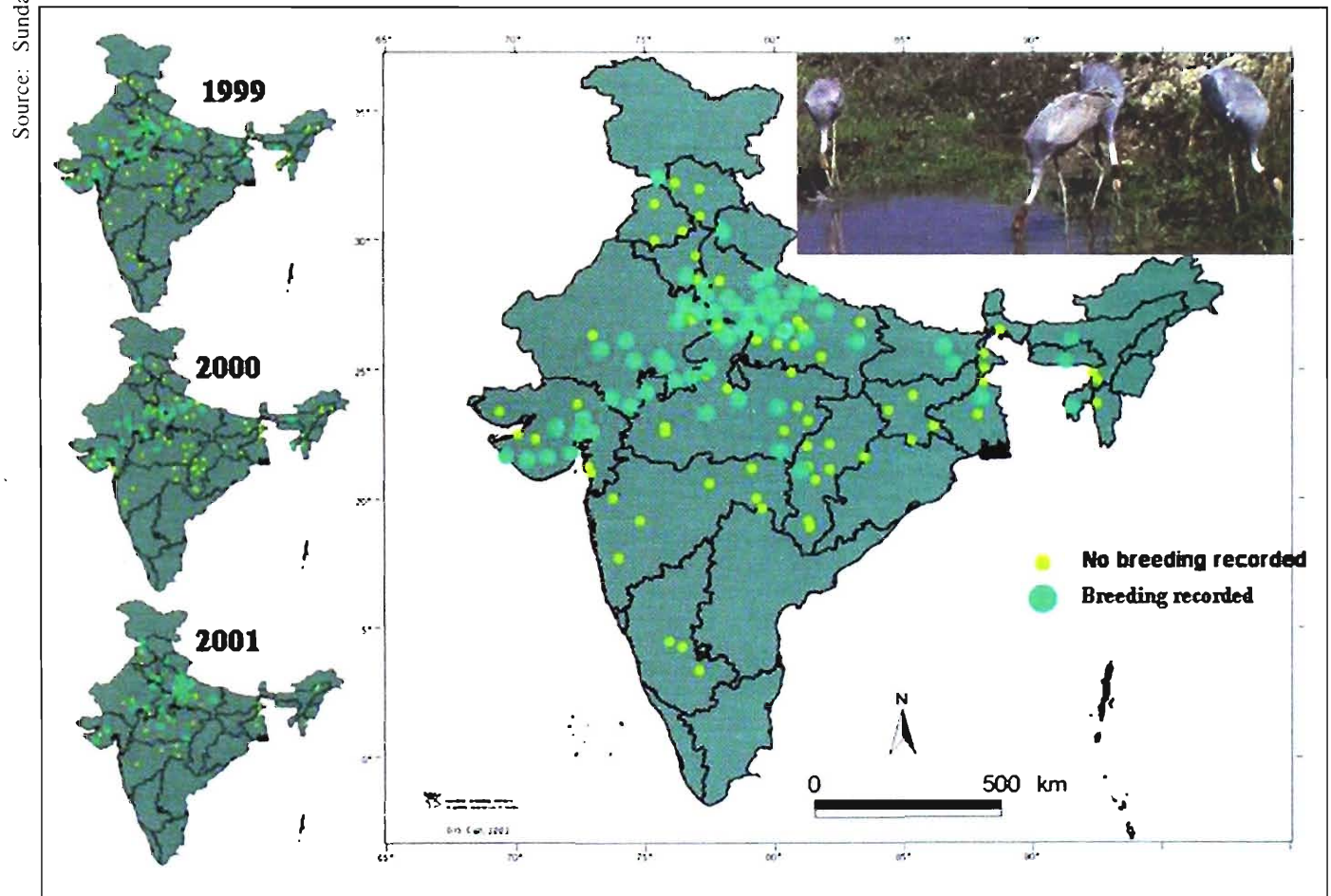
Photo: K. S. Gopi Sundar

Sarus Crane at nest

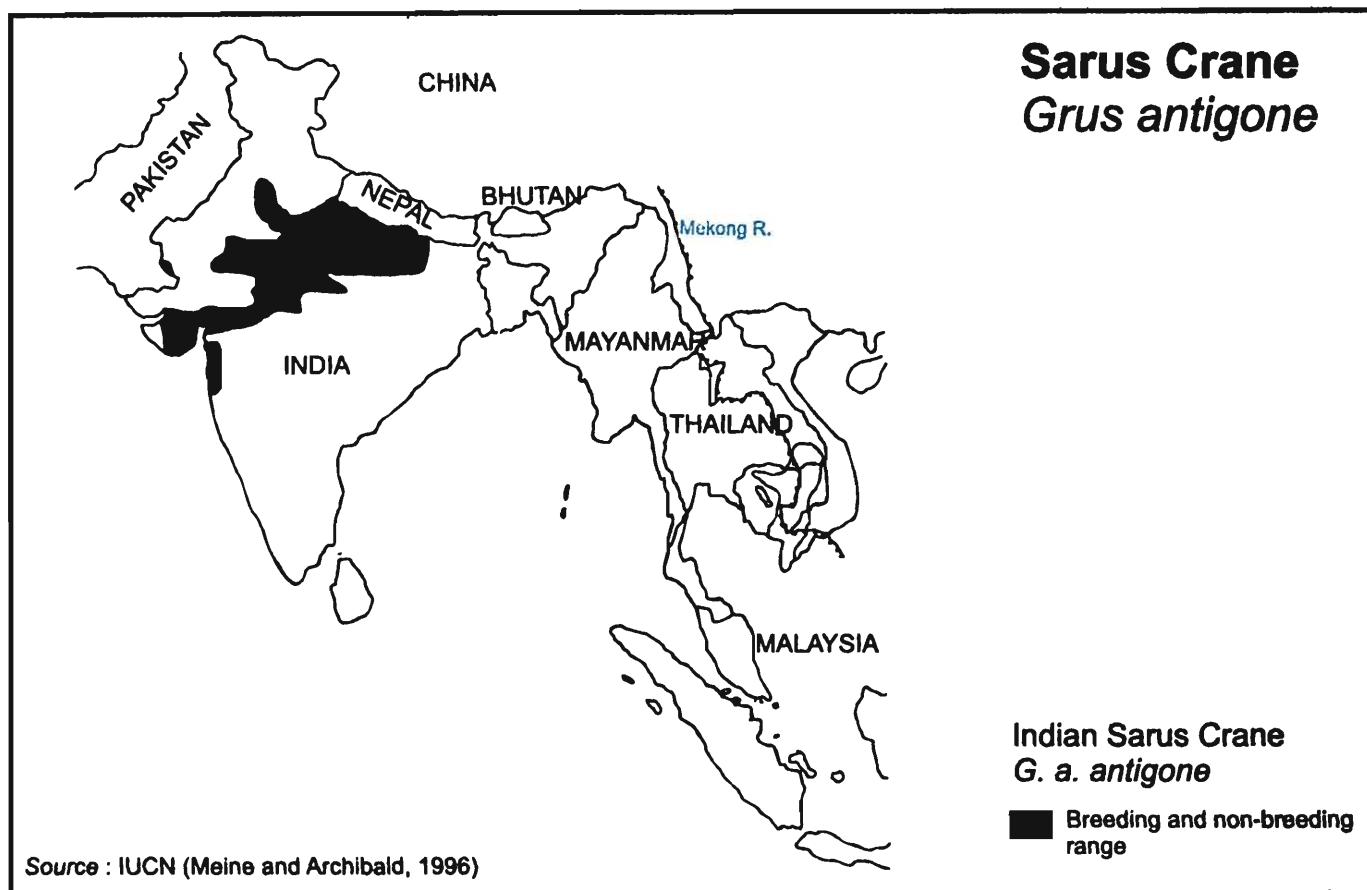
listed by participants was the spread of agriculture to the shores of wetlands (Choudhury *et al.*, 1999). Deaths due to collision/ electrocution with supply wires and power lines are known (Sundar and Choudhury, 2001). An attempt should be made to attach visual markers to overhead power cables in important areas for Sarus Cranes, or to lay cables underground (BirdLife Int., 2001). **Persecution:** It was once generally thought that local sentiments, religious or otherwise, kept this species safe from persecution in most parts of its range in India. However, traditional taboos against hunting or killing cranes are breaking down. Poaching does take place, while increasing levels of egg collection for food and medicinal purposes has been suggested as a cause of declining recruitment. In Uttar Pradesh, one of the most important states for the species, the cultural sentiment is now matched by one that considers it to be an agricultural pest (Sundar *et al.*, 2000). **Measures Taken:** Sarus Cranes are found scattered throughout private and village lands with only a small proportion of the population occurring in protected areas. The Uttar Pradesh forest department has decided to designate Saman Sanctuary as a special sanctuary for the Sarus Crane, and proposes to redirect its management accordingly. As protected areas play a relatively minor role in the conservation of this species, the management of agricultural land and the provision of artificial wetlands assume added significance. The construction of



Relative abundance of Sarus Cranes during the Sarus Crane Count

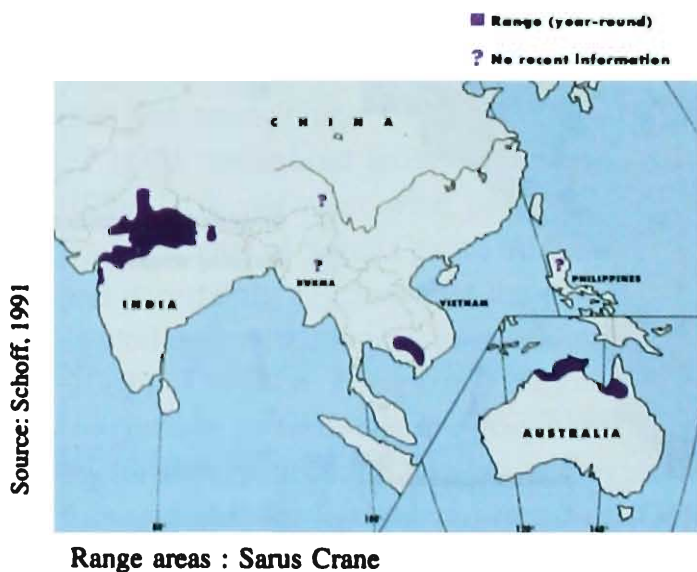


Sites with successful breeding pairs of Sarus Cranes recorded during the Sarus Crane Count



artificial water bodies (dams, reservoirs and percolation tanks) and seepage of irrigation canals (e.g. the Upper and Lower Ganga canals, Sharda Canal and their distributaries) has created numerous wetlands (e.g. Sheka jheel and Qasimpur Bamba in Aligarh district), which partly compensate for habitat losses. Aldrin, which has been implicated in cases of Sarus Crane poisoning, was added to the list of illegal pesticides in the India in January 1994 (Muralidharan, 1993).

Given the traditional association between the Sarus Crane and people, and in view of the fact that the principal habitat used by the species is rural agricultural land (Sundar and Choudhury, 2003), perhaps the most important step towards conserving the species involves education campaigns targeted at key regions throughout its range focused on highlighting its value, its endangerment and the role of people in its conservation. In India this type of activity should be focused towards areas where conflict with farmers is deemed a problem on the likes of the activity carried out recently in Kota, Rajasthan (Kaur and Choudhury, 2003). **Legislation:** The species is listed on Appendix II of CITES. It receives full legal protection in all range countries. Of the 10 Asian countries where it is found, eight are signatories to Ramsar (the exceptions are Laos and Myanmar). It was further suggested that the species be upgraded from CITES Appendix II to Appendix I (this normally requires concrete evidence of international trade as more than an incidental threat), and



Range areas : Sarus Crane

that countries yet to ratify the Ramsar Convention should do so. In India, the species should be moved from Schedule IV to Schedule I of the Wildlife Act (BirdLife Int. 2001). **Threshold number:** 90.

116(326). Demoiselle Crane. *Grus virgo* (Linnaeus, 1758); Sarus Crane-; 90-100 cm; **WMLCom H** (Plate 20.116)

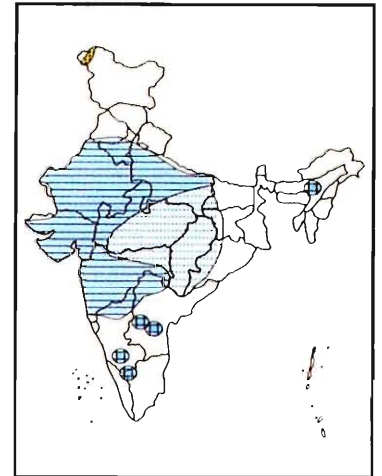
Photo: International Crane Foundation



Demoiselle Crane

Diagnostics: *Adult:* Sexes alike. A delicate grey crane of medium size with black head and neck, except for grey forecrown and nape; prominent white ear-tufts behind eyes; black feathers of lower neck long, pointed and falling over breast; brownish-grey sickle-shaped secondaries drooping over tail; red-tipped greenish bill; black legs and feet. *Juvenile:* Like adult, but with grey head and much shorter drooping secondaries. **Voice:** Loud *krook-krook*, but softer than that of the

Common Crane. **Habitat:** Large rivers with sandy beds, reservoirs, winter crop fields, flat open margins of jheels and tanks. **Habits:** Very highly gregarious species; flocks of thousands visit the subcontinent.



Feeds in early morning and late afternoon in winter arable crop fields, retires to sandbanks or edges of jheels at night. **Food:** Seeds of wheat, gram and paddy are favoured. **Status and Distribution:** Winter migrant, locally common in Gujarat, Rajasthan, Northern Karnataka, Eastern Uttar Pradesh, Orissa and



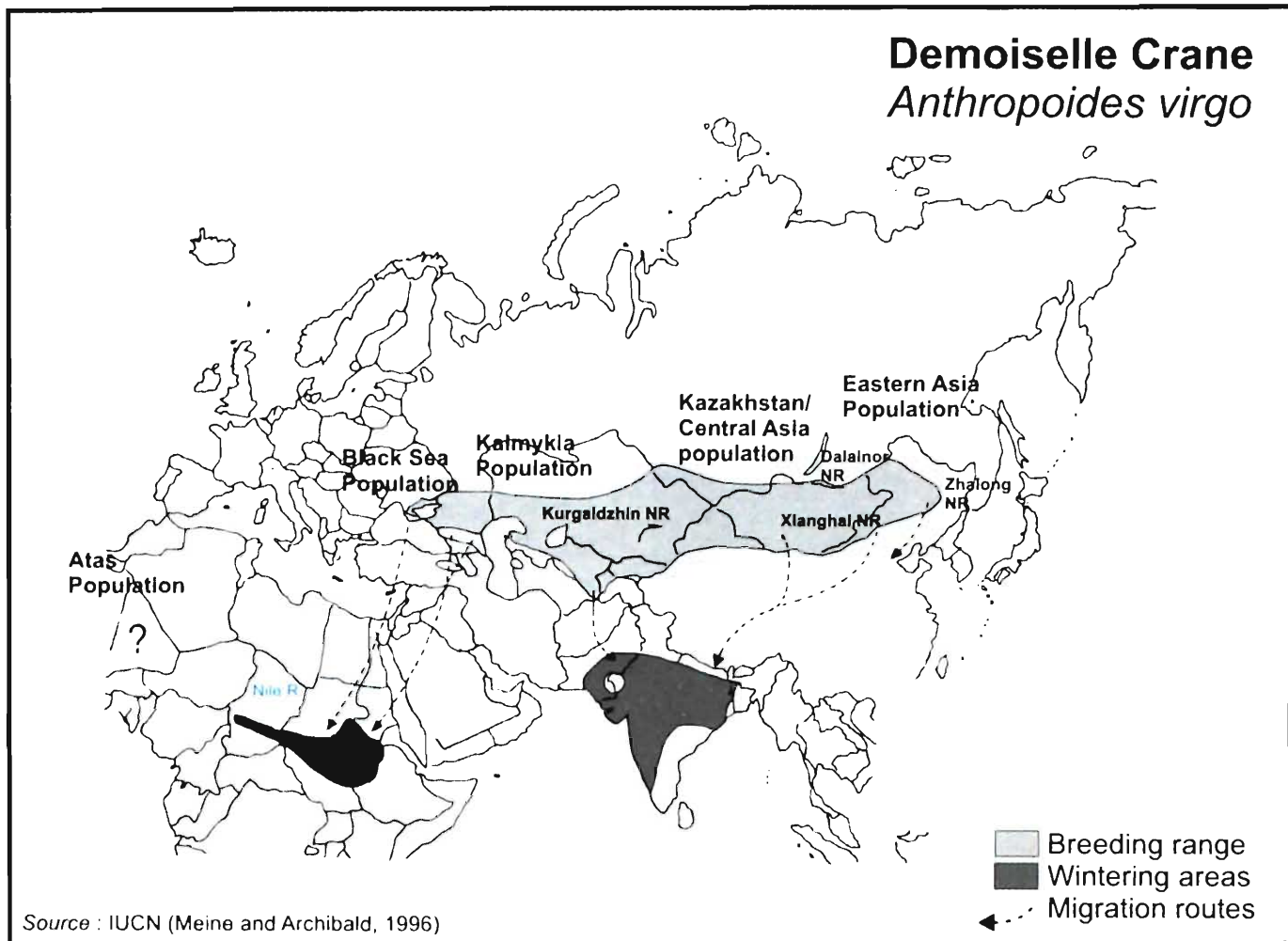
Major migration route: Demoiselle Crane

Source: Schoff, 1991

Photo: A. Basit



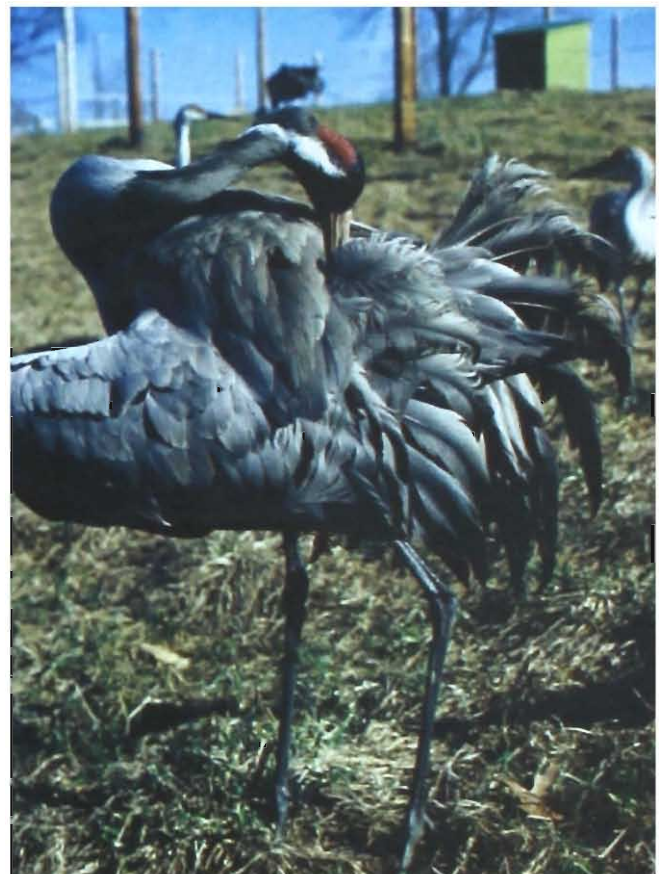
Demoiselle Crane



Andhra Pradesh; Pakistan; Nepal; Bhutan; Bangladesh. Breeds across W, Central Asia, winter in Indian sub-continent. **Threshold number: 1,000.**

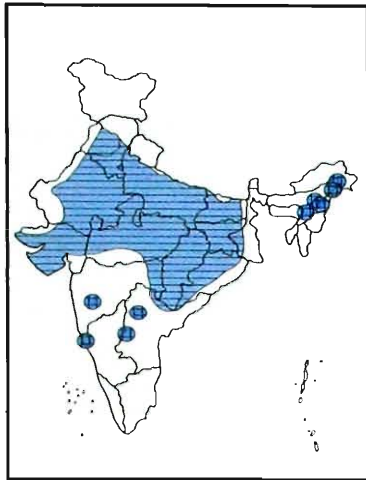
117(320). Common Crane. *Grus grus* Linnaeus, 1758; Goose \pm ; 110-120 cm; **WM/LCom H/C (Plate 20.117)**

Diagnostics: *Adult:* Sexes alike; a tall grey bird with black flight feathers, long neck, dull green bill, and black legs. Head and upper neck blackish with dull red naked patch across nape; a prominent broad white band runs from behind eye down on sides of upper neck; tail darker grey, concealed by a mass of long grey drooping tertiaries. *Juvenile:* Grey with buff-edged feathers, crown and neck covered by rusty feathers, tertiaries shorter. **Voice:** Echoing *kraarrh*. **Habitat:** Winter field crops, sandy riverbeds, marshes, reservoirs and



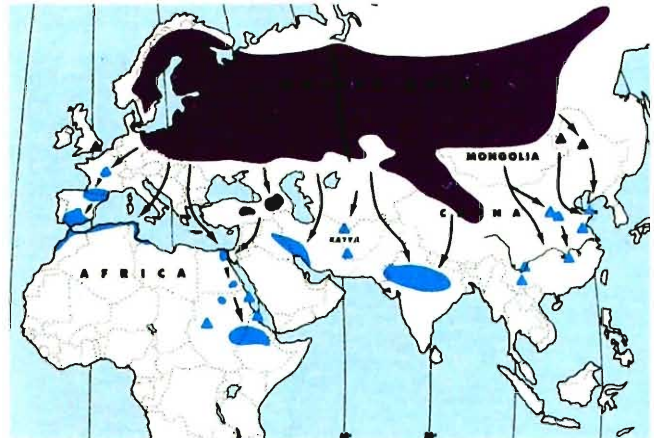
Common Crane

jheels. **Habits:** Highly gregarious, sometimes keeps in large flocks of hundreds massed together on open sandbanks of rivers during winters, often in company of Demoiselle Crane.



Fly in wide V-formation. Start arriving in NW India by August/September and return by end of March. **Food:** Mainly vegetarian, arable crops, shoots, tubers, seeds, also insects and reptiles. **Status and Distribution:** Winter migrant, earlier abundant in NW India, now generally occurs in Uttar Pradesh, Gujarat,

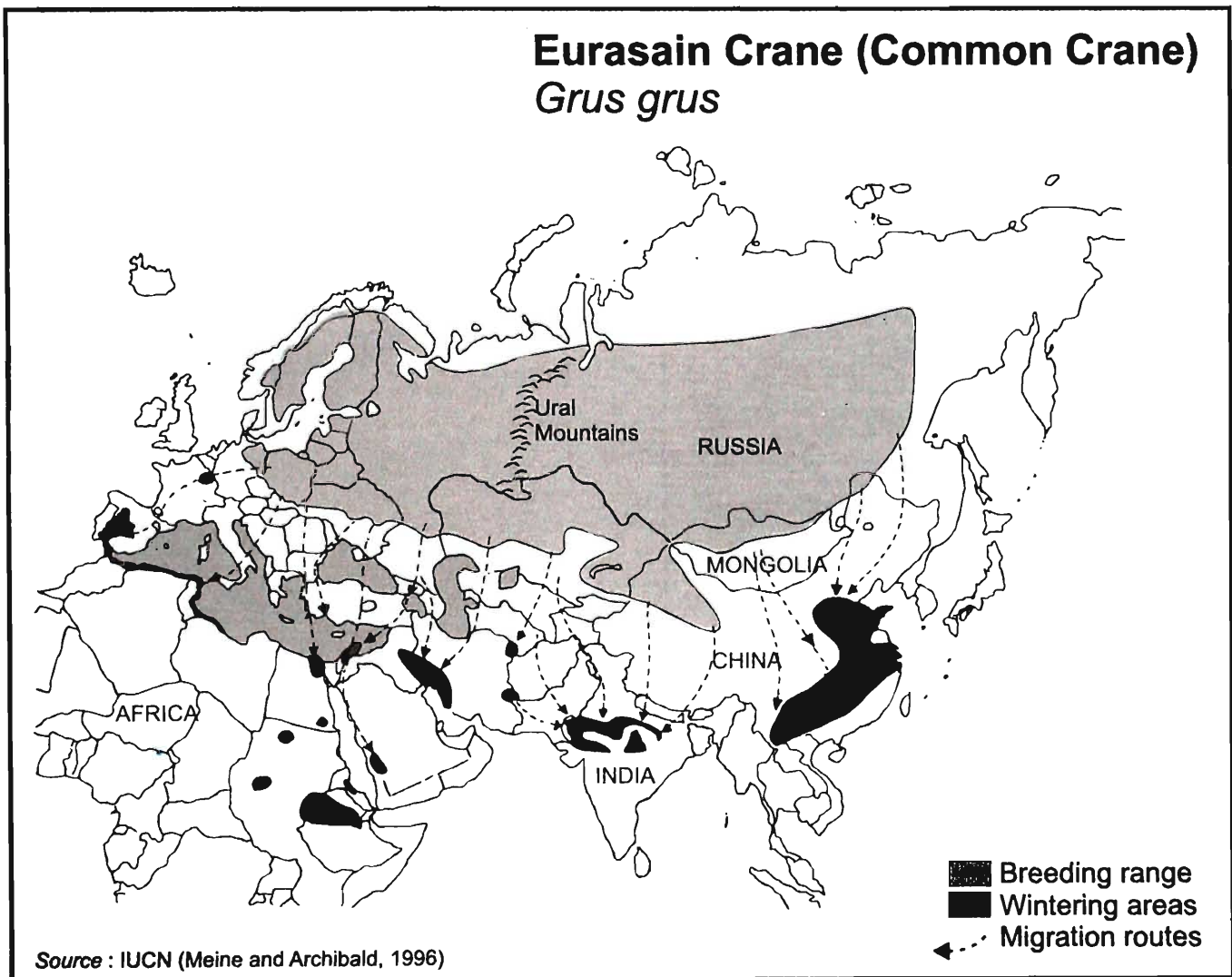
- Breeding range ▲ Localized (year-round)
- Winter range ↯ Major migration route
- ▲ Localized range



Source: Schoff, 1991

Major migration route: Common Crane

Madhya Pradesh; Pakistan; Nepal; Bhutan; Bangladesh. Breeds in W Siberia & Kazakhstan, winter in W & C India, E Iran, Afghanistan. **Threshold number:** 700.



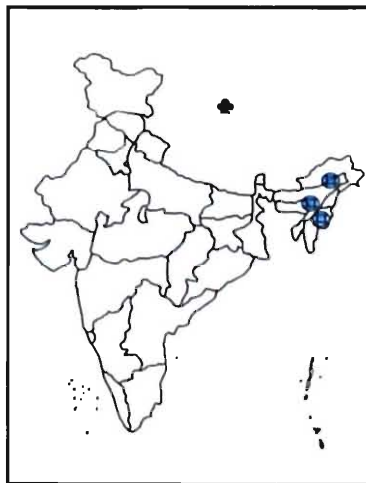
118(322). Hooded Crane. *Grus monacha*
 Temminck, 1835 Demoiselle Crane ±; 97 cm;
 GT/Vu WM/Va H (Plate 20.118)

Photo: Pete Morris/ Birdquest



Hooded Crane

Diagnostics: A dark slaty-gray crane with red fore crown; distinctive white head and about three-quarters of the neck (“hood”); black forehead and lores; bill greenish-yellow; iris orange-red; and legs blackish-brown. **Voice:** Loud *krurrk* or *kurr*. **Habitat:** On migration and in winter, Hooded Cranes utilise a wide variety of habitats in China, they tend to roost along the shores of rivers and shallow lakes, and to forage along the muddy edges of lakes and in nearby grasslands, grassy marshes, rice paddies and agricultural fields. **Habits:** Hunts in open land and marshes, keep in small during migration. **Food:** Chiefly grains. **Status and Distribution:** It was a very rare winter visitor to India in the nineteenth century, with records (by state) as follows: Assam lower Subansiri river, North



Hooded Crane

Source: International Crane Foundation

Cachar Hills district, one young bird collected in December 1899; Uttar Pradesh North Lakhimpur district, two flocks seen, of seven and eight birds, undated; Manipur between Booree Bazar and Bishenpur (Bishnoopoor), a “small flock”, March pre-1881, unspecified localities; six individuals shot, December 1897 to January 1898, but apparently regular in winter. Breeds in NE China and SE Russia, winter in China. **Remarks:** Recent estimates of the global population of Hooded Cranes have included: 9,400–9,600 birds; 9,230–9,300



Major migration route: Hooded Crane

Source: Schoff, 1991

birds, including 8,230–8,300 wintering in Japan and Korea and 1,000 in the Yangtze valley in China; and 9,150 birds, including c. 8,000 wintering at Izumi and c.50 at Yashiro and elsewhere in Japan, c.100 wintering in Korea, and 1,000 wintering in China. Although

Hooded Crane
Grus monachus
(*Grus monacha*)



little is known about historical changes in the distribution of this species, its numbers are known to have risen and fallen dramatically since the 1920s (or at least to have shifted between areas in such a way as to convey the impression of major population changes), and

at present its population is probably as large as at any point this century (BirdLife Int., 2001). **Remarks:** Only one definite record from North Cachar, Assam in 1899, also two sightings by Baker in N Lakhimpur district (Ali & Ripley, 1978). **Threshold number:** 10.

119(321). Black-necked Crane. *Grus nigricollis* Przevalski, 1876; Sarus Crane \pm ; 129 cm; **GT/Vu BRS (05) R/WM/VRa H** (Plate 20.119)

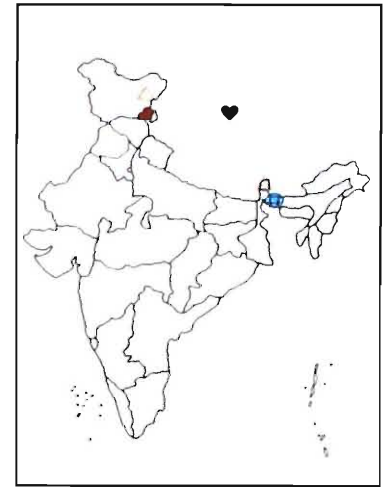
Photo: Otto Pfister



Black-necked Crane

Diagnostics: Sexes alike, female slightly smaller. Like Common Crane, a tall grey bird with black wing tips, horny-green bill and black legs and feet; head and neck black; entire crown and lores naked and dull red; a small white patch below and behind the eyes; tail black, concealed by drooping plumes. **Voice:** Loud whooping *kr-kra-kruw*. **Habitat:** Only alpine crane in the world, spends summer in high-altitude lakes in Trans-Himalayan Ladakh, winter in wet fallows and marshes in Bhutan. Nests are built on small pre-existing grassy islands or in the water, and consist of mud, grass, sedges and other aquatic plants. **Habits:** The species

appears to be moderately tolerant of people, regularly feeding near small pastoral settlements, fishermen and domestic livestock. Very sedentary in Apa Tani valley, Arunachal Pradesh where every winter a small flock arrives by mid-November and departs by end of February. **Food:** Seeds and grains. **Status and Distribution:** *Globally threatened/Vulnerable*. The breeding range of the Black-necked Crane includes much of the Qinghai-Tibetan Plateau in south-central China, with small breeding populations in two adjacent parts of India. The main wintering grounds are in China, on the southern and eastern parts of the Qinghai-Tibetan Plateau and on the Yunnan-Guizhou



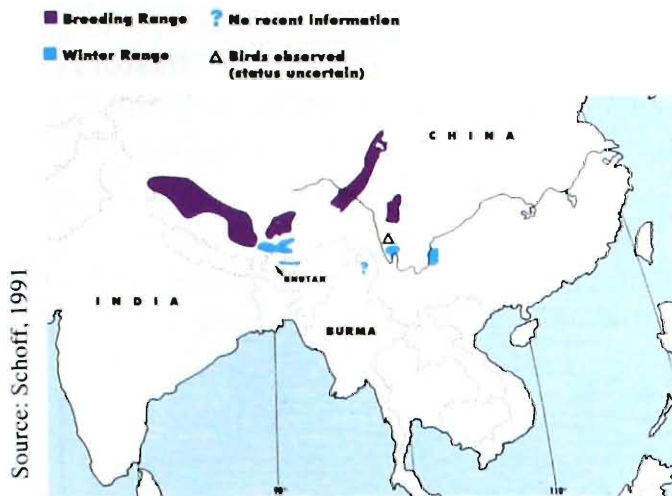
Plateau, and in Bhutan. Very small numbers have wintered in Arunachal Pradesh in India, and in the lowlands of northern Vietnam. **Remarks:** In India breeds in Ladakh between 4000-5000m from May to July in Chushul, Lalpari, Hanle and Lam Tso marshes (maximum population estimate of 38 individuals in 1997, including 12 breeding pairs), recently bred in

Sikkim, where small numbers of wintering birds visit Sangti valley; however, only three individuals were reported in 1996 and it appears that this population might be on the verge of extinction. It is a winter migrant to Bhutan (population has declined from c.500 individuals in 1985/1986 to c.357 in 1995/1996) and Arunachal Pradesh (20-40). After returning to Ladakh in spring, they remain in a small flock that spends around ten

Photo: International Crane Foundation



Black-necked Crane



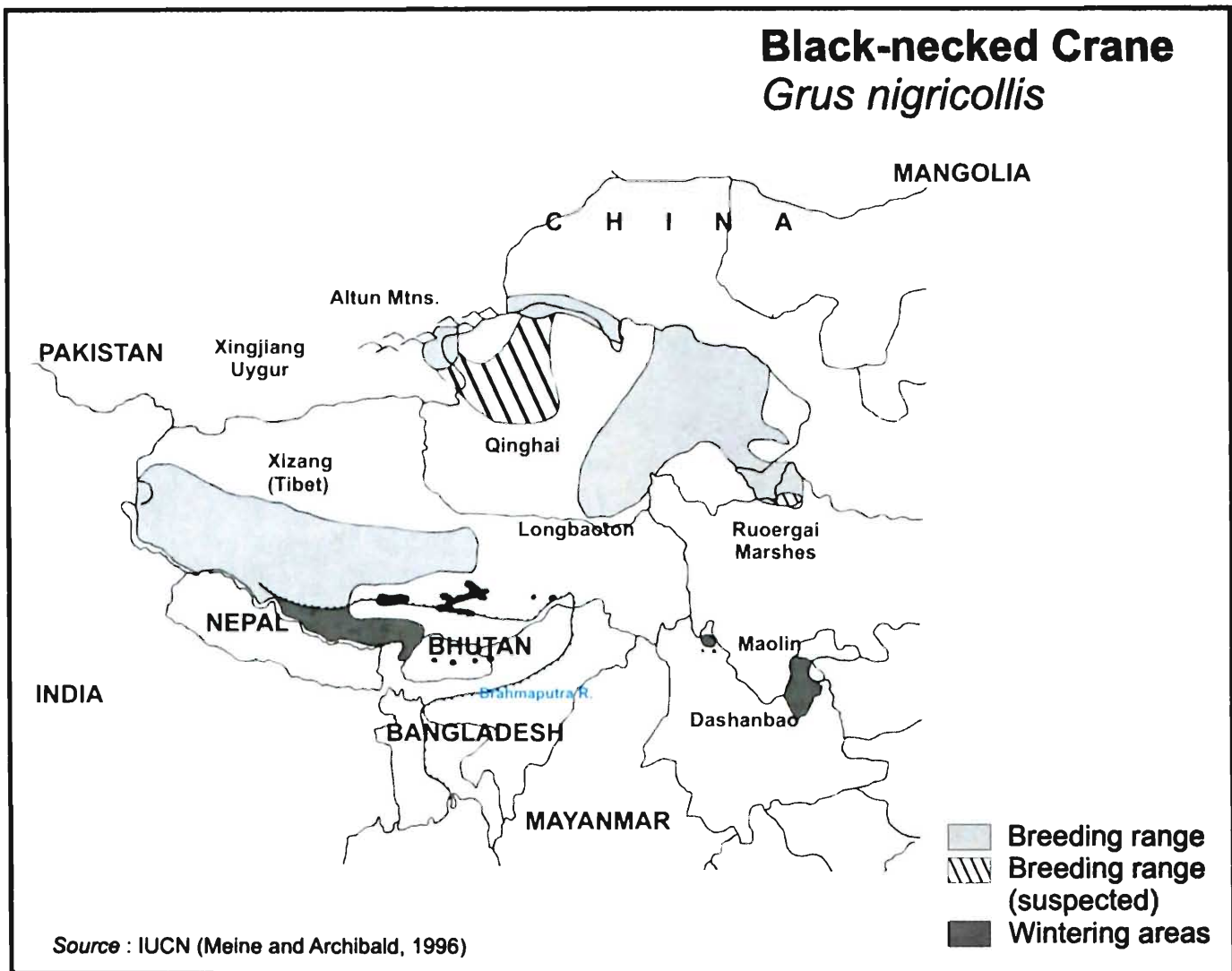
Major migration route: Black-necked Crane

days at a staging site such as Hanle or Chusul, until it gradually disintegrates as separate pairs travel to their breeding sites. The breeding population in Ladakh was reported to be four to five pairs in early twentieth century. However, more comprehensive and co-ordinated counts in the 1980s and 1990s have located larger numbers, with a maximum population estimate of 38 individuals in 1997, including 12 breeding pairs. Of 14 well-defined wetland areas in Ladakh, four appear to have been recently abandoned by the cranes while only six are regularly used as breeding sites, suggesting that a small decline might be taking place. However, it is believed that a recent increase might have occurred after poaching by military personnel was controlled in the mid-1980s. Small numbers of wintering birds were historically found at two localities in Arunachal Pradesh, namely Apa Tani and Sangti valleys. The small wintering population (20–40 individuals) in the Apa Tani valley of Arunachal Pradesh is thought to have disappeared by 1976 on account of new hunting practices by Apa Tanis who had recently acquired firearms. Suggestions that further populations were likely to exist in other suitable valleys in Arunachal Pradesh have not been substantiated. Indeed it appears that Apa Tani is topographically anomalous, and the species is unlikely to be found in any

other valleys in the state. In Sikkim, a population of less than ten birds has been visiting the Lhonak valley “as far back as ...Tibetan graziers can remember”. When the Indian Army occupied the area in the 1980s, crane numbers dropped to under five individuals and the frequency of their arrival decreased. Breeding apparently took place on several occasions during the 1990s, although only three individuals were reported in 1996 and it appears that this population might be on the verge of extinction. Surveys in the 1990s concluded that small numbers of wintering Black-necked Cranes also visit Lhonak valley in Sikkim. Curiously, a pair was observed in the lowlands of West Bengal in 1992, and local people reported them to be regular visitors (BirdLife Int., 2001). **Threats:** Black-necked Cranes probably disappeared from their wintering ground in Arunachal Pradesh because of an increase in human settlements and the construction of new roads and, thus should be a warning over what is happening in Ladakh. In the breeding areas of Ladakh, the high-altitude vegetation is slow growing and sensitive to disturbance, and direct and indirect human interference is having an increasingly detrimental impact. The constant diminution of undisturbed foraging and breeding areas is exerting such pressure on the small Indian population that it is unlikely to survive without assistance in



Sedge meadow in Changthang, Tsokar Lake, Ladakh—a breeding site for Black-necked Crane



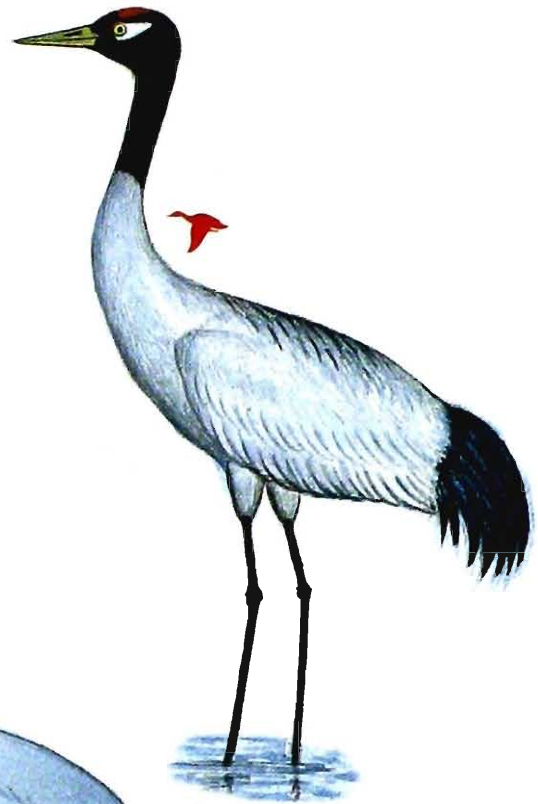
the form of legal and habitat protection. Roads and building on or near the Hanle plain and Chusul are causing disturbance and opening up previously remote areas; houses are being built and areas claimed for agriculture, directly destroying prime habitat for the cranes, while telephone wires have been strung across parts of the plain adjacent to the Lalpari nest site, posing a hazard to flying cranes (Pfister, 1998). In the past few years' new pressures on the Hanle marshes have emerged: (1) various parts of the marshes are being fenced for large plantations of willows; (2) the influx of Tibetan refugees has continued, their camps "growing bigger and bigger"; (3) the area is heavily disturbed by regular practice firing by the army; and (4) the number of feral/pet dogs is increasing owing to the presence of the army. **Measures Taken:** *International agreements and co-operation:*

Conservation action relevant to the species has expanded dramatically since the 1970s. Research conducted in China, India and Bhutan since the mid-1980s has involved co-operative efforts among conservationists and scientists from these three countries and the USA. The Black-necked Crane is listed on Appendix I of the CMS (Bonn Convention). It is also listed on Appendix I of CITES. The species is legally protected and its hunting is prohibited in India. *Protected areas and habitat management:* The Ladakh breeding population at Chushul, Hanle, Tso Moriri and Tso-Kar occurs within the Changthang Cold Desert Wildlife Sanctuary, an area also described as the "Changthang Wilderness Area," the proposed "High Altitude Cold Desert National Park" and the Changthang Wildlife Sanctuary. Owing to its location along the Tibetan border, and the partial opening to

Plate 20



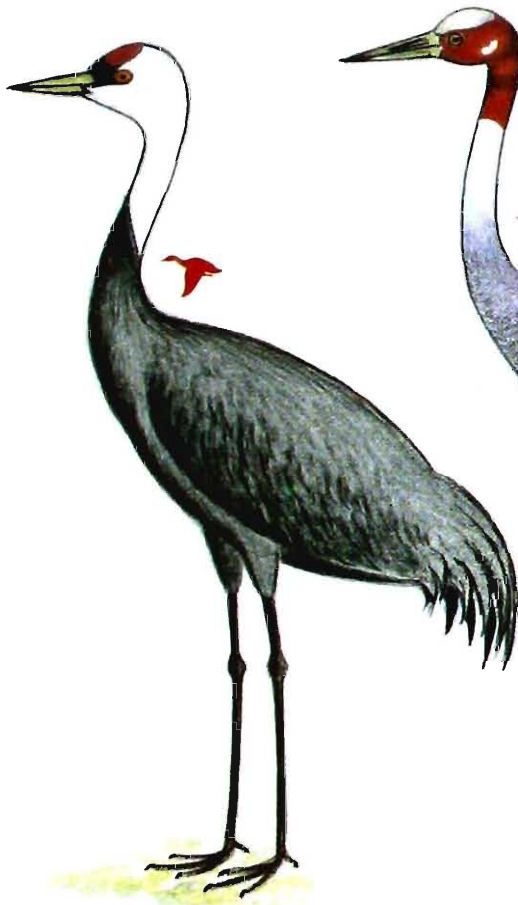
117. Common Crane



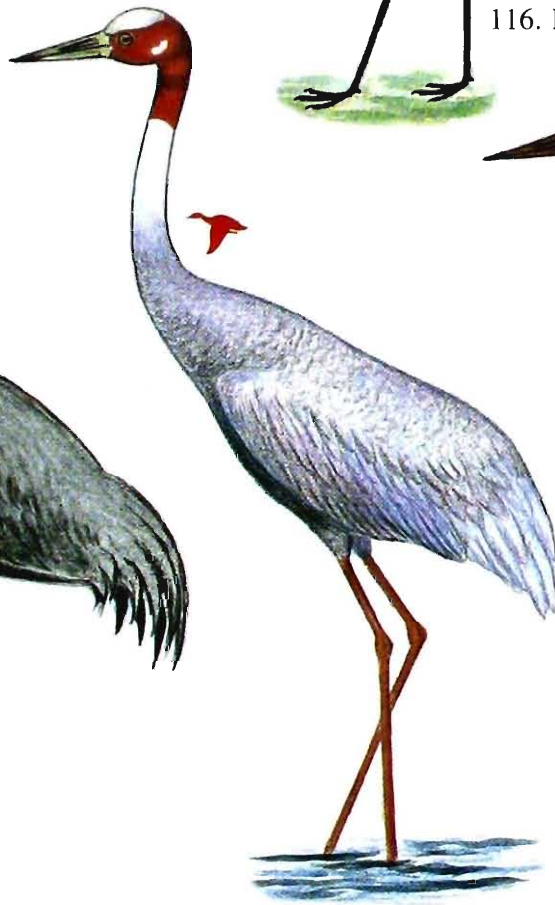
119. Black-necked Crane



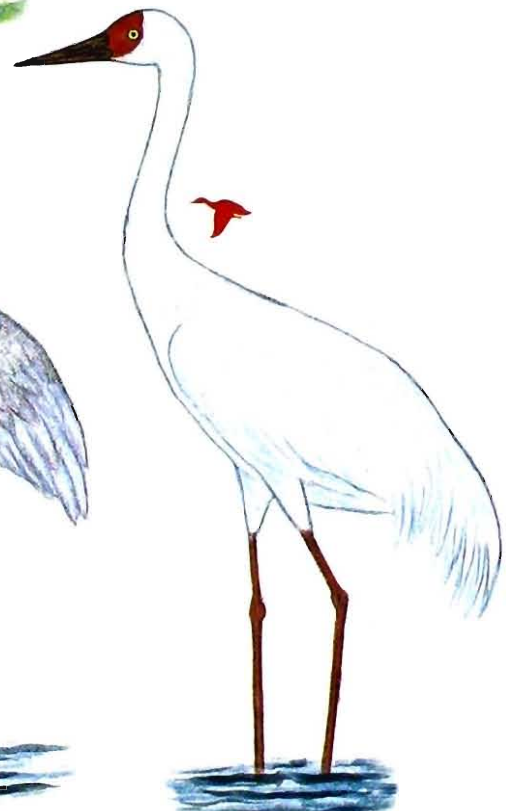
116. Demoiselle Crane



118. Hooded Crane



115. Sarus Crane



114. Siberian Crane

tourism, management at the site is complex. Army officials in Ladakh have issued instructions to all units near the breeding areas to mark and protect them, and patrols have been organised to prevent their violation. In Arunachal Pradesh, the crane wintering grounds at Sangti valley will not become a wildlife sanctuary (as suggested in Meine and Archibald, 1996) because the local farming practices provide food for the cranes, but the area will function as an unofficial sanctuary with commitments by (a) local people not to hunt the cranes and to plant trees only on slopes away from crane habitat, (b) the army to provide grain in cases of shortage, (c) teachers to promote awareness of the cranes among local children, and (d) a local committee to monitor the situation. **Measures Proposed:** *Legislation:* The Black-necked Crane in Jammu and Kashmir state (which includes Ladakh) should be moved from Schedule IV to Schedule I to confer maximum legal protection on the species. Breeding areas in Ladakh, including Chusul, Tso-Kar, Startsapuk-Tso, Hanle and the Tso Morari, should be designated waterbird sanctuaries. The Tso-Kar plain in Ladakh, including Startsapuk-Tso, should be evaluated for Ramsar site status. *Captive breeding and re-introduction:* Proposals for a crane breeding centre in Leh, Ladakh, using second eggs from the local breeding population were never followed up, and doubts linger regarding the wisdom of such a scheme because of the difficult access to the site and the lack of infrastructural and institutional capacity. Indeed, all the evidence points to better management of the wild population as the fundamental means of preventing the decline in this species, and captive breeding should at this stage merely involve the sensible propagation of existing birds in order to maintain an emergency reserve stock (BirdLife Int., 2001). **Threshold number:** 60.

Rails & Coots (Family Rallidae)

World: 146 species; Asia: 34; India: 17

Small to medium-size crepuscular or diurnal birds, with plump, laterally compressed body; short rounded wings; and short pointed tails. Plumage black or in soft shades of grey, brown, blue or green; bill long and curved in Rails, short and stout in Moorhens and Coot; tibiae partly bare. Legs long, toes very long in Rails and lobed in Coot. Walk, run and swim well but fly very poorly with legs dangling, although some species are long-distance migrants. Sexes similar in most species; young nidifugous.

120(333). Andaman Crake. *Rallina canningi* (Blyth, 1863) Grey Partridge +; 34 cm; **E DD RRS (2) R/Ra C** (Plate 21.120)



Photo: N. Ezhilarasi

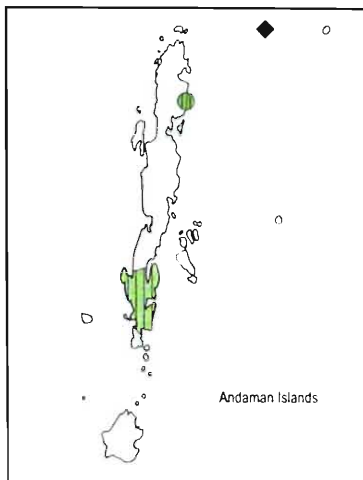
Andaman Crake

Diagnostics: *Adult:* Sexes alike; larger than Slaty-legged Crake. Bill pale green; upperparts and breast deep glossy ruddy chestnut; belly dark-grey with chestnut tinge and bold black and white barring; legs and feet olive green. *Juvenile:* With duller chestnut upperparts and breast; dark greyish belly with chestnut tinge and narrow white barring. **Voice:** Deep croak, *kroop! kroop!*; and sharp *chick, chick*. **Habitat:** The Andaman Crake inhabits forest edges or thick secondary growth, usually where the ground is swampy, near pools or streams, in grass bordering creeks, or in mangroves near the coast, but it skulks in reeds and low vegetation. **Habits:** Skulker,

prefers reeds and herbs, carries itself on its legs. Breeding season falls between June and August. The nest is a collection of grass, dead leaves and rushes placed on the ground in marshy areas or near streams in dense forest. **Food:** The diet comprises beetles, grasshoppers, worms, small snails and caterpillars, small freshwater fish and shrimps have also been mentioned. **Status and Distribution:** *Endemic/Data deficient/*

Restricted Range Species. Resident, rare and endemic to Andaman Islands (Middle and South), absent from the Nicobar. Earlier was common, very few recent records.

Remarks: The Andaman Crake is



a rarely encountered endemic bird of the Andaman Islands. Recently, it has been reported from Mount Harriet National Park. **Threats:** *Habitat loss:* Many of the Andaman endemics are threatened by their naturally limited distribution and scarcity, coupled with the degradation and destruction of available habitat by people. The impact of development and natural resource exploitation is increasing in most relevant habitats on the islands. In the area of South Andaman where this species was seen in 2000, the forest habitat was under pressure from logging and settlement, and deforestation was already widespread. There might also be a problem with introduced predators, such as dogs and cats, which possibly hunt this species and have brought many island rallids to the brink of extinction or beyond. **Measures Taken:** *Protected areas:* More than 16% of the total area (1,053.6 km²) of the Andaman Islands has been declared protected, i.e. sanctuaries, national parks and marine national parks. **Measures Proposed:** *Improved protection:* More

stringent measures are needed to secure the future of the endemic birds throughout the islands. No introductions of terrestrial mammalian predators on to the islands should be approved of (BirdLife Int., 2001). **Threshold number:** 250.

121(331). Red-legged Crake. *Rallina fasciata* (Raffles, 1822) Partridge -; 23-24 cm; **R/Ra C/H** (Plate 21.121)



Red-legged Crake

Photo: Paul Huang

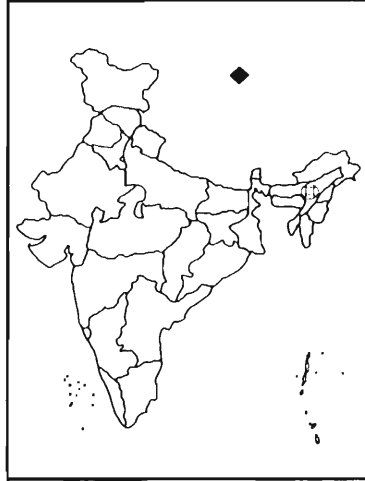


Red-legged Crake

Photo: Christian Artuso

Diagnostics: *Adult:* Sexes alike. Bill blackish; head, neck and breast deep chestnut; iris blood-red; upperparts brownish chestnut; wing-coverts blackish with white bars; chin and throat paler; underparts and under tail-coverts with black and white bars usually of same width; legs and feet coral-red. *Juvenile:* With brown head, neck and breast; less distinct buff or white barring on wing-coverts; and whitish underparts obscurely barred with brown. **Habitat:** Marshy and swampy areas; dense undergrowth on sides of streams, ponds and paddy fields. **Habits:** Occurs singly or in pairs in swampy reed beds,

ventures out to feed during early morning or dusk in cloudy and drizzly weather. **Voice:** Long descending vibration and loud series of nasal pek calls given at roughly half-second intervals. **Food:** Small freshwater snails, slugs, worms and insects; also vegetable matter, e.g. shoots and seeds of grasses and marsh plants; and occasionally paddy. **Status and Distribution:** Resident, recorded only from Assam in India, no recent records; Myanmar; breeds in S & SE Asia.



122(332). Slaty-legged Crake. *Rallina eurizonoides* (Lafresnaye, 1845); Quail/Partridge; 25 cm; R/LM/UnCom O (Plate 21.122)

Photo: Michelle and Peter Wong



Slaty-legged Crake

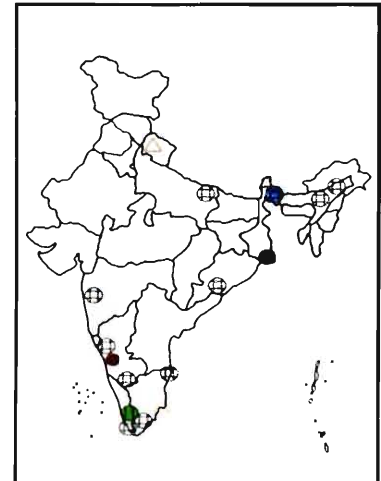
Diagnostics: *Adult:* Sexes alike. Head, neck and breast chestnut; remaining upper parts rufous brown; bill green, terminal half of upper mandible and tip of lower dark brown; chin and throat white; underparts with striking black and white bands; legs slaty. *Juvenile:* Uniformly olive-brown above; more ashy-brown on sides of head and neck; a few white and black bars on scapulars and wing-coverts. **Voice:** quiet krrrrr; nasal kak; kek-



Photo: Jijo Mathew

Slaty-legged Crake

kek....kraa-kraa **Habitat:** Occurs in a variety of forest habitats from plains up to 1600 m, marshes. **Habits:** Shy and wary, hides in thick cover, partly nocturnal, when flushed flies into trees, breeding from June to September, nesting in bamboo clumps and on masses of tangled creepers up to a metre or so above ground. **Food:** Omnivorous, marsh plant shoots, seeds, molluscs and worms.



Status and Distribution: Resident, local migrant, uncommon but widespread in well-wooded and well-watered tracts throughout India up to 1600 m in Himalaya; Nepal; Sri Lanka; Pakistan; Myanmar. Breeds in Pakistan & India E to Assam, winter in Pakistan, India, Sri Lanka.

123(329-330). Blue-breasted Rail. *Gallirallus striatus* Linnaeus, 1766; Slaty-breasted Rail (I); Grey Partridge-; 27cm; R/LM/UnCom O (Plate 21.123)

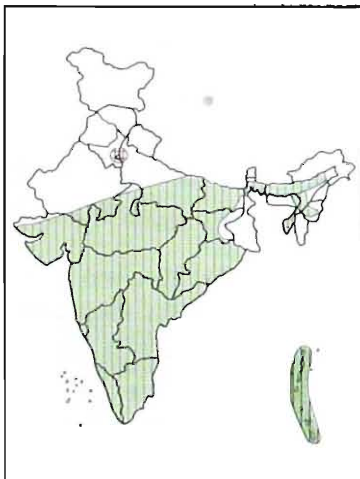
Diagnostics: *Male:* Crown to hind neck chestnut; upper parts dark brown with narrow white bars broken into spots on lower back and primaries; chin and throat white; sides of head, foreneck and breast ashy-blue;



Photo: Alistair Benn

Blue-breasted Rail

abdomen, flanks and under tail-coverts dark brown with conspicuous white bars; bill and eyes red; legs olive-grey. *Female*: Duller above and whitish on belly. *Juvenile*: Crown and neck rufous-brown streaked with dark brown; feathers of back streaked with dark brown, the white bars and spots absent. **Voice**: Generally silent. **Habitat**: Reedy swamps and mangroves, margins of village tanks, inundated paddy fields. **Habits**: Usually solitary or in pairs, more common and frequent than known, skulkers, flight that of a typical rail, slow and laboured flapping, with the legs dangling behind. Occasionally, can swim and dive. Breeds from mid-June to September, all over its range, nests usually placed on the edge of marshes. **Food**: Omnivorous, marsh plant shoots, seeds,



molluscs, crustaceans, worms and insects. **Status and Distribution**: Resident, nomadic and widespread from plains up to 1300 m in India; Andaman & Nicobar Islands; Nepal; Bangladesh; Sri Lanka; Extends to SC China, Thailand. It also winters in part of its Breeding range.

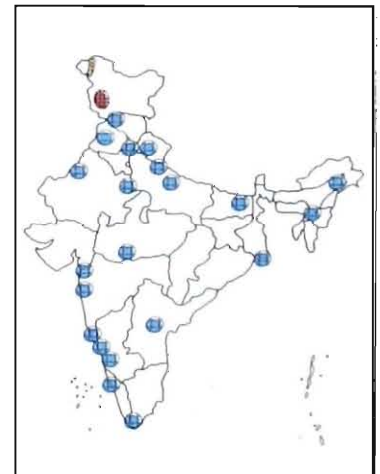
124(327-328). **Water Rail**. *Rallus aquaticus* Linnaeus, 1758: Grey Partridge -: 23-28 cm; **R/WM/LCom C/H** (Plate 21.124)



Photo: Mike Richard (RSPB)

Water Rail

Diagnostics: *Adult*: Sexes alike, medium-sized bird with slender body; comparatively longer, fleshy-brown legs and long orange-red bill. Above, greyish olive-brown streaked with black. Below, chin and throat white; sides of head, neck and breast pale slaty-grey; flanks with black and white bars. *Juvenile*: Has distinct white bars on wing-coverts, reddish-edged feathers below. **Voice**: Squealing *queeek...*, *krik*. **Habitat**: Occurs in reedy marshes, jheels, inundated sugar and paddy fields, and mangroves. **Habits**: Normally occurs singly or in pairs in swampy reed beds, ventures out to feed during early morning or dusk in cloudy and drizzly weather. Breeds from late May to early August in Kashmir valley and nests well



concealed in swamps a few centimetres above water. **Food:** Chiefly carnivorous, comprising snails, slugs, insects, but also marsh plants. **Status and Distribution:** Common in north-western and west-central India; straggles south up to Madhya Pradesh, breeds in Kashmir up to 1500 m; Pakistan; Nepal; Bangladesh; Sri Lanka. Breeds in W and C Asia, winter in NW & NE India and E China.

125(334). Corn Crake. *Crex crex* (Linnaeus, 1758); Grey Partridge -; 25-30 cm; GT/Vu (marginal to region) WM Va (Plate 21.125)

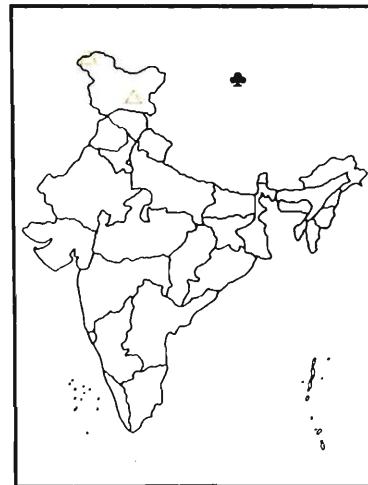


Photo: Andy Hay (RSPB)

Corn Crake

Diagnostics: Sexes alike. A quail-like Crake with grey-blue supercilium; yellowish-buff or yellowish-ashy upperparts, feathers boldly streaked dark brown; whitish chin and throat; pale ashy-grey breast; broadly barred reddish-brown flanks and under tail-coverts. **Voice:** Loud rasping *arp-arp* or *crake-crake*. **Habitat:** It breeds in open or semi-open habitats, mainly meadows with tall grass, particularly those managed for hay; in the wintering grounds, dry grassland and savanna are preferred. **Habits:** Crepuscular. **Food:** Mainly carnivorous (insects, snails and

worms), also seeds and other vegetable matter. **Status and Distribution:** *Globally threatened/Vulnerable, Marginal to the region*, winter migrant, vagrant in India, Pakistan and Sri Lanka. Breeds in W and NW Europe to NW China and C Siberia, winter chiefly in N and E Africa. **Remarks:** There has been a



steep decline in its population globally, and about 50% of the population has been lost in the last twenty years or so owing to privatisation, potential changes in agricultural practices in Russia and eastern Europe at breeding grounds, in addition to mass trapping of the species on migration. In Egypt 4600 birds were caught during the autumn of 1991 (Collar *et al.*, 1994). **Measures Taken:** Conservation measures have been taken in 14 European range states. National action plans have been prepared in six and appropriate habitat management has been researched. A Corn Crake Conservation Team was established in 1998 and a European Action Plan was published in 2000 (BirdLife Int., 2001). **Remarks:** Only one record (1870s) within our limits from J&K (Ali & Ripley, 1978).

126(342). Brown Crake. *Amaurornis akool* (Sykes, 1832); Grey Partridge -; 28 cm; R/LM/UnCom C/H (Plate 21.126)

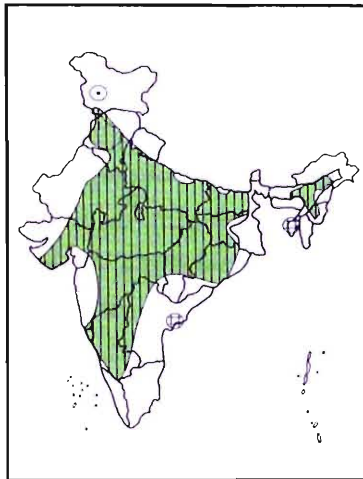
Diagnostics: *Adult:* Sexes alike, female slightly smaller; upperparts dark olive-brown; indistinct supercilia; sides of head and neck ashy-grey; chin and throat white; breast and upper abdomen ashy-grey; remaining underparts and flanks brown; legs and feet fleshy brown. **Voice:** Little known. **Habitat:** Prefers swampy reedy beds, water bodies with emergent vegetation, irrigation channels. **Habits:** Shy and secretive, crepuscular,

Photo: Gill Cardy

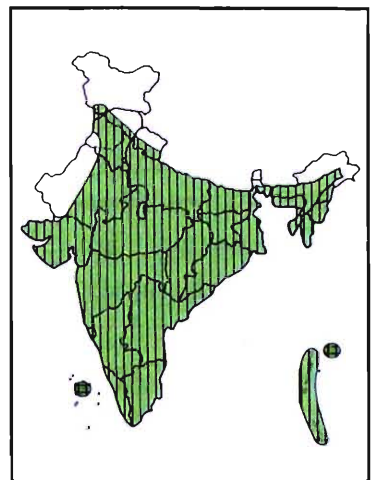


Brown Crake

emerges cautiously to feed at edges in early morning and evening; breeds from May to August; nest near or in marshes. **Food:** Chiefly insectivorous (aquatic insects, larvae, molluscs, worms), also marsh plants. **Status and Distribution:** A resident species though it moves around locally; uncommon in north, west and southern India up to 800 m; Bangladesh; W Myanmar.



Diagnostics: Adult: Sexes alike. A familiar dark slaty-grey and silky-white rail with greenish-yellow bill, base of upper mandible red; forehead, supercilia and sides of head pure white; upperparts dark slaty-grey; under parts silky-white, except rufous vent and under tail-coverts; side of breast and flanks slaty-grey; legs and feet yellowish-green. **Juvenile:** More olive-brown above with white facial mask obscured by slaty-tipped feathers. **Voice:** Silent except during breeding season in monsoon, call *krr-kwaak-kwaak*. **Habitat:** Occurs in reedy marshes, edges of submersed



fields, monsoon ponds, roadside ditches, village tanks, and reservoirs. **Habits:** Most common rail, less shy and secretive, often seen in villages and parks within the city limits, often feeds on dry land, breeds from June-July to October, and nests on the ground or thick bushes at water edges. **Food:** Almost omnivorous, including insects, molluscs, worms and plant shoots and seeds. **Status and Distribution:** Resident almost throughout India up to 1500 m.; Andaman & Nicobar Island; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives; extend upto E China and SE Asia, Malaysia and Phillipines.

127(343-345). White-breasted Waterhen. *Amaurornis phoenicurus* (Pennant, 1769); Grey Partridge ±; 32 cm; R/Com O (Plate 21.127)

Photo: Alister Benn



White-breasted Waterhen

128(341). Elwes's Crake. *Porzana bicolor* (Walden, 1872); Black-tailed Crake (I); Grey Quail ±; 22-25 cm; BRS (08) R/Ra C (Plate 21.128)

Diagnostics: Adult: Sexes alike. Bill bluish-green; head, neck and underparts sooty-grey; iris blood red; upperparts rufous-brown; tail black; legs and feet brick red. **Juvenile:** Like adult but with brown iris. **Voice:** Harsh rasping notes and prolonged trill. **Habitat:** In and around paddy-fields, pools, marshy areas near

Photo: K. Chaiyan



Elwes's Crake

forest and dense undergrowth.

Habits: Skulker, very little known about its habits; breeds from May to August in Khasi Hills; nests on wet ground in forest undergrowth. **Food:** Insectivorous.

Status and Distribution: Resident in Eastern Himalaya, from foothills to 3600 m, rare, other than Khasi hills where common; Bhutan; Myanmar; extends to SC China and NW Vietnam.

129(335, 336). Little Crake. *Porzana parva* (Scopoli, 1769); Grey Quail ±; 20-23 cm; **WM/Ra C** (Plate 21.129)

Diagnostics: Sexually dimorphic. *Male:* sides of head, neck and supercilium dark ashy-grey; crown and nape dark brown; remaining upperparts olive-brown; upper back, scapulars and innermost secondaries broadly streaked with black; chin, throat and rest of underparts dark ashy-grey barred with white posteriorly. *Female:* has pale grey head and underparts browner than male. **Voice:** Usually silent except during breeding; repeated, loud, nasal *quek...quek...quek* during migration; also a *quek* contact call and a *tyiik* alarm call. **Habitat:** Dense reed-cover in and around marshes. **Habits:** Skulker, mainly crepuscular.

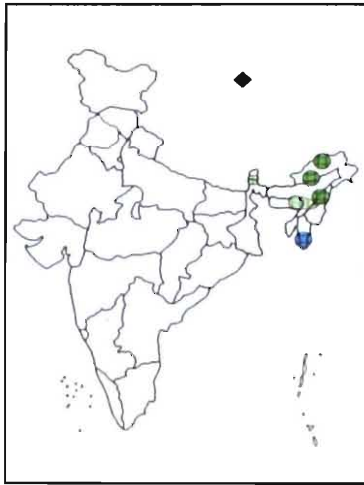
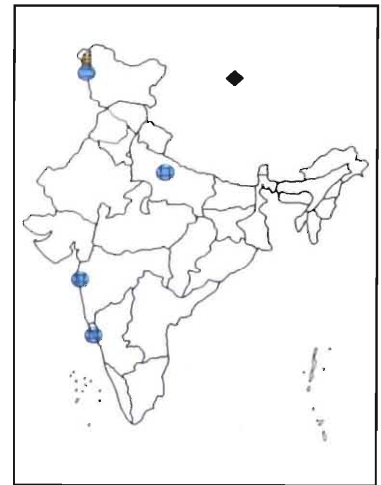


Photo: James Eaton

Little Crake

Food: Carnivorous, chiefly water insects. **Status and Distribution:** Winter passage migrant, rare in India and Pakistan, vagrant in Bangladesh. Breeds in C Asia and China, winter in W Pakistan and NW India.



130(337). Baillon's Crake. *Porzana pusilla* (Pallas, 1776); Grey Quail ±; 17-19 cm; **R/WM/LCom H/C** (Plate 21.130)

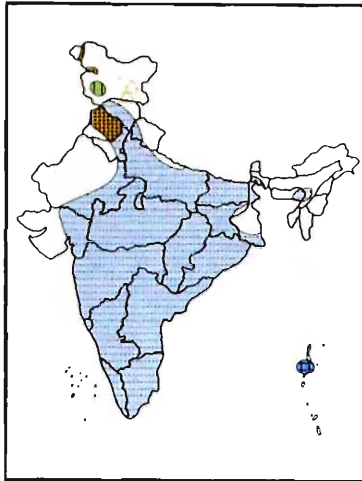


Photo: James Eaton

Baillon's Crake

Diagnostics: Adult: Sexes alike. The smallest Indian Rail. Bill horny-green; a brownish streak through eye over ear-coverts to sides of neck; supercilium, sides of head and neck, breast and anterior abdomen grey; remaining upper plumage rufous-brown broadly streaked dark brown; scapulars, back, rump

and upper tail-coverts with narrow white paint-like smears; posterior abdomen vent and under tail-coverts barred brown and white; legs and feet yellowish-green. **Juvenile:** Like adult but paler above; brown eye-streak broader; almost white below, sides of neck, breast and flanks suffused



with ruddy brown. **Voice:** Rattling trill *trrrriiii*. **Habitat:** Affects reedy marshes, jheels, edges of lakes, pools with emergent vegetation, irrigated crops, and paddy fields. **Habits:** Generally keeps singly or in pairs; great skulker, hides in reeds; chiefly crepuscular; breeds from May to August in Kashmir, chiefly June-July. A passage migrant recorded in N India in September-October and March-April. **Food:** Chiefly vegetarian, seeds of aquatic plants, occasionally molluscs and insects. **Status and Distribution:** Common in Kashmir during summers, where its breeds up to 1800 m; Pakistan; Nepal; Bangladesh; Sri Lanka; breeds in C and E Asia from the river Ob to N China, N India, winter in SW Asia, India, Sri Lanka, Myanmar and SE Asia.

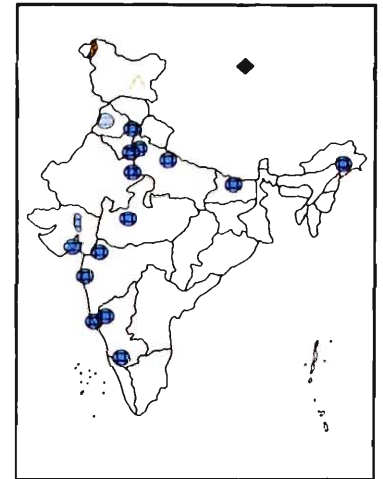
131(338). Spotted Crake. *Porzana porzana* (Linnaeus, 1766); Grey Quail +; 22-24 cm; **WM/Ra C** (Plate 21.131)



Photo: James Eaton

Spotted Crake

Diagnostics: **Adult:** Sexes alike. Bill yellow with orange base, dark green tip and culmen; supercilium, sides of head and neck grey, spotted white; remaining upper parts rufous olive-brown broadly black streaked; black hind neck and upper back white-spotted; scapulars, lower back, rump, upper tail-coverts and inner secondaries narrowly white-streaked. Chin and throat white; breast grey, white-speckled; vent and under tail-coverts buff; flanks grey-brown



with white bars; legs and feet bright olive-green. **Juvenile:** More brown below and with more extensive white on chin and throat. **Voice:** Generally silent. **Habitat:** Occurs in reedy jheels, marshes around reservoirs and canals, swamps. **Habits:** Typical Crake, crepuscular, occurs singly or in pairs, skulker prefers reed beds. **Food:** Primarily aquatic insects, molluscs. **Status and Distribution:** Rare winter migrant, mainly to NW India; Pakistan; Nepal; Myanmar; breeds in N, C Asia E to NW China, also in NW Kashmir, winter in N India to W Myanmar.

132(339-340). Ruddy-breasted Crake. *Porzana fuscus* (Linnaeus, 1766); Grey Quail +; 22 cm; **R/WM/UnCom C/H** (Plate 22.132)

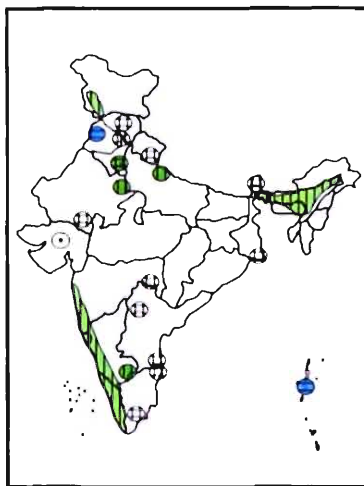
Diagnostics: **Adult:** Sexes alike; upperparts dark olive-brown; chin and throat white; forehead, crown, sides of face, neck and breast chestnut; under tail-coverts blackish with white fringes; legs and feet brick red. **Juvenile:** Darker above; sides of head, neck and lower plumage barred brown and white. **Voice:** Single note *crake*. **Habitat:** Occurs in swamps, edges of flooded

Photo: Suppalak Klabdec



Ruddy-breasted Crake

fields, reedy canal banks, and marshes. **Habits:** Shy, wary and extreme skulker; on being disturbed immediately slips into herbage; breeds in abundance in Kashmir from June to August. **Food:** Chiefly insectivorous (aquatic insect larvae, molluscs), also shoots and seeds of marsh plants. **Status and Distribution:** Resident in Kashmir, local migrant to NW India, found up to 1800m in Himalaya and 2000m in Western Ghats; Pakistan; Nepal; Bhutan; Bangladesh, Sri Lanka; Myanmar. Extend up to SC China, Indonesia and Phillipines; Winter in NW Pakista, NW India, S Nepal, Sikkim and Andaman & Nicobar Islands within Indian sub-region.



133(346). Watercock. *Gallicrex cinerea* (Gmelin, 1789); Grey Partridge +; 43 cm; **R/LM/LCom H/C** (Plate 22.133)

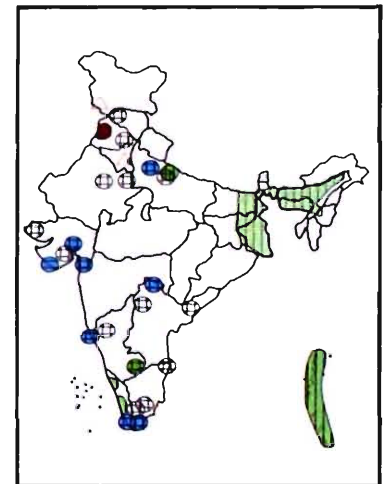
Diagnostics: Adult: Sexes alike in non-breeding plumage, female considerably smaller. Dark brown above and pale buff with fine wavy darker bars below; bill horny-yellow; legs and feet dull greenish-brown. The breeding male black with grey scaly markings above; red fleshy frontal shield projecting



Photo: Gehan de Silva Wijeyeratne

Watercock

above crown; bright red eyes and legs; buff-white under tail-coverts. **Juvenile:** Like female but less barred below. **Voice:** *kok kok...*, *utumb utumb...*; *kluck kluck...*; *toom*. **Habitat:** Affects reedy swamps, low-lying waterlogged paddy and other fields, ditches, ponds, canals and channels with emergent vegetation. **Habits:** Crepuscular, feeds early morning or late evening, as also in cloudy weather; male belligerent during breeding season, which extends from June to September. **Food:** Chiefly vegetarian, comprising arable crops, wild rice, also aquatic insects and molluscs. **Status and Distribution:** Resident and widespread species in well-watered areas, disperses widely in SW monsoon; generally common in NW India; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. SE Asia.



134(348-349). Purple Moorhen. *Porphyrio porphyrio* (Linnaeus, 1758); **Purple Swamphen (I); Hen ±; 45-50 cm; R/LM/LCom H/C** (Plate 22.134)

Diagnostics: Adult: Sexes alike, but the bald red forehead (Basque) smaller in female;

Photo: Gehan de Silva Wijeyeratne

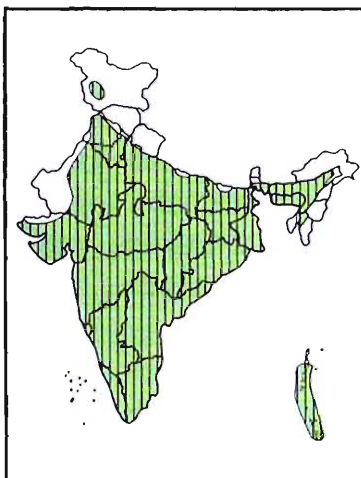


Purple Moorhen

Photo: James Eaton



purplish-blue rail with red bill, frontal shield and legs. Upperparts generally purple-blue; tail black with green iridescence; scapulars and wings greenish-blue; chin, throat and foreneck cobalt blue; breast greenish-blue; abdomen and flanks purple; vent blackish-brown; under tail-coverts white. *Juvenile*: Paler, with black bill and casque; orange-brown legs and feet. **Voice**: Explosive *cooh* (alarm call), powerful *quinkrrrrr...* (song), soft *chuck-chuck* (contact call). etc. **Habitat**: Occurs in large marshes and reed beds around jheels, rivers and swamps. **Habits**: Diurnal species occurs in flocks of 5-10, though seen in bigger groups up to 50; climbs among reeds for feeding; breeds mainly during SW monsoon, from June to September.



Food: Chiefly vegetarian (seeds and grains), also molluscs and insects. **Status and Distribution**: Resident and common throughout India up to 1500 m, except in NW and NE Himalaya, rare in Kashmir, uncommon elsewhere; Nepal; Pakistan; Bangladesh; Sri Lanka; N Myanmar; extends upto SW China and N Thailand.

135(347-347a). Common Moorhen. *Gallinula chloropus* (Linnaeus, 1758); Grey Partridge ±; 32-35 cm; R/WM/Com O (Plate 22.135)



Photo: BPB

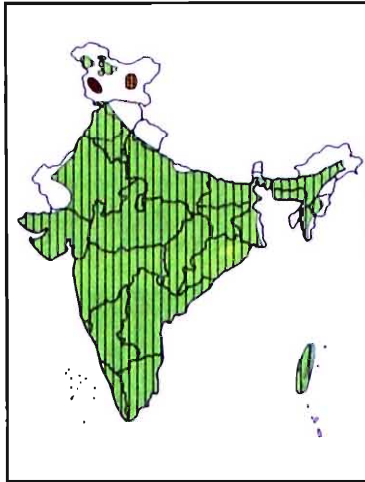
Common Moorhen



Photo: Peter Ericsson

Diagnostics: *Adult*: Sexes alike. Head and neck dark grey; remaining upperparts dark brown, closed wings with white edges; underparts slaty-grey; under tail-coverts conspicuously white with a black central patch; iris, frontal shield and base of bill red; terminal third of bill greenish-yellow; legs and feet green with an orange ring around base of tibia. *Juvenile*: More brown, less grey above; much mixed with white below; bill and

frontal shield greenish-brown. **Voice:** Usually silent; but occasionally loud and explosive *kurr-ik* and *kark* (advertising call), *cuk cuk* and *kekuk* (alarm call), and soft *kook kook* (territorial call). **Habitat:** Occurs in jheels and swamps, marshes, lakes, ponds, village tanks and ditches with emergent vegetation; shifts locally with water conditions. **Habits:** Singly, in pairs or in small flocks up to 50 or more in winter; spends most of its time



foraging in open water with floating vegetation; also feeds onshore; breeds up to 2400 m in Himalaya from May to August. **Food:** Omnivorous, aquatic plants, molluscs, insects, small fish and frogs. **Status and Distribution:** Resident, common and, widely distributed all over India (winter migrant in some areas); Pakistan; Nepal; Bangladesh; Sri Lanka.

136(350). Common Coot. *Fulica atra* Linnaeus, 1758 Duck -; 36-38 cm; **R/WM/VCom H/C** (Plate 22.136)



Photo: Gehan de Silva Wijeyeratne

Common Coot

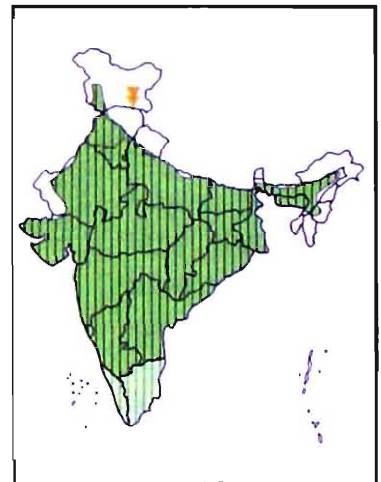


Photo: Satpal Gandhi

Common Coot

Diagnostics: *Adult:* Sexes alike. A slaty-black waterbird with stout pointed ivory-white bill, white frontal shield and green legs; head, neck and throat black; upper plumage slaty-black with steel-blue sheen; under plumage slaty-grey with dark vent and under tail-coverts. *Juvenile:* Greenish-brown above and mottled white underneath. **Voice:** Varied and loud high-pitched *pyee* and a series of long, often soft *dp...dp...calls*. **Habitat:** Large jheels, lakes, reservoirs and irrigation tanks with deep water and marginal emergent vegetation. **Habits:** Gregarious, gathers in very large flocks during winter, diurnal,

forages on aquatic vegetation in open waters, spends major part of day amidst floating vegetation. Breeds from May to December varies locally. **Food:** Chiefly vegetarian (aquatic plants, shoots, seeds), also molluscs and aquatic insects. **Status and Distribution:** Common resident and winter migrant and widely distributed all over India, breeds up to 2500m in Himalaya in India and Central and S Asia; Pakistan; Nepal; Bangladesh; Sri Lanka. **Threshold number:** 15,000.



Finfoots (Family Heliornithidae)

World: 3 species; Asia: 1; India: 1

Relatively large aquatic birds with long neck and heavy bill; swims partly submerged and dives well. Toes furnished with a lobed fringe like Coots. Rectrices (tail feathers) eighteen.

137(351). Masked Finfoot. *Heliopais personata* (G.R. Gray, 1849) domestic duck \pm ; 56 cm; **GT/Vu BRS (09) R/VRa C** (Plate 7.137)

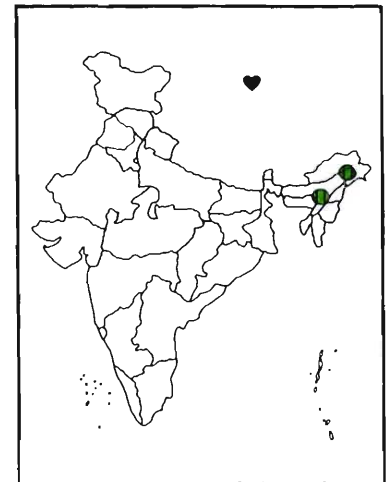
Photo: Yeap Soon Pin



Masked Finfoot

Diagnostics: *Adult:* A cormorant-shaped olive-brown bird with a velvety black facial mask, bordered by a narrow white line; a heavy pointed yellow bill and green legs. *Male:* Black chin and throat separated from grey nape by narrow white stripe. *Female:* White chin and throat separated from greyish-brown nape by black-and-white stripe. *Juvenile:* Like female but without black on crown. **Voice:** Loud grunting *quack*. **Habitat:** Inhabits "dense, swampy forest" such as at *Chutla bhil*, Assam, where a dense growth of *Barringtonia acutangula* trees and "cane" provides a secure retreat from danger. **Habits:** Often very shy, but many individuals appear remarkably tame and conspicuous; when disturbed it usually swims out of the water and retreats into nearby vegetation; perches on branches and tree-trunks overhanging water. **Food:** Comprises aquatic invertebrates, insects, crustaceans, molluscs, small fish, amphibians, small reptiles, and vegetable matter. **Status and Distribution:** *Globally*

threatened/Vulnerable/Biome Restricted Species. Resident but very rare, only one recent record. The Masked Finfoot occurs patchily from northeast India and Bangladesh through continental South-East Asia to Vietnam, Malaysia, and Sumatra. **Remarks:** In India, this species is a very rare breeding visitor (or possibly resident) in northeastern states, mainly Assam, Arunachal Pradesh and Manipur. There is one unconfirmed report from Dum Duma river inside Dum Duma Reserve Forest, although this was later given as a confirmed record. **Population:** It is estimated that the current population is around 2,500-10,000 birds, but there has undoubtedly been a major decline in the latter half of the twentieth century in South-East Asia owing to the combination of habitat loss and hunting. It has always been scarce in northeast India and there have been very few recent records, however, and the species is now a great rarity in the country. Although most suitable habitat has disappeared there are still considerable tracts of forested wetlands in Tinsukia district, Assam, whence old records of the species derive, but during almost two years of research in the 1990s it was not found, implying that it is now very rare or extinct in the area.



It is possible that undiscovered populations might survive in eastern Arunachal Pradesh, parts of Nagaland, Manipur or Mizoram, but if so they must be very small. **Threats:** *Habitat loss:* The Masked Finfoot is at risk throughout its range from loss of forest ponds, stream or riverside vegetation and the increase in human disturbance in chosen wetlands; an enormous amount of suitable habitat has disappeared from its historical range. In India, the Tingrai

river and the Moran area of India are now largely inhabited or under tea plantation, while Chutla bhil, North Cachar, had lost most of its appropriate cover even by 1901. **Measures Taken:** *Protected areas:* The species occurs in Upper Dihing (East Block) Reserve Forest, which is reportedly in the process of upgrading to wildlife sanctuary or national park status. **Measures Proposed:** The proposed Dhaleshwari, Digboi and Dum Duma-Dangori Wildlife Sanctuaries in Assam, India, should be established to provide possible protection for the species in Assam. In India, potential habitat for the species in Namdapha National Park and Kamlang Wildlife Sanctuary in Arunachal Pradesh, Intanki in Nagaland and Yangoupokpi-Lockchao in Manipur need to be surveyed for the species, as do many forest sites in north, east and south Assam (BirdLife Int., 2001). **Threshold number:** 60.

Jacanas (Family Jacanidae)

World: 8 species; Asia: 3; India: 2

Wading birds with enormously elongated toes and claws; wing spur short and wings rounded; tail short, except in *Hydrophasianus*; associated with floating vegetation. Flight is feeble and short, with large feet dangling behind; sexes alike; but female larger and polyandrous; young nidifugous and downy.

138(358). Pheasant-tailed Jacana. *Hydrophasianus chirurgus* (Scpoli, 1786); Grey Partridge =; 39-58 cm; R/LM/SM/UnCom H/C (Plate 22.138)

Diagnostics: *Adult:* Sexes alike, female slightly larger. *Breeding:* Head, face, throat and foreneck white; hind neck pale silky golden-yellow, edged with black line; upper and lower plumage chocolate-brown; rump, upper tail-coverts and tail black; wing-coverts white; tail long, pointed and sickle-shaped (Pheasant-like); legs and feet pale bluish with



Photo: BPB

Pheasant-tailed Jacana (br)

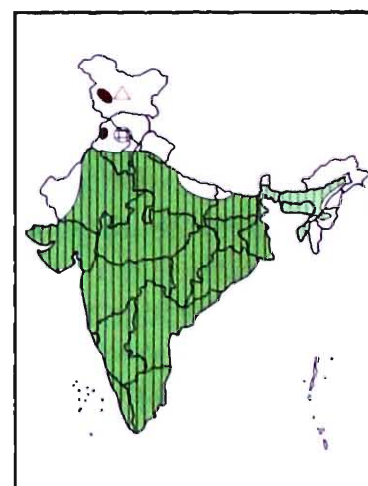


Photo: Peter Ericsson

Pheasant-tailed Jacana (nbr)

long spidery toes. *Non-breeding:* Chiefly dull brown and white with a black "necklace" on upper breast, and without the long tail. *Juvenile:* Yellow on neck absent; black necklace broken up with white; and crown dull rufous-brown. **Voice:** Loud musical *me-e-ou* in breeding season.

Habitat: Occurs in lotus and water hyacinth covered jheels, reservoirs, lakes, pools and village tanks. **Habits:** Gregarious in non-breeding season, when flocks of 50 to 100 birds occur, feeds



in open amidst the floating vegetation on which the bird walks; breeds from May to July in Kashmir and up to September in N India. **Food:** Chiefly vegetarian (aquatic plants,

shoots, seeds), also molluscs, aquatic insects. **Status and Distribution:** Resident, widely distributed all over India, mainly summer visitor up to 1500 m in Himalaya for breeding, winter migrant to plains of Indian peninsula; Pakistan; Nepal; Bangladesh; Sri Lanka. SE Asia. **Threshold number:** 1,000.

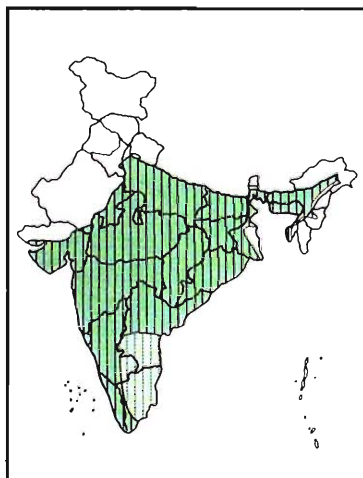
139(359). Bronze-winged Jacana. *Metopidius indicus* (Latham, 1790); Grey Partridge ±; 28-31 cm; **R/LCom H/C** (Plate 22.139)



Photo: James Eaton

Bronze-winged Jacana

Diagnostics: *Adult:* Sexes alike, female slightly larger. Bill greenish-yellow, tinged with red at base; frontal shield bluish-red; a broad superciliary streak from eye to nape of pure white; rest of head, neck and lower parts black with deep green sheen; back and wings metallic greenish-bronze; tail and under tail-coverts chestnut; vent and thigh-coverts dull brownish-black; legs and feet dull green. *Juvenile:* With short dull white supercilium, rufous-brown crown, terminal black band on rufous tail, and whitish



underbody. **Voice:** Short, harsh grunt. **Habitat:** Occurs in vegetation covered jheels, lakes, reservoirs, pools and village tanks. **Habits:** Similar to Pheasant-tailed Jacana and generally found together; when disturbed partially submerges, on being constantly disturbed takes refuge in standing vegetation on dry land; breeds from June to September. **Food:** Mainly vegetarian (seeds, shoots) also aquatic insects, molluscs. **Status and Distribution:** Resident, widely and commonly distributed in western and southern India, mainly from Uttar Pradesh and Gujarat; Pakistan; Nepal; Bangladesh. SE Asia.

Painted Snipe (Family Rostratulidae)

World: 2 species; Asia: 1; India: 1

Sexually dimorphic. Polyandrous; male attends to nest and rears young.

140(429). Greater Painted-Snipe. *Rostratula benghalensis* (Linnaeus, 1758); Gey Quail +; 25 cm **R/LM/LCom O** (Plate 23.140)



Photo: Kwan Po-Kuen

Greater Painted-Snipe (male & female)

Diagnostics: *Adult:* Polyandrous; female larger than male; sexes more or less alike and difficult to distinguish in non-breeding season; a colourfully mottled snipe with long, flesh-pink bill, slightly downcurved at tip. *Breeding (female):* Head and neck chestnut with a broad, median and buff stripe on head down to bill; a pure white circle around and a short band behind the eye; remaining

Plate 21



120. Andaman Crake



122. Slaty-legged Crake



121. Red-legged Crake



123. Blue-breasted Rail



124. Water Rail



125. Corn Crake



126. Brown Crake



127. White-breasted Waterhen



128. Elwes's Crake



129. Little Crake



130. Baillon's Crake



131. Spotted Crake

Plate 22



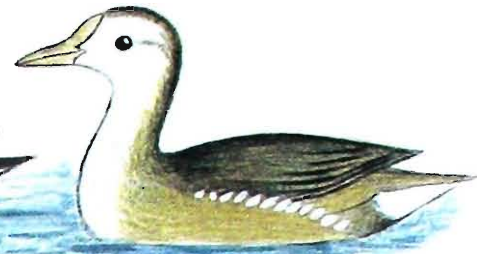
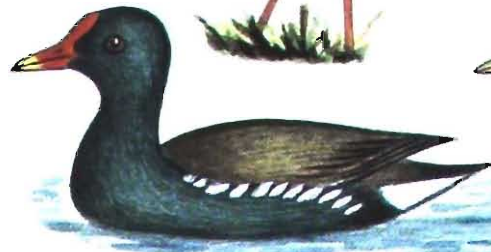
132. Ruddy-breasted Crake



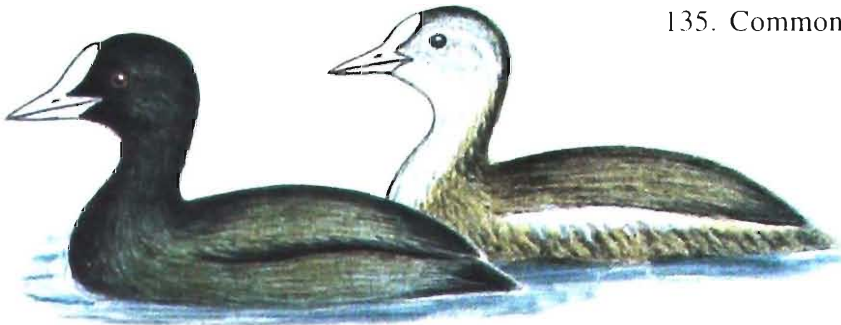
133. Watercock



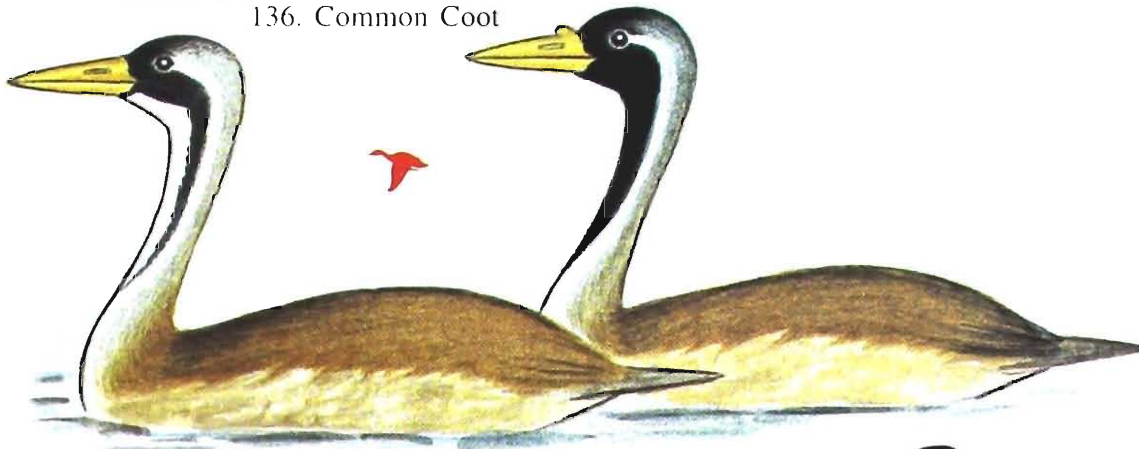
134. Purple Moorhen



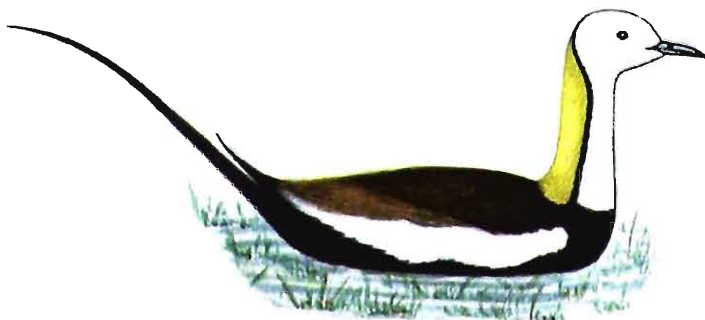
135. Common Moorhen



136. Common Coot



137. Masked Finfoot



138. Pheasant-tailed Jacana



139. Bronze-winged Jacana

Photo: Kwan Po-Kuen



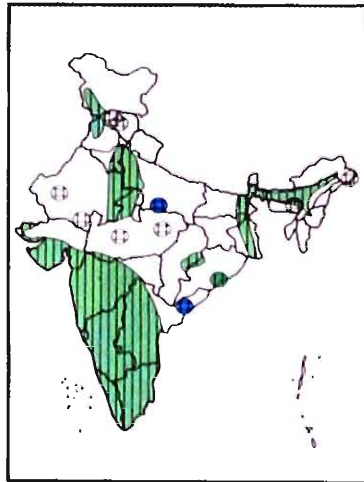
Greater Painted-Snipe

Photo: BPB



upperparts metallic bronze-green spotted and streaked with black and buff; broad white bands over shoulder to sides of breast; chin, throat and breast chestnut; lower breast blackish. Remaining underparts white. **Breeding (male):** Duller and lacking the chestnut and black on neck and breast.

Juvenile: Similar to adult male but with white throat; lower throat and foreneck washed with brown, with some dusky streaks. **Voice:** When flushed makes explosive *kek*. **Habitat:** Found in fresh-



water marshes with deep pools, ditches with thick vegetation and mud patches, also in mangroves. **Habits:** A crepuscular species, active in early morning, evening and night, solitary or in small flocks, forages by probing

into mud, wags rear end while feeding. Breeds almost throughout the year, but chiefly July to September; nests on grass padding hidden in thick vegetation. **Food:** Omnivorous, comprising molluscs, crustacean, aquatic insects and arable crops. **Status and Distribution:** A resident, but locally common species almost throughout India, up to 1800 m in Himalaya; Pakistan; Nepal; Bangladesh; Sri Lanka. SE & E Asia, Indonesia.

Oystercatcher (Family Haematopodidae)

World: 11 species; Asia: 2; India: 1

Sexes alike, but female with longer and thinner bill; frequents seashores; feeds chiefly bivalve mollusks; bill long and compressed slightly truncated at tip; wings long and pointed, first primary longest; tarsus short, stout and reticulated throughout; hind toe absent; anterior toes short, stout and edged laterally with a narrow membrane and slightly webbed, especially between 3rd and 4th toes.

141(360-361) Eurasian Oystercatcher. *Haematopus ostralegus* Linnaeus, 1758; Grey Partridge +; 42-46 cm; WM/Ra C (Plate 23.141)

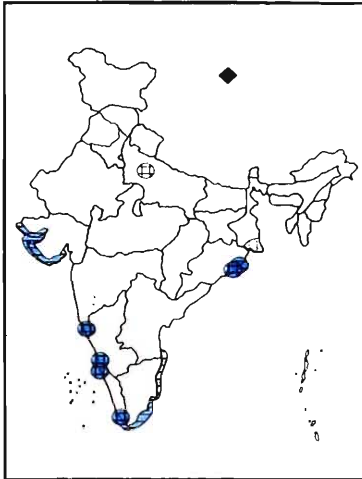


Photo: Gehan de Silva Wijeyratne

Eurasian Oystercatcher

Diagnostics: Sexes alike; a striking black and white bird with stout red legs; long straight orange-red snipe-like bill, blunt at tip. *Non-breeding* (first winter): White-collar present on foreneck; can be distinguished in flight by broad white band across the black wings. **Voice:** A loud piping *pi..peep*. **Habitat:** Chiefly a coastal bird, prefers sandy and rocky seashores, rare inland on shingle beds of large rivers. **Habits:**

Occurs in scattered flocks on seashore with other waders, runs about on intertidal sand, in search of food. **Food:** Carnivorous, mainly marine molluscs, annelids and crustaceans.



Status and Distribution: Winter migrant chiefly to seacoasts and offshore islands, a rare passage migrant inland; Sri Lanka; Maldives; Bangladesh; Nepal; Pakistan. Breeds in W Siberia and C Asia, winter in Coastal NE Africa, Persian, and Arabian Gulf E to NW India. **Threshold number:** 1,500.

Plovers, Dotterels & Lapwings (Family Charadriidae)

Word: 67 species; Asia: 22; India: 19

Small to medium-size waders; bill short, pigeon-like to long, slender and straight or downcurved; wings long and pointed; legs short to long, with tibiae partly bare in many species. Flight strong, swift and well sustained. Sexes may be nearly alike, or female may be much smaller and/or duller.

142(372). European Golden Plover. *Pluvialis apricaria* (Linnaeus, 1758); Grey Partridge -; 23-27 cm; WM/Va C/H (Plate 23.142)

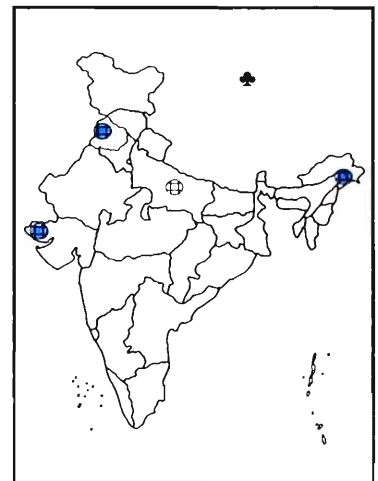
Diagnostics: *Adult:* Sexes alike; similar to Grey



Photo: Svein Bekkum

European Golden Plover (br)

Plover. *Non-breeding* (winter): Upper parts black and gold-spangled; chin and throat white, breast mottled gold and brown; abdomen, vent and under tail-coverts white, the latter tipped and barred on lateral feathers with gold and brown.



Breeding (summer): Upperparts bright gold-spangled; underparts black. In flight, the pure white underwing and axillaries distinguish it from Grey Plover, which has black axillaries, distinguish it from Grey Plover, which has black axillaries. **Voice:** Disyllabic whistle *too-lee*. **Habitat:** Prefers muddy margins of jheels, estuaries, wet pastures and grass fields. **Habits:** Gregarious, generally in small flocks in association with other waders, very wary and difficult to approach. **Food:** Chiefly carnivorous (insects, small molluscs crustaceans), occasionally aquatic plants. **Status and Distribution:** A winter vagrant to India and Pakistan. Breeds in Arctic Europe and Asia, winters chiefly in Mediterranean countries. **Remarks:** Odd records from Lucknow (U.P.), Dibrugarh (Assam) and Punjab (Ali & Ripley, 1978).

143(373). Pacific Golden-Plover. *Pluvialis fulva* (Gmelin, 1789); **Pacific Golden Plover (I); Grey Partridge -; c. 24 cm; WM/UnCom C/H (Plate 23.143)**

Photo: John Holmes



Pacific Golden-Plover (br)

Photo: Gehan de Silva Wijeyratne



Pacific Golden-Plover (nbr)

Diagnostics: Sexes alike; similar to Golden Plover, but with less gold spangling, especially on wings. **Non-breeding (winter):** Upperparts mottled brown, white, and golden yellow; underparts whitish, breast mottled with brown, grey, and yellow. Differs from the preceding two plovers by a little duller upperparts and grey axillaries (under wings near body), which are pure white in Golden Plover and black in Grey Plover. **Breeding (summer):** Forehead white running back in a broad band over the eyes and down sides of neck and breast; lores black; remaining upperparts blackish brown spangled with white and golden-yellow; underparts from throat to vent black. **Voice:** Abrupt high-

pitched disyllabic.

Habitat: Wet grasslands, coasts and coastal lagoons, tidal mudflats, muddy banks of rivers and jheels. **Habits:** Gregarious, in scattered flocks of 20-50 birds in company of other

waders, very wary, when disturbed the flock flies away suddenly. **Food:** Chiefly carnivorous (insects, small molluscs and crustaceans), occasionally seeds of marshy plants. **Status and Distribution:** Widespread winter migrant to NE and SE India, vagrant elsewhere; arrives early in August; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. Breeds in N Asia up to Yenisey River, winter chiefly in SW, S Asia & E Africa. **Threshold number:** 750.

144(371). Grey Plover. *Pluvialis squatarola* (Linnaeus, 1758); Grey Partridge =; 27-30 cm; **WM/UnCom C (Plate 23.144)**



Grey Plover

Diagnostics: Sexes alike. **Non-breeding (winter):** Forehead and lores white speckled with black; sides of head and neck white streaked with brown; rump, uppertail-coverts and tail white narrowly barred with brown; remaining upperparts dark brown, conspicuously scalloped with pale brownish-grey. Foreneck, breast and flanks streaked and

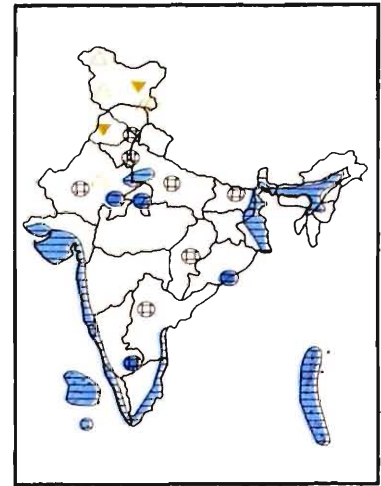


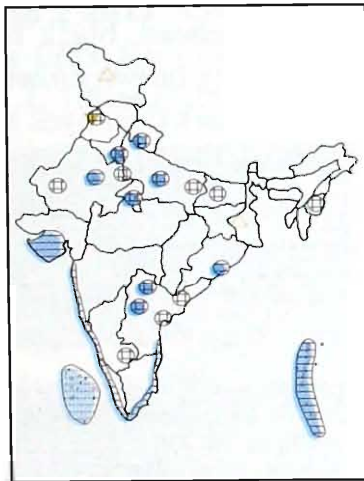
Photo: Gehan de Silva Wijeyratne

Photo: John Holmes



Grey Plover

spotted with brown; remaining underparts white. **Breeding** (summer): Upperparts mottled black and silver-grey; chin to middle of abdomen black; lower abdomen and under tail-coverts white. In flight a large black oval patch (axillaries) conspicuous in both summer and winter. In flight a large black oval patch (axillaries) conspicuous in both summer and winter. **Voice:** Shrill *chee-woo-ee*. **Habitat:** Mainly seaboard, coastal, in intertidal zones, less common (only as vagrant) in inland waters, lakes and pools. **Habits:** Gregarious, generally in flocks of 15-20, but sometimes very large flock(s) seen, swift flier, very wary and thus difficult to approach, occurs in company of other waders. Arrives in NW India by early August and departs by April, though rare vagrants may be seen round the year. **Food:** Carnivorous (molluscs, crustaceans, insects), rarely seeds of marsh plants. **Status and Distribution:** A widespread winter migrant to coastal India, rarely inland as passage migrant, common in peninsula; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. Breeds in Arctic Russia, winter in S Asia. **Threshold number:** 300.



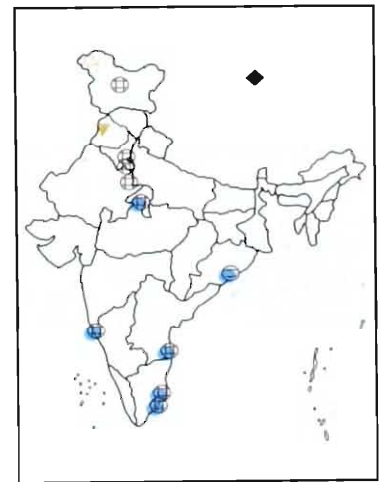
145(378). Common Ringed Plover. *Charadrius hiaticula* Linnaeus, 1758; Grey Quail ±; 18-20 cm; WM/Ra C (Plate 23.145)



Common Ringed Plover (br)

Photo: John Holmes

Diagnostics: *Adult:* Sexes alike; bill, legs and feet orange-yellow, the former with black tip. *Non-breeding* (winter): Breast-band and ear-coverts brownish-black; forehead and supercilium whitish; legs and base of bill orangish. *Breeding* (summer): Upper forehead, lores to upper ear-coverts black. A broad line from eye to eye covering lower forehead white; remaining head and upperparts dark brown, except a buffish hind-collar. Tail brown with a broad subterminal white band and pure white tip; chin, throat and sides of neck white, meeting the buff hind-collar; a broad black band across the foreneck and upper breast; remaining underparts white. **Voice:** Soft *too-li* or *tooee*. **Habitat:** Intertidal mudflats, mangroves and freshwater lakes. **Habits:** Occurs in pairs or in small flocks mixed with other waders; when foraging scatters over wide area, typical plover feeding behaviour. **Food:** Carnivorous. **Status and Distribution:** A very rare winter migrant in India; E to Pakistan; Bangladesh; Sri Lanka; Maldives.



Breeds in NE Europe & Arctic Russia, winter SW Asia, W & S Africa. **Threshold number:** 2,100.

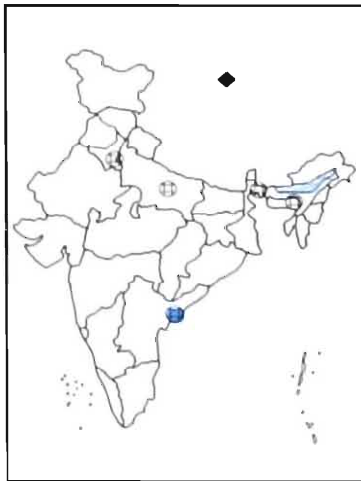
146(383). Long-billed Ringed Plover. *Charadrius placidus* J. E. Gray, 1863; **Long-billed Plover (I); Grey Quail +; 19-23 cm; WM/Ra C (Plate 23.146)**

Photo: John Holmes



Long-billed Ringed Plover (br)

Diagnostics: Similar to Large Ringed and Little Ringed Plovers except with nearly black frontal bar and comparatively thin black breast-band. In flight, white wing-bar inconspicuous. Non-breeding birds and juveniles are duller overall. **Habitat:** Occasionally on coarse sandy bank of large rivers. **Habits:** Generally solitary, rarely in small flocks, found mixed with other waders. When disturbed, flies off rapidly though at low altitude over the ground. **Voice:** Clear *piwee*. **Food:** Insects, worms and tiny crabs. **Status and Distribution:** Winter migrant to N and NE India, rare but regular; Nepal; Bhutan; Bangladesh and Sri Lanka; breeds in Russia, NC China. **Threshold number:** 100.



Sand Plover (I) ±; 14-17 cm; R/WM/Com C (Plate 23.147)



Little Ringed Plover (br)



Little Ringed Plover (nbr)

Diagnostics: Adult: Sexes alike. A typical little plover with sandy brown upperparts and white forehead; black fore-crown, separated from sandy brown crown by a thin white line running back over eyes and ear-coverts; black bands on head and breast, the latter continues into a pectoral band; white neck-ring, chin, throat and under parts; yellow eye-ring and legs; a double collar on hind neck (the upper white, the lower black) separating crown from



Little Ringed Plover (imm)

147(379-380). Little Ringed Plover. *Charadrius dubius* Scopoli, 1786; **Lesser**

Photo: Svein Bekkum

Photo: Alister Benn

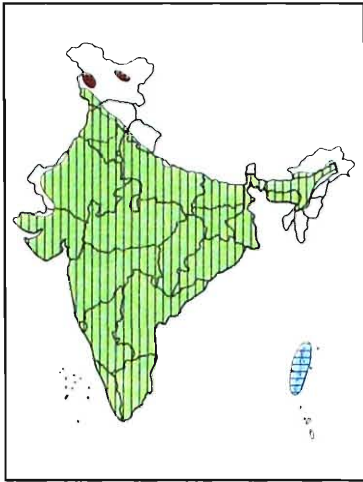
the sandy brown upperparts. *Juvenile*: Brownish head and breast; whitish fringes on black pectoral band when first assumed. **Voice**: Plaintive short and single *pheoo*.

Habitat: Sandy, pebbled margins of lakes, rivers, pools, mudflats, grasslands, intertidal zones, tidal creeks, etc.

Habits: In pairs or small flocks, which scatter over wide

area for feeding, generally mixed with other waders. **Food**: Carnivorous, insects, worms and tiny crabs. **Status and Distribution**: Resident (breeds in Kashmir up to 1500 m) and partly winter migrant. Common and widespread to the rest of the country; Pakistan; Nepal; Bhutan, Bangladesh, Sri Lanka and Maldives. Chiefly breeds in Siberia, N, E & S China, Indian subcontinent, Sri Lanka & SE Asia; winter in S & SE Asia, S China. **Threshold number**: 1,000.

148(381-382). Kentish Plover. *Charadrius alexandrinus* Linnaeus, 1758; Grey Quail -; 15-17 cm; **R/WM/LCom C** (Plate 23.148)



narrow and brownish eye stripe, and a small dark patch on either side of breast. *Breeding* (summer): Male has black and rufous crown and black eye streak; female more or less as in non-breeding plumage. *Juvenile*: Like female but with the upperparts narrowly scalloped with sandy buff. **Voice**: Soft *prrr*, short *kirrik*, shrill *too-it*.

Habitat: Mainly seashore, also riverbeds with shingle, sandy margins of lakes, ponds, and salt pans. **Habits**: Flocks mixed with

other waders, keeps in pairs or small groups, which scatter over large areas for feeding; breeds from March to August in W (Sind & Gujarat) and S (Tamil Nadu), nests slight depression on seashore, salt pan and dry riverbeds. **Food**: Carnivorous (crabs, sand hoppers and other insects). **Status and Distribution**: Resident and widespread winter visitor, locally common, India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives. Breeds across C Asia; winter in S Asia. **Threshold number**: 1,000.

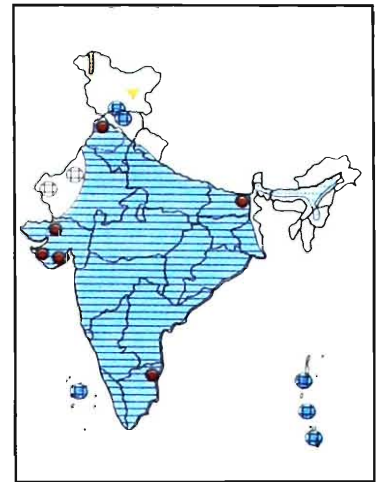


Photo: Gehan de Silva Wijeyaratne



Kentish Plover (br)

Diagnostics: Adult: Sexes alike, but female duller; similar to immature Little Ringed Plover. *Non-breeding* (winter): Distinguished by blackish legs, white forehead continued unbroken as supercilium, sandy grey crown,

149(384-384a). Lesser Sand Plover. *Charadrius mongolus* Pallas, 1776; Grey Quail =; 19-21 cm; **R/WM/LCom C** (Plate 23.149)



Lesser Sand Plover (male br)

Photo: Pete Morris/ Birdquest

Diagnostics: *Adult:* Sexes alike; a typical little plover with short pigeon-like black bill and greenish-grey legs. *Non-breeding* (winter): Distinguished from similar Kentish Plover by broad white face divided by dark brownish patch behind eyes. Upperparts sandy greyish-brown and underparts white. *Breeding* (summer): *Male:* Forehead and sides of head black; crown and hind neck rusty; remaining upperparts sandy brown; upperparts and flanks chestnut, separated from glistening white throat by a blackish half-collar; rufous-orange breast and hind neck. *Female:* Similar to non-breeding adult but with pale orange breast-band. *Juvenile:* Feathers of upperparts with pale fringes. **Voice:** Sharp and short *chitik, chichi,* and *kruit-kruit.* **Habitat:** Occurs in sandy plains in the vicinity of high-altitude lakes, streams and marshes in summer; during winters on coasts, intertidal mudflats, tidal creeks, rocky and sandy shores. **Habits:** Gregarious, keeps in scattered flocks, which are sometimes very large, with other waders; when resting the bird stands inert on one leg; breeds from early June to mid-July in Ladakh. **Food:** Carnivorous, comprising crabs, insects and worms. **Status and Distribution:** Resident between 3900-5500 m in Ladakh, Lahaul-Spiti and Sikkim, common winter migrant to coastal areas, rare inland; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives; C Asia; Himalaya; S Tibet. **Threshold number:** 1,000.

150(374). Greater Sand Plover. *Charadrius leschenaultii* Lesson, 1826; Grey Partridge -; 22-25 cm; **WM/UnCom C** (Plate 23.150)

Diagnostics: Sexes alike; *Non-breeding* (winter): Forehead and supercilium prominent

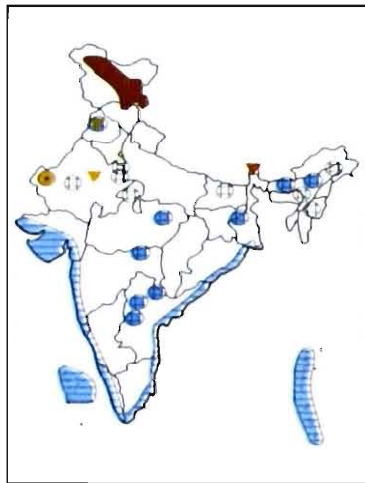
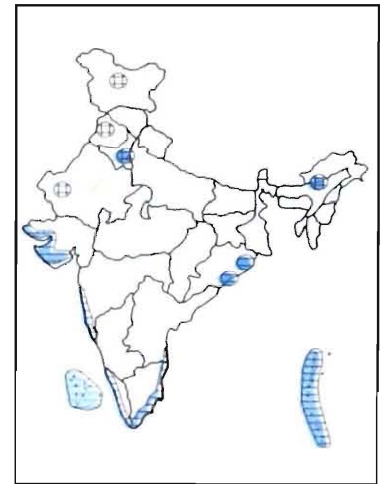


Photo: John Holmes

Greater Sand Plover (nbr)

pale; crown, ear-coverts, upperparts and patches on sides of breast grey-brown. *Breeding* (summer): Male has black mask with white patch on sides of forehead, rufous-orange breast-band and sides of neck; while female is similar to non-breeding adult but with an orange breast-band. **Voice:** A sharp *trrrt* or *prrrirt.* **Habitat:** Mainly on sandy shores, intertidal mudflats,



salt pans, mangroves and rocky coasts. **Habits:** A sea-board species, gregarious in company with other waders in the coastal areas. **Food:** Carnivorous, comprising crabs, marine worms and insects. **Status and Distribution:** Winter migrant to Indian seaboard; Pakistan; Nepal; Bangladesh; Sri Lanka and Maldives. Breeds in C Asia, winter in Coastal S Asia. **Threshold number:** 1,000.

151(376). Caspian Plover. *Charadrius asiaticus* Pallas, 1773; Grey Quail ±; 18-20 cm; **WM/Va** (Plate 24.151)

Diagnostics: *Adult:* Sexes alike. *Non-breeding* (winter): Forehead, supercilia, lores and cheeks buff-white; a brown patch behind eye to ear-coverts; upper parts brown; chin, throat and underparts white, except brown

Photo: Gehan de Silva Wijeyratne



foreneck and breast. In flight, mixed brown and white underwing and pure white axillaries are diagnostics. *Breeding* (summer): Crown, nape and ear-coverts brown; chestnut breast band with black lower border; underparts white. *Juvenile*: Like non-breeding adult but with rufous and buff fringes to feathers of upper-parts.

Voice: A whistling *ku-wit*. **Habitat:**

Generally on dry grassland, dry mud near freshwater, rarely on intertidal mud.

Habits: Not recorded in India.

Food: Unrecorded.

Status and

Distribution: A vagrant winter visitor to the Indian coasts; Sri Lanka and Maldives; breeds in WN & E Caspian to E Kazakhstan, NW China, winter in NE, E & Southern Africa.

Remarks: Single bird shot near Ratanagiri in 1880 (Ali & Ripley, 1978). **Threshold number:** 480.

152(377). Oriental Plover. *Charadrius veredus* Gould, 1848; Grey Quail +; 22-25 cm; WM/Va (Plate 24.152)

Diagnostics: *Adult:* Sexes alike; similar to Caspian Plover but larger. *Non-breeding*

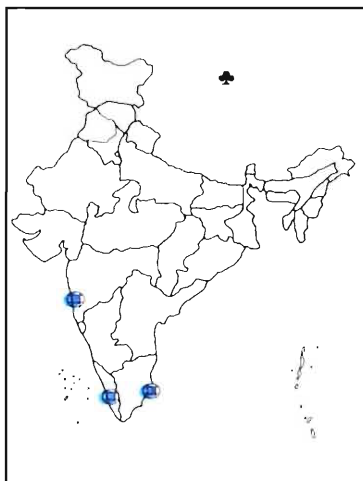


Photo: Michelle and Peter Wong's

(winter): Buff-white supercilia less distinct; hind neck paler than crown or back. In flight, uniformly dark underwing separates it from Caspian Plover. *Breeding* (summer): *Male:* Head and neck white, except dark rear crown; a brown band from eye to nape, covering ear-coverts; throat white; foreneck rufous, turning to chestnut on upper breast; a black band separating chestnut breast from remaining white underparts. *Juvenile:* Upperparts scalloped with rufous and breast feathers brown with dark centers. **Voice:** Sharp whistling *chip-chip-chip*. **Habitat:** Generally on dry grassland, dry mud near freshwater, rarely on intertidal mud. **Habits:**

Unrecorded. **Food:** Not recorded in India. **Status and**

Distribution: A vagrant winter migrant to Andamans; Sri Lanka. Breeds in S Siberia & NE China, winter in

Sundas, Philippines & Australia. **Remarks:** Single example in winter plumage from Andamans in 1872 (Ali & Ripley, 1978). **Threshold number:** 700.

153(375). Black-fronted Dotterel. *Elsayornis melanops* (Vieillot, 1818) Lesser Sand Plover -; 16-18 cm; Va (Plate 24.153)

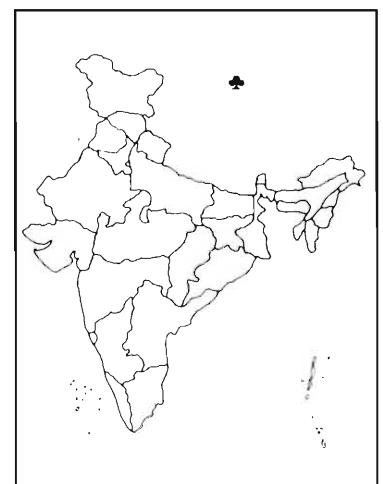


Photo: Tom Tarrant



Black-fronted Dotterel (br)

Diagnostics: *Adult:* Sexes alike. A distinctive small plover with black-tipped red bill; red eye-ring; broad black stripe through eye and white supercilium; black breast-band; and purplish chestnut scapular patch. *Juvenile:* Like adult but duller, with incomplete breast-band and distinctive white band from eye to eye across nape. **Voice:** High pitched *dip* and a soft *tink-tink*. **Habitat:**

Occurs on stony or shingle beds of rivers and streams.

Habits: Feeds by probing and by picking from the surface; flight swifts, often calls repeatedly when on the wing.

Status and

Distribution: Vagrant. Resident in Australia.

Remarks: Single example collected from Pulicat Lake in June, 1839/40 (Ali & Ripley, 1978). **Threshold number:** 160 (Australian population).



154(364). Northern Lapwing. *Vanellus vanellus* (Linnaeus, 1758); Grey Partridge =; 28-31 cm; **WMLCom C** (Plate 24.154)

Diagnostics: *Adult:* Sexes alike, female's crest smaller. *Non-Breeding* (winter): Crown brown; face, chin, throat and foreneck white, speckled with brown or black; scapulars, innermost secondaries and black breast-feathers fulvous



Photo: BPB

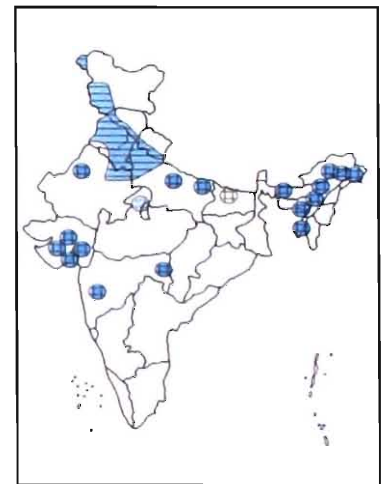
Northern Lapwing (br)

scalloped; remaining underparts as in breeding bird. **Breeding** (summer): Long upstanding pointed crest, crown and chin to breast black; remaining underparts white; sides of head and neck white with black markings; back, rump, scapulars and innermost secondaries glossy bronze-green; scapulars marked with violet-purple; upper and under tail-coverts cinnamon, former with a broad black subapical band. *Juvenile:* Brown above, each feather fulvous edged; back slightly glossed with purple-bronze and wings with green; under-parts like non-breeding adult.

Voice: Normally silent in winter; plaintive *pee-wit*. **Habitat:**

Prefers fallows,

reaped and irrigated fields, and riverbanks with pebbles, lake margins and marshlands. **Habits:** Generally found in pairs or small groups, though congregates in large flocks before migration, forage on wet meadows. **Food:** Carnivorous (molluscs, insects and worms). **Status and Distribution:** Winter migrant, locally common in N and NW, rare in NE India; Assam, Manipur, Arunachal Pradesh; Pakistan; Nepal; Bhutan; Bangladesh. Breeds in C Asia, winter in S Asia. **Threshold number:** 250.



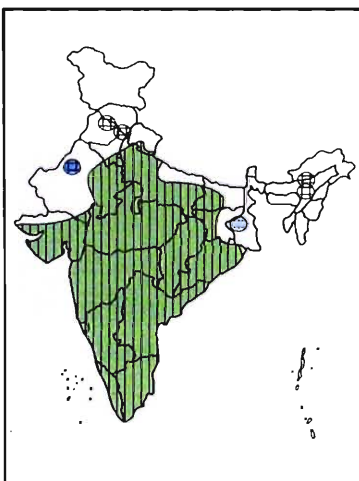
155(370). Yellow-wattled Lapwing. *Vanellus malabaricus* (Boddaert, 1783); Grey Partridge -; 26-28 cm; **BRS (11) R/LM/LCom C** (Plate 24.155)

Photo: Gehan de Silva Wijeyeratne



Yellow-wattled Lapwing

Diagnostics: *Adult:* Sexes alike. Bill black with yellow base and gape; wattle bright yellow; crown (skull cap) silky black, surrounded by a thin white line; upperparts sandy brown. Tail white with a broad black sub-terminal band; chin and throat black; breast sandy brown; remaining underparts white separated from breast by a thin black line; primaries black; outer secondaries white with a black tip; legs and feet bright yellow. *Juvenile:* Pale sandy brown above and whitish below with traces of brown on throat and upper breast. **Voice:** Plaintive screaming *tyi-ee, twit-twit-twit*. **Habitat:** Fallows, dry fields, much less dependent on water, near jheels, keeps away from muddy shores. **Habits:** Very similar to Redwattled Lapwing except that it keeps away from water, occurs in pairs, breeds March to August, nests on dry and bare



ground **Food:** Chiefly insectivorous (grasshoppers, beetles, etc.). **Status and Distribution:** *Biome Restricted Species.* Resident, locally common and widespread in India, undertakes local seasonal movements during SW monsoon, endemic to subcontinent; Pakistan; Nepal; Bangladesh; Sri Lanka.

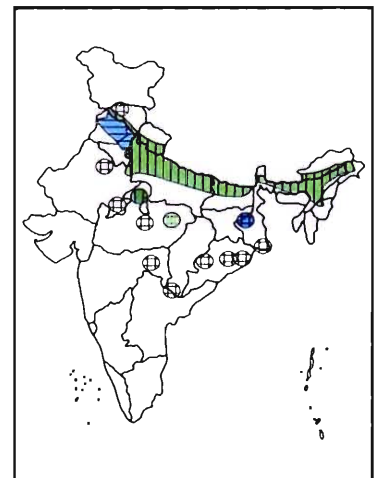
156(369). River Lapwing. *Vanellus duvaucelii* (Lesson, 1826); Grey Partridge =; 29-32 cm; **R/LM/LCom C** (Plate 24.156)



Photo: Bhumesh Bharti

River Lapwing

Diagnostics: *Adult:* Sexes alike. Bill, head and occipital crest (drooping over back) black; upperparts sandy grey-brown; upper tail-coverts and tail white, the latter with its terminal half black; central secondaries white; chin, cheek, throat and a patch on abdomen black bordered with white; upper breast vinous-grey; remaining under-parts white; legs and feet reddish-black. **Habitat:** Sandy, shingle and pebble banks and islands of rivers; jheels, tanks, reservoirs, ditches and puddles; also estuarine coasts. **Habits:** Generally solitary or in pairs,



rarely in flocks of up to 6 birds, foraging behaviour similar to Redwattled Lapwing, breeds from March to June, nests in open sand and shingle along the river. **Voice:** Sharp and persistent high-pitched *did, did, (did...)-do-wit*. **Food:** carnivorous (molluscs, crustaceans, insects, fish, frogs, tadpoles, etc.). **Status and Distribution:** A locally common resident species in N India and foothills of the NE, show seasonal nomadic movements; Nepal; Bhutan; Bangladesh; extends to E to SC China, Indochina. **Threshold number:** 250.

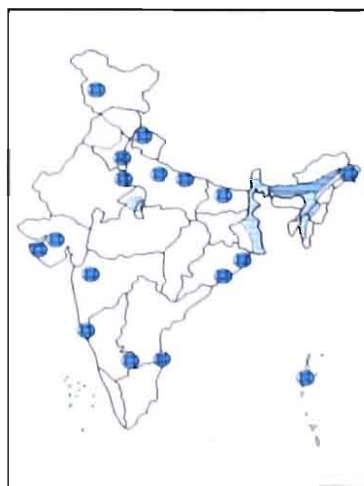
157(365). Grey-headed Lapwing. *Vanellus cinereus* (Linnaeus, 1758); Grey Partridge +; 34-37 cm; **WM/UnCom C** (Plate 24.157)



Photo: Pete Morris/Birdquest

Grey-headed Lapwing (nbr)

Diagnostics: *Adult:* Sexes alike. A comparatively larger Plover with red iris, yellow eyelids and lappets, yellow bill (terminal third black) and yellow legs. Head and neck grey; back light brown; rump, upper tail-coverts and tail white, the last with a broad black subterminal band; primaries black; secondaries white; neck and breast ashy-grey bordered by a chocolate-and-black pectoral band; remaining



underparts white. *Juvenile:* Light brown, without dark pectoral band. **Voice:** Usually silent in winter, plaintive *chee-it, chee-it*. **Habitat:** Occurs in marshes, jheels edges, riverbanks, grazing fields, ploughs and stubble. **Habits:** Gregarious, usually in parties of 5-6 or flocks up to 50 birds, commonly associated with Redwattled Lapwing. Arrives in India by September-October and departs by March end or April. **Food:** Carnivorous (insects, worms, molluscs). **Status and Distribution:** A common winter visitor to NE India, uncommon elsewhere; Nepal; Bangladesh; breeds in NE China, adjoining Russia and Japan, winter in S and SE & E Asia. **Threshold number:** 1,000.

158(366-368). Red-wattled Lapwing. *Vanellus indicus* (Boddaert, 1783); Grey Partridge +; 32-35 cm; **R/LM/Com C** (Plate 24.158)

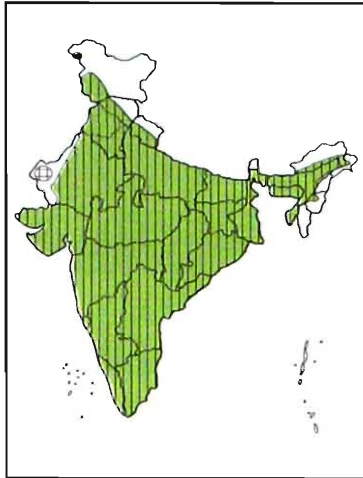


Photo: Satpal Gandhi

Red-wattled Lapwing

Diagnostics: *Adult:* Sexes alike; a familiar plover with black tipped red bill, crimson-red wattle and eyelids, and bright yellow legs. Head, neck and breast jet-black; upperparts bronze-brown; underparts white continuing to broad bands up the neck-sides towards eyes; rump, upper tail-coverts and tail white, the last with a broad sub-terminal black band; primaries and outer secondaries black, the latter with broad white bases. *Juvenile:* Black feathers of head broadly fringed with brown; chin, throat and fore-neck white; sides of neck sullied white. **Voice:** Loud penetrating *did ye do it*. **Habitat:** Found at jheels, tanks, ditches,

puddles, open cultivation, countryside and open grounds near water. **Habits:** Generally crepuscular and nocturnal; feeds actively in morning; evening or moonlit nights; keeps in pair or threes or small flocks up to a dozen birds; breeds from March to August-September in India; nests on ground in natural depressions, sometimes also at unusual places like rooftops, railway tracts, etc. **Food:** Carnivorous (molluscs, insects), rarely vegetable matter.



Status and Distribution: A common and widespread resident species all over India; undertakes altitudinal migration in spring and autumn up to 1800m; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Myanmar; extends to N Malaysia and Vietnam.

159(363). Sociable Lapwing. *Vanellus gregarius* (Pallas, 1771); Grey Partridge ±; 27-30 cm; **GT/Cr WM/Ra H** (Plate 24.159)



Photo: Marten van Dijk

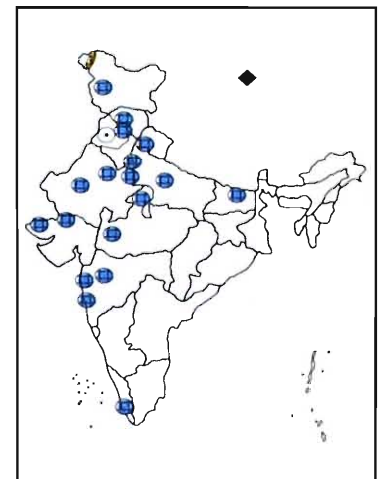
Sociable Lapwing (br)

Diagnostics: *Adult:* Sexes alike. *Non-Breeding* (winter): Crown and eye-stripe brown, forehead buff-white, supercilia white; remaining upperparts ashy-grey; wings black with large white patch (secondaries); lower back white; tail white with a black subterminal

band. Chin and throat white; breast mottled brown and grey; remaining underparts smoky-white; Bill, legs and feet black. *Breeding* (summer): Crown and eye-stripe black; forehead and supercilia pure white; throat and upper breast ashy-grey; lower breast black and chestnut; abdomen and vent white. The black subterminal tail band and large white patch in black flight feathers are diagnostic clues in flight. **Voice:** Usually silent in winter; *kyek; krreh, krreh, krreh.* **Habitat:** Occurs in fallow, wastelands, stubble, occasionally grassy margins of lakes and rivers. **Habits:** Generally keeps in small flocks of 5 or 6, before spring migration the size of flock(s) increases to 20-100; feeds generally during night, early morning or evening.

Arrives by September-October and departs by March-April in N and NW India. **Food:** Insectivorous (grasshoppers, crickets). **Status and Distribution:** *Globally threatened/ Critical.* Rare winter migrant to N and NW India, though common earlier; Pakistan; Bangladesh; Sri Lanka; Maldives; breeds in SC Asia, winter in NE Africa to Sudan and NW India.

Remarks: In India, the species was a common winter visitor to areas of the Punjab, regularly occurring in large flocks between 1910 and 1920 (BMNH label data). It was "common" around Sirsa, Haryana, in early 1931, with flocks of up to 20 birds seen, but absent from the same areas in 1933, suggesting that wintering populations fluctuate annually and regionally. Nineteenth-century reports from Kutch, Gujarat, suggested that it was "very common in open country". Numbers have dropped dramatically and the species is encountered at very few



sites. Repeated visits to dry areas of Gujarat and Rajasthan on ecotourism trips used to result in annual sightings in the 1980s, for example, but this is no longer the case and few have been seen since c.1992. **Threats:** Open areas and fallow land favoured by the species are disappearing, and grassland is becoming covered by exotic *Prosopis juliflora* trees. Dry areas of Gujarat, Haryana and Rajasthan are disappearing under cultivation, and this might be a factor underlying a decline, although the species is often seen in cultivated areas. There is apparently little hunting pressure in the Indian subcontinent. Pesticides are used liberally in India, and may have affected habitat quality. The species occurs in winter around sanctuaries such as Sultanpur jheel and Keoladeo National Park. In both Pakistan and India, protection of short-cropped dry land habitats may be needed (BirdLife Int., 2001). **Threshold number:** 8.

160(362). White-tailed Lapwing. *Vanellus leucurus* (Liechtenstein, 1823); Grey Partridge \pm ; 26-29 cm; **WM/LCom C** (Plate 24.160)



Photo: Vijay Cavale

White-tailed Lapwing

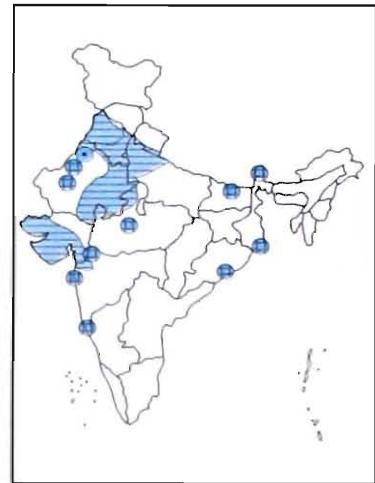
Diagnostics: *Adult:* Sexes alike. A light brown and white Plover with black bill and long



Photo: Satpal Gandhi

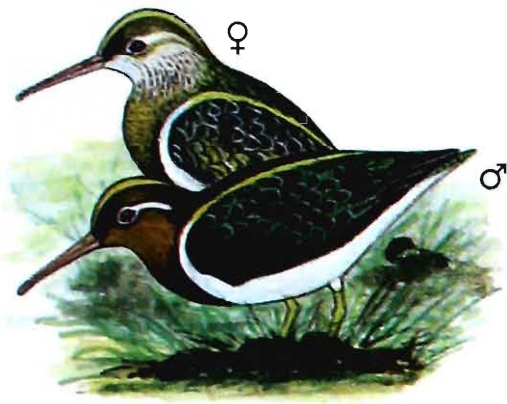
White-tailed Lapwing

prominent yellow legs; forehead and indistinct supercilia greyish-white; upper plumage light brown, except white rump and tail; chin, throat and foreneck ashy-grey; breast dark grey; abdomen and under tail-coverts rosy-white. The white rump and tail, and contrasting black primaries and white patch on secondaries are diagnostics in flight. *Juvenile:* Darker above and sullied white below. **Voice:** Usually silent in winter, soft



whistle *chee-viz, pi-wick*. **Habitat:** Freshwater marshes and marshy grassy edges of lakes and jheels. **Habits:** Gregarious, occurs in large flocks when migrating, otherwise in smaller groups of up to 25 birds, feeds in shallow water also on land. Visits N and NW India from September to March. **Food:** Carnivorous comprising aquatic insects, crustaceans, molluscs, etc. **Status and Distribution:** Locally common winter migrant to N, NW and C India; Pakistan; Nepal; Bangladesh. Breeds in Central Asian Republics, winter in C & E Pakistan, NC & NW India. **Threshold number:** 1,000.

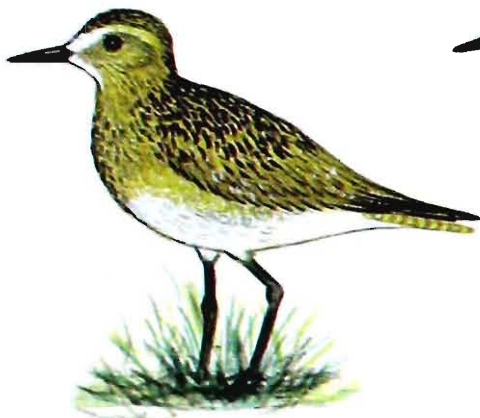
Plate 23



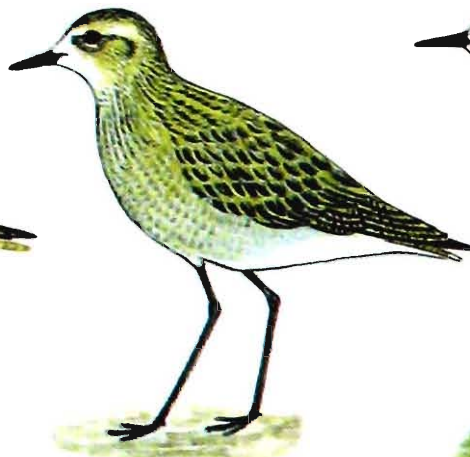
140. Greater Painted-Snipe



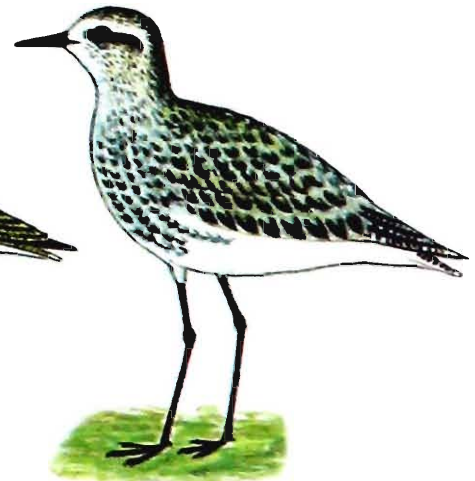
141. Eurasian Oystercatcher



142. European Golden Plover



144. Grey Plover



143. Pacific Golden-Plover



145. Common Ringed Plover



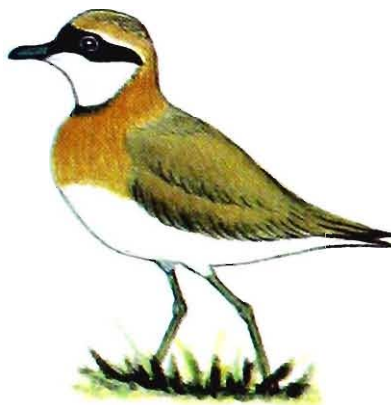
146. Long-billed Ringed Plover



147. Little Ringed Plover



148. Kentish Plover

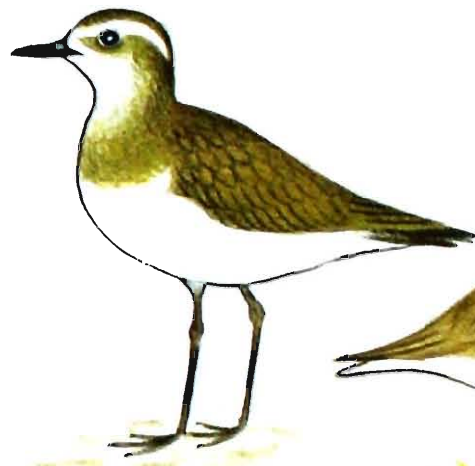


149. Lesser Sand Plover



150. Greater Sand Plover

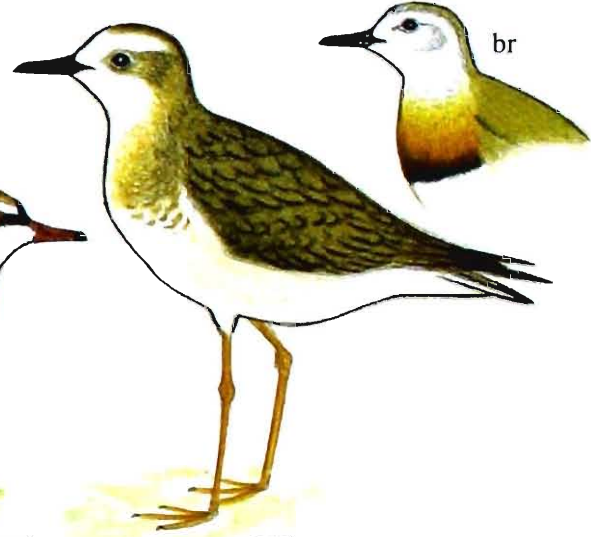
Plate 24



151. Caspian Plover



153. Black-fronted Dotterel



152. Oriental Plover



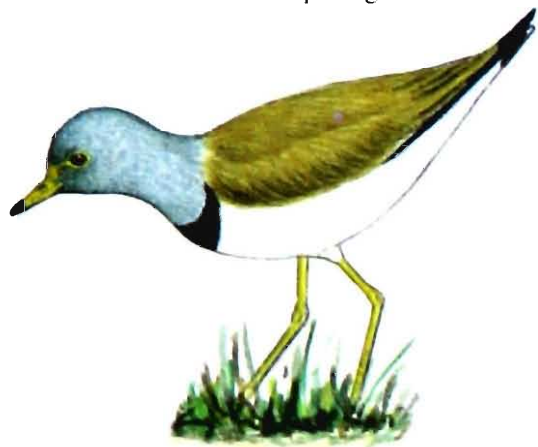
154. Northern Lapwing



155. Yellow-wattled Lapwing



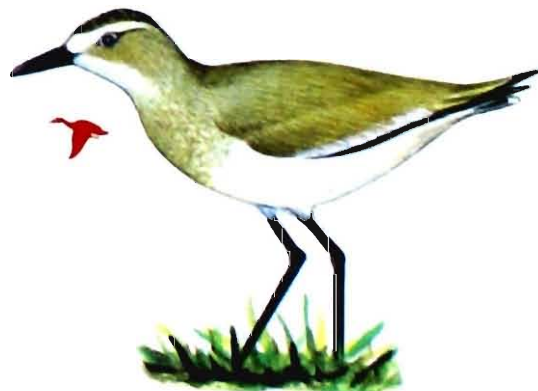
156. River Lapwing



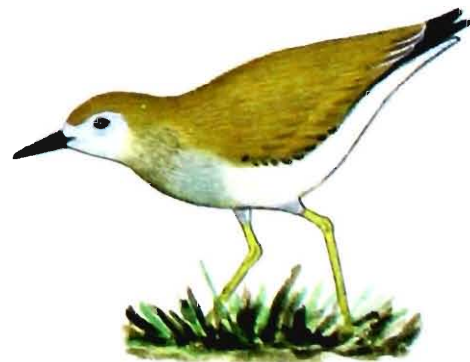
157. Grey-headed Lapwing



158. Red-wattled Lapwing



159. Sociable Lapwing



160. White-tailed Lapwing

Sandpipers, Stints, Snipes, Godwits & Curlews (Family Scolopacidae)

World: 90 species; Asia: 60; India: 37

Sandpipers and Stints are small to medium-sized waders with fairly long legs and longish bill used to probe in the mud for invertebrate prey on mudflats and at the margins of waterbodies. **Snipes** are medium-sized, stout-bodied waders with very long, fairly straight bill and highly cryptic plumage. Generally found in grassy marshland and soft margins of vegetated waterbodies probing vertically in the mud for prey. **Godwits and Curlews** are large, relatively tall, long-legged waders with long slender bills used to feed by probing in the mud for small invertebrates. The bills of godwits are slightly upcurved; those of curlews downcurved.

161(411). Eurasian Woodcock. *Scolopax rusticola* Linnaeus, 1758; Partridge -; 33-35 cm; **R/AM/WM/L.Com C/H** (Plate 25.161)



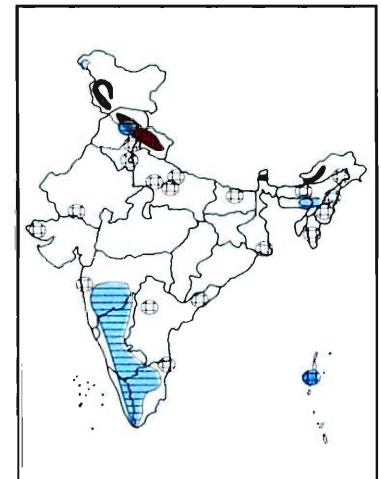
Photo: John Holmes

Eurasian Woodcock

Diagnostics: Sexes alike. An outsized snipe with cryptic colours of brown, black and white; bill long, dusky with swollen tip; head and nape with three broad transverse bands of velvet-black, divided by yellowish lines; a blackish line running from base of bill to eye; another similar line below eye and posterior ear-coverts; remaining face grey with brown spots. Hind crown, nape and rump cross-barred black and rufous; remaining upperparts

brownish-grey blotched and barred with black, rufous and buff. Chin white; remaining underparts dull greyish-white, cross-barred throughout with dark brown, more numerous on upper breast; legs short, green-grey. **Voice:** Usually silent; during display-flight *quorrr-quorrr*..... **Habitat:** Occurs at swampy glades in fir and rhododendron forests of Himalaya.

Habits: Solitary, crepuscular and nocturnal, lies in shady cover during daytime, feeds by probing in soft earth. Breeds in Himalaya between 2000-3800 m from April to July; nests in ground



depression. Arrives in south of India by October and departs by end of March. **Food:** Mainly carnivorous (ground worms), also plants and seeds. **Status and Distribution:** Resident in Himalaya, winter migrant to plains of India, locally common; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka. Also breeds across C & E Asia, winter in S and SE Asia.

162(404). Solitary Snipe. *Gallinago solitaria* Hodgson, 1831; Grey Quail +; 29-31 cm; **BRS (05) R/AM/WM/Ra C** (Plate 25.162)

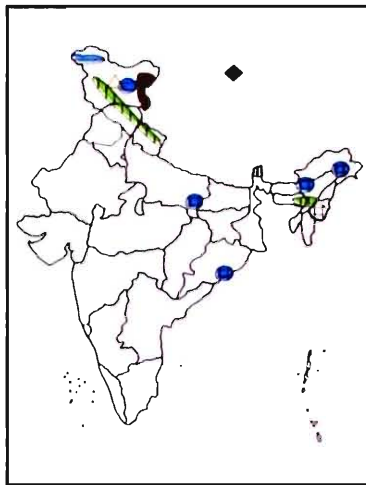


Photo: Jyn Morohashi

Solitary Snipe

Diagnostics: Sexes alike. A cryptic coloured marsh bird with plump body and long, greenish-plumbeous bill; plumage variegated

brown, black, rufous, fulvous and white. Crown black with a narrow white median band; supercilium broken, indistinctly mixed with white and brown, and narrowing behind the eye; scapulars with broad white outer edges; abdomen white, faintly barred at the sides; legs and feet plumbeous. **Voice:** Similar to Common Snipe but deeper and harsher *pench*. **Habitat:** Prefers large high-altitude boggy mountain streams and paddy fields bordered with stubble. **Habits:** Solitary, swamp-dwelling species at high altitudes in Himalaya, flies slowly and in short hops. **Food:** Carnivorous, comprising small molluscs, worms. **Status and Distribution:** *Biome Restricted Species*. Resident in Himalaya, found between 2440-4600m in summer and from 1200-3000 m in winter, an altitudinal migrant, rare winter migrant to plains; Pakistan; Nepal; Bhutan; Bangladesh. Breeds at high altitudes in C Asia and SC Siberia, probably also breeds in Puga Valley in Rupshu (Ladakh, J&K), Himachal Pradesh and Uttaranchal, winter in E Pakistan, N India and Myanmar. **Remarks:** The species is a Biome Rescricted Species (BRS) and confined to Eurasian High Montane Biome (Alpine and Tibetan). **Threshold number:** 1,000.



163(405). Wood Snipe. *Gallinago nemoricola* Hodgson, 1836; Grey Quail +; 28-32 cm; **GT/Vu BRS (05) R/AM/WM/Ra C** (Plate 25.163)

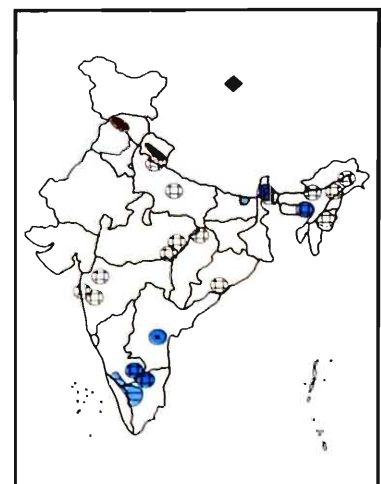
Diagnostics: Sexes alike. Bill horny brown, pointing downwards; upperparts dark brown, variegated with black, rufous and buff streaks; breast fulvous barred with brown; remaining underparts white closely barred with brown; legs dark plumbeous-green. Usually distinguished from Eastern Solitary, Pintail



Photo: Pete Morris/Birdquest

Wood Snipe

and Fantail Snipes by larger size; much darker colouration, comparatively slow flight with downward pointing bill. **Voice:** Occasionally with a low croaking when flushed. **Habitat:** Breeds in alpine meadows with streams, prefers swamps, pools and puddles. In winter, occurs in swampy areas at the edge of the forest. **Habits:** Solitary in montane areas, slow and wavering flight. **Food:** Carnivorous (aquatic insects, worms). **Status and Distribution:** *Globally threatened/Vulnerable/Biome Restricted Species*. The Wood Snipe breeds in the Himalaya and the mountains of China (and possibly in northern Vietnam), wintering southwards towards southern India, Bangladesh, Myanmar, Thailand and Indochina; rare winter migrant to Sri Lanka. A resident species throughout Himalaya, breeds from Arunachal to east of NW Himachal Pradesh between 3000-5000m. Comes down to foothills during winter, SE peninsula; Nepal; Bhutan; extends to SE Asia. **Remarks:** In



India, records of this species are broadly, but thinly scattered from Himachal Pradesh in the north-west to Assam, Arunachal Pradesh and Manipur in the north-east, southwards in hills

to the southern tip of India during winter. Nineteenth-century and early twentieth-century records show the species to be relatively widespread but generally scarce. Recent winter records of the species anywhere in India are scarce. **Threats:** In India, its population decline has occurred due to pressures (through habitat loss and hunting) exerted on the wintering population. **Habitat loss:** Breeding areas generally lie just above the treeline, a zone that is somewhat disturbed by herders in late spring and summer, possibly causing some depression of breeding success. Meanwhile, loss of marshes and undisturbed woody wetlands in the wintering range has probably contributed to an overall population decline. The fact that it was “not to be found near human habitations nor in paddy fields” suggests that the habitat available for wintering birds has declined dramatically as human populations and their associated agricultural activities have increased. **Measures Taken:** Few records fall within protected areas, but the only site that might support a regular (if small) wintering population is Periyar Sanctuary (472 km²). Schedule IV of the Indian Wildlife Act 1972 includes the general entry: “Snipes Scolopacinae” (BirdLife Int., 2001). **Threshold number:** 60.

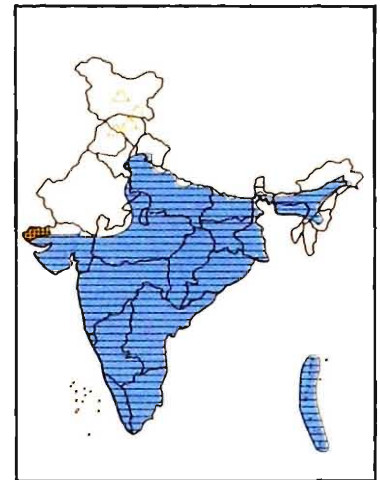
164(406). Pintail Snipe. *Gallinago stenura* (Bonaparte, 1830); Grey Quail +; 25-27 cm; **WM/LCom C** (Plate 25.164)



Photo: Gehan de Silva Wijeyeratne

Pintail Snipe

Diagnostics: Sexes alike, female slightly larger. Dark brown above heavily streaked with buff, rufous and black; dull white below. Bill long, with terminal third or half blackish-brown and basal half dull olive-green. Tail normally with 26 or 28 feathers, outer 8 or 9 on each side being stiff and narrow (pin-like, hence the name). Legs and feet plumbeous-green. **Voice:** A short rasping *pench* when flushed. **Habitat:** Occurs at edges of marshy jheels, paddy stubble, and seepage from reservoirs in foothills, occasionally on dry ground. **Habits:** Generally solitary, forages in morning and evening by probing its slender bill into soft mud, very active on cool windy days. Starts arriving by early September and departs by April. **Food:** Carnivorous, chiefly small molluscs, aquatic larvae and worms. **Status and Distribution:** A locally common winter migrant to almost whole of India including Andaman & Nicobar Islands, except northwestern and northeastern parts and Himalaya; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. Breeds in Urals to C Siberia, winter in E Africa, Saudi Arabia, and S Asia.



165(407). Swinhoe's Snipe. *Gallinago megala* Swinhoe, 1861; Grey Quail +; 25-29 cm; **WM/Ra** (Plate 25.165)

Diagnostics: Sexes alike. Indistinguishable from Pintail Snipe except in the hand, tail feathers usually 20 or 22, the six outer on each side less than 7.5 mm broad. In flight, toes project only slightly beyond tail-tip. **Voice:** Thin *pench*, but silent when flushed. **Habitat:** Like Pintail Snipe found at edges of marshy jheels, paddy stubble, and seepage from reservoirs in foothills, occasionally on dry ground. **Habits:** Usually solitary, feeds by

Photo: Adrian Boyle



Swinhoes Snipe

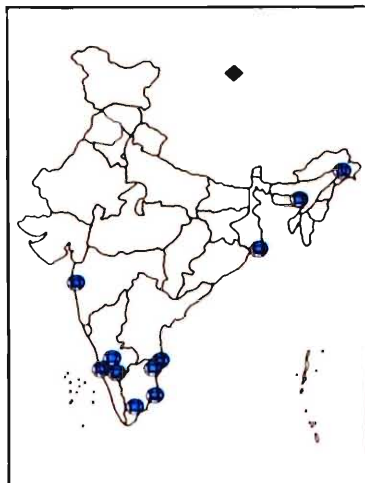
probing its slender bill into soft mud, very active on cool windy days.

Food: Carnivorous, chiefly small molluscs, aquatic larvae and worms.

Status and Distribution: A rare winter migrant to S and E India;

Nepal; Bangladesh; Sri Lanka; Maldives; breeds in CS Siberia, SE Russia and NE China.

Threshold number: 1,000.



166(408). Great Snipe. *Gallinago media* (Latham, 1787) Common Snipe +; 27-29 cm; **NT WM/Va C** (Plate 25.166)

Diagnostics: *Adult:* Sexes alike. Slightly larger and stouter than Common Snipe from which it differs by the larger amount of white in the tail (outside feathers). From Wood Snipe it differs with 2-3 white wing-bars (formed by tips to coverts) and bold barring on breast and flanks to vent, except central belly. *Juvenile:* Like adult but with narrow white tips to greater and median-coverts. **Voice:** A long single or double croak when flushed. **Habitat:** Marshy areas, also on drier grounds. **Habits:** Solitary, crepuscular, flight is slower, straighter and without zigzagging or towering

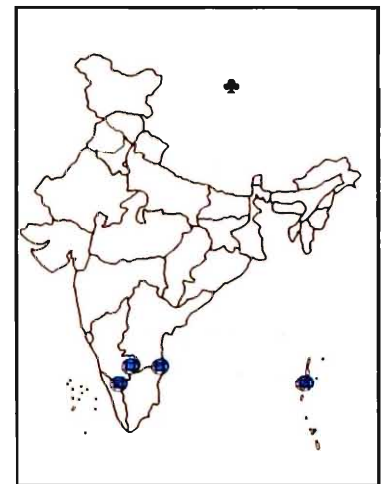


Photo: Svein Bekkum

Great Snipe

of Common Snipe. **Food:** As that of Pintail Snipe. **Status and Distribution:** *Near threatened.* A rare winter migrant to S India and Andaman & Nicobar Islands ; Sri Lanka; Myanmar; breeds in W Siberia, NE Europe; winter in Sub-Saharan Africa. **Remarks:** Its range has contracted and numbers have declined since the

late nineteenth century: although the Scandinavian population has stabilised, there are continuing rapid declines in the southern forest and forest-steppe zones of Russia and



Ukraine, largely as a result of the loss (to farmland and reservoirs) of nesting habitats—which include floodplain and tussock meadows, natural fens with scattered bushes, and peatlands up to 1,200 m—compounded by hunting in eastern Europe and in its wintering range (BirdLife Int., 2001). Recorded twice from Chennai, once each from Mysore and Andamans (Ali & Ripley, 1978); Kerala/Karnataka (Grimett *et al.*, 1998). **Threshold number:** 350.

167(409). Common Snipe. *Gallinago gallinago* (Linnaeus, 1758); Grey Quail +; 25-27 cm; **R/WM/Com C** (Plate 25.167)



Photo: C. Y. Chiang

Common Snipe

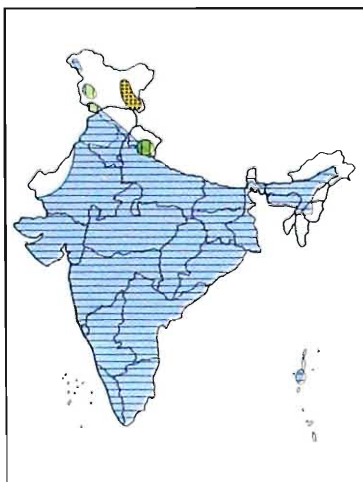
Diagnostics: *Adult:* Sexes alike. Dark brown above, heavily streaked with black, rufous and buff; whitish below; head with a buff median stripe and supercilium; bill olive-yellow on basal half and dark horny-brown to blackish on terminal half; tail-feathers 14 or 16; legs and feet dull olive-green. In flight, the long straight bill held downwards; distinguished from Pintail Snipe only when the bird is in hand.

Juvenile: Like adults, but with whitish fringes on mantle feathers and wing-coverts.

Voice: An urgent rasping *pench*.

Habitat: Occurs at swampy edges of jheels, marshes around reservoirs,

paddy stubble, muddy edges of rivers and pools. **Habits:** Solitary; occasionally in flocks; crepuscular and nocturnal, though feeds in daytime. Breeds from late April to mid-June, nest is a shallow depression lined with grasses. Starts arriving in plains by end of August to September and departs by April. **Food:** Carnivorous, chiefly small molluscs, aquatic larvae and worms. **Status and Distribution:** Resident in Himalaya, between



1600-4500 m, in Kashmir and Garhwal, common and widespread winter migrant to rest of India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives; breeds from NC Asia to Kamchatka, W Aleutians.

168(410). Jack Snipe. *Lymnocyptes minimus* (Brunnich, 1764); Grey Quail ±; 17-19 cm; **WM/UnCom C/H** (Plate 25.168)



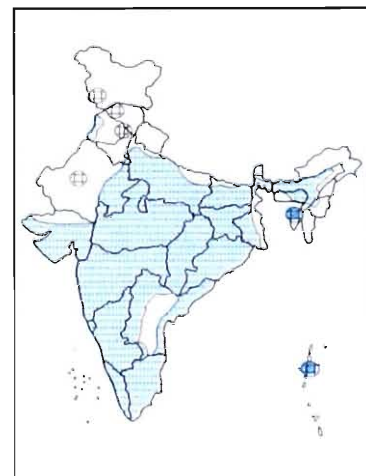
Photo: Svein Bekkum

Jack Snipe

Diagnostics: Sexes alike. The smallest snipe with relatively shorter and stouter bill, shining metallic green and purple back boldly streaked with buff, wedge-shaped tail, and pale olive-green legs and feet. **Voice:** Usually silent in winter, *kurrr*. **Habitat:** Found in swamps, around jheels, marshes, waterlogged paddy fields. **Habits:** Invariably solitary, generally crepuscular and nocturnal. Arrives by end of October and departs by April. **Food:** Chiefly carnivorous on small molluscs, aquatic insects and larvae, occasionally on aquatic plants.

Status and

Distribution: An uncommon winter migrant almost throughout India generally below 1500 m, except parts of NW, NE and Himalaya; Pakistan; Nepal; Bangladesh; Sri Lanka; Myanmar. Breeds in C and E Siberia, winter in S Asia and Myanmar.



169(389-390). Black-tailed Godwit. *Limosa limosa* (Linnaeus, 1758); Hen =; 36-44 cm; **WM/LCom C/H** (Plate 25.169)

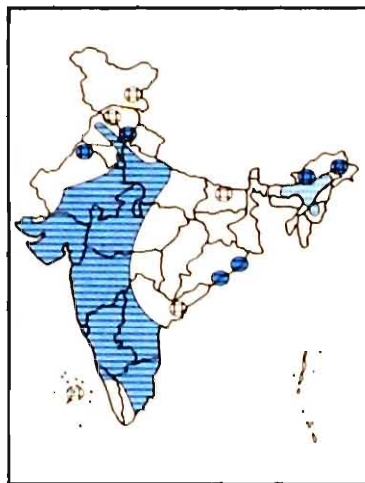


Black-tailed Godwit



Photo: Gehan de Silva Wijeyeratne

Diagnostics: Adult: Sexes alike but female slightly larger; bill long, slender and straight with red base and dusky tip; upperparts grey-brown, with white upper tail-coverts; underparts white; legs and feet greyish-green. In summer, assumes chestnut head and breast, bars on flanks; white chin, throat, abdomen and lower back. In flight, broad white wing-bars, white rump and black tail-tip distinctive. **Voice:** Silent in winter, low trisyllabic *wit-wit-wit* or *quick-quick-quick*. **Habitat:** A predominant freshwater species,



found at inland jheels, shallows and mud banks of rivers, lakes and reservoirs, sometimes also in brackish lagoons, tidal waters and coastal saltpans. **Habits:** Gregarious, often occurs in large flocks, common in stagnant waters at the margins of drying jheels; flocks often wade into shallow water up to the belly feeding with head and neck submerged. **Food:** Chiefly carnivorous (molluscs, crustaceans), also seeds of aquatic plants. **Status and Distribution:** A locally common and widespread winter migrant to India extending eastward up to W. Bengal; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. Breeds in C Asia, disjunct areas in C & E Siberia, winter in S & SE Asia, Philippines to Australia. **Threshold number:** 1,000.

170(391-391a). Bar-tailed Godwit. *Limosa lapponica* (Linnaeus, 1758); Hen =; 37-41 cm; **WM/UnCom C** (Plate 25.170)



Bar-tailed Godwit

Photo: Christoph Bock

Diagnostics: Sexes alike, except in summer; a dark-patterned sandy brown bird with parti-coloured black-and-white tail; flesh-coloured bill (terminal half-black); and greenish-grey legs and feet. **Non-breeding (winter):** Plumage like Black-tailed Godwit, but distinguished by slender straight bill slightly upcurved and shorter legs when the bird is at rest. **Breeding (summer):** Head, neck and underparts of the male are rich rufous; female duller and browner. In flight, absence of white wing-bar and barred tail are pointers. **Juvenile:** Like

Photo: Christoph Bock

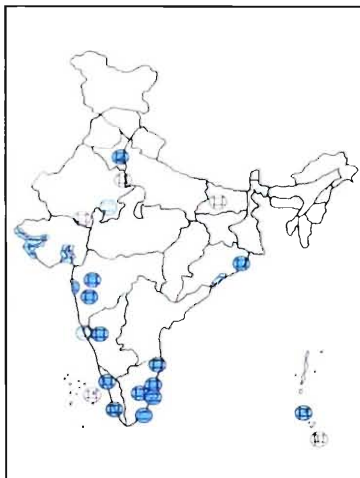


Bar-tailed Godwit (br & nbr)

adult in winter but the breast buff, mottled and streaked blackish. **Voice:** A barking *kak-kak*. **Habitat:** Generally estuaries, lagoons and salt pans, rarely on inland waters, lakes. **Habits:** Gregarious, mostly coastal in mixed flocks with Black-tailed Godwit and other waders, one of the earliest migrants from western coasts of the subcontinent. **Food:** Carnivorous (molluscs, marine worms and insects). **Status**

and Distribution:

A widespread but uncommon winter migrant, more frequent in NW India; Pakistan; Bangladesh; Sri Lanka and Maldives. Breeds in C Siberia, winter in Coastal Arabian Peninsula, S Iran E to NW India and E African Coast. **Threshold number:** 1,300.



171(385-386). Whimbrel. *Numenius phaeopus* (Linnaeus, 1758); Hen =; 40-46 cm; **WM/UnCom C** (Plate 26.171)

Diagnostics: *Adult:* Sexes alike. Bill long, down curved, horny brown; crown black with one white median stripe and two white superciliary stripes; a dark brown band from lores through eye to ear-coverts. Upperparts sandy brown with whitish spots; lower back and rump white; tail ashy-brown with blackish bars; chin, throat and abdomen white, remaining underparts dusky; white-black streaks on foreneck and breast, and bars on



Photo: John Holmes

Whimbrel

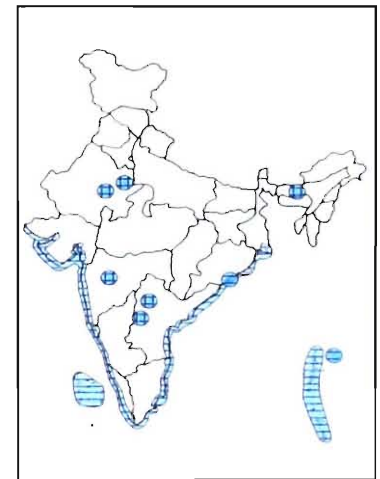
flanks; legs and feet greenish-grey. *Juvenile:*

Mantle buff-scalloped; lower back, rump and upper tail-coverts white, finely brown scalloped.

Voice: Distinctive whistle *he-he-he-he-he*.

Habitat: Mainly intertidal coastal mudflats, mudbanks of tidal

creeks and mangroves; occasionally on inland waters when in passage. **Habits:** Gregarious, often found in flocks of 5-15 in winter, walks about on mud and feeds by picking up from surface or by probing. **Food:** Carnivorous (crabs, molluscs, crustaceans). **Status and Distribution:** An uncommon winter migrant to inland but locally common on Indian coasts; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives. Breeds in C, E Siberia, winter S Asia. **Threshold number:** 1,000.



172(387-388). Eurasian Curlew. *Numenius arquata* (Linnaeus, 1758); large hen =; 50-60 cm; **WM/UnCom C** (Plate 26.172)



Photo: Svein Bekkum

Eurasian Curlew

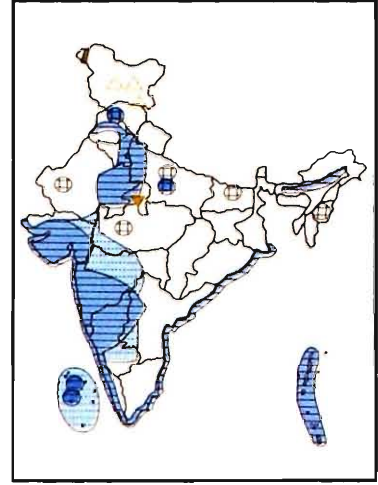
Diagnostics: *Adult:* Sexes alike. An unmistakable wader with long, slender and strongly downcurved dark brown bill; bluish-grey legs and feet; plumage, streaked buff and brown, abdomen whitish streaked with black; white lower back and rump conspicuous in flight. *Juvenile:* With more pronounced buff streaks on upperparts; white back; buff tinge on rump; narrow black streaks on breast and abdomen. **Voice:** Plaintive *cur-lew*. **Habitat:** Occasionally on large lakes, mudflats, commonly around tidal estuaries and creeks. **Habits:** Keeps singly or in small flocks of



Photo: Satpal Gandhi

Eurasian Curlew

about 6 birds, runs around and feeds between tidemarks, wary and difficult to approach. Starts arriving in India by October and departs by April end or early May. **Food:** Carnivorous, comprising fiddler and sand crabs, crustaceans and insects. **Status and Distribution:** An uncommon winter migrant to the whole of the subcontinent, migrant mainly to the coastal areas; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. Breeds in Siberia, winter in S, SW Asia. **Threshold number:** 1,000.



173(392). Spotted Redshank. *Tringa erythropus* (Pallas, 1764); Grey Partridge ±; 29-32 cm; **WM/LCom C** (Plate 26.173)



Photo: Vijay Cavale

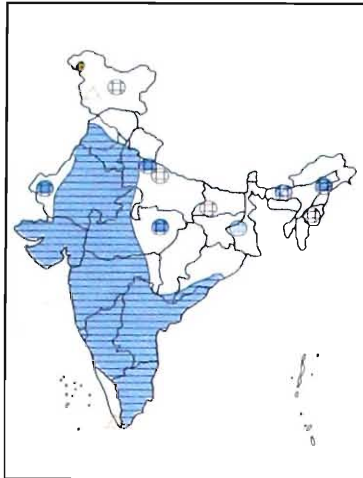
Spotted Redshank (nbr)

Diagnostics: Sexes alike. *Non-breeding* (winter): Brownish-grey with faint white spots; red and black bill and red legs; head, hind neck and back ashy-brown; supercilia white; upper back with tiny white fringes on each feather; scapulars and inner secondaries notched with black and white; wing-coverts with broad white fringes; lower back, rump and tail-coverts white, the last barred with black; tail ashy-brown, barred with white on edges; underparts white with brown on neck and

upper breast; dusky tinge on flanks. *Breeding* (summer): Overall sooty; black spotted; scalloped with white. **Voice:** Distinctive *tu-ick*.

Habitat: Occurs at inland jheels and tanks, muddy banks and shallow waters of lakes and rivers, also in tidal estuaries and creeks.

Habits: Generally solitary or in small flocks in company of other waders, forages either in water or by picking from surface in open deep waters. Starts arriving in India by mid-September and departs by end of April.



Food: Carnivorous (molluscs, crustaceans and insects). **Status and Distribution:** A locally common winter migrant in much of India including Kashmir, except Far East and the Himalaya, where scarce; Pakistan; Nepal; Bangladesh; Sri Lanka. Breeds in N Siberia, winter in NW India, Pakistan, NE India, Bangladesh. **Threshold number:** 250.

174(393-394). Common Redshank. *Tringa totanus* (Linnaeus, 1758); Grey Partridge ±; 27-29 cm; R/WM/Com C (Plate 26.174)

Photo: Svein Bekkum



Common Redshank (br)

Diagnostics: *Adult:* Sexes alike. *Non-breeding* (winter): Mottled grey-brown above and white below with orange-red legs and basal third of bill; lower back, rump and tail white, the last

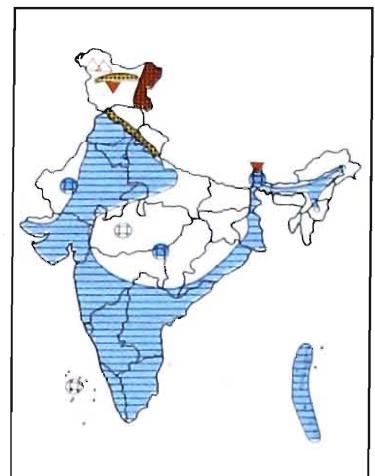


Photo: Alister Benn

Common Redshank (winter morph) (nbr)

barred with brown; breast finely streaked with brown. *Breeding* (summer): Upperparts streaked and spotted with black and fulvous; upper breast heavily streaked with brown; lower breast with dark crescent spots. The white edges to the dark greyish wings and the white lower back and rump are diagnostic in flight. *Juvenile:* More rufous above; scapulars with fulvous spots; flanks with more black bands. **Voice:** Shrill piping *tiwee-tiwee*. **Habitat:** Found at marshes, muddy edges of rivers, lakes, muddy pools, mudbanks of mangroves, saltpans, tidal creeks and estuaries. **Habits:** Occurs alone or in small groups with other waders, wary and noisy, feeds by picking from surface while walking, shallow water wader. **Food:** Carnivorous, comprising molluscs, aquatic insects and worms. **Status and Distribution:**

A common winter migrant, except C and E India and part of Himalaya; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. Breeds in Pamirs, Russia E of Ural, C & S Tibet, India {Ladakh (Tsokar, Tso Moriri and



Pangong lakes, Rupshu, Chushul, etc.), Kashmir and Sikkim between 4000-5000 m from May to July}, winter in India, Sri Lanka. **Threshold number:** 10,000.

175(395). Marsh Sandpiper. *Tringa stagnatilis* (Bechstein, 1803); Grey Partridge-; 22-25 cm; **WM/LCom C** (Plate 26.175)

Photo: Gehan de Silva Wijeyeratne

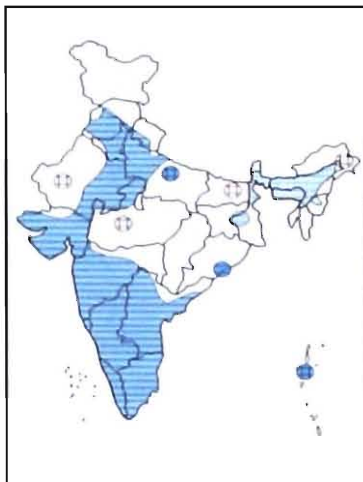


Marsh Sandpiper

Diagnostics: Sexes alike. *Non-breeding* (winter): Greyish-brown above and white below with white forehead, supercilium, sides of head, lower back and rump; black bill; greenish legs. *Breeding* (summer): Sandy grey above and white below with dark angular spots on back; brown spots on foreneck and upper breast; irregular bars on flanks; narrow bars on tail.

Voice: Series of *kiu-kiu-kiu*.

Habitat: Occurs at swampy edges of freshwater ponds and jheels, paddy fields and marshes, also



intertidal mudflats, brackish lagoons and salt pans. **Habits:** Generally solitary, sometimes in flocks with other waders, forages actively at the edges of water bodies or on mud, probes occasionally. Arrives in India by mid-August and departs by end of April or early May. **Food:** Carnivorous, comprising molluscs, crustaceans, insects and worms. **Status and Distribution:** A locally common and widespread winter migrant to India; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. Breeds in Siberia, winter S Asia.

176(396). Common Greenshank. *Tringa nebularia* (Gunner, 1767); Grey Partridge +; 30-34 cm; **WM/LCom C** (Plate 26.176)



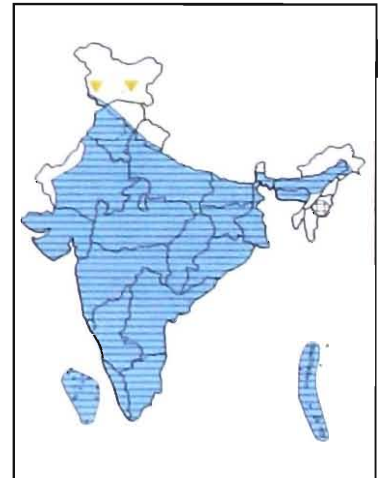
Photo: Gehan de Silva Wijeyeratne

Common Greenshank

Diagnostics: Sexes alike. *Non-breeding* (winter): Dark greyish-brown above and white below. White forehead; lower back, rump and tail, the last with faint, almost invisible barring. Greyish on foreneck and sides of head; bill greenish-brown, blacker at tip and slightly upcurved; legs and feet olive-green. *Breeding* (summer): Darker above, with broad black centres on back and scapulars. In flight distinguished from Marsh Sandpiper by larger size, and from Redshank by absence of white wing-bar. Olive-green legs and slightly up-curved bill. **Voice:** A loud ringing *tu-tu-tu*.

Habitat: Found at riverbanks, marshes, puddles, paddy fields, tanks, jheels and brackish pools, coastal lagoons, tidal creeks and salt pans. **Habits:** Forages in scattered parties with other sandpipers, occurs in flocks of 15-20 birds

when migrating, runs around on mud often probing for food, wades in shallow water. Arrives by second half of August in India and departs by end of April or early May. **Food:**



Carnivorous (tadpoles, molluscs, crustaceans,

insects). **Status and Distribution:** A locally common and widespread winter migrant all over India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives. Breeds in C Asia, C and E Siberia, winter in S Asia. **Threshold number:** 1,000.

177(399). Spotted Greenshank. *Tringa guttifer* (Nordmann, 1835); Nordmann's Greenshank (I); Grey Partridge ±; 29-32 cm; GT/En WM/Va C (Plate 26.177)

Photo: John Holmes



Spotted Greenshank (br)

Photo: Tun Pin Ong

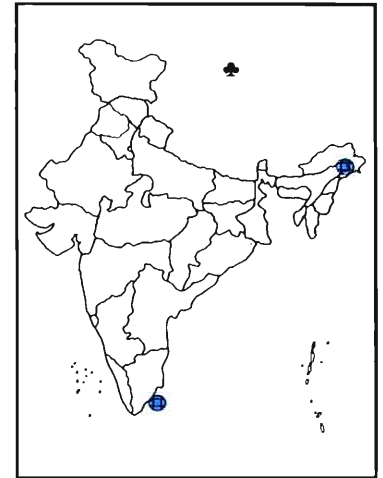


Spotted Greenshank (nbr)

Diagnostics: Sexes alike. Like Common Greenshank but with yellow legs. *Non-breeding* (winter): Head and neck washed grey with fine streaks; scapulars grey, notched with triangular white spots; remaining upperparts ashy-brown; primaries black; tail ashy-white; underparts white. *Breeding*: (summer): Upperparts blackish-brown with a few white spots on scapulars; scattered dark spots on foreneck and breast; remaining underparts pure white. **Voice:** Shrill

piping *tiwee-tiwee-tiwee*. **Habitat:** Coastal mudflats, beach areas, sandbanks and swamps.

Habits: Generally solitary or in very small flocks of 3-5 birds in the company of Redshanks. Wary and usually silent, often wades up to belly, feeds in



shallow water. **Food:** Carnivorous, generally molluscs, crustaceans, insects and tadpoles. **Status and Distribution:** *Globally threatened/Endangered*. A vagrant winter migrant to India; Bangladesh; Sri Lanka; Myanmar. Breeds on Sakhalin Isles and W Okhotsk Sea, winter in NE India, Bangladesh, Myanmar & SE Asia. **Remarks:** *Population:* The Spotted Greenshank always appears to have been rare, possibly because of the limited availability of its specialised breeding habitat. Much of its breeding range is in remote areas, and it occurs at very low densities in its non-breeding range, therefore, hard to assess the numbers. It has been estimated to total about 1,000 birds. In India, an extremely rare non-breeding visitor with statewise records as follows: in Assam near the Brahmaputra river, “occurs in passage, both autumn and spring on the wider expanses of cultivation and swamps”, undated; Daphlang beel, Baguri, Kaziranga National Park, one, April 1994; Surma valley, “in passage, both autumn and spring”, undated. The main threats to the species are the degradation of coastal wetlands throughout Asia for industry, infrastructure, aquaculture and pollution. It is listed on Appendix I of CITES. Recorded once in passage near Kaziranga NP (1994), Brahmaputra river and Surma valley in early nineteenth century (BirdLife Int., 2001). **Threshold number:** 6.

178(397). Green Sandpiper. *Tringa ochropus* Linnaeus, 1758; Grey Quail +; 21-24 cm; **WM/PM/LCom C** (Plate 26.178)

Photo: John Holmes



Green Sandpiper (nbr)

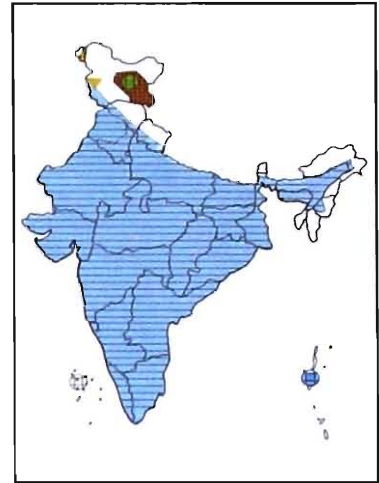
Photo: Gehan de Silva Wijeyeratne



Green Sandpiper (br)

Diagnostics: *Adult:* Sexes alike. *Non-breeding* (winter): Head and neck ashy brown; remaining upperparts dark brown with green-bronze sheen; tail white with faint blackish terminal bars; underparts white with fine brown streaks on throat, breast and flanks. *Breeding* (summer): Darker, spotted lightly with white. *Juvenile:* With bronze narrow scalloping on upperparts and narrow bars with a broad terminal band on tail. Distinguished from similar Wood Sandpiper by more white on rump and tail, and darker surface of upper- and underwings. **Voice:** Shrill piping *ti-tui* or *twee-twee-twee*. **Habitat:** Generally favours small wetlands like village tanks, puddles, streams, marshes and paddy fields, though affect lakes. **Habits:** Generally solitary, gathers into small flocks of 15 to 20 when migrating,

not found in company of other waders; runs about and feeds at water edge, also wades in shallow water and probes by bill. **Food:** Carnivorous - molluscs, crustaceans and aquatic insects. **Status and Distribution:** A locally common and widespread winter and passage migrant to much of India up to 2000 m; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka. Breeds in Casia to E Siberia, winter in S and SE Asia.



179(398). Wood Sandpiper. *Tringa glareola* Linnaeus, 1758; Grey Quail ±; 18-21 cm; **WM/LCom C** (Plate 26. 179)



Photo: Svein Bekkum

Wood Sandpiper (br)

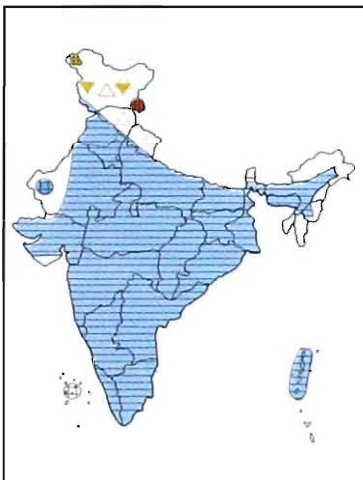
Diagnostics: Sexes alike. *Non-breeding* (winter): Grey-brown above spotted white; white below with dusky breast; bill blackish; supercilium whitish; lower back, rump and tail white, the last blackish



Photo: Alister Benn

Wood Sandpiper (nbr)

barred; legs and feet olive-green. **Breeding** (summer): Darker with conspicuous white spots. In flight, grey-brown upperparts, white rump, barred brown-and-white tail, and absence of wing-bar is diagnostic. **Voice:** Soft *chip, chip, chip*. **Habitat:** Prefers jheels with emergent vegetation, marshes, village tanks, paddy fields, irrigation tanks in lowlands, and tidal creeks, occasionally up to 2000 m. **Habits:** Gregarious, often in flocks of 20-30, still larger flocks at the time of migration, when also shows territorial behaviour, wades for feeding in shallow waters. **Food:** Carnivorous, comprising tiny fishes, molluscs, crustaceans. **Status and Distribution:** A locally common winter migrant to much of India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives. Starts arriving in India by end of August and depart by March/May. Breeds in C & E Siberia to Kamchatka, Commander Isles, winter in S Aia. **Threshold number:** 10,000.



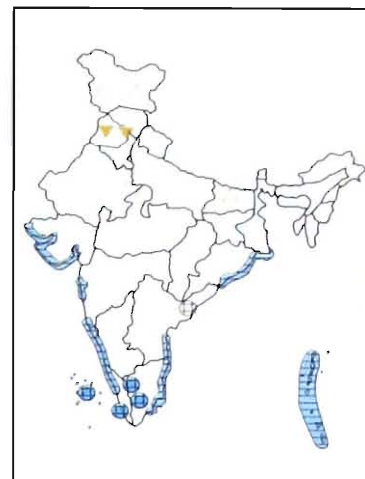
180(400). Terek Sandpiper. *Xenus cinereus* (Guldenstadt, 1774); Grey Quail +; 22-25 cm; **WM/PM/UnCom C** (Plate 26.180)



Photo: John Holmes

Terek Sandpiper

Diagnostics: Sexes alike; an unmistakable bird with long, slender and upcurved bill (yellow base and black or dark brown tip); orange-yellow short legs. **Non-breeding** (winter): Forehead and supercilia white; upperparts greyish-brown with blackish streaks; underparts pure white. **Breeding** (summer): Sides of head and neck, and breast streaked with brown; upperparts boldly streaked with black. **Voice:** Soft *tooit-twit-twit*. **Habitat:** Seashores, mudbanks



of mangrove creeks and coastal lagoons. **Habits:** Gregarious, keeps in small flocks of 10-15 birds, generally feeds on seashore between the tidemarks. **Food:** Carnivorous - small molluscs, crustaceans and aquatic insects. **Status and Distribution:** A common winter migrant to the coastal areas, uncommon passage migrant to inland areas of the country like Punjab; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. Starts arriving by early August and departs by April/May. Breeds in Boreal Siberia, winter in S India and Sri Lanka. **Threshold number:** 1,000.

181(401). Common Sandpiper. *Actitis hypoleucos* Linnaeus, 1758; Grey Quail =; 19-21 cm; **R/WM/LCom C** (Plate 26.181)



Photo: Alister Benn

Common Sandpiper

Photo: Svein Bekum



Common Sandpiper

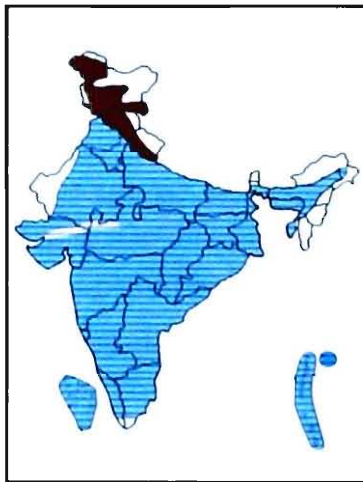
Diagnostics: Sexes alike. *Non-breeding* (winter): Olive-brown above and white below with more ash-brown on head and sides of neck; supercilia pale and indistinct; rump and tail brown with only the outer tail-feathers white; breast lightly brown-streaked; a prominent small white patch - dividing band of wing from side of breast. *Breeding* (summer): Darker above and speckled; foreneck and breast boldly brown-streaked. In flight distinguished by white wing-bar and brown rump.

Voice: Alarming note *tee-tee-tee*.

Habitat: Hill streams and rivers during breeding season; in winter prefers freshwater bodies, village tanks, stream banks, ditches, rivers, canals,

lakes; tidal creeks, rocky seashores, harbours and docks. **Habits:** Generally solitary or in twos or threes in non-breeding season; runs along water edge and picks up tidbits from ground or vegetation; regularly wags its tail and bobs the head constantly while feeding.

Food: Carnivorous - small molluscs, crustaceans, aquatic insects. **Status and Distribution:** Breeds in higher elevations of Kashmir, Ladakh and Garhwal between 1800-3200 m in May and June; locally common winter migrant to all over India; Pakistan;



Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives. Breeds in C Asia, Siberia, winters in S Asia.

182(402). Ruddy Turnstone. *Arenaria interpres* (Linnaeus, 1758); Grey Quail ±; 23 cm; **WM/LCom C** (Plate 27.182)



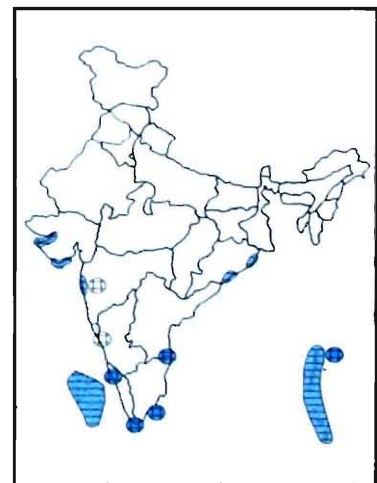
Photo: Peter Ericsson

Ruddy Turnstone (br)

Diagnostics: Sexes alike. Dark brown and white wader with glistening white chin and throat, straight conical black bill and orange-red legs. *Non-breeding* (winter): Upperparts dark brown and white; lower back, rump and tail-coverts white, the last with a dark brown cross-bar; tail dark with white tip; foreneck and sides of breast brown; remaining underparts including chin and throat pure white. *Breeding*

(summer): Head white streaked with black on crown; a black band from forehead to eye; a black patch below eye; upperparts chiefly black and deep rufous; foreneck and sides

of breast black; remaining underparts white. **Voice:** Metallic twitter. **Habitat:** Predominantly coastal rocky and sandy shores, also tidal mudflats, rarely on inland waters. **Habits:** Occurs in small flocks, runs actively on sandy banks; often forages by turning over pebbles



and shells. **Food:** Carnivorous, comprising small crabs, molluscs, crustaceans and marine worms. **Status and Distribution:** Locally common winter migrant, chiefly along the western coast, inland vagrant; arrives towards the end of August and departs by May; Pakistan; Nepal; Sri Lanka; Maldives. Breeds in High Arctic Siberia, winters in S Asia. **Threshold number:** 1,000.

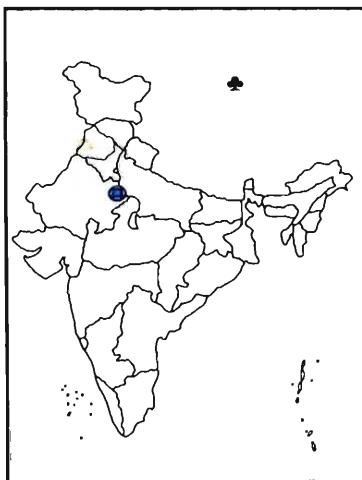
183(N). Long-billed Dowitcher. *Limnodromus scolopaceus* (Say, 1823); 29 cm; WM/Va (Plate 27.183)

Photo: K. Chaiyan



Long-billed Dowitcher

Diagnostics: Sexes alike; smaller than Asian Dowitcher; bill straight, long and greenish; upperparts whitish; legs greyish green. In flight, underwings lightly barred. **Non-breeding** (winter): Breast and upperparts slightly darker, grey breast and white belly relatively distinct. **Voice:** Thin *keek*. **Habitat:** Jheels, marshes, coastal mudflats. **Habits:** Not recorded in India. **Food:** Not recorded. **Status and Distribution:** Vagrant winter migrant to India. **Remarks:** Recorded once from Rajasthan (Grimett, *et al.* 1998)



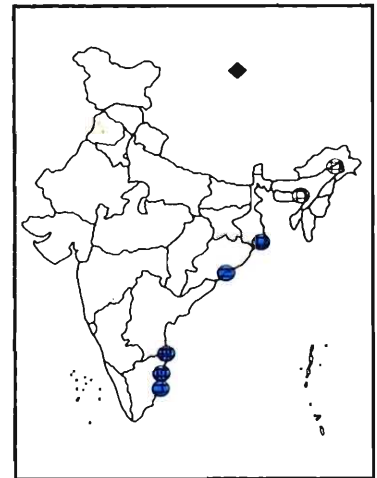
184(403). Asian Dowitcher. *Limnodromus semipalmatus* (Blyth, 1848); Grey Partridge +; 34-36 cm; NT WM/Ra C (Plate 27.184)



Photo: Tun Pin Ong

Asian Dowitcher (bird with dark legs)

Diagnostics: Sexes alike. Similar to Godwit but has conspicuously broad-based and all-black long bill, swollen at tip. **Non-breeding** (winter): Supercilium broad and white, upperparts blackish-grey with white scalloping, underparts whitish with dark grey streaks except throat and belly. **Breeding** (summer): Head, neck, breast, belly and upperparts rufous, mantle feathers with black centres, under tail-coverts white barred brown. **Voice:** Usually silent in winters. **Habitat:** Mainly coasts, intertidal mudflats, brackish waters and mudbanks of large tidal rivers. **Habits:** Generally roosts in small mixed parties with Godwit and other waders, feeds by probing deep into mud. **Food:** Carnivorous, usually molluscs, crustaceans and worms, occasionally seeds of marshy vegetation. **Status and Distribution:** Rare winter migrant to Indian coasts; Bangladesh and Sri Lanka; breeds in W, C & E Siberia, Mongolia, N Manchuria, winters in E India, SE Asia, N



Australia. **Remarks:** It breeds in extensive freshwater wetlands in the steppe and forest-steppe zones, during the nonbreeding season it occurs in sheltered coastal environments, primarily estuarine and intertidal mudflats, lagoons, creeks and saltworks. Recent population estimates include 15,000–23,000 birds. It may therefore be particularly vulnerable to habitat loss, hunting, pollution and other pressures on both the breeding and wintering grounds. **Threshold number:** 230.

185(413). Great Knot. *Calidris tenuirostris* (Horsfield, 1821) Grey Partridge -; 26-29 cm; **WM/UnCom C** (Plate 27.185)

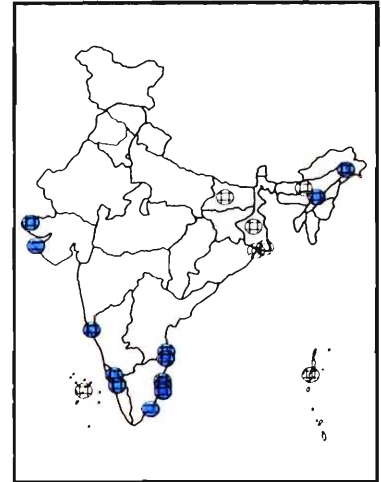


Photo: K. Chaiyan

Great Knot (nbr)

Diagnostics: Sexes alike; larger than Red Knot. A stocky shore bird with dusky black bill slightly decurved at tip; and dark green legs. *Non-breeding* (winter): Upperparts light brownish-grey, streaked with black; foreneck and upper breast with dark brown streaks or spots; remaining underparts white. *Breeding* (summer): Head, neck, and mantle heavily streaked with black; scapular boldly spotted with chestnut; breast and flanks spotted with black, the spotting on breast often merges to form solid black patch. **Voice:** A low *nyut nyut*. **Habitat:** Prefers tidal mudflats and creeks on the seacoasts, lagoons. **Habits:** Gregarious, often roosts on tidal mudflats in mixed flocks with other waders. **Food:** Carnivorous - tiny crustaceans, molluscs etc washed up on the

seashore. **Status and Distribution:** Uncommon winter migrant to the Indian coasts, rare inland; Pakistan; Bangladesh; Sri Lanka. Breeds in NE Siberia; winters S & SE Asia and Australia. **Threshold number:** 3,800.



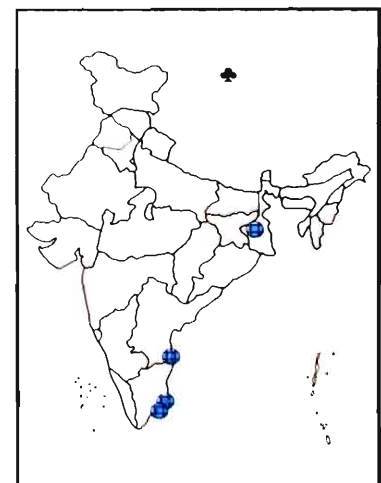
186(412). Red Knot. *Calidris canutus* (Linnaeus, 1758); Grey Quail +; 23-25 cm; **WM/Va C** (Plate 27.186)



Photo: Gehan de Silva Wijeyeratne

Red Knot (nbr)

Diagnostics: Sexes alike; like Great Knot but slightly smaller with round body; straight and relatively shorter black bill; and yellowish-green legs. *Non-breeding* (winter): Upperparts ashy-grey with thin whitish fringes and narrow blackish shaft-streaks; underparts whitish with faint streaks on breast and upper belly. *Breeding* (summer): Strongly mottled chestnut, black above; bright rufous below.



Voice: Usually silent. **Habitat:** Coastal mudflats and shores. **Habits:** Gregarious, feeds by probing in to soft mud. **Food:** Carnivorous-tiny crustaceans, molluscs, etc. washed up on the seashore. **Status and Distribution:** A vagrant winter migrant to the coastal areas; Pakistan; Bangladesh; Sri Lanka. Breeds in C Siberia, winters in SW & S Africa, Sri Lanka. **Remarks:** Vagrant to SE coast and W Bengal (Grimett, *et al.* 1998). **Threshold number:** 3,400 (W African population).

187(414). Sanderling. *Calidris alba* (Pallas, 1764); Grey Quail; 19-20 cm; **WM/LCom C** (Plate 27.187)

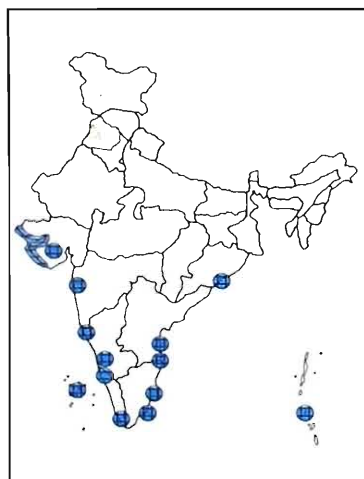
Photo: S. Guliano & S. Somazzi



Sanderling (nbr)

Diagnostics: Sexes alike. *Non-breeding* (winter): Face whitish; upperparts pale grey with blackish shoulder patch; under parts white; bill and legs black. *Breeding* (summer): Sides of head, breast and upperparts rufous mottled with black; underparts pure white. *Juvenile:* Chequered black-and-white above and whitish below.

In flight, the broad white wing-bar is a pointer. **Voice:** Shrill *wick-wick*. **Habitat:** Seashore, Sandy beaches, Coastal mudflats. **Habits:** Forages in mixed flocks with other small waders, runs



swiftly with water line to pick up the titbits the wave may cast ashore. **Food:** Carnivorous-tiny crustaceans, molluscs and other small animals. **Status and Distribution:** Winter migrant to coasts, very rare inland; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. Breeds on Arctic Tundra, winters in coasts of S Asia. **Threshold number:** 1,000.

188(423). Spoonbill Sandpiper. *Calidris pygmeus* (Linnaeus, 1758); **Spoon-billed Sandpiper** (I); Little Stint ±; 14-17 cm; **GT/En WM/Ra C** (Plate 27.188)



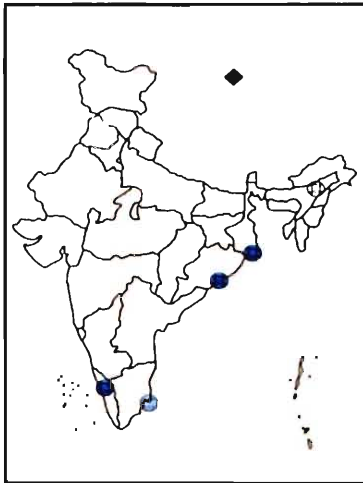
Photo: Chris Schenk

Spoonbill Sandpiper

Diagnostics: Sexes alike; a small stint-like wader (in all plumages) with black bill, legs and feet. The spatulate tip to bill, though difficult to see when viewed sideways on, is the best identification. *Non-breeding* (winter): Plumage similar to Little Stint, but with paler grey upperparts (with darker shaft-streaks); pronounced white supercilium, forehead and cheek; and cleaner and whiter underparts. *Breeding* (summer): Like rufous-necked stint but with more rufous-orange face and breast; blackish upperparts, fringed with rufous; and whitish remaining underparts. **Voice:** Soft rolling *preep*. **Habitat:** The Spoon-billed Sandpiper inhabits a very specific breeding habitat; mainly sea coasts where there are sandy ridges sparsely vegetated by mosses, dwarf willows and grasses, and lakes and marshes in nearby depressions. **Habits:** Very rare individuals in mixed flocks with Stints and other waders. Runs and feeds on tidal

mudflats. **Food:** Insectivorous. **Status and Distribution:** *Globally threatened/Endangered*. Rare winter migrant to east coast of India. In India, it is an uncommon winter visitor recorded mainly on the east coast. **Population:** The global population of this species was recently estimated at between 4,000 and 6,000 individuals, presumably originally based on an estimate of between 2,000 and 2,800 breeding pairs in Russia. It appears to be rare on migration and in winter throughout its range, indicating that it may actually

total well below 4,000 individuals. In India, this species is known mainly by regular records of small numbers at Chilika Lake in Orissa and Point Calimere in Tamil Nadu, but it is probably more



numerous than the records suggest because of the difficulty of finding it amongst large mixed flocks of small waders. **Measures Proposed:** *Protected areas and habitat management:* The effective protection and management of coastal wetlands in both the breeding and non-breeding ranges are vital for the conservation of this species. Unfortunately, given its low population and the current lack of information about its most important sites, at present it is only possible to urge stronger conservation at a few known important sites and in very general terms for the many areas in which small numbers have been recorded. At the Point Calimere Sanctuary, industrial impacts on habitat quality need to be minimised, particularly by advising saltworks to maintain appropriate water levels in evaporation reservoirs during non-operational periods to help ensure that suitable habitat for shorebirds is constantly available, and fishing, hunting and disturbance controlled; further encroachment

of coastal areas by industries should be minimised and previously affected areas should be restored if possible. At Chilika Lake, studies are required to investigate how the natural tidal hydrology can be restored, and Nalaban Island should be maintained as a core area of the reserve where fishing, grazing and other non-research activities are banned; the Indian government has already provided funds for habitat improvement there and the state government has drawn up a comprehensive plan which includes desiltation, fisheries development, tourism development and multi-disciplinary research (BirdLife Int., 2001). **Threshold number:** 30.

189(416). Little Stint. *Calidris minuta* (Leisler, 1812); Grey Quail -; 13-15 cm; **WM/LCom C/H** (Plate 27.189)



Photo: Gehan de Siva Wijeyeratne

Little Stint

Diagnostics: *Adult:* Sexes alike. *Non-breeding* (winter): Bill black; forehead and supercilia white; upperparts 'scaly' grey-brown with smoky-brown outer tail feathers; underparts white with faint streaks on breast; legs and feet blackish. *Breeding* (summer): Has forehead and supercilia often obsolete pale fawn; feathers on back black with broad rufous edges; foreneck and upper breast indistinctly spotted dark brown. *Juvenile:* Like adult in summer, but hind neck greyer and mantle less rufous, white below. **Voice:** Weak *pi, pi, pi*. **Habitat:** Found at tidal creeks, mudflats, coastal lagoons, marshes, jheels, lakes and paddy fields in winters. **Habits:**

Gregarious, often found in large flocks of hundreds mixed with other waders in coastal areas, constantly runs around on mud picking up food, when disturbed whole flock flies simultaneously and swiftly like a cloud. Starts arriving in India in small numbers by August and departs by April/May. **Food:** Chiefly carnivorous, comprising small molluscs, crustaceans, insects, also aquatic plants and seeds. **Status and**

Distribution: A widespread winter migrant to both the coasts of India and inland, except higher Himalaya and extreme NW and NE regions of the country; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. Breeds in NW & NC Siberia to New Siberian Isles and R Yana, winters in Subcontinent, Sri Lanka, India and Myanmar. **Threshold number:** 2000.

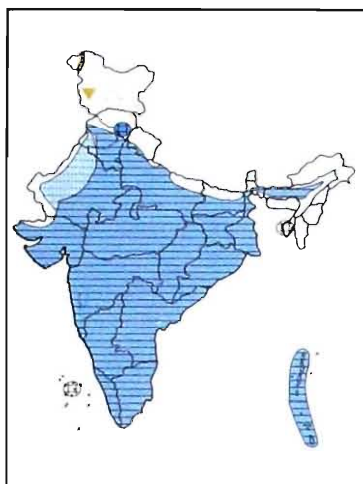
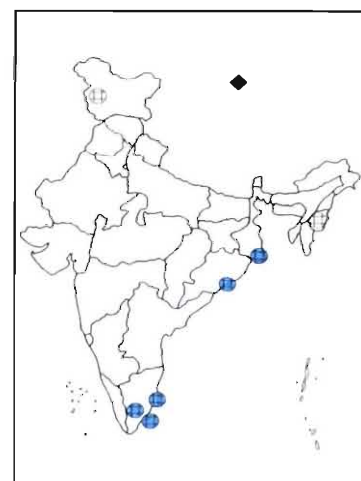


Photo: John Holmes

Rufous-necked Stint (br)

with narrow dark shafts. **Breeding** (summer): Similar to little stint, except with chin; rufous face, throat, neck and upper breast, and black streaked head. **Voice:** Slightly coarser than Little Stint.



Habitat: Chiefly coastal mudflats. **Habits:** Gregarious, often found in large flocks mixed with other waders. **Status and Distribution:** Rare winter migrant chiefly to eastern coast; Bangladesh, Sri Lanka. Breeds in northern and NE Siberia, winters in E India, Sri Lanka, through SE & E Asia to Australia. **Threshold number:** 3,200.

190(415). Rufous-necked Stint. *Calidris ruficollis* (Pallas, 1776); Red-necked Stint (I); Grey Quail -; 13-16 cm; WM/Ra (Plate 27.190)



Photo: John Holmes

Rufous-necked Stint (nbr)

Diagnostics: *Adult:* Sexes alike. *Non-breeding* (winter): Indistinguishable from little stint, but slightly larger and with a shorter, stouter and blacker tarsus; and greyish-brown upperparts

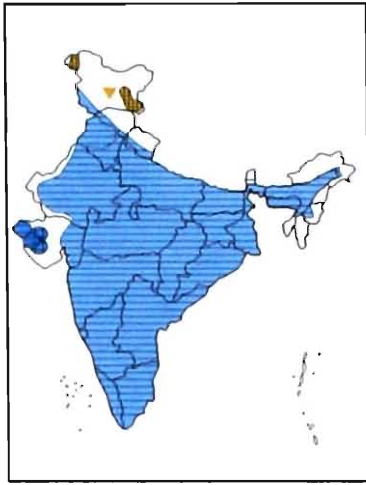
191(417). Temminck's Stint. *Calidris temminckii* (Leisler, 1812); House Sparrow +; 13-15 cm; WM/LCom C/H (Plate 27.191)



Photo: Svein Bekkum

Temminck's Stint

Diagnostics: Sexes alike; very similar to little Stint but distinguished by more uniform grey-brown upperparts; brownish fore head; white outer tail-feathers and greenish legs. *Non-breeding* (winter): Brown-ash-grey upper parts, breast-band and less distinct supercilium; underparts white. *Breeding* (summer): Similar to non-breeding but has browner head, breast and upper parts. **Voice:** Thin *trrrrrit*. **Habitat:** Prefers fresh water habitats with vegetation, riverbanks, pools, lakes, brackish marshes, mudflats and tidal lagoons. **Habits:** Often solitary, though sometimes occurs in small flocks of about 20 birds, forages at the margins and feeds slowly, picking prey from vegetation or mud.



Starts arriving in India by September/October and returns by May. **Food:** Chiefly carnivorous (small molluscs, crustaceans, insects), occasionally aquatic plants. **Status and Distribution:** A locally common widespread winter migrant to all over the country, except part of Himalaya, NW and NE; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives. Breeds in N Siberia, winters in S Asia. **Threshold number:** 1,000.

192(418). Long-toed Stint. *Calidris subminuta* (Middendorff, 1853); House Sparrow +; 13-15 cm; **WM/UnCom C** (Plate 27.192)

Diagnostics: Sexes alike; similar to Little Stint but with comparatively longer, yellowish legs; upright and longish neck; slightly down curved bill and greyish-brown outer tail-feather. *Non-breeding* (winter): Upperparts with prominent dark centres in feathers and prominent supercilium. *Breeding* (summer): Has crown rufous, supercilium white and foreneck and breast streaked with brown.

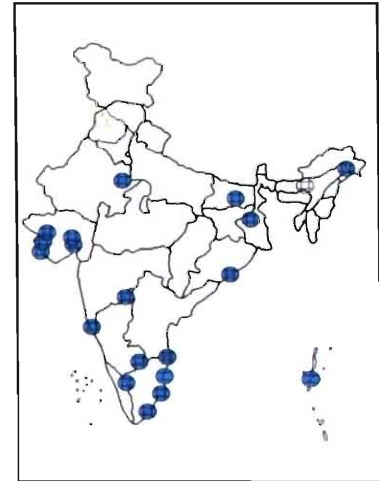


Photo: John Holmes

Long-toed Stint

Juvenile: With white V on back formed due to white edging to mantle. **Voice:** Soft *prrt*, *chrrup*. **Habitat:** Marshes, lakes, riverbanks and intertidal mudflats, prefers vegetation.

Habits: Forages with other Stints; runs about energetically for feeding. **Food:** Carnivorous, tiny invertebrates. **Status and Distribution:** Uncommon but widespread winter migrant along E



Coast, Gujarat and eastern India; Nepal; Bangladesh; Sri Lanka; Maldives. Breeds in SW, C & E Siberia, winters in E India, Sri Lanka, SE Asia. **Threshold number:** 1,000.

193(420,421). Dunlin. *Calidris alpina* (Linnaeus, 1758); Grey Quail -; 16-22 cm; **WM/UnCom C** (Plate 27.193)

Diagnostics: Sexes alike. *Non-breeding* (winter): Upperparts grey-brown; throat, belly and under tail-coverts white; breast streaked grey; bill black, long and slightly downcurved near tip. *Breeding* (summer): Has head and upperparts chestnut boldly mottled with black; underparts white, except centre of breast and abdomen black. In flight, the white wing-bar, as in Curlew Sandpiper, conspicuous, but differs from it by black

Photo: Svein Bekkum



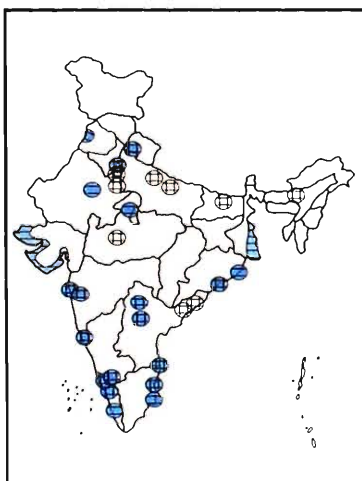
Dunlin (juv)

Photo: Jon Hornbuckle



Dunlin (br)

upper tail-coverts instead of white. **Voice:** shrill *tue-ep*. **Habitat:** Seashore, intertidal mudflats, creeks, riverbeds, flooded fields and sandbars. **Habits:** Gregarious, keeps in flocks mixed with other waders, scatters to feed on wet mud as well by wading near water edges, flies swiftly in close pack. Starts arriving in India by August and departs by mid-May. **Food:** Carnivorous, comprising molluscs, crustaceans, aquatic insects. **Status and Distribution:** A locally common winter migrant chiefly to the western coast of India, occasionally inland; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. Breeds in



NC Siberia, winters in Caspian, SW Asia. **Threshold number:** 1,000.

194(422). Curlew Sandpiper. *Calidris ferruginea* (Pontoppidan, 1813); Dunlin ±; 18-23 cm; **WM/UnCom C** (Plate 28.194)



Photo: John Holmes

Curlew Sandpiper (nbr)

Diagnostics: Sexes alike. Often confused with Dunlin but differs by its slightly larger size, longer legs and similarly downcurved but more slender bill. In flight, it is distinguished by its white tail-coverts. **Non-breeding** (winter): Upperparts mottled grey-brown. Underparts white, with brownish wash and streaks on breast. **Breeding** (summer): Upper and underparts mainly chestnut and rich rufous, crown and mantle grey-brown, fairly distinct supercilium from the forehead to nape. Underparts white. **Habitat:** Chiefly coasts, seashore, mudflats and salt pans, rarely on inland lakes and rivers. **Habits:** Gregarious, often in flocks with other waders, while



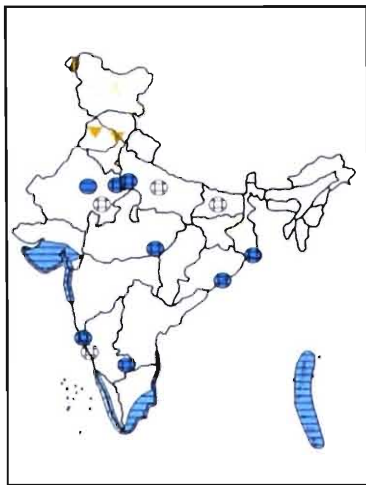
Photo: John Holmes

Curlew Sandpiper (br)

foraging runs over wet mud near the edges, feeds by pecking or probing. **Food:** carnivorous, comprising molluscs, crustaceans and worms. **Status and Distribution:** Un

Common winter migrant chiefly to the coasts, very common WM on west coast, rarely inland in small numbers as passage migrant; Pakistan; Nepal; Sri Lanka; Maldives. Breeds

in Arctic Siberia,, winters in S Asia, Myanmar. **Threshold number:** 1,000.



195(424-425). Broad-billed Sandpiper. *Limicola falcinellus* (Pontoppidan, 1763); Quail ±; 16-18 cm; **WM/UnCom C** (Plate 28.195)



Photo: K. Chaiyan

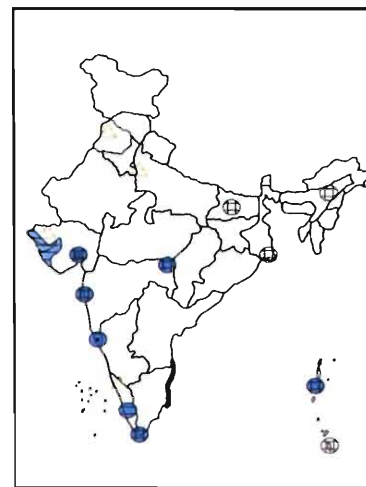
Broad-billed Sandpiper (nbr)

Diagnostics: Sexes alike. *Non-breeding* (winter): Bill horny black with broad base and slightly downcurved; supercilium short and white; upperparts mottled dark grey-brown, with a blackish patch on wing-shoulder; rump, upper tail-coverts and middle rectrices brown; underparts white with streaks on breast; legs and feet yellowish grey. *Breeding* (summer): Upperparts black with rufous and white markings; back has buff stripes; a double eye-stripe. **Voice:** Twittering flushing note. **Habitat:** Muddy creeks, intertidal mudflats,

brackish lagoons and sandbanks of large rivers.

Habits: Generally solitary in winters or small flocks when in passage; feeds by pecking and probing. Starts arriving by end of July and August and

departs by the end of May. **Food:** Carnivorous (molluscs, aquatic insects, worms). **Status and Distribution:** Uncommon winter migrant to coasts, common in extreme SE coastal region, rare inland; Pakistan; Bangladesh; Sri Lanka. Breeds in Scandinavia, NW Russia, winters in south Mediterranean, Black, Caspian and Red Seas, Middle East, W& S India, Sri Lanka. **Threshold number:** 630.



196(425a). Buff-breasted Sandpiper. *Tryngites subruficollis* (Vieillot, 1819); Common Sandpiper ±; 18-20 cm; **NT WM/Va C** (Plate 28.196)



Photo: Jon Hornbuckle

Buff-breasted Sandpiper (nbr)

Diagnostics: Sexes alike. Bill short and straight, eyes large, upperparts blackish with buff scalloping, face and underparts buff, legs bright yellow. In flight, lacks obvious wing-bar and has more uniform upper tail-coverts. *Adult:* Unmarked buff face, black eyes; black streaks on crown and hindneck; upperparts with dark feathers; underparts buff. *Juvenile:* Like adult but buff centres and dark terminal

Photo: K. Chaiyan

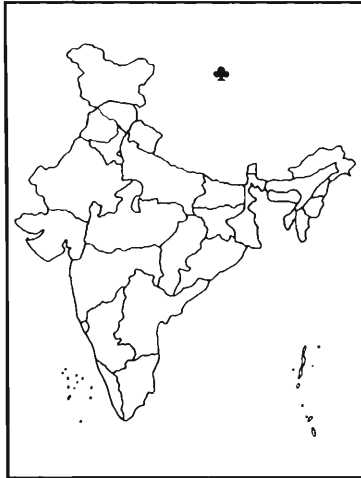


Buff-breasted Sandpiper (br)

crescents to pale-fringed feathers of mantle and scapulars.

Voice: Generally silent. **Habitat:** Dry short-grass, dry mudflats and seashore. **Habits:** Feeds actively by picking prey from the ground and vegetation, does not wade, walks quickly, flight rapid and erratic.

Food: Carnivorous, mainly insects. **Status and Distribution:** *Near threatened*. Vagrant to India and Sri Lanka. **Remarks:** Single record from Punjab (Grimett, *et al.* 1998). **Threshold number:** 150 (American and Canadian population).



197(426). Ruff. *Philomachus pugnax* (Linnaeus, 1758); Grey Quail +; 26-32 cm; WM/PM/LCom C/H (Plate 28. 197)

Diagnostics: *Non-breeding* (winter): A greyish-brown wader with bold scaly-patterned upperparts; relatively short, dark brown bill with yellowish base; varying-orange-yellow legs. *Breeding* (summer): Upperparts of both sexes blackish, feathers edged with buff or rufous; breast flanks etc. suffused with brown. *Male* (Ruff): Face covered with yellow caruncles and grows an



Ruff (female)



Ruff (male)

enormous ruff, extending from nape to cover the entire breast. The ruff may be of any colour chestnut, buff, white, black or grey. *Female* (Reeve): Upperparts blackish, sometimes with black linear spots or broken bars on pale fulvous breast. **Voice:** Generally silent, low *chugh-chugh*. **Habitat:** Prefers flooded paddy fields, freshwater lakes, pools, marshes, grassland, intertidal mudflats and estuaries. **Habits:** Gregarious, generally in small flocks of about 25 birds in company of other waders, though may congregate in large numbers at arrival and departure time in NW India and on chosen feeding grounds. Starts arriving by

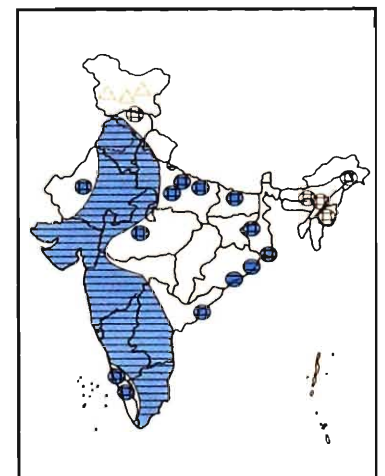


Photo: Chris Boch

Plate 25



161. Eurasian Woodcock



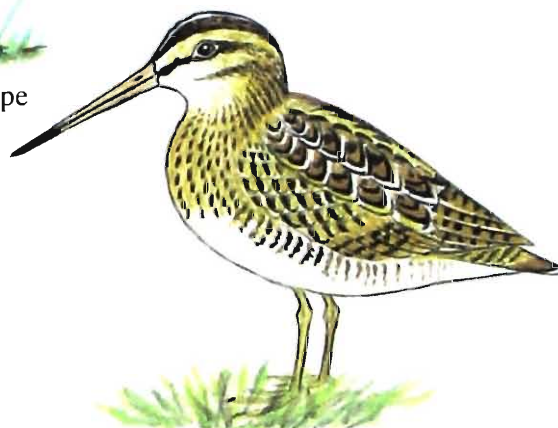
162. Solitary Snipe



164. Pintail Snipe



163. Wood Snipe



165. Swinhoe's Snipe



166. Great Snipe



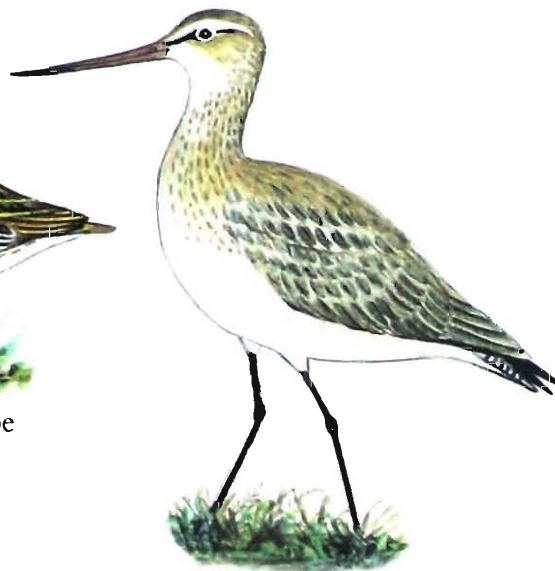
167. Common Snipe



169. Black-tailed Godwit

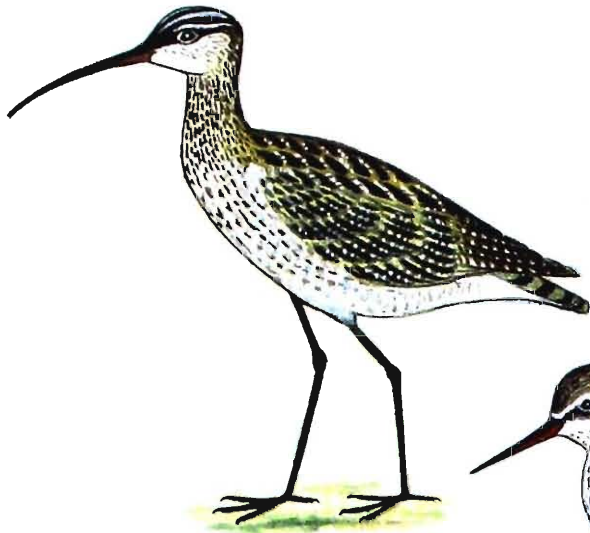


168. Jack Snipe



170. Bar-tailed Godwit

Plate 26



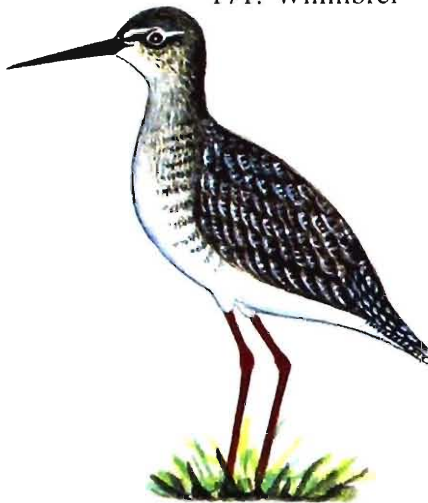
171. Whimbrel



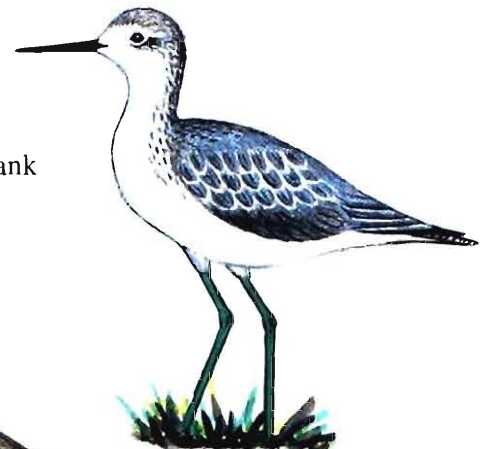
172. Eurasian Curlew



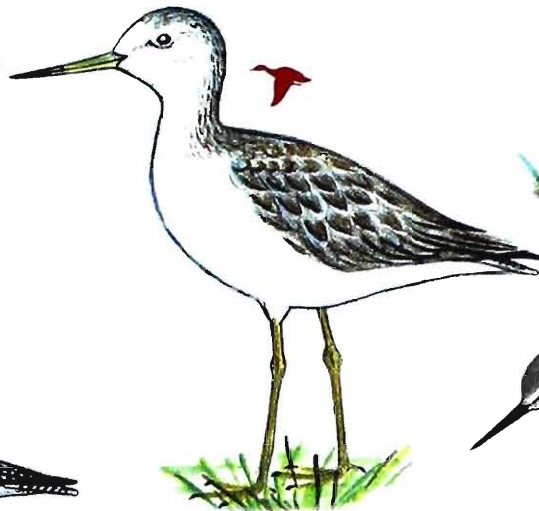
174. Common Redshank



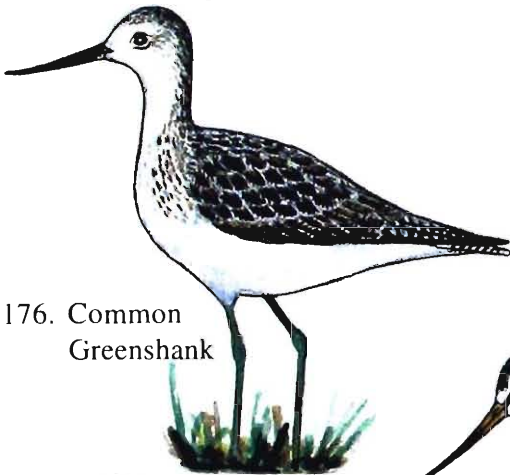
173. Spotted Redshank



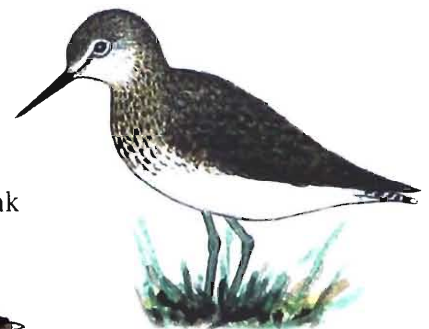
175. Marsh Sandpiper



177. Spotted Greenshank



176. Common Greenshank



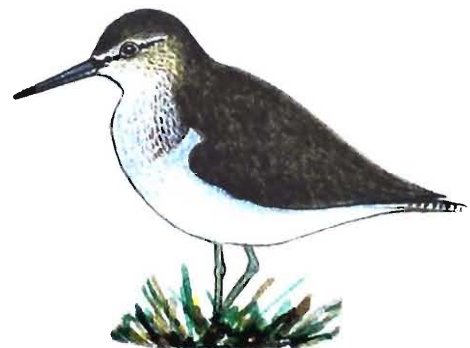
178. Green Sandpiper



180. Terek Sandpiper

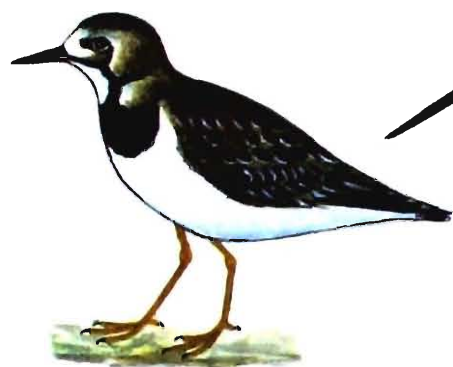


179. Wood Sandpiper

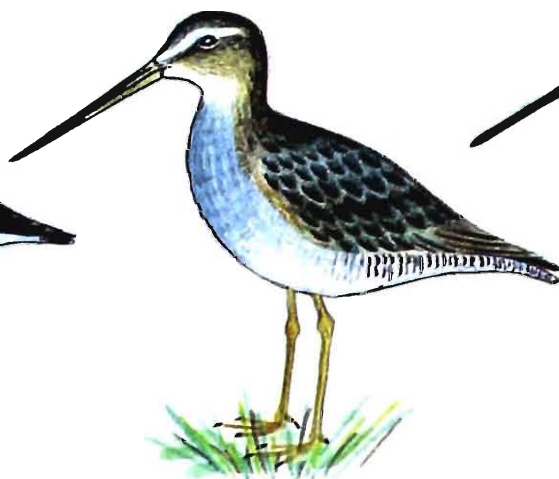


181. Common Sandpiper

Plate 27



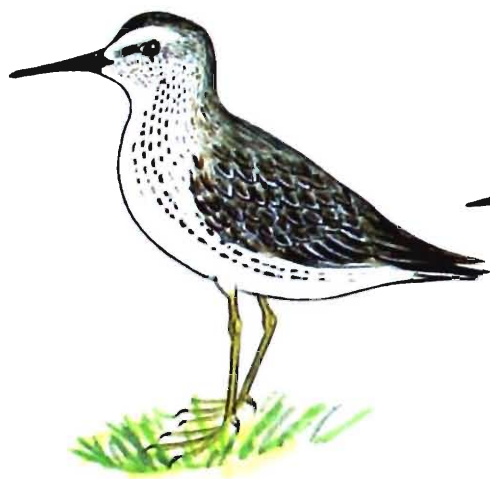
182. Ruddy Turnstone



183. Long-billed Dowitcher



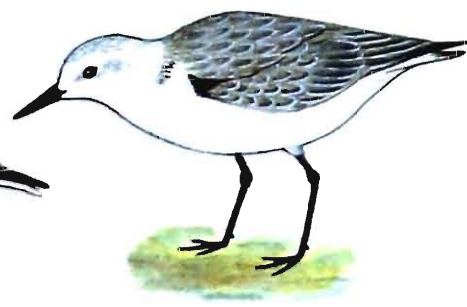
184. Asian Dowitcher



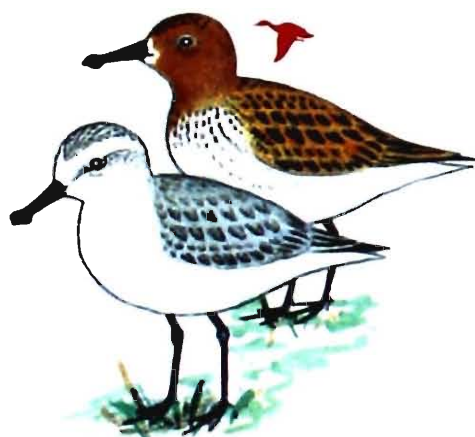
185. Great Knot



186. Red Knot



187. Sanderling



188. Spoonbill Sandpiper



189. Little Stint



190. Rufous-necked Stint



191. Temminck's Stint



192. Long-toed Stint



193. Dunlin

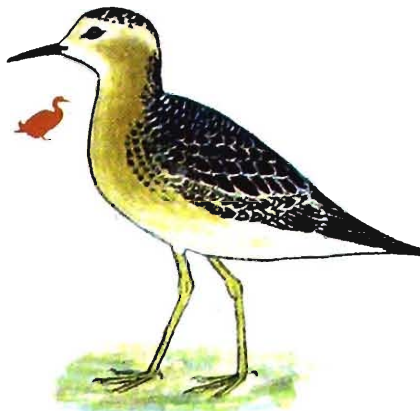
Plate 28



194. Curlew Sandpiper



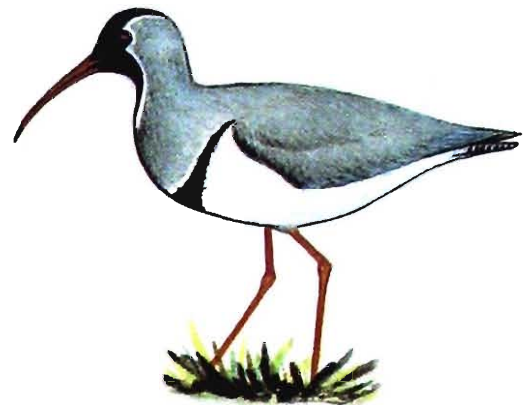
195. Broad-billed Sandpiper



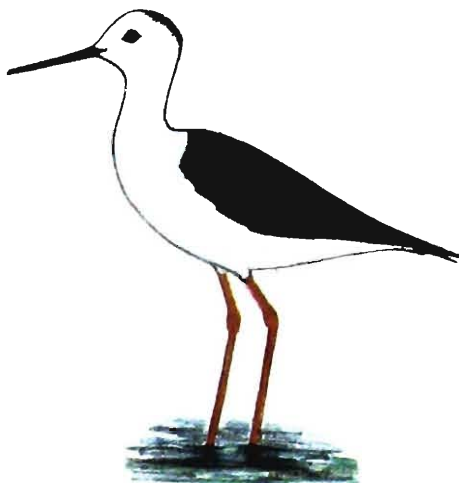
196. Buff-breasted Sandpiper



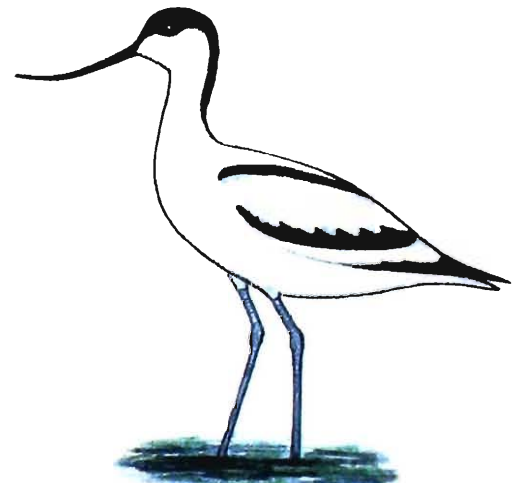
197. Ruff



198. Ibisbill



199. Black-winged Stilt



200. Pied Avocet

August/September and departs by February/March. **Food:** Mainly carnivorous, comprising molluscs, crustaceans, aquatic insects, occasionally exclusively on aquatic plants. **Status and Distribution:** A winter migrant to NW and extreme SE India; a common passage migrant in Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. Breeds in W, C & E Siberia, winters in S Asia. **Threshold number:** 1,000.

Ibisbill, Avocets & Stilts (Family Recurvirostridae)

World: 9 species; Asia: 3; India: 3

White, black or brownish-grey waders. Bill straight in Stilts; upcurved in Avocets; downcurved in Ibisbill. Wings long and pointed. Tail short and square; legs extremely long; feet webbed; hallux or hind-toe vestigial or absent; sexes alike; young nidifugous and downy.

198(433). Ibisbill. *Ibidorhyncha struthersii* Vigors, 1832; Grey Partridge +; 38-41 cm; **BRS (05) R/AM/UnCom C (Plate 28.198)**



Photo: Tim Loseby

Ibisbill

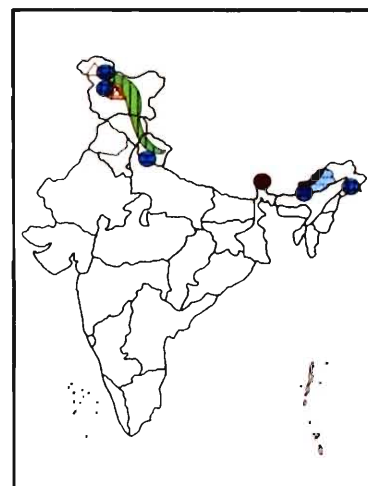
Diagnostics: Adult: Sexes alike; an ashy grey-brown bird with black facial mask and broad breast-band long downcurved crimson-red bill. Bluish-grey neck, sides of head and upper breast; white border along facial mask; a narrow white band separating the broad breast-band from upper breast; ashy grey tail with narrow wavy blackish cross-bars; white lower plumage; pinkish-grey (non-breeding



Photo: Audevard Aurelien

Ibisbill

and young) to blood-red (breeding) legs and feet. **Juvenile:** Without black and white on head and black breast-band. **Voice:** Loud *tee-ti-ti-ti-tee*. **Habitat:** Torrential hill streams and rivers with pebbly bed and islands. **Habits:** Generally occurs in pairs or in small flocks of 6 to 8 birds, forages quietly on shingle bed in mountain rivers and streams, wary; feeds by walking slowly through the water by probing under stones or in short grass by rivers; breeds from end of



March to mid-May. Nests on shingle islands. **Food:** Carnivorous, insects, molluscs and crustaceans. **Status and Distribution:** *Biome Restricted Species*; an uncommon breeding resident in NW Himalaya, between 1700-4500 m in Ladakh, Kashmir, Garhwal and Kumaon; altitudinal migrant, moves to foothills in NE Himalaya and plains during winter; Pakistan; Bhutan; Nepal; C Asia.

199(430-431). Black-winged Stilt. *Himantopus himantopus* (Linnaeus, 1758); Grey Partridge ±; 35-40 cm; **R/LM/Com C/H (Plate 28.199)**

Diagnostics: Adult: A lanky black and white wader with painted wings, black bill and crimson-red legs. **Male:** Head white with a few black spots; wings glossy black above and black below; tail pale grey-brown; remaining



Photo: BPB

Black-winged Stilt



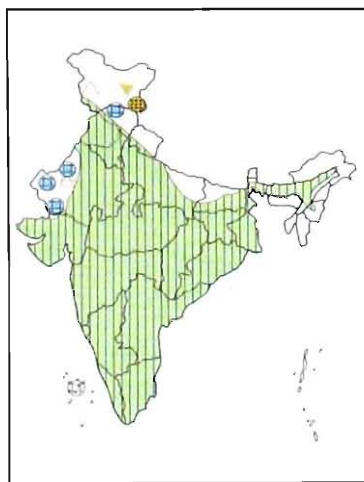
Photo: Gehan de Silva Wijeyeratne

Black-winged Stilt

body glossy white. *Female*: Head and hind neck off-white with brownish grey, wings brown above and black below. Duller in winter. *Juvenile*: Young males with black anterior crown, upper ear-coverts and a line down the back of the neck.

Voice: Noisy readily agitated, *kek, kek*. **Habitat**: Prefers freshwater and brackish water marshes, pools, village tanks, reservoirs, and shallow margins of lakes, jheels, lagoons

and saltpans. **Habits**: Gregarious, occurs in small flocks round the year, though larger



groups of 100 or more birds found occasionally, breeds in colonies, walks slowly, forages by wading or on dry mud, also floats sometimes for feeding. Breeds between March and August. Nests on a mound surrounded by shallow water or on dry bank. **Food**: Chiefly carnivorous (molluscs, aquatic insects), marshy vegetation, seeds. **Status and Distribution**: A common resident species throughout India, breeds at 1500 m in Himalaya (Kashmir); subject to local movements in winter; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives; breeds in S Asia. **Threshold number**: 10,000.

200(432). Pied Avocet. *Recurvirostra avosetta* Linnaeus, 1758; Grey Partridge +; 42-45 cm; **WM/R/LCom C** (Plate 28.200)

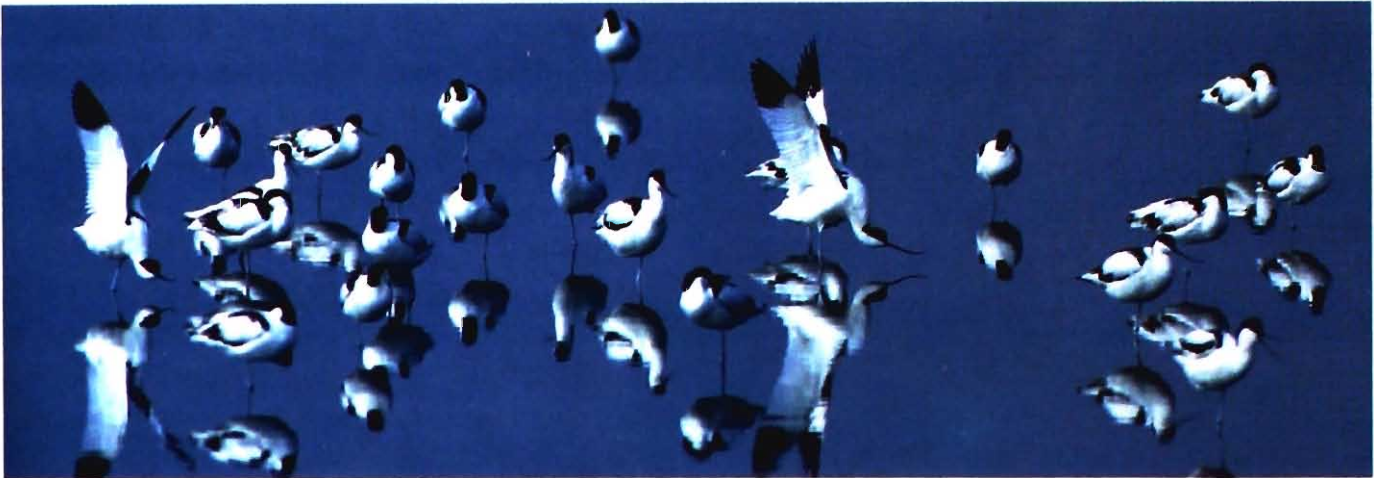


Photo: Gill Cardy

Pied Avocet

Diagnostics: *Adult*: Sexes alike. An unmistakable marsh bird with conspicuously upcurved long black bill; dark red iris; glistening white body, black head, hind neck and two wing-bands, and bluish-grey legs. In winter, the tail is greyish, the long secondaries more grey and less black. **Voice**: High-pitched *klooit, kweet-kweet*. **Habitat**: Generally found at shallow brackish pools, jheels, swamps, mudflats, also tidal creeks, saltpans and estuaries. **Habits**: Generally occurs in pairs or small parties though flocks of about 100 birds may be found, nests in colonies, runs about on mudflats and feeds by sweeping bill from side to side on water surface or mud, swims like dabbling duck. **Food**: Carnivorous,

Photo: BPB



A flock of Pied Avocet

comprising small molluscs, crustaceans and insects. **Status and Distribution:** A locally common winter and passage migrant to NW India, within our limits only one breeding record in Gujarat, though could happen more often (Mundkur, *pers. com.*); Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka. Breeds in C Asia, winters in S Asia. **Remarks:** The species was adopted as the symbol of bird conservation in Britain and Ireland in the 1940s. **Threshold number:** 1,000.

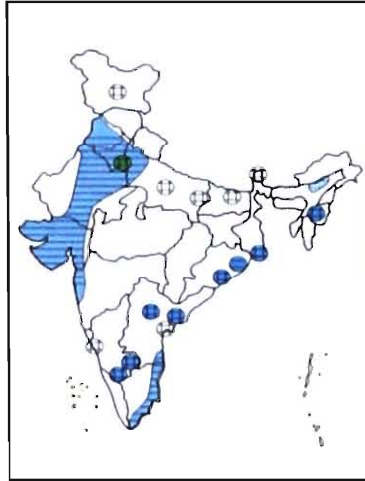
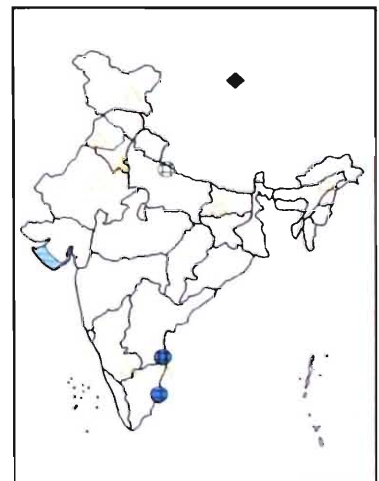


Photo: Svein Bekkum

Red-necked Phalarope (male)

Diagnostics: Female brighter and larger; A sandpiper-like bird with blackish bill. *Non-breeding* (winter): Crown, nape, a broad line through eyes and legs blackish; remaining upperparts grey streaked with white; forehead, underparts and wing-bar white. *Breeding* (summer): Upperparts blackish-grey, sides of neck and foreneck rich rufous forming a broad band. Male duller, the rufous band divided by dark grey on the foreneck. **Voice:** Generally silent, *twick* in flight. **Habitat:** Winters at sea, prefers shallow coastal waters, occasionally inland lakes and pools as passage migrant during



Phalaropes (Family Phalaropidae)

World: 3 species; Asia: 2 ; India: 2

Bill slender, short and straight; nostrils placed in a groove at base of bill; wings long and pointed, first primary longest; tail moderate in length and nearly square; Tarsus scutellated; hind toe present; more aquatic than other waders and usually found swimming; in breeding plumage female larger and brighter than male with dark smudge behind the eye.

201(428). Red-necked Phalarope. *Phalaropus lobatus* (Linnaeus, 1758); Quail ±; 18-19 cm; WM/Ra C (Plate 29.201)

winter. **Habits:** Pelagic, gregarious offshore, swims buoyantly like a cork and spins round, extremely tame in freshwater, also wades when foraging. **Food:** Chiefly insectivorous, also on macro-planktons. **Status and Distribution:** An uncommon winter migrant along the western coast of Gujarat, and Tamil Nadu, very rare inland passage migrant, arrives by September; Pakistan; Nepal; Sri Lanka. Breeds NE Siberia winters in NW Arabian Sea.

202(427). Red Phalarope. *Phalaropus fulicaria* (Linnaeus, 1758) Grey Quail ±; 20-22cm; **WM/Va** (Plate 29.202)



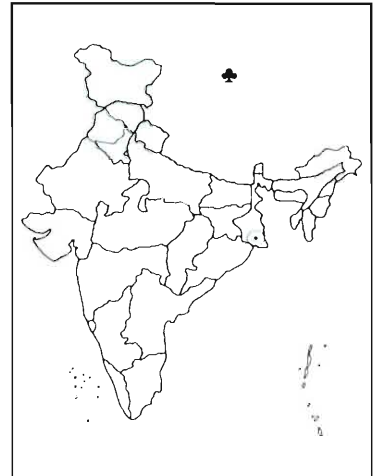
Red Phalarope (nbr)



Red Phalarope (br female)

Diagnostics: Sexes alike in winter plumage; slightly larger than Red-necked Phalarope with short, thick, dark horny bill, and brownish legs. *Non-breeding* (winter): A prominent dark patch from eye-coverts, uniformly pale grey upperparts, chiefly yellow bill and yellowish lobes on toes separate it from Red-necked Phalarope. *Breeding*

(summer): *Female:* Unmistakable with black-tipped yellow bill; black crown and front of face; white face patch; brick red, neck and underparts; and rufous fringes to the feathers of upper parts. *Male:* Duller than female with streaked crown and much white on neck, flanks and belly. **Voice:** Shrill *wit*. **Habitat:** Not known in India but largely a sea species. **Habits:** pelagic, and gregarious. **Status and Distribution:** Vagrant. **Remarks:** One record in 1846 from Calcutta market (Ali & Ripley, 1978).



Crab-Plovers (Family Dromadidae)

World: 1 species; Asia: 1; India: 1

Mainly white wader with black on the wings and back; long pale legs; distinctively shaped thick black bill adapted for preying on crabs and other crustaceans; feeds chiefly on coastal mudflats and reefs.

203(434). Crab-Plover. *Dromas ardeola* Paykull, 1805; Grey Partridge +; 38-41 cm; **WM/Ra C** (Plate 29.203)



Crab - Plover (adult with juv)

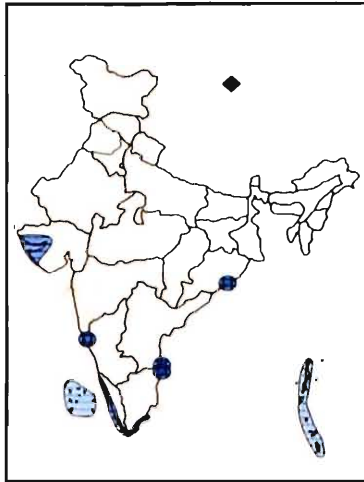
Diagnostics: *Adult:* Sexes alike, like other piebald (black and white) waders such as

Photo: Jon Hornbuckle

Photo: James Eaton

Avocet, Stilt and Oystercatcher, but with short black tern-like bill; small blackish marks on lores; and long pale grey legs. In flight, legs project well beyond tail. *Juvenile*: With black streaks on rear crown; dark grey (not black) back; and brownish-grey scapulars and tail. **Voice**: Shrill, *tchuk-tchuk*. **Habitat**: Intertidal mudflats, coral reefs and coastal rocks; may roost in saltpans **Habits**: Essentially pelagic, gregarious at

roosting sites otherwise keep in small flocks, crepuscular. **Food**: Chiefly crabs, mudskippers, octopus and shrimp (Mundkur, 1991). **Status and Distribution**: Winter migrant to



the coastal region, with special concentration in Gulf of Kachchh in Gujarat, rare otherwise; Pakistan; Bangladesh; Sri Lanka and Maldives; breeds in NW Indian Ocean, Red Sea, Persian Gulf, winters in NW Indian Ocean, Coastal Pakistan, W India. **Threshold number**: 700.

Stone-Plovers/ Thick-knees (Family Burhinidae)

World: 9 species; Asia: 3; India: 2

Plover-like bird with large yellow eyes, stout heavy bill; large broad head; long pointed wings; long legs, thickened tibiotarsal joint (knee), partly webbed feet with three toes. Sexes similar. Largely crepuscular and nocturnal.

204(437). Great Stone-Plover. *Esacus recurvirostris* (Cuvier, 1829); Great Thick-knee (I); domestic hen =; 49-54 cm; R/LM/UnCom C (Plate 29.204)

Diagnostics: Adult: Sexes alike; a massive-billed sandy brown plover, with greenish-yellow legs. Bill stout and black with yellow



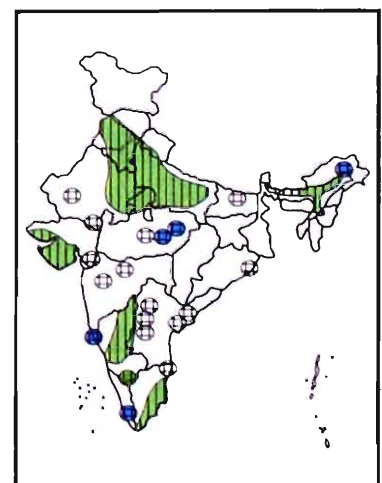
Photo: Gehan de Silva Wijeyeratne

base, distinctly upturned; lores, feathers round the eye and supercilium white; eyes large and yellow with two blackish bands resembling 'goggles'; primaries, innermost secondaries and scapulars black; tail ashy-brown with pale tip and two irregular dark bars; a short grey-brown moustache-like streak, remaining lower plumage white.

Juvenile: Paler. **Voice**: loud, harsh, *kree-kree-kree*. **Habitat**: Generally in deciduous

habitats such as stony beds of large rivers and lakes with pebbled shores, salt marshes, estuaries and saltpans.

Habits: Crepuscular and nocturnal but prefers sunlight during day,



inhabits water edges, if disturbed, camouflage or runs off; breeds from February to June. Nest on exposed sandbank on riverbeds. **Food:** Carnivorous, chiefly crabs, molluscs and insects also fish, frogs and reptiles. **Status and Distribution:** A widespread but un-common resident species all over India, especially plains; Pakistan; Nepal; Bangladesh; Sri Lanka. SE Asia.

205(438). Beach Stone-Plover. *Esacus magnirostris* (Vieillot, 1818); **Beach Thick-knee,** *Esacus neglectus* (I); domestic hen; 53-57 cm; **NT R/LCom C** (Plate 29.205)

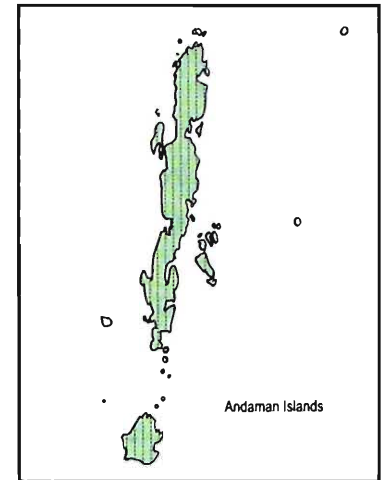


Photo: Tom Tarrant

Beach Stone-Plover

Diagnostics: Sexes alike. Slightly larger than Great Stone-Plover; but distinguished by comparatively heavy and straighter bill, lacking white surround to eye, and black forehead and lores. **Voice:** Harsh *wee-loo* or *peep-peep*. **Habitat:** Maritime, restricted to coastal beaches, reefs, muddy shores, mudflats and mangroves. **Habits:** Generally in pairs or small parties occasionally in company of Crab Plover, crepuscular. **Food:** Feeds on crabs and shellfish; breeds in Andaman in March-April. Nest a hollow on seashore above high tide mark. **Status and Distribution:** *Near threatened*. Widespread locally common resident in Andaman Islands. SE Asia to Australia. **Remarks:** Species is widespread around coasts from the Andaman Islands, India, Mergui archipelago, Myanmar, islands

off peninsular Thailand, and Peninsular Malaysia and Singapore through Indonesia, the Philippines, Papua New Guinea, the Solomon Islands and Australia. The range is, however, essentially linear so that, despite ranging from the farthest point west in north Australia round to south of the farthest point east, its total population there may be as few as 1,000 birds; it is very rare on and around Sumatra, and there appears to be extensive (but wholly unquantified) human disturbance of beach habitats in many areas (BirdLife Int., 2001). **Threshold number:** 250.



Pratincoles (Family Glareolidae)

World: 18 species; Asia: 4; India: 3

Plover-like birds with strong flight. **Courasers:** wings short and broad; bill longish and tapering; tail short; legs long and bare; three anterior toes short. **Pratincole:** Wings long, narrow and pointed; bill and legs short; tail forked; hind-toe (hallux) present; middle toe elongated with pectinate claw; sexes alike, or nearly so.

206(442). Collared Pratincole. *Glareola pratincola* (Linnaeus, 1766); Myna ±; 16-19 cm; **WM/Ra C** (Plate 29.206)

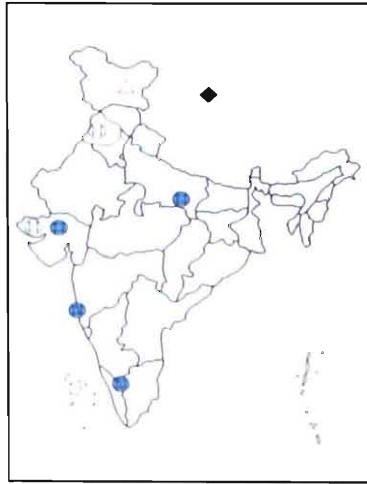


Photo: Otto Pfister

Collared Pratincole

Diagnostics: *Adult:* Sexes alike. A short-legged bird with long, narrow and pointed 'tern-like' wings; black bill; ashy-black legs and feet; olive-brown upperparts; white upper tail-coverts; black tail with white base; creamy chin and throat with narrow black border; brown upper breast; white abdomen and under tail-coverts. *Juvenile:* Like adult but upper feathers pale tipped with black under edges; breast mottled brown and rufous-white; black neckline absent. **Voice:** Tern like *kirik-kirik, kit-kit-kit*. **Habitat:** Occur at barren rivers, flood-plains, grazing land around jheels, swamps and tidal creeks. **Habits:** Generally crepuscular, gregarious, active on cloudy days, usually sluggish and squats on open sandbank in rivers or grazing land. **Food:**

Insectivorous, mainly moths, beetles and swarming ants and termites. **Status and Distribution:** Rare winter migrant to NW India; Pakistan; Sri Lanka. Breeds in Mediterranean, Black Sea, Middle East up to W Pakistan, winters in Africa and SW Asia. **Threshold number:** 240.

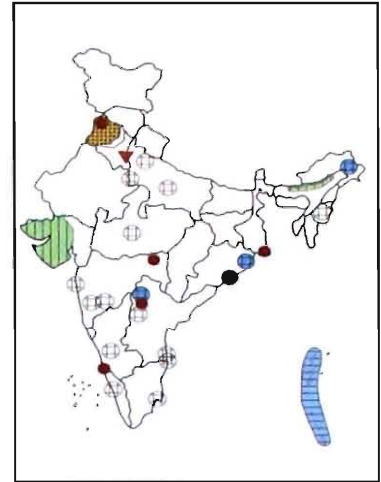


207(443). Oriental Pratincole. *Glareola maldivarum* J.R.Forster, 1795; Myna ±; 23-24 cm; **R/LM/SM/LCom C** (Plate 29.207)



Oriental Pratincole

Diagnostics: Same as Collared Pratincole, but with less deeply forked tail. **Voice:** Sharp rising *kik-kirri, kit-kit-kit*. **Habitat:** Bare flats of larger rivers and marshes, low-lying pastures and fields, often near water, tidal mudflats. **Habits:** Gregarious, crepuscular, keeps in flocks of 30 to 40, sometimes even larger, hawks insects in the air like Swallows, occasionally feeds on ground; breeds in colonies from March to July. Nest colonial, a shallow scrape. **Food:** Chiefly insectivorous, comprising moths, bugs, beetles. **Status and Distribution:** A localized resident species, more widespread during winter, subject to local movements; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives; breeds in India and Sri Lanka.



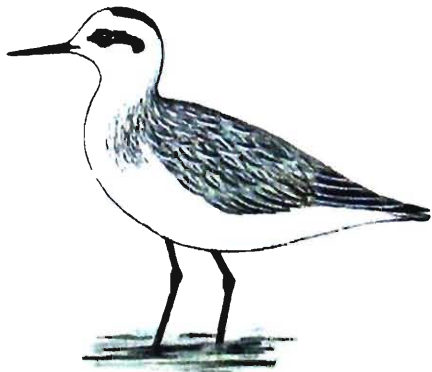
208(444). Small Pratincole. *Glareola lactea* Temminck, 1820; Sparrow +; 16-19 cm; **R/LM/LCom C** (Plate 29.208)



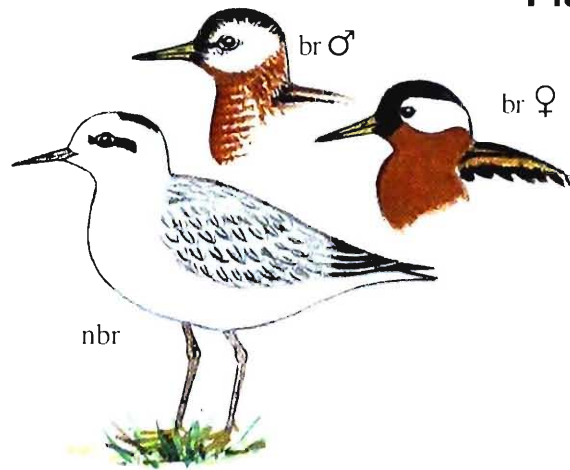
Small Pratincole (br)

Diagnostics: *Adult:* Sexes alike. Forehead brown; remaining upperparts pale sandy grey; black band from eye to beak; wings long, narrow and pointed; tail white with a broad sub-terminal black band; underparts smoky brown tinged with rufous, except whitish

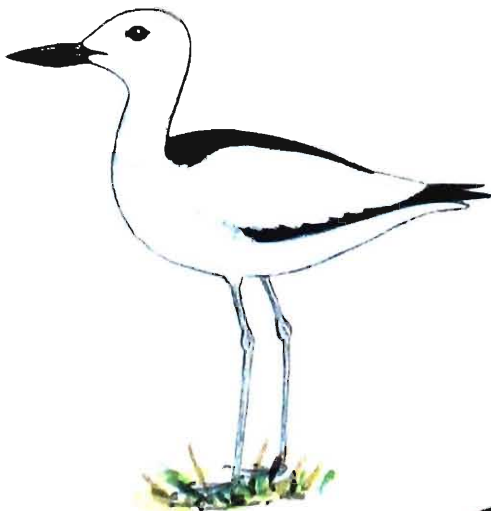
Plate 29



201. Red-necked Phalarope



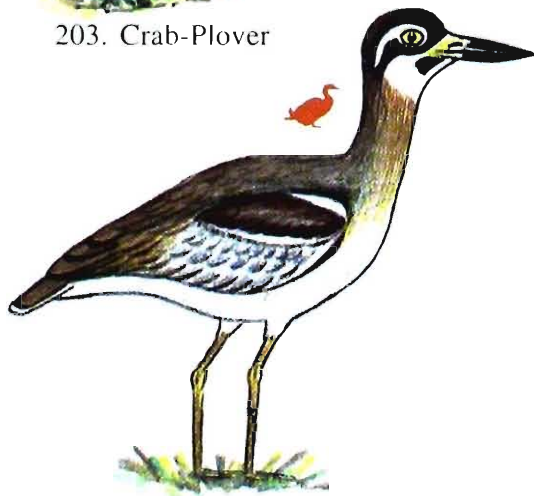
202. Red Phalarope



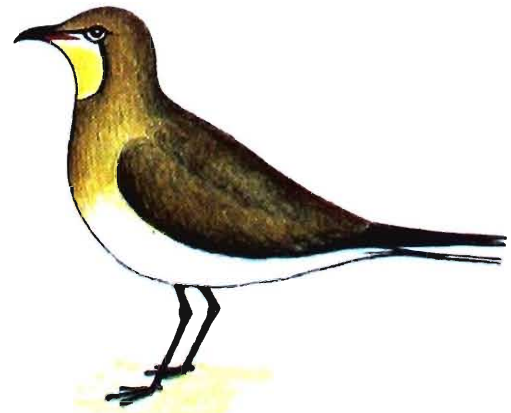
203. Crab-Plover



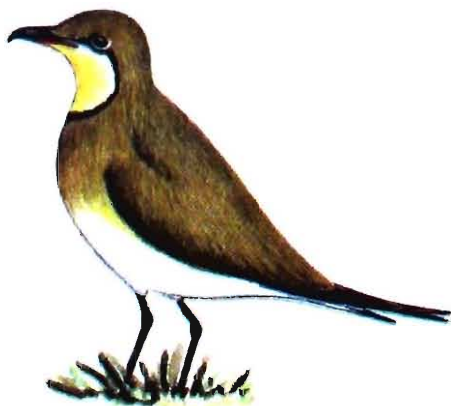
204. Great Stone-Plover



205. Beach Stone-Plover



206. Collared Pratincole



207. Oriental Pratincole



208. Small Pratincole

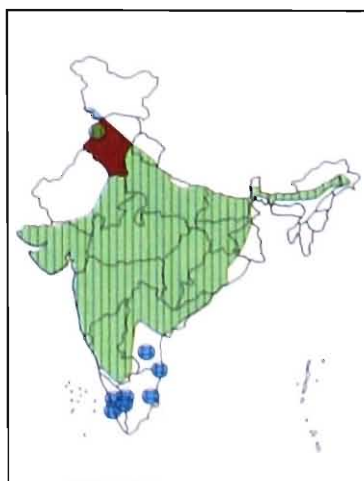
Photo: Gehan de Silva Wijeyeratne



Small Pratincole (br)

lower breast and abdomen; legs and feet short and dark brown. *Juvenile*: Upper plumage scaly; throat and foreneck spotted with black. **Voice**: Highpitched *tirit, tirit, tirit*. **Habitat**: Occurs around large rivers with shingle or sand banks, placid streams and lakes in Himalaya up to 1800 m, also coastal swamps. **Habits**: Gregarious, found in large flocks around rivers and lakes, crepuscular, feeds generally at dusk; breeds from February to April, Nests colonial, a shallow scrape. **Food**: Insectivorous feeds on beetles, bugs and termites.

Status and Distribution: A locally common resident, but local migrant species in almost whole of India, moves to coastal areas in non-breeding season; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka. N,W & C Indo-China. **Threshold number**: 1,000.



Skuas & Jaegers (Family Stercorariidae)

World: 18 species; Asia: 4; India: 3

Gull-like birds, but with a fleshy cere across the base of the upper mandible; largely brown and white plumage; strongly hooked bills; long sharp claws and more piratical habits; partial scavengers. Feeds by chasing gulls and other birds and forcing them to disgorge food, but also feed directly on fish, birds, eggs, chicks, small mammals, carrion, insects and berries. Nest on ground in temperate and cold latitudes, some species wintering in tropics.

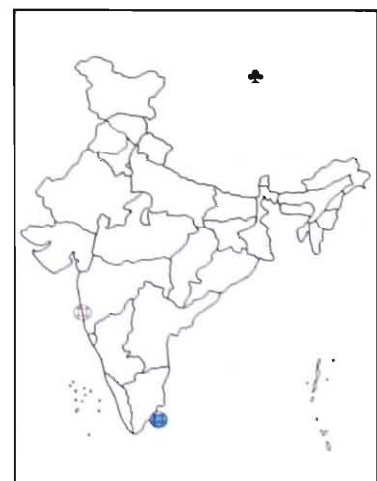
209(445-446). Brown Skua. *Catharacta antarctica* (Lesson, 1831); domestic duck \pm ; 63 cm; **SM/Va C** (Plate 30.209)



Photo: Jon Hornbuckle

Brown Skua

Diagnostics: A broad-winged large skua with white patch at base of upper and underside of primaries. Plumage varies from light to dark brown. *Adult*: Larger and broader winged than South Polar Skua, upperparts and underparts warmer brown coloured, mantle and scapulars



pale streaking and rufous brown. *Juvenile*: Generally more uniformly darker than adult, warmer brown on upper and underparts. **Habitat**: Coastal waters. **Habits**: Flight powerful and straight with steady shallow wingbeats, dashing when preying. **Status and Distribution**: Vagrant in India; Sri Lanka; Maldives. Breeds on Falkland Is., Argentina; South Africa and New Zealand. **Remarks**: One specimen from Kerala (1933), another along west coast in Ratanagiri district in 1957 (Ali & Ripley, 1978).

210(446a). South Polar Skua. *Catharacta maccormicki* (Saunders, 1893); domestic duck \pm ; 53 cm; **SM/Va C** (Plate 30.210)



Photo: Richard Thomas

South Polar Skua

Diagnostics: A medium sized skua with short bill and tarsus; white flashes at base of upper and underside of primaries. *Adult*: (Pale Morph): Completely pale head vent and undertail coverts; (Dark Morph): Uniformly dark brown or blackish with large white underwing flash, pale nape and band across forehead. *Juvenile*: Greyer than adult, head and underparts pale to medium grey, upperparts dark grey. **Habitat**: Coastal waters. **Habits**: Follows ships, otherwise like Brown



Photo: Phil Hansbro

South Polar Skua

Skua. Status and Distribution: Vagrant in India (Lakshadweep); Sri Lanka; Maldives.

Remarks: One specimen collected along west coast at Udipi, Mysore in 1964 (Ali & Ripley, 1978), vagrant also to Lakshadweep (Grimett, *et al.* 1998).



211(447). Pomarine Jaeger. *Stercorarius pomarinus* (Temminck, 1815); domestic duck -; 56 cm; **PM/Ra C** (Plate 30.211)



Pomarine Jaeger

Diagnostics: Sexes alike; large gull-like bird with broad warped spatula like projection of central tail feathers. *Adult*



Photo: Phil Hansbro

(*non-breeding*): Tail short, in light morph cap becomes indistinct, neck and breast difusedly barred with brown; mental and scapulars barred with buff, upper and under tail coverts pale. *Juvenile*: Ideally dark brown with broad, pale bars on upper and undertail and underwing coverts, presence of pale crescent on underwing. **Habitat**: Coastal waters generally near the mouth of creeks, frequently offshore. **Habits**: Regularly in mixed flocks with terns, flight powerful with customary

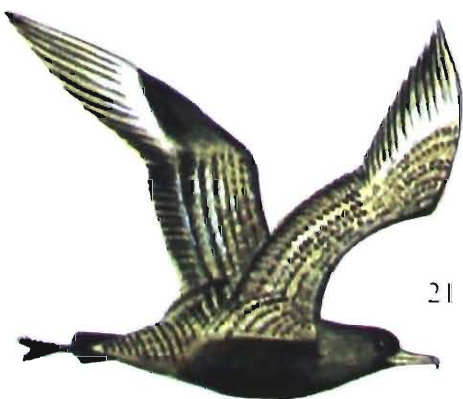
Plate 30



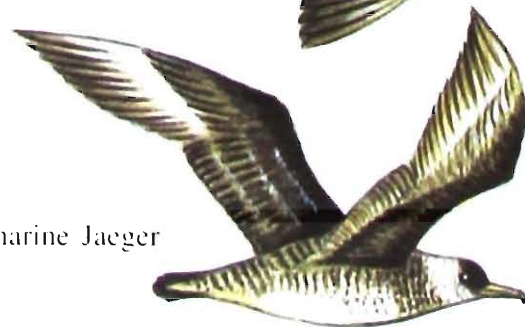
209. Brown Skua



210. South Polar Skua



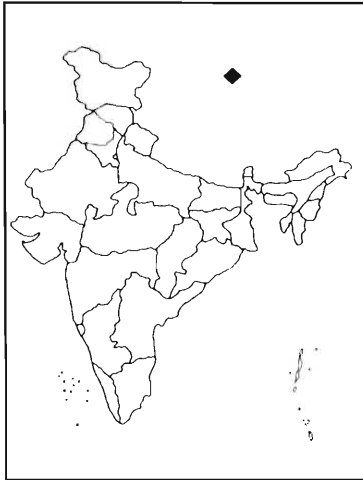
211. Pomarine Jaeger



212. Parasitic Jaeger



wingbeats. **Status and Distribution:** Rare passage migrant to India; Pakistan; Sri Lanka. Breeds on Arctic coast and islands of Siberia; winters in W Africa, Mediterranean and Indian Ocean.

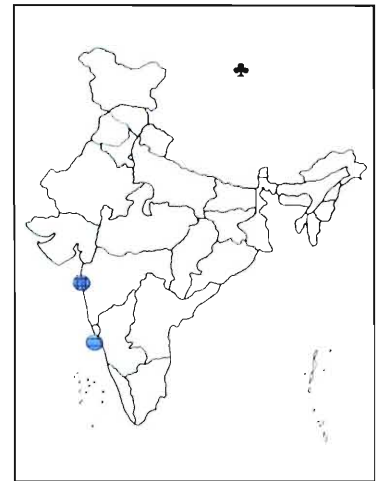


212(448). Parasitic Jaeger. *Stercorarius parasiticus* (Linnaeus, 1758); domestic duck -; 45 cm; WM/Va (Plate 30.212)

Diagnostics: Sexes alike; smaller and similar

Coastal waters generally around mouth of large creeks, rivers and lagoons.

Habits: Commonly associates with terns and gulls; flight buoyant with jerky wing beats. **Status and Distribution:** Vagrant winter migrant to Indian coasts; Pakistan;



Bangladesh; Sri Lanka; breed on Arctic coast and Islands of the Holarctic Region. **Remarks:** Vagrant along west coast and Lakshadweep (Grimett *et al.*, 1998).

Gulls, Terns & Noddies
(Family Laridae)

World: 91 species; Asia: 45; India: 30

Gulls: Heavy-bodied gregarious birds with grey, white and black plumage; long pointed wings; sharply pointed or blunt and slightly hooked bill; square or forked tail; legs short; feet webbed; hind-toe small or vestigial; roost and nest in colonies; sexes alike. **Terns:** Generally smaller and slimmer than gulls with soft grey plumage, except the Skimmer which has black and long pointed wings; finer bill; shorter legs, webbed feet. Sexes similar. like gulls, colonial breeders. In winter, generally the head of white-headed species of Gulls streaked darker, while that of black-headed changes into white, sometimes mottled with grey. On the other hand, the black caps of Terns become white or streaked.

213(449). Sooty Gull. *Larus hemprichii* Bruch, 1853; domestic duck -; 45 cm; S/WM/Va C (Plate 31.213)

Diagnostics: Sexes alike. Medium sized sea gull with brown head and breast, and white collar. **Adult:** Head, nape and throat sooty brown, bill yellowish with black terminal band

Photo: S. Guliano & S. Sommazi



Parasitic Jaeger (dark morph)

to Pomarine Jaeger in both the morphs; but distinguished by straight and pointed projecting central rectrices, *contra* broad, blunt and twisted.

Adult: Pale feather fringes to mantle, white bars on rump and vent, dispersed bars on head and neck, pale patch just above the bill, and pointed tipped tail. **Juvenile:** Range from grey and buff in colour, heavily barred, to blackish-brown. **Habitat:**

Photo: Jon Hornbuckle



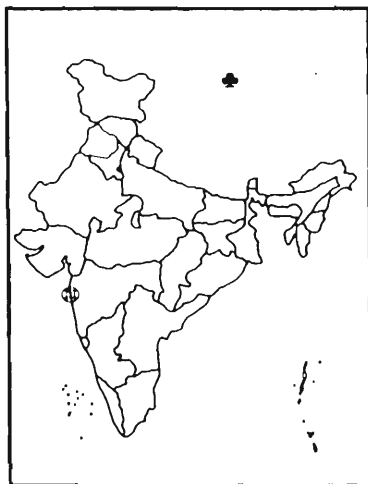
Parasitic Jaeger (pale morph)

Photo: Gill Cardy



Sooty Gull (br)

and red tip, eyebrow white and short, collar white, mantle greyish brown, wing quills blackish brown; abdomen, tail-coverts and tail white. *Juvenile*: Head and breast pale brown, tail brownish mottled with white and black-brown band, bill pale grey with black tip. **Voice**: Silent. **Habitat**: Maritime, invariably at seacoasts, occasionally in harbours and on fishing boats. **Habits**: Gregarious, scavenger, follows fishing boats for fish offal and leftovers, also snatches food from smaller gulls and terns in flight. Breeds in colonies in W Pakistan along Sind and Makran coast from end of June to end August. **Food**:



Invariably dead fish and offal also preys on eggs and chicks of terns. **Status and Distribution**: A vagrant visitor to west coast of India; Sri Lanka; Maldives; locally common in Pakistan, where breeds also at Astola Isles off Makran Coast. NW Indian Ocean, Red Sea. **Remarks**: Single bird recorded off Mumbai in 1875 (Ali. & Ripley, 1978). **Threshold number**: 2,300 (Global population).

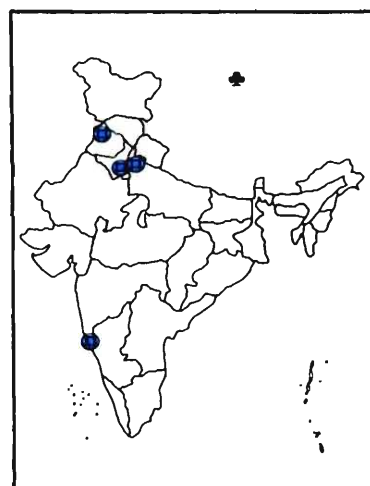
214(N). Mew Gull. *Larus canus* Linnaeus, 1758; 43 cm; WM/Va C (Plate 31.214)



Photo: Jon Hornbuckle

Mew Gull (br)

Diagnostics: Smaller than Yellow-legged Gull with slim body, rounded head and shorter bill. *Adult*: With white head, greenish-yellow bill and legs, and develops a narrow blackish sub-terminal band in non-breeding season. *Juvenile*: Grey-brown mantle and wing-coverts with pale fringes, dark-streaked crown and ear-coverts, and mottled grey-brown breast-band. **Voice**: Nasal Keow and shrill glieeo. **Habitat**: Lakes, large rivers and coasts. **Habits**: Scavenges on fish waste and refuse in harbours and around fishing boats and ships, seeks invertebrates on mudflats, steals eggs and chicks from seabird colonies. **Food**: Carnivorous (fish, eggs and chicks of seabirds, invertebrates). **Status and Distribution**: Vagrant winter migrant to India; Nepal; Bhutan; rare in Pakistan. Breeds in NE Siberia, winters along Coasts of E, SE Asia. **Threshold number**: 10,000.



215(450). Heuglin's Gull. *Larus heuglini* Bree, 1876; Duck ±; 58-65 cm; WM/Ra C (Plate 31.215)

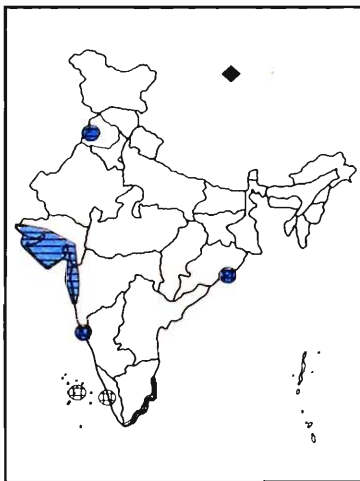
Diagnostics: Sexes alike; a large, heavy gull with bright yellow bill and legs; a bright red patch near tip of lower mandible. *Non-*

Photo: Gehan de Silva Wijeyeratne



Heuglin's Gull

breeding (winter): Head and hindneck with brown streaks. *Breeding* (summer): Head, neck, underparts and tail snow-white; mantle pearl-grey; wing-quills black with white near tip. **Voice:** Loud harsh *kee-ow, kee-ow*, etc. **Habitat:** Maritime, generally along seacoast, harbours, also prefers inland lakes and rivers during winter. **Habits:** Gregarious, flies gracefully, scavenger, forages on aquatic invertebrates in mudflats or by wading. Regularly flies between roosting and feeding places at dusk and dawn; pirates food like skuas. **Food:** Carnivorous (fish waste, molluscs, crabs, also steals eggs and chicks from terns). **Status and Distribution:** A winter migrant mainly along the western coast of India, rare passage migrant inland; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. Breeds in S Kola Peninsula E to Taymyr Peninsula, winters in SW Asia S to E Africa and NW India, Sri Lanka.



216(451). Yellow-legged Gull. *Larus cachinnans* Pallas, 1811; domestic duck ±; 55-65 cm; WM/UnCom C (Plate 31.216)

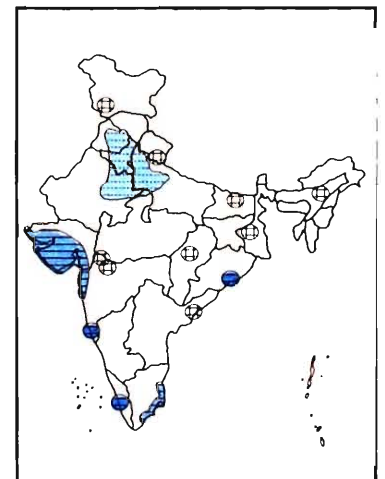
Diagnostics: Sexes alike; a large gull with long, dull yellow legs; yellow bill with red spot



Photo: Gill Cardy

Yellow-legged Gull

on lower mandible. *Adult:* Similar to Heuglin's Gull in size and structure, but larger than Mew Gull and nearer to Pallas's Gull. *Non-Breeding* (winter): With fine streaks on head, may form faint mask around eyes that is usually retained longer on hind neck (prominent in early winter). Bill and legs duller or pinkish, former often with blackish sub-terminal band. *Breeding* (summer): Upperparts grey, slightly paler than Pallas's; outer 6-8 primaries black with white tips, the black decreases inwards giving a 'shutter' effect; outer primary with single large white 'mirror'; head, underparts and tail white; bill yellow with red gonys spot; legs usually yellow, occasionally pink. **Voice:** Loud harsh *kee-ow, kee-ow*, etc. **Habitat:** Coasts, harbours, offshore waters also in passage in inland lakes, marshes and rivers. **Habits:** Often scavenges for fish waste and refuse in



harbours; also wades in mudflats for feeding on Invertebrates, communal roosting on rocks. **Food:** Carnivorous (fish waste, molluscs, crabs, also steals eggs and chicks from terns). **Status and Distribution:** Wide-spread but uncommon winter migrant to India; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives.

Breeds at Black Sea to Caspian and E Kazakhstan, winters in Black and Caspian Seas, SW Asia, NE Africa, Sri Lanka. **Threshold number:** 10,000.

217(453). Pallas's Gull. *Larus ichthyaetus* Pallas, 1773; duck +; 66-72 cm; **WM/LCom C** (Plate 31.217)

Photo: Satpal Gandhi



Pallas's Gull (br)

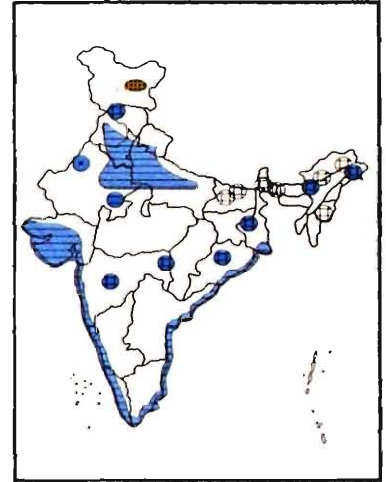
Photo: Gehan de Silva Wijeyeratne



Pallas's Gull (imm)

Diagnostics: Sexes alike; largest gull in India, with robust bill; eyes dark; solitary. *Non-breeding* (winter): Head white with brown and black streaks across hind crown; white-tipped primaries sub-terminally black. Bill stout, yellow with an orange tip banded with black. *Breeding* (summer): Head and upper neck black with two crescent white patches (one above and one below eye); bill stout, yellow with an orange tip, banded with black; mantle pearl-grey with slaty tinge, remaining plumage pure white; primaries mainly white, the outer ones with sub-terminal black bands and white tips; legs and feet yellowish-green. **Voice:** Loud harsh *kraa-a*, though seldom in winter. **Habitat:** Generally at coasts, and at sea

around fishing boats, occasionally on large inland lakes, large rivers, and river barrages as winter or passage migrant. **Habits:** Solitary, only rarely in small loose flocks, swims by sitting on water. Scavenger and often indulges in piracy; flight steady. **Food:** Carnivorous (chiefly fish and crustaceans). **Status and Distribution:** A widespread and locally common winter migrant along Indian coasts, rare inland winter/ passage migrant on large rivers and lakes; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives. Breeds in C Asia E to L Balkash, S to Tibet, winters along the coasts of south Asia. **Threshold number:** 1,000.



218(454). Brown-headed Gull. *Larus brunnicephalus* Jerdon, 1840; Jungle Crow ±; 42-46 cm; **BRS (05) WM/R/LCom C** (Plate 31.218)



Brown-headed Gull (nbr)

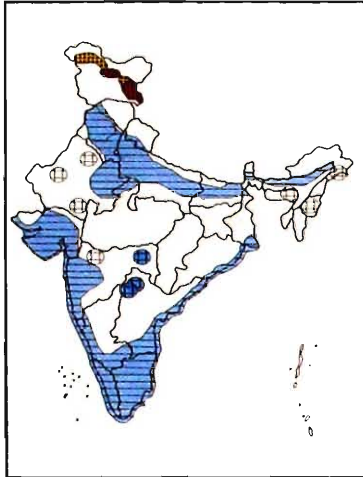
Photo: Satpal Gandhi

Diagnostics: Sexes alike. Medium-sized gull with a white patch (mirror) near the tips of black primaries; deep red bill, legs and feet. *Non-breeding* (winter): Head white with a vertical black crescent mark on ear-coverts. *Breeding* (summer): Head dark brown; remaining upperparts grey except white tail; underparts white. **Voice:** A loud harsh *kyaaar*.

Habitat: Found inland at most large rivers and lakes as passage migrant during winters.

Habits: Gregarious, scavenger on sea generally feeds and roosts with Pariah and Brahminy kites and Black-headed Gull. **Food:** Carnivorous, on Carcass and fish waste, prawns on seaboard, inland on insects, worms, grubs, slugs and also shoots of various crops. **Status and Distribution:** *Biome Restricted species.*

A winter migrant mainly along the Indian coasts, uncommon inland, mostly as passage migrant along large rivers and lakes; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives.



Breeds in high plateaus of SC Asia {also breeds in Ladakh between 3000-4500 m (Tsokar and Tso Moriri)}, winters on coasts S and SE Asia and W to Arabian Peninsula. **Threshold number:** 1,000.

219(455). Black-headed Gull. *Larus ridibundus* Linnaeus, 1766; House Crow ±; 38-43 cm; WM/LCom C (Plate 31.219)

Photo: Gehan de Silva Wijeyeratne



Black-headed Gull

Diagnostics: Sexes alike. Very similar to Brown-headed Gull, but distinguishable in all seasons by white leading edges to wings instead of white 'mirror' **Voice:** A loud harsh *kree-ah*. **Habitat:** Seacoasts, harbours,

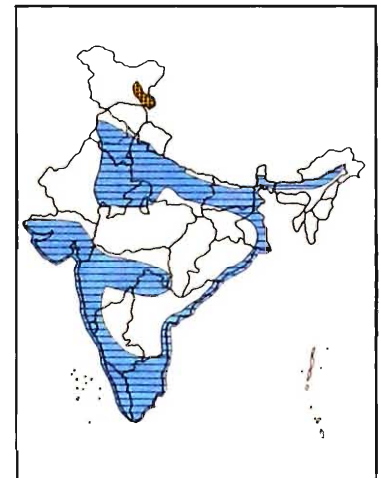


Photo: Gehan de Silva Wijeyeratne

Black-headed Gull (br)

estuaries, large rivers and inland jheels and lakes during winter. **Habits:** Gregarious, often in company of Brown-headed Gull, scavenger on sea, generally

feeds and roosts with Brown-headed Gull, Pariah and Brahminy kites. **Food:** Carnivorous (fish, prawns, crabs and carcass on seaboard, insects etc. inland like Brownheaded



Gull). **Status and Distribution:** A regular winter migrant along the coasts of India, though more common on western coast, passage migrant along inland rivers and lakes; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. Breeds in Russia, C Asia, winters in S Asia.

220(456). Slender-billed Gull. *Larus genei* Breme, 1839; House Crow ±; 43 cm; WM/Ra C (Plate 31.220)

Diagnostics: Sexes alike. Very similar to Black-headed Gull, but distinguished from it by absence of the brown spot on ear-coverts, smaller head, long neck, longer and brighter red bill and legs. **Voice:** Deeper *kuk*. **Habitat:** Estuaries, lagoons, tidal creeks, salt pans,

Photo: Gill Cardy



Slender-billed Gull (br)

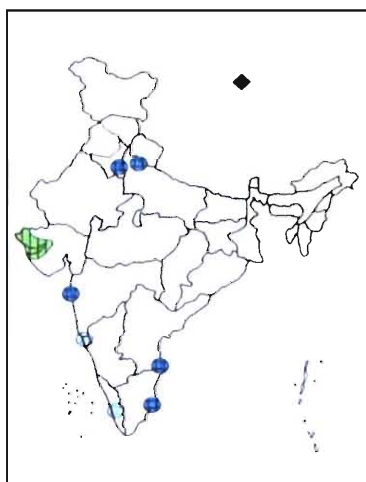
coastal waters, offshore and occasionally also on inland lakes. **Habits:** Feeds on shoals of small fish, also scavenges from fishing boats.

Food: Carnivorous, mostly fish. **Status**

and Distribution:

A regular winter migrant to western coast of India, particularly Gujarat, rare and irregular inland; Pakistan; Nepal; Sri Lanka. Breeds in SW Asia to Caspian,

E Kazakhstan, Afghanistan, Pakistan, NW India, winters along Sea coasts of Caspian and W Asia. **Threshold number:** 1,500.



221(457). Little Gull. *Larus minutus* Pallas, 1776; Pigeon -; 25-30 cm; **WM/Va C** (Plate 31.221)

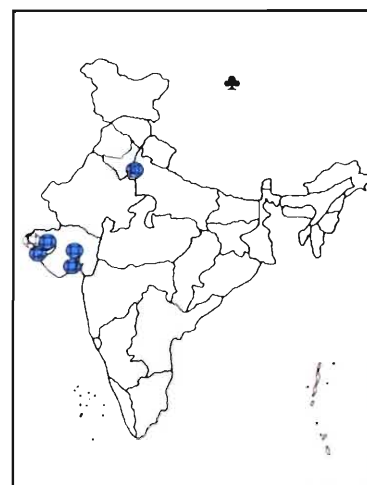
Photo: Audevard Aurelien

Little Gull (1st winter)

Diagnostics: Sexes alike. *Non-breeding* (winter): Forehead, lores and a line over eyes white; crown and nape soft bluish-grey; remaining upperparts blue-grey, except white upper tail-coverts and tail; underparts white. *Breeding* (summer): Head and upper neck pure black. **Voice:** Short *kek* or *kik*. **Habitat:**

Coastal and inland waters. **Habits:** A graceful species, which swims lightly by sitting on water, feeds on insects from water surface or by hawking. **Food:**

Carnivorous (fish, prawns, carcass on seaboard, insects etc., inland). **Status and Distribution:** A vagrant species to India. Breeds in W Siberia, winters on coasts of Black and Caspian Seas, E Mediterranean. **Remarks:** Single specimen collected from Ladakh, sight record from Mumbai harbour 1910 (Ali & Ripley, 1978), sporadic records from Gujarat coast; Delhi, Punjab (Grimmett *et al.*, 1998). **Threshold number:** 1,000.



222(460-461). Gull-billed Tern. *Gelochelidon nilotica* (Gmelin, 1789); House Crow -; 35-38 cm; **R/WMLCom C** (Plate 32.222)



Gull-billed Tern

Photo: Gehan de Silva Wijeyeratne

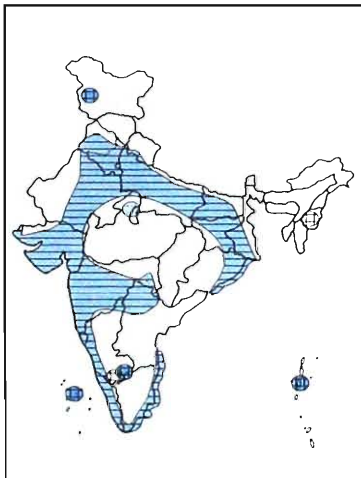
Diagnostics: *Adult:* Sexes alike. Pale grey and white tern, with stout black 'gull-like' bill, slightly forked white tail and black legs. *Non-*

Photo: Gehan de Silva Wijeyeratne



Gull-billed Tern

breeding (winter): Head white, streaked with black in front and behind the eyes. Distinguished from Whiskered Tern by larger size, stouter bill and slower wing beats. *Breeding* (summer): Head turns jet-black covering forehead, crown down to eyes and nape. *Juvenile*: Crown grey or greyish-white; upperparts pale brown with buff edges and grey-brown primaries. **Voice**: Generally silent, low *gek-gek-gek*. **Habitat**: Coastal mudflats, saltpans, tidal creeks, brackish lakes, large inland rivers, jheels, marshes and cultivations. **Habits**: Gregarious, but generally seen in ones or twos in association with other terns near wetlands, flying low over sand-mudflats, swooping down frequently for foraging. Breeds from end of April to end of June, nests on sand-banks in rivers and on islands in lakes or jheels in



West Bengal, Chilika lake. **Food**: Carnivorous, chiefly sand crabs, prawns, crustaceans, fish, small frogs and insects. **Status and Distribution**: Mainly widespread and locally common winter migrant along the coasts of India; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. Breeds in C Asia (also in W Bengal, and Chilika Lake in Orissa), winters in S Asia. **Threshold number**: 1,000.

223(462). Caspian Tern. *Sterna caspia* Pallas, 1770; Jungle Crow +; 47-54 cm; WM/R/UnCom C (Plate 32.223)



Photo: Jon Holmes

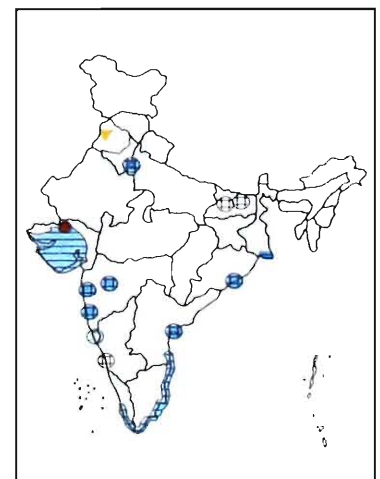
Caspian Tern



Photo: Gehan de Silva Wijeyeratne

Caspian Tern (br)

Diagnostics: *Adult*: Sexes alike. A large tern with stout coral-red bill, slightly forked tail, black legs and feet. *Non-breeding* (winter): Head and neck white, crown streaked with black; upperparts pearl-grey; coral-red bill with dusky tip; underparts pure white. *Breeding* (summer): Forehead and crown to below eyes glossy jet-black. *Juvenile*: Like adult in winter but upperparts barred with buff grey and brown. **Voice**: Loud harsh *kraa-ah*. **Habitat**: Coasts, estuaries, mudflats, mangroves and large inland lakes and rivers. **Habits**: Gregarious during breeding



season, otherwise found singly or in twos, feeds by hovering over water with bill pointed downward, plunges often, submerging completely. **Food:** Carnivorous, comprising mainly fish, crabs, prawns. **Status and Distribution:** A winter migrant to Indian coastal areas; widespread along NW & SE coasts; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. Breeds in C Asia (though breeds in Gujarat within Indian limits, as also in Pakistan and Sri Lanka), winters in Pakistan, India, Sri Lanka. **Threshold number:** 1,000.

224(463). River Tern. *Sterna aurantia* J.E.Gray, 1831; House Crow \pm ; 38-46 cm; **R/LCom C** (Plate 32.224)

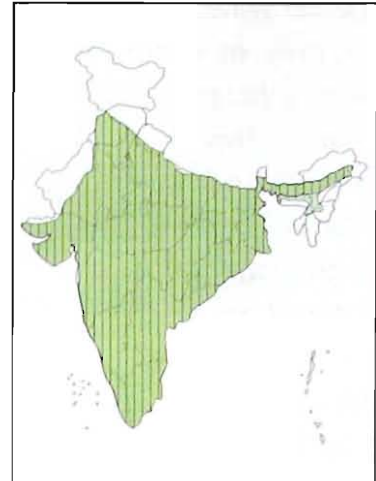


Photo: Vijay Cavale

River Tern (br)

Diagnostics: *Adult:* Sexes alike. A fluviatile pale grey and white bird with pointed bright yellow bill; deeply forked 'swallow' tail; and short red legs. *Non-breeding* (winter): Head dull grey with streaks; bill duller with black tip. *Breeding* (summer): Forehead, crown and nape down to below eyes glossy jet-black; a horizontal crescent white patch below eyes; upperparts blue-grey; underparts white. *Juvenile:* With white forehead and broad supercilium; buffy white edged and blackish sub edged upperparts. **Voice:** High pitched and melodious *kiuk-kiuk*. **Habitat:** Prefers large rivers, lakes, canals and tanks. **Habits:** Generally solitary, also found in twos and threes, flies in flocks up and down rivers and lakes for foraging, feeds by plunging from a height with wings pulled in, roosts at night on sandbanks. Breeds in colonies from November to August, varying locally; nest a

shallow depression on bare sand and rock, also islets in rivers. **Food:** Carnivorous (frogs, fish, crustaceans and aquatic insects). **Status and Distribution:** A widespread locally common resident species on the plains of India except Himalaya, uncommon in south; Pakistan; Nepal; Bhutan; Bangladesh. Breeds in S Asia. **Threshold number:** 1,000.



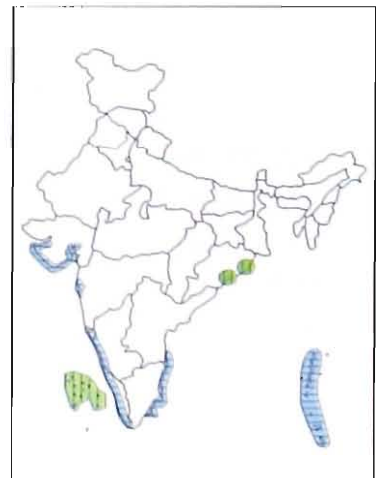
225(479). Lesser Crested Tern. *Sterna bengalensis* Lesson, 1831; House Crow \pm ; 35-37 cm; **R/WMLCom C** (Plate 32.225)



Photo: Tom Tarrant

Lesser Crested Tern (adult & juv)

Diagnostics: *Adult:* Sexes alike. Smaller and lighter built tern with slim and small yellowish-orange to orange bill, pale grey upper parts. *Breeding* (summer): Black crown, crest and forehead, lacking white lores. *Non-breeding* (winter): Black nape band, pale yellowish-orange bill. *Juvenile:* Diffuse dark bars across wings, dark centres to mantle, scapulars and tertials. **Voice:**



Loud clamour, *kreek-kreek*. **Habitat:** A typical offshore tern, often far from land, seldom in coastal water or tidal creeks. **Habits:** Scouts for prey in small flocks, feeds by plunging from a height, when several birds drop one after another. **Food:** Chiefly fish and prawns. **Status and Distribution:** Resident, and probably breeds in Lakshadweep, winter migrant along the west and east coast of India, as well as Andaman & Nicobar Islands; Pakistan; Bangladesh; Sri Lanka; Maldives. Breeds in Persian Gulf, Pakistan Coast, Maldives and Lakshadweep, winters in Indian Ocean, S to Sri Lanka. **Threshold number:** 1,700.

226(478). Large Crested Tern. *Sterna bergii* Lichtenstein, 1823; Pariah Kite -; 46-49 cm; **R/WM/LCom C** (Plate 32.226)



Photo: Gehan de Silva Wijeyeratne

Large Crested Tern (nbr)

Diagnostics: *Adult* : Sexes alike; large tern with black crown, nuchal crest and legs; bill lemon yellow. *Breeding* (summer): White band across lores and forehead, crown down to eyes, nape and prominent nuchal crest velvety black; bill lime green; neck and underparts white; primaries blackish; tail greyish white. *Non-breeding* (winter): Nape band streaked, upper parts with grey brown in patches, bill greenish yellow. *Juveniles*: Upperparts brownish grey with four dark bars across upperwing. **Remarks:** Can be separated from Lesser Crested Tern by broader and drooping bill and large size.

Voice: Loud clamouring in typical *cherrak....*

Habitat: A typical offshore tern, often far from land (invariably keeps on the open sea), occasionally on large tidal creeks and channels.

Habits: Often found scouting for food in loose mixed flocks with

Lesser Crested Tern; flies steadily above the water, occasionally hovering, then plunging into water to capture fish. **Food:** Chiefly fish and prawns. **Status and Distribution:** A breeding resident on offshore islands along coasts of India – Vengurla Rocks south of Ratnagiri, Lakshadweep, Sunderbans, winter visitor to coasts; Pakistan; Bangladesh; Sri Lanka; Maldives. Breeds in Arabian Gulf, E to Maldives, Sri Lanka, Myanmar, winters in Indian Ocean Kenya to Myanmar.

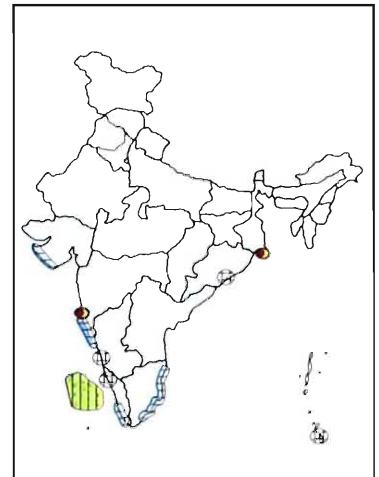
227(480). Sandwich Tern. *Sterna sandvicensis* Latham, 1787; House Crow ±; 36-41 cm; **WM/LCom C** (Plate 32.227)



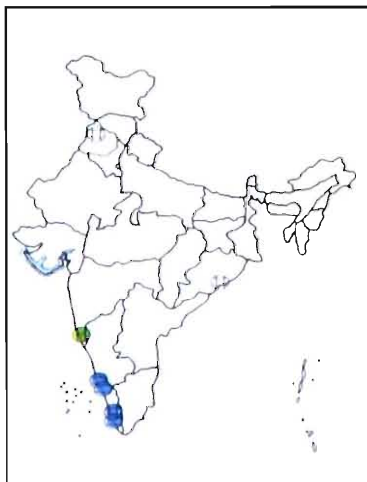
Photo: Gehan de Silva Wijeyeratne

Sandwich Tern

Diagnostics: *Adult*: Sexes alike. *Non-breeding* (winter): Forehead and crown white, black crest forming U-shaped patch, pale grey upper wings and darker outer primaries form distinct wedge. *Breeding* (summer): Cap black with crest. *Juvenile*: Like non-breeding adult



with dark band on the lesser wing-coverts, brown crescent bars on tertiaries and tail-feathers, primaries dark grey. **Voice:** Loud clamoring in typical *cherrak*. **Habitat:** Frequents seacoasts, tidal creeks and open sea. **Habits:** Flies closer to the water surface, often forages in flocks with Lesser Crested Tern, plunge-dives for fish. **Food:** Carnivorous (fish and marine worms). **Status and Distribution:** Regular winter migrant to W coast, also in Gulf of Kutch, rare inland; Pakistan; Sri Lanka. Breeds in Caspian Sea, winters on coasts of Persian Gulf and S Red Sea to Pakistan, India, Sri Lanka. **Threshold number:** 1,100.



228(466). Roseate Tern. *Sterna dougallii* Montagu, 1813; House Crow -; 33-38 cm; **R/UnCom C** (Plate 32.228)



Roseate Tern (br)

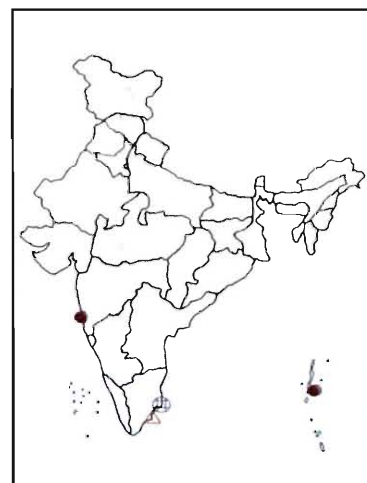
Diagnostics: *Adult:* Sexes alike. Slender grey and white tern with deeply forked tail. *Breeding* (summer): Bill reddish with black at tips; forehead, crown and nape black upto eye; underparts pinkish. *Non-breeding* (winter): Bill black; forehead white; lesser-covert bar faint dark; upperparts paler grey; tail longer with white outer feathers,



Roseate Tern

Photo: S. Guliano & S. Somnazi

underparts pinkish. *Juvenile:* Bill long and black, forehead spotted, crown streaked with black and white, rump and upper tail coverts ashy grey, underparts white. **Voice:** Low harsh *cherr wick*. **Habitat:** Coastal waters, offshore islands and islets. **Habits:** Forages in flocks. Prefers shallow inshore waters. Feeds by plunge-diving in shallow water. **Food:** Chiefly fish and prawn. **Status and Distribution:** Resident. Breeds in Andamans, and on Islets off SE and W coasts of India; Sri Lanka; Maldives. Breeds in Sri Lanka, SW Myanmar, winters in Indian & Pacific Oceans. **Threshold number:** 100.



229(468-469). Black-naped Tern. *Sterna sumatrana* Raffles, 1822; House Crow -; 35 cm; **R/LCom** (Plate 32.229)

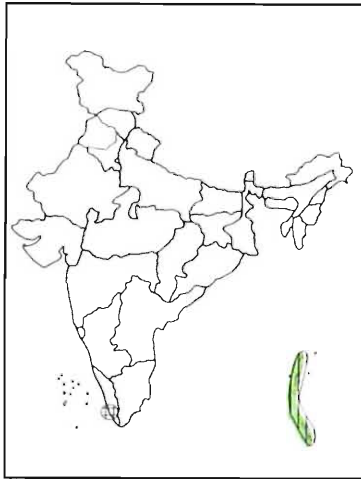
Diagnostics. *Adult:* Sexes alike. A pale greyish-white tern with black nuchal band, bill and legs. *Breeding* (summer): Bill black, occasionally with yellow tip; a black band commencing in front of eye and encircling the sides of head and nape (the black nuchal band), remaining head white; and legs black. *Non-breeding* (winter): Nuchal band black, narrower and less prominent. *Juvenile:* Bill slightly paler black than adult, looks shorter

Photo: Tom Tarrant



Black-naped Tern

and thicker; nape dark chocolate-brown; mantle, scapulars, tertials and wing-coverts with blackish sub-terminal bars. **Voice:** Less loud and harsh, sharp *kick* **Habitat:** Exclusively maritime, inshore waters around islands and islets; favours lagoons. **Habits:** Forages in flocks and prefers shallow inshore waters, feeds by plunging from the surface. **Food:** Carnivorous, chiefly fish. **Status and Distribution:** Resident, locally common in Andaman and Nicobar Islands; Bangladesh; Sri Lanka; Maldives. Breeds in NE Indian Ocean, SE Asia, N and E Australia.



230(464-465). Common Tern. *Sterna hirundo* Linnaeus, 1758; House Crow -, 31-36 cm; **R/WM/LCom C** (Plate 32.230)

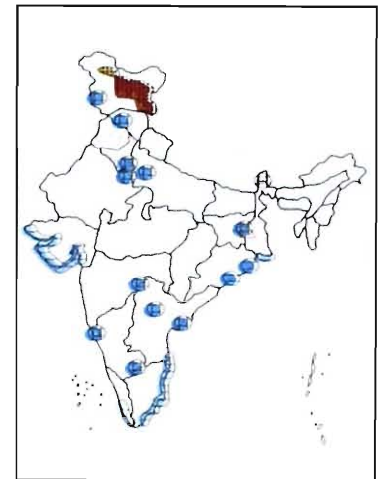
Diagnostics: *Adult:* Sexes alike; a pale grey bird with black-tipped reddish bill; forked tail; red legs. *Non-breeding* (winter): Forehead white, head streaked, and nape dark. *Breeding* (summer): Forehead, crown below to eyes and nape black. *Juvenile:* Forehead buff, head



Common Tern

Photo: Svein Bekkum

streaked black, nape black; upperparts buff barred dark brown; underparts white. **Voice:** Ringing short *kik*. **Habitat:** Prefers large rivers, jheels and lakes. **Habits:** Generally solitary, sometimes in colonies, hunts fishes by plunging from a height. **Food:** Carnivorous, comprising chiefly fish, molluscs, crustaceans and aquatic insects. **Status and Distribution:** A breeding resident in high-altitude lakes of Ladakh (c. 3500m, Pangong, Tsokar and Tso Moriri), locally common at breeding grounds, recorded up to 4700m, uncommon but widespread winter migrant in the coastal areas; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives. Breeds in mountains W Mongolia S to Kashmir, Tibet, Sichuan, winters mostly in Indian Ocean. **Threshold number:** 1,000.



231(466a). Arctic Tern. *Sterna paradisaea* Pontoppidan, 1763; House Crow -, 33-36 cm; **Va C** (Plate 32.231)

Diagnostics: Sexes alike. Similar to Common Tern, but bill, neck and legs shorter, tail longer. *Non-breeding* (winter): Bill and legs black, forehead white, hindcrown down to eyes and nape dark. *Breeding* (summer): Bill and legs red; primaries translucent;

Photo: Jon Hornbuckle



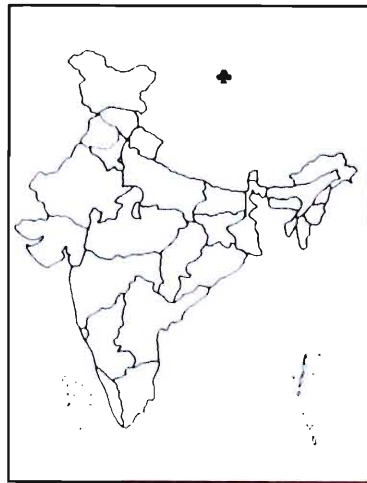
Arctic Tern

Photo: Svein Bekkum



Arctic Tern

underparts grayer. *Juvenile*: Differs from the juvenile of Common Tern by white secondaries and inner primaries; and without brown on upperparts. **Voice**: A *krii-a*, clearer and shorter than Common Tern's. **Habitat**: Inland only along Tundra rivers and marshes, mostly maritime. **Habits**: Similar to other common terns. **Food**: Carnivorous, mainly comprising fish, molluscs and aquatic insects. **Status and Distribution**: Recorded only once from Suru Valley (4000 m), Kashmir, India. Circumpolar, breeds in Holarctic between 60° and 75° N, winters in Antarctic south to 75° S; thus the species covers over 35,000 km on migration. **Remarks**: Single record from Suru valley, Kashmir in 1936 (Ali & Ripley, 1978).



232 (475-476).

Little Tern. *Sterna albifrons* Pallas, 1764; Myna ±; 22-24 cm; WM/R/LCom C (Plate 33.232)

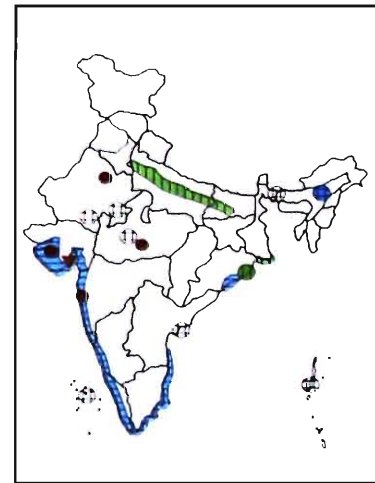


Little Tern



Photo: S. Guliano & S. Somnazi

Diagnostics: *Adult*: Sexes alike. A small grey and white tern. *Non-breeding* (winter): Forehead, crown and nape black mixed with white; bill blackish; legs and feet dusky red. *Breeding* (summer): Forehead white, crown and nape velvety black; bill and legs orange-yellow. *Juvenile*: Dark wavy bars on upperparts; white forehead and crown speckled brownish-black; blackish nape finely dotted with white. **Voice**: A sharp *creek, creek*. **Habitat**: Generally on inland rivers, jheels, lakes and reservoirs. **Habits**: Feeds alone or in small flocks, flying back and forth over water surface scanning for food, plunges steeply over prey; also feeds by dipping. **Food**: Carnivorous, comprising chiefly small fish,



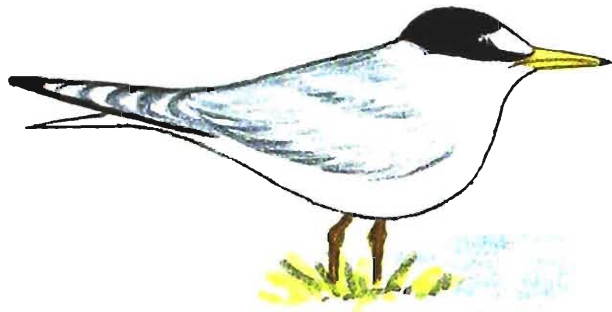
crustaceans and aquatic insects. **Status and Distribution:** Resident in Gangetic Plains, during non-breeding season disperses along coastal areas; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. Mostly breeds Gangetic Plains, Sri Lanka, Myanmar, Sumatra, Java, winters in Indian Ocean, along W coast of India, SE Asia. **Threshold number:** 1,000.

233(477). Saunders's Tern. *Sterna saundersi* Hume, 1877; Myna ±; 23 cm; **R/ SM/UnCom C** (Plate 33.233)

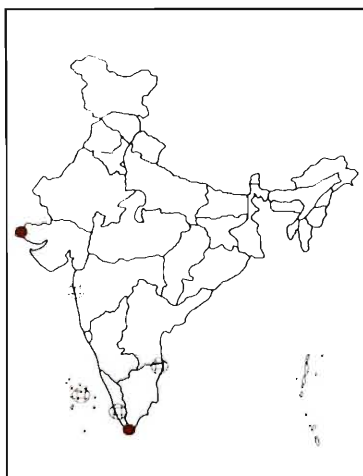
Photo: Gehan de Silva Wijeyeratne



Saunders's Tern



Diagnostics: Adult breeding: With shorter and more rounded white forehead patch and broader black loreal stripe; grey rump and centre of tail matching paler grey mantle; purer and black outer edge to primaries; shorter tail-streamers; and reddish-brown to brown legs. **Voice:** A sharp creek, creek. **Habitat:** Coastal



waters, lagoons and tidal creeks. **Habits:** Feeds solitary or in small flocks, flying back and forth over water surface looking for food, plunges steeply over prey; also feeds by dipping. **Food:** Carnivorous, comprising chiefly small fish, crustaceans and aquatic insects. **Status and Distribution:** Resident, uncommon, breeds in Gujarat, Pakistan, Sri Lanka and possibly Maldives, summer migrant along the coasts of Maharashtra, Kerala and Tamil Nadu. N & W Indian Ocean, Red Sea. **Threshold number:** 400.

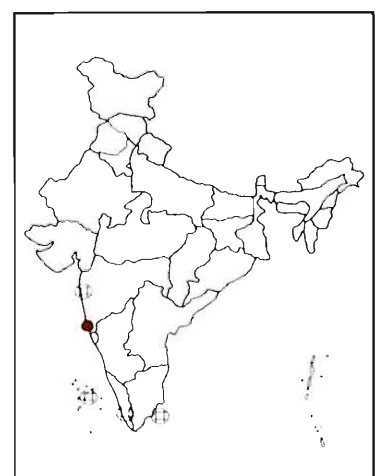
234(467). White-cheeked Tern. *Sterna repressa* Hartert, 1916; House Crow -; 32-34 cm; **R/ Ra C** (Plate 33.234)



Photo: Armond van den Berg

White-cheeked Tern (br)

Diagnostics: Adult breeding (summer): Sexes alike. With darker grey upperparts than all other *Sterna*; a well defined white cheek-stripe contrasting with grey throat and neck; longer red bill with black tip; darker grey underparts; larger and longer tail streamers. **Non-breeding (winter):** Darker grey upper parts concolorous rump and grey tail; broader black hood. **Juvenile:** With darker upperparts, broader black hood and darker grey rump and tail. **Voice:** Ringing short kik. **Habitat:** Coastal waters, often far from land. **Habits:** Hunts in flocks by plunging from the air with steep



dive. **Food:** Carnivorous, comprising chiefly fish. **Status and Distribution:** Status uncertain, very rare; breeds on Vengurla rocks of Maharashtra coast, a few records of non-breeding birds from offshore W India; Lakshadweep; Pakistan; Sri Lanka; Maldives. Breeds in Red Sea S to S Somalia, Kenya, Persian Gulf to W India, summers in Somalia and Kenya, Gulf of Oman, Pakistan and W Indian coasts. **Threshold number:** 6,000.

235(470). Black-bellied Tern. *Sterna acuticauda* J.E.Gray, 1831; House Crow -; 33 cm; NT R/LCom C (Plate 33. 235)

Photo: Khalid Rafeek



Black-bellied Tern (br)

Diagnostics: *Adult:* Sexes alike. *Non-breeding* (winter): Head white streaked with black; a black patch behind eye; bill dull yellow with dusky tip; upper plumage greyish; under plumage white with grey tinge on foreneck and breast; tail deeply forked; legs orange-red. *Breeding* (summer): Forehead, crown down below to eyes and nape glossy black; lores, cheeks, chin and throat pure white; upper plumage ashy-grey; remaining under plumage black. *Juvenile:* Upperparts buff-grey, feathers with pale buff-white edges and blackish subedges. **Voice:** Clear piping *peuo*. **Habitat:** Predominantly inland freshwater tern, found on large rivers, jheels and lakes, etc. in winter. **Habits:** Gregarious, occurs in flocks flying up and down on tranquil stretches of rivers, or resting on shoals and sandbanks; feeds by swiftly plunging vertically from air and submerging in water, or by scooping the



Black-bellied Tern (br)



Chick of Black-bellied Tern

prey from water or land. **Food:** Carnivorous (fish, crustaceans and aquatic insects). **Status and Distribution:** *Near threatened*. Resident in almost whole of India, except NW, NE and Himalaya; Pakistan; Nepal; Bangladesh. SE Asia. **Remarks:** It is found on large rivers (usually breeding on sandspits and islands) and marshes, occasionally on smaller pools and ditches, in lowlands (but not on the coast) up to 730 m. There has been an extremely rapid decline in South-East Asia and it is now almost extinct in the region. Nevertheless, the suggestion that the world population could be below 10,000 may be over-cautious given its status in South Asian countries. Threats include the destruction of breeding habitat (islands and sandspits in larger rivers are increasingly

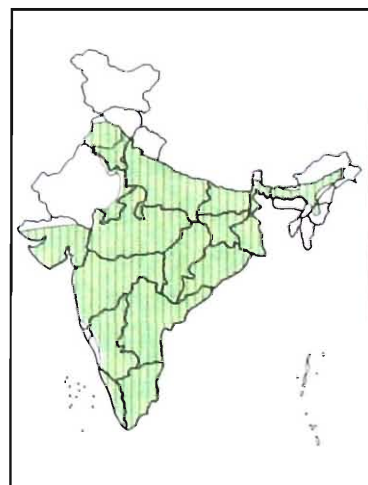


Photo: Khalid Rafeek

cultivated), the collection of eggs for food, and natural or dam-determined flooding of nests (BirdLife Int., 2001). **Threshold number:** 250.

236(471, 72, 73). Bridled Tern. *Sterna anaethetus* Scopoli, 1786; House Crow -; 30-32 cm; R/WMLCom C (Plate 33. 236)

Photo: S. Guitano & S. Sommazi



Bridled Tern (br)

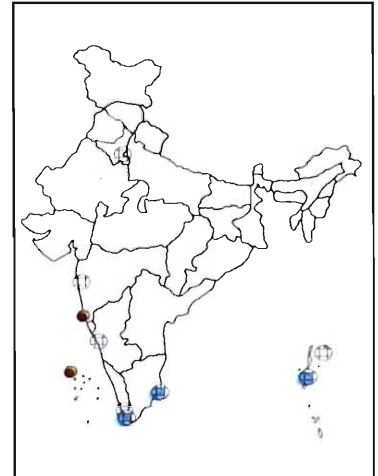
Photo: Tony Palliser



Diagnostics: *Adult:* Sexes alike. A medium-sized sea tern with dark greyish brown mantle, wings and tail, and white underparts; white forehead and superciliary region; black crown, nape and a stripe from lores to behind eye; aptly known as Bridled Tern from its face markings. In flight, white leading edges of upper wings conspicuous. *Juvenile:* With greyish-white crown, dark mask, white forehead and supercilium, and brownish patch on sides of breast. **Voice:** Shrill *kek, kek*. **Habitat:** Maritime, usually offshore waters. **Habits:** Often seen in flocks with other seabirds over shoals of fish, dips down to pick fish and plankton from the surface. **Food:**

Carnivorous, mainly fish also insects and crustaceans. **Status and Distribution:**

Resident, locally common, breeds on Vengurla rocks of Maharashtra coast, also Lakshadweep, disperses in non-breeding season to offshore coastal waters of W India; Pakistan; Sri Lanka; Maldives; Tropical Indian Ocean. **Threshold number:** 1,500.



237(474). Sooty Tern. *Sterna fuscata* Linnaeus, 1766; House Crow; 33-36 cm; R/LCom C (Plate 33.237)



Sooty Tern

Diagnostics: *Adult:* Sexes alike. A medium sized black-and-white pelagic tern with conspicuously long pointed wings

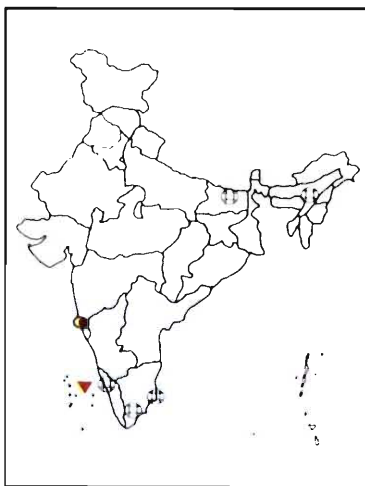


and deeply forked tail. **Breeding (summer):** Blackish mantle and wings which concolorous with black crown and nape; white oval-shaped forehead patch; white outer tail feathers contrasting strongly with rest of the black tail. **Non-breeding (winter):** White spotting on

Photo: Jon Hornbuckle

crown and wing fringes to upperparts. *Juvenile*: With sooty-black head and breast contrasting with whitish lower belly and bold spotting on mantle, scapulars and wing-coverts. **Voice**: Distinctly loud and piercing *wide-a-wake*. **Habitat**: Maritime, occurs well out to sea. **Habits**: Usually seen in flocks, very active and clamorous both in daytime and during night on its breeding grounds. Pursues shoals of small fish and deftly scoops them. Also catches flying fishes as they leap out of the water; spends much time in the arial manoeuvres. **Food**: Carnivorous, chiefly fish and squid. **Status and Distribution**:

Resident, locally common, breeds on Vengurla rocks of Maharashtra coast, also Lakshadweep, disperses in non-breeding season to the adjacent islands; Sri Lanka and Maldives; Indian Ocean to W Pacific Ocean. **Threshold number**: 20,000.



238(458). Whiskered Tern. *Chlidonias hybridus* (Pallas, 1811); Pigeon-; 23 cm; **R/WM/PM/LCom C** (Plate 33. 238)



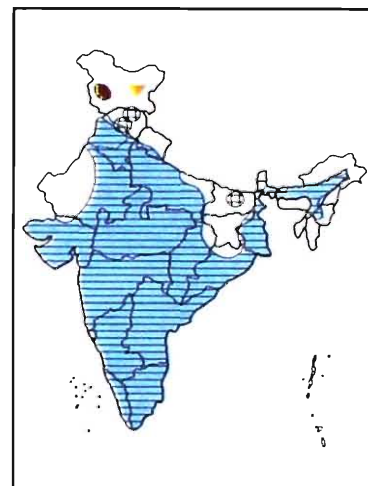
Photo: Gehan de Silva Wijeyeratne

Whiskered Tern (nbr)

Diagnostics: Adult: Sexes alike. A silvery-grey and white bird with long narrow pointed

wings (tips projecting beyond tail) and short red legs. *Non-breeding* (winter): Forehead white with black streaks; head and nape black; plumage pale ashy; bill and legs blackish. *Breeding* (summer): Crown down to eyes and nape black with contrasting snow-white cheeks ('whiskers'); belly black; bill and legs dark red. *Juvenile*: Streaked brown and white. **Voice**: Sharp grating *kirreak-kirreak...kerk-kerk*. **Habitat**: Prefers inland jheels, lakes, reservoirs, marshes, rivers and flooded paddy fields. **Habits**: Gregarious, often feeds in flocks, mostly forages for insects by capturing them from surface, sometimes plunges for fish. **Food**: Carnivorous, comprising fish, tadpoles, crabs and odonata larvae. **Status and Distribution**:

An uncommon winter migrant/passage migrant to India, breeds in Kashmir and Assam; Pakistan; Nepal; Bangladesh; Sri Lanka. Also breeds in E Iran, Pakistan, N India, winters in S Asia. **Threshold number**: 1,000.



239(459). White-winged Black Tern. *Chlidonias leucopterus* (Temminck, 1815); **White-winged Tern (I)**; Pigeon-; 20-23cm; **WM/PM/UnCom C** (Plate 33.239)



Photo: Alister Benn

White-winged Black Tern (nbr)

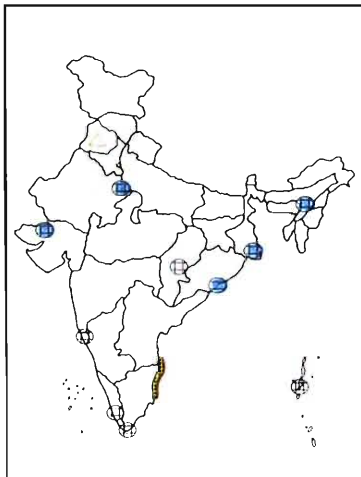
Diagnostics: Adult: Sexes alike. In winter, similar to Whiskered Tern except slightly

Photo: Jon Hornbuckle



White-winged Black Tern (br)

contrast on underwing between whitish flight feathers and black wing-coverts. **Voice:** A sharp *kreak, kreak*. **Habitat:** Prefers lakes, marshes, flooded paddy fields and pools. **Habits:** Gregarious, in winter generally feeds with Whiskered Tern in small flocks flying back and forth at the height of 3 to 6 metres and thus catching insects in the air or by swooping and picking from water surface. **Food:** Carnivorous, comprising tadpoles, fish, crabs, aquatic larvae. **Status and Distribution:** A local winter/passage migrant to India, sight records from Jammu and Kashmir, Punjab and Haryana; Pakistan; Nepal; Bangladesh; Sri Lanka; Maldives. Breeds in C E Siberia, N Mongolia to SE Russia, NE China, winters in S and SE Asia up to Australia, New Zealand.



240(459a). Black Tern. *Chlidonias niger* (Linnaeus, 1758); Pigeon -; 22-24 cm; **PM/Va C** (Plate 33.240)

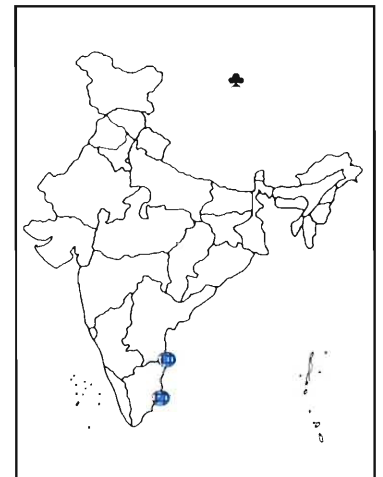
smaller in size with dull grey (not silvery-grey) mantle. *Non-breeding* (winter): Black patch from pale crown to ear-coverts extends below eyes; often there is a white gap between this patch and eye; Tail white. *Breeding* (summer): Head to belly black with contrasting white wings; bill black; legs dark red; in flight, striking



Black Tern (juv.)

Photo: Gehan de Silva Wijeyeratne

Diagnostics: *Non-breeding* (winter): Differs from Whiskered Tern by dull grey instead of silvery-grey mantle; from White-winged Black Tern by a black patch on each side of breast, near bend of wings. *Breeding* (summer): Dark slate-grey above, black below without the white wing-shoulder or white tail of White winged Black Tern. **Voice:** Shrill nasal *kyew; kyek; kja*. **Habitat:** Found on lakes, marshes, paddy fields and pools. **Habits:** Gregarious, generally feeds in small flocks catching insects in flight or by swooping on water. **Food:** Carnivorous (fish, frogs, crustacean). **Status and Distribution:** A vagrant passage migrant to India, sight record near Delhi in 1949 (Ali and Ripley, 1978), might have been overlooked with other marsh tern species. Breeds in W, C & S Europe, W & C Asia, winters along the coasts of Africa and parts of S Asia. **Threshold number:** 4,000.



241(481). Brown Noddy. *Anous stolidus* (Linnaeus, 1758); House Crow -; 42 cm; **R/LCom C** (Plate 33.241)

Diagnostics: *Adult:* Sexes alike; summer and winter plumage also alike. A tern-like bird, with

Photo: S. Guliano & S. Sommazi



Brown Noddy

Photo: Jon Hornbuckle



Brown Noddy

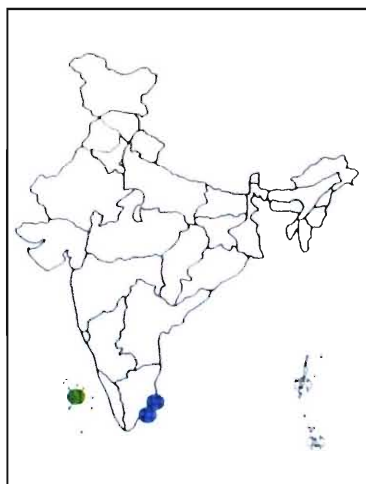
smoky chocolate-brown upperparts; white forehead and grey crown; blackish brown wedge-shaped tail; underparts darker. *Juvenile:* With browner forehead and crown, indistinct pale buff

fringes to mantle, scapulars and coverts.

Voice: Low harsh *karrk; kraa*. **Habitat:**

Generally keep away from coasts, except when nesting. **Habits:** Do not plunge for fish, feed largely by following schools of small fish which are being attacked by some submarine predator; they

congregate in groups on such feeding centres, also feed on moonlit nights. **Food:** Carnivorous, mainly fish. **Status and Distribution:** Resident, locally common; breeds on Lakshadweep and Maldives; also recorded off coasts of Andamann and Nicobars; Pakistan; Sri Lanka. Breeds in S Red Sea and Gulf of Aden, winters in Indian Ocean. **Threshold number:** 750.



242(482). Black Noddy. *Anous minutus* Boie, 1844; Pigeon; 34 cm; **Va C** (Plate 33.242)



Black Noddy

Photo: S. Guliano & S. Sommazi

Diagnostics:

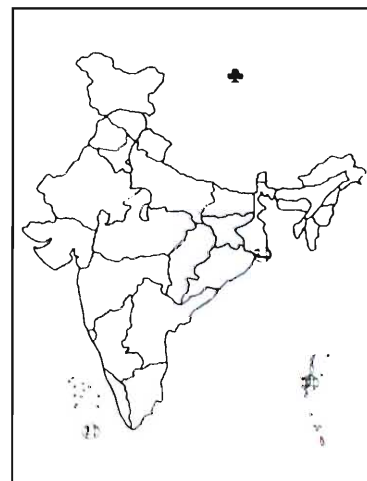
Adult: Very similar to Brown Noddy but faster with more fluttering flight. Distinguished by its



Photo: Jon Hornbuckle

smaller and slimmer appearance; darker brownish-black plumage; slimmer, straighter and longer-looking bill (longer than head); shorter tail which is falling level with wing tips at rest (*cf* beyond wing-tips in Brown Noddy); whiter forehead and crown. *Juvenile:* Best separated by the bill shape, faint pale fringes to upperparts and the whiter head. **Voice:** A querulous *krrrk; krikrikrik*. **Habitat:** Marine. **Habits:** A typical noddy. Details not recorded in Indian waters. **Food:** Carnivorous, mainly fish. **Status and Distribution:** Vagrant; India; Sri Lanka. Islands of Sulu Sea.

Remarks: One specimen from Kolkata, another specimen from Port Blair in Andamans, one more from Minicoy Island (Ali & Ripley, 1978).



Skimmers (Family Rynchopidae)

World: 3 species; Asia: 1; India: 1

Related to Terns but distinguished by the long, strong, scissor-like bill with elongated lower mandible. Feed on water surface with bill open and lower mandible partly immersed to grasp encountered fish quarry.

243(484). Indian Skimmer. *Rynchops albicollis* Swainson, 1838; House Crow ±; 40 cm; GT/Vu R/LM/UnCom C (Plate 33.243)

Photo: Suppalak Klabdee



Indian Skimmer

Photo: Otto Pfister



Diagnostics: *Adult:* Sexes alike, but female slightly smaller. A large tern-like bird with contrasting pied plumage. Bill orange-red, yellow at tip and orange at base, with much longer lower mandible; forehead, neck-collar and wing-bar white; upperparts blackish-brown; underparts glistening white; legs and feet red. At rest, wings project far beyond the slightly forked tail. *Juvenile:* Forehead streaked with brown; upperparts lighter brown, scalloped with fulvous white; tail-feather brown-tipped. **Voice:** A nasal *kap*,



Photo: Suppalak Klabdee

Indian Skimmer

kap. **Habitat:** Occurs in undisturbed reaches of large rivers with sandbanks, reservoirs, and lakes; occasionally coastal waters. **Habits:** Generally solitary, feeds in small flocks, roosts communally, hunts actively during moonlit nights, and gracefully skims over undisturbed waters ploughing with lower mandible held at oblique angle. **Food:** Carnivorous, comprising small fish. **Status and Distribution:** *Globally threatened/Vulnerable.* Resident, nomadic, mainly occurs on large rivers in Punjab and C India; Pakistan; Nepal; Bangladesh; Myanmar. SE Asia. **Remarks:** In the past century of increased human usage of wetlands, many colonies have been plundered and the substrates mined, cultivated and settled; and many feeding areas have been over-exploited, polluted, flooded or drained. The Indian Skimmer has consequently declined throughout and will continue to do so unless suitable wetland habitats, and particularly their colonies, are kept sufficiently free of disturbance and development. Its stronghold is India, but even here it is thought to be the species most urgently in need of conservation action. **Disturbance and persecution:** the

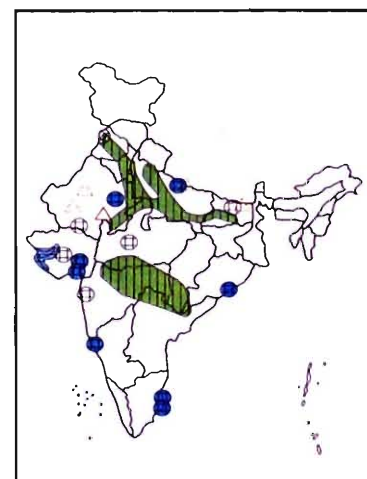
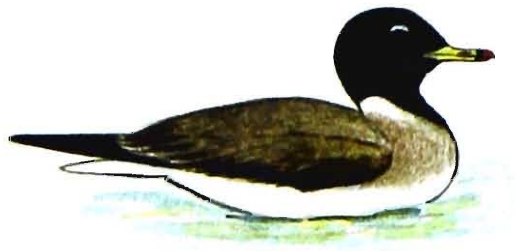
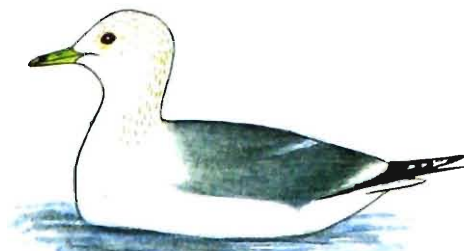


Plate 31



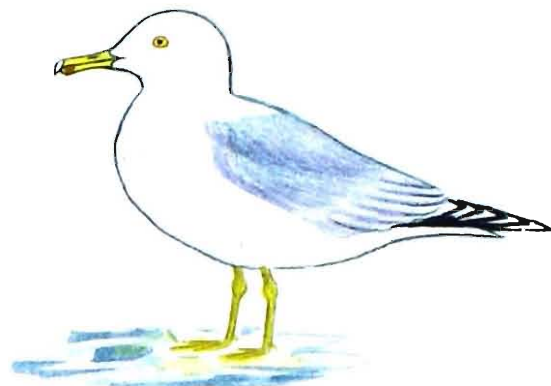
213. Sooty Gull



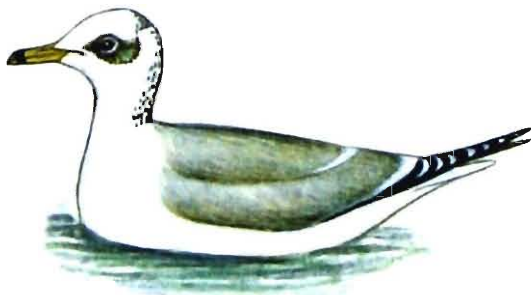
214. Mew Gull



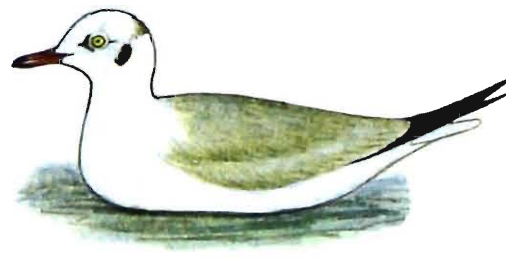
215. Heuglin's Gull



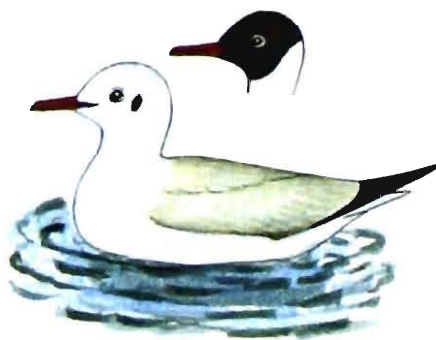
216. Yellow-legged Gull



217. Pallas's Gull



218. Brown-headed Gull



219. Black-headed Gull



220. Slender-billed Gull

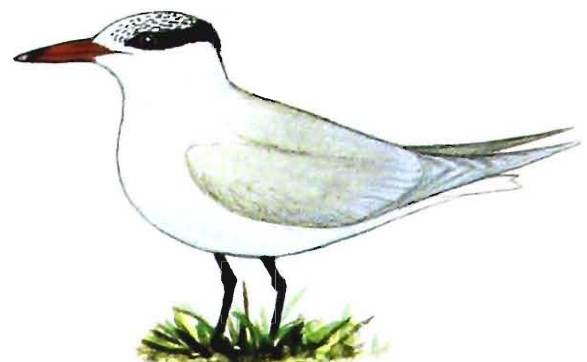


221. Little Gull

Plate 32



222. Gull-billed Tern



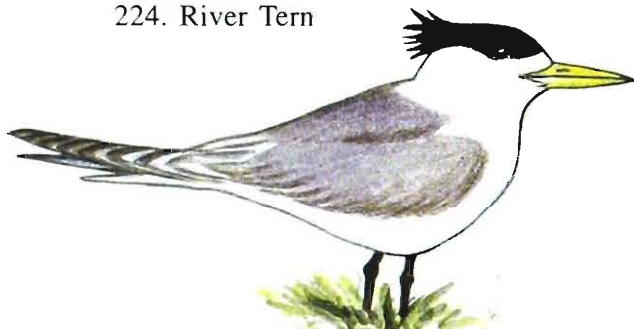
223. Caspian Tern



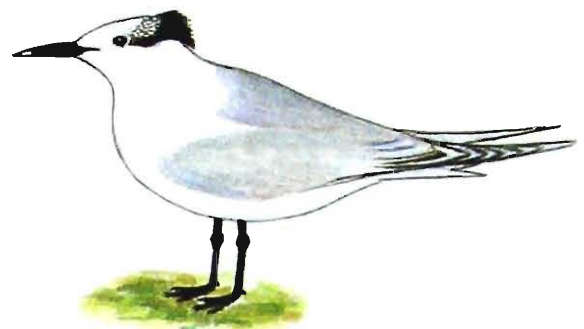
224. River Tern



225. Lesser Crested Tern



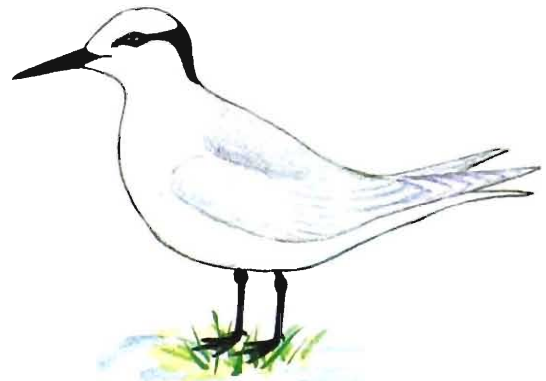
226. Large Crested Tern



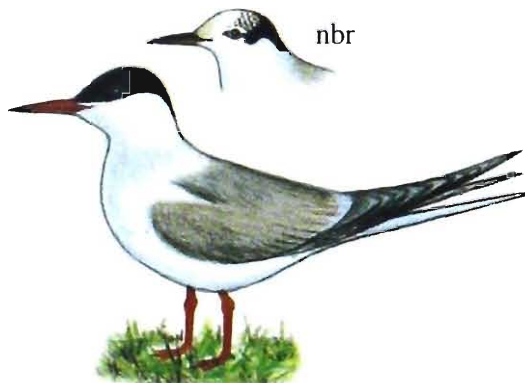
227. Sandwich Tern



228. Roseate Tern



229. Black-naped Tern

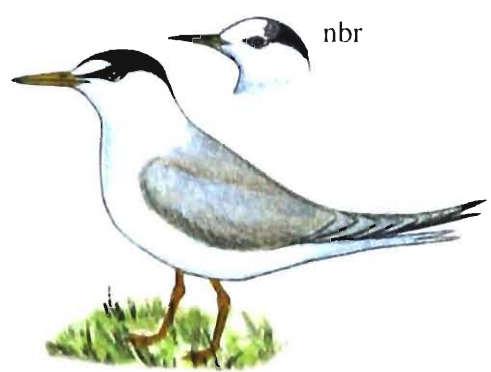


230. Common Tern

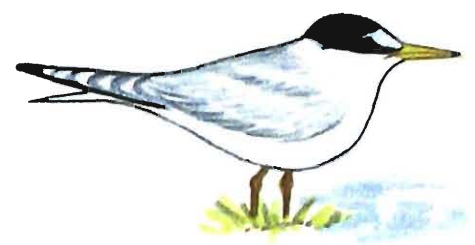


231. Arctic Tern

Plate 33



232. Little Tern



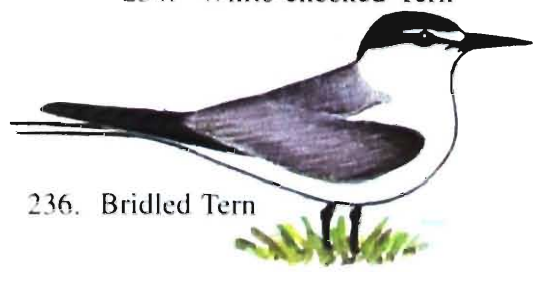
233. Saunders's Tern



234. White-cheeked Tern



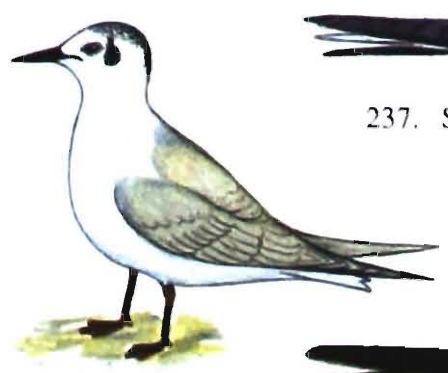
235. Black-bellied Tern



236. Bridled Tern



238. Whiskered Tern



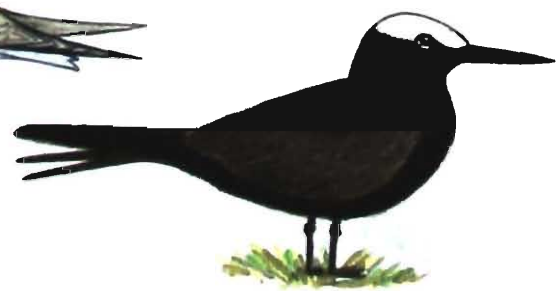
239. White-winged Black Tern



237. Sooty Tern



240. Black Tern



242. Black Noddy



241. Brown Noddy



243. Indian Skimmer

requirements of this species overlap dangerously with those of India's people; crucially, most watercourses in the country are used intensively by people for fishing, transportation and domestic purposes (Rahmani 1995a). As a consequence of huge increases in the human population of India, pressures are mounting on wetlands throughout the country; in particular, human use of main river channels previously favoured by the species is now intensive in most areas. Increased cultivation (e.g. of melons) on the islands and banks of large rivers is reducing the availability of breeding sites for the species. Flooding of rivers in the breeding season, for whatever reason, destroys nests in colonies on low sandbanks (Smith, 1942, Smythies, 1986). While this threat can result from natural phenomena such as early snow-melt or heavy rainfall, it is presumably exacerbated by comprehensive deforestation in the watersheds of major

rivers and consequent rapid run-off. **Protected areas:** In India The National Chambal Sanctuary (5,400 km²) was established to protect Gharial *Gavialis gangeticus*, but it also contains one of the healthiest skimmer populations in Asia. It is financed by the Indian government, through the state governments of Rajasthan, Madhya Pradesh and Uttar Pradesh (Scott, 1989). The skimmer has also occurred in Harike Lake Wildlife Sanctuary, and in or near Ranthambore National Park. Khijadia lakes (c.6 km²), Gujarat, have been declared a bird sanctuary in which all hunting is prohibited. Part of Pocharam reservoir is managed as a sanctuary. Population has become very scarce recently, thus rarely seen in most parts of India, except Gujarat. Global population is estimated to be around 10,000 individuals. Over 600 birds recorded in Bangladesh in 1991 during Asian Waterfowl Census. **Threshold number:** 60.



Photo: Gehan de Silva Wijeyeratne

A flock of Garganey and Wigeon

2.3 Wetland Dependent and Associated Birds

Eagles, Kites & Harriers (Family Accipitridae)

They are large raptors, which specialize in preying on fish, and are hence almost always found near water. **Eagles** are from medium to very large birds with massive bills. In flight, the wings are characteristically long, broad and parallel-sided. The tails are decorative, rather short, rounded and wedge-shaped. **Kites** are small to medium-sized hawks with forked tails. The Brahminy Kite is an exception, but resembles the true kites in its scavenging habits. The adult has a most distinctive chestnut and white plumage. **Harriers** are slim, medium-sized raptors with relatively long slender wings and tail. Males are generally black and females rufous in plumage. Tails have bars or rings. They use flap-and-glide technique with the wings held in a characteristic V during flight. Hunt by quartering fairly near the ground to surprise their prey.

244(135). Brahminy Kite. *Haliastur indus* (Boddaert, 1783); Pariah Kite -; 48 cm; **R/LM/LCom C** (Plate 34.244)



Photo: Banard Lau

Brahminy Kite

Diagnostics: Sexes alike. **Adult:** Has bright chestnut and white plumage, and rounded tail. **Juvenile:** Is chocolate brown with pale bars across the upperwing. **Voice:** Short high-



Photo: Gehan de Silva Wijeyeratne

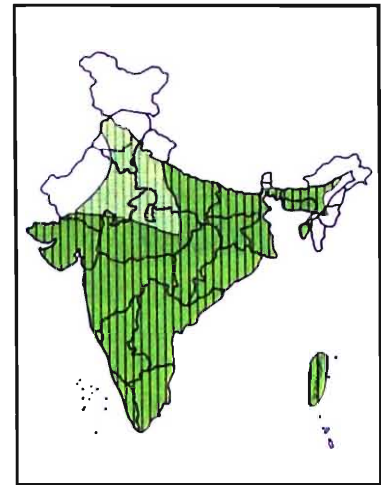
Brahminy Kite (imm.)

pitched scream.

Habitat: Near around freshwater bodies, marshes, estuaries, and coastal waters.

Habits: Often solitary or in pairs, but roost communally and gregarious where common. **Food:**

Chiefly fish, frogs, crabs and young ducks. **Status and Distribution:** Resident; undertakes local movements; widespread and locally common up to 1800 m in Himalayas; Pakistan; Nepal; Bangladesh; Sri Lanka; India to S China.



245(173). White-bellied Sea-Eagle. *Haliaeetus leucogaster* (Gmelin, 1788); **White-bellied Sea Eagle (I); Kite +; 66-71 cm; R/Ra C** (Plate 34.245)



Photo: James Eaton

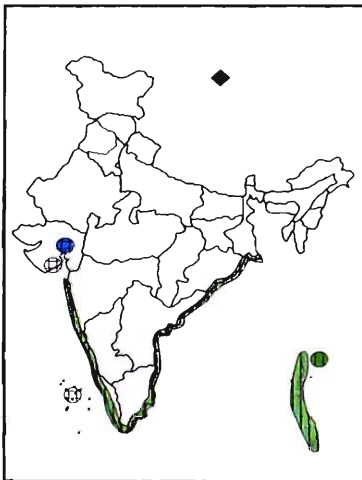
White-bellied Sea-Eagle

Photo: Laurence Poh



White-bellied Sea-Eagle

Diagnostics: Sexes alike; female larger. *Adult:* Ashy-brown upper parts; white head, neck, underparts and terminal third of tail. *Juvenile:* Mainly brown with pale head, whitish tail and brownish sub terminal band. **Voice:** A loud nasal goose-like honking. **Habitat:** Sea coasts, lagoons and estuaries; occasionally some way along rivers, freshwater lakes and creeks. **Habits:** Usually keeps singly or in pairs. Frequently soars, circling at great heights. Also spends time on rocks or dead trees, usually near water. **Food:** Largely sea snakes, fish; occasionally crabs, rats, and any living thing it can catch. **Status and Distribution:** Resident and rare, chiefly coasts and offshore islands from Mumbai south, down the west coasts and up to east coasts, north to Bangladesh; Sri Lanka. S China to Australasia.



246(174). Pallas's Fish-Eagle. *Haliaeetus leucorhynchus* (Pallas, 1771); Pallas's Fish Eagle (I); Kite +; 76-84 cm; GT/Vu R/WM/Ra C (Plate 34.246)



Photo: Tim Loseby

Pallas's Fish-Eagle

Diagnostics: Sexes alike; female slightly larger. *Adult:* Dark brown with pale golden brown head, broad white band across tail conspicuous in flight. *Juvenile:* Dark brown with dark ear-coverts, paler and grayer underparts, and very dark wing quills and tail (unbanded). **Voice:** Loud, far-carrying raucous shrieks like the creaking of the unoiled bullock cart. **Habits:** Rather sluggish, perching for long periods on a tree or support near water, feeds mainly on fish and ducks; breeds near lakes. **Habitat:** Pallas's Fish-eagle frequents areas close to freshwater lakes and rivers; It is generally absent from coasts, tidal creeks or mangroves. **Food:** Chiefly fish, also waterfowl/waterbirds, snakes, frogs and turtles. **Status and Distribution:** *Globally threatened/Vulnerable.* Resident, rare; from Kashmir east to NE India and south to SE Rajasthan, and Madhya Pradesh, SE Orissa and Gujarat; Pakistan; Nepal; Bhutan; Bangladesh. **Remarks:** Pallas's Fish-eagle is widespread in central, southern and eastern Asia with occasional records west into Europe. Pallas's Fish-eagle is a widespread breeding species on lakes and large rivers in the north and north-

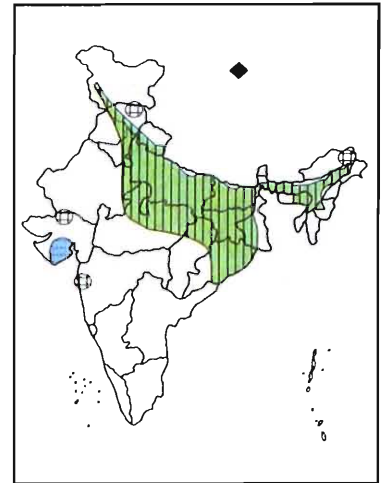
Photo: Bhumesh Bharti



Pallas's Fish-Eagle at nest

east of the country. There are unconfirmed records from the south in Karnataka, Tamil Nadu and Andhra Pradesh. In the nineteenth century the species was manifestly "common" in its Indian range. These early reports indicate that the species was once remarkably abundant for such a large raptor throughout much of northern India, it apparently bred along the entire length of the Yamuna, Ganges and Chambal Rivers with pairs being encountered "every three or four miles. Around Dehra Dun and Mussoorie (Uttaranchal) it used to be "extremely common", skirting the outer hills. As with several large waterbirds (e.g. Greater Adjutant *Leptoptilos dubius*, Lesser Adjutant *L. javanicus* and Spot-billed Pelican *Pelecanus philippensis*), Assam remains an important stronghold for this species. Shortage of prey, loss of habitat, disturbance, and the effects of agricultural chemicals pose a general threat to the species throughout its range. In general, the degradation of wetlands and the removal of nest sites pose major threat to the species. While this species used to be one of the commonest raptors of the Gangetic plains and some semi-arid zones of India, it has become rare almost throughout, chiefly because of the drainage and degradation of wetlands. All this

pressure has reduced the availability of feeding, roosting and nesting sites. Loss of large trees has been rife throughout India because of the demand for fuel wood and timber.



The massive human population of India places extreme pressure on wetlands; these have become increasingly overrun with fishermen, hunters and general human traffic, and this in turn has led to increased disturbance and hunting and a diminution of habitat quality. **Legislation:** Pallas's Fish-eagle is included in Appendix I of CITES. **Protected areas and habitat management:** The Assamese population of the species in general presents the best opportunity for preserving the species (in particular Kaziranga and Nameri National Parks) and efforts should be made to manage relevant protected areas appropriately. In general, nesting sites should be protected from disturbance and degradation, and tall trees near suitable wetlands maintained (BirdLife Int., 2001).

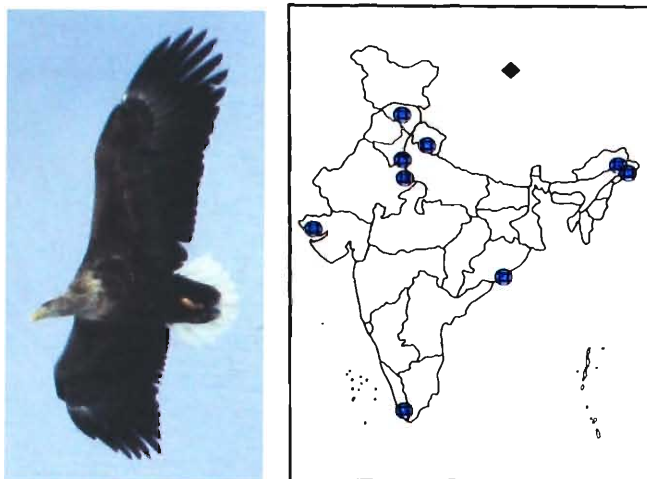
247(172a) White-tailed Sea-Eagle. *Haliaeetus albicilla* (Linnaeus, 1758); White-tailed Eagle (I); Kite +; 69-86 cm; NT WM/Ra C (Plate 34.247)



Photo: Pete Morris/ Birdquest

White-tailed Sea-Eagle

Photo: Pete Morris/ Birdquest



White-tailed Sea-Eagle

Diagnostics: Sexes alike; female larger. *Adult:* Huge dark brown eagle with paler head, neck and upper breast; easily recognized by wholly white tail contrasting with brown wings and body. *Juvenile:* Mainly blackish-brown with mottled tail edged with brown. **Voice:** Series of barking notes. **Habits:** Lethargic, generally sits for hours perched on objects at ground level by edge of water. Scoops fish while flying low above water surface. **Habitat:** Coasts, large rivers, lakes and jheels. **Food:** Largely fish, also ducks and mammals. **Status and Distribution:** *Near threatened.* Rare winter migrant and widespread in India; Pakistan; Nepal; Bhutan; Bangladesh. **Remarks:** *Haliaeetus albicilla* has its strongholds in Norway (1,600–1,800 pairs) and Russia (5,000–7,000 pairs), with important populations in south-west Greenland. In India the species has its strongholds in Assam. It is mainly migratory in the north and east of its breeding range but sedentary elsewhere. During the nineteenth and first half of the twentieth centuries numbers declined dramatically and its range contracted in western Europe. This trend has been reversed in the north-west of its breeding range since the 1970s. Numbers are thought to be stable or slightly increasing in countries of the former Soviet Union but are still declining in south-east Europe. Loss and degradation of wetlands, increasing human disturbance, and the indiscriminate use of poisons are continuing threats. Modern forestry methods have reduced the availability of suitable habitat (BirdLife Int., 2001).

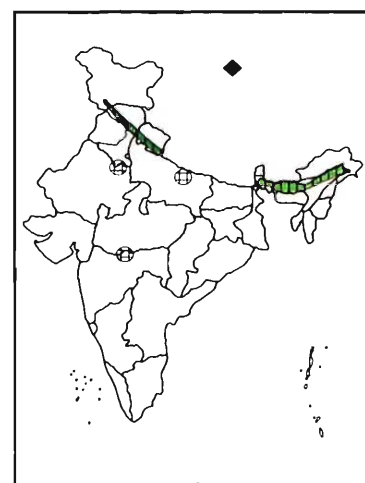
248(177) Lesser Grey-headed Fish-Eagle. *Icthyophaga humilis* (S. Muller & Schlegel, 1841); **Lesser Fish Eagle** (I); Kite ±; c.64 cm; **NT R/AM/Ra C** (Plate 34.248)



Photo: Vijay Cavale

Lesser Grey-headed Fish-Eagle

Diagnostics: Sexes alike. Head pure grey; less brown on crown; white belly, thigh and under tail-coverts clearly demarcated from breast, basal two-third of tail-mottled brown, and terminal third blackish. **Voice:** Irritable shouts and crackles. **Habits:** Solitary or in pairs, usually perches on trees or rocks overlooking water from where it takes flight for hunting fish, glides and soars on level wings. **Habitat:** Forest streams and lakes in foothills and sub-Himalayan terai. **Food:** Mainly fish, also young birds and small mammals. **Status and Distribution:** *Near threatened.*



Resident, rare, chiefly in Himalayas from Kashmir east to Arunachal Pradesh in India; Nepal; Bhutan. SE Asia. **Remarks:** Restricted to Himalayan foothills and north-east; declining in range and population. It frequents large forested rivers and wetlands in the lowlands and foothills up to 2,400 m, but usually below 1,000 m. Loss of forest habitat along rivers, siltation, over-fishing and

increasing human disturbance of waterways are important threats that are causing widespread decline. It is also declining in Uttar Pradesh, India, partly because of pesticide use, and this is presumably relevant throughout much of its range (BirdLife Int., 2001).

249(175-176). Greater Grey-headed Fish-Eagle. *Ichthyophaga ichthyaetus* (Horsfield, 1821); **Grey-headed Fish Eagle (I); Kite +; 69-74 cm; NT R/UnCom C (Plate 34.249)**

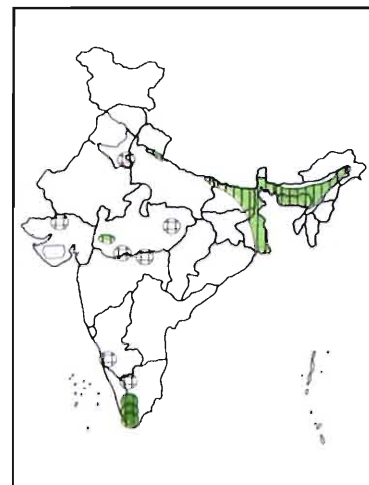


Photo: Gehan de Silva Wijeyeratne

Greater Grey-headed Fish-Eagle

Diagnostics: *Adult:* Distinguished from the above by two-tone tail (i.e. tail white with black terminal band). Head, neck and throat grey; upper parts dark brown, breast rufous brown. *Juvenile:* Dark brown above with boldly streaked head and underparts and pale supercilium. **Voice:** Unmusical, uncanny. **Habits:** Sluggish and usually perches on trees

above water. **Habitat:** Near streams, rivers, lakes, reservoirs and tidal lagoons in wooded country. **Food:** Mainly fish, also young birds and small mammals. **Status and Distribution:** *Near threatened.* Resident, uncommon and widespread in northeast India; Nepal; Bangladesh; Sri Lanka. SE Asia. **Remarks:** Widespread in India and locally frequent in the northeast, scarce and local in the peninsula. It is found near slow-moving rivers and streams, lakes, reservoirs and tidal lagoons in wooded country, usually in lowlands but ascending locally to 1,525 m. The most pertinent threats are the loss of undisturbed wetlands, over-fishing, siltation, pollution and persecution (BirdLife Int., 2001).



250(193). Western Marsh-Harrier. *Circus aeruginosus* (Linnaeus, 1758); **Eurasian Marsh Harrier (I); Kite -; 54-59 cm; WM/LCom C (Plate 35.250)**



Photo: Tom Tarrant

Western Marsh-Harrier (juv)

Diagnostics: *Male:* Has pale head, grey upperwings with black tips, brown greater coverts and creamy leading edge. *Female:* Chiefly dark brown with creamy head and leading edge. *Juvenile:* Entirely dark with pale



Photo: Vijay Cavale

Western Marsh-Harrier

251(194). Eastern Marsh-Harrier. *Circus spilonotus* Kaup, 1847; **Eurasian Marsh Harrier (I);** Kite -, 48-59 cm; WM/LCom C (Plate 35.251)



Eastern Marsh-Harrier

Photo: Jyn Morohashi

Diagnostics: *Male:*

With blackish or streaked head; black mantle and median coverts (feathers boldly edged with white). *Female:* Cream head and breast with dark streaking; dark-barred greyish flight feathers and tail; white



upper tail-coverts; and diffuse streaking on underparts. *Juvenile:* Rather dark; head mainly cream, with variable dark streaks. **Voice:** Usually silent. **Habitat:** Reedbeds, marshes,

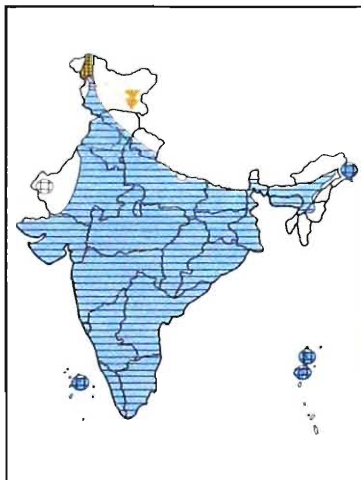
lakes, flooded paddy fields and coastal lagoons.

Habits: Solitary spends time near marshland and jheels. **Food:**

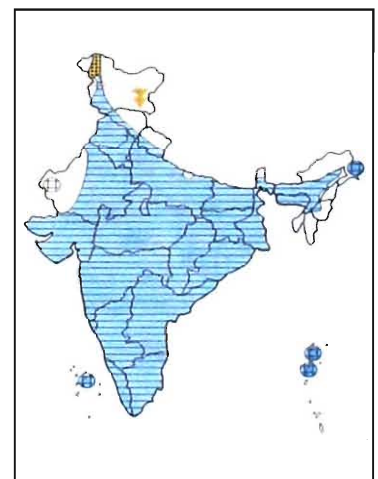
Frogs, fish, weak birds, lizards, field mice and voles and large insects.



Photo: Jon Hornbuckle



head and throat. **Voice:** Silent. **Habitat:** Reedbeds, marshes, lakes, flooded paddy fields and coastal lagoons. **Habits:** Solitary, spends time near marshland and jheels. **Food:** Frogs, fish, weak birds, lizards, field mice and voles and large insects. **Status and Distribution:** Locally common and widespread winter migrant up to 2000 m, mainly in plains in India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives.



Status and Distribution: Locally common winter migrant to Assam and Manipur; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives.

252(170). Greater Spotted Eagle. *Aquila clanga* Pallas, 1811; Kite +; 64-72 cm; **GT/Vu WM/R/Ra C** (Plate 35.252)



Photo: Vijay Cavale

Greater Spotted Eagle

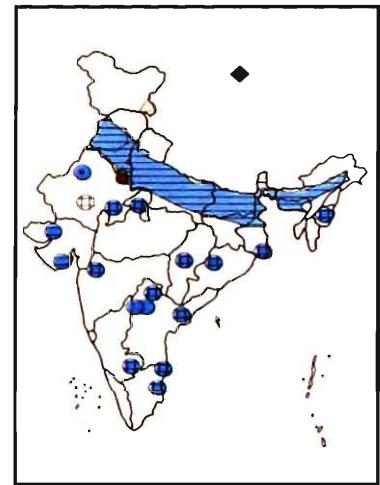
Diagnostics: Sexes alike; female larger. **Adult:** A dark eagle with purplish wash on back; paler below; shorter and more rounded tail; black tipped slaty-blue bill; yellow cere; large round nostrils; dull yellow legs and feet. **Juvenile:** With white trailing edge to the wings and tail; white spots on the coverts and scapulars form white bars on the wings in flight. **Voice:** Wild clanging *jeb-jeb-jeb*. **Habitat:** Large lakes, jheels, canals, marshes and mangroves. **Habits:** Usually perched singly high on treetop, stump and canal banks. Hunts on the ground, generally slow moving prey. **Food:** Frogs, fish, lizards and waterbirds. **Status and Distribution:** *Globally threatened/Vulnerable*. Rare winter migrant and very local breeder in Gangetic plains; Pakistan; Nepal; Bhutan and Bangladesh. **Remarks:** The species winters widely in India, especially in northern states but straggling down to the Palk



Photo: Gill Cardy

Greater Spotted Eagle (juv)

straits adjacent to Sri Lanka. During migration and in winter, a variety of open habitats are visited, including deserts, shrub land, wetlands and mangroves. The species breeding status in the country remains somewhat unclear. It has suffered from extensive habitat loss and persistent persecution. The decline of the species in India is attributed to “altering ecological conditions, natural or man-made”, and in particular to reclamation of wetlands. The global population of the Greater Spotted Eagle is probably less than 10,000 mature individuals, with Russia holding 2,800–3,000 pairs, and the European



population probably no more than 900 pairs. It is now generally “uncommon” in the north and “rare” in the peninsula having been “apparently more abundant” in Assam, the population is now “declining alarmingly” (BirdLife Int., 2001). **Threats:** In Asia the main threats to this species are decline in the availability of habitat and prey, and these central issues are influenced by secondary factors such as disturbance, hunting and pollution. In all these cases, the scale of threat

is magnified by the large home ranges of individuals (and, therefore, the large size of breeding territories), and the highly migratory nature of the species, factors that eliminate the possibility of conserving viable breeding populations within protected areas, and that reduce the efficacy of the protected area approach in general. **Legislation:** The Greater Spotted Eagle is listed on Appendix I of the CMS. It is also listed on Appendix II of CITES; it is listed in Schedule I of the Wildlife Act 1972 [as "Accipitridae"]. **Protected areas:** Small numbers have been recorded in the following national parks: Bandhavgarh, Borivli, Corbett, Dibru-Saikhowa, Dudhwa, Guindy, Kaziranga, Keoladeo, Manas, Orang, Rajaji, Ranthambore and Sultanpur. It has occurred in Bhindawas, Bordoibam-Bilmukh, Burhachapori, Chakrashila, Harike Lake, Rangananthitoo, Sariska and Pobitora Wildlife Sanctuaries, and Deepor Beel, Nawabganj Priyadarshani, Panidihing, Patna and Vedanthangal Sanctuaries; in Goa, the Salim Ali Sanctuary (1.8 km²) situated on Chorao island is possibly of benefit to the species (BirdLife Int., 2001).

253(169). Steppe Eagle. *Aquila nipalensis* Hodgson, 1833; Kite +; 76-80 cm; WM/LCom C (Plate 35.253)



Photo: Jon Hornbuckle

Steppe Eagle

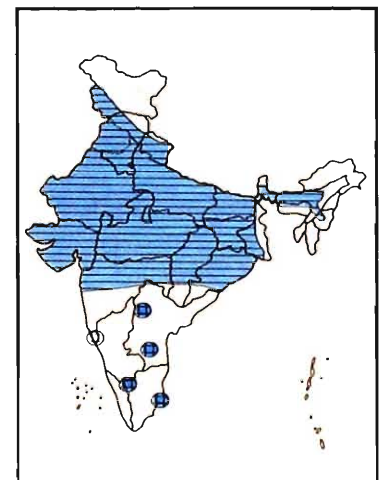
Diagnostics: Sexes alike; female larger. *Adult:* A buffish brown eagle with a rufous patch on nape; usually two pale bars on upper and under side of wings; and distinct barring on remiges. *Juvenile:* With a broad white bar across underwings; two white bars on upperwings;



Photo: Gill Cardy

Steppe Eagle

and white crescent across upper tail-coverts. **Voice:** Unrecorded/ undescribed. **Habitat:** Wooded hills and large lakes. **Habits:** Spends much time on treetops near rubbish dumps or slaughterhouses. Feeds on carrion and refuse. **Food:** Apart from carrion, feeds on lizards, birds and rodents. **Status and Distribution:** A locally common widespread winter migrant in India; Pakistan; Nepal; Bhutan and Bangladesh.



254(167). Eastern Imperial Eagle. *Aquila heliaca* Savigny, 1809; **Imperial Eagle (I);** Vulture -; 81-90cm; GT/Vu WM/Ra C (Plate 35.254)

Diagnostics: Sexes alike; female larger. *Adult:* A large dark eagle with pale head and whitish shoulders. *Juvenile:* With streaked buff plumage. **Voice:** Quick barking *owk-owk-owk.*

Photo: Martin Hale



Eastern Imperial Eagle

Habitat: Around major lakes and wetlands, open country in plains. **Habits:** Sluggish and solitary; spends time perching on treetops and on the bare ground. Feeds largely on carrion. Flights slow and heavy like a vulture. **Food:** Apart from carrion, feeds on lizards, birds and rodents. **Status and Distribution:** *Globally threatened/Vulnerable*. Rare, winter migrant to NW India; Pakistan; Nepal; Bangladesh. **Remarks:** The Imperial Eagle occupies a massive range in the Old World, breeding mainly in the Palearctic from Central Europe east to the Russian Far East, and wintering in the Afro tropical and Oriental regions. The Imperial Eagle occurs at low densities in most parts of its range, and its total world population

Photo: Audevard Aurelien

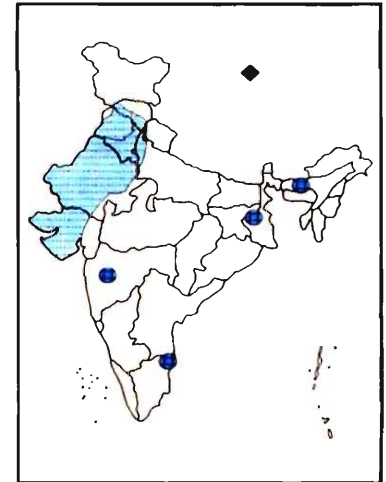


Eastern Imperial Eagle

is probably only a few thousand pairs. Early reports suggest that the species was patchily common in India, especially on the plains of Uttar Pradesh and Gujarat, but apparently rare in the lowlands from Bihar eastwards; The only confirmed breeding record comes from Haryana, where a female in her nest was shot. The important Imperial Eagle population in north-west India appears to have declined in the late 1990s. **Threats:** Despite the huge range of this eagle, its population has declined significantly everywhere as a consequence of changing land-use practices, pesticides, persecution and declining prey. Its long-term survival will depend on the protection of sufficient natural habitat, especially in the breeding range, and control of hunting, particularly in the wintering range.

Legislation: The Imperial Eagle is listed on Appendix I of the CMS. It is also listed on

Appendix I of CITES. It is legally protected in India. **Protected areas:** In India, records are from the following national parks: Corbett, Desert, Dudwa, Kaziranga, Keoladeo, Manas and Sultanpur. It has also been reported from the Kugti, Nalsarovar, Tundah and Vedanthangal Sanctuaries, and Sariska Wildlife Sanctuary (BirdLife Int., 2001).



Osprey (Family Pandionidae)

The Osprey is smaller than other fishing eagles, and rather more dashing with fairly long angular wings and tail. It is the only representative of its genus and is found throughout most of the world.

255(203). Osprey. *Pandion haliaetus* (Linnaeus, 1758); Kite -; 55-58 cm; **WM/R/UnCom C** (Plate 36.255)

Photo: Gill Cardy

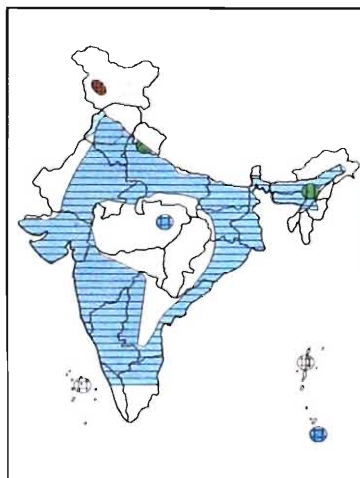


Osprey

Photo: Jon Hornbuckle



Diagnostics: Sexes alike. *Adult:* Head white with dark brown band through the eye; white underbody and under wing-coverts with black carpal patch. *Juvenile:* Similar to adult but has buff tips to upperparts, including coverts; rust breast band prominent in adult is poorly defined. **Voice:** A short cheeping whistle *kai, kai, kai*. **Habitat:** Major rivers, reservoirs, lakes, jheels, coastal lagoons and estuaries. **Habits:** Usually solitary frequently perches on dead trees in vicinity of wetlands. Feeds on fish. **Food:** Chiefly fish. **Status and Distribution:** Mainly winter visitor, from September to March throughout the subcontinent. Breeds in Himalayas in Ladakh, Kashmir and Uttaranchal between 2000-3300 m altitude; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives; almost cosmopolitan.



Falcon Family Falconidae)

Small to medium-sized compact raptors with relatively long, pointed wings, hooked beak, sharp curved talons, and remarkable powers of sight and flight. They are mainly diurnal birds preying on smaller birds, mammals, reptiles and insects, which they hunt from the air. Females are larger than males.

256(209-211). Peregrine Falcon. *Falco prergrinus* Tunstall, 1771; Kite -, 38-48 cm; **R/WM/UnCom C** (Plate 36.256)

Diagnostics: Sexes alike; female larger. *Adult:* Prominent slaty-black head; grey upperparts barred with blackish; black cheek stripes contrasting with white chin and throat. *Juvenile:* Dark brown above and darkest on head; rufous-white below. **Voice:** Hoarse *kwaeb, kek-kek, chirr-r-r*. **Habitat:** Winters near



Peregrine Falcon

large lakes, rivers and marshes. **Habits:** Seen singly or in pairs; feeds on waterfowl, pigeons, partridges and other birds; preys actively at dawn and dusk. **Food :** Chiefly hunts winter waterbirds. **Status and Distribution:** Widely spread but uncommon resident up to lower Himalaya, undertakes altitudinal movements, winters on Indus plains in Pakistan and plains of N

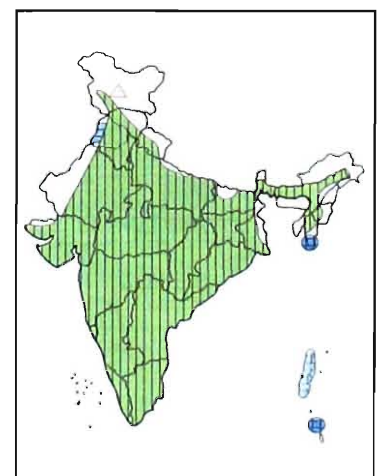
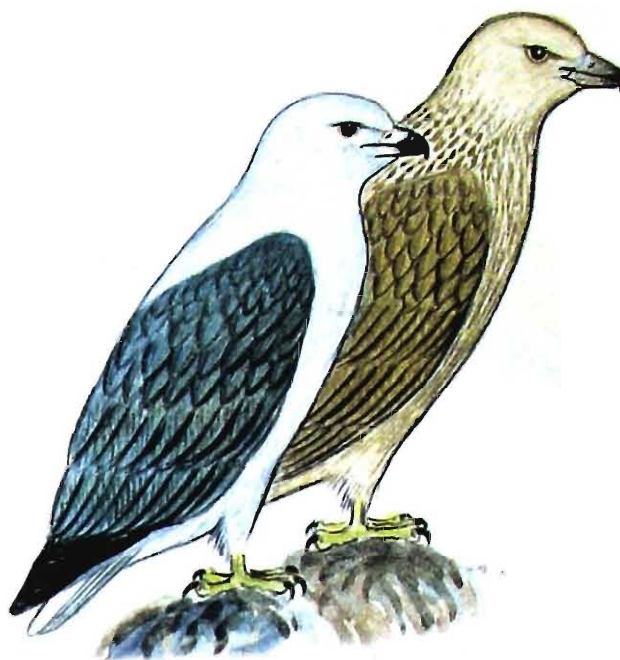


Photo: Jon Hornbuckle

Plate 34



244. Brahminy Kite



245. White-bellied Sea-Eagle



246. Pallas's Fish-Eagle



247. White-tailed Sea-Eagle

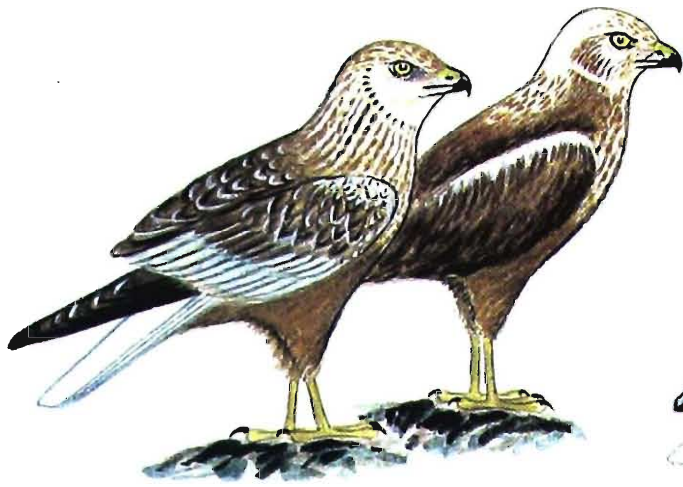


249. Greater Grey-headed Fish-Eagle



248. Lesser Grey-headed Fish-Eagle

Plate 35



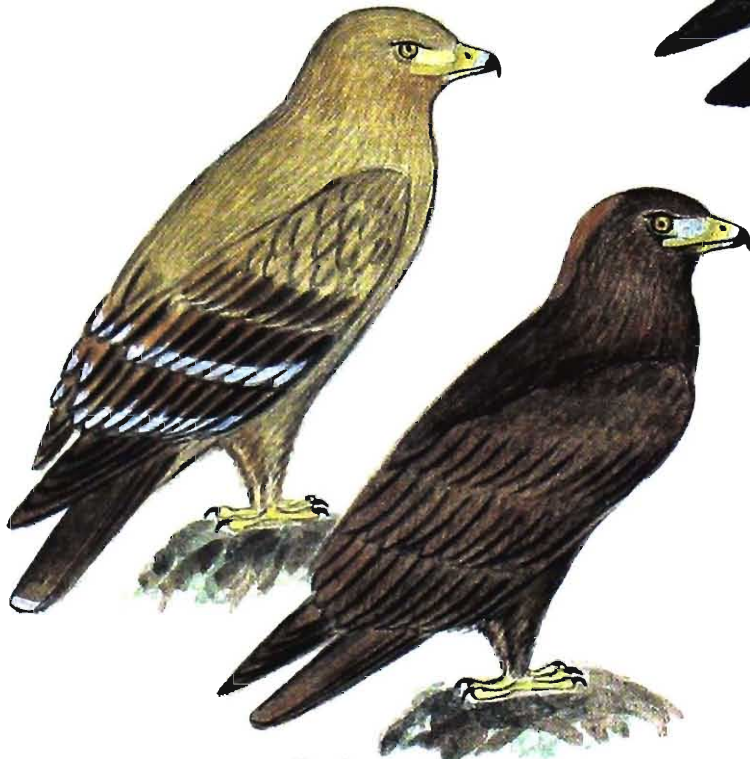
250. Western Marsh-Harrier



251. Eastern Marsh-Harrier



252. Greater Spotted Eagle



253. Steppe Eagle



254. Eastern Imperial Eagle

India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives. Almost cosmopolitan.

Partridges (Family Phasianidae)

Partridges are generally medium-sized terrestrial birds with plump body, rounded wings, relatively small head, short thick bill, strong unfeathered legs and shorter tails.

257(247). Swamp Francolin. *Francolinus gularis* (Temminck, 1815); Grey Partridge +; 37 cm; **GT/Vu/E R/LCom O** (Plate 36.257)

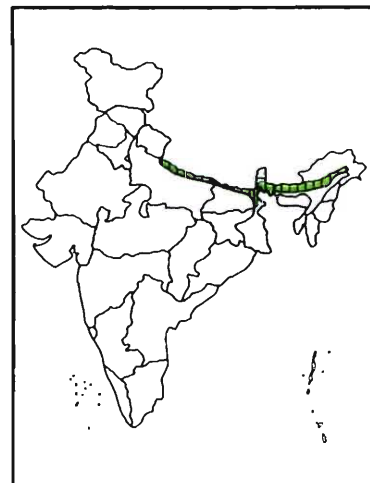


Photo: Pervez Iqbal

Swamp Francolin

Diagnostics: Sexes alike, but male with a spur on each leg. Has rust-red chin and throat, buff supercilium and ear-coverts, brown upperparts with rufous-brown patches, brown underparts with white longitudinal streaks edged with black, and chestnut tail. **Voice:** Loud *kye, kyew-kyew-kyew-ka-ka., kaw-care.* **Habitat:** Tall grasslands and swamps near wetlands. **Habits:** Keeps in pairs or in groups of 5 or 6 birds. It breeds from end of March and early April, and some as early as February. In Dudhwa National Park most hatching takes place before the onset of the monsoon in late May or early June. **Food:** Omnivorous; feeds on weed seeds, grains, shoots of crops and insects. **Status and Distribution:** *Globally threatened/Vulnerable.* Resident, locally common to terai and plains in India; Nepal; Bangladesh. **Remarks:** The Swamp Francolin is endemic to the Indian subcontinent, where it is distributed

from northern Uttar Pradesh and southern Nepal, east through northern Bihar and West Bengal to the Brahmaputra valley in north-eastern India and, at least historically, to parts of Bangladesh. The global population was recently estimated at 1,000–10,000 individuals. However, the species remains locally common in many areas and is undoubtedly more abundant than these figures suggest, with the population in Assam alone now thought to approach or possibly exceed 10,000. In Uttar Pradesh, the largest populations survive in Pilibhit Wildlife Sanctuary, Kishanpur Wildlife Sanctuary and Dudhwa National Park. One of the most important populations of the species survives in the grasslands of the Brahmaputra valley, Assam, where it occurs in at least thirty localities. The global population was recently estimated at 1,000–



10,000 individuals. However, the species remains locally common in many areas and is undoubtedly more abundant than these figures suggest, with the population in Assam alone now thought to approach or possibly exceed 10,000. The ongoing clearance, fragmentation and degradation of terai grasslands suggest nevertheless that the Swamp Francolin has declined rapidly in the recent past, and may well continue to do so. **Threats:** Virtually all remaining grasslands within the species' range are subject to intense pressures from encroachment by people. Over the latter half of the twentieth century, large-scale conversion of terai grasslands into cropland has taken place. Plantation of commercially important trees such as *Eucalyptus*, *Dalbergia sissoo* and *Bombax ceiba* has further encroached on large areas of this habitat. Terai grassland once extended over

twelve districts of Uttar Pradesh, but is now confined to six: Lakhimpur, Basti, Gorakhpur, Bahraich, Pilibhit and Gonda. Unsustainable grazing pressure is also deleterious to Swamp Francolin habitat and is rampant throughout the Indian subcontinent as the livestock population continues to grow; grazing is especially damaging in summer when post-burn regrowth emerges and water distribution is limited (moreover, this period coincides with chick rearing in the francolins). Even in protected areas over-grazing is a major problem. Two factors have, however, raised some qualified optimism about the species future. (1) The development of canals and dams (e.g. the Sharda Sagar dam and canals in Pilibhit Reserve Forest, Girija barrage in Katarniaghat Wildlife Sanctuary), and their resultant seepage marshes, has provided habitat for Swamp Francolins, although the numbers involved are probably small and most of these sites are isolated from each other by forest or agricultural fields. However, the damage to and loss of grasslands caused by dams have been extensive. (2) The species has been found calling and even nesting in sugarcane crops. However, breeding success appears to be low in this habitat owing to human disturbance, and the species almost certainly requires access to less disturbed habitats. **Measures Taken:** The Swamp Francolin is protected under the Wildlife Act 1972 (Schedule IV). It is listed from fifteen protected areas in India, ranging from 11 km² to 614 km² although the extent of available habitat within these areas is not known. A captive breeding programme has been initiated by the Uttar Pradesh Forest Department (BirdLife Int., 2001).

Owls (Family Strigidae)

Owls are birds of prey with large and rounded heads, big forwardly facing eyes surrounded by broad facial disc, and short neck and tail. Most are nocturnal and cryptically coloured.

258(631-632). Brown Fish-Owl. *Ketupa zeylonensis* (Gmelin, 1788); **Brown Fish Owl (I);** Pariah Kite ±; 56 cm; **R/UnCom C** (Plate 36.258)



Photo: John Holmes

Brown Fish-Owl

Diagnostics: Sexes alike. A large dull brown “eared” (feather tufts above head) owl, has a prominent large white patch on throat and foreneck, golden yellow eyes and unfeathered legs. Upper parts heavily streaked with black; underparts whitish, with fine wavy-brown crossbars and bold blackish vertical streaks.

Voice: Deep *whoo-hoo*;

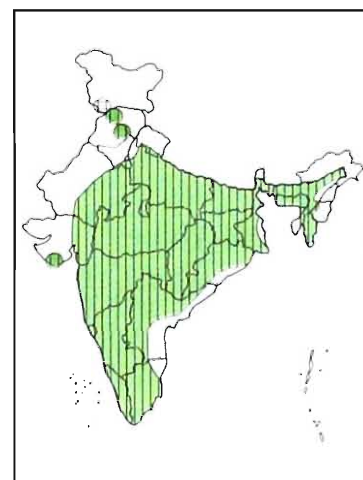
cat-like mewing. **Habitat:**

Forest, well-wooded areas and banks of hill streams. **Habits:**

Lives in pairs, crepuscular and partly diurnal. **Food:**

Chiefly fish, crabs, lizards and

insects, also birds and rodents. **Status and Distribution:** Resident and uncommon in hills and plains, locally up to 1500 m, NW India; Pakistan; Nepal; Bangladesh; Sri Lanka; East to SE Asia.



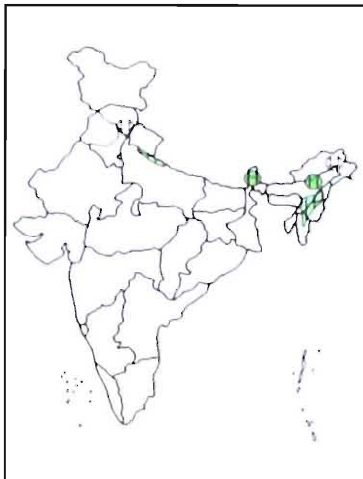
259(633). Tawny Fish-Owl. *Ketupa flavipes* (Hodgson, 1836); **Tawny Fish Owl (I);** Pariah Kite ±; 61 cm; **R/UnCom C** (Plate 36.259)



Photo: Vijay Cavale

Tawny Fish-Owl

Diagnostics: Sexes alike. Like Brown Fish-Owl but has orange-rufous or tawny upper parts with bold black streaks and orange buff barring on wing-coverts; bright orange-rufous underparts with broad black streaks, broadest on breast. **Voice:** Deep *whoo-hoo*, cat-like mewing. **Habitat:** Ravines, stream banks, rivers and pools near wooded areas.



Habits: Lives in pairs, crepuscular and partly diurnal. **Food:** Chiefly fish, crabs, lizards and insects, also birds and rodents. **Status and Distribution:** Resident, uncommon in Himalayas from Himachal Pradesh to Bhutan, NE India; Nepal; Bangladesh; SE Asia.

260(633a). Buffy Fish-Owl. *Ketupa ketupu* (Horsfield, 1821); **Buff Fish Owl (I); 50 cm; R/ Va C** (Plate 36.260)



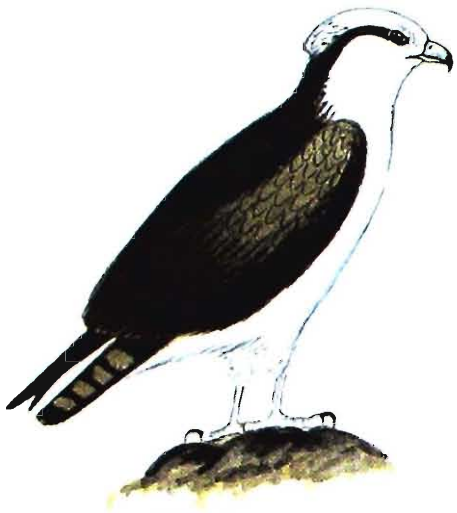
Photo: Christian Artuso

Buffy Fish-Owl

Diagnostics: Smallest of the fish owls. Its rufous-orange coloration with heavier black streaking and white forehead differentiate it from Brown Fish-Owl. Finer streaking on underparts and more diffused streaking on crown and nape separate it from the larger Tawny Fish-Owl. **Voice:** Long and monotonous *bup-bup-bup...* or *hup-hup-hup.....*, like a generator. **Habitat:** Wooded areas neighbouring water. **Habits:** Very shy, alert during day as well as night. **Food:** Chiefly fish, crabs, lizards, and large insects; also rodents and game birds. **Status and Distribution:** Vagrant, recorded in E Assam in early 20th century, presumably once resident. SE Asia.



Plate 36



255. Osprey



256. Peregrine Falcon



257. Swamp Francolin



258. Brown Fish-Owl



259. Tawny Fish-Owl



260. Buffy Fish-Owl

Kingfishers (Family Alcedinidae)

Kingfishers are small to medium-sized birds with long strong bill; large flat head; short neck; compact body; short rounded wings; and short weak legs. Many are tied to aquatic habitats; subsisting largely on fish caught by diving from an exposed position, but some prey on insects and small animals well away from water. Flight is direct and strong with rapid wing beats. They actively defend their territory throughout the year.

261(721). Blyth's Kingfisher. *Alcedo hercules* Laubmann, 1917; Myna -; 22 cm; **NT BRS (08) R/Ra C** (Plate 37.261)



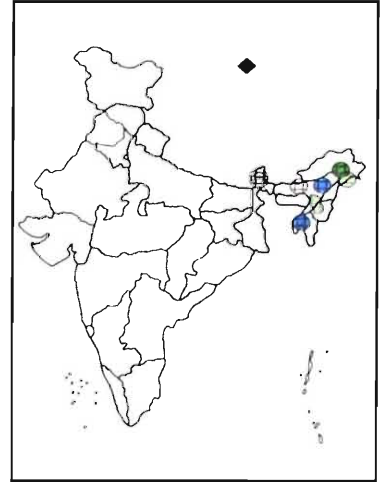
Photo: John Holmes

Blyth's Kingfisher

Diagnostics: Sexes alike. A larger and darker version of the Small Blue Kingfisher has deeper rufous underparts; darker greenish-blue ear-coverts, scapulars and wings; heavier spotting on blackish crown. **Voice:** Piping *chee, chichee*. **Habitat:** Prefers undisturbed, steep-sided, shady streams and rivers through dense forest. **Habits:** Keeps singly, haunts deeply shaded fast-flowing forest streams. Perches low down in overhanging bushes rather than at conspicuous vantage points. It is difficult to observe due to its shy nature. **Food:** Fish and aquatic insects. **Status and Distribution:** *Near threatened/Biome Restricted Species*.

Resident. Rare in duars and foothills up to 1200m India; Bhutan; Bangladesh. SE Asia.

Remarks: It is found along streams in evergreen forest from 200–1,200 m, mainly at 400–1,000 m. It is thus still widespread at low densities within its historical range, although deforestation is reducing and fragmenting its habitat, and



human disturbance and river pollution are possibly also threats. Given its linear distribution along rivers, and thus restricted extent of occurrence, the total population size is potentially modest (BirdLife Int., 2001).

262(722-724). Small Blue Kingfisher. *Alcedo atthis* (Linnaeus, 1758); **Common Kingfisher (I); Sparrow +; c.18 cm; R/WM/SM/Com C** (Plate 37.262)



Photo: Gehan de Silva Wijeyeratne

Small Blue Kingfisher



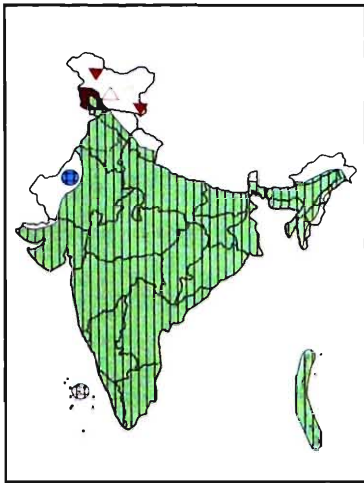
Photo: Alister Benn



Photo: Pisith Singjai

Diagnostics: Sexes alike. Brilliant turquoise-blue and orange kingfisher; blue green above,

deep rust below; white neck patch; rust-red ear-coverts; short stumpy tail and long, straight pointed bill. **Voice:** Piping *chee, chichee*. **Habitat:** Streams, canals, ditches, ponds,



rivers and lakes in open country. **Habits:** Perches around 1-2m high at a vantage point, plunges headlong into the water to catch prey. **Food:** Small fish, tadpoles, and aquatic insects. **Status and Distribution:** Resident, common up to 2000 m almost throughout India; Pakistan; Nepal; Bhutan; Bangladesh and Sri Lanka.

263(725-726a). Blue-eared Kingfisher. *Alcedo meninting* Horsfield, 1821; Sparrow; 16 cm; **R/ Ra C** (Plate 37.263)

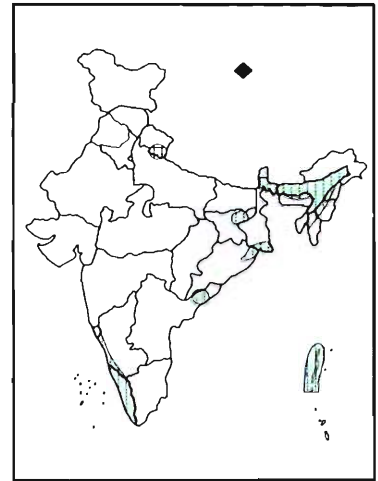
Photo: Pete Morris/ Birdquest



Blue-eared Kingfisher

Diagnostics: Sexes alike. Differs from Small Blue Kingfisher by blue ear-coverts; darker and more intense cobalt-blue upperparts and richer rufous underparts. **Voice:** Piping *chee*, higher and shorter than Common Kingfisher. **Habitat:** Pools and streams in dense evergreen forest, thick bamboo, also streams through patches of rice cultivation in Kerala, and tidal creeks fringed with mangroves in Andamans. **Habits:** Similar to that of Common Kingfisher,

but shy. **Food:** Mainly fish and aquatic insects. **Status and Distribution:** Resident but rare. Himalayan foothills from C Nepal east to SE Arunachal Pradesh; NE India and Bangladesh and South to Orissa; SW India; and Sri Lanka; Bhutan. SE Asia.



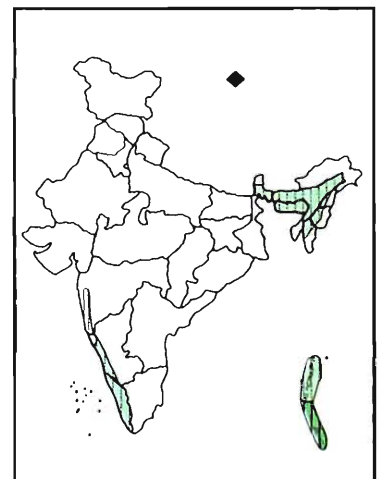
264(727-728). Oriental Dwarf Kingfisher. *Ceyx erithacus* (Linnaeus, 1758); Sparrow -; 13 cm; **R/LM/Ra C** (Plate 37.264)



Photo: Suppalak Kalabdee

Oriental Dwarf Kingfisher

Diagnostics: Sexes alike. A small kingfisher with violet iridescence on orange head and variable blue streaking on purple back and wings, underparts orange-yellow, bill and legs coral-red bright, deep blue patch on either side of neck. **Voice:** Piping *chee*, but shriller. **Habitat:**



Usually small shady streams and pools in hill forest. **Habits:** Perches in a shaded position on a rock or low in vegetation. Takes aquatic prey just below the water surface; also frequently takes insects from the ground and from foliage. **Food:** Small fish, insects and crustaceans. **Status and Distribution:** Resident, but local migrant and rare; Himalayan foothills from Sikkim east to Arunachal Pradesh; NE India and Bangladesh; SW India and Sri Lanka; Nepal; Bhutan; SE Asia.

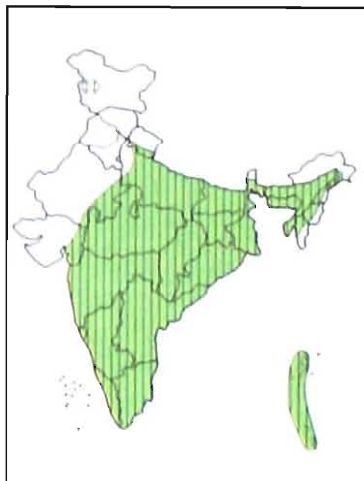
265(730-732). Stork-billed Kingfisher. *Halcyon capensis* (Linnaeus, 1766); Pigeon \pm ; c. 38 cm; **R/LCom C** (Plate 37.265)



Photo: G. C. Tan.

Stork-billed Kingfisher

Diagnostics: Sexes alike. Enormous compressed blood red bill, brownish cap, pale orange-buff collar and underparts, blue-green upperparts. **Voice:** *Peew-piu; ke-ke-ke-KE.* **Habitat:** Lowland rivers, streams, irrigation channels and lakes. **Habits:** Occurs singly or in separated pairs, sluggish, generally remains hidden amidst overhanging vegetation at wetlands. **Food:** Fish, frogs, lizards, mice and young birds; also crabs,



water beetles, etc. **Status and Distribution:** Resident, locally common in plains, foothills of Uttar Pradesh and eastern & southern parts of India. SE Asia.

266(729). Brown-winged Kingfisher. *Halcyon amauroptera* Pearson, 1841; Pigeon \pm ; 36 cm; **NT R/LCom C** (Plate 37.266)



Photo: Ooi Beng Yeap

Brown-winged Kingfisher

Diagnostics: Sexes alike. A large Kingfisher with enormous red bill; brownish-orange head, neck and underparts; dark brown mantle, wings and tail; and turquoise back and rump. **Voice:** Harsh grating crying. **Habitat:** Restricted to coasts, mangroves swamps, creeks and tidal rivers. **Habits:** Keeps singly or in pairs, captures prey by diving into the water or by landing on mud. **Food:** Mainly fish and crustaceans. **Status and Distribution:** *Near threatened.* Resident and locally common India; Bangladesh, through Myanmar to Malaysia. **Remarks:** It is usually restricted to coasts, favouring mangroves (particularly old growth), creeks and tidal rivers, although it has been recorded occasionally far inland. Despite being locally



common, its total population may not be very large within its linear distribution and it is presumably negatively affected by the ongoing clearance and degradation of mangroves in South-East Asia (BirdLife Int., 2001).

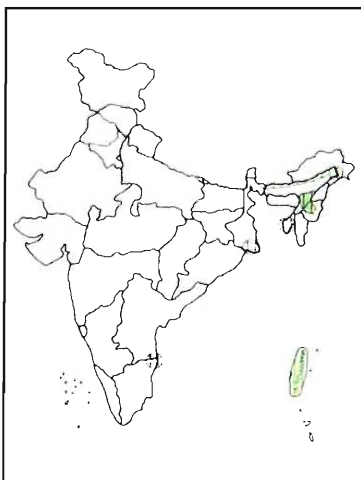
267(733-734). Ruddy Kingfisher. *Halcyon coromanda* (Latham, 1790); Myna +; 26 cm; **R/LM/Ra C** (Plate 37.267)



Ruddy Kingfisher



Diagnostics. Sexes alike. A rufous-chestnut Kingfisher with white back and rump, tinged with pale blue; varying rufous underparts, paler on chin and throat; bright red bill and legs. **Voice:** Descending and high-pitched trill *tititititi*. **Habitat:** Freshwater and



brackish swamp forest, evergreen forest, streams and pools. **Habits:** Shy and retiring, keeps singly or in pairs, heard more often than seen, occasionally dashing past as a cinnamon flash through the jungle. **Food:** Fish, crabs, beetles, grasshoppers and other insects. **Status and Distribution:** Resident, subject to poorly known local movements, rare, E Himalayan foothills from Sikkim to Arunachal Pradesh; NE India; Nepal; Bhutan; Bangladesh; E and SE Asia.

268(735-738). White-breasted Kingfisher. *Halcyon smyrnensis* (Linnaeus, 1758); **White-throated Kingfisher (I);** Myna +; c. 28 cm; **R/LM/Com C** (Plate 37.268)



White-breasted Kingfisher

Diagnostics: Sexes alike. A large Kingfisher with large red bill, chocolate-brown head and underparts except white throat and centre of breast; brilliant turquoise-blue upperparts, rump and tail. In flight, the bold white wing-patch is the diagnostic. **Voice:**

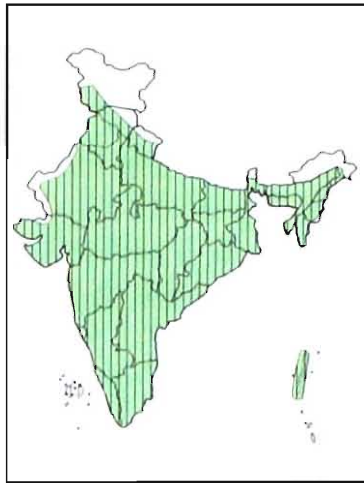


Photo: Pete Morris/Birdquest

Photo: Alister Benn

Photo: G. C. Tan

Loud *ke-ke-kek-kek-kek.-kek* in flight. **Habitat:** Varied, often ranging away from water; streams, rivers, canals and village tanks. **Habits:** Characteristically perches on telegraph/phone wires, poles and branches; bold and noisy. **Food:** Fish, crabs, beetles, grasshoppers and other insects. **Status and Distribution:** Resident, subject to local movements, common from plains up to 2250 m in India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka. SE Asia.



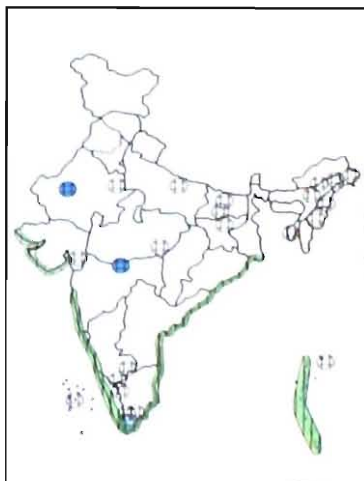
269(739). Black-capped Kingfisher. *Halcyon pileata* (Boddaert, 1783); Myna +; c. 30 cm; **R/LM/LCom C** (Plate 38.269)



Photo: G. C. Tan

Black-capped Kingfisher

Diagnostics: Sexes alike. Mainly a coastal kingfisher with coral-red bill, purple-blue upperparts and tail, and pale rust underparts. In flight, the large white wing-patch is conspicuous. **Voice:** Distinctive ringing cackle, *kikikikiki*. **Habitat:** Coastal



areas including mangrove swamps, estuaries, tidal creeks and rivers. **Habits:** Perches on open edges of mangroves, forests and telegraph/phone wire. Dives down obliquely, rarely plunges into water. **Food:** Fish, crabs, beetles, grasshoppers and other insects. **Status and Distribution:** Resident, shows local movements and locally common on coasts in India; Pakistan; Nepal; Bangladesh; Sri Lanka. E Asia.

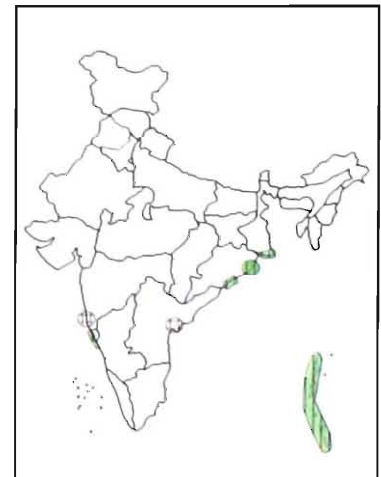
270(740-743). Collared Kingfisher. *Todiramphus chloris* (Boddaert, 1783); Myna ±; 24 cm; **R/LCom C** (Plate 38.270)



Photo: Alister Benn

Collared Kingfisher

Diagnostics: Sexes alike. A maritime Kingfisher with dark bill; blue green upper parts; and white or buff collar merging into white or buff underparts. **Voice:** *krerk-krerk-krerk*. **Habitat:** Coastal areas, tidal creeks, mangrove swamps, also gardens and forest edges. **Habits:** Perches on open edges of mangroves, forests and telegraph/phone wire. Dives down obliquely, rarely plunges into water. **Food:** Mainly



crabs, fish, mudskippers, grasshoppers, crickets, orthopterous insects, lizards and centipedes. **Status and Distribution:** Resident, locally common in West Bengal, Orissa, Andamans in India; Bangladesh.

271(717-718). Greater Pied Kingfisher. *Ceryle lugubris* (Temminck, 1834); **Crested Kingfisher (I); House Crow ±; c. 41 cm; R/LCom C** (Plate 38.271)



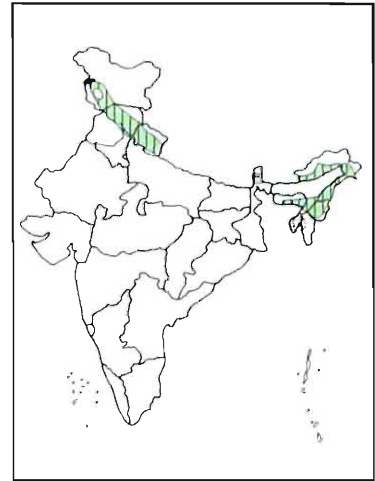
Greater Pied Kingfisher (male)



Greater Pied Kingfisher (female)

Diagnostics: A very large crested black-and-white kingfisher with cross-banded back. *Male:* Has prominent erectile back crest spotted and streaked with white; a broad white half-collar on nape; a broad pectoral band of black spots mixed with rufous-brown; blackish barring on flanks, sides of abdomen and under tail-coverts. *Female and juvenile:* Similar to male, but have pale rufous under-wing-coverts. **Voice:** Usually silent, a loud hoarse, grating trill. **Habitat:** Torrential hill streams and large

rivers in Himalayan foothills; rarely by lakes and reservoirs. **Habits:** Generally restricts to selected river stretch and perches most of the day on overhanging branches, from where it dives directly to catch fish. **Food:** Mainly fish. **Status and Distribution:** Resident, locally common in Himalayas up to 2000 m, from N Pakistan east to Arunachal Pradesh; NE India; Pakistan; Nepal; Bhutan; Bangladesh.



272(719-720). Lesser Pied Kingfisher. *Ceryle rudis* (Linnaeus, 1758); **Pied Kingfisher (I); Myna +; c. 31 cm; R/Com C** (Plate 38.272)



Lesser Pied Kingfisher (female & male)



Diagnostics: Male: A black and white Kingfisher with small crest; black band through eye with broad white supercilium; upperparts

Photo: Satpal Gandhi

Photo: Satpal Gandhi

Photo: Anil Rathi

blotched with black; white underparts with black breast-band.

Female: Similar to male but has single, usually broken breast-band. **Voice:** High *chirik-chirik*

Habitat: Ponds, lakes, canals, irrigation tanks, flooded ditches, jheels, slow-running streams and rivers; sometimes also tidal creeks and intertidal pools. **Habits:** Has a characteristic habit of hunting by hovering over water with bill pointing down and fast beating wings; plunges vertically downwards to catch the fish. **Food:** Mainly fish, tadpoles and aquatic insects. **Status and Distribution:** Resident, common throughout India below 1800m; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka. SE Asia.

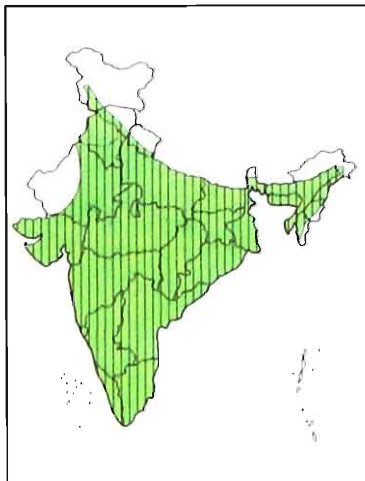


Photo: BirdLife International, U. K.

Blue-cheeked Bee-eater

Bee-eaters (Family Meropidae)

Mostly slim and medium-sized birds have essentially green plumage with splashes of blue, yellow and chestnut; longish, slim, pointed decurved bill; long triangular wings; long tail, often with elongated central tail feathers; short weak legs. Gregarious. They hawk for insects or catch them in graceful sallies from an exposed perch, and nest in burrows. Most species are sociable.

273(747). Blue-cheeked Bee-eater. *Merops persicus* Pallas, 1773; Bulbul ±; 24-26 cm; **SM/PM/LCom C** (Plate 38.273)

Diagnostics: Sexes alike. **Adult:** Has chestnut throat and yellow chin; bronze-green tail whitish forehead and turquoise-and-white supercilium; pure green upper and underparts. **Juvenile:** Has diffuse pale fringes to upper and underparts. Lacks blue on supercilium and cheeks. **Voice:** Liquid trilling *prreeew*. **Habitat:** Near jheels, irrigation tanks, reservoirs, canals and sandy seashores. **Habits:** Keeps in loose

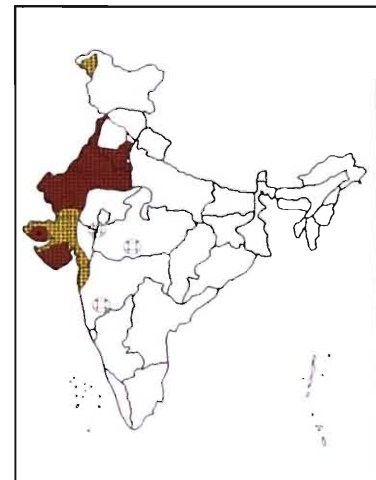
flocks when foraging. Perches on exposed telegraph wires.

Hawks insects in continuous flight; roosts communally in trees, outside breeding season.

Food: Dragonflies, damselflies, bees, wasps and other flying insects.

Status and Distribution:

Summer migrant as well as passage migrant, locally common in NW India; Pakistan. SW Asia.



274(748). Blue-tailed Bee-eater. *Merops philippinus* Linnaeus, 1766; Bulbul ±; 23-26 cm; **R/WMLCom C** (Plate 38.274)

Diagnostics: Sexes alike. **Adult:** Blue rump and tail, green forehead and supercilium are the diagnostics. **Juvenile:** With strong blue cast to rump, upper tail-coverts and tail, and less defined rufous throat. **Voice:** Liquid trilling *prreeew*. **Habitat:** Near jheels, irrigation tanks, reservoirs, canals and sandy seashores; keeps close to water, but inhabits more wooded, less

Photo: Alister Benn



Blue-tailed Bee-eater

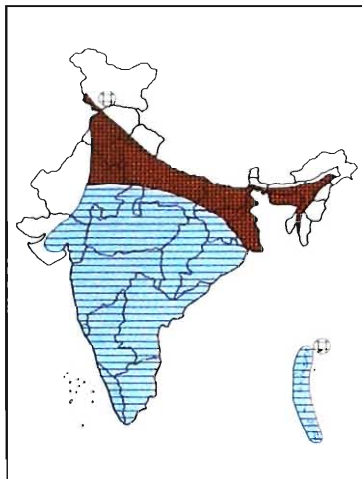
Photo: Gehan de Silva Wijeyeratne



dry country.

Habits: : Keeps in loose flocks when foraging. Perch on exposed telegraph wires. Hawks insects in continuous flight; roosts communally in trees, outside breeding season. Sometimes also

hunts from treetops at forest edges. **Food:** Mainly dragonflies, wasps and bees. **Status and Distribution:** Resident as well as winter migrant, locally common in N and NE India; Pakistan; Nepal; Bangladesh; Sri Lanka and Maldives. SE Asia.



275(744-745). Chestnut-headed Bee-eater. *Merops leschenaulti* Vieillot, 1817; Bulbul ±; 18-20 cm; **R/LCom C** (Plate 38.275)

Diagnostics: Sexes alike. *Adult:* The rich chestnut cap distinguishes it from all bee-



Photo: Alister Benn

Chestnut-headed Bee-eater

eaters except European Bee-eater, which is larger, bluer below, golden-yellow on scapulars and rump; and has elongated central tail feathers.

Juvenile: Much duller with chestnut of upperparts

absent or reduced to a wash on crown. **Voice:** *perrip, perrip.* **Habitat:** Vicinity of water in deciduous forests. **Habits:** Often launches sally from treetops or feeds high above canopy. At sunset gathers noisily in favoured communal roosting trees. **Food:** Bees, dragonflies, ants, termites, etc.

Occasionally butterflies. **Status and Distribution:** Resident and locally common in Himalayas from Uttaranchal to Arunachal Pradesh, SE and SW India; Nepal; Bhutan; Bangladesh and Sri Lanka. SE Asia.

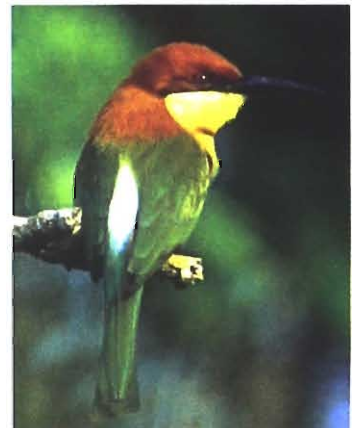


Photo: Gill Cardy

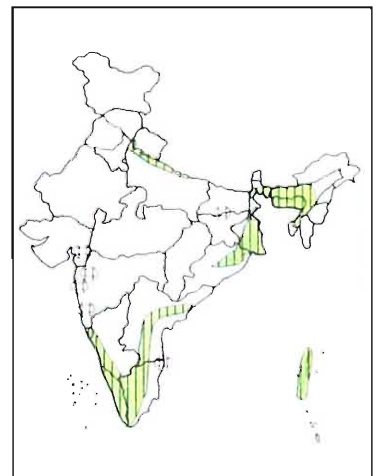


Plate 37



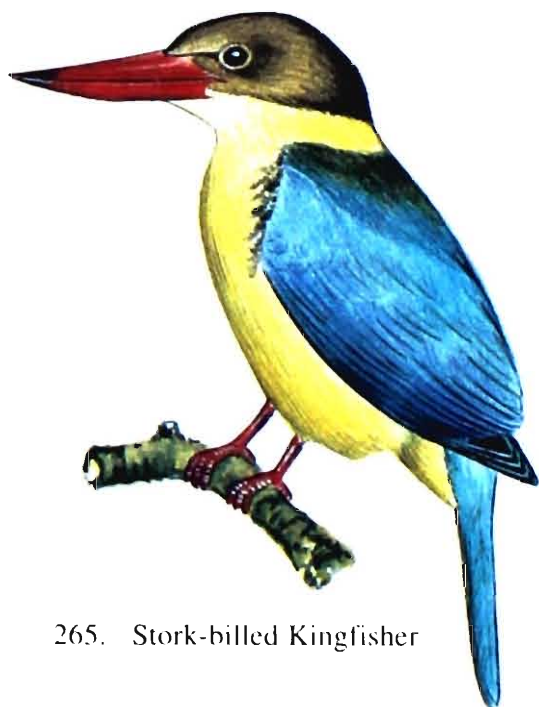
261. Blyth's Kingfisher



262. Small Blue Kingfisher



263. Blue-eared Kingfisher



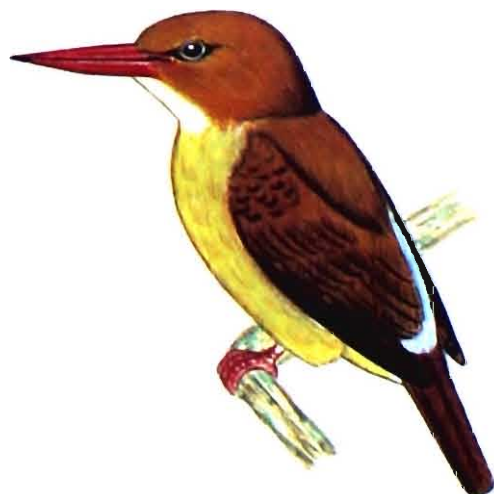
265. Stork-billed Kingfisher



264. Oriental Dwarf Kingfisher



266. Brown-winged Kingfisher



267. Ruddy Kingfisher



268. White-breasted Kingfisher

Plate 38



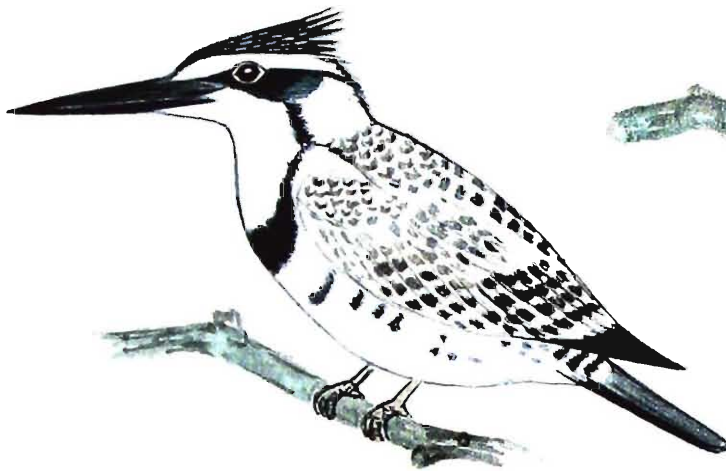
269. Black-capped Kingfisher



270. Collared Kingfisher



271. Greater Pied Kingfisher



272. Lesser Pied Kingfisher



273. Blue-cheeked Bee-eater



274. Blue-tailed Bee-eater



275. Chestnut-headed Bee-eater

Swallows & Martins (Family Hirundinidae)

Swallows and martins are slender and slim bodied birds with long and pointed wings; small bill with wide gape; short and weak legs; more or less forked tail. Long-tailed species are known as *Swallows* and shorter-tailed *Martins*. They hawk day-flying insects in swift, agile, sustained flight, sometimes high in the air. Catch most of their food while flying in the open air. Perch on exposed branches and telegraph wires. Gregarious, often roost and feed communally. Nests in holes, tunnels, walls and cliffs with mud.

276(911). Sand Martin. *Riparia riparia* (Linnaeus, 1758) Sparrow -; 13 cm; **R/WM/LCom C** (Plate 39.276)

Photo: Peter Ericsson



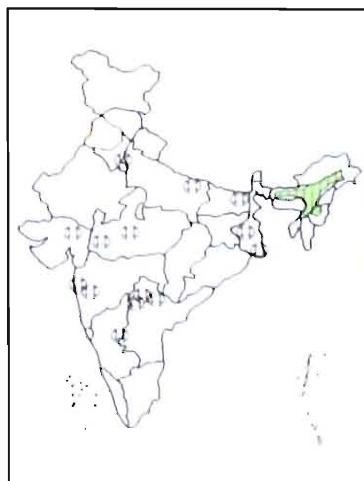
Sand Martin

deeper forked tail. *Juvenile*: With buff fringes to upperparts and buff tinge to throat. **Voice**: Pleasant twittering intermixed with rasping call.

Habitat: Around streams and rivers with sandy banks.

Habits: Usually feeds above water, sometimes also overland; often in flocks with swifts; active at dusk; forms large communal roosts in reedbeds. **Food**:

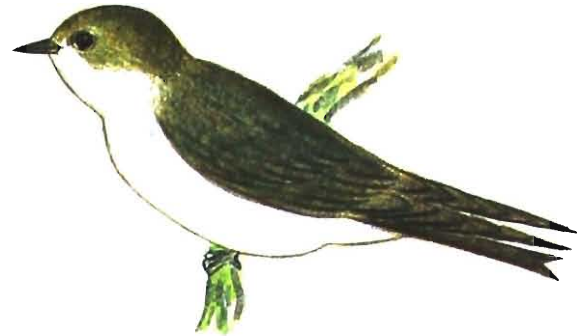
Dipterans and small beetles. **Status and Distribution**: Resident as well as winter migrant, locally common; breeds in Assam,



Diagnostics: Sexes alike. *Adult*: Similar to Pale Martin but with white throat and half collar; brown breast-band; darker brown upperparts; and

recorded also from Gujarat, Bihar, Manipur, Maharashtra in India; Nepal; Bangladesh and Maldives.

277(910). Pale Martin. *Riparia diluta* (Sharpe & Wyatt, 1893); Sparrow -; 13 cm; **R/WM/LCom C** (Plate 39.277)

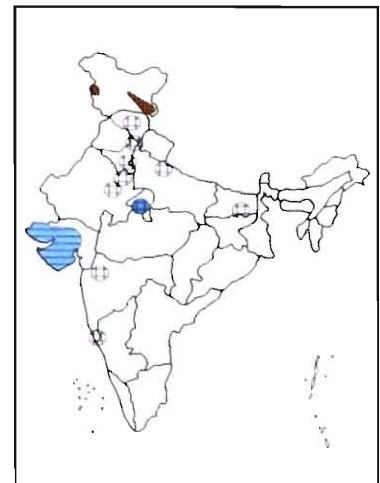


Diagnostics: Sexes alike. *Adult*: Differs from Sand Martin by ill-defined breast-band; indistinct greyish-white throat; paler and greyish upper parts and shallowly forked tail.

Juvenile: Has rufous fringes to upperparts, including tertials and upper tail-coverts. **Voice**: A short grating twittering. **Habitat**: Near large waterbodies. **Habits**: Usually feeds above water, sometimes also overland, often in flocks with swifts; active at dusk; forms large communal roosts in reedbeds.

Food: Diptera and small beetles taken on the wing.

Status and Distribution: Resident and possible winter migrant, locally common in India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives.



278(912). Plain Martin. *Riparia paludicola* (Vieillot, 1817); Sparrow -; c. 12 cm; **R/LM/Com C** (Plate 39.278)

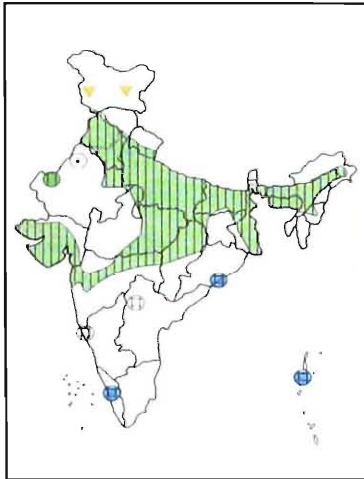
Diagnostics: Sexes alike. *Adult*: Pale brownish-grey throat and breast, merges with drab white of underparts. *Juvenile*: Has rufous fringes to upperparts and throat. **Voice**: High-pitched twitter. **Habitat**: Near large rivers,

Photo: Amano samarpan



Plain Martin

streams and lakes with vertical sandy banks. **Habits:** Generally feeds over water, crepuscular; perches in rows on telegraph/phone wires, roosts communally in reedbeds. **Status and Distribution:** Resident, common in N and C India from plains to 1500 m. Pakistan; Nepal; Bhutan; Bangladesh; Maldives.



279(916-918). Common Swallow. *Hirundo rustica* Linnaeus, 1758; **Barn Swallow (I); Sparrow ±; c. 18 cm; R/WM/LCom C (Plate 39.279)**

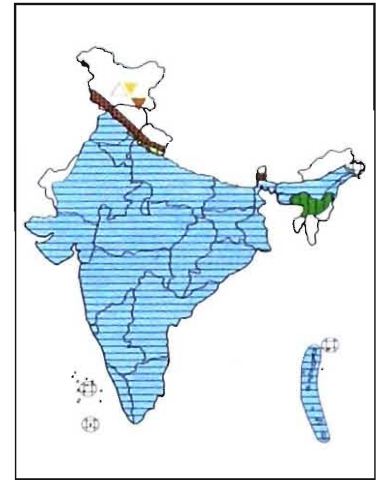
Diagnostics: Sexes alike. *Adult:* Rust-colored forehead and throat, long tail-streamers, blue-black breast band. *Juvenile:* Has orange-buff forehead and throat, breast-band is browner and less defined; upperparts duller; and shorter tail-streamers. **Voice:** Pleasant twittering



Photo: Svein Bekkum

Common Swallow

and screeching; clear *vit vit*. **Habitat:** Open country lakes and rivers, generally near water in winter. **Habits:** Swift and agile flier, forages by skimming low over water, highly sociable, flocks in large numbers on telegraph/phone wires. **Food:** Chiefly midges, gnats and other dipterous insects.



Status and Distribution: Resident and partial winter migrant, widespread in winter; breeds from foothills up to 3000 m in Himalayas from N Pakistan east to Arunachal Pradesh; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka, Maldives.

280(921). Wire-tailed Swallow. *Hirundo smithii* Leach, 1818; Sparrow ±; c.14 cm; **R/SM/LCom C (Plate 39.280)**

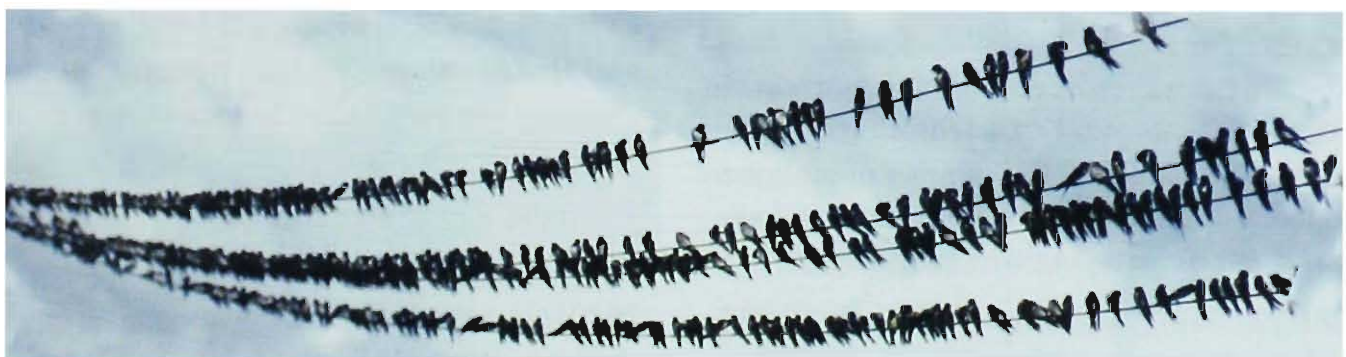


Photo: Jon Hornbuckle

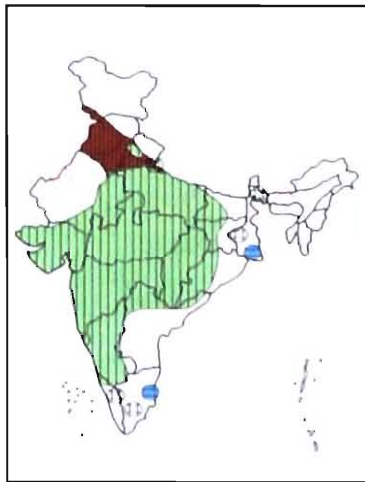
Congregation of Common Swallows at Chilika Lake

Photo: Vijay Cavale



Wire-tailed Swallow

Diagnostics: Sexes alike, but female with shorter tail-wires. **Adult:** Glossy steel blue above with bright chestnut cap; easily distinguished by bright pure white underparts and two long tail-wires. **Juvenile:** Has brownish cast to blue upperparts and dull brownish crown. **Voice:** Double *chirrik-weet*, and *chichip* alarm call. **Habitat:** Open country, cultivation in the neighbourhood of rivers, jheels, reservoirs, etc. **Habits:** Generally found in vicinity of water, in flocks skims over the water surface, usually feeds in pairs or loose flocks, roosts in reedbeds. **Status and Distribution:** Resident in peninsula undertakes summer migration to N India, up to 1500 m in the Himalayas in India; Pakistan; Nepal; Bangladesh; Sri Lanka.



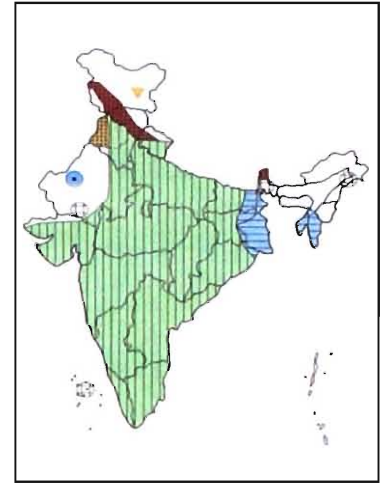
281(923-928). Red-rumped Swallow. *Hirundo daurica* Linnaeus, 1771; Sparrow ±; 16-19 cm; **R/SM/WM/LCom C** (Plate 39.281)



Photo: Raymond De Smet

Red-rumped Swallow

Diagnostics: Sexes alike. **Adult:** The Rufous rump (varies from white to chestnut) separates it from all Swallows except Striated Swallow. Neck, sides and rump rufous-orange; upperparts glistening blue-black; underparts buff-white, with fine streaks on throat and upper breast. **Juvenile:** Has less gloss to blue crown, mantle and wings; paler neck-collar and rump; buff tips to tertials; and shorter tail-streamers. **Voice:** A



loud low-pitched *cheer*, a sparrow-like chirp, and a more nasal *queenk*. **Habitat:** in upland cultivation and on open grassy hill slopes during summer and in open scrub country, cultivation and forest clearings during winter. **Habits:** Gathers in huge numbers in winter and on migration, when frequently seen in close-packed flocks on telegraph wires, roosts communally in reedbeds. **Food:** Dipterans, Coleopterans, winged ants and termites. **Status and Distribution:** Resident, winters in plains, common summer visitor to mountain regions of W Himalayas up to 3300 m, breeds between 1000 and 3300 m in India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka.

282(922). Streak-throated Swallow. *Hirundo fluvicola* Blyth, 1855; Sparrow -; c. 12 cm; **R/SM/LCom C** (Plate 39.282)

Photo: Vijay Cavale



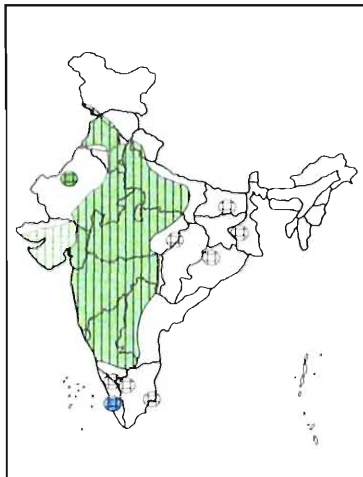
Streak-throated Swallow

Diagnostics: Sexes alike. *Adult:* Very slightly forked tail; glossy steel blue above with narrow white streaks on mantle; chestnut forehead and crown;

brown streaking on chin, throat and breast; rump pale brown; fulvous white below. *Juvenile:* Has duller, browner crown, and brown-toned mantle and wings.

Voice: Twittering chirp and sharp

trr trr in flight. **Habitat:** Found in open country and cultivation in the vicinity of rivers, canals and reservoirs. **Habits:** Highly gregarious, forages in close proximity to water with other swallows. **Food:** Midges, gnats and other dipterous insects **Status and Distribution:** Resident, locally common in plains of N & SW India, breeds in plains and up to 700 m in W Himalayas in India; Pakistan; Nepal; Bangladesh; Sri Lanka.



generally unstreaked, brighter and more contrasting, wag their tails up and down, feed primarily on insects, often call in flight, usually found singly in breeding season, roost communally in non-breeding season. **Pipits** are dull coloured, like larks, some wag their tails up and down while walking, flight less fluttery, often give diagnostic call in flight.

283(1885-1890). White Wagtail. *Motacilla alba* Linnaeus, 1758; Bulbul; c. 18 cm; R/WM/PM/Com C (Plate 40.283)



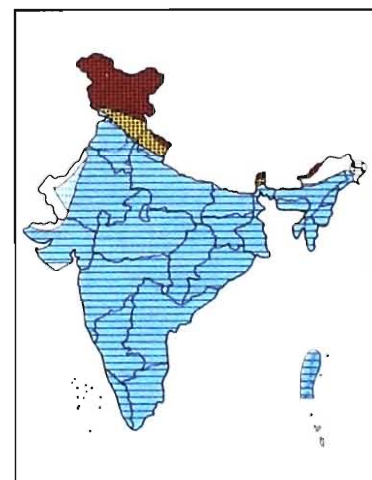
Photo: Svein Bekkum

White Wagtail



Photo: Vijay Cavale

Diagnostics: Sexes alike. *Adult:* Black and white head pattern, mantle grey or black, wing-coverts largely black. Considerable variations occur in breeding adults. *Juvenile:* With



Wagtails & Pipits
(Family Motacillidae)

They are small and slim ground-feeding birds with slender pointed bill, pointed wings, fairly long legs, walk with deliberate gait and run rapidly, nest on the ground. **Wagtails** are

grey head, mantle and breast with whitish supercilium. **Voice:** Sharp *chi-cheep*. **Habitat:** Inhabits streams and rivers in hills during summer, winters in open country near marshes, rivers, streams, canals, lakes etc. **Habits:** Swiftly moves around wetlands and fields; wags its tail continually up and down. **Status and Distribution:** Resident with altitudinal and short-range movements; breeds in Himalayas (1500-5000 m), widespread and common winter migrant; India, Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka.

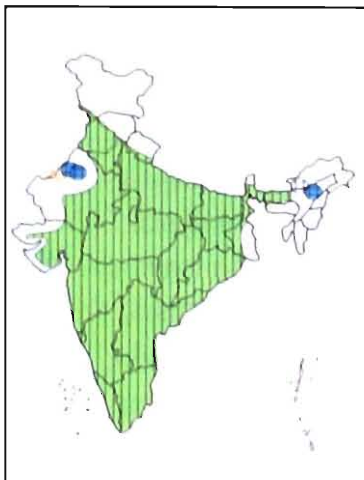
284(1891). Large Pied Wagtail. *Motacilla maderaspatensis* Gmelin 1789; White-browed Wagtail (I); Bulbul; c. 21 cm; R/LCom C (Plate 40.284)



Photo: Vijay Cavale

Large Pied Wagtail

Diagnostics: Sexes alike. *Adult:* A large Wagtail with black and white plumage that distinguishes it from the all other wagtails, wing-coverts largely white, supercilium white. *Juvenile:* With brownish-grey head, mantle and breast, with white supercilium. **Voice:** Loud *chiz-zit*, chiefly uttered in flight. **Habitat:** Banks of rivers, canals, lakes and irrigation barrages. **Habits:** Usually keeps in pairs throughout the year. Generally



sedate and confiding inhabits clear, rocky smooth running streams with grassy islands. **Food:** Beetles, locusts, dragonflies, snails and small seeds. **Status and Distribution:** Resident, locally common and widespread except NW & NE Himalayas (up to 1500 m), up to 2200 m in peninsula; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka.

285(1881-1883). Citrine Wagtail. *Motacilla citreola* Pallas, 1776; Sparrow with a long tail; c. 17 cm; R/AM/WM/LCom C; (Plate 40.285)



Photo: Gill Cardy

Citrine Wagtail



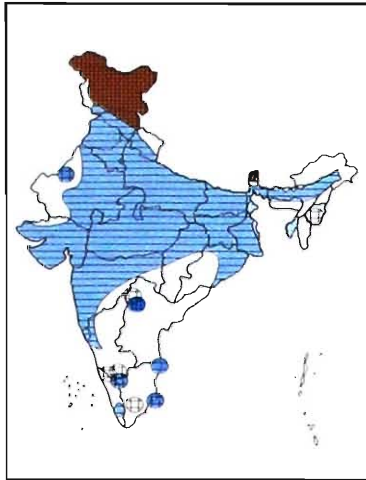
Photo: Jon Hornbuckle

Diagnostics: *Male:* Has yellow head and underparts, black mantle. *Female:* Has broad yellow supercilium, which joins the yellow of throat; crown grey; underparts mainly yellow. *Juvenile:* With brownish crown, ear-coverts and mantle, buff supercilium and buff-white underparts. **Voice:** Harsh *brrzzreep*, *chiz-zit*. **Habitat:** Summers on marshy patches below glaciers and melting snow, winters around lakes, jheels and tanks. **Habits:** Highly

gregarious during winter, generally occurs at wetlands, sometimes forages on floating vegetation on lakes.

Status and Distribution:

Resident and locally common in Himalayas from J & K to Himachal Pradesh (3000-5000 m), winter migrant to plains in India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka.



286(1875-1880). Yellow Wagtail. *Motacilla flava* Linnaeus, 1758; Sparrow ±; 17 cm; **R/AM/WM/PM/LCom C** (Plate 40.286)



Photo: Vijay Cavale

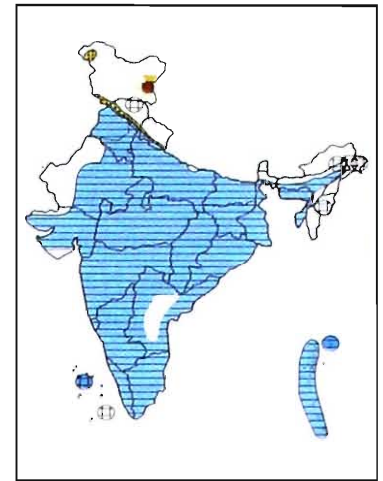
Yellow Wagtail

Diagnostics: *Male* (Breeding): Olive-green upperparts and yellow underparts, with considerable variation in coloration of head depending on race, differentiate it from all other Wagtails. *Female*: Often with some features of breeding male, otherwise extremely variable. *Juvenile*: With dark malar stripe and band across breast. **Voice:** A loud disyllabic *tswee-ip*. **Habitat:** Damp pastures, marshy areas with short vegetation, margins of rivers, lakes and jheels. **Habits:** Keeps in small loose flocks, characteristically associates with grazing domestic livestock while foraging, and captures insects disturbed by the animal's hooves. **Food:** Insects: flies (muscid), pentatomid bugs,

beetles and weevils.

Status and Distribution:

Resident, breeds in NW Himalayas 3600-4500 m, locally common and widespread winter migrant in plains and lower hills, also common passage migrant in W & C Himalayas, India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka; Maldives.



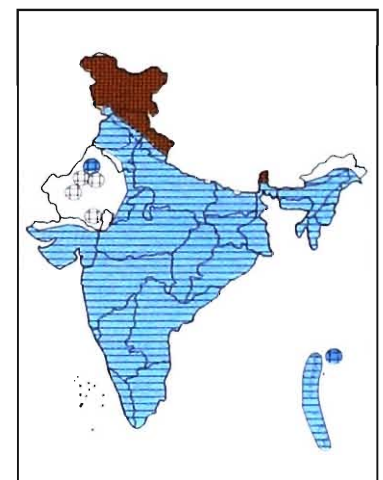
287(1884). Grey Wagtail. *Motacilla cinerea* Tunstall, 1771; Sparrow, with a long tail; c. 17 cm; **R/AM/WM/LCom C** (Plate 40.287)



Photo: Jon Hornbuckle

Grey Wagtail

Diagnostics: *Male*: Head and back grey, supercilium white, wings dark brown with whitish margins. In breeding throat is black and underparts yellow. *Female*: Throat buff, underparts pale. *Juvenile*: With brownish cast to upper parts, buff supercilium, and dark mottling on breast. **Voice:** A sharp *stt* or *zee-fit*. **Habitat:** Undisturbed rocky mountain streams with rocky banks during summers, seeps in plains



and foothills during winter. **Habits:** Solitary, runs around small streams and seeps in forests. **Food:** Mainly insects, occasionally butterflies; tiny molluscs. **Status and Distribution:** Resident in Himalayas summers between 1800-3900 m; winter migrant to plains and foothills in India; Pakistan; Nepal; Bhutan; Bangladesh; Sri Lanka and Maldives.

288(1864). Red-throated Pipit. *Anthus cervinus* (Pallas, 1811); Sparrow ±; 15 cm; PM/Ra C (Plate 40.288)



Red-throated Wagtail (male br)

Diagnostics: Sexes alike. **Adult:** Pale brown, heavily streaked with dark brown, buff supercilium, double whitish wing-bar. Creamy buff streaked with dark brown on breast, sides of neck and flanks, whitish or pinkish throat. **Voice:** A clear *pee-eez* and hoarse *teeez*.

Habitat: Wet grasslands, marshes and cultivations. **Habits:** Keeps in small flocks, flight is like that of Tree Pipit. **Food:** Insects. **Status and Distribution:** A rare passage migrant, India; Pakistan; Nepal; Bhutan; Bangladesh; Maldives.

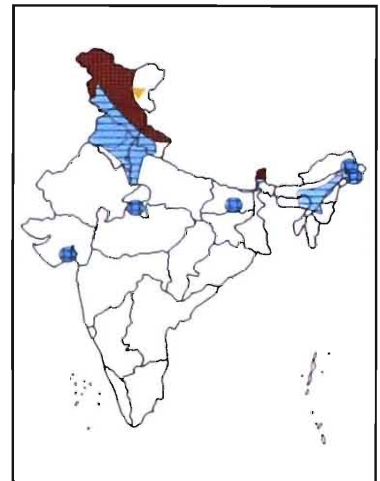
289(1865). Rosy Pipit. *Anthus roseatus* Blyth, 1847; Sparrow ±; 15 cm; R/AM/WMLCom C (Plate 41.289)



Photo: Otto Pfister

Rosy Pipit

Diagnostics. Adult: A dark heavily streaked Pipit with olive cast to mantle, olive green edges to wing-coverts; and long supercilium; breeding birds with suffused pink on underparts. **Voice:** Thin *tsip* or *tsiep*. **Habitat:** Alpine meadows below treeline in summer, and wet grounds below foothills in winter. **Habits:** In summer behaves like Water Pipit and in winter is rather skulking, running and creeping on the ground with body held almost horizontal, forages among grass clumps, boulders, bushes and along edges of small streams. **Food:** Insects, seeds (probably from berries). **Status and Distribution:** Resident, locally common on breeding grounds from the timberline up to 4200 m, winters in northern plains and



foothills, breeds in Himalayas from N Pakistan east to Arunachal Pradesh, India; Pakistan; Nepal; Bhutan and Bangladesh; Breeds from Afghanistan to Sinkiang, Himalayas, and Tibet.

290(1871). Water Pipit. *Anthus spinoletta* (Linnaeus, 1758); Sparrow ±; 15cm; WM/LCom C (Plate 41.290)

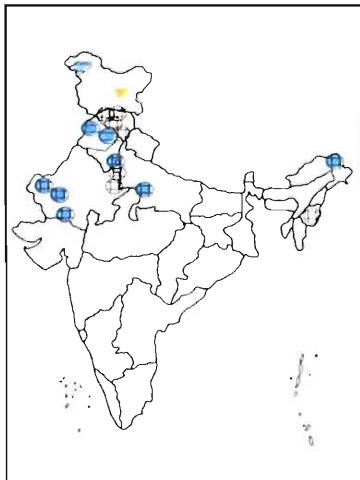
Diagnostics: Greyish-brown upperparts; whitish underparts; fairly conspicuous wing-

Photo: Gill Cardy



Water Pipit

bars; generally dark legs. **Voice:** *tsiep* similar to Rosy Pipit. **Habitat:** Marshes, irrigated cultivation, damp grassy edges of jheels, canals and ditches. **Habits:** Keeps in small-scattered flocks. Flight is undulating and buoyant. **Food:** Insects. **Status and Distribution:** Winter migrant locally common, in N plains and foothills, India; Pakistan and Nepal.



291(1872). Buff-bellied Pipit. *Anthus rubescens* (Tunstall, 1771); Sparrow ±; 15 cm; **WM/Ra C** (Plate 41.291)

Photo: Audevard Aurelién

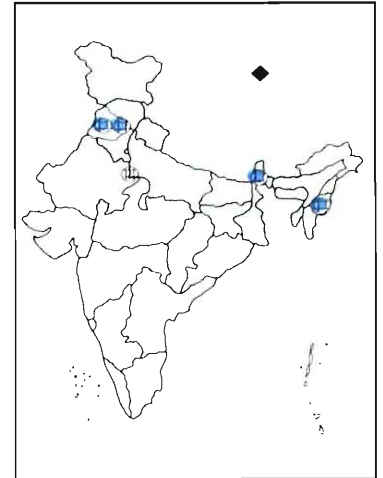


Buff-bellied Pipit

Diagnostics: Like water Pipit but with darker and less streaked upperparts; pale lores; distinct eye-ring and malar; heavily streaked

flanks and breast; and pale legs. Breeding birds lack blue-grey on crown and nape.

Voice: High *tsip-it* or *tsiit*. **Habitat:** Marshes, irrigated cultivation, damp grassy edges of jheels, canals and ditches. **Habits:** Keeps in small-scattered flocks. Flight is



undulating and buoyant. **Food:** Insects. **Status and Distribution:** A rare winter migrant to N India; Pakistan; Nepal and Bhutan.

Dippers (Family Cinclidae)

Dippers are plump brown birds with short wings and tail; adapted for feeding in fast flowing mountainous rivers and streams; swim and walk under water for invertebrate prey beneath stones and boulders; flight direct and low over the water.

292(1772-74). White-throated Dipper. *Cinclus cinclus* (Linnaeus, 1758); Myna ±; c. 20 cm; **R/AM/UnCom C** (Plate 41.292)

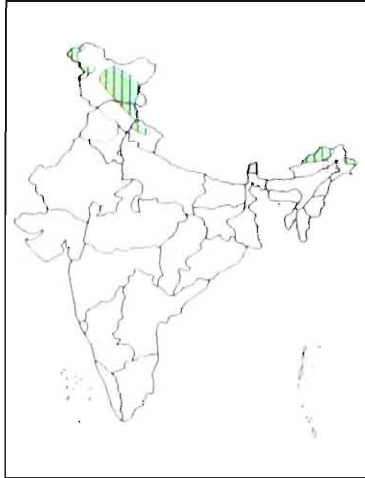


Photo: Svein Bekkum

White-throated Dipper

Diagnostics: Sexes alike. **Adult:** White throat and breast contrasting with brown belly; brown head and nape merging into greyish tinge of mantle, wings and tail. **Juvenile:** With grey upperparts boldly scaled with black, white

throat, white under parts scaled with grey brown. **Voice:** Call is an abrupt, rasping *jeet*, song is a mixture of grating and twittering notes. **Habitat:** Fast-flowing high-altitude mountain streams. **Habits:** Aquatic, perches on rocks in mid-stream, highly territorial, flies low over the water surface. **Status and Distribution:** Resident, restricted to Himalayas from Ladakh to Arunachal Pradesh in India, common north of the main Himalayan range, scarce in south, breeds between 3000-4800 m; Pakistan; Nepal and Bhutan.



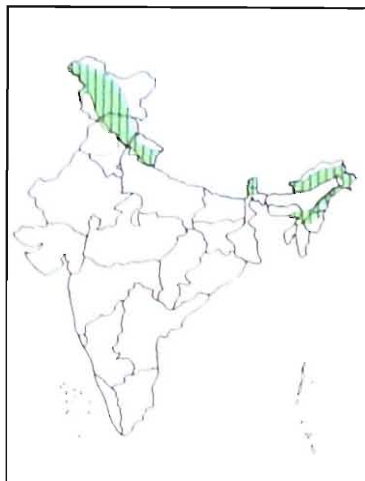
293(1775-1776). Brown Dipper. *Cinclus pallasii* Temminck, 1820; Myna ±; c. 20 cm; **R/AM/LCom C** (Plate 41.293)



Photo: Otto Pfister

Brown Dipper

Diagnostics: Sexes alike. **Adult:** Entirely brown plumage. **Juvenile:** Grey-brown boldly spotted with white. **Voice:** A high-pitched *dzit-dzit*. **Habitat:** Mountain streams and lakes. **Habits:** Solitary, perches



on rocks in hill streams, dives from a floating position like a Dabchick. **Food:** Aquatic insects (muscid, tenedronid and elatrid beetles). **Status and Distribution:** Resident, locally common in Himalayas from N Pakistan east to Arunachal Pradesh, breeds 450-3900 m in W Himalayas, 1000-4200 m in the east, undertakes altitudinal movements; Pakistan; Nepal; Bhutan and Bangladesh.

Wrens (Family Troglodytidae)

Small, plump passerines with rather short, blunt wings; strong legs and erect and stubby tail; occurs in bushy and rocky habitats in Himalaya.

294(1769-1771). Winter Wren. *Troglodytes troglodytes* (Linnaeus, 1758); Sparrow -; 9 cm; **R/AM/LCom C** (Plate 41.294)



Photo: Jyn Morohashi

Winter Wren

Diagnostics: Sexes alike. A dark rufous-brown bird with stubby tail and dark barring on wings, tail and underparts, except chin and upper breast. **Voice:** Alarm notes *tzick-tzick-tzick*; *tzrrr, trrrk*; loud rapid song. **Habitat:** Rocks on moraines, scree and tumbled rock slopes above the treeline, scattered bushes in alpine and subalpine zones; winters on stone walls around

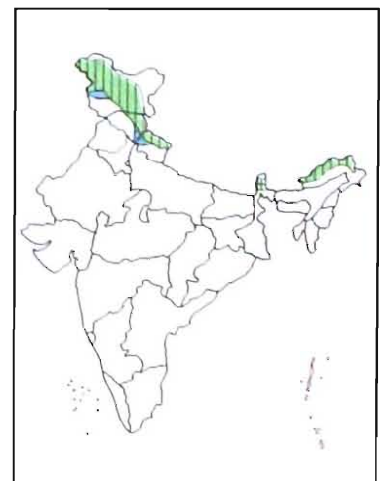
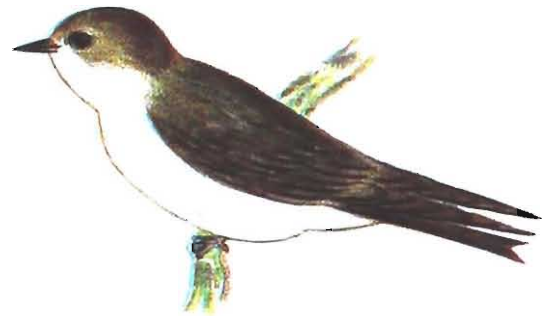


Plate 39



276. Sand Martin



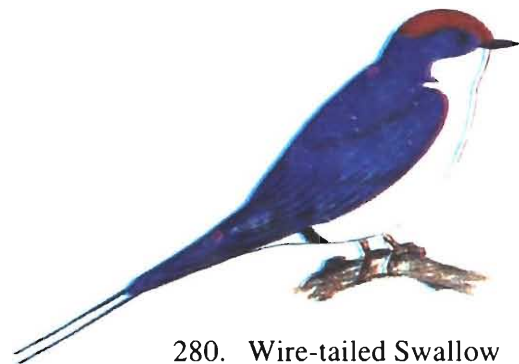
277. Pale Martin



279. Common Swallow



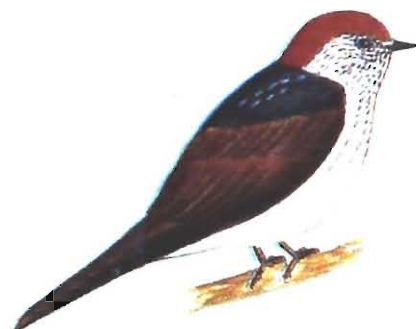
278. Plain Martin



280. Wire-tailed Swallow

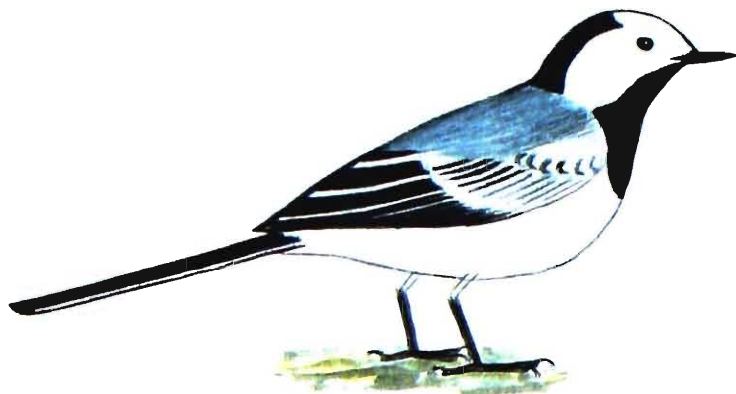


281. Red-rumped Swallow

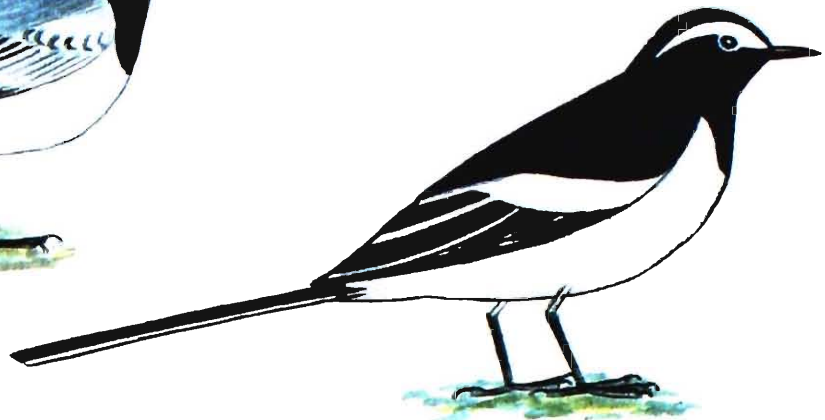


282. Streak-throated Swallow

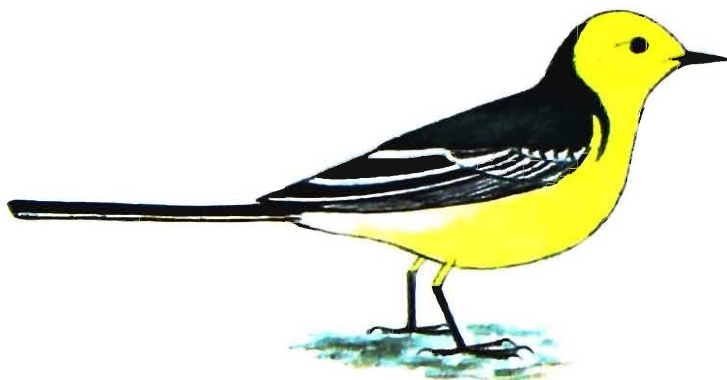
Plate 40



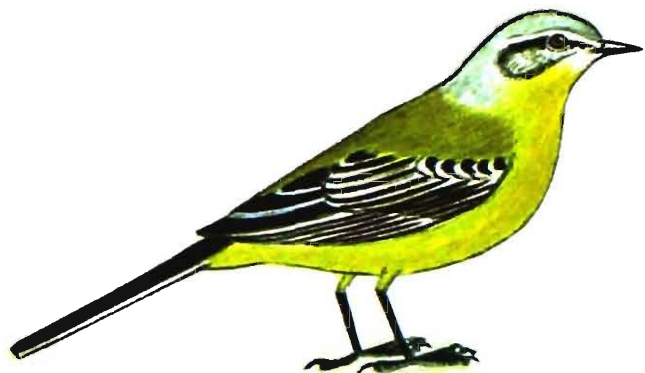
283. White Wagtail



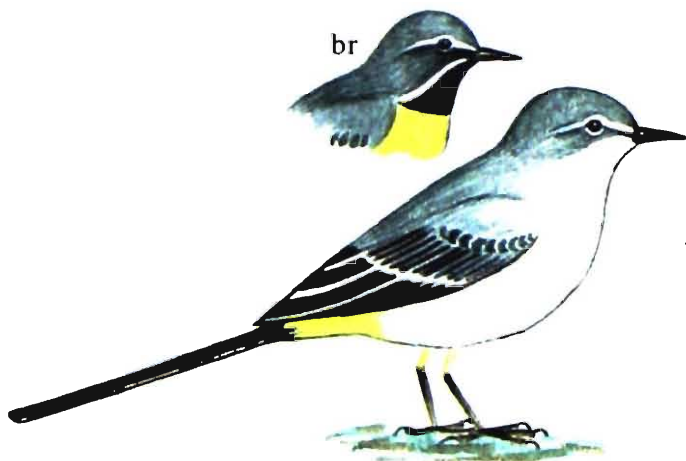
284. Large Pied Wagtail



285. Citrine Wagtail



286. Yellow Wagtail



287. Grey Wagtail



288. Red-throated Pipit

Plate 41



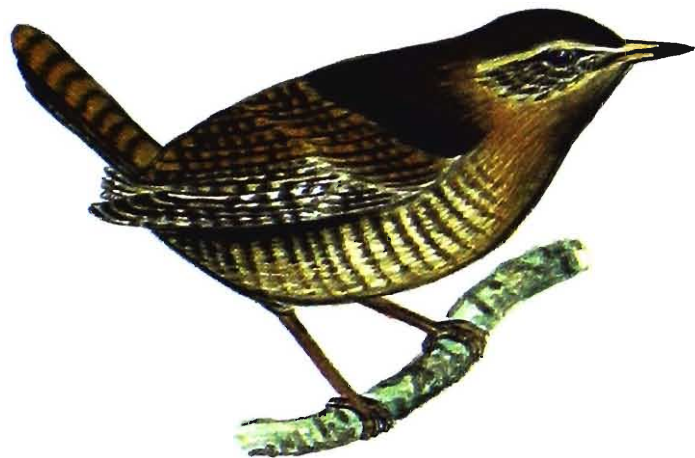
289. Rosy Pipit



290. Water Pipit



291. Buff-bellied Pipit



294. Winter Wren



292. White-throated Dipper



293. Brown Dipper

villages and fields, stony river beds, and on fallen tree trunks in coniferous forest; in summer (2400) 2700- 5000 m (5300) and in winter 1200-3600 m (4700). **Habits:** Solitary, roosts communally, always on the move, creeping and flitting among rocks and low vegetation, usually tail is erect and moved vigorously up and down. **Food:** Insects. **Status and Distribution:** Resident, subject to altitudinal movements, locally common, Himalayas from N Pakistan east to Arunachal Pradesh. In India, breeds 2400-3900 m in west and 2700-5000 m in east, winters at lower elevations; Pakistan; Nepal; and Bhutan.

Accentors (Family Prunellidae)

Accentors are compact and small sombre-coloured birds with slender and pointed bill; feed mainly on insects, seeds and berries flight usually low over the ground, build cup-shaped nests of plant materials usually on shrubs; most species live above tree line, descent to lower altitude in winter.

295(1678). Guldenstadt's Redstart. *Phoenicurus erythrogaster* (Guldenstadt, 1775); **White-winged Redstart** (I); Sparrow +; 18 cm; **R/WM/AM/LCom C/H** (Plate 42.295)

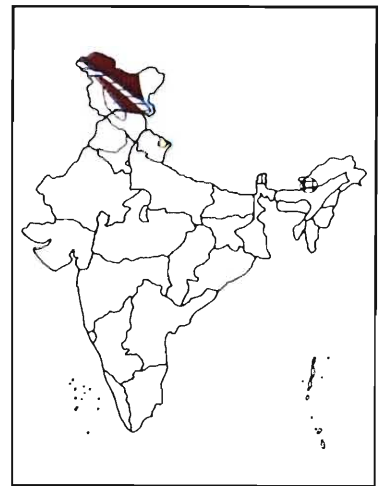


Photo: Jon Hornbuckle

Guldenstadt's Redstart

Diagnostics. *Male:* With white cap and large white wing patch; forehead, round the eye, throat and breast black; rump tail and remaining underparts chestnut. *Female:* With pale brown upperparts; and pale fulvous-brown underparts. *Juvenile:* Brown head and body with

diffuse buff spotting on and brown scaling on median and greater coverts. **Voice:** *Tik; tyeet-teek-teek.* **Habitat:** *Hippophae* bushes, riverbeds and dry scrubby alpine habitats. **Habits:** Perches on boulders, walls and low bushes, forages by hopping or running about on the ground and picking up insects; also by flying down to prey from a low perch, also takes insects in the air during brief flight. **Food:** Insects and small seeds; grit often found in stomachs. **Status and Distribution:** Resident, undertakes altitudinal movements, winter migrant as well; breeds in the dry alpine zone among glacial moraines and boulder strewn meadows (3600-5200 m), winters on stony pastures, in patches of *Hippophae* and along riverbeds (1525-4800 m); locally common in the Himalayas from N Pakistan east to Arunachal Pradesh in India; Nepal; Bhutan.



296(1716). White-capped Redstart. *Chaimarrornis leucocephalus* (Vigors, 1831); **White-capped Water Redstart** (I); Bulbul; c. 19 cm; **R/AM/WM/Com C/H** (Plate 42.296)



Photo: Vijay Cavale

White-capped Redstart

Diagnostics: Sexes alike. *Adult:* Has white cap contrasting with blue-black head, mantle and breast; rufous belly and rump; tail with broad

black terminal band. *Juvenile*: Rump and tail as adult but black fringes to white crown, brownish-black upperparts and blackish underparts. **Voice**:

Tsee; sit sit; low whistle. **Habitat**:

Mountain streams and rivers, along canals at low altitude during winter; in summer, also in alpine meadows and rocky areas far from water. **Habits**:

Occurs singly or in pairs, perches on stones in torrents or rocky banks, has distinctive habit of pumping and fanning its tail. **Food**: Mainly insects; also berries. **Status and Distribution**: Resident, undertake altitudinal movements; winter migrant as well; breeds in Himalayas, summers between 1830-4880 m, restricts up to 1500 m during winter, from Pakistan east to Arunachal Pradesh, NE Indian hills; Pakistan; Nepal; Bhutan; Bangladesh.

297(1679). Plumbeous Redstart. *Rhyacornis fuliginosus* (Vigors, 1831); Sparrow -; c. 12 cm; **R/AM/LCom C/H** (Plate 42.297)



Photo: Tim Loseby

Plumbeous Redstart (male)

Diagnostics: Male: Bluish slaty with chestnut tail and rufous lower belly. *Female*: Dark grey-brown above with two rows of white spots on wing, mottled slate and white below. *Juvenile*:

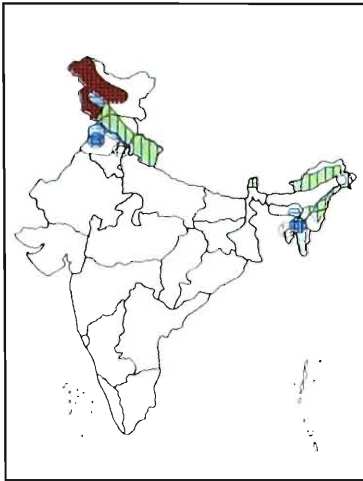


Photo: Satpal Gandhi

Plumbeous Redstart (female)

Like female but has buff spotting on browner upperparts, buff underparts with black scaling. **Voice**:

Ziet; krreee; five-second sharp, creaky jingle. **Habitat**:

Fast-flowing streams and rivers. **Habits**: Solitary or in pairs, confined to hill streams, rivers, where it hops from boulder to boulder, crepuscular, and hunts until late dusk. **Food**:

Chiefly insects; occasionally berries. **Status and Distribution**: Resident, undertakes altitudinal movements; summers in Himalayas between 1200 and 4400 m, winters between 1000 and 1800 m from N Pakistan east to Arunachal Pradesh, and NE Indian hills; Pakistan; Nepal; Bhutan; Bangladesh.

298(1684). Little Forktail. *Enicurus scouleri* Vigors, 1832; Sparrow -; c. 12 cm; **R/AM/LCom C** (Plate 42.298)

Diagnostics: Sexes alike. *Adult*: Distinguished from other Forktails by smallness, rounded body, short black tail with prominent white sides; black band across the white rump; forehead prominent white. *Juvenile*: Resembles with adult except white forehead. **Voice**: Usually silent, song a loud *ts-youeee*.

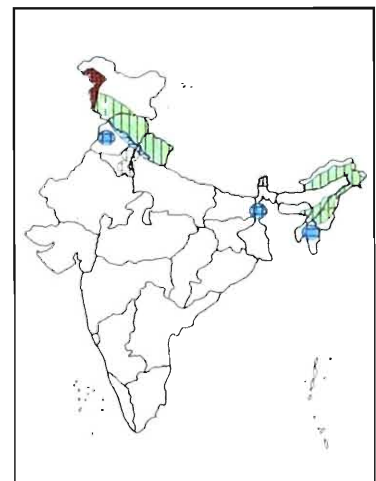
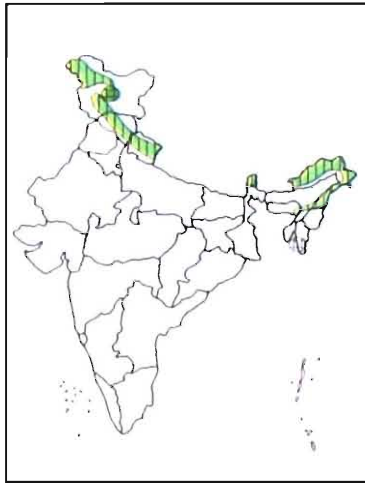


Photo: Jon Hornbuckle



Little Forktail

Habitat: Rocky mountain streams, chiefly near waterfalls; in winter, also on larger slower-moving rivers. **Habits:** Always occurs near water, feeds by standing on or running over partly submerged rocks. Continually fans and closes its tail while simultaneously moving it slowly up and down, often dashes under the spray of falling water. **Food:** Aquatic insects and their larvae.



Status and Distribution: Resident; undertakes altitudinal movements, summers between 1800 and 3300 m, winters between 1000 and 2000m; throughout Himalayas from N Pakistan east to Arunachal Pradesh, NE Indian hills, Bangladesh; Pakistan; Nepal; Bhutan; Bangladesh.

299(1685). Black-backed Forktail. *Enicurus immaculatus* (Hodgson, 1836); Bulbul, with long tail; c. 25 cm; **R/LCom C** (Plate 42.299)

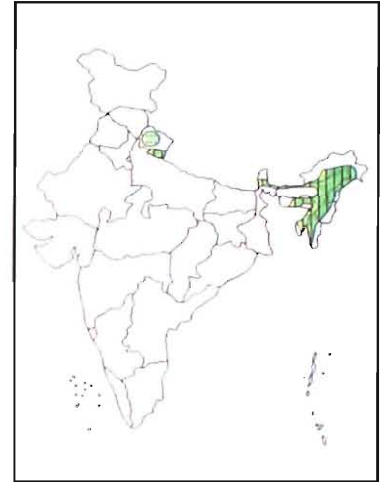
Diagnostics: Sexes alike. *Adult:* Long, forked black and white tail, with white band across wing; crown and mantle black; bill small, more white on forehead. *Juvenile:* Apparently like adult but has shorter tail, lacks white forehead and supercilium. **Voice:** Short whistle; *dew; curt-seeeee.* **Habitat:** Forested hill streams. **Habits:** Solitary, occurs on stones and



Photo: Jon Hornbuckle

Black-backed Forktail

boulders in and along streams. **Food:** Insects. **Status and Distribution:** Resident, restricted to Himalayan foothills from Uttaranchal east to Arunachal Pradesh; NE India; Nepal; Bhutan; Bangladesh. Myanmar.



300(1686). Slaty-backed Forktail. *Enicurus schistaceus* (Hodgson, 1836); Bulbul, with long tail; c. 25 cm; **BRS (08) R/AM/LCom C** (Plate 42.300)

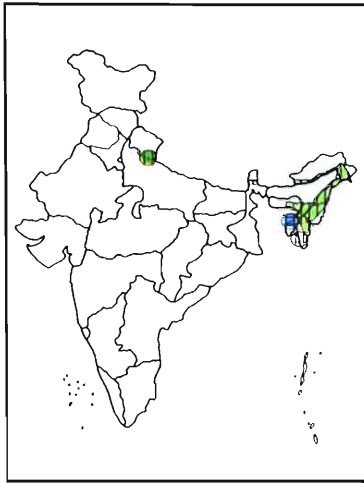


Photo: Jon Hornbuckle

Slaty-backed Forktail

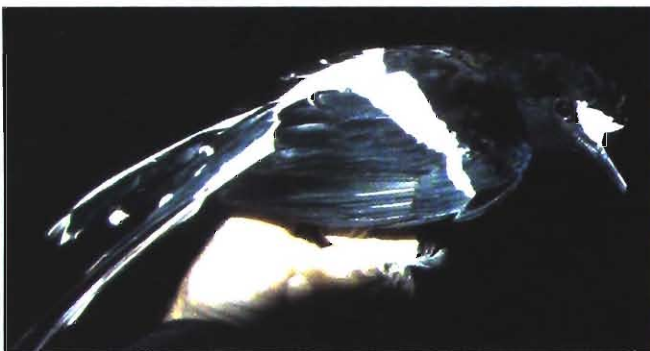
Diagnostics: Sexes alike. *Adult:* Long, forked black and white tail; slaty-grey crown and mantle contrasting with black throat and wing-coverts. *Juvenile:* Apparently like adult but has shorter tail, lacks white forehead and supercilium. **Voice:** High *tsee; teenk; cheet.* **Habitat:** Large rocky forested torrential streams in the tropical and subtropical zones; also lake margins. **Habits:** Remains solitary or in pairs,

flits from stone to stone or trots over boulders for foraging. **Status and Distribution:** *Biome Restricted Species*. Resident undertakes altitudinal movements, locally common; restricted in Himalayas from E Uttaranchal to Arunachal Pradesh; NE India; Nepal; Bhutan; Bangladesh.



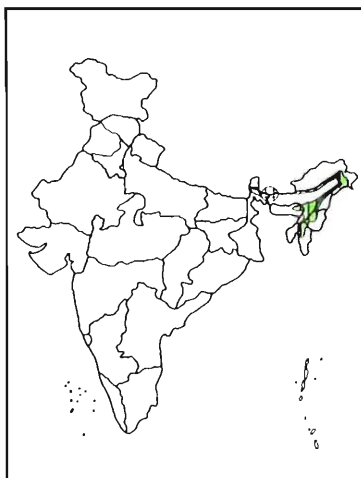
301(1687). Leschenault's Forktail. *Enicurus leschenaulti* (Vieillot, 1818); White-crowned Forktail (I); Myna, with long tail; 28 cms; R/LM/UnCom C (Plate 42.301)

Photo: Jon Hornbuckle



Leschenault's Forktail

Diagnostics: Sexes alike. *Adult:* The largest and the blackest of the Forktails with white forehead and forecrown; black breast and mantle; and the black of underparts extending up to breast and flanks. *Juvenile:* Lacks white forehead but has brownish-black upperparts, throat and breast. **Voice:** *Scree; scree chit-chit-chit.* **Habitat:** Torrential streams and rivers in broad-leaved evergreen forest. **Habits:** Very shy, and flies off immediately if disturbed. **Food:** Insects. **Status**



and Distribution: Resident, subject to seasonal movements; breeds in foothills; uncommon from Darjeeling east to Arunachal Pradesh; NE Indian hills; Bhutan; Bangladesh.

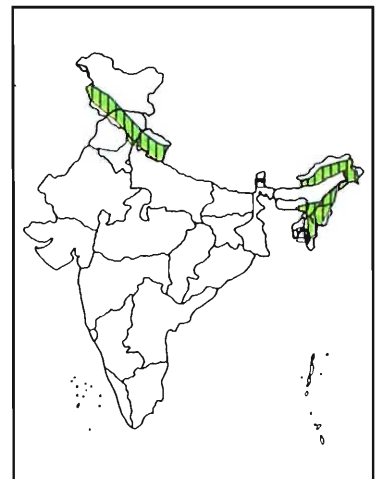
302(1688-89). Spotted Forktail. *Enicurus maculatus* Vigors, 1831; Bulbul, with long tail; c. 25 cm; R/AM/LCom C (Plate 42.302)



Photo: Tim Loseby

Spotted Forktail

Diagnostics: Sexes alike. *Adult:* Large sized Forktail with very long tail, white spots on black mantle, white forehead prominent, black of throat extends down to breast. *Juvenile:* With brownish-black upperparts, paler brownish-black throat and breast with white streaking; and brown mottling on upper belly and brown flanks; lacks white forehead. **Voice:** A shrill, rasping *kreee* or *tseek*; also a creaky *cheek-chik-chik-chik.* **Habitat:** Rocky forested streams and ravines. **Habits:** Singly or in separate pairs, flits over moss-covered stones at the water's edge or



from stone to stone in mid-current. Has a characteristic habit of constantly swaying its tail slowly up and down. **Food:** Aquatic insects and small mammals. **Status and Distribution:** Resident, subject to altitudinal movements; restricted to Himalayas from N Pakistan to Arunachal Pradesh; hills of NE India; Pakistan; Nepal; Bhutan; Bangladesh.

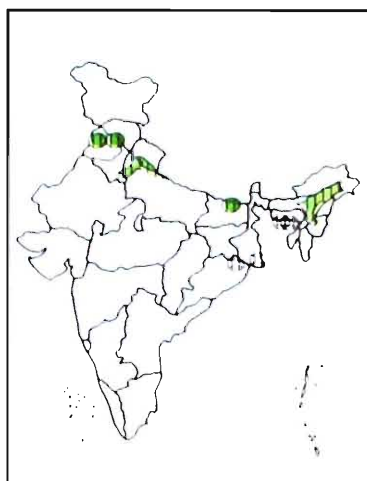
303(1699). White-tailed Stonechat. *Saxicola leucura* (Blyth, 1847); Sparrow -; 12.5-13 cm; **R/LM/LCom C** (Plate 43.303)

Photo: Jon Hornbuckle



White-tailed Stonechat

Diagnostics: *Male:* Central tail feathers are largely white which are visible when tail is flicked or fanned. *Female:* With grayer upperparts, paler underparts with light orange-buff wash, and paler grey-brown tail. **Voice:** Alarm note is a *peep-chaaa*. **Habitat:** Reeds, tall grass and tamarisks subject to seasonal flooding, usually along rivers. **Habits:** Perches on top of some tall grass, reed or bush descending to the ground for insects. When perched moves tail slowly up and down, at the same time fanning it rapidly. **Food:** Insects. **Status and Distribution:** Resident, subject to local movements, from Punjab east through terai to Assam, south to N Orissa; Indus river system in Pakistan; Nepal; Bangladesh.



Babblers (Timaliinae)

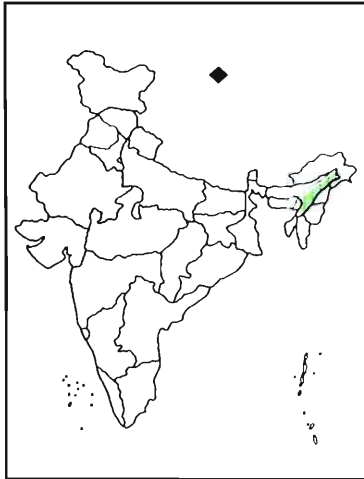
Large and diverse group of small to medium-sized passerines, with soft and loose plumage, short or fairly short wings and strong legs and feet. Feed mainly on insects; inhabit forest and scrub. Many are gregarious; most are noisy and have wide range of chatters, rattles, and whistles. Sexes are alike in most species.

304(1160). Marsh Babbler. *Pellorneum palustre* Gould, 1872; Sparrow; ca 15 cm; **GT/Vu RRS E R/Ra C** (Plate 43.304)



Diagnostics: Sexes alike. Adult has olive-brown upperparts, white throat, grey supercilium back to eye, and bold brown streaking on breast and flanks. **Voice:** A loud double chirp *chichew*. **Habitat:** Reeds, tall grass and tangled scrub near water. **Habits:** A great skulker, easily overlooked, though call-notes are constantly uttered. When flushed, flits in a rather lopsided manner from one patch of grass to another. **Food:** Insects. **Status and Distribution:** *Globally threatened/Vulnerable/Endemic to subcontinent/ Restricted Range Species*, limited to the floodplain of the Brahmaputra River and its associated tributaries in northeastern India (Arunachal Pradesh, Assam, Meghalaya), and adjacent Bangladesh. **Remarks:** Historically, it was described as a "rare bird" in North Cachar, although "common

about marshy ground” in Meghalaya, and “not rare in Assam”. **Population:** The Marsh Babbler’s population is unknown but is here inferred to be declining as a result of loss of its tall grassland habitat. **Threats:** The Marsh Babbler is one of three threatened species that are restricted to the “Assam Plains Endemic Bird Area”. The key threat is probably habitat loss and degradation. Huge areas of grassland in northern India, including the Brahmaputra valley, have been



lost as a result of conversion to agriculture and forestry plantations, edaphic grasslands have been altered from flooding by dam and irrigation schemes, and many remaining grasslands are subject to high grazing pressure from domestic stock and intensive harvesting by local communities, often associated with grassland burning. **Measures taken:** The species occurs in Dibru-Saikhowa, Kaziranga (430 km², with new areas of grassland recently added), Manas (391 km²) and Nameri National Parks. **Measures proposed:** The long-term survival of the Marsh Babbler depends largely on the efficacy of conservation action in protected areas in Assam. Its conservation requirements should be viewed in combination with the needs of those other threatened grassland birds so that a programme of habitat management and research can be implemented with benefits to each of these species (BirdLife Int., 2001). The species is listed under Schedule IV of Wildlife (Protection) Act, 1972.

305(1233-34). Jerdon’s Babbler. *Chrysomma altirostre* Jerdon, 1862; Bulbul -; ca 17 cm; **GT/Vu E R/Ra** (Plate 43.305).

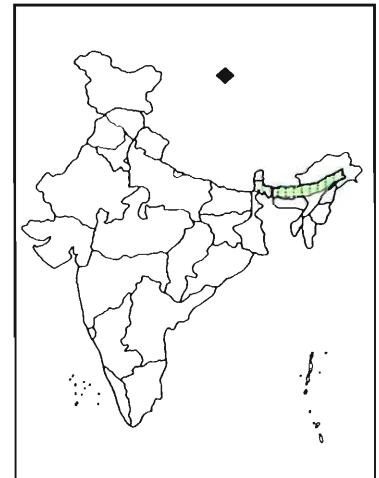
Diagnostics: Sexes alike. A stocky, long-tailed babbler with rounded head and stout bill;



Photo: Nigel Bean

Jerdon’s Babbler

mainly differs from the yellow-eyed babbler by brown iris, paler yellowish-brown bill, and fleshy-brown legs and feet. **Voice:** *Chew, chi, chi.* **Habitat:** Tracts of elephant grass and reedbeds. **Habits:** Sedentary, keeps in pairs or small parties, seeks insects in reedbeds, skulks but male climbs to



the top of a tall reed to sing in breeding season. **Food:** Grasshoppers and other insects; also small seeds. **Status and Distribution:** *Globally threatened/Vulnerable/Endemic.* Resident, occurs in the Indus valley of Pakistan, the plains and Brahmaputra valley of northeast India, and the terai of Nepal, historically from Myanmar and possibly from Bangladesh. **Remarks:** This species small population is inferred to be rapidly declining as a result of extensive loss of its tall, wet grassland habitat, primarily due to drainage and conversion to cultivation. **Population:** Jerdon’s Babbler was, on the basis of early reports, once “locally common” in northeast India. The evidence suggests that it is now very local in Assam, but perhaps overlooked. **Threats:** Huge areas of grassland have been lost in India as a result of conversion to agriculture and forestry

plantations, edaphic grasslands have been altered from flooding by dam and irrigation schemes, and many remaining grasslands are subject to high grazing pressure from domestic stock and intensive harvesting by local communities, often associated with grassland burning. **Measures taken:** The species occurs in Dibru-Saikhowa, Kaziranga and Manas National Parks. **Measures proposed:** Effective protection of Manas National Park is required, along with continued searches for the species in potentially suitable areas so that further protected areas can be established for this and other grassland species. The Amarpur grasslands, near Dibru-Saikhowa National Park, contain important tracts of natural habitat; they should not be cleared for agriculture, and deserve inclusion within the national park or some other form of protection to halt the grazing pressure from domestic stock and intensive harvesting by local communities (BirdLife Int., 2001). The species is listed under Schedule IV of Wildlife (Protection) Act, 1972.

Parrotbills (Panurinae)

The short deep, parrot-like bill with curved cutting edges to the mandibles used for cutting grass and bamboo stems distinguishes Parrotbills. They are gregarious but shy inhabitants of bamboo and grassland.

306(1251). Black-breasted Parrotbill. *Paradoxornis flavirostris* Gould, 1836; Bulbul; c. 19 cm; **GT/Vu RRS (6) E R/VRa** (Plate 43.306)



Photo: Des Allen

Black-breasted Parrotbill

Diagnostics: Sexes alike. A medium-sized stocky Parrotbill with rufous-brown head and olive-brown upperparts, black patch on ear-coverts, and huge orange bill; the black breast and solid black chin are the diagnostics. **Voice:** A striking whistle *phew, phew, phew, phuit*. **Habitat:** Elephant grass, mixed grass and bamboo, reedbeds, etc. **Habits:** Keeps in small parties in non-breeding season, shy and skulking, occasionally flies up into the air. **Food:** Mainly vegetable matter (bamboo, shoots, seeds); also insects and their larvae especially during the breeding season. **Status and Distribution:** *Globally threatened/ Vulnerable/ Restricted Range Species/ Endemic* to the subcontinent; now very rare and local in plains and foothills up to 900 m. It has been recorded in the north-eastern plains and neighbouring foothills of India, from West Bengal, through Assam, to Arunachal Pradesh and northern Bangladesh, with possible records from Nepal, Sikkim and the Chittagong region (Bangladesh). **Remarks:** This tall grassland specialist is inferred to have a small, rapidly declining population as a result of extensive loss and degradation of grasslands. It frequents dense thickets of reeds, or tall grassland, especially along the banks and beds of rivers and,



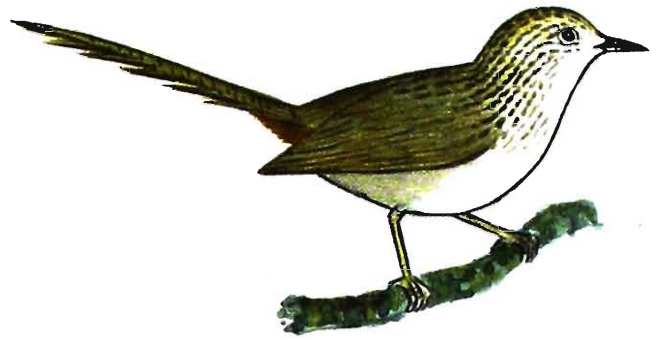
at least in Bangladesh, around stagnant wetlands. **Threats:** The Black-breasted Parrotbill is one of three threatened bird species that are entirely restricted to the "Assam Plains Endemic Bird Area". The key threat to the species is the loss in area and quality of its grassland and marshland habitat. **Measures taken:** D'Ering Memorial Wildlife Sanctuary (190 km²) protects appropriate habitat in Arunachal Pradesh, while in Assam the species

occurs in and around Dibru-Saikhowa National Park (340 km²; the important Amarpur section was once included in the park, but it has subsequently been left out, and Kaziranga National Park (430 km²); in West Bengal it has been recorded in Jaldapara Wildlife Sanctuary (216 km²). **Measures Proposed:** In Assam and Arunachal Pradesh this species shares habitat not only with the Florican but also with several other threatened species including Swamp Francolin *Francolinus gularis*, Bristled Grass-warbler *Chaetornis striatus*, Marsh Babbler *Pellorneum palustre*, Jerdon's Babbler *Chrysomma alirostre* and Slender-billed Babbler *Turdoides longirostris*, all of which would benefit from a concerted grassland conservation programme in north-east India involving a network of protected areas and effective habitat management. Surveys of any remaining pockets of tall grassland in Sylhet, Bangladesh, are required to establish whether the species remains there, and in north-east India (including any suitable areas of the Brahmaputra valley and also, at the earliest opportunity, Cachar) to clarify its current range and status (BirdLife Int., 2001). The species is listed under Schedule IV of Wildlife (Protection) Act, 1972.

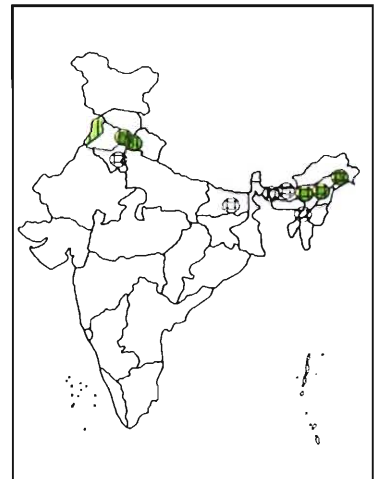
Prinias & Warblers (Sylviinae)

They are largely insectivorous inhabitants of various types of grassland, though some also make use of adjoining scrub and mixed habitat. **Prinias** are small to medium-sized warblers with short rounded wings and long thin graduated tails often held cocked and/ or rather loosely waved around. Rectrices show white tip, which may be lost by abrasion. Forage, often in loose parties. **Warblers** are medium to large warblers with fairly broad graduated tail; skulking except for striated grassbird.

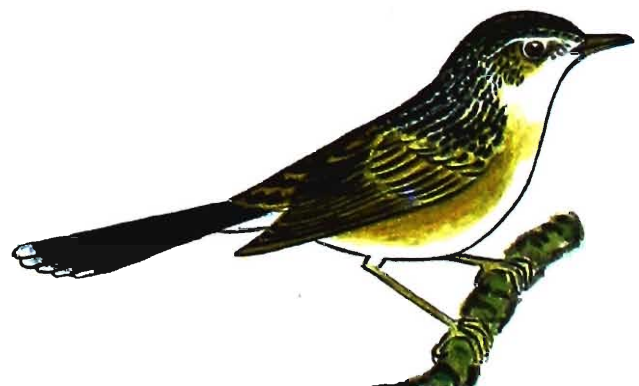
307(1531-32). Long-tailed Prinia. *Prinia burnesii* (Blyth, 1844); **Rufous-vented Prinia** (I), Sparrow -; 17 cm; **R/LCom E C** (Plate 43.307)



Diagnostics: Sexes alike. **Adult:** Has dark streaking on greyish upperparts, whitish throat and breast, conspicuous whitish lores and eye-ringing, rufous-chestnut undertail-coverts. **Juvenile:** Uniform sandy grey-brown upperparts and buff wash to underparts. **Voice:** Call-note a wheezy *feez*, song loud and pleasant. **Habitat:** Floodplains, tall riverine grassland, *sarkhan* grass. **Habits:** Usually solitary or in pairs, skulks in dense vegetation, forages by hopping, flies low over vegetation and soon drops into cover again. **Food:** Insects. **Status and Distribution:** Endemic to India and Pakistan, Resident, locally common in Punjab, Brahmaputra plains in Assam, Bihar in India; Pakistan; Bangladesh.



308(1534). Rufous-rumped Grass-Warbler. *Graminicola bengalensis* Jerdon, 1863; **Rufous-rumped Grassbird** (I); Sparrow; 18 cm; **R/LCom E C** (Plate 43.308)



Diagnostics: Sexes alike. It is separated from Bristled Grassbird by black crown, nape and mantle; black streaked rufous rump; blackish tail broadly tipped with white; and white underparts with rufous-buff breast sides and flanks. **Voice:** Mewing; harsh loud song.

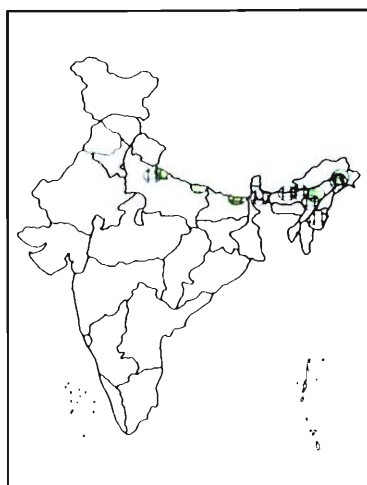
Habitat: Tall grass and reeds near water.

Habits: Skulks and creeps quietly in dense grassland, males very noisy during breeding season in monsoon. **Food:**

Insects. **Status and Distribution:**

Resident, locally

common in terai N Uttar Pradesh east through floodplains of Brahmaputra, Arunachal Pradesh, Assam, Manipur and west Bengal; Nepal; Bangladesh.



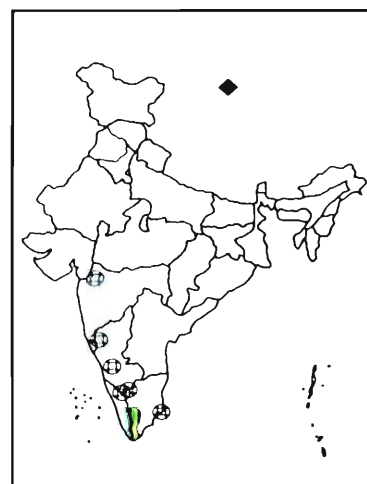
309(1546). Broad-tailed Grass-Warbler. *Schoenicola platyura* (Jerdon, 1844); **Broad-tailed Grassbird** (I); Sparrow; 18 cm; **GT/Vu E R/Ra C** (Plate 43.309)



Diagnostics: Sexes alike; identified by its stout bill; long and broad tail with diffused cross bars; uniform rufous-brown upperparts; buff supercilium; and whitish underparts with rufous-buff wash to breast and flanks. **Voice:** Nasal *tsee; tsit; chit; tilt*. **Habitat:** Dense and tall grasses on open hillsides, often near damp depressions. **Habits:** Skulking except breeding season, when males sing from the tops of bushes. **Food:** Insects. **Status and Distribution:**

Globally threatened/Vulnerable. A species endemic to the subcontinent, resident and rare to Western Ghats India; Sri Lanka. **Remarks:** The Broad-tailed Grassbird is restricted to grassy highlands, principally in the Western Ghats of southern India, at least in the breeding season. Outside this time there is some indication that altitudinal movement occurs, with some birds possibly dispersing as far as Sri Lanka. **Population:** At Belgaum in the nineteenth century the Broad-tailed Grassbird was “very rare”, with only one small breeding population of six or seven pairs discovered. However, at the outset of the twentieth century it was considered “evidently common in grasslands on the summits of the hills in south Travancore” (an old administrative unit covering southernmost Kerala and Tamil Nadu west of the Western Ghats). Small numbers have been recorded recently on the Grass hills, but again a population estimate is impossible.

Threats: The Broad-tailed Grassbird is one of (now) four threatened members of the suite of 16 bird species that are entirely restricted to the “Western Ghats Endemic Bird Area”. In the Western Ghats, upland grassland areas are heavily overgrazed which is of major concern to this species and



the near-threatened Nilgiri Pipit *Anthus nilghiriensis*. The Broad-tailed Grassbird in particular frequents rather tall grass and the distribution of this habitat type is becoming increasingly fragmented in southern India. **Measures taken:** The species is known from Periyar Sanctuary and Mudumalai Wildlife Sanctuary, with an important population thought to exist in the former. In the Ashambu hills, the Muthukuzhi and Kadayar areas fall

within the Kalakad-Mundanthurai Sanctuary. **Measures proposed:** A comprehensive survey and study of the species is required, looking in detail at its ecology and distribution, so as to determine optimal habitat and management regimes and to identify further key areas to conserve. This needs to be done in the breeding season, so as to assess optimal habitats (BirdLife Int., 2001).

Whistlers (Pachycephalinae)

Whistlers are reminiscent of chats and flycatchers but more strongly built with a thick rounded head, short thick neck and short heavy bill. They catch insects from branches and foliage but also catch while in flight.

310(1470). Mangrove Whistler. *Pachycephala grisola* (Blyth, 1843); Sparrow +; 17 cm; **R/ UnCom C** (Plate 43.310)

Photo: Suppalak Klabdee



Mangrove Whistler

Diagnostics: Sexes alike. A rather drab bird with thick black bill, uniform grey-brown crown and ear-coverts, olive-brown mantle, rump and tail, and greyish-white throat and breast merging into slivery-white of remaining underparts. **Voice:** Rapid ringing 'pwee' pwee' pwee pwit. **Habitat:** Mangroves. **Habits:** Solitary outside the breeding season, in pairs when breeding, forages inconspicuously in trees, from the roots up to the canopy, gleans insects from the branches, trunk and foliage. **Food:** Insects. **Status and Distribution:** Resident and uncommon in Sunderbans in West Bengal, Orissa and Andaman Islands in India; Bangladesh.

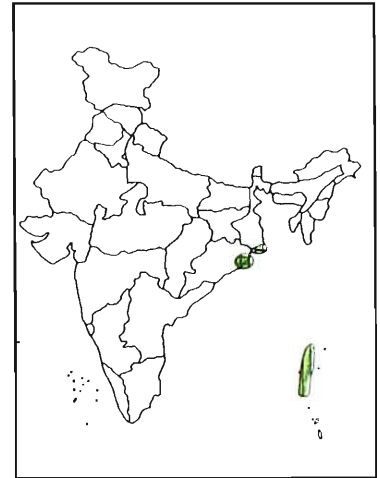


Photo: Gehan de Silva Wijeyeratne

Garganey and Wigeon (in flight)



Photo : Talat Khalid

Greylag Geese

Plate 42



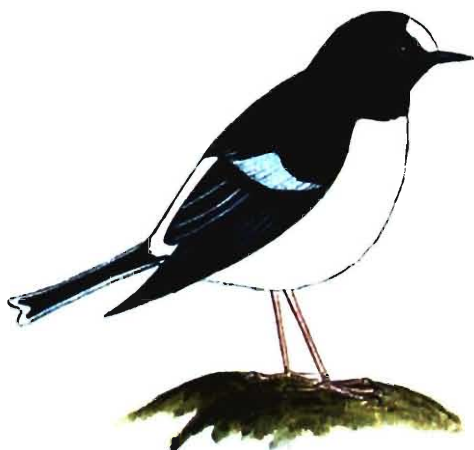
295. Guldenstadt's Redstart



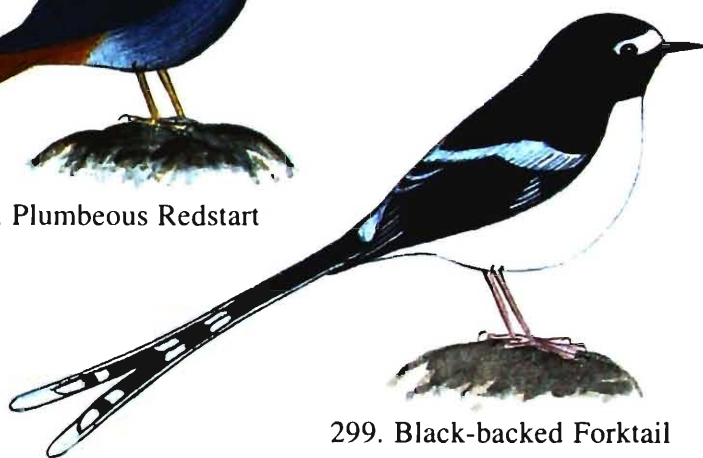
296. White-capped Redstart



297. Plumbeous Redstart



298. Little Forktail



299. Black-backed Forktail



300. Slaty-backed Forktail



302. Spotted Forktail



301. Leschenault's Forktail

Plate 43



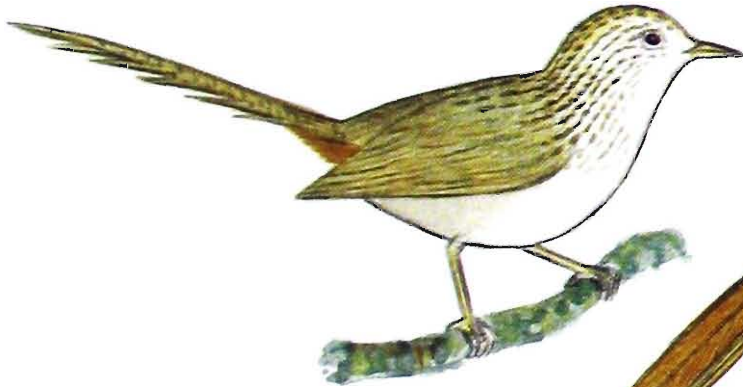
303. White-tailed Stonechat



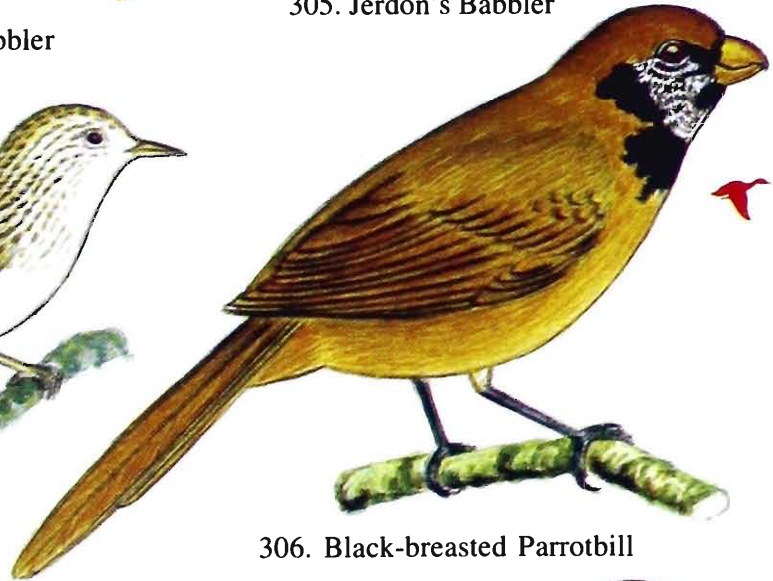
304. Marsh Babbler



305. Jerdon's Babbler



307. Long-tailed Prinia



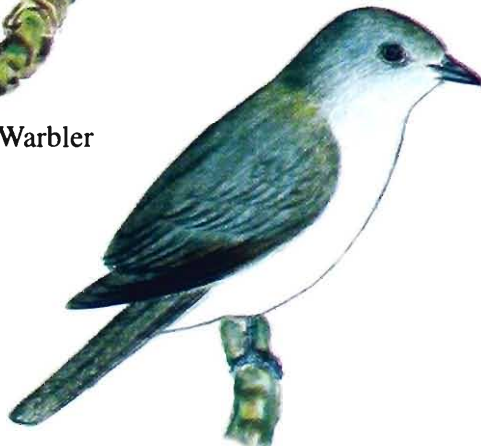
306. Black-breasted Parrotbill



308. Rufous-rumped Grass-Warbler



309. Broad-tailed Grass-Warbler



310. Mangrove Whistler



Photo: Gill Cardy

Goliath Heron

3. STATUS OF WETLAND BIRDS

3.1 Residential

The cyclical migration of waterbirds across the globe has been long recognized as a natural wonder. Annually waterbirds fly many thousands of kilometres across a vast range of climates and habitats in response to the urge to nest or to avoid adverse weather conditions. Out of 310 Indian wetland species 130 (c. 42%) are migrant, 173 resident, while the status is not known for 7 species.

Of the 130 migrants, 107 species are winter migrants (WM), 6 species with some passage population(s) (WM/PM), 13 species are summer migrant (SM), and the remaining 4 species are purely passage migrant (PM).

Of 173 resident species, 53 are completely

resident (R), 38 are part resident and part winter migrant (R/WM), 50 undertake local movements chiefly depending on water conditions (R/LM), 7 are part resident, part altitudinal and winter migrant (R/AM/WM), 10 undertake altitudinal movements (R/AM), 2 part resident, part winter and local migrant (R/WM/LM), 3 part resident, part winter and passage migrant (R/WM/PM), 4 are resident with summer movement/influx (R/SM), 2 are with local as well as summer movements (R/LM/SM), 2 with summer and winter movements (R/SM/WM), 1 with winter as well as altitudinal movements and the remaining 1 with altitudinal, winter and passage movements (R/AM/WM/PM) (Fig. 3.1).

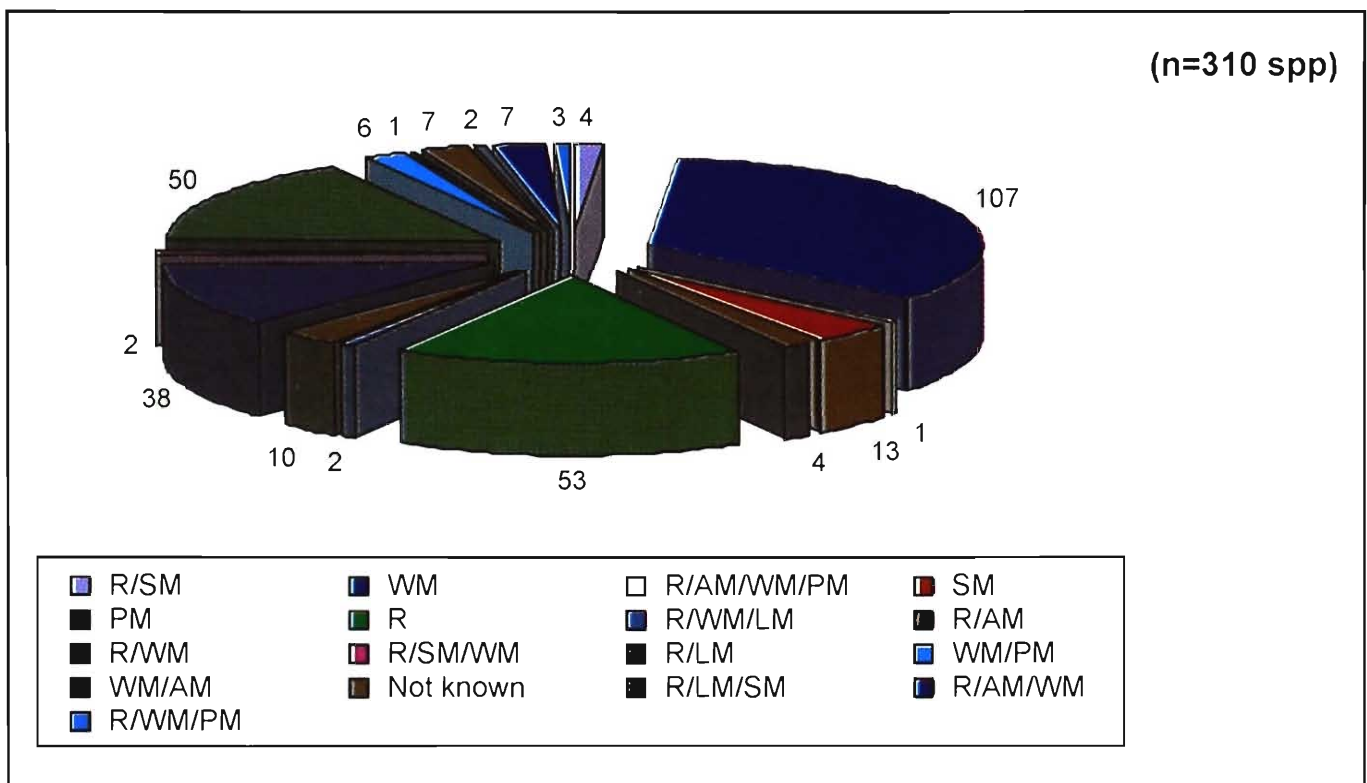


Fig. 3.1 Residential status of Indian wetland birds.

3.2 Abundance

In accordance with the recommendations of the Convention on Wetlands (Ramsar Convention), one of the criteria for identifying Important Bird Areas (IBAs) is the estimate of waterbird populations. Wetlands International regularly carries out population estimates of waterbird populations throughout the globe to determine population trends. The third edition of waterbird population estimates was published in 2002. It is vital that the population status of both resident and migratory waterbird species be regularly monitored at all levels. Indian wetland birds can generally be categorized as Very Common - VCom (4 species), Common - Com (26), Locally Common - LCom (115), Un Common - UnCom (45), Rare - Ra (67), Very Rare - VRa (05), Vagrant - Va (47) and Probably Extinct - PEx (1) (Fig.3.2).

Out of 46 vagrant wetland birds known from India, 35 species have been recorded only once or more in over 100 years (Table 3.3).

3.3 Conservation

A total of 1,186 bird species (12% of the world's avifauna) are currently threatened with

global extinction, 182 of which are considered Critically Endangered and are thus facing a very high risk of extinction in the immediate future. The countries with the largest number of threatened species include Indonesia, the Philippines and Brazil, followed by India. Forest is the most important habitat (used by 75% of threatened birds) and habitat destruction and degradation the most significant threats (affecting 85% of threatened birds).

All globally threatened species are, of course, conservation priorities, but there are many additional species which are threatened at the regional level, with declining populations or shrinking ranges, or otherwise vulnerable, and which therefore require flagging at the earliest opportunity.

Clearance, conversion and degradation of natural forests, grasslands and wetlands are the most far reaching causes of endangerment in Asia, affecting nearly all species classified as Critical, Endangered, and Vulnerable. Exploitation for human use is the second most common category of threat, affecting more than 50% of all threatened bird species; of these, c. 70% are hunted for food and sport and c. 30% are captured for the wild bird trade (BirdLife Int., 2003).

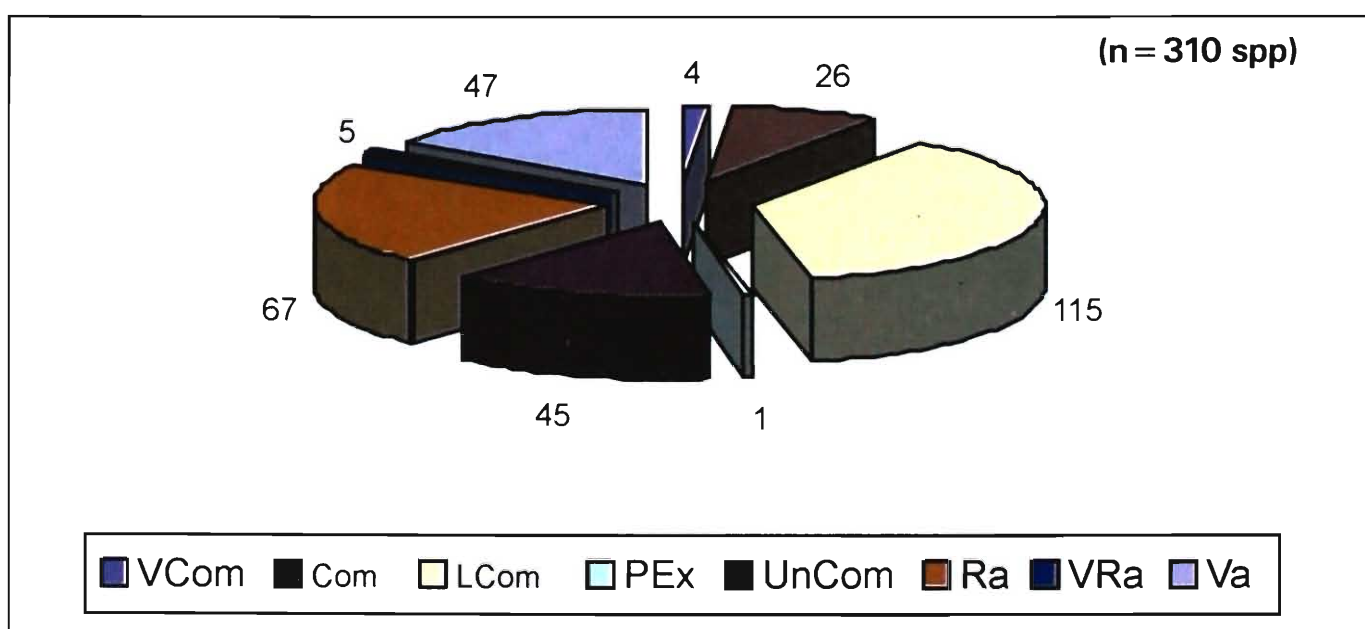


Fig. 3.2 Abundance status of Indian wetland birds.

The main pressure on Asian waterbirds is wetland drainage and conversion, including the infilling (or 'reclamation') of intertidal coastal wetlands, principally for agriculture and aquaculture. Dams and irrigation projects are also negatively affecting wetlands (BirdLife Int., *l.c.*).

Wetlands are crucial for biodiversity conservation in the Asian region, with at least 20% of threatened bird species found in these habitats. One in eight of all bird species in the Asian region is Globally Threatened (GT). Next to tropical forest, wetlands are the most severely affected habitats due to constant human pressure. Therefore, species like storks, herons, ibises, ducks, geese, cranes, gulls and waders all feature disproportionately highly as threatened species in the Asian region.

As the official Red Listing Authority for Birds for the IUCN Red List, BirdLife International monitors the state of the world's birds and identifies those species that are threatened with extinction, using standard numerical criteria based on measured or reasoned rates of decline, population levels, and range sizes. The BirdLife Partnership has been most active in formulating and implementing broad-based action plans for the recovery and restoration of particularly threatened species.

BirdLife International has been analysing and documenting the status of the world's threatened bird species since the 1970s. The results have been published in a series of global checklists and regional Red Data Books. The most recent Asian Checklist was the *Threatened Birds of Asia: the BirdLife International Red Data Book* (2001). This deals with the plight of bird species in the world's most heavily populated and fastest developing region. This is followed by BirdLife International's recent publication "*Saving Asia's Threatened Birds: A guide for government and civil society* (2003)" It aptly identifies the all-important action that must be

taken for conservation of threatened birds in Asia.

2001 IUCN Criteria for Red Listing of Threatened Species

Background

The IUCN Criteria for Red Listing of Threatened Species provide the globally acceptable standard for the identification of species at severe risk of global extinction. The criteria were adopted by the IUCN Council in 1994 following extensive international consultation. The IUCN updated the Red List Categories in 2001 (Table 3.1).

1. Roles of the different criteria

For listing as Critically Endangered, Endangered or Vulnerable there is a range of quantitative criteria; meeting any one of these criteria qualifies a taxon for listing at that level of threat. Each taxon should be evaluated against all the criteria. Even though some criteria will be inappropriate for certain taxa (some taxa will never qualify under these however close to extinction they may be), there should be criteria appropriate for assessing threat levels for any taxon. The relevant factor is whether any one criterion is met, not whether all are appropriate or all are met. Because it will never be clear in advance which criteria are appropriate for a particular taxon, each taxon should be evaluated against all the criteria, and all criteria met in the greatest threat category must be listed.

2. Derivation of quantitative criteria

The different criteria (A-E) are derived from a wide review aimed at detecting risk factors across the broad range of organisms and their diverse life histories. The quantitative values presented in the various criteria associated with threatened categories were developed through wide consultation, and they are set at generally judged appropriate levels, even if no formal justification for these values exists. The levels

for different criteria within categories were set independently but against a common standard. Broad consistency between them was sought. However, because the globally threatened bird species list had not been updated since the publication of the *Threatened Birds of Asia* (BirdLife International 2001), the IUCN (1994) categories are used in the AWC publication. Readers should refer to the IUCN website to review the updated criteria. Detailed information on the IUCN 2001 criteria is available on the IUCN webpage. http://www.iucnredlist.org/info/categories_criteria_2001.html. PDF version in English, French and Spanish can also be downloaded from http://www.iucn.org/themes/ssc/redlists/RLcats_2001booklet.html.

Both the Ramsar Convention on Wetlands and the Bonn Convention on Migratory Species depend heavily on objectively collected data on waterbird population round the globe. In this context, the Wetlands International has been chronicling the Global Waterbirds Estimates every two years. The third edition of the Global Waterbirds Population Estimates was brought out in 2002 (Wetland International, 2002). It provides a solid basis for the use of important criteria for protecting sites, such as the 1% criteria, threatened species and the management of populations within entire flyways.

Approximately 12% of Asian birds are globally threatened with extinction. Wetlands are particularly important since 20% of the threatened bird species in Asia inhabit wetlands. This is much more than the 10% of globally threatened waterbirds. Many species are edging very close to extinction through disturbance or conversion of their habitats, as well as through intensive hunting pressure. It is, therefore, of the utmost importance to understand the conservation, residential, distribution and abundance status of Indian waterbirds to evolve appropriate conservation strategies.

The Waterbird Population Estimates, third edition by Wetland International (2002), lists 2271 biogeographical populations of all 868 species recognized as waterbirds occurring throughout the world. The largest number of waterbird populations (697) is found in Asia, followed by Africa (611) and the Neotropics (540).

The analysis of the threatened waterbirds indicates that a total of 242 species so far occur around the globe (CR=23, EN=38, VU=75, NT=71, EX=35); 82 species in Asia (CR=11, EN=16, VU=29, NT=24, EX=2); and 39 in India (CR=4, EN=7, VU=16, NT=11, EX=0) (Figs.3.3 -3.5).

Out of the 310 wetland birds in India, 51 species (c. 16%) are Globally Threatened (GT), of which four are Critical (Cr), seven Endangered (En), 23 Vulnerable (Vu), 16 Near Threatened (NT) and Data Deficient (DD) (Fig. 3.6, Table 3.2). Of the 51 threatened Indian wetland species, 39 species are showing a declining population trend, while three are increasing, five are stable, and the population trend of another three species is indeterminate. The remaining one species, *i.e.*, Pink-headed Duck has probably disappeared from India (Fig. 3.7, Table 3.2).

Further, out of 310 Indian wetland birds, seven species are endemic, three fall into the Restricted Range Species (RRS) category, one comes under the data deficient (DD) category, and 11 are Biome-Restricted Species (BRS) (Fig.3.8). Of the 11 BRS species, five species are from Eurasian High Mountain (Biome 05), three from Sino-Himalayan Subtropical Forest (Biome 08), one from Indo-Chinese Tropical Moist Forest (Biome 09), and two from Indo-Malayan Tropical Dry Zone (Biome 11) (Jhunjhunwala, *et al.*, 2001; Islam & Rahmani, 2004).

Based on the analysis of the key habitats of threatened birds in Asia, the distribution and status of geographical populations of threatened Indian wetland birds indicates that 51 species occur in wetlands, six in forests,

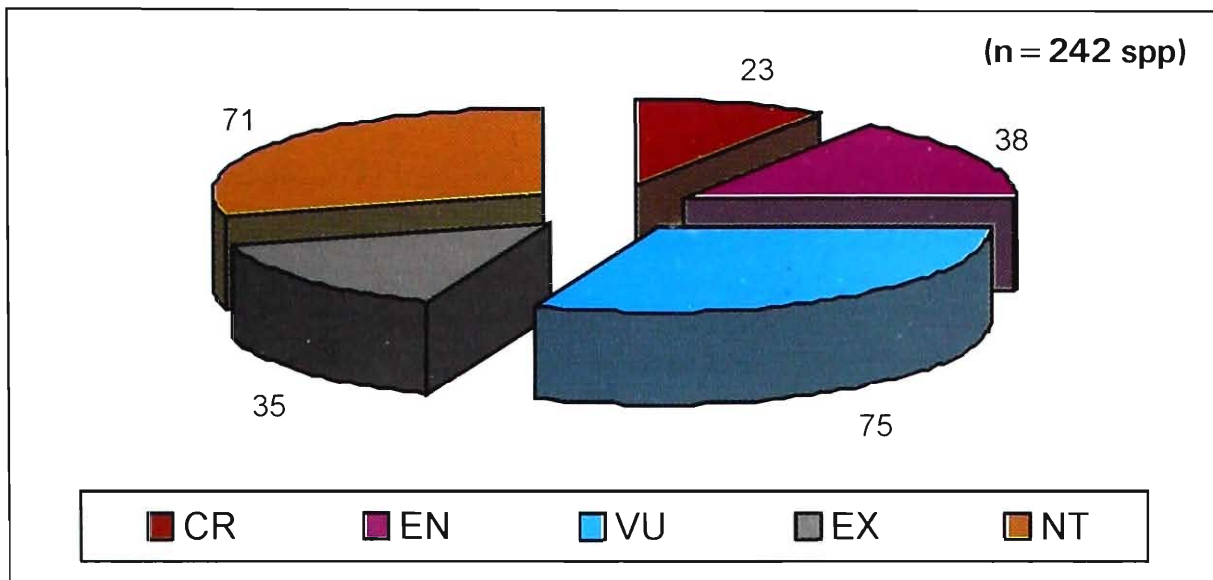


Fig. 3.3 Number of threatened waterbird species in the world by IUCN Red List category.

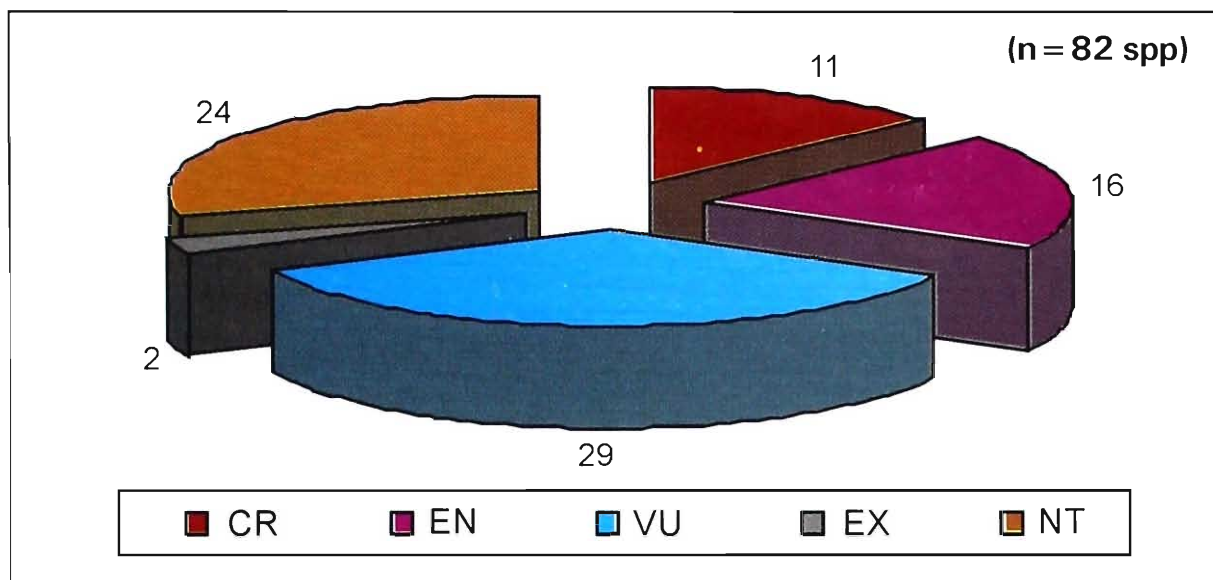


Fig. 3.4 Number of threatened waterbird species in Asia by IUCN Red List category.

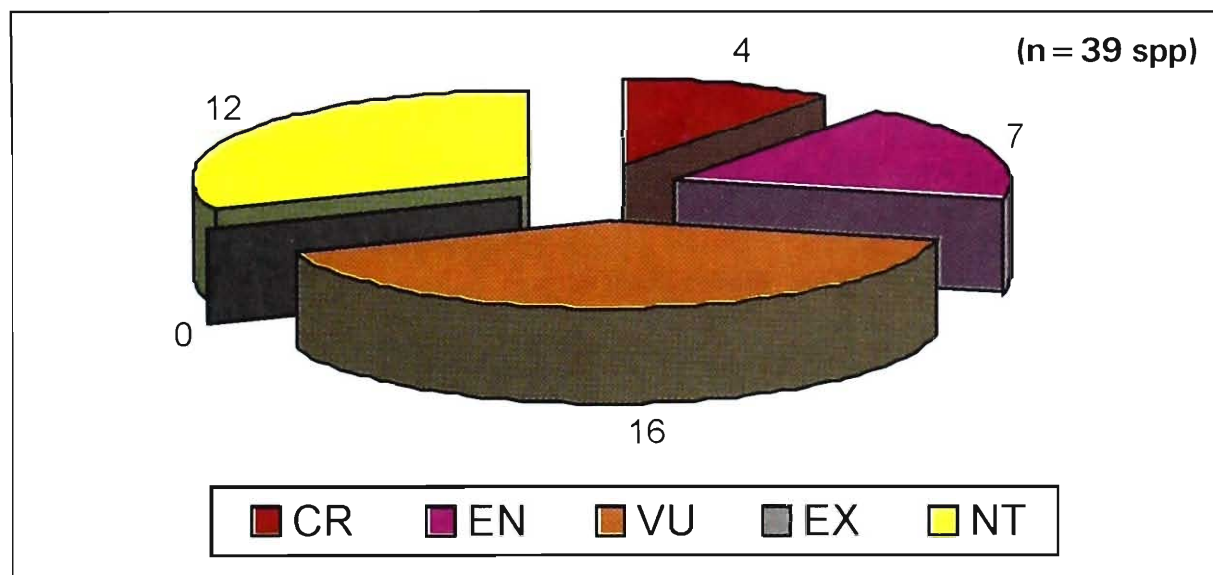


Fig. 3.5 Number of threatened waterbird species in India by IUCN Red List category

five in grasslands, and one is a Seabird. Of the 51 wetlands birds, five species are found in the wetlands of the Tibetan Plateau (W09), 15 in the North Indian Wetlands (W12), five in the South Indian and Sri Lankan Wetlands (W13), 16 in the Assam and Sylhet Plains (W14), and 10 in the Bay of Bengal Coast (W15). Of six forest dwelling species, one occurs in Sino-Himalayan Mountain Forests (F04), two in the Indian Peninsula and Sri Lankan Forests (F05), and three in Indo-Burmese Forests. Of the five grassland species, four are found on Indo-Gangetic Grassland (G02) and one in South Asian Arid Habitats (G03). Only one species is a seabird (S01) (Fig. 3.9; Table 3.2).

Altogether 23 species are listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 2002) (12 under Appendix-I and 11 under Appendix-II). A total of 51 species comes under the Convention on Migratory Species (CMS) (20 under Appendix-I and 31 under Appendix-II) (Fig. 3.10). Of the 310 species, 21 are listed in Schedule-I and 231 in Schedule-IV of the Wildlife (Protection) Act, 1972 while 58 species are not listed under the Act. (Fig. 3.11). A further, nine GT species are listed under Schedule-I and 22 under Schedule-IV of the Wildlife (Protection) Act, 1972, while three threatened species are not listed in the above Act at all. Altogether ten GT species are listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 2002) (Appendix-I: nine and Appendix-II: one) (cf. sub-chapter 2.1).

Analysis of the conservation status of Indian waterbirds indicates that further efforts are needed to enhance their protection level, as out of 34 GT species only 11 are listed under CITES, while the remaining species like *Spot-billed Pelican*, *White-bellied Heron*, both the *Adjutants* (*Greater* and *Lesser*), *Sarus Crane*, *Indian Skimmer*, *Andaman Crake*, *Pallas's Fish-Eagle* and *Greater Spotted Eagle*, though Globally Threatened,

do not find any place in either Appendices of CITES, thus imposing no restriction on their clandestine trade and game.

Of the 34 GT species only nine are listed under Schedule-I of the WL (P) Act, while 22 are relegated to Schedule-IV, and two species: *Masked Finfoot* and *Indian Skimmer* (with a total population for the South Asian region estimated to be 5,000 birds of each) are not included under the WL (P) Act, 1972 at all. Similarly, two of the most highly threatened Indian Waterbirds, namely *Sarus Crane* and *Black-necked Stork*, are again listed under Schedule-IV with threshold populations of 90 and 4 respectively. It is felt that such lacunae must be rectified for the sake of the conservation of Indian waterbirds (cf. sub-chapter 2.1).

In a recent study Subramanian, *et al.* (2004) hypothesized that threatened birds of India are characterized by large size, flesh-fish-carrion eaters, with narrow geographical ranges and habitat preferences. Freshwater bodies and evergreen forests harbour a significantly large number of threatened bird species and are vital to their conservation, since these habitats are much more susceptible to fragmentation. Compared to migrant species, a larger proportion of breeding residents are threatened. A very high proportion of birds that have been traditionally considered as game birds are threatened, and it is likely that most of these species continue to be hunted to this day. There is no evident relation between species that figure in the list of traded birds and those listed as threatened (Table 3.4).

A broad range of national policies, particularly on forestry, agriculture, wetlands and fisheries, can have significant impacts on biodiversity conservation. By ensuring that policies and laws (at local, provincial and national levels) take into account the principle of conservation, threats to species can be minimized.

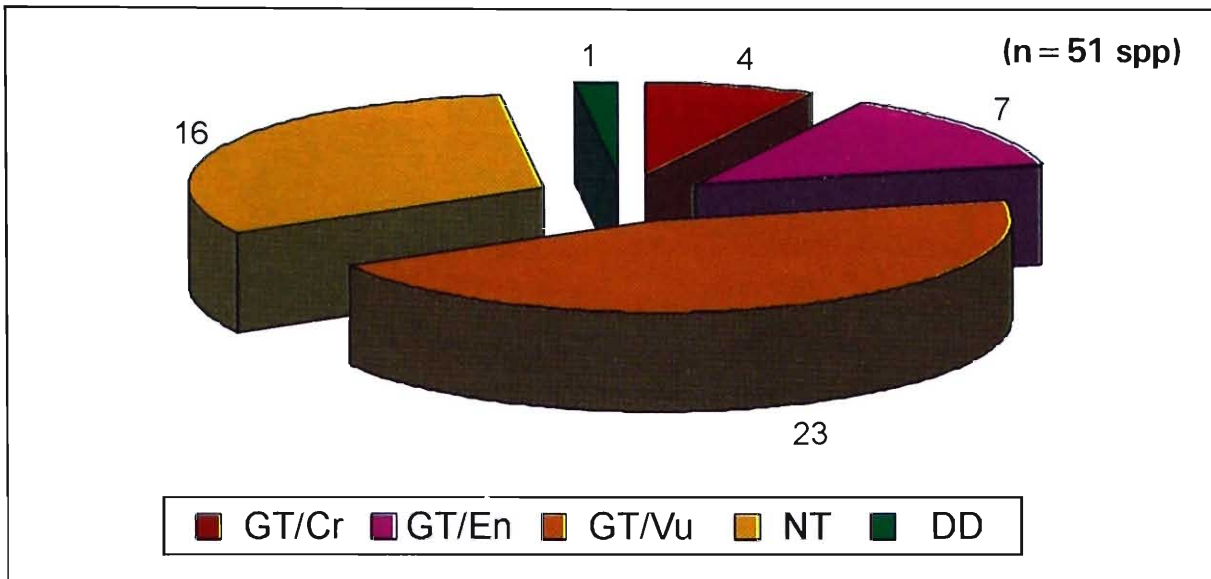


Fig. 3.6 Conservation status of Globally threatened wetlands birds of India.

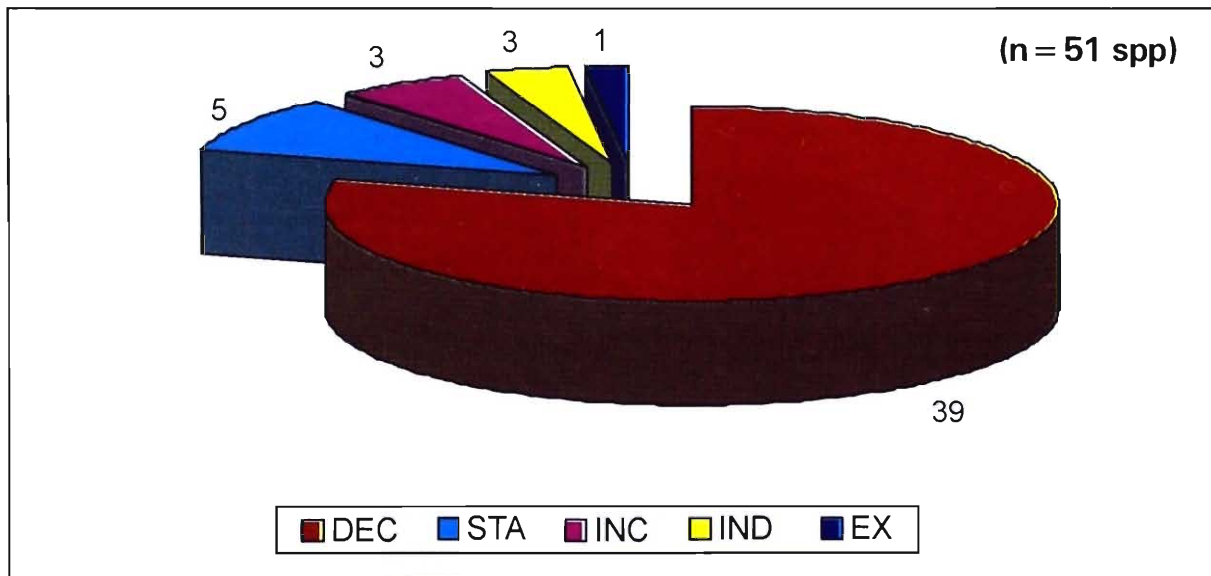


Fig. 3.7 Population trends of Globally threatened wetland birds of India

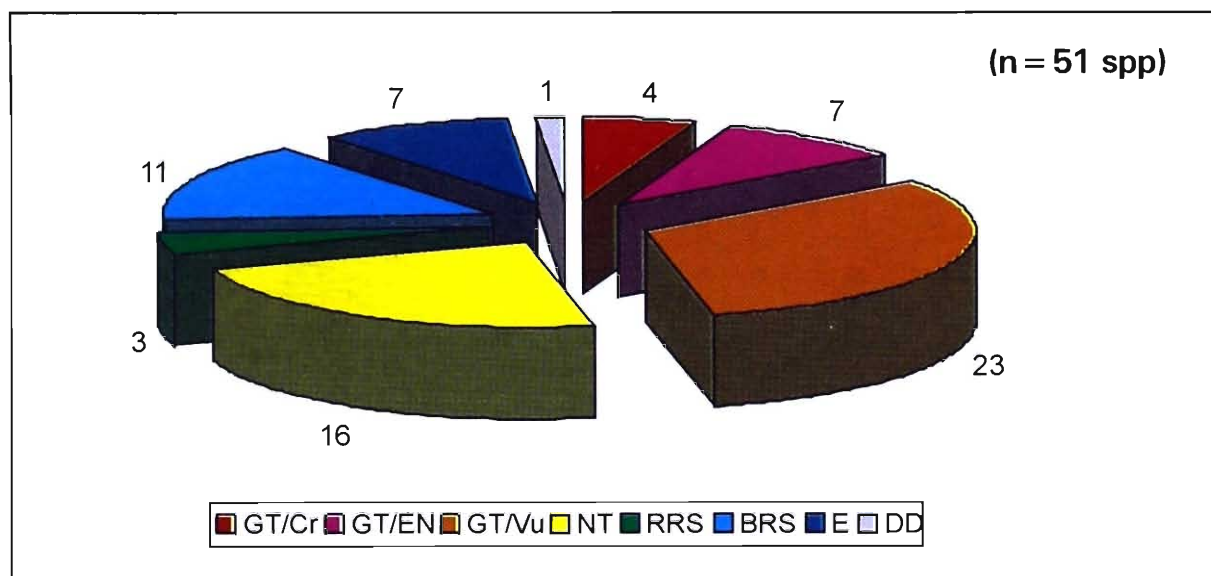


Fig. 3.8 Conservation categories of wetland birds of India.

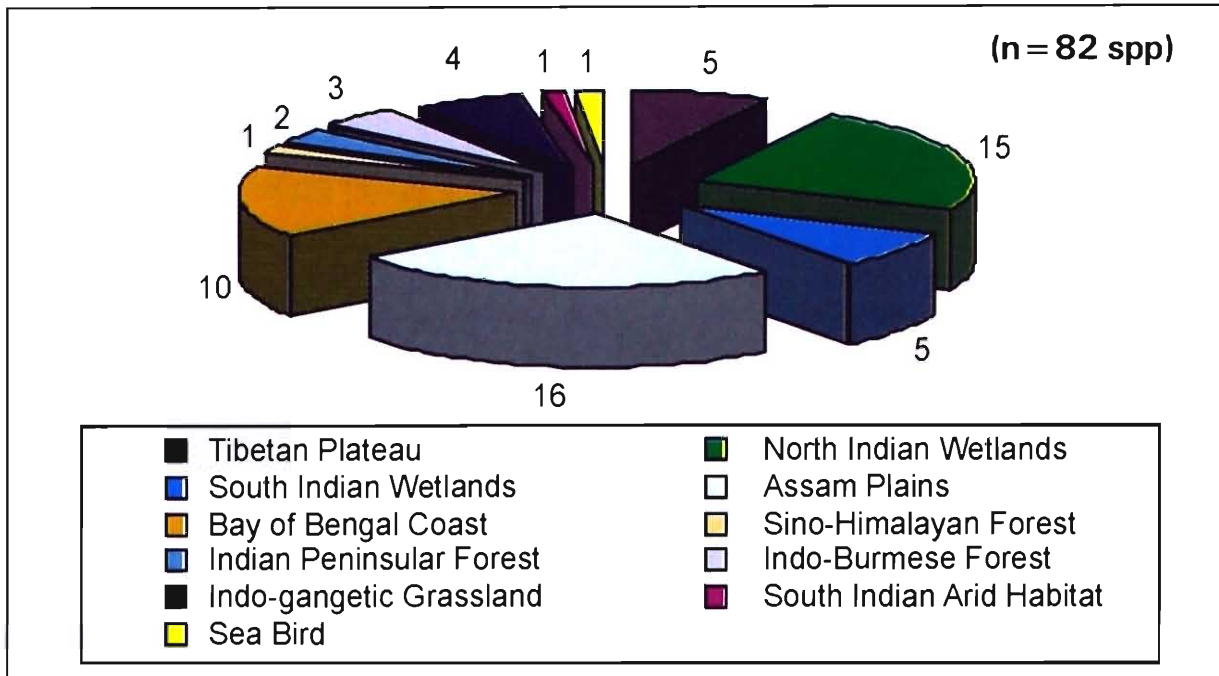


Fig. 3.9 Key habitats for Globally threatened wetland birds of India.

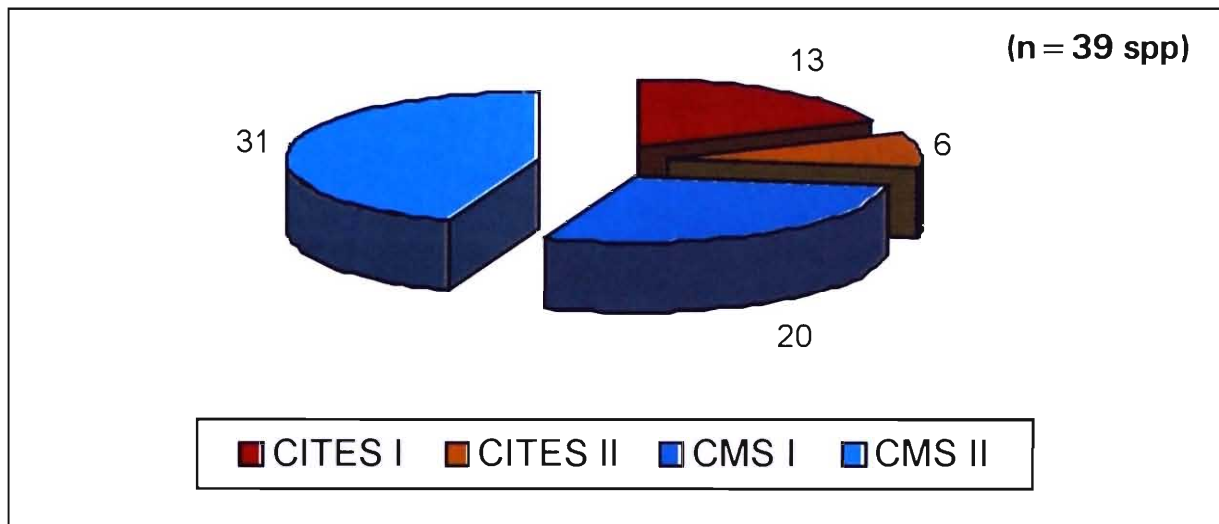


Fig. 3.10 Wetland birds of India under CITES and CMS.

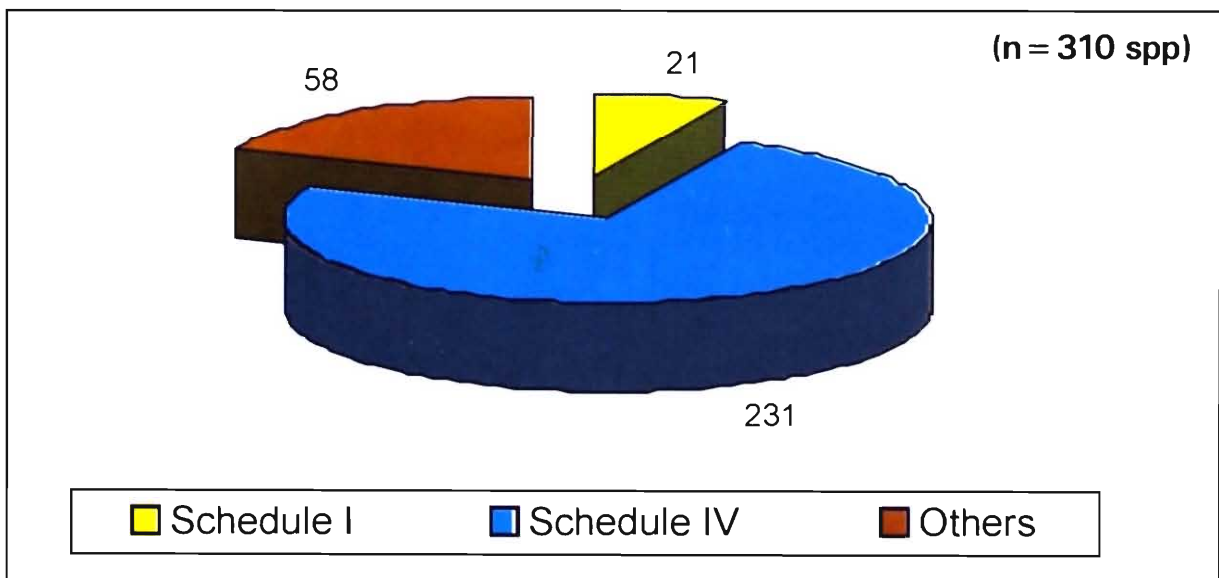


Fig. 3.11 Wetland birds of India listed in Wildlife (P) Act 1972.

Table 3.1 Summary of the IUCN Red List Categories (2001) (Table A2a.1) and Criteria (Table A2a.2).

Category	Abbreviation	Definition
Extinct	Ex	Species for which extensive surveys show there is no reasonable doubt that the last individual has died.
Extinct in the Wild	EW	Species that survive only in cultivation, captivity or as a naturalized population (or populations) well outside the past range.
Critically endangered	CR	Species that are facing an extremely high risk of extinction in the wild (i.e., when the best available evidence indicated that they meet any of the criteria A to E for Critically Endangered in Table A2a2)
Endangered	EN	Species that are facing a very high risk of extinction in the wild (.e. when the best available evidence indicates that they meet any of the criteria A to E for Endangered in Table A2a2)
Vulnerable	VU	Species that are facing a high risk of extinction in the wild (i.e. when the best available indicates that they meet any of the criteria A to E for Vulnerable in Table A2a2)
Near Threatened	NT	Species that do not qualify for Critically Endangered, Endangered or Vulnerable now, but are close to qualifying for, or are likely to qualify for, a threatened category in the near future.
Least Concern	LC	Species that do not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant species are included in this category.
Data Deficient	DD	Species for which there is inadequate information to make a direct, or indirect, assessment of extinction risk based on distribution and/or population status. A species in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is, therefore, not a category of threat.
Not Evaluated	NE	A species is Not Evaluated when it has not yet been evaluated against the criteria (see Table A2a2). NE species are not shown on the <i>IUCN Red List</i> .
The 1994 version included an additional category which is used for some species, but once they are all reassessed it will no longer be used (IUCN 1994a):		
Lower Risk/ conservation	LR/cd	Species that are the focus of a continuing species-specific or
dependent		habitat-specific conservation programme targeted towards the species in question, the cessation of which would result in the species qualifying for one of the threatened categories within five years.

Table 3.2 Conservation status of wetland bird species in India

Sl. No.	Common name	Scientific name	Status						Remarks
			Category	Trend	Res.	Abun.	1%	Region	
Globally Threatened									
Critical species									
1	1 Christmas Island Frigatebird	<i>Fregata andrewsi</i>	GT/Cr	DEC		Va	-	S01	non-breeding visitor from another region
2	2 Pink-headed Duck	<i>Rhodonessa caryophyllacea</i>	GT/Cr	EXT	R	Extinct	1	W12, 14, 16	probably extinct
3	3 Siberian Crane	<i>Grus leucogeranus</i>	GT/Cr	DEC	WM	VRa	1	W12	region estimated to support <10% of global non-breeding population
4	4 Sociable Lapwing	<i>Vanellus gregarius</i>	GT/Cr	DEC	WM	Ra	8	G03	non-breeding visitor from another region
Endangered species									
5	1 White-bellied Heron	<i>Ardea insignis</i>	GT/En	DEC	R	VRa	6	F06	confined to the Asian region
6	2 Oriental White Stork	<i>Ciconia boyciana</i>	GT/En	DEC	WM	Ra	30	W14	vagrant
7	3 Greater Adjutant-Stork	<i>Leptoptilos dubius</i>	GT/En	DEC	R/LM	Ra	7	W12 W14 W15	region estimated to support <10% of global non-breeding population region estimated to support 50-90% of global breeding population vagrant
8	4 White-headed Duck	<i>Oxyura leucocephala</i>	GT/En	DEC	WM	Ra	3	W12	vagrant
9	5 White-winged Duck	<i>Cairina scutulata</i>	GT/En	DEC	R	Ra	5	F06	also breeds in other region (s)
10	6 Spotted Greenshank	<i>Tringa guttifer</i>	GT/En	DEC	WM	Va	6	W14 W15	vagrant region estimated to support 50-90% of global non-breeding population
11	7 Spoonbill Sandpiper	<i>Calidris pygmeus</i>	GT/En	DEC	WM	Ra	30	W13 W14 W15	region estimated to support <10% of global non-breeding population vagrant region estimated to support 50-90% of global non-breeding population

Sl. No.	Common name	Scientific name	Status						Remarks
			Category	Trend	Res.	Abun.	1%	Region	
Vulnerable species									
12	1 Spot-billed Pelican	<i>Pelecanus philippensis</i>	GT/Vu	DEC	R/LM	LCom	40	W12 W13 W14 W15	region estimated to support <10% of global non-breeding population region estimated to support 50-90% of global breeding population region estimated to support 10-50% of global breeding population vagrant
13	2 Lesser Adjutant-Stork	<i>Leptoptilos javanicus</i>	GT/Vu	DEC	R/LM	Ra	50	W12 W13 W14 W15	region estimated to support <10% of global non-breeding population region estimated to support <10% of global breeding population region estimated to support 10-50% of global breeding population region estimated to support <10% of global breeding population
14	3 Lesser White-fronted Goose	<i>Anser erythropus</i>	GT/Vu	DEC	WM	Ra	110	W12 W14	vagrant vagrant
15	4 Red-breasted Goose	<i>Branta ruficollis</i>	GT/Vu	INC	WM	Va	880	-	-
16	5 Baikal Teal	<i>Anas formosa</i>	GT/Vu	INC	WM	Ra	3000	W12 W14	vagrant vagrant
17	6 Marbled Teal	<i>Marmaronetta angustirostris</i>	GT/Vu	DEC	WM	Ra	50	W12 W14	vagrant region estimated to support <10% of global non-breeding population
18	7 Baer's Pochard	<i>Aythya baeri</i>	GT/Vu	DEC	WM	Ra	150	W09 W12 W14	region estimated to support <10% of global non-breeding population region estimated to support <10% of global non-breeding population region estimated to support 10-50% of global non-breeding population

Sl. No.	Common name	Scientific name	Status						Remarks
			Category	Trend	Res.	Abun.	1%	Region	
19	8 Sarus Crane	<i>Grus antigone</i>	GT/Vu	DEC	R/LM	LCom	90	W12 W14 W15	region estimated to support 50-90% of global breeding population region estimated to support <10% of global breeding population vagrant
20	9 Hooded Crane	<i>Grus monacha</i>	GT/Vu	DEC	WM	Va	10	W14	vagrant
21	10 Black-necked Crane	<i>Grus nigricollis</i>	GT/Vu	STA	R/WM	VRa	60	W09	region estimated to support >90% of global breeding population
22	11 Corn Crake	<i>Crex crex</i>	GT/Vu	DEC	WM	Va	-	-	-
23	12 Masked Finfoot	<i>Heliopais personata</i>	GT/Vu	DEC	R	VRa	60	F06	also breeds in other region (s)
24	13 Wood Snipe	<i>Gallinago nemoricola</i>	GT/Vu	DEC	R/AM/ WM	Ra	60	F04 F05	also breeds in other region (s) non-breeding visitor from another region
25	14 Indian Skimmer	<i>Rynchops albicollis</i>	GT/Vu	DEC	R/LM	UnCom	50	W12 W14 W15	region estimated to support >90% of global breeding population region estimated to support <10% of global non-breeding population region estimated to support 10-50% of global non-breeding population
26	15 Pallas's Fish-Eagle	<i>Haliaeetus leucoryphus</i>	GT/Vu	DEC	R/WM	Ra	-	W09 W12 W14 W15	region estimated to support <10% of global breeding population region estimated to support 10-50% of global breeding population region estimated to support 10-50% of global breeding population region estimated to support <10% of global breeding population
27	16 Greater Spotted Eagle	<i>Aquila clanga</i>	GT/Vu	DEC	WM/R	Ra	-	W09 W12-15	vagrant region estimated to support unknown percentage of global non-breeding population

Sl. No.	Common name	Scientific name	Status						Remarks
			Category	Trend	Res.	Abun.	1%	Region	
28	17 Eastern Imperial Eagle	<i>Aquila heliaca</i>	GT/Vu	DEC	WM	Ra	-	W09 W12 W13 W14 W15	vagrant region estimated to support unknown percentage of global non-breeding population vagrant region estimated to support unknown percentage of global non-breeding population vagrant
29	18 Swamp Francolin	<i>Francolinus gularis</i>	GT/Vu	DEC	R	LCom	-	G02	confined to the Asian region
30	19 Marsh Babbler	<i>Pellorneum palustre</i>	GT/Vu	DEC	R	Ra	-	G02	confined to the Asian region
31	20 Jerdon's Babbler	<i>Chrysomma altirostre</i>	GT/Vu	DEC	R	Ra	-	G02	also breeds in other region (s)
32	21 Black-breasted Parrotbill	<i>Paradoxornis flavirostris</i>	GT/Vu	DEC	R	VRa	-	G02	confined to the Asian region
33	22 Broad-tailed Grass-Warbler	<i>Schoenicola platyura</i>	GT/Vu	IND	R	Ra	-	F05	confined to the Asian region
34	23 Dalmatian Pelican	<i>Pelecanus crispus</i>	GT/Vu	STA	WM	Ra	110		
Near Threatened									
35	1 Darter	<i>Anhinga melanogaster</i>	NT	DEC	R/LM	LCom	40		
36	2 Painted Stork	<i>Mycteria leucocephala</i>	NT	DEC	R/LM	LCom	150		
37	3 Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	NT	DEC	R	Ra	10		
38	4 Oriental White Ibis	<i>Threskiornis melanocephalus</i>	NT	STA	R/LM	LCom	100		
39	5 Lesser Flamingo	<i>Phoenicopterus minor</i>	NT	INC	R/LM	LCom	1500		
40	6 Ferruginous Pochard	<i>Aythya nyroca</i>	NT	DEC	R/WM	LCom			
41	7 Great Snipe	<i>Gallinago media</i>	NT	STA	WM	Va	350		
42	8 Asian Dowitcher	<i>Limnodromus semipalmatus</i>	NT	DEC	WM	Ra	230		
43	9 Buff-breasted Sandpiper	<i>Tryngites subruficollis</i>	NT	DEC	WM	Va	150		
44	10 *Beach Stone-Plover	<i>Esacus magnirostris</i>	NT	DEC	R	LCom	250		
45	11 Black-bellied Tern	<i>Sterna acuticauda</i>	NT	DEC	R	LCom	250		

Sl. No.	Common name	Scientific name	Status						Remarks
			Category	Trend	Res.	Abun.	1%	Region	
46	12 White-tailed Sea-Eagle	<i>Haliaeetus albicilla</i>	NT	DEC	WM	Ra	-		
47	13 Lesser Grey-headed Fish-Eagle	<i>Ichthyophaga humilis</i>	NT	DEC	R/AM	Ra	-		
48	14 Greater Grey-headed Fish-Eagle	<i>Ichthyophaga ichthyaetus</i>	NT	IND	R	UnCom	-		
49	15 Blyth's Kingfisher	<i>Alcedo hercules</i>	NT	STA	R	Ra	-		
50	16 Brown-winged Kingfisher	<i>Halcyon amauroptera</i>	NT	DEC	R	LCom	-		
Data Deficient									
51	1 Andaman Crake	<i>Rallina canningi</i>	DD	IND	R	Ra	250		

Key :

GT = Globally Threatened

Cr = Critical

En = Endangered

Vu = Vulnerable

CD = Conservation Dependent

NT = Near Threatened

DD = Data Deficient

DEC = Declining

EXT = Extinct

INC = Increasing

IND = Indeterminate

STA = Stable

1% = 1% of a Biogeographic Population of a congregatory waterbird species in South Asia

F04 = Sino-Himalayan Mountain Forests

F05 = Indian Peninsula and Sri Lankan Forests

F06 = Indo-Burmese Forests

G02 = Indo-Gangetic Grasslands

G03 = South Asian Arid Habitats

W09 = Tibetan Plateau

W12 = North Indian Wetlands

W13 = South Indian and Sri Lankan Wetlands

W14 = Assam and Sylhet Plains

W15 = Bay of Bengal Coast

S01 = Seabirds

GT species categories and criteria= BirdLife International, 2001

Source:

The BirdLife International (2001, 2003, 2004)

Buceros, 6 (1): i-ix+1-37; 6 (2): 1-49; 7 (1&2): i-x+1-102; 7(3): 1-5 (2002); 8(1): 1-30 (2003);

Wetlands International (2002).

Table 3.3 List of wetland bird species recorded only once or twice from India.

Sl.No.	H.B. No.	Common Name	Remarks
1	1	Black-throated Diver	Single record, one specimen, flooded land, W. Yamuna Canal, Jagadhri, Haryana (Ali & Ripley 1978)
2	(N)	Horned Grebe	Single record from north India (Grimett <i>et al.</i> , 1998)
3	6	Cape Petrel	Sole record from Gulf of Mannar (Ali & Ripley, 1978)
4	12	* Persian Shearwater	Two specimens collected on Bombay coast and one in Kerala (Ali & Ripley, 1978)
5	15	Black-bellied Storm-Petrel	Single specimen collected in Bay of Bengal in 1895 (Ali & Ripley, 1978), vagrant in SW coastal waters and in Lakshadweep (Grimett <i>et al.</i> , 1998)
6	31	Great Frigatebird	Vagrant, only Indian specimen is a storm blown example from near Quilon, Kerala (Ali & Ripley, 1978)
7	32	Lesser Frigatebird	Only two records from India: west coasts near Trivendrum (1904) and one near Mumbai in 1960 (Ali & Ripley, 1978); and east coasts (Grimett <i>et al.</i> , 1998)
8	87	Mute Swan	Only single record from near Pune in 1922 (Ali & Ripley, 1978)
9	86	Whooper Swan	In last century one record each from Kashmir, Punjab and Rajasthan (Ali & Ripley, 1978)
10	(84-85)	* Tundra Swan	Only two records from India in last century from Delhi and Bhuj, Rann of Kutch (Ali & Ripley, 1978)
11	(76-77)	Bean Goose	Only three records from Assam in last century (Ali & Ripley, 1978)
12	83	Snow Goose	Recorded only once from Gujarat in 1989 (Mundkur <i>et al.</i> , 1991)
13	75	Red-breasted Goose	Recorded once from Madhya Pradesh (1836) and twice from Assam 1907 (Ali & Ripley, 1978)
14	113	Mandarin Duck	In last century one record each from Lakhimpur, Assam and Mayangthang Valley, Manipur in 1934 (Ali & Ripley, 1978)
15	117	Long-tailed Duck	In last century recorded once each from Kashmir (Hokarsar, 1939), Assam (1934) (Ali & Ripley, 1978), Dehra Dun (from Asan by Singh, 1991)
16	122	Red-breasted Merganser	Only two records from India from W Bengal 1889 & 1961 (Ali & Ripley, 1978)
17	322	Hooded Crane	Only one definite record from North Cachar, Assam in 1899, also two sightings by Baker in N Lakhimpur district (Ali & Ripley, 1978)

Sl.No.	H.B. No.	Common Name	Remarks
18	334	Corn Crake	Only one record (1870s) within our limits from J&K (Ali & Ripley, 1978)
19	372	European Golden Plover	Odd record from Lucknow (U.P.), Dibrugarh (Assam) and Punjab (Ali & Ripley, 1978)
20	376	*Caspian Plover	Single bird shot near Ratanagiri in 1880 (Ali & Ripley, 1978)
21	377	*Oriental Plover	Single example in winter plumage from Andamans in 1872 (Ali & Ripley, 1978)
22	375	Black-fronted Dotterel	Single example collected from Pulicat Lake in June, 1839/40 (Ali & Ripley, 1978)
23	408	Great Snipe	Recorded twice from Chennai, once each from Mysore and Andamans (Ali & Ripley, 1978); Kerala/Karnataka (Grimett <i>et al.</i> , 1998)
24	399	Spotted Greenshank	Recorded once on passage near Kaziranga NP (1994), Brahmaputra river and Surma valley in early Nineteenth century (BirdLife Intl., 2001)
25	(N)	Long-billed Dowitcher	Recorded once from Rajasthan (Grimett <i>et al.</i> , 1998)
26	412	Red Knot	Vagrant to SE coast and W Bengal (Grimett <i>et al.</i> , 1998)
27	(425a)	Buff-breasted Sandpiper	Single record from Punjab (Grimett <i>et al.</i> , 1998)
28	427	Red Phalarope	One record in 1846 from Calcutta market (Ali & Ripley, 1978)
29	(445-446)	* Brown Skua	One specimen from Kerala (1933), another along west coast in Ratanagiri district in 1957 (Ali & Ripley, 1978)
30	(446a)	* South Polar Skua	One specimen collected along west coast at Udipi, Mysore, in 1964 (Ali, S. & Ripley, S.D. 1978), vagrant also to Lakshadweep (Grimett <i>et al.</i> , 1998)
31	448	Parasitic Jaeger	Vagrant along west coast and Lakshadweep (Grimett <i>et al.</i> , 1998)
32	449	Sooty Gull	Single bird recorded off Mumbai in 1875 (Ali & Ripley, 1978)
33	457	Little Gull	Single specimen collected from Ladakh, sight record from Mumbai harbour 1910 (Ali, S. & Ripley, S.D. 1978), sporadic records from Gujarat coast; Delhi, Punjab (Grimett <i>et al.</i> , 1998)
34	(466a)	Arctic Tern	Single record from Suru Valley, Kashmir in 1936 (Ali & Ripley, 1978)
35	482	* Black Noddy	One specimen from Kolkata, another specimen from Port Blair in Andamans, one more from Minicoy Island (Ali & Ripley, 1978)

Table 3.4 Attributes of 29 threatened wetland bird species assigned to one of the threatened categories (modified from Subramanian *et al.*, 2004).

Sl. No.	Family	Common Name	Scientific Name	Body Length (cm)	Feeding	Resident Status	No. of Habitats	No. of Regions	Traded	Games	Threat Status
1.	Acciptridae	Eastern Imperial Eagle	<i>Aquila heliaca</i>	86	NV	RM	2	6	-	-	VU
2.	Acciptridae	Greater Spotted Eagle	<i>Aquila clanga</i>	68	NV	RM	3	6	-	-	VU
3.	Acciptridae	White-tailed Eagle	<i>Haliaeetus albicilla</i>	78	NV	M	3	1	-	-	NT
4.	Acciptridae	Pallas's Fishing Eagle	<i>Haliaeetus leucoryphus</i>	80	NV	RM	1	2	-	-	VU
5.	Acciptridae	Greater Grey-headed Fishing Eagle	<i>Ichthyophaga ichthyaetus</i>	74	NV	R	1	9	-	-	NT
6.	Acciptridae	Lesser Grey-headed Fishing Eagle	<i>Ichthyophaga humilis</i>	64	NV	R	2	4	-	-	NT
7.	Alcedinidae	Blyth's Kingfisher	<i>Alcedo hercules</i>	20	NV	R	1	2	-	-	NT
8.	Alcedinidae	Brown-winged Kingfisher	<i>Pelargopsis amauroptera</i>	36	NV	R	1	2	-	-	NT
9.	Anatidae	Lesser White-fronted Goose	<i>Anser erythropus</i>	60	V	M	1	1	-	-	VU
10.	Anatidae	Marbled Teal	<i>Marmaronetta angustirostris</i>	48	V	RM	2	7	-	-	VU
11.	Anatidae	Baikal Teal	<i>Anas formosa</i>	40	O	V	1	6	-	+	VU
12.	Anatidae	Pink-headed Duck	<i>Rhodonessa caryophyllacea</i>	60	O	R	1	1	-	+	CR
13.	Anatidae	Ferruginous Duck	<i>Aythya nyroca</i>	41	O	RM	2	9	-	+	NT
14.	Anatidae	Baer's Pochard	<i>Aythya baeri</i>	46	O	M	1	2	-	+	VU
15.	Anatidae	White-winged Duck	<i>Carina scutulenta</i>	81	O	R	1	2	-	+	EN
16.	Anatidae	White-headed Duck	<i>Oxyura leucocephala</i>	46	V	M	1	5	-	+	EN
17.	Ardeidae	White-bellied Heron	<i>Ardea insignis</i>	127	NV	R	1	3	-	-	EN
18.	Burhinidae	Beach-stone Plover	<i>Esacus magnirostris</i>	51	I	R	3	10	-	-	NT
19.	Charadriidae	Sociable Lapwing	<i>Vanellus gregarious</i>	33	O	M	2	4	-	-	VU
20.	Charadriidae	Spotted Greenshank	<i>Tringa guttifer</i>	33	O	M	1	1	-	-	EN
21.	Charadriidae	Asian Dowitcher	<i>Limnodromus semipalmatus</i>	34	I	M	1	4	-	-	NT
22.	Charadriidae	Wood Snipe	<i>Gallinago nemoricola</i>	31	NV	RM	1	6	-	-	VU
23.	Charadriidae	Great Snipe	<i>Gallinago media</i>	27	I	V	2	3	-	-	NT
24.	Charadriidae	Spoon-billed Sandpiper	<i>Eurynorhynchus pygmaeus</i>	17	NV	M	1	5	-	-	VU
25.	Ciconiidae	Painted Stork	<i>Mycteria leucocephala</i>	93	NV	RM	1	9	+	-	NT
26.	Ciconiidae	Oriental Stork	<i>Ciconia boyciana</i>	106	NV	M	1	4	+	-	EN
27.	Ciconiidae	Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	135	NV	R	1	9	+	-	NT
28.	Ciconiidae	Adjutant Stork	<i>Leptoptilos dubius</i>	85	NV	RM	1	4	-	-	EN
29.	Ciconiidae	Lesser Adjutant	<i>Leptoptilos javanicus</i>	115	NV	RM	1	5	-	-	VU

Legend : Size: Body length in cm; Feeding Group: I+: Insects and other invertebrates; I: Insectivore; NV: Flesh-fish-carrion eaters (small vertebrates, fishes and carcasses); O: Omnivore; V: Vegetarian; Resident Status: R: Resident; M: Migratory; RM: Partly resident and partly migratory; V: Vagrant; No: Habitats: Number of nine major habitats occupied, No: Regions: Number of 10 major Indian biogeographic provinces occupied, Traded: Listed as traded in TRAFFIC-India list; Game: Listed in Stewart Baker's list of game birds of India; Threat Status: As listed in Threatened Birds of Asia.

Globally Threatened Species



Spot-billed Pelican



Oriental White Stork



White-winged Duck



Dalmatian Pelican



Greater Adjutant Stork



Baikal Teal



Christmas Island Frigatebird



White-headed Duck



Marbled Teal



White-bellied Heron



Lesser White Fronted Goose



Pink-headed Duck



Lesser Adjutant Stork



Baer's Pochard



Siberian Crane



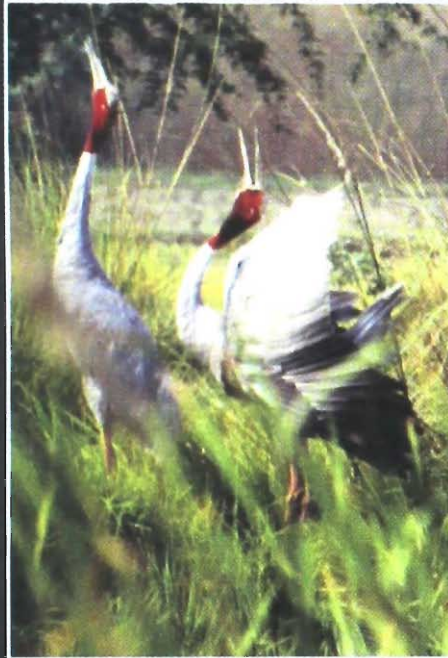
Black-necked Crane



Sociable Lapwing



Wood Snipe



Sarus Crane



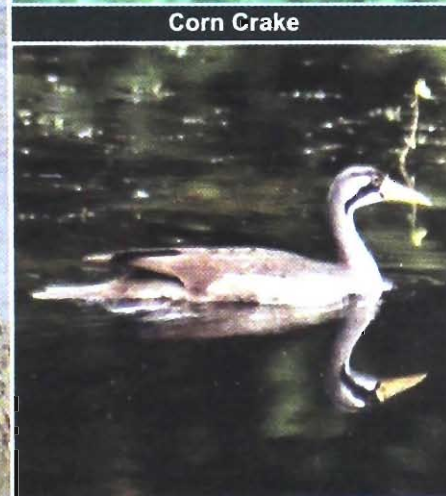
Corn Crake



Spotted Greenshank



Hooded Crane



Masked Finfoot



Spoonbill Sandpiper



Indian Skimmer



Pallas's Fish-Eagle



Eastern Imperial Eagle



Jerdon's Babbler



Greater Spotted Eagle



Swamp Francolin



Black-breasted Parrotbill

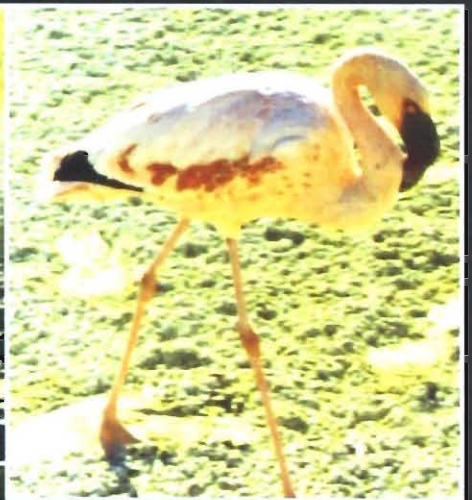
Near Threatened and Data Deficient Species



Darter



Black-necked Stork



Lesser Flamingo



Painted Stork



Oriental White Ibis



Ferruginous Pochard



Andaman Crake



Beach Stone-Plover



Greater Grey-headed Fish-Eagle



Great Snipe



Black-bellied Tern



Asian Dowitcher



White-tailed Sea-Eagle



Blyth's Kingfisher



Buff-breasted Sandpiper



Lesser Grey-headed Fish-Eagle



Brown-winged Kingfisher



Photo : J. Wijpekema

White-winged Duck

4. SOCIO-ECONOMICS OF WETLANDS

4.1 Values

What is a wetland?

The term wetland is not precise. Wetlands are neither truly terrestrial nor aquatic; they can be both at the same time, or seasonally aquatic, or terrestrial. This in-between and dynamic character influences the plant and animal communities in such a way that wetlands are different from either aquatic or dry habitats.

Definition of wetlands as used by the Ramsar Convention:

“Area of marsh, fen, peat bog or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water, the depth of which does not exceed six metres.”

Wetlands cover approximately 6% of the earth’s surface. The following are the broad categories of different wetlands types:

- *Coasts* - areas between the land and the open sea that are not influenced by rivers (e.g. shorelines, beaches, mangroves and coral reefs)
- *Estuaries* - where rivers meet the sea and water changes from fresh to salt as it meets the sea (e.g. deltas, mudflats, salt marshes, mangroves)
- *Flood Plains* - land next to the permanent course of a river that extends to the edge of the valley (e.g. flood plains, including features such as ox-bow lakes, river islands)
- *Marshes/swamps* land where water is more or less permanently at the surface and/or causing saturation of the soil (e.g. papyrus swamp, fen, peatbogs)
- *Lakes* areas of permanent or semi-permanent water with little flow (e.g. ponds, salt lakes, volcanic crater lakes) (Stuip *et al.*, 2002).

Since the beginning of human civilisation wetlands have played a most important part in supporting and developing culture. The fertile Nile and Tigris and Euphrates river valleys supported the ancient Egyptians and Babylonians. In India the Rivers Ganga, Yamuna, Brahamputra and Kaveri played the pivotal role in development of Hindu civilisations. All our major centres of human settlements have been around one or other wetland type. Though this has resulted in enormous pressure on the wetland resources and sustainability as the wetlands provide a major source of livelihood to the people.

Wetlands can also provide alternative sources of income for local communities, in addition to their use for recreational activities such as fishing, hunting, bird watching and boating. These activities also generate money from visitors and offer development opportunities. In addition, many material services such as water quality improvement, flood protection and navigable waterways are provided by wetlands, depending on their type and location.

Wetlands are significant reserves for biodiversity, such as waterfowl habitats and species-rich coral reefs, from life-support to development to cultural heritage. Continued,

provision, however, depends on maintenance, reliability and health of wetland resources against the ever-increasing pressure of the growing and developing human population.

Stuip *et al.* (2002) applied the Ramsar Database (1999), to analyse the threats to wetlands and recorded that 84% of Ramsar sites had undergone or were threatened (either lost or degraded) by the following ecological changes,

- Drainage for agriculture
- Settlements and urbanisation
- Pollution
- Hunting

It is well known that globally about 50% of wetlands have been lost since 1900. While the loss in the first half of the last century occurred mostly in the northern temperate zone, in the second half it has rapidly spread to tropical and subtropical wetlands, particularly the swamp forests and mangroves.

Drainage for agriculture

Agriculture is considered the principal cause for wetland loss worldwide. It was estimated that 56-65% of available wetlands in Europe and north America, 27% in Asia, 6% in South America and 2% in Africa were drained for agriculture by 1985. Of the estimated 58.2 million hectares of wetlands in India, 40.9 million hectares are now under rice cultivation.

The extent of wetland loss due to degradation is less easily estimated but is no less vigorous. This may be river embankment, over exploitation of ground water, building dams across rivers and changing the hydrological regime. Pollution from surrounding agricultural or industrial sources causes the increase of nutrients, pesticides or heavy metals, thus seriously affecting the ecological process.

Wetlands are diverse but their basic interactive processes are the same, i.e., soil, water, plants and animals. These are the basic processes that generate the product, services and attributes that are so valuable to humans. These can be direct economic values, or non-monetary in affecting the way of life of a community. The economic values can broadly be divided into three groups:

- i) Direct use values,
- ii) Indirect use values,
- iii) Potential future use values

Non-use values are related to the essential nature of a wetland and to the merit that is placed on it due to variety of qualities such as its biodiversity, cultural/ heritage or social significance.

Direct use values

- *Wetlands products:* Wetlands are the most productive ecosystem source of biomass harvesting in the form of wood, reeds, peat, food such as fish, fruit and meat.
- *Recreation and tourism:* Wetlands offer major opportunities for recreation in the form of canoeing and sailing on lakes, diving in coral reefs, sport fishing, hunting and bird watching all make good tourist sites.

Indirect Use Values

- *Flood control:* Lakes, marshes and swamps help in flood control by acting as reservoirs, while flood plains are the natural extensions of rivers when high discharges occur.
- *Ground water discharge:* Water from wetlands filters down into the local ground water system. This is then available for the local population to use as drinking water or for irrigation. This is a very important value, particularly in

semi-arid or arid areas where water resources are scarce.

- **Biodiversity value:** The existence of many species of plants and animals depends on wetlands as habitats. Some species live permanently in wetlands for their existence, others depend on them for crucial aspects of their life cycles such as resting points en route for migratory waterbirds or spawning grounds for fishes.

Total economic value

The total economic value of a wetland is the sum of all mutually compatible values.

Wetlands in India

India, with its annual rainfall of over 130 cm, varied topography and climatic regimes supports and sustains diverse and unique wetland habitats. Natural wetlands in India consist of the high-altitude Himalayan lakes, followed by wetlands in the flood plains of the major river systems, saline and temporary wetlands of the arid and semi-arid regions,

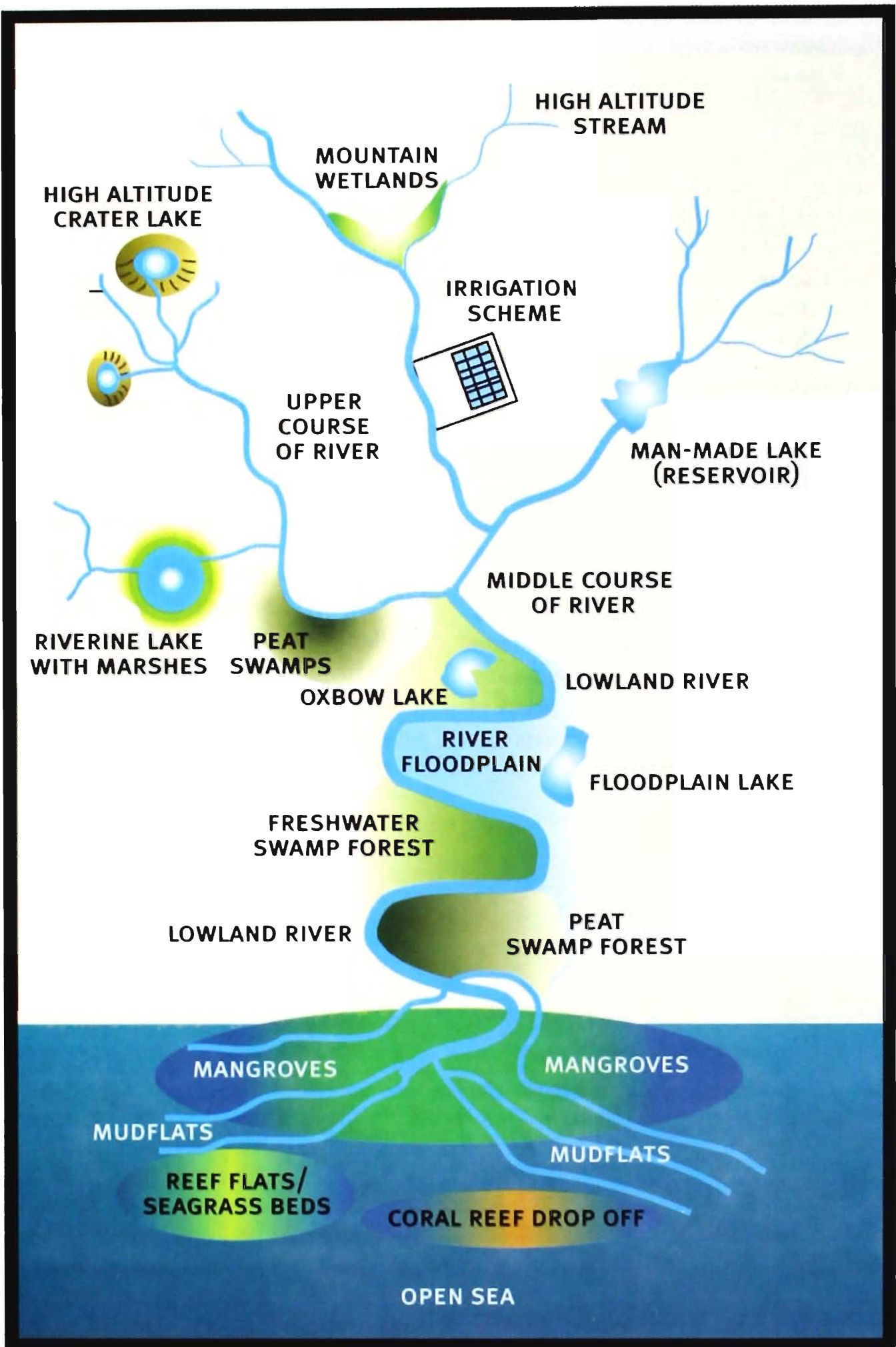
coastal wetlands such as lagoons, backwaters and estuaries; mangrove swamps; coral reefs and marine wetlands, and so on. In fact, with the exception of bogs, fens and typical salt marshes, Indian wetlands cover the whole range of ecosystem types. In addition to the various types of natural wetlands, a large number of man-made wetlands also contribute to the faunal and floral diversity. These wetlands, which have resulted from the needs of irrigation, water supply, electricity, fisheries and flood control, are many. The various reservoirs, shallow ponds and numerous tanks support wetland biodiversity and add to the country's wetland wealth. It is estimated that freshwater wetlands alone support 20 per cent of the known range of biodiversity in India (Prasad *et al.*, 2002).

Wetlands in India occupy 58.2 million hectares, including areas under wet paddy cultivation (Anonymous, 1993). Most inland wetlands are directly or indirectly dependent on the major rivers like, Ganga, Brahmaputra, Narmada, Godavari, Krishna, Kaveri, and

Table 4.1 Summary of main types of wetland values and the different categories they fall in.

Total Economic Value of Wetlands			
Use Values			Non-use Values
Direct Use Values	Indirect Use Values	(Potential) Future Values	Existence Values
Wetland products (fish, reeds)	Flood Control	Potential future uses (direct and indirect)	Biodiversity
Recreation and Tourism	Ground Water recharge	Future value of information	Cultural and Heritage value
Transport	Shoreline Stabilisation and storm protection		Bequest values (for future generations)
Agriculture	Water quality Improvement		
Peat/Energy	(micro) Climate change mitigation		

Source: Stuij, *et al.* (2002)



Source : Wetland International

Fig. 4.1 Different types of wetlands as per Ramsar definition

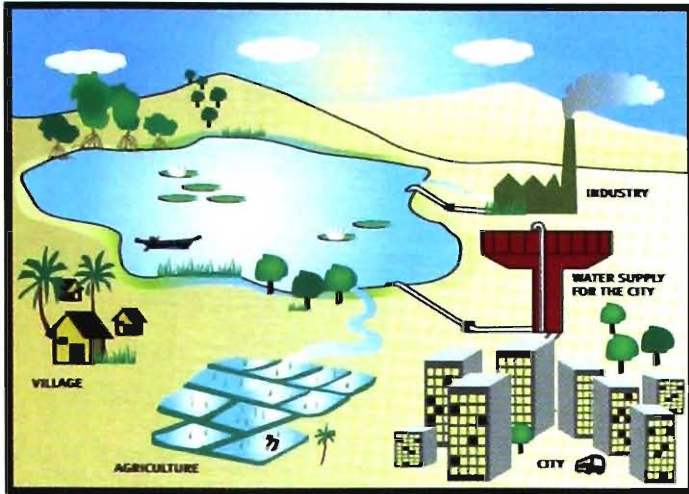


Fig. 4.2.1 Water supply and extraction

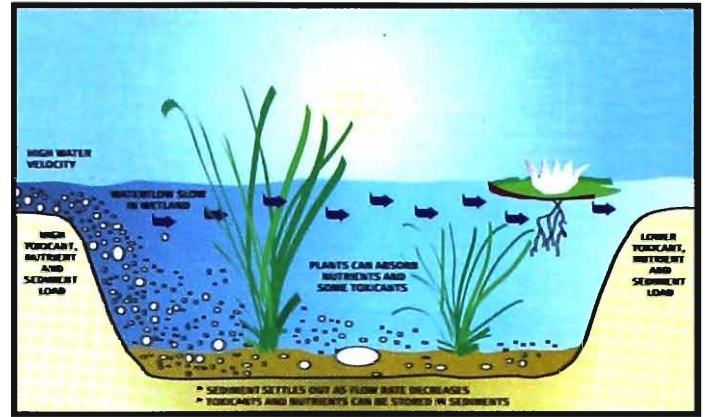


Fig. 4.2.2 Water quality improvement



Fig. 4.2.3 Flood control

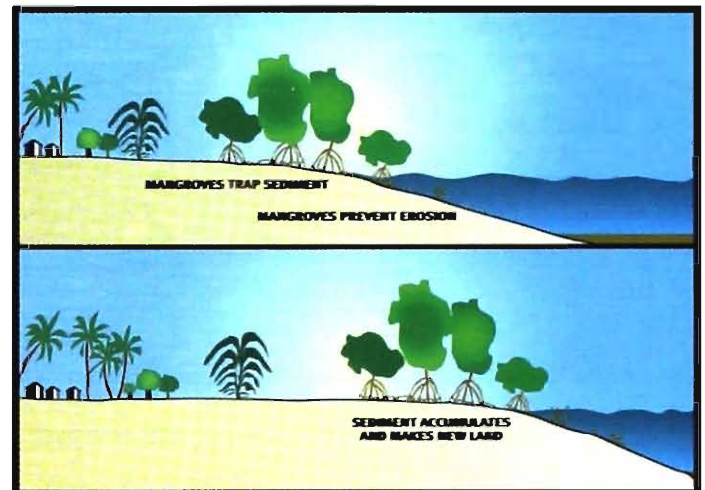


Fig. 4.2.4 Prevention of coastal erosion

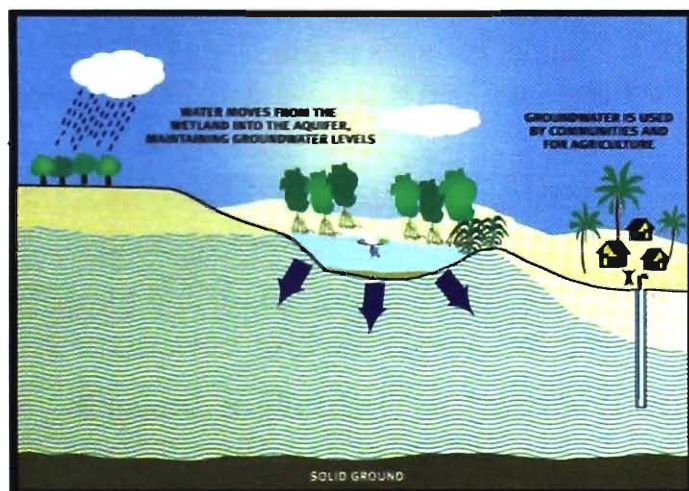


Fig. 4.2.5 Maintenance of ground water table

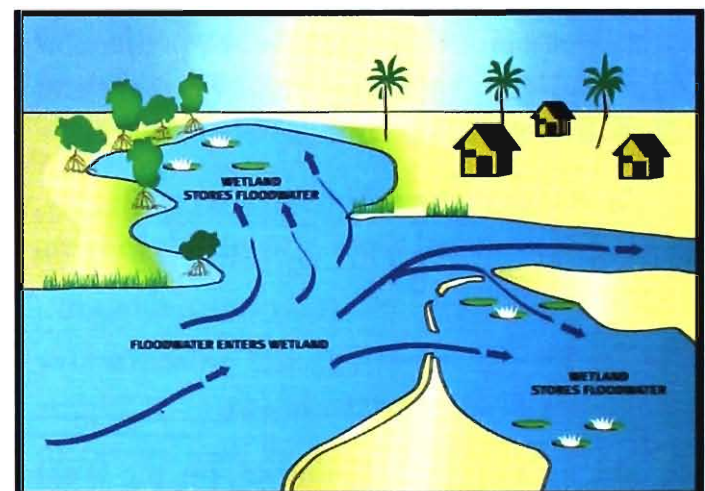


Fig. 4.2.6 Flood control

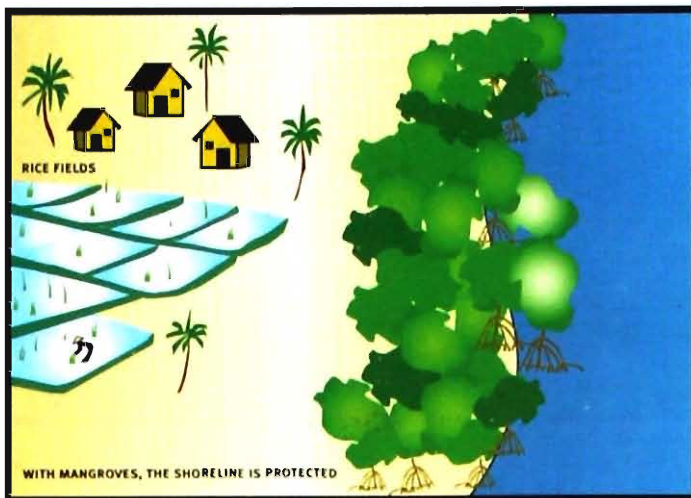


Fig. 4.2.7 Shoreline protection

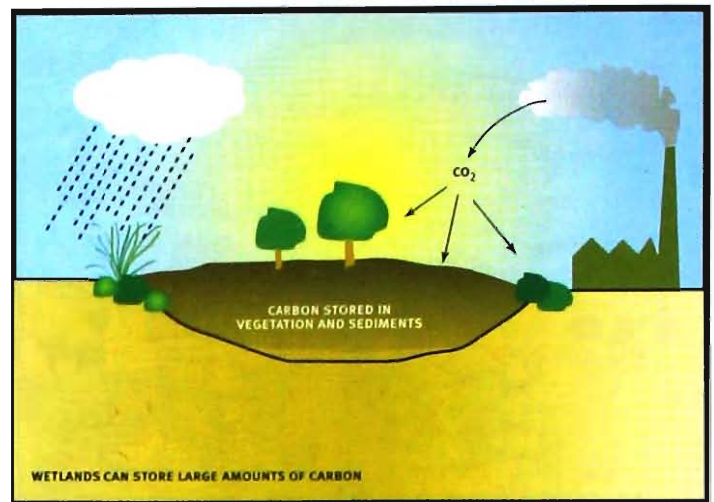


Fig. 4.2.8 Act as Carbon sinks

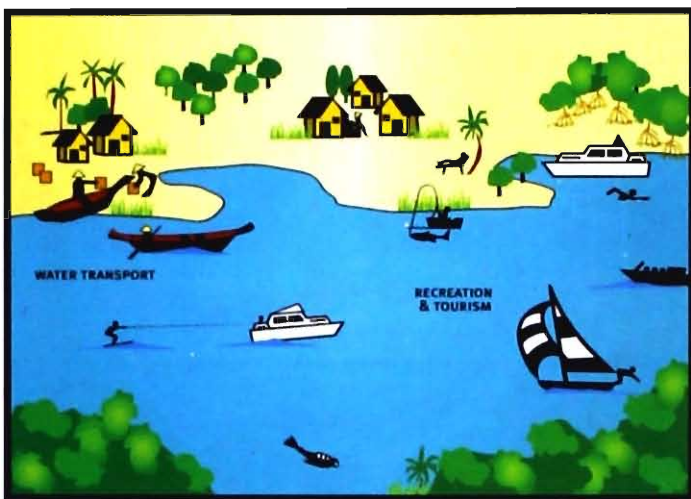


Fig. 4.2.9 Watertransport, recreation and tourism

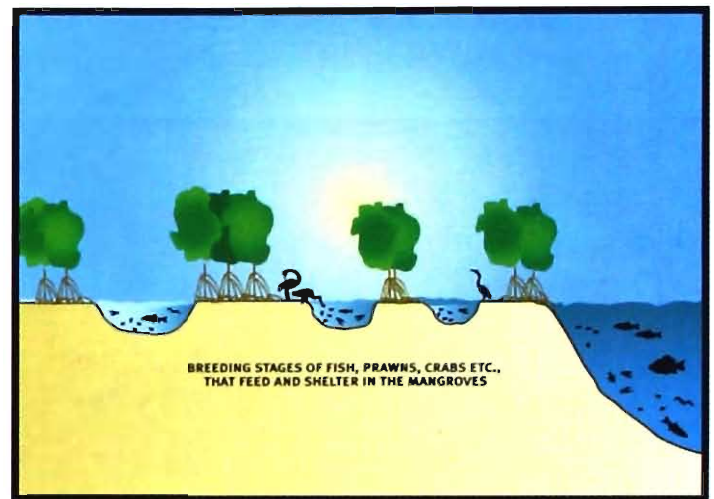


Fig. 4.2.10 Breeding ground for aquatic plants and animals

Fig. 4.2. (1-10) Socio-economic uses of wetlands (Source: Stuip *et al.*, 2002).

Tapti. They occur in the hot arid regions of Gujarat and Rajasthan, the deltaic regions of the east and west coasts, highlands of central India, wet humid zones of south peninsular India and the Andaman and Nicobar, and Lakshadweep Islands (Prasad *et al.*, 2002).

Wetlands include 22 habitat types (IUCN, 1989). The principal types of wetlands in India are (Anonymous, 1993):

1. Tanks, Reservoirs, and other water bodies of Deccan peninsula,
2. Backwaters and Estuaries on the west coast of the peninsula,
3. The vast saline expanses of Rajasthan and Gujarat,
4. Freshwater Lakes and Reservoirs from Gujarat eastwards through Rajasthan and Madhya Pradesh,
5. Deltaic wetlands (including Mangroves), Lagoons, and Salt Swamps of India's east coast,
6. Marshes, Jheels, Terai Swamps, and Chaur lands of the Indo-Gangetic plain,
7. Floodplain of Brahmaputra and Marshes and Swamps in the hills of northeastern India,
8. Lakes and rivers of the montane of Kashmir and Ladakh,
9. Wetlands (primarily Mangroves associates and Coral reefs) of India's island arcs.

Indian wetlands are grouped as:

- **Himalayan wetlands**

Ladakh and Zaskar: Pangong Tso, Tso Morari, Chantau, Noorichan, Chushul and Hanlay marshes

Kashmir Valley: Dal, Anchar, Wular, Haigam, Malgam, Haukersar and Kranchu lakes.

Central Himalayas: Nainital, Bhimtal and Naukuchiatal

Eastern Himalayas: Numerous wetlands in Sikkim, Assam, Arunachal Pradesh, Meghalaya, Nagaland and Manipur, Beels in the Brahmaputra and Barak Valley.

- **Indo-Gangetic wetlands:** The Indo-Gangetic flood plain is the largest wetland system in India, extending from the river Indus in the west to the Brahmaputra in the east. This includes the wetlands of the Himalayan terai and the Indo-Gangetic plains.

Table 4.2. Extent of Wetlands in India (Parikh and Parikh, 1999).

Wetlands in India	(area in million hectares)
Area under wet paddy cultivation	40.9
Area suitable for fish culture	3.6
Area under captured fisheries	2.9
Mangroves	0.4
Estuaries	3.5
Backwaters	3.5
Impoundments	3.0
Total area	58.2

- **Coastal wetlands:** The vast intertidal areas, mangroves and lagoons along the 7500 kilometre long coastline in West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, Goa, Maharashtra and Gujarat. Mangrove

forests of the Sunderbans of West Bengal and the Andaman and Nicobar Islands. Offshore coral reefs of the Gulf of Kutch, Gulf of Mannar, Lakshadweep and Andaman and Nicobar Islands.

- **Deccan:** A few natural wetlands, but innumerable small and large reservoirs and several water storage tanks in almost every village in the region (Prasad *et al.*, *l.c.*).

Biodiversity in Indian wetlands

In India, lakes, rivers and other freshwaters support a large diversity of biota representing almost all taxonomic groups. Algae in open waters represent the floral diversity and macrophytes dominate the wetlands. It is difficult to analyse the floral diversity in India with reference to different habitats, endemism to India, as well as the changes that occur due to anthropogenic disturbances. From an ecological point of view, the diversity of species present in the wetlands is an indication of the relative importance of them to the aquatic biodiversity issue as a whole.

Vegetation

The total number of aquatic plant species exceeds 1200 (Gopal, 1995). He has also partly listed the fauna of the wetland system. Aquatic vegetation is a valuable source of food, especially for waterbirds. In the winter, migratory waterbirds search the sediment for nutritious seeds, roots and tubers. Resident waterfowl may feed on different species of aquatic vegetation throughout the year.

Aquatic plants are one of the life supports in the wetland ecosystem. These plants are used by man and animals in various ways, *viz.*, as a source of wild crops, vegetables, green manure, food for fishes, waterbirds, and in several miscellaneous and commercial uses.

Table 4.3 Extent of Inland Wetlands in India as mapped by

Scale 1:2,50,000

Scale 1:50,000

State	Wetland Area (ha.)
Andhra Pradesh	366609
Bihar	177683
Gujarat	209206
Jammu & Kashmir	406780
Karnataka	254015
Kerala	34200
Madhya Pradesh	294118
Maharashtra	284942
Orissa	162774
Pondicherry	59
Tamil Nadu	161521
Uttar Pradesh	328690
<i>Source: Space Application Centre</i>	

State	Wetland Area (ha.)
Andaman & Nicobar Islands	3204
Arunachal Pradesh	56325
Assam	101232
Daman Diu & Nagar Haveli	38
Delhi	4717
Goa	2145
Haryana	27057
Himachal Pradesh	54766
Lakshadweep	918
Manipur	52959
Meghalaya	2222
Mizoram	152
Nagaland	918
C'garh & Punjab	71879
Sikkim	1985
Tripura	9896
West Bengal	143859
Total	3558915
<i>Source: Prasad et al., 2002</i>	

*The seeds of a number of aquatic grasses including wild rice (*Oryza*) are used. The most important among these are *Coix lachrymal jobi*, *Echinochloa stagnina*, *Paspalum scobiculatum*. Seeds of *Nymphaea nouchali* and *N. stellata* are also eaten by poor people. Whole plants and leaves of *Amaranthus viridis*, *Alternanthera sessilis*, *Neptunia oleracea*, *Ceratopteris thalictrioides*, *Centella asiatica*, *Enhydra fluctuans* and leafy shoots of *Ipomoea aquatica* are also eaten as a vegetable. Tender kernels of *Trapa bispinosa*, rhizomes of *Nelumbo nucifera* and seeds of makhana *Euryale ferox* are commonly known and also cultivated for their potential value. The culms

of *Phragmites karka* and *P. australis* and leaves of *Typha angustata* are extensively used for thatching roofs of houses in rural areas. Fibrous roots of *Vetiveria zizanioides* are fragrant due to the presence of an essential oil. A large number of perennial grasses, e.g., *Paspalum distichum*, *Panicum paludosum*, *Echinochloa colonum*, *Paspalidium germinatum* are good forage grasses. *Azolla pinnata*, an aquatic fern, in association with *Anabaena azolla*, blue green algae, is used as a biofertilizer. Shoots of *Typha elephantina* are eaten by elephants. Besides these, several plant species are used as medicines in curing many diseases, such as jaundice, dysentery, and nervous

* *Source: Srivastava, S.K., Botanical Survey of India, Dehra Dun.*

Table 4.4 Estimated Number of Important Aquatic Vascular Plants (modified from Gopal, 1995)

Angiosperms			
Acanthaceae	18	Convolvulaceae	17
Aizoaceae	2	Cyperaceae	159
Alismataceae	10	Najadaceae	6
Amaranthaceae	9	Nelumbonaceae	1
Amaryllidaceae	3	Nymphaeaceae	6
Apiaceae	4	Onagraceae	5
Aponogetonaceae	8	Poaceae	78
Araceae	40	Podostemaceae	22
Asteraceae	-	Polygonaceae	13
Balsaminaceae	24	Pontederiaceae	3
Brassicaceae	5	Potamogetonaceae	7
Butomaceae	4	Primulaceae	1
Cabombaceae	1	Ranunculaceae	7
Callitrichaceae	2	Rubiaceae	7
Capparidaceae	3	Saururaceae	2
Chenopodiaceae	3	Scrophulariaceae	43
		Sparganiaceae	2

disorders. *Typha angustata*, *Phragmites karka*, *Ceratophyllum demersum*, *Bacopa monnieri* and *Eichornia crassipes* also act as biological purifiers and natural filters. A few species are being exploited for their medicinal and economic value, hence categorised under threatened taxa. These are *Aschynomene aspera* (medicinal and wood), *Nelumbo nucifera* (edible), *Euryale ferox* (seeds), *Bacopa monnieri* and *Centella asiatica* (medicinal).

Aquatic plants have excellent aesthetic and ornamental value, too. Lilies and lotus are commonly cultivated in a temple tank. Likewise, wood of *Aschynomene aspera* is used to make decorative items for puja and marriages in West Bengal.

Faunal diversity in Indian wetlands

Alfred & Nandi (2000) recorded a total of 17,853 species of animals from wetlands in India. Wetlands are also important as resting

sites for migratory birds. Avifauna species found in Indian Wetlands have been listed (Kumar *et al.*, 2002).

Endemic fauna

Endemism in wetland Indian fauna is not so well studied. Among the vertebrates one species of mammal, namely Marsh Mongoose *Herpestes palustris*, is reported from the Salt Lake swamp in Kolkata, 44 species of waterbirds, one species of Himalayan Newt *Salamandur verrucosus* and 223 species of fish are known to be endemic in Indian wetlands (Alfred and Nandi, 2000).

Threatened fauna

51 species of globally threatened wetland birds have been listed from India in the present handbook. Besides, one species of dragonfly *Epiophlebia laidlawi* found in hill streams of Darjeeling district, West Bengal, one species of salamander *Pleurodeles*

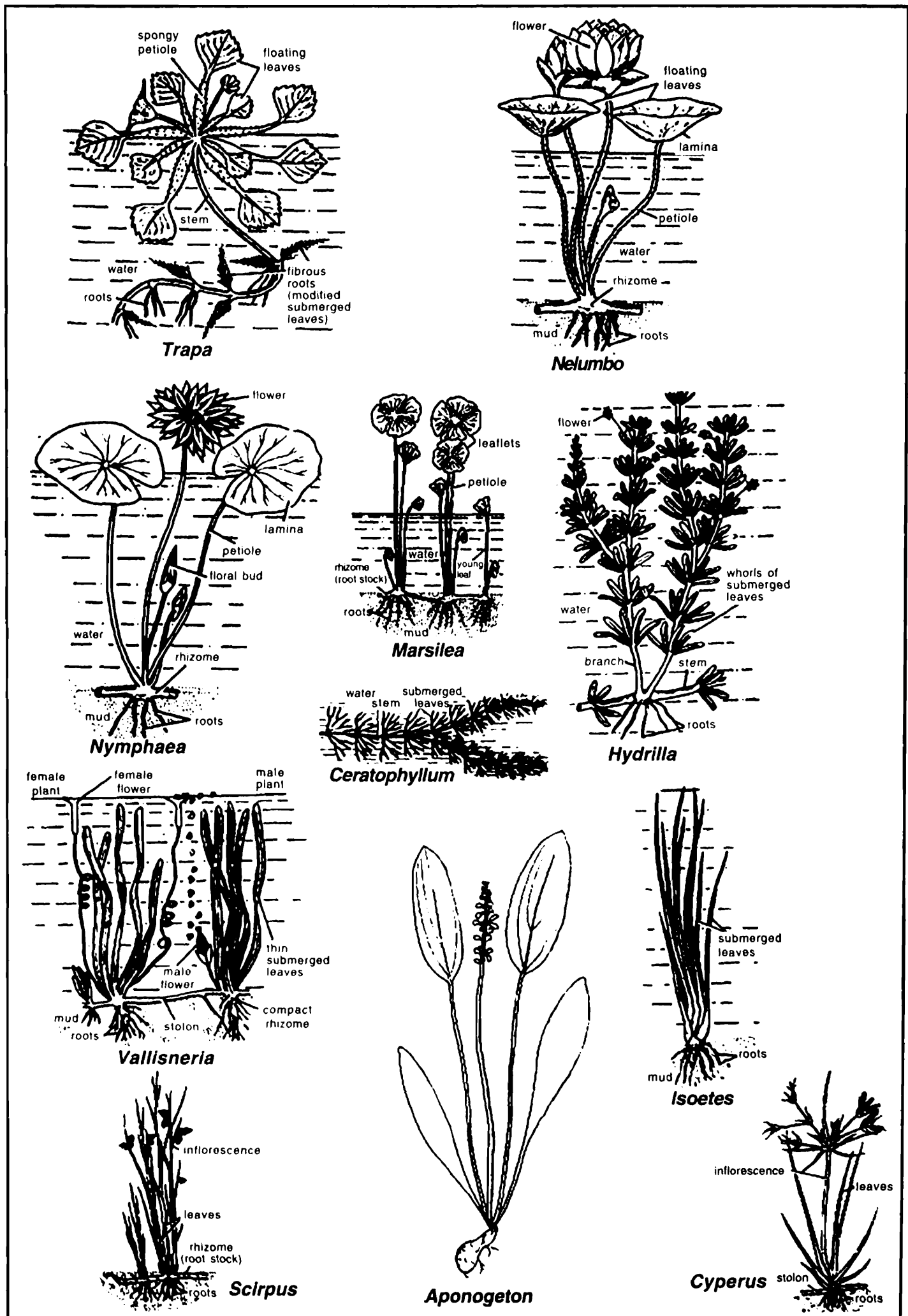


Fig. 4.3 Some common aquatic plants of Indian wetlands (Subramanyam, 1962)

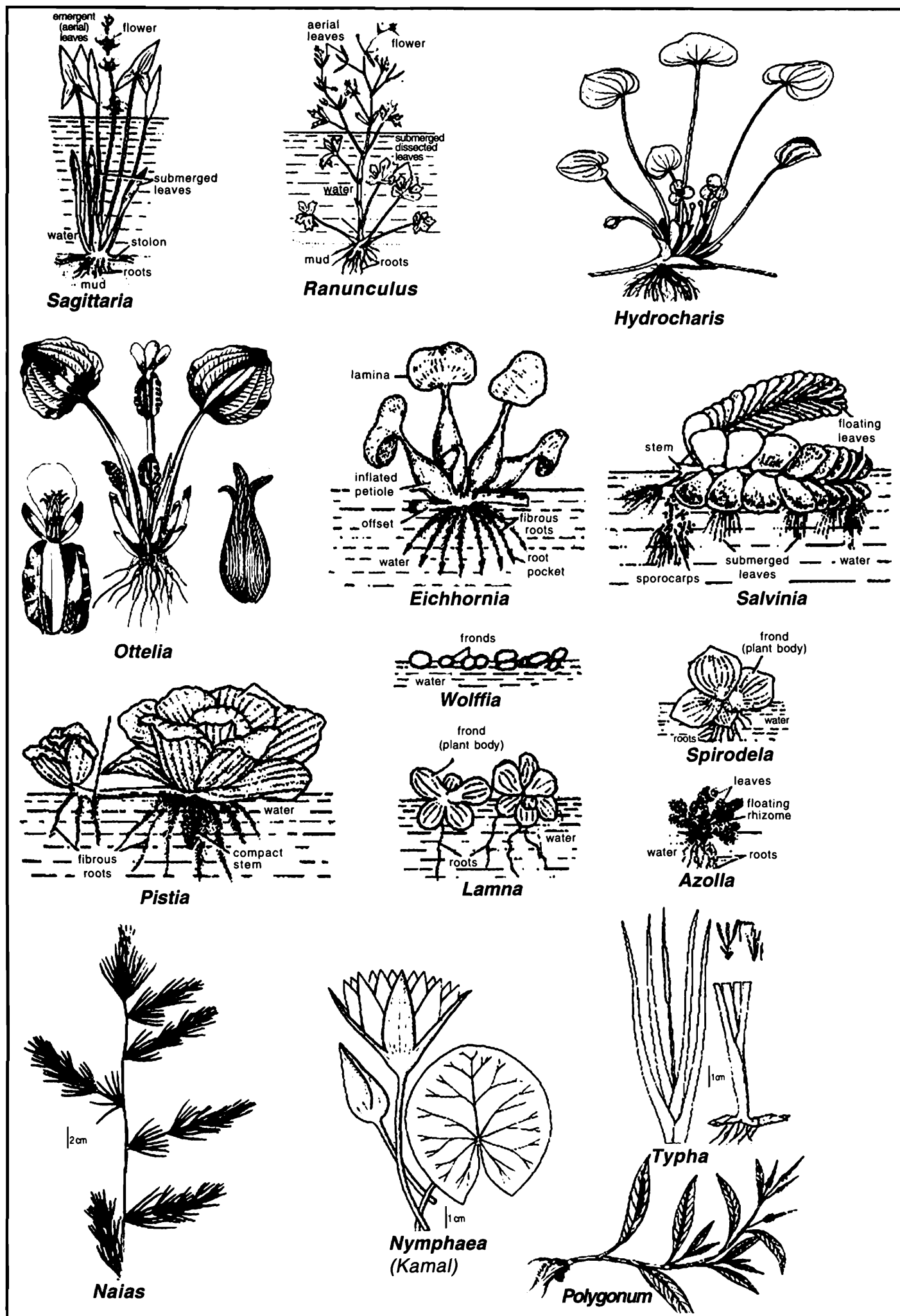


Fig. 4.4 Some common aquatic plants of Indian wetlands (Subramanyam, 1962)

Table 4.5 Aquatic Faunal Diversity in Indian Wetlands

Animals			
Protozoa	1250	Odonata	494
Porifera	400	Plecoptera	113
Cnidaria	540	Hemiptera	200
Ctenophora	10	Coleoptera	C600
Platyhelminthes	1200	Diptera	C5000
Rotifera	330	Trichoptera	812
Gastrotricha	80	Echinodermata	500
Nematoda	500	Protochordate	70
Mollusca	2300	Pisces	2000
Annelida	500	Amphibia	150
Crustacea	2000	Reptiles	50
Arachnida	300	Aves	310
Insecta	5000	Mammalia	30
Ephemeroptera	91	Total	17,853

Source: Alfred & Nandi (2000)

verrucosus, 14 species of reptiles belonging to crocodile, turtle, varanus and python families and ten species of mammal are listed under various categories of Red list fauna.

Invasive species

A number of exotic species have been introduced into Indian wetlands for either commercial propagation purposes or as game. Such exotics include several species of fish, such as tilapia, silver carp, grass carp, cyprinus carp and gouramy for commercial exploitation, while for game, fish such as trout were introduced from Europe.

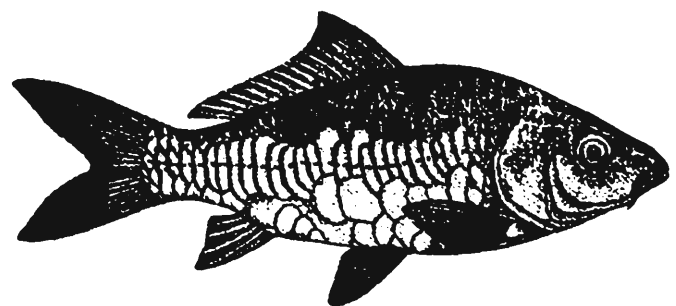
Cultivable species

Besides about 50 species of fish both endogenous and exotic, about 10 species of mollusc and 15 species of crustacean from Indian wetlands are being cultured and harvested. Of these, the tiger prawn *Penaeus monodon*, and the mud crab, *Scylla serrata* are exported frozen, canned or alive from India. Some of the cultivable fishes are-

1. Common Carp, *Cyprinus carpio*

Key features:

1. Body stout, slightly compressed
2. Moderate triangular head
3. Obtusely rounded snout
4. Barbels two pairs
5. Large scales; anal fin trapezoidal in shape . Silvery or golden sides.



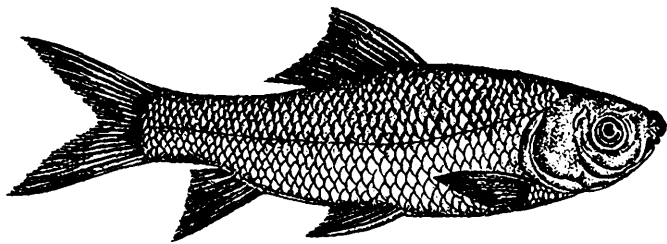
2. Rohu, *Labeo rohita*

Regional Names : Rohiti, Rui, Rau - Assam; Rahu, Riu, Ruee - West Bengal; Rohu - Bihar; Rohu, Bhobhari - Uttar Pradesh; Rohu, Tapra, Dumra, Dhambra - Punjab; Rohi, Rohu - Orissa; Bocha-gandumeenu

- Andhra Pradesh; Kennadi-kendai, Rohu
- Tamil Nadu; Tambada-massa Maharashtra.

Key features :

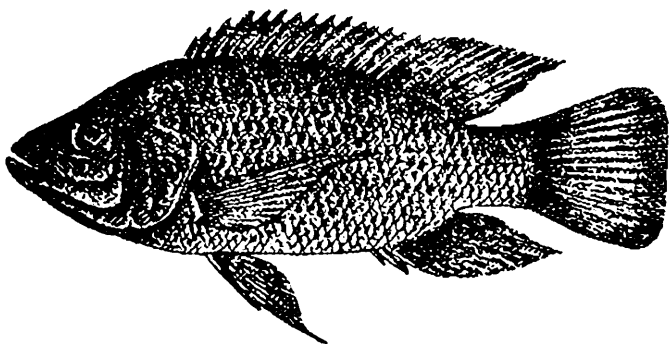
1. Body moderately elongate
2. Depressed snout, projects beyond the mouth
3. Large eyes and small mouth
4. Moderate scales; forked tail fin
5. Bluish along back; reddish mark on each scale appearing like a reddish line on the dorsal side.



3. Tilapia, *Tilapia mossambica* / *Oreochromis mossambica*

Key features:

1. Elongated and compressed body
2. Cycloid scales
3. Anal fin has 12-16 spines
4. Watery-grey to yellowish in colour.
5. Rounded caudal fin.

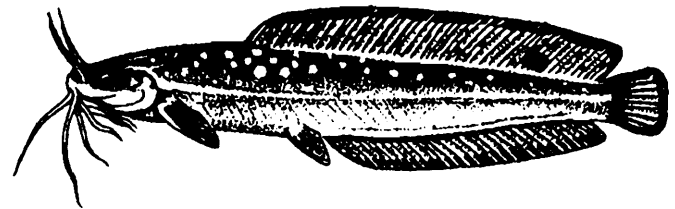


4. Magur, *Clarias batrachus*

Regional Names: Magur, Mahgur Assam and West Bengal; Wagur, Manguri, Mangur - Bihar and Uttar Pradesh; Magur, Kugga Punjab; Magurah, Maguro - Orissa; Marpoo, Marpulu Andhra Pradesh; Masari, Karupputheli Tamil Nadu; Muzhi, Muzhu, Yeri-vahly, Musi - Kerala; Halimeena - Karnataka.

Key features:

1. Body elongated
2. Terminal Mouth
3. Four pairs of barbels
4. One pair each of maxillary, nasal and two of mandibular
5. Rayed dorsal fin and no spine
6. Caudal fin rounded
7. Lateral line complete.

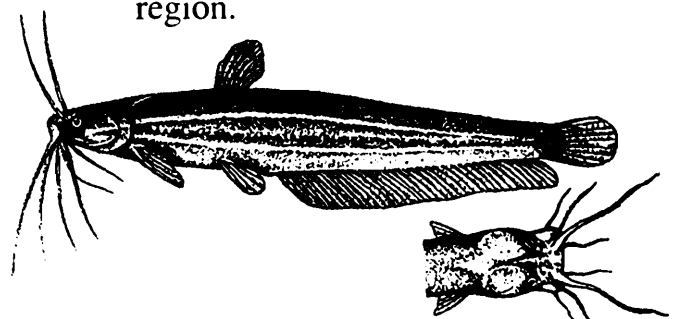


5. Stinging Catfish, *Heteropneustes fossilis*

Regional names: Singee, Sheenee Assam; Singhi West Bengal; Singhi - Bihar; Kamachasinghi, Bitchu, talia, Singee Uttar Pradesh; Lahoord, Nullie Punjab; Singee, Singhi - Orissa; Ingilayee, Mapujella, Marpu Andhra Pradesh; Thaylee, Thalimeen Tamil Nadu; Kahree-meen, Kadu, Moyya, Kari - Kerala; Kappethede, Kappershode, Seruva, Sinimeen - Karnataka; Bitchukamachi- Maharashtra; Singhi Gujarat.

Key features:

1. Elongated compressed body
2. Flat snout with terminal mouth
3. Four pairs of barbels; one maxillary and nasal; two - mandibular
4. Rayed dorsal fin and long anal fin with 60 to 79 rays
5. Rounded caudal fin and lateral line complete
6. Gill chambers with accessory air-sacs extending backwards into caudal region.

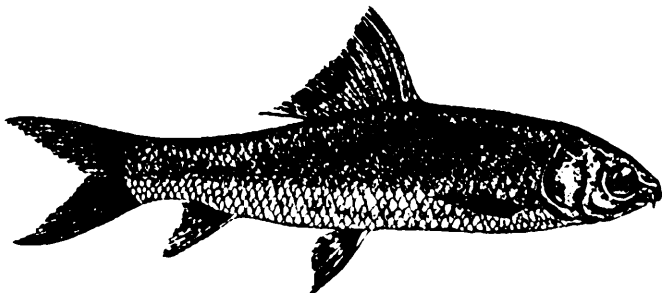


6. Mrigal, *Cirrhinus mrigala*

Regional Names : Mrigal- English; Mrigal, Mirrgah, Mriga - Assam; Mrigal, Mrigala West Bengal; Mirrgah, Mirikali - Orissa; Nain, Nainee, Mrigal - Bihar; Mrigal, Mirki - Uttar Pradesh; Mori, Movakha, Mrigal - Punjab; Arju, Yerramosa, Ballalamosa Andhra Pradesh; Mrigala Tamil Nadu; Mrigalam Kerala; Mrigal, Mirya - Maharashtra; Morahkee, Nagari - Gujarat.

Key features:

1. Body streamlined
2. Blunt snout with pores
3. Broad mouth
4. Distinctive upper lip ; Deeply Forked tail fin
5. Golden eyes; dark grey along back with a coppery tinge and silvery white belly.



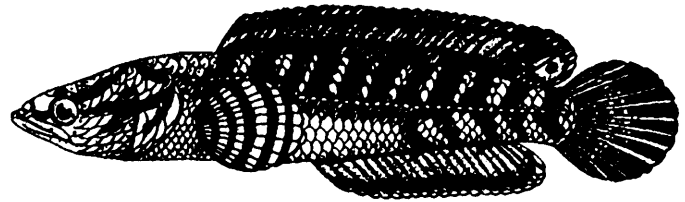
7. Asiatic snake head, *Channa orientalis* / *Channa gachua*

Regional Names : Chengal Assam; Cheng West Bengal; Dheridhok, Chainga - Bihar, Dorrah Punjab; Chenga - Orissa; Malamatta-gudisa, Erramatta, Tatimatta-gudisa - Andhra Pradesh; Parakoravai, Maniam-koravai - Tamil Nadu; Koravu, Vattudi - Kerala; Mohkorava, Mottu Karnataka.

Key features:

1. Anal fin with 21 - 23 rays
2. No black spots on scales
3. Body elongated with moderate eyes and large mouth
4. Pectoral fins extend to anal fin

5. Round caudal fin
6. Pectoral fins with a series of distinct alternating blue and pale orange vertical bands.



4.2 Threats

4.2.1 Wetland losses - a threat to ecological balance

Wetlands are one of the most threatened habitats in the world. Wetlands in India, as elsewhere, are increasingly facing several anthropogenic pressures. Thus, the rapidly expanding human population, large scale changes in land use or land cover, rapidly increasing development projects and unsuitable use of watersheds have all caused a substantial decline in wetland resources of the country. Significant losses have been caused by conversion threats from industrial, agricultural and various urban developments. These have led to hydrological perturbations, pollution and their effects. Unsustainable levels of grazing and fishing have also resulted in the degradation of wetlands. A recent study (Parikh & Datye, 2002) analysed that about 38% sites have serious problems with wildlife poaching, while 37% are affected by pollution and are under severe grazing pressure.

The current loss rates in India will lead to serious consequences, where 74% of the human population is rural (Anonymous, 1994) and many of these people are resource dependent. Healthy wetlands are essential in India for sustainable food production and potable water for humans and livestock. They are also necessary for the continued existence of India's diverse populations of wildlife and plant species; a large number of endemic

Table 4.6 Classification of wetlands in the Indian subcontinent (Gopal *et al.*, 1995) (Fig. 4.7)

I	Inland Wetlands
A.	Saline wetlands
a.	<i>Woody vegetation</i>
i.	Permanently flooded (or waterlogged)There are none
ii.	Seasonally flooded (or waterlogged) Saline scrubs (e.g., Rann of Kutch)
b.	<i>Herbaceous vegetation (submerged or other halophytes)</i>
i.	Permanently flooded (or waterlogged).....Saline high altitude lakes (littoral zones only)
ii.	Seasonally flooded (or waterlogged) Saline lakes (e.g. Sambhar, Pachpadra, Deedwana)
B.	Freshwater wetlands
a.	<i>Woody vegetation</i>
i.	Permanently flooded (or waterlogged) <i>Myristica</i> swamp (<i>Myristica</i> species) Sub-montane hill valley swamp (<i>Bischofia</i> , <i>Alstonia</i> , <i>Salix</i>) Creeper swamp (including cane brakes) (<i>Magnolia</i> , <i>Eugenia</i> , <i>Calamus</i>)
ii.	Seasonally flooded Eastern seasonal swamp (<i>Machilus gamblei</i> , <i>Elaeocarpus</i> sp.) <i>Barringtonia</i> swamp (<i>Barringtonia acutangula</i>) <i>Syzygium cumini</i> swamp (<i>Syzygium cumini</i>) Seasonal low swamp forest (<i>Cephalanthus occidentalis</i>) Eastern <i>Dillenia</i> swamp (<i>Dillenia indica</i> , <i>Bischofia javanica</i>) Riparian fringing forests (<i>Tamarix dioica</i> , <i>Terminalia</i> sp.) Alder forests (<i>Alnus nepalensis</i>) Riverine blue pine forests Wet Bamboo brakes (<i>Bambusa</i> , <i>Neohouzeaua</i>)
b.	<i>Herbaceous vegetation</i>
i.	Permanently flooded (or waterlogged) Submerged and/or floating leaved Cattails (mainly <i>Typha angustata</i>) Reeds (<i>Phragmites karka</i> , <i>P. australis</i> , <i>Arundo donax</i>) Tall Emergent (other than reeds and cattails) (e.g., <i>Ipomoea fistulosa</i>) Tall sedges (<i>Scilpus</i> , <i>Cyperus</i> , <i>Eleocharis</i>)
ii.	Seasonally flooded (or waterlogged) Submerged and/or floating leaved Cattails (<i>Typha elephantina</i>) Reeds (<i>Phragmites karka</i> , <i>Arundo donax</i>) Tall Emergent (other than reeds and cattails) (e.g., <i>Ipomoea fistulosa</i>) Tall sedges (<i>Scilpus</i> , <i>Cyperus</i> , <i>Eleocharis</i>) Short sedges and grasses (<i>Kyllinga</i> , <i>Eleocharis</i> , <i>Fimbristylis Paspalum</i> , <i>Echinochloa</i>) Wet meadows (mostly forbs, <i>Cynodon</i>) Tall grasses (<i>Vetiveria</i> , <i>Saccharum</i>)

species are wetland dependent. Most problems pertaining to India's wetlands are related to the human population. India contains 16% of the world's population, and yet constitutes only 2.42% of the earth's surface. The Indian landscape has contained fewer and fewer natural wetlands over time. At the same time the demand for wetland products (e.g., water, fish, wood, fibre, and medicinal plants) will increase with the increase in population.

Wetland loss refers to physical loss in the spatial extent or loss in the wetland function. The loss of one km² of wetlands in India will have a much greater impact than the loss of one km² of wetlands in sparsely populated areas of abundant wetlands (Foote *et al.*, 1996). Restoration of these converted wetlands is quite difficult once they are occupied for non-wetland uses, since wetlands are more complex and fragile ecosystems than rivers and do not have a 'self-cleaning ability' and thus readily accumulate pollution (Parikh & Datye, 2002).

The wetland loss in India can be divided into two broad groups; namely acute and chronic losses. The filling up of wet areas with soil constitutes acute loss, whereas the gradual elimination of forest cover with subsequent erosion and sedimentation of the wetlands over many decades is a chronic loss (Prasad *et al.*, 2002).

Siltation: Most wetlands such as Chilika lake, Dal lake, Wular and Kabar lakes have serious siltation problems with large littoral deposits causing excessive growth of macrophytes and severely shrinking the lake area.

Eutrophication: The degradation of water quality due to excessive nutrients, as in trans-Himalayan high altitude glacial lakes, is a serious problem.

Pollution: A large number of urban wetlands in India exposed to regular toxic contamination of water by DDT, PCB, mercury

and many other heavy metals and pesticides.

Abundant growth of aquatic vegetation: Increased levels of nutrients and heavy sedimentation leads to prolific growth of macrophytes, such as *Potamogeton pectinatus*, *Hydrilla verticillata* and *Myriophyllum* sp., often choking these sites.

Invasive species: The introduction of exotics, such as *Eichornia crassipes*, *Salvinia molesta*, *S. natans* and *Azolla* sp. causing severe suppression of native species. This has further led to a change in floral and faunal diversity in the wetlands resulting in their severe degradation.

Aquaculture: A large number of coastal wetlands have been converted to aquaculture, causing degradation by excess addition of fish food, salination, and eutrophication. This leads to the creation of algal blooms and a reduction in DO concentration.

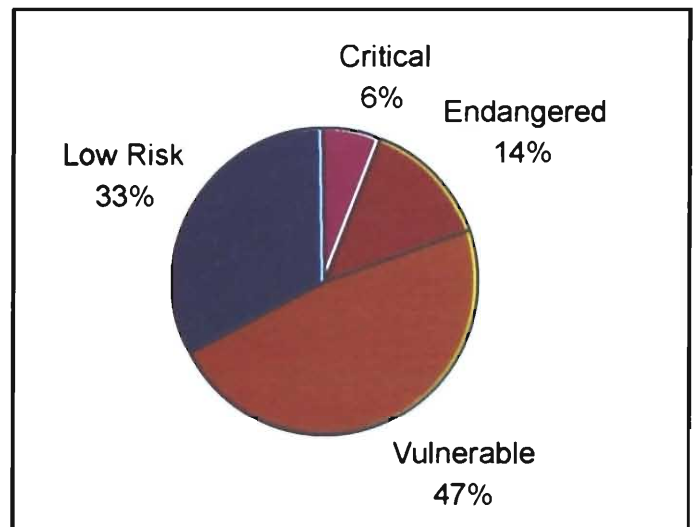


Fig. 4.5 Status of 49 Threatened migratory species in the Asia-Pacific Region

Encroachment: Due to unclear ownership rights most wetlands are being converted to agriculture and other developmental activities, especially in urban areas. This leads to a serious loss of wetland habitats and an adverse impact on the environment. Further deforestation and agriculture in catchment areas changes the hydrological regime of the wetlands.

All the above activities ultimately lead to a decrease in wetland areas, a decline in biodiversity and resource base that causes the needs of the people dependant on these resources to be unfulfillment.

4.2.2 Wetland losses - Threats to Waterbirds

Waterbirds play an important role in several spheres of human interest: culturally, socially, scientifically and as a food resource. Several species, such as cranes, swans, geese and ducks, are revered.

Waterbirds are broadly defined as: “birds ecologically dependent on wetlands”. It includes traditionally recognised groups popularly known as wildfowl, waterfowl and shorebirds or waders. In addition to these groups, there are other birds also dependent on wetlands, such as kingfishers, birds of prey and passerines. These birds benefit from efforts undertaken to conserve waterbirds.

Waterbirds are an essential component of most wetland ecosystems, as they form important links in the food web and nutrient cycles. Many wetland species also play a role in the control of agricultural pests, whilst some species are themselves considered pests of certain crops. After fish, birds are probably the most important faunal group that attracts people to wetlands.

Many waterbirds are migratory, undertaking annual journeys along different flyways spanning the length and breadth of the globe between their breeding and non-breeding grounds. During their annual

A Flyway is broadly defined as: the Migration route of a population, species, or group of species of birds, between a breeding area, through a series of staging sites (passage) and non-breeding area (wintering area).

migration, waterbirds stop for very short periods of time to rest and feed at staging

sites “stepping stones” that are essential for migration and crucial to their survival.

They regularly cross national boundaries and thus conservation of migratory waterbirds is clearly the collective responsibility of all countries along the flyway. During their annual migrations, the birds depend on a great diversity of habitats, ranging from the Arctic tundra to forests, rivers and estuaries, lakes and marshes, farm lands, rice fields, deserts, coastal marshes, sandy beaches, intertidal mudflats, coral reefs and atolls, and mangroves, most of which are wetlands.

The loss of waterbird habitats through direct and indirect modifications and unsustainable harvesting of waterbirds for human needs has led to a decline in several waterbird populations and species. Some of the most catastrophic losses have happened in the last few decades, and the list of threatened species in the Asia-Pacific region has expanded rapidly to include species from a large range of waterbird groups. It is vital to understand the underlying causes for the decline in populations and to control these trends in order to prevent the loss of key components of the biodiversity of wetland habitats. The number of waterbirds using a particular habitat is related to its type and quality, abundance and availability of food, and level of disturbance.

Monitoring of waterbirds provides valuable information on the status of wetlands, and can be a key tool for increasing awareness of wetlands importance and conservation values.

A review of the status of wetlands in Asia undertaken during the late 1980s (Scott, 1989; Scott & Poole, 1989) revealed that 85% of important wetlands were under some form of threat. The main threats included general disturbance from human settlement and agricultural encroachment; drainage and

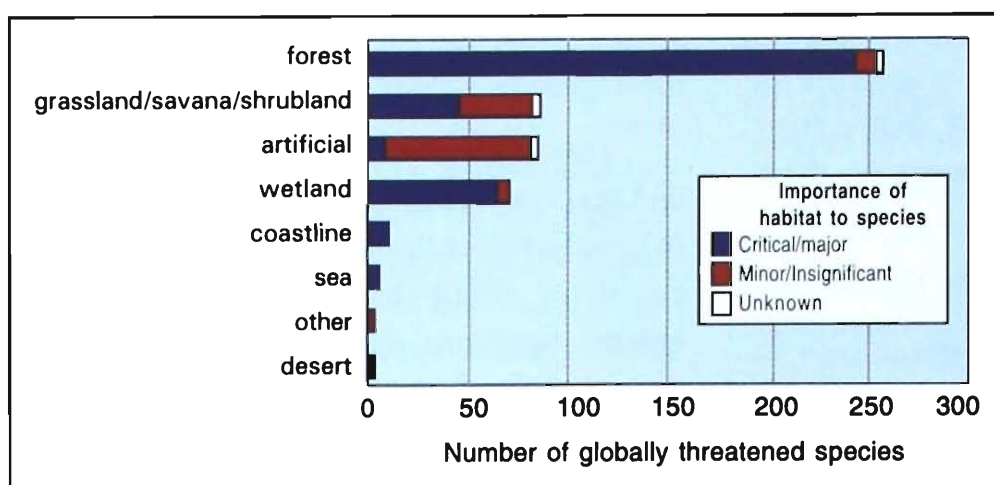


Fig. 4.6 The habitat upon which threatened Asian birds depend
(Source: BirdLife Int., 2003)

reclamation for agriculture; domestic, industrial waste water and pesticide pollution; over-exploitation of fishery resources and associated disturbance; commercial logging and other forestry activities in wetland-associated forests; and degradation of watersheds resulting in increased soil erosion and siltation and decreased water quality. Fifty percent of these wetlands were reported to be under moderate or severe threat, providing an indication of the severity of human impact on the habitats. The Wetlands Policy of the Commonwealth Government of Australia (Environment Australia, 1997) notes the loss of wetlands and major factors leading to degradation and loss; it also states that the greatest threat, even today, remains ignorance of the importance of wetlands and the roles they play. Wetlands of the Pacific Islands region, while generally subject to lower population pressure than in Asia, are nevertheless increasingly under threat from expanding agriculture, logging and unsustainable harvesting of marine and freshwater resources (R. Jaensch, unpublished).

In order to address waterbird conservation issues, therefore, it is vital to address issues associated with conservation and the sustainable use of wetlands and other habitats used by the birds during their annual migratory cycles.

4.2.3 Loss of habitat
The loss of habitat through changes in land use is the most severe threat to the conservation of waterbirds.

Drainage and reclamation of wetlands, for example for agriculture and aquaculture, continues in most countries. In contrast to habitat loss in the

temperate and tropical regions, there has been less impact in the high arctic region, where most migratory waterbirds breed. However, expansion of oil and gas developments in Alaska and Russia could adversely affect waterbirds on their breeding grounds.

4.2.4 Degradation of habitat

In addition to the loss of habitat, degradation of the quality of habitat occurs due to over-exploitation of wetland resources (inland and coastal fisheries, mangroves, and reeds) and changes in the watersheds resulting from logging and mining, urban, rural and industrial developments. Siltation and increased sediment loads from deforestation and urban developments are adversely affecting many inland and estuarine wetlands. Pollution and eutrophication from industrial, agricultural and domestic operations are creating severe problems for inland and coastal wetlands; these contaminants directly and indirectly affect waterbirds. Degradation of habitat reduces the ability of the habitat to support a high density and diversity of birds.

4.2.5 Threats due to introduced/exotic species

Control of undesirable introduced species:

The area that has received least attention in terms of practical implementation through enforcement is the management and/or

eradication of species introduced outside their natural ranges that threaten native biodiversity or economic interests such as agriculture or forestry. The Convention on the Conservation of Biodiversity requires that signatory parties “... control or eradicate those alien species which threaten ecosystems, habitats or species....”

Wetlands across the region have been adversely affected by the introduction of plant species such as Water Hyacinth *Eichhornia crassipes*, *Salvinia* sp. and *Mimosa pigra*. These plants have led to long-term changes of the nature and biodiversity of the wetlands; in turn, this has had a significant effect on the use of these wetlands by waterbirds and other species. Precedents from elsewhere in the world suggest that other introduced species, including fishes, mammals, birds, and reptiles, may have a negative impact on waterbirds, although quantitative information is lacking from the Asia-Pacific Zone. Human development in the arctic region has increased natural predator populations adversely affecting breeding waterbirds.

4.2.6 Effects of climate change

Coastal ecosystems, islands and atolls, with their mangroves, inter-tidal mudflats and coral reefs, are prone to predicted “climate change” impacts such as increased sea levels, which may adversely affect the present spatial distribution and dynamics of coastal ecosystems and their flora and fauna. Several species of migratory waterbirds, especially shorebirds, depend on these habitats and it is likely that sea-level rise would have serious implications for their populations. In addition, global warming is believed to lead to the slow drying or raising salinity of inland wetlands, especially in areas where rivers are diverted from the wetlands for irrigation or other uses. However, more information is required before

the effects of these potential impacts are understood.

4.2.7 Harvesting of waterbirds

Migratory waterbirds, their eggs and young are traditionally harvested and collected in several countries for their high subsistence value, to trade domestically or internationally, or for sport. Whilst in some countries hunting is strictly regulated by legislation, uncontrolled and illegal activities are still a major problem in many important staging and non-breeding areas. Unregulated and poorly monitored harvesting of waterbirds may have serious consequences on the species, leading to rapid decline in populations. When unmanaged harvesting is combined with the destruction of habitats, species are vulnerable to faster rates of decline or extinction.

4.2.8 Information Needs for Waterbird and Wetland Conservation

Baseline information is a prerequisite to plan and monitor management of waterbirds and their habitats. Without scientifically robust time series information on population status and distribution, success or failure of active conservation cannot be assessed.

Comprehensive information on breeding ranges, migration routes, important staging areas, non-breeding sites, feeding requirements, quality of habitat and carrying capacity and seasonal/annual use of habitat and population changes is not available for many waterbirds. Monitoring of bird distributions and populations during the migration cycle is still in its infancy; thus, population sizes and trends of many species remain unknown. As well, quantitative information is lacking on the socio-economic importance of the harvest of waterbirds in the Asia-Pacific region.

The exchange of information on waterbirds and their habitats will facilitate their conservation. Such information exchange can benefit greatly from the use of computer-based information storage and retrieval systems, especially as computer-based literacy increases across the region.

There are four main global/regional databases that store information on waterbirds and their habitats:

- i) Database of Wetlands of International Importance (Convention on Wetlands)
- ii) Important Bird Area Database (BirdLife International)
- iii) International Waterbird Census Database (Wetlands International)
- iv) World Bird Database (BirdLife International)

The Asian Waterfowl Census, part of the International Waterbird Census, collects, collates and disseminates information on the distribution of waterbirds and wetlands. The programme needs to be expanded in the Asia-Pacific region. An Asian Wetland Inventory database is being developed to collect standardised information on wetlands of international importance throughout Asia.

4.3 Conservation

The Ramsar Convention prefaces its policies by the definition “*wise use of wetlands*”, this clearly indicates the conservation of the wetland habitats but at the same time ensuring long term benefit to the local communities dependent on them. It can best be interpreted as providing maximum benefits to the present generation while keeping its potential for meeting the needs of future generations (Rao & Datye, 2003). The authors further emphasise that the overall concept of wetland management is not only the protection of wetland resources but also their balanced use for human benefit. Wise use emphasises incorporating social, economic and ecological considerations in the resource management.

According to Rao & Datye (2003) the essential features of wise use include:

- Assessment of wetland resources;
- Developing national wetland policy/strategy supported by legislative measures for regulation;
- Inventory;
- Capacity building;
- Conservation of wetland sites
- Research

Photo: Vijay Cavale



Bar-headed Geese

Wetland Habitats



Freshwater Lake



Reservoir



Freshwater Stream



Paddyfield



Temporary Monsoon Pool



Moorland



Backwater



Backwater Swamp

Photos: ZSI, Calicut

Wetland Habitats

Photo: B.C. Choudhury



Sailine Lake



Sailine High Altitude Lake

Photo: G.S. Rawat

Photo: ZSI, Chennai



Coral Reef



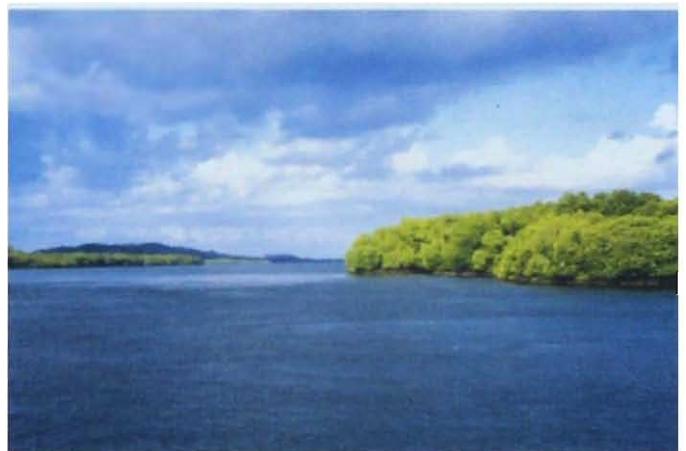
Mangrove

Photo: ZSI, Chennai

Photo: ZSI, Chennai



Estuary



Creek

Photo: ZSI, Chennai

Photo: ZSI, Chennai



Island



Gulf of Manar

Photo: ZSI, Chennai

5. PROTECTED AREA NETWORK

5.1 Wetland Sanctuaries and National Parks

The need for conservation of an area is directly related to its biological value, which consists of the biological communities and their component plant and animal species. In simple term, it may be defined as the more communities and more species in an area, more value must be given to it. In addition, if these communities or these species are unique to that area (endemic or threatened due to one or the other reason) the area becomes of even greater value. The more value placed on an area, the greater need for its effective conservation.

India has a well-developed Protected Area Network (PAs) comprising 89 National Parks (covering an area of 37,530.76 km², or 1.14% of the country's geographical area) and 489 Wildlife Sanctuaries (1,17,042.04 km², or 3.56% of the country's geographical area). Put together the 578 PAs cover about 4.70% of the country's geographical area). It is now proposed to increase it to 870 PAs, with an area of 1,88,764.35 km², or 5.74% of the country's geographical area (Rodgers *et al.*, 2002).

Choudhury & Raghu Ram (2003) have reviewed the wetland-protected areas in the country and listed 55 wetland PAs in India (*cf.* Hussain, 1996). Many of the specific wetland types, such as mangroves and coral reefs, have been declared protected areas. The authors further state that about 50 NPs and Sanctuaries have man-made wetlands within in their boundaries or in adjoining areas. Since the

ownership of wetlands is generally not well defined, the focus so far has been to protect the terrestrial areas which are legally own by the states.

This under-representation of wetlands in the PA network does not reflect in any way their ecological, socio-economic, cultural, and aesthetic significance, but only highlights problems with ownership, as they are owned by multiple agencies, in contrast to forests which are owned by the state. The second impediment is dependence of a large human population on wetlands for their daily needs. By existing laws declaring them as protected areas would put immediate restrictions on their use for humans, which would be against the spirit of Ramsar Convention which advocates their wise use with sustainable development. Many other factors have also contributed to their under-representation in the PA network (Choudhary & Raghu Ram, *l.c.*). The brief list is below

Lack of inventory of wetlands in the high altitude Himalayas.

Rapidly changing land use pattern in the foothills of Himalayas.

Fragmentation, overuse and abuse of wetlands in the Gangetic plains.

Seasonal nature of wetlands and their existence in the arid and semi-arid regions of the country.

The recent Biodiversity Conservation Project (BCP) highlights the inadequate data on many Indian wetlands, which deserve protection status.

The Directory of Indian Wetlands (1993), while listing the Indian wetlands has identified about 140 wetlands of importance and further suggested that a number of them should be included under PA network because of their biodiversity and ecological importance. MOEF in 1997 listed the wetlands of national importance. India as signatory to Ramsar Convention has so far declared 19 Ramsar sites.

Rodgers *et al.* (2002) have updated the protected area network in India based on the 10 biogeographical zones and 26 biotic provinces in the country (Fig. 5.1 & 5.2). It indicates that the PAs are not uniformly distributed in various zones. In the present study we have further appended the wetland PA network from the Wild Life database in the Wild Life Institute of India and have prepared a detailed inventory of wetland PAs and waterbirds sanctuary in India. These have been overlaid on the biogeographical zones map of India in GIS domain (Fig. 5.3).

In the spirit of the Ramsar Convention which professes 'wise use' of wetlands on sustainable basis, however, our country will have to evolve bold initiatives for wetland conservation (Choudhury and Raghu Ram, *l.c.*).

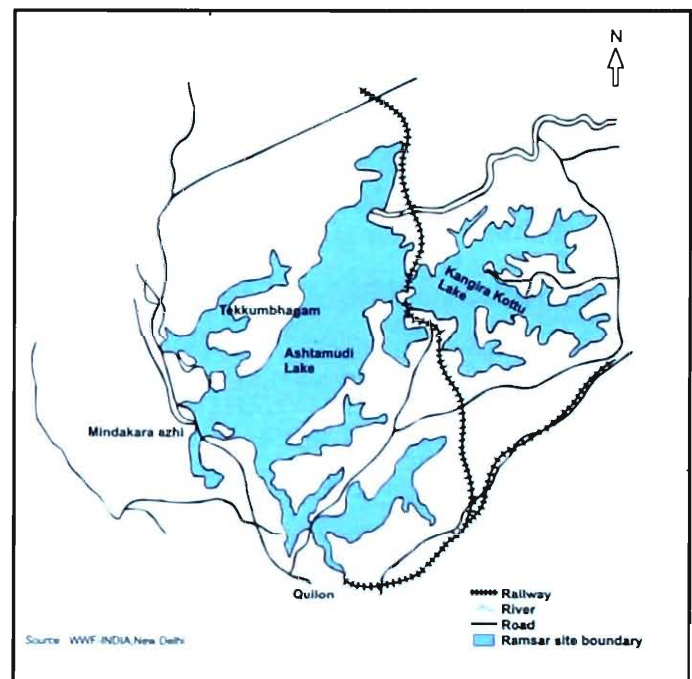
5.2 Ramsar Sites

The convention on wetlands came into force for India on 1st February 1982. India now has 19 sites designated as Wetlands of International Importance, with a surface area of 648,507 hectares. It is proposed by the Ministry of Environment and Forests to increase this number by declaring another 12 sites, namely, Hokera, Pangong Tso, Mansar Sunsar (J&K), Chandertal, Renuka (H.P.), Upper Ganga - Narora to Brijghat (U.P.), Rann of Kutch, Nalsarovar (Gujarat), Thane Creek (Maharashtra), Pulicat (Andhra Pradesh), Sunderbans (W.B.), and Rudrasagar (Tripura) (Fig. 5.4).

Descriptions, maps and some photographs of the Indian Ramsar Sites have been adapted from "A Fact File on India's Wetlands of International Importance" (2002) prepared by the World Wide Fund for Nature - India (WWF-India) under the auspices of the Ministry of Environment and Forests, New Delhi.

Key: site; date of designation; region, province, state; surface area; co-ordinates site.

1. **Ashtamudi Lake.** 19/08/02. Kerala. 61,400 ha. 08°57'N 076°35'E. An extensive estuarine system, the second largest in Kerala State, which is of extraordinary importance for its hydrological functions, its biodiversity, and its support for fish.



The site contains a number of mangrove species as well as over 40 associated plant species, and 57 species of birds have been observed, including six that are migratory. Nearly 100 species of fish sustain a lively fishing industry, with thousands of fishermen depending directly upon the estuary for their livelihood. Population density and urban pressures pose threats to the site, including pollution from oil spills from thousands of fishing boats and from industries in the surrounding area and conversion of natural

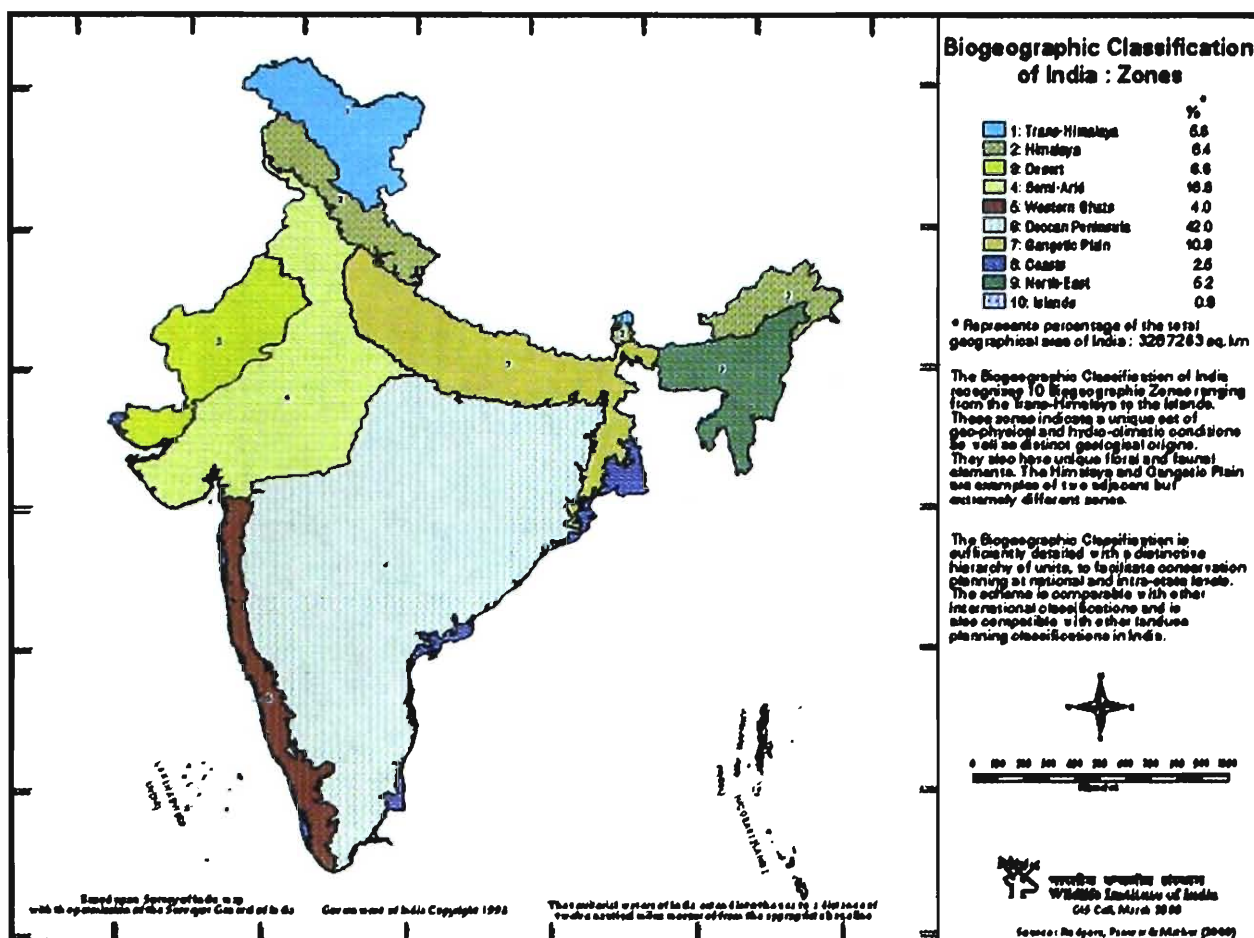


Fig. 5.1 Biogeographic Classification of India : Zones (Source: Rodgers, Panwar & Mathur, 2002)

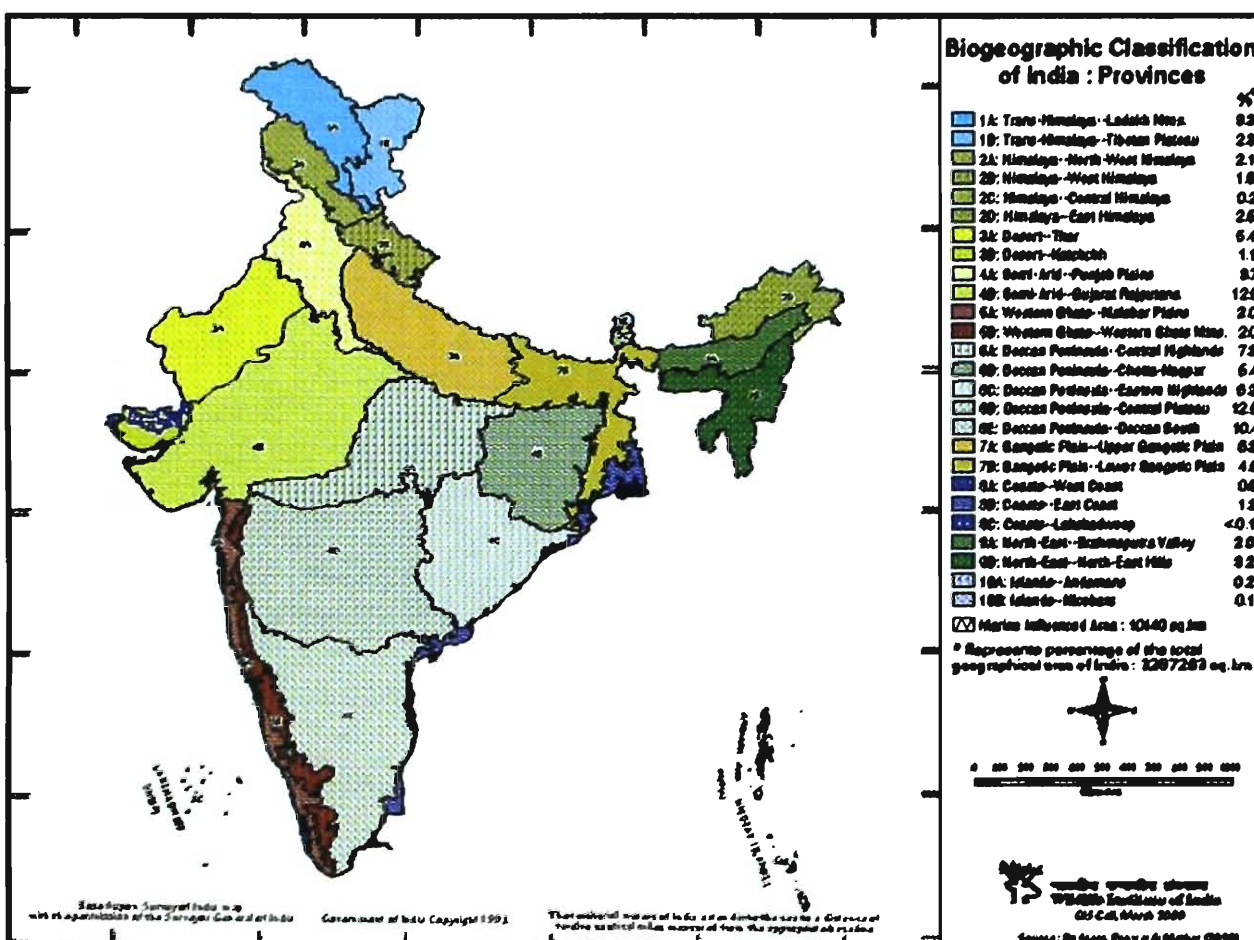


Fig. 5.2 Biogeographic Classification of India: Provinces (Source: Rodgers, Panwar & Mathur, 2002)

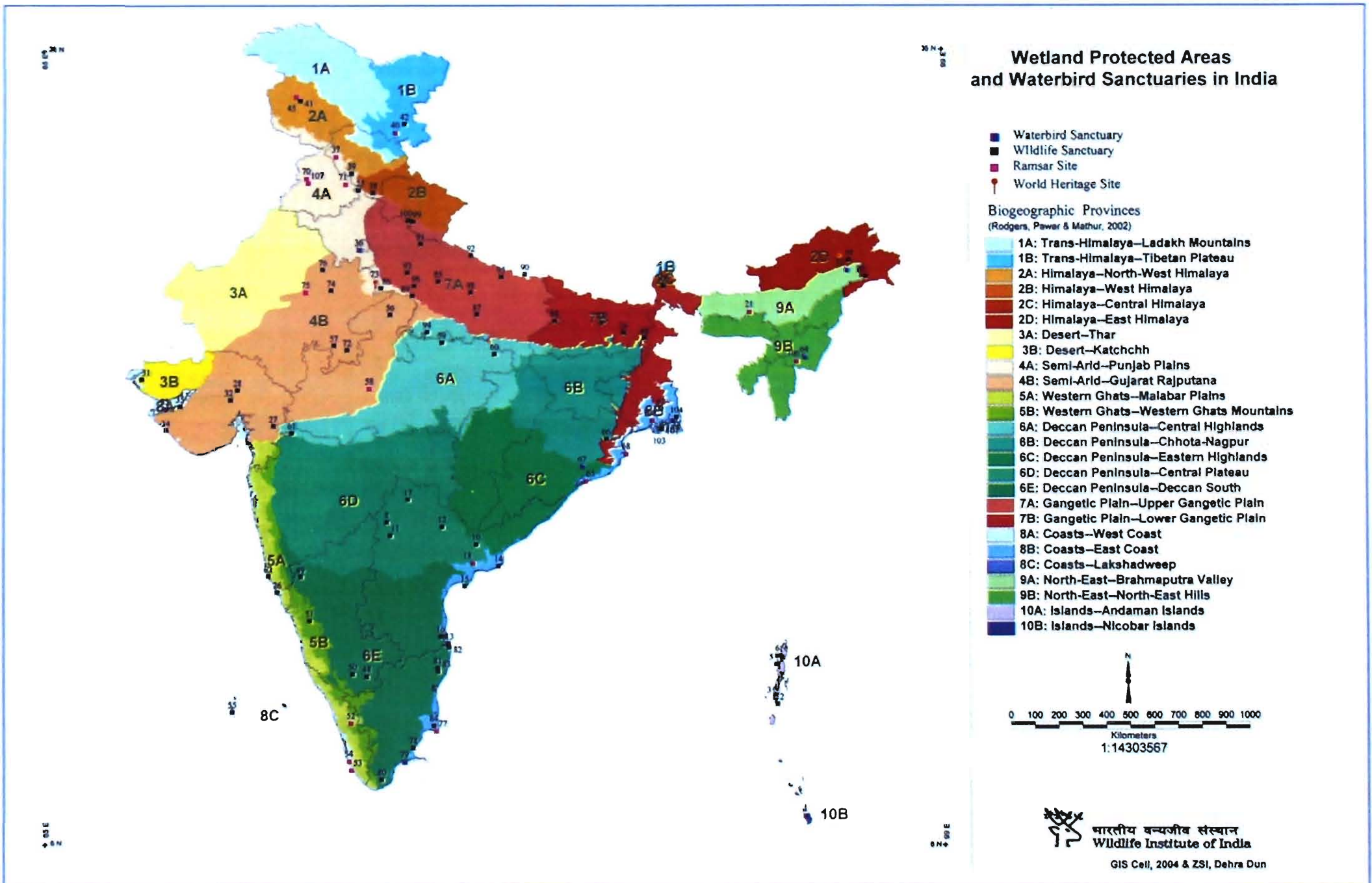


Fig. 5.3 Wetland Protected Area Network in India



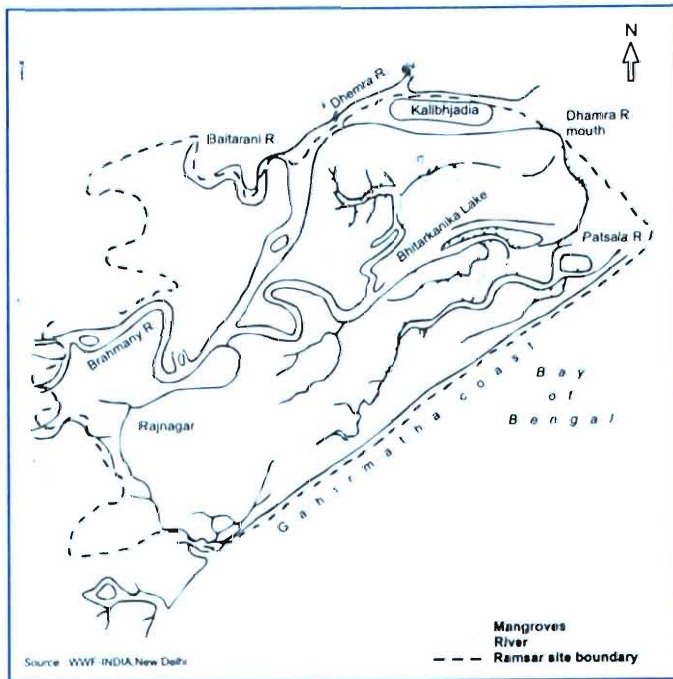
Fig. 5.4 Location map of Ramsar sites in India

habitat for development purposes. Ramsar site no. 1204.

2. **Bhitarkanika Mangroves.** 19/08/02. Orissa. 65,000 ha. 20°39'N 086°54'E. Wildlife Sanctuary. One of the finest remaining patches of mangrove forests

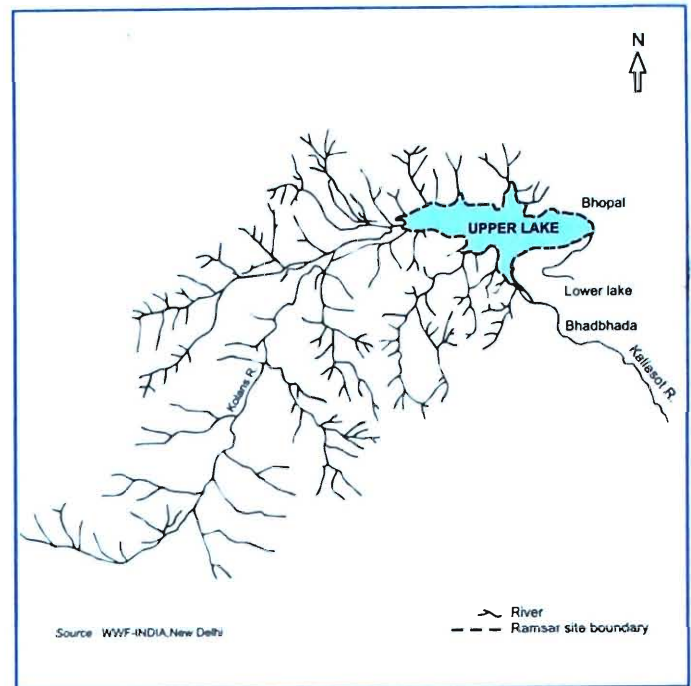
along the Indian coast - 25 years of continued conservation measures have made the site one of the best known wildlife sanctuaries.

The site's Gahirmatha beach is said to host the largest known Olive Ridley sea turtle



nesting beach in the world, with half a million nesting annually, and the site has the highest density of saltwater crocodiles in the country, with nearly 700 *Crocodylus porosus*. It is a major breeding and wintering place for many resident and migratory waterbirds and is the east coast's major nursery for brackish water and estuarine fish fauna. Like many mangrove areas, the dense coastal forests provide vital protection for millions of people from devastating cyclones and tidal surges - of India's 58 recorded species of mangroves, 55 species are found in Bhitarkanika, a wider mangrove diversity than in the Sundarbans! Traditionally, sustainable harvesting of food, medicines, tannins, fuel wood, and construction materials, and particularly honey and fish, has been the rule, but population pressures and encroachment may threaten that equilibrium. Ramsar site no. 1205.

3. Bhoj Wetland. 19/08/02. Madhya Pradesh. 3,201 ha. 23°14'N 077°20'E. Two contiguous human-made reservoirs - the "Upper Lake" was created in the 11th century by constructing an earthen dam across the Kolans River, and the lower was constructed nearly 200 years ago, largely through leaks from the Upper, and is surrounded by the city of Bhopal.



The lakes are extremely rich in biodiversity, particularly macrophytes, phytoplankton, zooplankton, both natural and cultured fish species, resident and migratory birds, insects, reptiles and amphibians. Since implementation of a management action plan in 1995 with financial support from the government of Japan, a number of bird species have been sighted which had rarely or never before been seen in the region. WWF-India has been of great assistance in preparing the site's designation. Ramsar site no. 1206.

4. Chilika Lake. 01/10/81. Orissa. 116,500 ha. 19°42'N 085°21'E. Brackish lake separated from the Bay of Bengal by a long sandy ridge and subject to sea water exchange, resulting in extreme seasonal fluctuations in salinity in different sections of the lake.

Saline areas support aquatic algae. The site is an important breeding, wintering and staging area for 33 species of waterbirds. It also supports 118 species of fish, including commercially important species. Significant numbers of people are dependent upon the lake's resources. Placed on the Montreux Record in 1993 due to problems caused by siltation and sedimentation which was choking the mouth of the lake; removed from the Record in 2002 following rehabilitation efforts

Photo: ZSI, Calicut



Ashtamudi Lake

Photo: B. C. Choudhury



Bhitarkanika Wetland

Photo: ZSI, Jabalpur

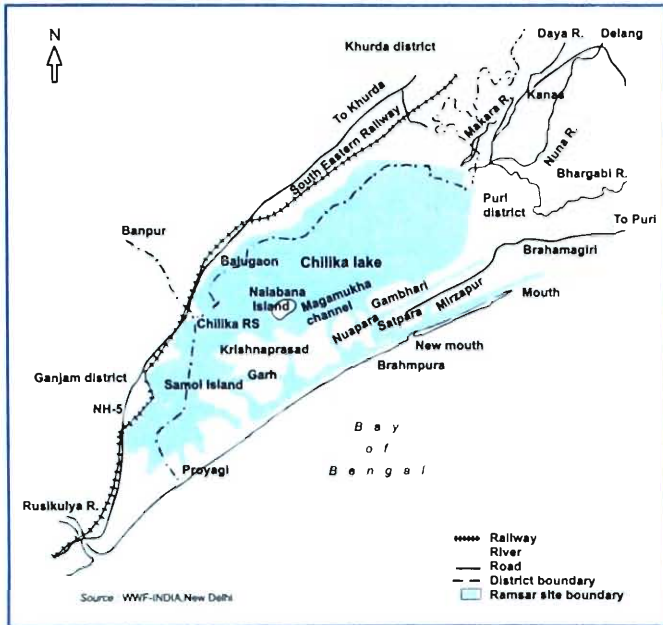


Bhoj Wetland, Bhopal

Photo: B. C. Choudhury



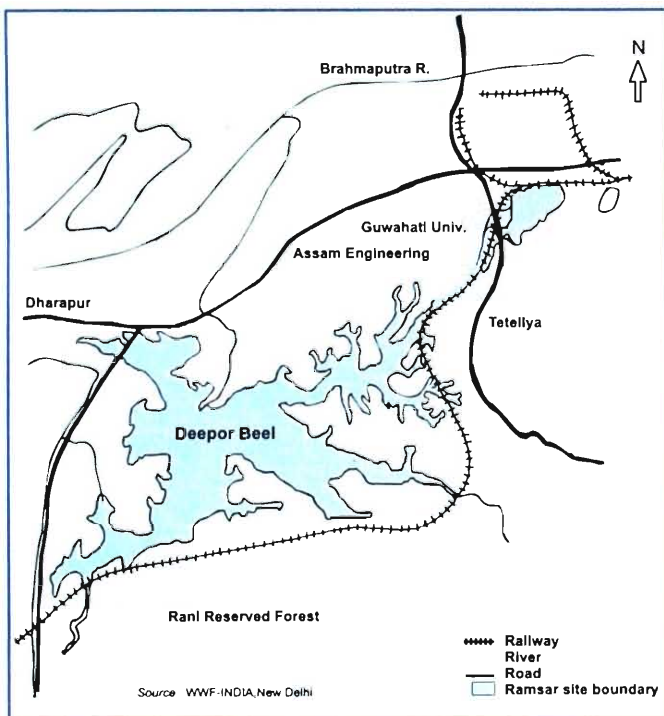
Chilika Lake



for which the Chilika Development Authority received the Ramsar Wetland Conservation Award in 2002. Subject of a Ramsar Advisory Mission, 2001. Ramsar site no. 229.

Added to the **Montreux Record**, 16 June 1993; removed from the Record, 11 November 2002.

5. **Deepor Beel**. 19/08/02. Assam. 4,000 ha. 26°08'N 091°39'E. Sanctuary. A permanent freshwater lake in a former channel of the Brahmaputra river, of great biological importance and also essential as the only major storm water storage basin for the city of Guwahati.



The beel is a staging site on migratory flyways and some of the largest concentrations of aquatic birds in Assam can be seen here, especially in winter. Some globally threatened birds are supported, including Spotbilled Pelican (*Pelicanus philippensis*), Lesser and Greater Adjutant Stork (*Leptoptilos javanicus* and *dubius*), and Baer's Pochard (*Aythya baeri*). The 50 fish species in the Beel provide livelihoods for people of surrounding villages, and nymphaea nuts and flowers, as well as ornamental fish, medicinal plants, and seeds of the Giant water lily *Euryale ferox* provide major revenue sources in local markets; orchids of commercial value are found in the neighboring forest. Potential threats include over-fishing and hunting pressure upon waterbirds, pollution from pesticides and fertilizers, and infestation by water hyacinth *Eichhornia crassipes*. A proposal to create a sewage canal from the city directly to the beel is considered to be disastrous in its potential effects. Ramsar site no. 1207.

6. **East Calcutta Wetlands**. 19/08/02. West Bengal. 12,500 ha. 22°27'N 088°27'E. World-renowned as a model of a multiple-use wetland, the site's resource recovery systems, developed by local people

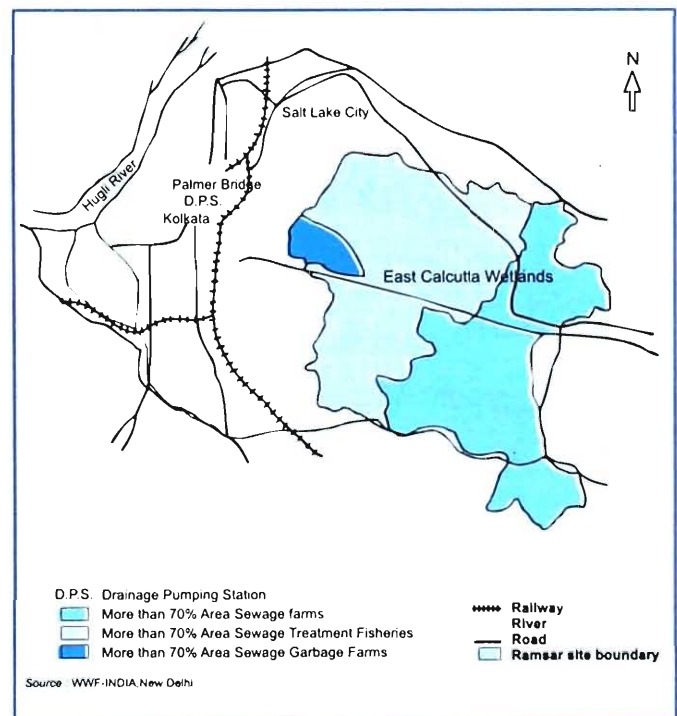


Photo: WWF-India, New Delhi



Deepor Beel

Photo: WWF-India, New Delhi

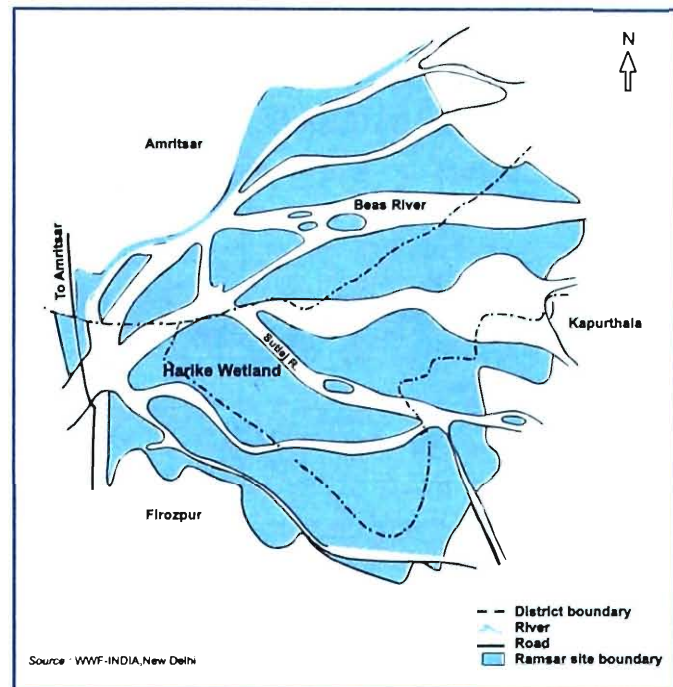


East Calcutta Wetland

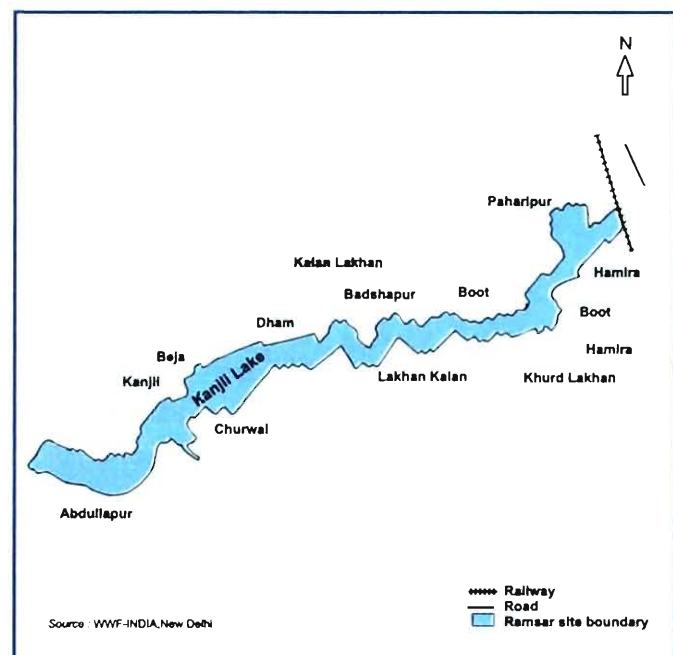
through the ages, have saved the city of Calcutta from the costs of constructing and maintaining waste water treatment plants.

The wetland forms an urban facility for treating the city's waste water using the treated water for pisciculture and agriculture, through the recovery of nutrients in an efficient manner - the water flows through fish ponds covering about 4,000 ha, and the ponds act as solar reactors completing most of their bio-chemical reactions with the help of solar energy. Thus the system is described as "one of the rare examples of environmental protection and development management where a complex ecological process has been adopted by the local farmers for mastering the art of resource recovery" (RIS). The wetland provides about 150 tons of fresh vegetables daily, as well as some 10,500 tons of table fish per year, the latter providing livelihoods for about 50,000 people directly and as many again indirectly. The fish ponds are mostly operated by worker co-operatives, in some cases in legal associations and in others in co-operative groups whose tenurial rights are under legal challenge. A potential threat is seen in the recent unauthorized use of the waste water outfall channels by industries which add metals to the canal sludge and threaten the edible quality of the fish and vegetables. Ramsar site no. 1208.

7. **Harike Wetland.** 23/03/90. Punjab. 4,100 ha. 31°13'N 075°12'E. Bird Sanctuary. A shallow water reservoir with thirteen islands at the confluence of two rivers. Dense floating vegetation covers 70% of the lake. An important site for breeding, wintering and staging birds, supporting over 200,000 Anatidae (ducks, geese, swans, etc.) during migration. The entire lake is leased on an annual basis to commercial fishery organizations. Ramsar site no. 462.



8. **Kanjli Lake.** 22/01/02. Punjab. 183 ha. 31°25'N 075°22'E.



A permanent stream, the Kali Bein, converted by construction of a small barrage in 1870 into a water storage area for irrigation purposes. The site fulfils Criterion 3 because of its importance in supporting a considerable diversity of aquatic, mesophytic, and terrestrial flora and fauna in the biogeographical region, and acts also as a key regulator of groundwater discharge and recharge with the seasons. By this means and by direct abstraction of water for irrigation by the local population, the site

Photo: J. M. Julka



Harike Wetland

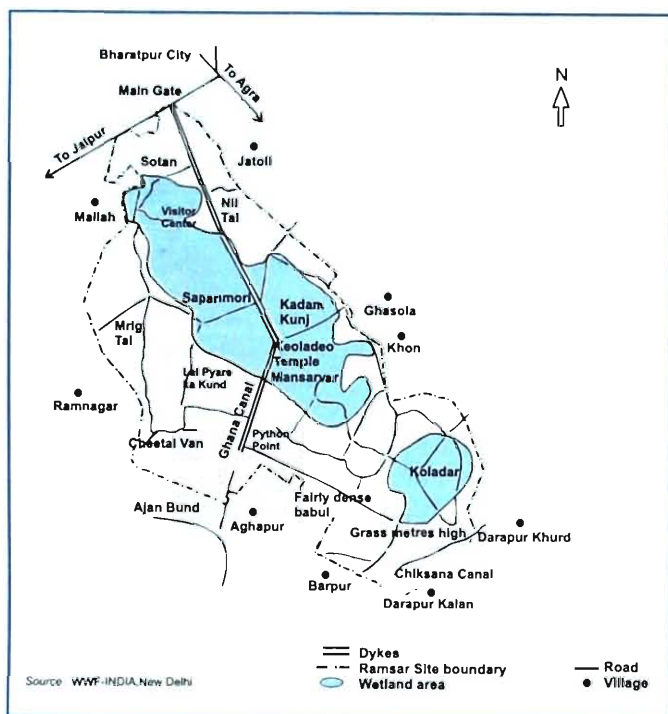
Photo: PSCST, Chandigarh



Kanjli Wetland

plays a crucial role in the agriculture which predominates on the surrounding fertile plain, with fewer pressures upon water supplies than elsewhere in the Punjab. The invasive water hyacinth is present and must be removed from time to time; increasing pollution levels, deforestation in the catchment area, and excessive grazing are seen as potential threats. The stream is considered to be the most significant in the state from the religious point of view, as it is associated with the first guru of the Sikhs, Shri Guru Nanak Devji. The stream itself and surrounding marsh is under provincial ownership and surrounding areas privately owned. The site is a centre for environmental tourism and picnicking. Ramsar site no. 1160.

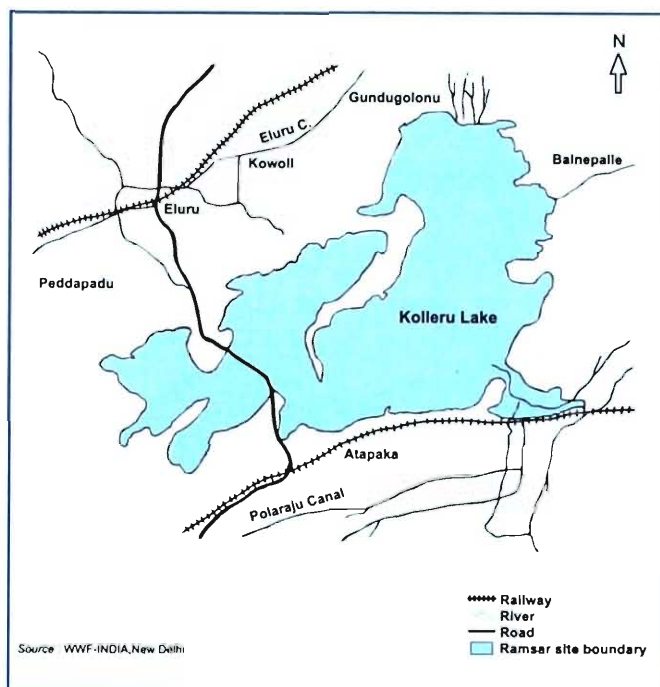
9. Keoladeo National Park. 01/10/81. Rajasthan. 2,873 ha. 27°13'N 077°32'E. Added to the **Montreux Record**, 4 July 1990. World Heritage Site. National Park. Bird Sanctuary.



A complex of ten artificial, seasonal lagoons, varying in size, situated in a densely populated region. Vegetation is a mosaic of scrub and open grassland that provides habitat for breeding, wintering and staging migratory birds. Also supported are five species of ungulates, four species of cats, and two

species of primates, as well as diverse plants, fish and reptiles. The canal provides water for agriculture and domestic consumption. Cattle and water buffalo graze on the site. A field research station exists. Placed on the Montreux Record in 1990 due to “water shortage and an unbalanced grazing regime”. Additionally, the invasive growth of the grass *Paspalum distichum* has changed the ecological character of large areas of the site, reducing its suitability for certain waterbird species, notably the Siberian crane. Subject of Ramsar Advisory Missions in 1988 and 1990. Ramsar site no. 230.

10. Kolleru Lake. 19/08/02. Andhra Pradesh. 90,100 ha. 16°37'N 081°12'E. Wildlife Sanctuary.



The lake is situated between the two major river basins of the Godavari and the Krishna, fed by two seasonal rivers and a number of drains and channels, is a natural eutrophic lake, which functions as a natural flood balancing reservoir between the deltas of two rivers. It provides a habitat for a number of resident and migratory birds, including declining numbers of the vulnerable Grey Pelican (*Pelecanus philippensis*), and sustains both cultured and captured fisheries, agriculture and related

Photo: WWF - India, New Delhi

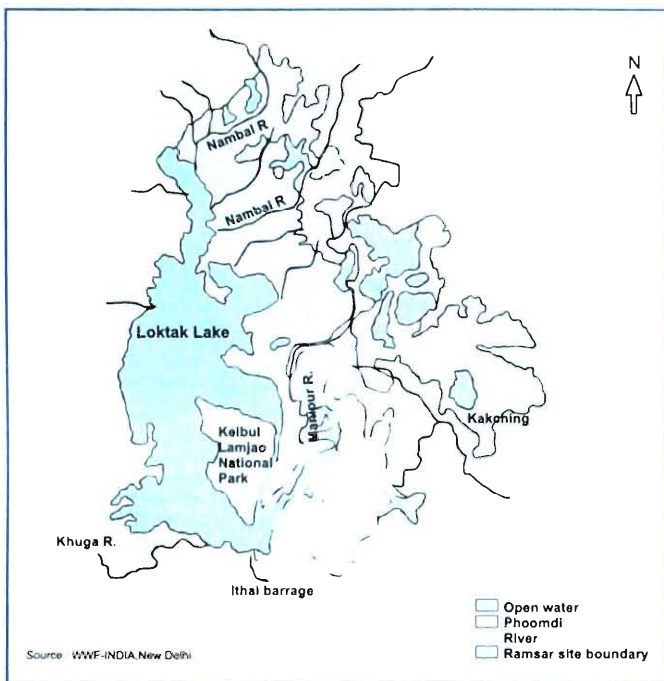
**Keoladeo National Park**

Photo: WWF-India, New Delhi

**Kolleru Lake**

occupations of the people in the area. Damage and losses due to flooding in monsoon seasons and partial drying out during summers, caused by inadequate management planning and action, are seen as areas for improvement. WWF-India has been of great assistance in preparing the site's designation. Ramsar site no. 1209.

11. Loktak Lake. 23/03/90. Manipur. 26,600 ha. 24°26'N 093°49'E. Added to the **Montreux Record**, 16 June 1993.



A large, but shrinking freshwater lake and associated swamplands supplied by several streams. Thick, floating mats of weeds covered with soil ('phumids') are a characteristic feature. The lake is used extensively by local people as a source of water for irrigation and domestic use and is an important wintering and staging area for waterbirds, particularly ducks. It also plays an important role in flood control. Included on the Montreux Record in 1993 because of ecological problems such as deforestation in the

catchment area, infestation of water hyacinth, and pollution. The construction of a dam for hydroelectric power generation and irrigation purposes has caused the local extinction of several native fish species. Ramsar site no. 463.

12. Point Calimere Wildlife and Bird Sanctuary. 19/08/02. Tamil Nadu. 38,500 ha. 10°19'N 079°38'E. Wildlife and Bird Sanctuary.

A coastal area consisting of shallow waters, shores, and long sand bars, intertidal flats and intertidal forests, chiefly mangrove, and seasonal, often-saline lagoons, as well as human-made salt exploitation sites. Some 257 species of birds have been recorded, 119 of them waterbirds, including the vulnerable species Spoonbill Sandpiper (*Euryhorhynchus pygmaeus*) and Grey Pelican (*Pelecanus philippensis*) and some 30,000 Greater and Lesser Flamingos. The site serves as the breeding ground or nursery for many commercially important species of fish, as well as for prawns and crabs. Some 35,000 fishermen and agriculturalists support their families around the borders of the sanctuary. Illegal collection of firewood and forest produce such as fruits (gathered by lopping off tree branches), the spread of *Prosopis chilensis* (Chilean mesquite), increasingly brackish groundwater caused by expansion of the

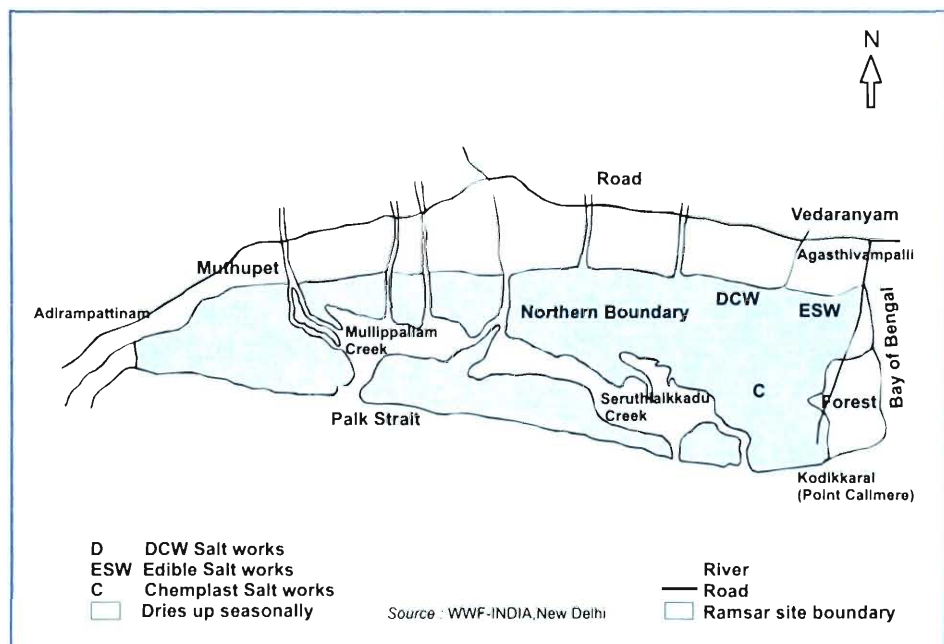


Photo: S. A. Hussain

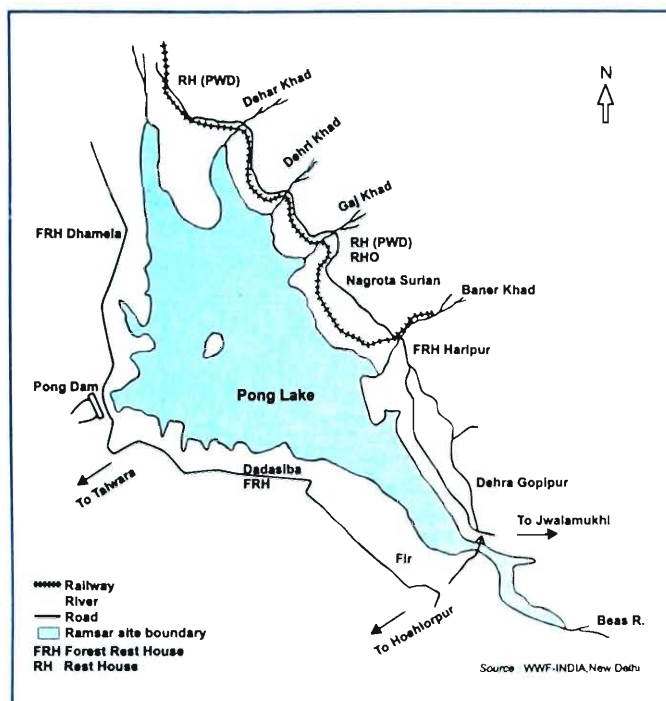
**Loktak Lake**

Photo: WWF - India, New Delhi

**Point Calimere Wildlife & Bird Sanctuary**

historical salt works, and decreasing inflow of freshwater are all seen as potential causes for concern. Visitors come to the site both for recreation and for pilgrimage, as it is associated with Lord Rama. Ramsar site no. 1210.

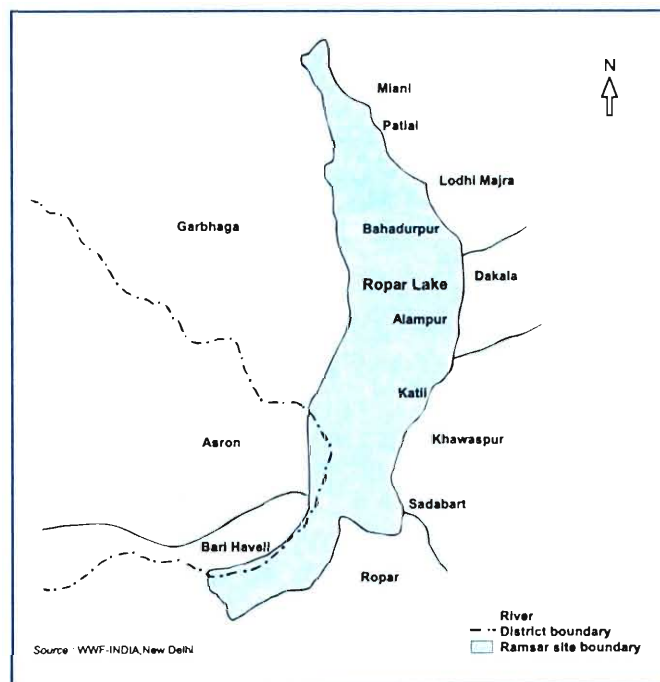
13. Pong Dam Lake. 19/08/02. Himachal Pradesh. 15,662 ha. 32°01'N 076°05'E. Wildlife Sanctuary.



A water storage reservoir created in 1975 on the Beas River in the low foothills of the Himalaya on the northern edge of the Indo-Gangetic plain. The RIS notes that “at a time when wetlands in northern India are getting reduced due to extensive drainage and reclamation, the avian habitats formed by the creation of the Pong Dam assume a great significance” - given the site’s location on the trans-Himalayan flyway, more than 220 bird species have been identified, with 54 species of waterfowl. Hydrological values include monsoon-season flood prevention, both in the surroundings and downstream due to water regulation, groundwater recharge, silt trapping and prevention of soil erosion; electricity is generated for this and neighboring states, and irrigation water is being channelled to fertile areas of the Punjab and Rajasthan deserts. Low-yield subsistence fishing existed prior to

impoundment, but since then a lucrative fishery has grown up, with 27 fish species and a yield increasing markedly each year some 1800 fishermen now have direct employment and 1000 families benefit indirectly. A nature conservation education centre is found on the island of Ransar or Ramsar (sic). Recent management strategies have shifted away from law enforcement and use restrictions towards more participatory approaches and community awareness, and the site is well suited to “community-based ecotourism” Ramsar site no. 1211.

14. Ropar Lake. 22/01/02. Punjab. 1,365 ha. 31°01'N 076°30'E. National Wetland.



A human made wetland of lake and river formed by the 1952 construction of a barrage for diversion of water from the Sutlej River for drinking and irrigation supplies. The site is an important breeding place for the nationally protected Smooth Indian Otter, Hog Deer, Sambhar, and several reptiles, and the endangered Indian Pangolin (*Manis crassicaudata*) is thought to be present. Some 35 species of fish play an important role in the food chain, and about 150 species of local and migratory birds are supported. Local fisheries are economically significant, and wheat, rice,

Photo: WWF-India, New Delhi



Pong Dam Lake

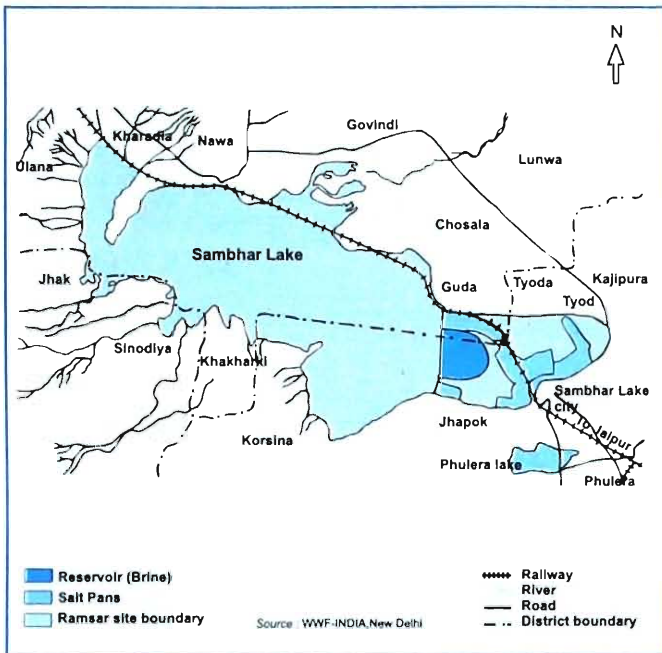
Photo: PSCST, Chandigarh



Ropar Wetland

sugar cane, and sorghum are cultivated in the surrounding area. Deforested local hills leading to siltation, and increasing industrialization causing an inflow of pollutants, are potential threats, and invasive weeds are a further cause for concern. Nature lovers, birdwatchers, swimmers and boaters visit the site in considerable numbers. Ramsar site no. 1161.

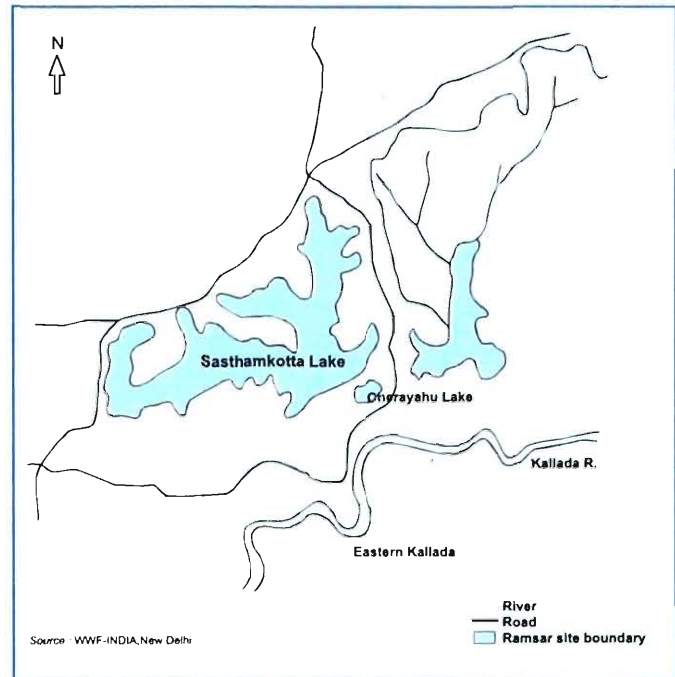
15. Sambhar Lake. 23/03/90. Rajasthan. 24,000 ha. 27°00'N 075°00'E.



A large saline lake fed by four streams set in a shallow wetland and subject to seasonal fluctuations. It is surrounded by sand flats and dry thorn scrub and fed by seasonal rivers and streams. The site is important for a variety of wintering waterbirds, including large numbers of flamingos. Human activities consist of salt production and livestock grazing. Ramsar site no. 464.

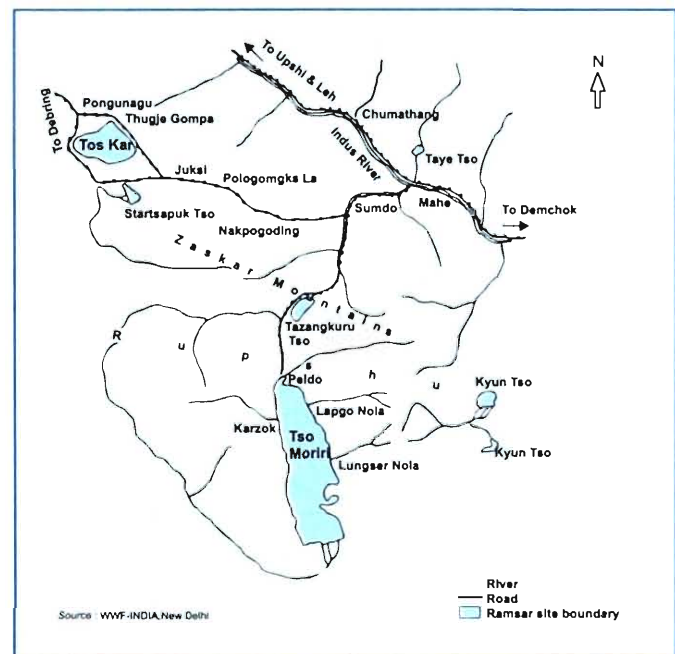
16. Sasthamkotta Lake. 19/08/02. Kerala. 373 ha. 09°02'N 076°37'E.

The largest freshwater lake in Kerala state in the southwest of the country, spring-fed and the source of drinking water for half a million people in the Kollam district. There are some 27 species of freshwater fishes are found in the lake. The water contains no common salts or other minerals and supports no water



plants; a larva called “cavaborus” abounds and eliminates bacteria in the water, thus contributing to its exceptional purity. The ancient Sastha temple is an important pilgrimage centre. WWF-India has been of great assistance in preparing the site’s designation. Ramsar site no. 1212.

17. Tso Moriri. 19/08/02. Jammu & Kashmir. 12,000 ha. 32°54'N 078°18'E. Wetland Reserve.



A freshwater to brackish lake lying at 4,595 m above sea level, with wet meadows and borax-laden wetlands along the shores.

Photo: B. C. Choudhury



Sambhar Lake

Photo: ZSI, Calicut



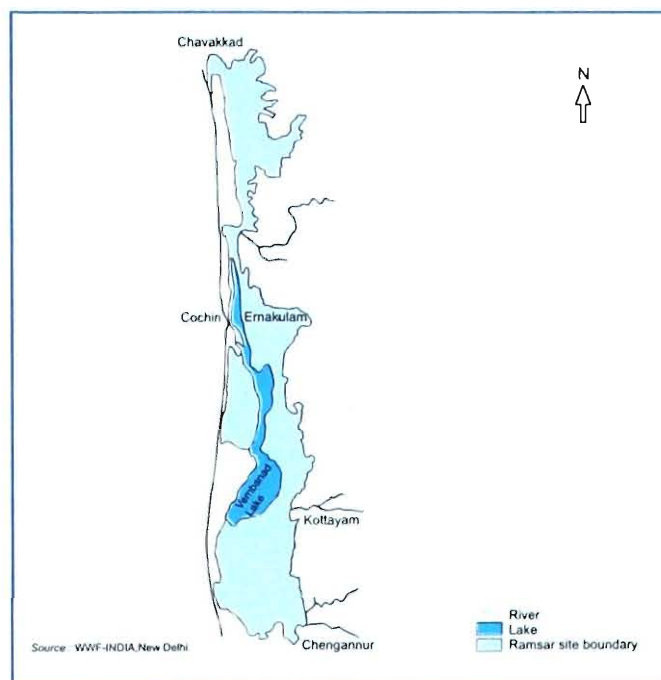
Sasthamkotta Lake

The site is said to represent the only breeding ground outside China for one of the most endangered cranes, the Black-necked Crane (*Grus nigricollis*), and the only breeding ground for Bar-headed Geese in India. The Great Tibetan Sheep or Argali (*Ovis ammon hodgsoni*) and Tibetan Wild Ass (*Equus kiang*) are endemic to the Tibetan plateau, of which the Changthang is the westernmost part.

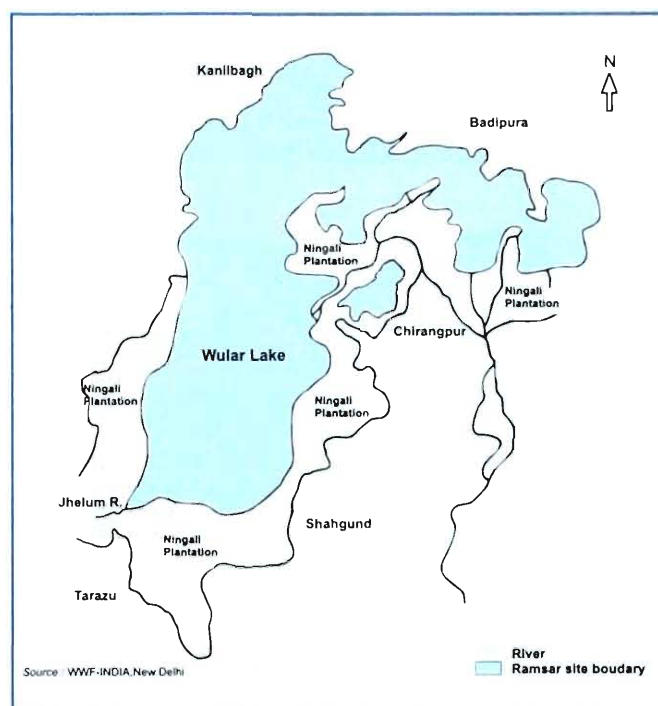
The barley fields at Korzok have been described as the highest cultivated land in the world. With no outflow, evaporation in the arid steppe conditions causes varying levels of salinity. Ancient trade routes which are now major trekking routes pass the site. The 400-year-old Korzok monastery attracts many tourists, and the wetland is considered sacred by local Buddhist communities and the water is not used by them. The local community dedicated Tsomoriri as a WWF Sacred Gift for the Living Planet in recognition of WWF-India's project work there. The rapidly growing attraction of the recently opened area to western tourists (currently 2500 per summer) as an "unspoilt destination" with pristine high desert landscapes and lively cultural traditions brings great promise but also potential threats to the ecosystem. Ramsar site no. 1213.

18. Vembanad - Kol Wetland. 19/08/02.
Kerala. 151,250 ha. 09°50'N 076°45'E.

The largest brackish, humid tropical wetland ecosystem on the southwest coast of India, it is fed by 10 rivers and typical of large estuarine systems on the west coast, renowned for its clams and supporting the third largest waterfowl population in India during the winter months. Over 90 species of resident birds and 50 species of migratory birds are found in the Kol area. Flood protection for thickly-populated coastal areas in three districts of Kerala is considered a major benefit, groundwater recharge helps to supply well water for the region, and the value of the system for the local transport of people and trade is considerable. Ramsar site no. 1214.



19. Wular Lake. 23/03/90. Jammu & Kashmir. 18,900 ha. 34°16'N 074°33'E.



The largest freshwater lake in India with extensive marshes of emergent and floating vegetation, particularly water chestnut, that provide an important source of revenue for the State Government and fodder for domestic livestock. The lake supports an important fishing industry and is a valuable source of water for irrigation and domestic use. The area is important for wintering, staging and breeding birds. Human activities include rice cultivation and tree farming. Ramsar site no. 461.

Photo: Parikshit Gautam



Tso Moriri

Photo: V. P. Uniyal



Grazing along Tso Moriri

Photo: ZSI, Calicut



Vembanad Wetland

Photo: WWF - India, New Delhi



Wular Lake

5.3 Montreux Sites

List of Wetlands of International Importance included in the Montreux Record in India

- Keoladeo National Park, designated 01/10/81, Rajasthan, 2,873 ha, Montreux Record 04/07/90
- Loktak Lake, designated 23/03/90, Manipur, 26,600 ha, Montreux Record 16/06/93

Refer to site details under Ramsar Sites above.

5.4 World Heritage Sites

List of Wetlands of International Importance includes Keoladeo National Park, designated 01/10/81, Rajasthan, 2,873 ha as a World Heritage Site in India.

5.5 Important Bird Areas (IBAs)

India is one of the 12-megabiodiversity countries with two global biodiversity hot spots, that is, the Western Ghats and NE Himalaya. The bird diversity is equally rich and current estimates show 1220 species of breeding, staging and wintering birds from diverse habitats (Manakadan & Pittie, 2001).

A widespread and well-established Protected Area Network comprising 489 Wildlife Sanctuaries, 89 National Parks, 19 Ramsar Sites and 13 Biosphere Reserves exist in the country (Rodgers, Panwar & Mathur, 2002). Nevertheless, the extensive human pressure resulting in habitat loss, and degradation due to a changing land use pattern has a detrimental impact culminating in marked reduction in abundance and range of several bird species.

In India now 79 species are Globally Threatened (GT), and a further 52 are listed as Near Threatened species, while many more are

declining and need urgent action for conservation.

In-situ conservation is the ideal way of protecting habitats. The identification of the key bird habitats is carried globally through the Important Bird Area (IBAs) programme of BirdLife International. The IBAs are sites of international significance for bird conservation. The Bombay Natural History Society (BNHS) is the BirdLife Partner in India and is co-ordinating this programme with funding from The Royal Society for Protection of Birds (RSPB), the BirdLife Partner in the United Kingdom.

Aims

The IBA Programme aims to identify, document and advocate the protection and management of a network of sites that are important for the long-term viability of naturally occurring bird populations throughout the geographic range of those bird species for which a site-based approach is appropriate.

The aims of the IBA programme are to:

- Contribute in the development of national conservation strategies, highlight sites which are threatened or inadequately protected.*
- Help build regional and national networks of ornithologists and conservationists.*
- Guide the work of international and national NGOs.*
- Influence global conventions, e.g., Biodiversity, Ramsar;*

The Indian IBA programme will also try to contribute in the following ways:

- Help identify high biodiversity areas.*
- Help identify future priorities for birds and biodiversity conservation action.*

- iii) *Provide decision makers with high quality biodiversity information for sustainable land and resource use.*
- iv) *Assist government in the implementation of international agreements such as the Convention on Biological Diversity.*
- v) *Provide material for education and training.*
- vi) *Contribute to the National Biodiversity Strategy and Action Plan.*

Criteria

Important Bird Areas Global Categories and Criteria are:

A1. Globally Threatened Species: The site regularly holds significant numbers of a globally threatened species, or other species of global conservation concern.

A2. Restricted-range species: The site is known or thought to hold a significant component of a group of species whose breeding distribution define an Endemic Bird Area (EBA) or Secondary Area (SA).

A3. Biome-restricted assemblage: The site is known or thought to hold a significant component of the group of species whose distributions are largely or wholly confined to one biome.

A4. Congregation: A site may qualify on any one of the four criteria listed below:

- i) Site known or thought to hold, on a regular basis, = 1% of a biogeographic population of a species.
- ii) Site known or thought to hold, on a regular basis, = 1% of the global population of a congregatory seabird or terrestrial species.
- iii) Site known or thought to hold, on a regular basis, = 20,000 waterbirds or = 10,000 pairs of seabirds of one or more species.

- iv) Site known or thought to exceed thresholds set for migratory species at bottleneck sites.

Congregatory IBA Inventories

A total of 139 sites has been identified across the states and Union territories of the country. A detailed state-wise list of IBAs in India is provided below (Islam & Rahmani, 2004).

5.6 Sacred wetlands

Yogesh Gokhale, *Centre for Ecological Sciences, Indian Institute of Science, Bangalore – 560012.*

In India sacred traditions of nature conservation are found in almost all parts. Mohenjodaro and Harappan civilizations had tradition of worshipping fig trees. Since that time the range of species to ecosystems is conserved religiously. There are mainly two kinds of sacred nature conservation practised traditionally by local societies, namely, Landscape level conservation practices and Species level conservation practices.

In case of the first practice a patch of local landscape or the whole landscape such as forest, grove, mountain, hillock, riverbed, streambed, or pond, is left aside or its use is regulated due to faith or fear associated with the local deity in that landscape. In the case of the second practice, specific species are given protection due to importance or economic importance.

Landscape level sacred conservation practices

1. *Sacred groves* – These are the patches of natural or near-natural vegetation, dedicated by local communities to their ancestral spirits or deities. They are protected by local communities, usually through customary taboos and sanctions with cultural and ecological implications.

2. *Sacred grazing woodlands* - Sacred grazing woodland is a popular practice in western Rajasthan, locally called *oran*. It is reported that *orans* account for 8 to 9 per cent of the desert area.
3. *Sacred alpine meadows* - In villages of Himalayan States alpine meadows are an important grazing resource. These meadows have been used in a regulated fashion traditionally by considering them sacred. In Uttaranchal these meadows are called *bugyal* but *rang* in Himachal Pradesh.
4. *Sacred waterbodies* The pools in streambeds and riverbeds of north Indian States Himachal Pradesh and Uttaranchal are protected because of religious importance and are called *machhiyal*. No one is allowed to kill fishes from the *machhiyal*. Along with *machhiyal* temple ponds in the southernmost state Kerala and in Maharashtra, mosque ponds in the Barak valley of north east India fishing is totally or partly restricted due to religious taboos.

Typology of sacred wetlands in India

The following types of sacred wetlands have so far been observed in India.

- a) **Lakes and temple tanks** - A large number of lakes all over India are known to be locally sacred. Some of the lakes are sacred due to mythological importance such as *Manas sarovar*, where several temple tanks are important due to the existence of important religious temples such as the Golden Temple at Amritsar in Punjab.
- b) **River systems** – Rivers at various stages are considered sacred and are worshipped. The sources of several rivers are sacred all over India, such as the Ganga, Yamuna, Kaveri, Godavari, Krishna,

Brahmaputra. The complete *rivers* are considered sacred. Stretches of streams, rivers are treated as sacred and certain restrictions are followed for not disturbing those stretches. Usually fishing is taboo from these stretches. But downstream fishing may be possible. This system is found in Himalayan states like Uttaranchal and Himachal Pradesh and is also observed in the Western Ghats of Karnataka. In the Western Ghats of Maharashtra, some streams are supposed to have seven mermaids (*Sati Asara*) who would lure people and ultimately kill them. Due to this fear the use of a certain stream is restricted.

- c) **Swamps** – In the Western Ghats there are forest pockets with streams harbouring one of the primitive ecosystems in the world known as the Myristica swamps. Out of 51 known swamps from the Uttara Kannada district of Karnataka, nine are sacred.

In Ladakh, high altitude wetlands on the western edge of the Tibetan plateau at altitudes between 4000 m and 5000 m include a number of sacred lakes. These lakes are so precious to the local Buddhist population that they will not use water or take anything from the lakes. They serve as the only breeding grounds for some rare birds and support unique flora and rare mammals.

In a nutshell, there are several anecdotal examples of sacred wetlands from various parts of the world. But no effort has been made to document these wetlands systematically in order to recognize the biodiversity potential in them. The Ramsar convention refers to the importance of the sacred nature of several wetlands all over the world. But there is a need to investigate these wetlands further from a bio-cultural point of view.

Table 5.1 List of wetlands identified under national wetland conservation programme

Sl. No.	Wetland	State	Sl. No.	Wetland	State
1.	Wular	Jammu & Kashmir	35.	Rasik Beel	West Bengal
2.	Tso Moriri	Jammu & Kashmir	36.	Nawabganj	Uttar Pradesh
3.	Tisgul Tso	Jammu & Kashmir	37.	Sandi	Uttar Pradesh
4&5.	Renuka & Pong Dam combined	Himachal Pradesh	38.	Lakh Bahoshi	Uttar Pradesh
6.	Chandratal	Himachal Pradesh	39.	Samaspur	Uttar Pradesh
7.	Harike	Punjab	40.	Sultanpur	Haryana
8.	Ropar	Punjab	41.	Bhindawas	Haryana
9.	Kanjli	Punjab	42.	Magadhi	Karnataka
10.	Chilika	Orissa	43.	Gudavi Bird Sanctuary	Karnataka
11.	Kabar	Bihar	44.	Bonal	Karnataka
12.	Sambar	Rajasthan	45.	Hidkal and Ghataprabha	Karnataka
13.	Kolleru	Andhra Pradesh	46.	Kaliveli	Tamil Nadu
14.	Loktak	Manipur	47.	Pallikarni	Tamil Nadu
15.	Asthamudi	Kerala	48.	Great Rann of Kachh	Gujarat
16.	Sasthamkotta	Kerala	49.	Thol Bird Sanctuary	Gujarat
17.	Ujni	Maharashtra	50.	Khijadiya Bird Sanctuary	Gujarat
18.	Nalsarovar	Gujarat	51.	Little Rann of Kachh	Gujarat
19.	Deepar Beel	Assam	52.	Pariej	Gujarat
20.	Rudrasagar	Tripura	53.	Wadhvana	Gujarat
21.	Hokersar	Jammu & Kashmir	54.	Nanikakrad	Gujarat
22.	Mansar-Surinsar	Jammu & Kashmir	55.	Barna	Madhya Pradesh
23.	Pongong Tsar	Jammu & Kashmir (Ladakh)	56.	Yashwant Sagar	Madhya Pradesh
24.	East Calcutta	West Bengal	57.	Wetland of Ken River	Madhya Pradesh
25.	Sunderbans	West Bengal	58.	National Chambal Sanctuary	Madhya Pradesh
26.	Point Calimer	Tamil Nadu	59.	Ghatigaon	Madhya Pradesh
27.	Kottuli	Kerala	60.	Ratapani	Madhya Pradesh
28.	Palak	Mizoram	61.	Denwa Tawa wetland	Madhya Pradesh
29.	Tamdil	Mizoram	62.	Kanha Tiger Reserve	Madhya Pradesh
30.	Barilla	Bihar	63.	Pench Tiger Reserve	Madhya Pradesh
31.	Kusheshwar Asthan	Bihar	64.	Sakhyasagar	Madhya Pradesh
32.	Ban Ganga Jhilmil Tal	Uttaranchal	65.	Dihaila	Madhya Pradesh
33.	Rewalsar	Himachal Pradesh	66.	Ranjitsagar	Jammu & Kashmir
34.	Ahiron Beel	West Bengal			

Source: Ministry of Environment and Forests.

Table 5.2 Statewise distribution of Wetland PAs, Waterbird Sanctuaries and Ramsar Sites in India

S1. No.	ID	Name	Year of Establish	District	Habitat	X_CO-ORD	Y_CO-ORD	Bio Unit	Area in km ²	Ramsar Sites
Andaman & Nicobar Islands										
1	1	Great Nicobar Island NP	1983	Andaman	Coastal	93.73000	7.13000	10A	281.50000	
2	2	Cinque Islands WLS	1987	Andaman	Coastal	92.70722	11.28639	10A	9.51000	
3	3	Rani Jhansi Marine NP	1996	Andaman	Coastal	92.60000	11.55000	10A	256.14000	
4	4	Lohabarrack WLS	1987	Andaman	Coastal	92.61695	11.63139	10A	22.21000	
5	5	South Reef Island WLS	1987	Andaman	Coastal	92.66000	12.78000	10A	1.17000	
6	6	North Reef Island WLS	1987	Andaman	Coastal	92.70000	13.09500	10A	3.48000 574.01000	
Andhra Pradesh										
7	8	Pocharam WLS	1952	Medak	Freshwater	77.95000	18.13333	06D	130.00000	
8	10	Papikonda WLS	1978	East GodvariI	Freshwater lake	81.33333	17.30000	06D	591.00000	
9	11	Manjira WLS	1978	Medak	Freshwater	78.08333	17.63333	06D	20.00000	
10	12	Pakhal WLS	1952	Warangal	Freshwater lake	80.05000	17.96000	06D	879.30000	
11	13	Pulicat Lake WLS	1976	Nellore	Coastal lake	80.26000	13.57000	06D	500.00000	
12	14	Coringa WLS	1978	East Godavari	Coastal	82.17000	16.50000	06C	235.70000	
13	15	Krishna WLS	1989	Krishna	Coastal	80.88000	15.73000	06C	194.81000	
14	16	Nellapattu WLS	1976	Nellore	Freshwater lake	79.96667	13.83333	06E	4.40000	
15	17	Lanja Madugu Sivaram	1978	Adilabad	Freshwater, Riverine	78.75000	18.98333	06D	36.29000	
16	18	Kolleru WLS	2002	West GodavariI	Freshwater	81.20833	16.62500	06D	673.00000 3264.50000	+
Arunachal Pradesh										
17	19	D'ering Memorial WLS	1978	East Siang	Riverine	95.44167	28.02500	02D	190.00000	
18	20	Mahao WLS	1980	Debang/ Khonsa	Riverine, Marsh	95.66667	28.08333	02D	281.50000 471.50000	
Assam										
19	21	Deepor Beel	2002	Kamrup	Freshwater Lake	91.67500	26.11667	09A	4.14000	+
20	22	Dibru-Saikhowa NP	1999	Kamrup	Freshwater, Riverine	95.35000	27.69000	09A	340.00000 344.14000	

S1. No.	ID	Name	Year of Establish	District	Habitat	X_CO-ORD	Y_CO-ORD	Bio Unit	Area in km ²	Ramsar Sites
Bihar										
21	23	Kabarjheel WLS	1989	Begusarai	Freshwater Lake	86.08000	25.68000	07B	63.11000 1.50 km in	
22	24	Vikramshila WLS	1990	Bhagalpur	Freshwater, Riverine	86.93000	25.29000	07B	63.11 63.11000	
Chandigarh										
23	25	Sukhna Lake WLS	1986	Chandigarh	Freshwater	76.90000	30.70000	04A	25.42000	
Goa										
24	26	Chorao Island (Dr Salim Ali WLS)	1988	Goa	Coastal	73.79000	15.50000	08A	1.78000	
Gujarat										
25	27	Shoolpaneswar (Dhumkhal)WLS	–	Bharuch	Freshwater	73.66667	21.78333	04B	607.70000	
26	31	Narayan Sarovar WLS	1995	Kutch	Freshwater	68.71750	23.56736	03B	444.23000	
27	32	Nal Sarovar WLS	1969	Ahmadabad	Freshwater	72.03903	22.78334	04B	120.82000	
28	33	Marine (Gulf of Kutch) NP	1982	Jamnagar	Coastal wetland	69.58333	22.45833	08A	457.92000	
29	34	Porbandar Lake WLS	1988	Junagarh	Freshwater wetland	69.61000	21.63100	04B	0.09000	
30	35	Khijadia WLS	1981	Jamnagar	Coastal	70.14999	22.53333	04B	6.05000	
31	28	Thol Lake WLS	1988					04B	6.99000	
Harayana										
32	36	Sultanpur NP	1989	Gurgaon	Freshwater wetland	76.91667	28.46667	04A	1.43000	
Himachal Pradesh										
33	37	Pong Dam Lake	2002	Kangra	Freshwater wetland	76.05000	31.99000	04A	307.29000	+
34	38	Renuka WLS	1964	Sirmaur	Freshwater Lake	77.45764	30.60917	04A	4.02000	
35	39	Gobindsagar WLS		Bilaspur	Freshwater wetland	76.65014	31.33792	04A	100.34000	
Jammu & Kashmir										
36	40	Tso Moriri	2002	Changtang,	Freshwater	78.30000	32.90000	01B	120.00000	+
				Ladakh	Brackish Lake					
37	41	Hokarsar Lake WLS	1992	Badgam	Freshwater Brackish Lake	74.71667	34.08333	01A	13.75000	
38	42	Chanthang WLS	1987	Ladakh	Freshwater Brackish Lake	78.65000	33.21000	01B		

Sl. No.	ID	Name	Year of Establish	District	Habitat	X_CO-ORD	Y_CO-ORD	Bio Unit	Area in km ²	Ramsar Sites
39	45	Wular Lake	1990		Freshwater	74.55000	34.26667	01A	173.00000	+
Jharkhand										
40	46	Udhwa Lake WLS	1991	Sahibganj	Freshwater	87.73000	25.10000	06B	0.06000	
Karnataka										
41	48	Cauvery WLS		Mysore	Freshwater wetland	77.16667	12.33333	06E	526.96000	
42	49	Ghataprabha WLS	1974	Belgaum		74.69000	16.09000	06E	29.78000	
43	50	Ranganathittu WLS	1940	Mysore	Freshwater lake	76.63594	12.42534	06E	0.67000	
44	51	Gudavi Bird Sanctuary	1989	Shimoga		75.01667	14.43333	05B	0.74000	
Kerala										
45	52	Sasthamkotta Lake	2002	Kollam	Freshwater Lake	76.58333	10.58333	05B	11.30000	+
46	53	Ashtamudi Lake	2002	Kollam	Estuary	76.58333	8.83333	05B	1860.00000	+
47	54	Vembanad-Kol Wetland	2002	Vembanad	Brackish water	76.50000	9.16667	05B	4583.00000	+
Lakshadweep										
48	55	Pitti Islands Bird Sanctuary	2002	Kavaratti Islands		72.08333	11.00000	08C	0.01000	
Madhya Pradesh										
49	57	Gandhi Sagar WLS	1981	Mandsaur	Freshwater, reservoir	75.96667	24.83300	04B	368.62000	
50	58	Bhoj Wetland	2002	Bhopal	Freshwater lake	77.30000	23.21667	04B	31.00000	+
51	59	Ken Gharial WLS	1981	Panna	Freshwater, Riverine	80.06000	24.93000	06A	45.20000	
52	60	Son Gharial WLS	1981	Sidhi	Freshwater, Riverine	82.07000	24.50000	06A	41.80000	
53	56	National Chambal WLS	1978	Murena-Bhind	Freshwater, Riverine				435.00000	
Maharashtra										
54	61	Aner Dam WLS	1986	Dhule	Freshwater, reservoir	74.35000	21.51000	06A	82.94000	
55	62	Marine (Malvan) WLS	1987	Sindhudurg	Coastal	73.47100	16.11000	08A	29.12000	
Manipur										
56	64	Keibul-Lamjao NP	1977	Bishnupur	Freshwater	93.77000	24.41000	09B	40.00000	
57	106	Loktak Lake	1990			93.46000	24.25000	09B	312.00000	+
Orrisa										
58	65	Chilika (Nalaban)	1987	Puri	Coastal	85.48000	19.71000	08B	15.53000	+

Sl. No.	ID	Name	Year of Establish	District	Habitat	X_CO-ORD	Y_CO-ORD	Bio Unit	Area in km ²	Ramsar Sites
59	66	HadgarhWLS	1978	Kendujhar,	86.26000	21.28000	06B	191.06000	
			(1975)	Madhuban						
60	68	Bhitarkanika Mangroves	2002	Cuttack	Coastal	86.99900	20.75000	08B	525.00000	+
61	67	Satkosia Gorge WLS		Angul, Cuttack	Freshwater, Riverine				745.52000	
Punjab										
62	70	Harike Lake	(1982)		Freshwater	74.93333	31.16667	04A	86.00000	+
			1990	Firozpur	reservoir					
63	71	Ropar Lake	2002	Ropar	Freshwater, reservoir	76.41667	30.95000	04A	41.36000	+
64	107	Kanjli Lake	2002			75.076	31.32	04A	14.84	+
Rajasthan										
65	72	Jawahar Sagar WLS	1975 (1981)	Kota	Freshwater, reservoir	76.46667	24.66667	04B	100.00000	
66	73	Keoladeo Ghana NP		Bharatpur	Freshwater, reservoir	77.51861	27.15944	04A	28.73000	+
67	74	Jalmahal Bird Sanctuary	Jaipur	Freshwater	75.86667	26.91667			
68	75	Sambhar Lake	1990	Jaipur	Saline lake	74.90000	26.86667	04B	736.00000	+
69	76	Jaisamand	1955 (1967)	Udaipur		75.55000	27.70000	04B	52.00000	
Tamil Nadu										
70	77	Point Calimere WLS	2002	Thanjavur	Coastal	79.79000	10.28000	08B	17.26000	+
71	78	Vettangudi WLS	1977	Sivagangai		78.92000	9.64000	08B	0.38000	
72	79	Gulf of Mannar Marine NP	1980	Ramanathapuram	Coastal	78.57600	9.13200	08B	6.23000	
73	80	Kuthankulam-Kadankulam WLS	1994	Tirunelvelikattabom		77.73000	8.47000	05B	1.29000	
74	81	Karikili WLS	1989	Kanchipuram		79.85000	12.65000	06E	0.61000	
75	82	Pulicat Lake WLS	1980	Chengalpattu	Coastal lake	80.28000	13.43000	08B	153.67000	
76	83	Vedanthangal WLS	1925	Chengalpattu	Freshwater	79.86667	12.53333	06E	0.30000	
77	84	Udayanarthandapuram Lake WLS	1991	Thanjavur	Freshwater	79.70000	10.46000	08B	0.45000	
Uttar Pradesh										
78	85	Sandi WLS	1990	Hardoi	Freshwater	79.91667	27.25000	07A	3.09000	
79	86	Sur Sarovar WLS	1991	Agra	Freshwater	77.75000	27.00000	04A	4.03000	

Sl. No.	ID	Name	Year of Establish	District	Habitat	X_CO-ORD	Y_CO-ORD	Bio Unit	Area in km ²	Ramsar Sites
80	87	Samaspur WLS	1987	Rae Bareli	Freshwater	81.41667	26.00000	07A	7.99000	
81	88	Surha Tal WLS	1991	Ballia	Freshwater	84.33333	25.75000	07A	34.32000	
82	89	National Chambal WLS	1979	Agre-Etawah	Freshwater Riverine	78.94000	26.71000	04B	635.00000	
83	90	Bakhira Tal WLS	1990	Basti	Freshwater	83.21667	27.51660	07A	28.94000	
84	91	Okhla WLS	1990	Ghaziabad	Freshwater	79.25000	28.66667	07A	4.00000	
85	92	Katarniyaghat WLS	1976	Bahraich	Freshwater	81.18333	28.23334	07A	400.69000	
86	93	Patna WLS	1990	Etawah	Freshwater	78.75000	27.58333	07A	1.09000	
87	94	Vijay Sagar WLS	1990	Mahoba	Freshwater	79.50000	25.33333	06A	2.62000	
88	95	Parvati Aranga WLS	1990	Gonda	Freshwater	82.33333	27.41667	07A	10.84000	
89	96	Saman WLS	1990	Mainpuri	Freshwater	79.00000	27.08333	07A	5.25000	
90	97	Nawabganj WLS	1984	Unnao	Freshwater	88.33333	22.41667	07A	2.25000	
91	98	Lakh-Bahusi WLS	1988	Farrukhabad	Freshwater Lake	81.16667	26.83333	07A	80.24000	
Uttaranchal										
92	99	Kalagarh WLS (Part of Corbett TR)	1936	Pauri	Freshwater Riverine	79.70000	26.80000	07A		
93	100	Sona Nadi WLS	1987	Pauri	Freshwater Riverine	78.55000	29.21667	07A	301.18000	
West Bengal										
94	101	Lothian Island WLS	1976	South 24 Parganas	Coastal	88.34000	21.65000	08B	38.00000	
95	102	Sunderban NP	1984	North 24 Parganas	Coastal	88.77000	22.02000	08B	1330.10000	
96	103	Haliday Island WLS	1976	South 24 Parganas	Coastal	88.34000	21.65000	08B	5.95000	
97	104	Sajnakhali WLS	1976	South 24 Parganas	Coastal	88.92000	22.11000	08B	362.40000	
98	105	Senchal WLS	1976	Darjiling	Coastal	88.44000	27.05000	02C	38.88000	
99	108	East Calcutta Wetlands	2002	Kolkata	Freshwater	88.2035	22.254	08B	378	+

Source: Wildlife Database, Wildlife Institute of India and Zoological Survey of India, Dehra Dun.

Table 5.3 Statewise list of Congregatory IBA sites in India

Sl.No.	IBA sites	Criteria	State
1.	Coringa WLS and Godavari Estuary	A4iii	Andhra Pradesh
2.	Kolleru	A4i,A4iii	Andhra Pradesh
3.	Manjira WLS	A4i, A4iii	Andhra Pradesh
4.	Nelapattu Bird Sanctuary	A4i	Andhra Pradesh
5.	Pulicate Lake	A4iii	Andhra Pradesh
6.	Rollapadu WLS	A4ii	Andhra Pradesh
7.	Telineelapuram	A4i	Andhra Pradesh
8.	Uppalapaddu	A4i, A4iii	Andhra Pradesh
9.	Manabum and Tengapani Reserve Forests	A4i	Arunachal Pradesh
10.	D'ering Memorial WLS	A4i	Arunachal Pradesh
11.	Chakrasila Complex	A4i, A4iii	Assam
12.	Deobali Jalah	A4i	Assam
13.	Dhansiri Reserve Forest	A4i	Assam
14.	Deepor Beel Bird Sanctuary	A4iii	Assam
15.	Haflong	A4ii	Assam
16.	Jatinga	A4iv	Assam
17.	Jhanjimukh - Kokilamukh	A4i	Assam
18.	Kaziranga National Park	A4i, A4iii	Assam
19.	Majuli	A4iii	Assam
20.	Orang National Park	A4ii	Assam
21.	Pabitora Wildlife Sanctuary	A4iii	Assam
22.	Pani-Dihing Bird Sanctuary	A4iii	Assam
23.	Sivasagar Tanks	A4i	Assam
24.	Tamaranga-Dalani-Bhairab Complex	A4iii	Assam
25.	Urpod Beel	A4iii	Assam
26.	Chauras of North Bihar	A4i, A4iii	Bihar
27.	Danapur Cantonment Area	A4i	Bihar
28.	Gogabil Pakshi Vihar	A4iii	Bihar
29.	Kawar Lake Wildlife Sanctuary	A4iii	Bihar
30.	Kurseala River Course and Diyara Flood Plains	A4iii	Bihar
31.	Mokama Taal (Barah) Wetlands	A4i, A4iii	Bihar
32.	Nagi Dam and Nakti Dam Bird Sanctuaries	A4i, A4iii	Bihar
33.	Reservoirs of Chota Nagpur Plateau	A4i, A4iii	Bihar
34.	Okhla Wildlife Sanctuary	A4iii	Delhi
35.	Carambolim Wetlands	A4i, A4iii	Goa
36.	Banni Grassland	A4i, A4iii	Gujarat
37.	Charakla Salt Pans	A4i, A4iii	Gujarat

Sl.No.	IBA sites	Criteria	State
38.	Flamingo City	A4iii	Gujarat
39.	Kaj Wetland	A4i	Gujarat
40.	Khijadiya Lake and Bird Sanctuary	A4i, A4iii	Gujarat
41.	Marine NP & WLS	A4i, A4iii A4iv	Gujarat
42.	Nalsarovar WLS	A4i, A4iv	Gujarat
43.	Salt Pans of Bhavnagar	A4iii	Gujarat
44.	Thol Lake Bird Sanctuary	A4i, A4iii	Gujarat
45.	Velavadar Blackbuck N P	A4ii	Gujarat
46.	Wild Ass Sanctuary	A4i, A4iii	Gujarat
47.	Basai Wetlands	A4i, A4iii	Haryana
48.	Bhindawas Sanctuary	A4i, A4iii	Haryana
49.	Sultanpur National Park	A4i, A4iii	Haryana
50.	Wetlands of Yamuna River	A4iii	Haryana
51.	Pong Dam Lake WLS	A4i, A4iii	Himachal Pradesh
52.	Gharana Wetland Reserve	A4iii	Jammu & Kashmir
53.	Haigam Rakh	A4iii	Jammu & Kashmir
54.	Hokarsar	A4iii	Jammu & Kashmir
55.	Mirgund Jheel And Reserve	A4i	Jammu & Kashmir
56.	Shallabugh Lake and Marshes	A4iii	Jammu & Kashmir
57.	Wular Lake and assoc. Marshes	A4iii	Jammu & Kashmir
58.	Bardha Dam Reservoir	A4i	Karnataka
59.	Gudavi Bird Sanctuary	A4i	Karnataka
60.	Karanji Lake	A4i	Karnataka
61.	Kokkare Bellur	A4i	Karnataka
62.	Krishnarajasagar Reservoir	A4i, A4iii	Karnataka
63.	Kunthur-Kallur Lakes	A4i, A4iii	Karnataka
64.	Lingambudhi Lake	A4i, A4iii	Karnataka
65.	Magadi and Shetikere Wetlands	A4iii	Karnataka
66.	Narasambudhi Lake	A4i	Karnataka
67.	Rangananthittu Bird Sanctuary	A4i	Karnataka
68.	Sulekere Lake	A4i, A4iii	Karnataka
69.	Kole Wetland	A4i, A4iii	Kerala
70.	Vembanad Lake	A4i, A4iii	Kerala
71.	Pitti Island	A4iii	Lakshadweep
72.	Ratapani WLS	A4iii	Madhy Pradesh
73.	Barna Reservoir	A4iii	Madhya Pradesh
74.	Dihaila	A4i, A4iii	Madhya Pradesh
75.	Gandhisagar WLS	A4ii, A4iii	Madhya Pradesh
76.	Halali Reservoir	A4iii	Madhya Pradesh
77.	Rangawa Reservoir	A4iii	Madhya Pradesh

Sl.No.	IBA sites	Criteria	State
78.	Yeshwantsagar	A4i	Madhya Pradesh
79.	Bhoj Wetland	A4i, A4iii	Madhya Praesh
80.	Burnt Island (Bandra) Vengurla Rocks	A4iii	Maharashtra
81.	Gangapur Dam	A4i, A4iii	Maharashtra
82.	Jaikwadi Bird Sanctuary	A4i, A4iii	Maharashtra
83.	Mahul - Sewri Mudflats	A4i, A4iii	Maharashtra
84.	Nandur Madhameshwar WLS	A4i, A4iii	Maharashtra
85.	Thane Creek	A4i, A4iii	Maharashtra
86.	Loktak Lake	A4iii	Manipur
87.	Balpakram Complex	A4i	Meghalaya
88.	Bhitarkanika WLS and NP	A4i	Orissa
89.	Chandka-Dampara WLS	A4iii	Orissa
90.	Chilika (Nalaban) WLS	A4i, A4iii	Orissa
91.	Mangaljodi	A4i, A4iii	Orissa
92.	Bahour Lake	A4i, A4iii	Pondicherry
93.	Ousteri Lake	A4i, A4iii	Pondicherry
94.	Harike Lake	A4i, A4iii	Punjab
95.	Kanjli Lake	A4i, A4iii	Punjab
96.	Ropar Lake	A4iii	Punjab
97.	Alniya Dam	A4iii	Rajasthan
98.	Jaisamand Lake and Willdife Sanctuary	A4i, A4iii	Rajasthan
99.	Keoladeo National Park and Ajan Bandh	A4i, A4iii	Rajasthan
100.	Khichan	A4i	Rajasthan
101.	Ramsagar Bandh	A4iii	Rajasthan
102.	Sambhar Lake	A4i, A4iii	Rajasthan
103.	Sareri Bandh	A4iii	Rajasthan
104.	Udaipur Lakes Complex	A4i	Rajasthan
105.	National Chambal WLS	A4iii	Rajasthan, Uttar Pradesh
106.	Big Tank (Peria Kanmai) & Sakkarakotai Kanmai	A4iii	Tamil Nadu
107.	Chitragudi WLS	A4i	Tamil Nadu
108.	Gulf of Mannar Marine NP	A4i	Tamil Nadu
109.	Kaliveli Tank and Yedayanthittu Estuary	A4i, A4iii	Tamil Nadu
110.	Karaivetti Wildlife Sanctuary	A4i, A4iii	Tamil Nadu
111.	Koonthangulam	A4i	Tamil Nadu
112.	Point Calimere WLS	A4i, A4iii	Tamil Nadu
113.	Suchindram Therur	A4i	Tamil Nadu
114.	Vedanthangal WLS	A4iii	Tamil Nadu
115.	Veeranam Lake	A4i, A4iii	Tamil Nadu
116.	Vettangudi Bird Sanctuary	A4i	Tamil Nadu
117.	Watrap	A4i, A4iii	Tamil Nadu
118.	Wellington Lake	A4iii	Tamil Nadu

Sl.No.	IBA sites	Criteria	State
119.	Gumti Wildlife Sanctuary	A4i	Tripura
120.	Kudaiyya Marshland	A4iii	Uttar Pradesh
121.	Kurra Jheel	A4iii	Uttar Pradesh
122.	Lakh Bahosi WLS	A4iii	Uttar Pradesh
123.	Narora	A4iii	Uttar Pradesh
124.	Nawabganj WLS	A4iii	Uttar Pradesh
125.	Parvati Aranga WLS	A4iii	Uttar Pradesh
126.	Patna WLS	A4i, A4iii	Uttar Pradesh
127.	Pyagpur (Bagheltal) Jheel	A4iii	Uttar Pradesh
128.	Saman WLS	A4i, A4iii	Uttar Pradesh
129.	Samaspur WLS	A4i, A4iii	Uttar Pradesh
130.	Sandi WLS	A4i, A4iii	Uttar Pradesh
131.	Sarsai Nawar Lake	A4i, A4iii	Uttar Pradesh
132.	Sauj Lake	A4i, A4iii	Uttar Pradesh
133.	Sheikha Jheel	A4i, A4iii	Uttar Pradesh
134.	Sur Sarovar WLS	A4iii	Uttar Pradesh
135.	Surha Taal WLS	A4i, A4iii	Uttar Pradesh
136.	Bakhira WLS	A4iii	Uttar Pradesh
137.	Asan Barrage	A4i	Uttaranchal
138.	Farakka Barrage and Adjoining Area	A4i, A4iii	West Bengal
139.	Kulik Bird Sanctuary	A4i, A4iii	West Bengal

Source: Islam and Rahmani (2004).

Legend: A4 = Congregations: A4i= Site known or thought to hold, on a regular basis, = 1% of a biogeographic population of a congregatory waterbird species; A4ii= Site known or thought to hold, on a regular basis, = 1% of the global population of a congregatory seabird or terrestrial species; A4iii= Site known or thought to hold, on a regular basis, = 20,000 waterbird or = 10,000 pairs of seabirds of one or more species; A4iv= Site known or thought to exceed thresholds set for migratory species at bottleneck sites [Jhunjhunwala *et al.* (2001)].



Photo: N. Ezhilarasi

Andaman Crake

6. FRAMEWORK FOR CONSERVATION

***6.1 National Policies and Laws**

The Ramsar Convention takes precedence in many respects particularly as it is one of the first ecosystems-specific Conventions to address the wise use of wetlands and not conservation alone. It also enjoins the Parties to the Convention to formulate and implement their planning so as to promote the conservation of listed wetlands and, as far as possible, the wise use of wetlands in their territory (Art 3.1). The review of legal and institutional issues related to wise use of wetlands is mandated further by the Additional Guidance for the implementation of the wise use concept (I-2 of the Additional Guidance). India became a signatory to Ramsar in 1981 and already has 19 Ramsar sites listed, plus one world heritage site and three Montreux sites. However, the review of legal and institutional issues has still not received adequate attention. The lack of accurate scientific information on wetlands particularly with the vast body of decision makers is a key factor responsible for the neglect of the review of laws and institutions governing wetlands. This is further aggravated by the plethora of laws and institutions applicable to wetlands. Since there are so many laws that indirectly have a bearing on wetlands, it would be a Herculean task to amend these laws to attain the objective of wise use or set in place a comprehensive national wetland law. Indeed, this may not even be desirable for accomplishing wise use of wetlands in India.

The obstacles and hurdles faced by the country in conserving wetlands and evolving

guidelines for wise use of wetlands are severe and need to be closely examined. In India the conservation and wise use of wetlands falls within the mandate of the central Ministry of Environment and Forests (MoEF). The existing body of laws (within the federal structure of the Government of India) applicable to wetlands can be classified into four categories: central laws, state laws, municipal laws as well as customary laws.

Though the Indian Wildlife (P) Act, 1972 and the Forest Act, 1980, do not define wetlands as a separate category of ecologically important areas, they generally form part of protected areas, whenever the wetlands are the habitats of endangered wildlife (and exist within Sanctuaries or National Parks). An amendment in the Wildlife (P) Act, 1972 incorporates a broad inclusive definition of wetlands, which facilitates and makes it legally binding for wetland managers to draw up wetland conservation plans. Equally, it would make it mandatory for the Government agencies (central and state) to offer institutional and financial support for local wetland management and wise use practices.

However, national wildlife law places a strict ban on grazing within a National park and hence prohibits the human impact and influences on the wetland ecosystem once this is declared a National Park. This restriction in national parks (which are zones of highest protection in protected area categories) makes wise use of the wetland virtually impossible.

*Summarised from Panini (1998).

The experience from Keoladeo National Park, an artificial wetland area designated both as a Ramsar site and as a national park needs to be kept in mind by the Government agency when they undertake or commission the review of national legislation and institutional issues related to wise use of wetlands.

Keoladeo National Park is significant as this area had a history of conflicts amongst the park management and local people whose traditional (and evidently sustainable) relationship with the wetland had been disrupted following the designation of the area as a National Park in 1981. Grazing and fuel-wood collection from the wetland were stopped following the designation of the area as protected. Scientists at the Bombay Natural History Society who have carried out a ten year study of the Park were emphatic in their view that grazing in a regulated way was needed to control the profusion of aquatic macrophytes which were colonising the wetland.

This case brings out the contradictions in fulfilling the wise use obligation under the Ramsar Convention and the Wildlife (P) Act's strict protection within a national park. Any legal and institutional review would need to address this apparent conflict in implementing the wise use obligations under the International Convention and stipulations under conventional national wildlife law. Thus merely assigning a protected area status and declaring the area a listed site under the Convention does not automatically ensure wise use.

The Environment (Protection) Act, 1986 has been instrumental in protecting wetlands and groups of wetlands. This Act has been useful in checking mushrooming aqua-culture in the coastal areas, protecting threatened wetlands such as the Dahanu wetlands in the state of Maharashtra from environmentally harmful industries and projects.

Legal and institutional review upon ratification of the Ramsar Convention

The MoEF has constituted a National Committee on wetlands, mangroves and coral reefs which has representatives from various Indian Government ministries, academic institutions and non-government organisations. Recently, this committee has been divided into two parts, namely, Wetlands/ Lakes Committee, and the Mangroves and Coral Reefs Committee. The whole Committee meets at least twice a year to review wetland related activity. Further more, state level committees have been appointed to look into the conservation and wise use of the listed wetland sites in their states.

One of the key issues in the agenda of the committee is the review of action for wetland conservation as a whole and assessing wise use of wetlands in the country. Various Government representatives report on the status of various wetlands in the states, which were also Ramsar sites.

On the issue of a National Wetland Policy

The existing framework of laws in the country offers adequate safeguards and legal bases for wetland conservation and wise use, although there are some glaring loopholes in the law that need to be rectified. The Wildlife (Protection) Act, which at present includes certain wetlands (with wildlife inhabitants) in the conventional protected areas network, would need to be amended to include wetlands in a special category of multiple use areas. This is imperative as a certain degree of human impact on wetlands is desirable to maintain the ecological character of the wetland. The degree to which human impact on wetlands is allowed should be decided from scientific studies on the carrying capacity of the particular wetland. Thus, restrictions/regulations, people's dependence

on the wetland would have to be decided by a committee of wetland experts as well as representatives of local communities and stakeholders on a case to case basis keeping in mind the various sustainable traditional practices of wise use which have evolved through the centuries.

The Environment (Protection) Act, 1986, could also be instrumental in extending legal protection to wetlands as distinct ecosystems and creating restrictions and safeguards for wise use of these areas. At the state level, several state acts regulate the use of wetlands. Most of the coastal states have state rules for fishing which directly or indirectly have an impact on wetlands. In fact, the states of West Bengal and Tamil Nadu have specific state acts (the West Bengal Inland Fisheries Act and the Tamil Nadu Aqua-culture Regulation Act, 1995) which recognise the value of wetlands and the fisheries they sustain, with specific restrictions for use of wetland areas.

Recommendations

Some specific recommendations for achieving law reform for sustainable development and environmental and social justice:

- Conventional Protected Area management and conventional wildlife law may not be suitable or adequate for achieving wise use obligations imposed by the Ramsar Convention. There is a need for a systematic study of the legal system and the institutions that would be involved in wetland management in the country. This study would need to take a holistic perspective on wetland management in the country and, therefore, need to go beyond action taken by Government agencies and departments and look at local customs of wise use,

and reviving and supporting local institutions that regulate these practices.

- A National Wetland Policy for India needs to suggest broad guidelines for positive action for wetland conservation and wise use. However, such a policy must reflect the importance of wise use of wetlands by communities, and must provide a blue-print for initiating collaborative wetland management plans which could be further modified and adapted by local users and institutions.
- The Environment (Protection) Act, 1986, can be used effectively to phase out certain unsound practices and ensure safeguards for threatened wetlands. Instead of merely adding more wetlands to the List of Wetlands of International Importance and not maintaining their ecological character, it would be far better if the Central Ministry of Environment and Forests notified threatened wetlands as “ecologically sensitive” areas under the existing Environment (Protection) Act and prohibit ecologically harmful industries, operations and processes in these “ecologically sensitive” wetlands.
- Lastly, any review of legal and institutional issues related to wetlands and their management are incomplete without a case study of local laws for wetlands, so that customary laws and practices of wise use could be undertaken in four different regions in the country. This study would also need to highlight the conflicts in the selected wetland areas and how to resolve any conflict (negotiation/arbitration) and the agencies that are involved in conflict resolution.

Related Legislatures in India

The Wildlife (Protection) Act, 1972 (amended in 2003): An Act to provide for the

protection of wild animals, birds and plants and for matters connected therewith or ancillary or incidental thereto.

The Indian Wildlife (Protection) Act, 1972 was enacted to provide special legal protection to wildlife on a unified national basis. It contains provision for the establishment of National Parks and Sanctuaries by state governments for the purpose of protecting, propagating, and developing wildlife therein, or its environment, and includes power for stringent punishment if these provisions are infringed. Hunting of all animals and destruction of flora is prohibited, except in special circumstances, when the state government may grant permits. A complete ban on grazing and fishing in National Parks indicates a higher level of protection than in Wildlife Sanctuaries where grazing and fishing may be "regulated, controlled, or prohibited." All the states and union territories have adopted the act, except Jammu & Kashmir, which has a separate legislation enforced since 1978.

The fourth amendment in The Wildlife (Protection) Act in 1991 extended the protection to wildlife and intensified punishment for violations. This amendment has provisions for non-government organizations and individuals (non-officials) to report matters of violations of the Act directly to the court after notification. Hunting of all wildlife specified in Schedules I, II, III and IV of the 1972 Act is prohibited. These include all wetland dependent species of birds and other animals. The amendment extends protection to plant species for the first time. Apart from the amendment to the Wildlife (Protection) Act, India also amended its export policy in 1991, bringing a total ban on the export of birds. Legislative measures have been instituted to stop the hunting of waterbirds outside Protected Areas. However, illegal trapping of waterfowl by villagers

continues in many states, but this may stop once the government takes more effective measures to rehabilitate the people.

Wildlife (Protection) Amendment Bill, 2002

A Bill to amend the *Wildlife (Protection) Act, 1972* to ensure the ecological and environmental security of the country.

The Indian Forest Act, 1927

An Act to consolidate the law relating to forests, the transit of forest-produce and the duty leviable on timber and other forest-produce.

Forest (Conservation) Act, 1980

An Act to provide for the conservation of forests and for matters connected therewith or ancillary or incidental thereto.

Forest (Conservation) Rules, 1981

Rules by the Central Government for working and conduct of business under the Forest (Conservation) Act, 1980.

National Forest Policy, 1988

The principal aim of the Forest Policy is to ensure environmental stability and maintenance of ecological balance. The derivation of direct economic benefit must be subordinated to this principal aim.

The Water (Prevention and Control of Pollution) Act, 1974

An Act to provide for the prevention and control of water pollution and the maintaining or restoring of the wholesomeness of water, for the establishment.

The Water (Prevention and Control of Pollution) Rules, 1975

Rules by the Central Government after consultation with the Central Board for the Prevention and Control of Water Pollution for working and conduct of business under the

Water (Prevention and Control of Pollution) Act, 1974.

The Water (Prevention and Control of Pollution) Cess Act, 1978

National Wildlife Action Plan, 2002-2016

Strategies and action points for wildlife conservation in today's context in order to protect India's long-term ecological security.

National Biodiversity Bill, 2000 (Act, 2002)

A Bill to provide for conservation of Biological Diversity, sustainable use of its components and equitable sharing of the benefits arising out of the use of biological resources.

The Tamil Nadu Aquaculture Regulation Act, 1995

The West Bengal Inland Fisheries Act (amended in 1994)

6.2 International Conventions, Agreements and Policies

International nature conservation conventions are inter-governmental treaties. They contain a variety of provisions that bind signatory governments (and sometimes other Contracting Parties such as Regional Economic Integration Organisations). Any convention text will contain many Articles of varying legal strength. Whilst some may be binding or mandatory on a signatory, others (and more usually) take the form of general urgings that create a framework of expectation, e.g. "*Wherever possible Contracting Parties will strive to achieve...*" Notwithstanding what some may consider to be the 'weak' legal status of such conventions and their associated 'secondary legislation', these treaties are very valuable in guiding conservation policy at both national

and international levels given strong public as well as international pressure on governments to fulfill agreed commitments (Caldwell, 1988).

The direction of conventions is frequently modified through decisions taken at meetings of the Contracting Parties. These can amend lists of species and other details given in the appendices of a convention, and have the authority to pass Resolutions and Recommendations on particular subjects. An example is Recommendation 4.1 made under the Bonn Convention on the Conservation and Management of Cormorants in the African-Eurasian Region which urges *inter alia* the maintenance of a favourable conservation status for the great cormorant *Phalacrocorax carbo*. Such 'secondary' international legislation is very helpful in elaborating the meaning of the Convention text, or for providing topical guidance in its implementation.

Conventions are usually structured with a general preamble - which outlines the objectives and rationale - followed by a series of more specific Articles which describe main provisions. It is important to note that the preamble of Conventions and Directives has the same legal status as the detailed Articles.

There is a wide range of Conventions and international treaties to which the government is signatory. The most important treaties (related to waterbird conservation) include:

- 1960** The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- 1972** 'Ramsar' Convention on Wetlands
- 1972** Convention for the Protection of the World Cultural and Natural Heritage
- 1979** Convention on Migratory Species (Bonn Convention)
- 1992** Biodiversity Convention (Rio)

Bilateral Treaties

1984 Convention on Protection of Migratory Birds between India and USSR.

2002 Convention on Protection of Migratory Birds between India and Russia

Why should we be interested in international treaties?

There are a variety of reasons from individuals (rather than governments) to be aware of international conservation treaties and obligations. Through these treaties we can share international experience. The Ramsar Convention, in particular, has developed a wide variety of 'best practice' guidance relating to many aspects of wetland (and waterbird) management. They also provide good public relations opportunities (as regards wetland education and public awareness issues). Thus, World Wetlands Day (2 February), established by the Ramsar Convention a few years ago on the anniversary of the signing of the Convention (on 2 February 1971), is now observed around the world.

An examination of international treaties reveals a variety of common themes. These include obligations relating to:

Sites

Identification of key sites and establishment of site networks

- Conservation/wise use of sites
Site management planning
Monitoring

Wise Use / Sustainable Use

- involvement of public, local communities and NGOs
multi-use protected areas
need for monitoring (site and wider countryside)
laws and planning control

Introduced Non-Native Species

- Prohibition of introduction of non-native species
Control of established aliens causing ecological problems
International exchange of information
Pests
- Maintenance of favourable conservation status for *all* native species
important consequences for control of pests
Principle of derogations
Prohibited techniques of control

6.2.1 Convention on Conservation of Wetlands (Ramsar Convention)

The Convention on Wetlands is an intergovernmental treaty adopted on 2 February 1971 in the Iranian city of Ramsar, on the southern shore of the Caspian Sea. Thus, though nowadays the name of the Convention is usually written "Convention on Wetlands (Ramsar, Iran, 1971)", it has come to be known popularly as the "Ramsar Convention". Ramsar is the first of the modern global intergovernmental treaties on conservation and wise use of natural resources, but, compared with more recent ones, its provisions are relatively straightforward and general. Over the years, the Conference of the Contracting Parties (the main decision-making body of the Convention composed of delegates from all the Member States) has further developed and interpreted the basic tenets of the treaty text and succeeded in keeping the work of the Convention abreast of changing world perceptions, priorities, and trends in environmental thinking.

The official name of the treaty – *The Convention on Wetlands of International Importance especially as Waterfowl Habitat* – reflects its original emphasis on the

conservation and *wise use of wetlands primarily to provide habitat for waterbirds*. Over the years, however, the Convention has broadened its scope to cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. For this reason, the increasingly common use of the short form of the treaty's title, the "Convention on Wetlands", is entirely appropriate.

The Convention entered into force in 1975 and as of 1 May 2003 has 136 Contracting Parties. More than 1280 wetlands have been designated for inclusion in the List of Wetlands of International Importance, covering some 108.7 million hectares (1.87 million km²), more than the surface area of France, Germany, and Switzerland combined.

Ramsar and Montreux Sites: In Asia, UNESCO serves as Depositary for the Convention, but its administration has been entrusted to a secretariat known as the "Ramsar Bureau", which is housed in the headquarters of IUCN - The World Conservation Union in Gland, Switzerland, under the authority of the Conference of the Parties and the Standing Committee of the Convention.

Why do countries join the Ramsar Convention?

Membership of the Ramsar Convention: entails an endorsement of the principles that the Convention represents, facilitating the development at national level of policies and actions, including legislation that helps nations make the best possible use of their wetland resources in their quest for sustainable development;

- presents an opportunity for a country to make its voice heard in the principal intergovernmental forum on the conservation and wise use of wetlands;

- brings increased publicity and prestige for the wetlands designated for the List of Wetlands of International Importance, and hence increased possibility of support for conservation and wise use measures;
- brings access to the latest information and advice on applying the Convention's internationally accepted standards, such as criteria for identifying wetlands of international importance, guidelines on application of the wise use concept, and guidelines on management planning in wetlands;
- brings access to expert advice on national and site-related problems of wetland conservation and management through contacts with Ramsar Bureau personnel and consultants and through application of the Ramsar Advisory Mission mechanism when appropriate; and
- encourages international co-operation on wetland issues and brings the possibility of support for wetland projects, either through the Convention's own Small Grants Fund or through the Convention's contacts with multilateral and bilateral external support agencies.

What are the commitments of Parties joining the Ramsar Convention?

When countries join the Convention, they are enlisting in an international effort to ensure the conservation and wise use of wetlands. The treaty includes four main commitments that the Contracting Parties have agreed to by joining.

i) Listed sites

The first obligation under the Convention is to designate at least one wetland for inclusion in the **List of Wetlands of International Importance** (the "Ramsar

List”) and to promote its conservation, including, where appropriate, its wise use. Selection for the Ramsar list should be based on the wetland’s significance in terms of ecology, botany, zoology, limnology, or hydrology. The Contracting Parties have adopted specific criteria and guidelines for identifying sites that qualify for inclusion in the List of Wetlands of International Importance.

ii) **Wise use**

Under the Convention there is a general obligation for the Contracting Parties to include wetland conservation considerations in their national land-use planning. They have undertaken to formulate and implement this planning so as to promote, as far as possible, “**the wise use of wetlands in their territory**” (Article 3.1 of the treaty).

The Conference of the Contracting Parties has approved guidelines and additional guidance on how to achieve “wise use”, which has been interpreted as being synonymous with “sustainable use”

iii) **Reserves and training**

Contracting Parties have also undertaken to establish nature reserves in wetlands, whether or not they are included in the Ramsar List, and they are also expected to promote training in the fields of wetland research, management and wardenship.

iv) **International co-operation**

Contracting Parties have also agreed to consult other Contracting Parties about implementation of the Convention, especially with regard to wetlands across frontiers, shared water systems, and shared species.

Over the years, the Conference of the Contracting Parties has interpreted and elaborated upon these four major obligations included within the text of the treaty, and it

has developed guidelines for assisting the Parties in their implementation. These guidelines are published in the Ramsar Handbook series.

v) **Reporting**

Contracting Parties report on progress in implementing their commitments under the Convention by submission of triennial National Reports to the Conference of the Contracting Parties. The National Reports become part of the public record.

The Criteria for Identifying Wetlands of International Importance

The text of the Convention (Article 2.2) states that:

“Wetlands should be selected for the List [of Wetlands of International Importance] on account of their international significance in terms of ecology, botany, zoology, limnology or hydrology” and indicates that “in the first instance, wetlands of international importance to waterfowl at any season should be included”

To facilitate the implementation of this provision, the Conference of the Parties has developed criteria to assist in the identification of wetlands of international importance. The latest version of the Criteria was adopted by the 7th meeting of the Conference of the Contracting Parties in 1999.

Convention on wetlands came into force for India on 1 February 1982. India now has 19 sites designated as Wetlands of International Importance, with a surface area of 648,507 hectares.

6.2.1. Guidelines for operation of the Montreux Record

The Montreux Record is the principal tool of the Convention for highlighting those sites where an adverse ecological change

Group A of the Criteria. Sites containing representative, rare or unique wetland types

Criterion 1: A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.

Group B of the Criteria. Sites of international importance for conserving biological diversity**Criteria based on species and ecological communities**

Criterion 2: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.

Criterion 3: A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.

Criterion 4: A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

Specific criteria based on waterbirds

Criterion 5: A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.

Criterion 6: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

Specific criteria based on fish

Criterion 7: A wetland should be considered internationally important if it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.

Criterion 8: A wetland should be considered internationally important if it is a vital source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.

has occurred, is occurring, or is likely to occur, and which are therefore in need of priority conservation attention. It shall be maintained as part of the Ramsar Database and shall be subject to continuous review.

The following procedure should be observed when considering the possible inclusion of a listed site in the Montreux Record:

A Contracting Party may request inclusion of a site in the Montreux Record, because of potential or actual adverse change in its ecological character, in order to draw attention to the need for action or support. Alternatively, the Bureau, on receipt of information on actual or possible adverse change from partner organizations, other international or national NGOs, or other interested bodies, may draw the attention of

the Contracting Party concerned to this information and enquire whether a Ramsar site should be included in the Montreux Record. A site can only be included in the Record with the approval of the Contracting Party concerned.

The Bureau will pass the information received from partner organizations, other international or national NGOs, or other interested bodies, to the Contracting Party, together with a concise, voluntary questionnaire (see "Montreux Record - Questionnaire") normally to be returned to the Bureau within three months. However, this deadline should be flexible to take into account the circumstances of developing countries and Contracting Parties whose economies are in transition

The completed questionnaire will, with the agreement of the Contracting Party, be forwarded by the Bureau to the Scientific and Technical Review Panel (STRP) for advice in line with the "Working Definitions and Guidelines for Describing and Maintaining the Ecological Character of Listed Sites" (Resolution VI.1). The Bureau will, with the agreement of the Contracting Party, relay the completed questionnaire to the original source of the information. If the Contracting Party is not able to agree to this, the Bureau will relay the Contracting Party's decision.

1. Any technical comment or advice provided by the STRP will be forwarded by the Bureau to the Contracting Party and to the source of the information first received by the Bureau (if different from the Contracting Party).
2. The Bureau will discuss the STRP's comments and advice with the Contracting Party concerned, with the aim of determining what steps might be taken, including a decision whether the site should be included in the Montreux

Record. The STRP and other interested bodies will, where appropriate, be informed of the decision made by the Contracting Party, in consultation with the Bureau.

3. Within the framework of their triennial National Reports, Contracting Parties shall provide a report to the Convention Bureau on the conservation status of any sites included in the Montreux Record. If necessary, further information will be provided to the Bureau on request.
 - 3.1 The following procedure should be observed when considering the removal of a listed site from the Montreux Record:
 - 3.2 The Bureau is requested to remove a listed site from the Montreux Record by the Contracting Party in whose territory the site is included. The Bureau may also receive information from other sources, suggesting that there is no longer a risk of change in the ecological character of the listed site.
 - 3.3 The Bureau will submit the concise questionnaire (see "Montreux Record - Questionnaire") to the Contracting Party and forward the completed questionnaire to the Scientific and Technical Review Panel (STRP) for advice in line with the "Working Definitions and Guidelines for Describing and Maintaining the Ecological Character of Listed Sites"
 - 3.4 Any requests from the STRP for further information, together with the STRP's technical comments or advice, will be forwarded by the Bureau to the Contracting Party. The Bureau may also request information from other sources.

- 3.5 At the invitation of the Contracting Party, the Bureau may organize a site visit, ideally by the relevant Bureau staff member, the regional member of the STRP, and other appropriate experts.
- 3.6 A wetland will be removed from the Montreux Record based on the request of the Contracting Party and after consideration of advice and/or comment from the STRP. The Contracting Party will make the final decision.
- 3.7 The Bureau will, unless the Contracting Party concerned objects, provide information on the decision made by the Contracting Party to other interested bodies.

6.2.2 Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention on Migratory Species) (CMS)

The Contracting Parties

Recognizing that wild animals in their innumerable forms are an irreplaceable part of the earth's natural system which must be conserved for the good of mankind;

Aware that each generation of man holds the resources of the earth for future generations and has an obligation to ensure that this legacy is conserved and, where utilized, is used wisely;

Conscious of the ever-growing value of wild animals from environmental, ecological, genetic, scientific, aesthetic, recreational, cultural, educational, social and economic points of view;

Concerned particularly with those species of wild animals that migrate across or outside national boundaries;

Recognizing that the States are and must be the protectors of the migratory species of wild animals that live within or pass through their national boundaries;

Convinced that conservation and effective management of migratory species of wild animals require the concerted action of all States within the national boundaries of which such species spend any part of their life cycle;

Recalling Recommendation 32 of the Action Plan adopted by the United Nations Conference on the Human Environment (Stockholm, 1972) and noted with satisfaction at the Twenty-seventh Session of the General Assembly of the United Nations, have agreed as follows:

Article I

Interpretation

1. For the purpose of this Convention:
 - a) "Migratory species" means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national boundaries;
 - b) "Conservation status of a migratory species" means the sum of the influences acting on the migratory species that may affect its long-term distribution and abundance;
 - c) "Conservation status" will be taken as "favourable" when:
 - (1) population dynamics data indicate that the migratory species is maintaining itself on a long-term basis as a viable component of its ecosystems;

- (2) the range of the migratory species is neither currently being reduced, nor is likely to be reduced, on a long-term basis;
- (3) there is, and will be in the foreseeable future sufficient habitat to maintain the population of the migratory species on a long-term basis; and
- (4) the distribution and abundance of the migratory species approach historic coverage and levels to the extent that potentially suitable ecosystems exist and to the extent consistent with wise wildlife management;
- d) “Conservation status” will be taken as “unfavourable” if any of the conditions set out in sub-paragraph (c) of this paragraph is not met;
- e) “Endangered” in relation to a particular migratory species means that the migratory species is in danger of extinction throughout all or a significant portion of its range;
- f) “Range” means all the areas of land or water that a migratory species inhabits, stays in temporarily, crosses or flies over at any time on its normal migration route;
- g) “Habitat” means any area in the range of a migratory species which contains suitable living conditions for that species;
- h) “Range State” in relation to a particular migratory species means any State (and where appropriate any other Party referred to under subparagraph (k) of this paragraph) that exercises jurisdiction over any part of the range of that migratory species, or a State, flag vessels of which are engaged outside national jurisdictional limits in taking that migratory species;
- i) “Taking” means taking, hunting, fishing capturing, harassing, deliberately killing, or attempting to engage in any such conduct;
- j) “Agreement” means an international agreement relating to the conservation of one or more migratory species as provided for in Articles IV and V of this Convention; and
- k) “Party” means a State or any regional economic integration organization constituted by sovereign States which has competence in respect of the negotiation, conclusion and application of international Agreements in matters covered by this Convention for which this Convention is in force.
2. In matters within their competence, the regional economic integration organizations which are Parties to this Convention shall in their own name exercise the rights and fulfill the responsibilities which this Convention attributes to their member States. In such cases the member States of these organizations shall not be entitled to exercise such rights individually.
3. Where this Convention provides for a decision to be taken by either a two-thirds majority or a unanimous decision of “the Parties present and voting” this shall mean “the Parties present and casting an affirmative or negative vote” Those abstaining from voting shall not be counted amongst “the Parties present and voting” in determining the majority.

Article II

Fundamental Principles

1. The Parties acknowledge the importance of migratory species being conserved and of Range States agreeing to take action to this end whenever possible and appropriate, paying special attention to migratory species the conservation status of which is unfavourable, and taking individually or in co-operation appropriate and necessary steps to conserve such species and their habitat.
2. The Parties acknowledge the need to take action to avoid any migratory species becoming endangered.
3. In particular, the Parties:
 - a) Should promote, co-operate in and support research relating to migratory species;
 - b) Shall endeavour to provide immediate protection for migratory species included in Appendix I; and
 - c) Shall endeavour to conclude Agreements covering the conservation and management of migratory species included in Appendix II.
4. Parties that are Range States of a migratory species listed in Appendix I shall endeavour:
 - a) Reliable evidence, including the best scientific evidence available, indicates that the species is no longer endangered, and
 - b) The species is not likely to become endangered again because of loss of protection due to its removal from Appendix I.
5. Parties that are Range States of a migratory species listed in Appendix I shall endeavour:
 - a) To conserve and, where feasible and appropriate, restore those habitats of the species which are of importance in removing the species from danger of extinction;
 - b) To prevent, remove, compensate for or minimize, as appropriate, the adverse effects of activities or obstacles that seriously impede or prevent the migration of the species; and
 - c) To the extent feasible and appropriate, to prevent, reduce or control factors that are endangering or are likely to endanger the species further, including strictly controlling the introduction of, or controlling or eliminating, already introduced exotic species.

Article III

Endangered Migratory Species: Appendix I

1. Appendix I shall list migratory species, which are endangered.
2. A migratory species may be listed in Appendix I provided that reliable evidence, including the best scientific evidence available, indicates that the species is endangered.
3. A migratory species may be removed from Appendix I when the Conference of the Parties determines that:
 - a) The taking is for scientific purposes;
 - b) The taking is for the purpose of enhancing the propagation or survival of the affected species;
 - c) The taking is to accommodate the needs of traditional subsistence users of such species; or

- d) Extraordinary circumstances so require; provided that such exceptions are precise as to content and limited in space and time. Such taking should not operate to the disadvantage of the species.
6. The Conferences of the Parties may recommend to the Parties that are Range States of a migratory species listed in Appendix I that they take further measures considered appropriate to benefit the species.
7. The Parties shall as soon as possible inform the Secretariat of any exceptions made pursuant to paragraph 5 of this Article.

Article IV

Migratory Species to be the Subject of Agreements: Appendix II

1. Appendix II shall list migratory species which have an unfavourable conservation status and which require international agreements for their conservation and management, as well as those which have a conservation status which would significantly benefit from the international co-operation that could be achieved by an international agreement.
2. If the circumstances so warrant, a migratory species may be listed both in Appendix I and Appendix II.
3. Parties that are Range States of migratory species listed in Appendix II shall endeavour to conclude Agreements where these should benefit the species and should give priority to those species in an unfavourable conservation status.
4. Parties are encouraged to take action with a view to concluding agreements for any population or any geographically separate part of the population of any

species or lower taxon of wild animals, members of which periodically cross one or more national boundaries. 5. The Secretariat shall be provided with a copy of each Agreement concluded pursuant to the provisions of this Article.

Memorandum of Understanding between the Bureau of the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) and the Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention or CMS)

The Ramsar Convention's fields of action are conservation and wise use of wetland habitats, which are of crucial importance in achieving a positive conservation status for many species of wetland fauna and flora, including migratory species, especially waterfowl. The Bonn Convention's field of action is conservation and management of migratory species (including waterfowl and other wetland species), and promotion of measures for their conservation including habitat conservation. Conservation of these habitats is one of the principal actions taken for endangered species listed under Bonn's Appendix I, and for species or groups of species, which are the subject of Agreements under the Bonn Convention. The scientific literature abounds with examples of decline and extinction of species that can be directly or indirectly attributed to habitat degradation and habitat loss. Clearly there are common interests between the two conventions, whose secretariats will aim to establish the closest possible co-operation.

6.2.3 Convention on Biodiversity (CBD) Sustainable Use of Biodiversity

Sustainable use, one of the three objectives of the Convention, is the key to achieving the broader goal of sustainable development and is a cross-cutting issue

relevant to all biological and natural resources. Sustainable use entails the introduction and application of methods and processes for the use of biodiversity to prevent its long term decline, thereby maintaining its potential to meet current and future human needs and aspirations.

Article 10 of the Convention sets the sustainable use agenda for Parties, which should:

- *integrate consideration of the conservation and sustainable use of biological resources into national decision-making;*
- *adopt measures relating to the use of biological resources to avoid or minimize adverse impacts on biological diversity;*
- *protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements;*
- *support local populations in developing and implementing remedial action in degraded areas where biological diversity has been reduced; and*
- *encourage co-operation between its government authorities and its private sector in developing methods for sustainable use of biological resources.*

At its fifth meeting in May 2002 the Conference of the Parties considered sustainable use as a priority issue and adopted decision V/24, on sustainable use as a cross-cutting issue, and decision V/25, on the relationship between biological diversity and tourism within the context of sustainable use.

The Conference of the Parties recognized that conservation and sustainable use of biological diversity are essential to the survival

of species and also benefits humankind, particularly those people who are dependent on biological diversity for their livelihoods. The importance of integrating the conservation and sustainable use of biological diversity into sectoral or cross-sectoral plans, programmes and policies and of addressing this issue in national biodiversity strategies and action plans was also recognized.

Inland Waters Biodiversity

Importance

Inland water systems can be fresh or saline within continental and island boundaries. They include lakes, rivers, ponds, streams, groundwater, springs, cave waters, floodplains, as well as bogs, marshes and swamps, which are traditionally grouped as inland wetlands. Biodiversity of inland waters is a source of food, income and livelihood. Other values of these ecosystems include: water supply, energy production, transport, recreation and tourism, maintenance of the hydrological balance, retention of sediments and nutrients, and provision of habitats for various fauna and flora.

Status and trends and causes of biodiversity loss

Inland water ecosystems are often extensively modified by man, more so than marine or terrestrial systems, and appear to be the most threatened ecosystem type of all. Physical alteration, habitat loss and degradation, water withdrawal, over-exploitation, pollution and the introduction of Alien Invasive Species are main threats to these ecosystems and their associated biological resources, as 41 percent of the world's population lives in river basins under water stress. More than 20 percent of the world's 10,000 freshwater fish species have become extinct, threatened or endangered in recent decades. The Industrial Revolution,

rapid economic development and population growth, have brought about transformations of these ecosystems and biodiversity loss on an unprecedented scale. There is increasing concern for maintenance of the richness of inland water biodiversity and reducing the risks many species face so that the goods and services they deliver will be maintained as well.

How the issue is being addressed under the CBD

Inland waters adopted as a CBD thematic area at the fourth meeting of the Conference of the Parties in Bratislava. The Convention's inland waters programme promotes integrated watershed management as the best way to reconcile competing demands with dwindling supplies of inland waters. The programme identifies the actions that Parties need to carry out to halt the trend of biodiversity loss including monitoring, assessment and evaluation of biological diversity of inland water ecosystems, conducting Environmental Impact Assessments of water development projects, development of pollution prevention strategies choosing and using appropriate technology, and promoting Trans-boundary co-operation and the involvement of local and indigenous communities in ecosystem management.

The relevant programme of work on biological diversity of inland water ecosystems promotes watershed management; appropriate technologies; research, monitoring and assessment; and co-operation with other conventions and organizations jointly.

6.2.4 Convention for the Protection of the World Cultural and Natural Heritage

The General Conference of the United Nations Education, Scientific and Cultural Organization meeting in Paris from 17 October to 21 November 1972, at its seventeenth session,

Noting that the cultural heritage and the natural heritage are increasingly threatened with destruction not only by the traditional causes of decay, but also by changing social and economic conditions which aggravate the situation with even more formidable phenomena of damage or destruction,

Considering that deterioration or disappearance of any item of the cultural or natural heritage constitutes a harmful impoverishment of the heritage of all the nations of the world,

Considering that protection of this heritage at the national level often remains incomplete because of the scale of the resources which it requires and of the insufficient economic, scientific, and technological resources of the country where the property to be protected is situated,

Recalling that the Constitution of the Organization provides that it will maintain, increase, and diffuse knowledge by assuring the conservation and protection of the world's heritage, and recommending to the nations concerned the necessary international conventions,

Considering that the existing international conventions, recommendations and resolutions concerning cultural and natural property demonstrate the importance, for all the peoples of the world, of safe-guarding this unique and irreplaceable property, to whatever people it may belong,

Considering that parts of the cultural or natural heritage are of outstanding interest and therefore need to be preserved as part of the world heritage of mankind as a whole,

Considering that in view of the magnitude and gravity of the new dangers threatening them, it is incumbent on the international community as a whole to participate in the protection of the cultural and natural heritage of outstanding universal

value, by the granting of collective assistance which, although not taking the place of action by the State concerned, will serve as an efficient complement thereto,

Considering that it is essential for this purpose to adopt new provisions in the form of a convention establishing an effective system of collective protection of the cultural and natural heritage of outstanding universal value, organized on a permanent basis and in accordance with modern scientific methods,

Having decided, at its sixteenth session, that this question should be made the subject of an international convention,

Adopts this sixteenth day of November 1972 this Convention.

6.2.5 The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement between Governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival.

Widespread information nowadays about the endangered status of many prominent species, such as the tiger and elephant, might make the need for such a convention seem obvious. But at the time when the ideas for CITES were first formed, in the 1960s, international discussion of the regulation of wildlife trade for conservation purposes was something relatively new. With hindsight, the need for CITES is clear. Annually, international wildlife trade is estimated to be worth billions of dollars and to include hundreds of millions of plant and animal specimens. The trade is diverse, ranging from live animals and plants to a vast array of wildlife products derived from them. Levels of exploitation of some

animal and plant species are high and the trade in them, together with other factors, such as habitat loss, is capable of heavily depleting their populations and even bringing some species close to extinction. Many wildlife species in trade are not endangered, but the existence of an agreement to ensure the sustainability of the trade is important in order to safeguard these resources for the future.

Because the trade in wild animals and plants crosses borders between countries, the effort to regulate it requires international cooperation to safeguard certain species from over-exploitation. CITES was conceived in the spirit of such cooperation. Today, it accords varying degrees of protection to more than 30,000 species of animals and plants, whether they are traded as live specimens, fur coats or dried herbs.

CITES is an international agreement to which States (countries) adhere voluntarily. States that have agreed to be bound by the Convention ('joined' CITES) are known as Parties. Although CITES is legally binding on the Parties in other words they have to implement the Convention it does not take the place of national laws. Rather it provides a framework to be respected by each Party, which has to adopt its own domestic legislation to make sure that CITES is implemented at the national level.

Not one species protected by CITES has become extinct as a result of trade since the Convention entered into force and, for many years, CITES has been among the largest conservation agreements in existence, now with 160 Parties.

CITES works by subjecting international trade in specimens of selected species to certain controls. These require that all import, export, re-export and introduction from the sea of species covered by the Convention has to be authorized through a licensing system.

('Re-export' means export of a specimen that was imported.)

The species covered by CITES are listed in three Appendices, according to the degree of protection they need. (For additional information see CITES Species.)

- Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.
- Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid use incompatible with their survival.

Appendix III contains species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade.

Each Party to the Convention must designate one or more Management Authorities in charge of administering the licensing system and one or more Scientific Authorities to advise them on the effects of trade on the status of the species.

A specimen of a CITES-listed species may be imported into or exported (or re-exported) from a State party to the Convention only if the appropriate document has been obtained and presented for clearance at the port of entry or exit. There is some variation of the requirements from one country to another and it is always necessary to check on the national laws.

The waterbirds listed under List I & II of CITES from India are listed under table 2.1.

6.2.6 Convention on Protection of Migratory Birds between India and USSR

Realising the importance of bird protection at the international level and considering that a large number of birds which

nest in the USSR and winter in India migrate between both the countries and are under constant threat due to human pressure, a treaty on protection of migratory birds between India and (former USSR) Russia was signed in 1984 for co-operation in protection of bird populations and their habitat.

Under the treaty the governments of India and the former USSR have agreed as follows:

Article I

- 1) In this convention, the term 'Migratory Birds' means;
 - (a) The species of birds for which there is positive evidence of migration between the two countries from the recovery of bands or other markers; and the species of birds with subspecies common to both countries and in the absence of
 - (b) Subspecies, the species of birds common to both countries.
- 2) The species of birds defined as 'Migratory Birds' in paragraph 1 of this article are birds listed in the appendix to this convention.

Article II

- 1) The contracting parties shall prohibit taking of migratory birds and collection of their eggs. Any sale, purchase or exchange of these birds or their eggs, taken illegally alive or dead and any sale, purchase or exchange of the products thereof or their parts shall also be prohibited other than for mutually agreed purposes.
- 2) Each contracting party may fix a hunting season in its country bearing in mind preservation of normal reproduction of migratory birds.

Article III

- 1) The contracting parties agree that to preserve the species and subspecies of birds that are in danger of extinction, measures of special protection are desirable. Each party will inform the other regarding such remedial measures.
- 2) Each contracting party shall control the export of species and subspecies of birds specified in paragraph 2 of this article as well as the products thereof or their parts.

Article IV

- 1) The contracting parties shall exchange data and publications pertaining to research on migratory birds and birds in danger of extinction.
- 2) The contracting parties shall promote coordinated and joint research programmes on migratory birds that are in danger of extinction as well as on their preservation.

Article V

- 1) Each contracting party shall endeavour to set up sanctuaries and other necessary establishments for the management and protection of migratory birds as well as those that are in danger of extinction together with their natural environment.
- 2) Each contracting party shall endeavour to take other appropriate measures to preserve and improve the natural environment of birds protected under Articles II and III.

Article VI

Each contracting party agrees to take measures necessary for the attainment of the objectives of this convention.

Article VII

The contracting parties shall hold consultations regarding implementation of

this convention at the request of any one of them.

Article VIII

This convention shall not be interpreted as inconsistent with or modifying either any agreement in force between the contracting parties or any international obligations adopted by each party.

Article IX

This convention shall be subject to ratification or confirmation by the contracting parties and shall be in force for a period of 15 years with automatic extension for each successive period of five years unless either contracting party declares its desire to terminate it.

***6.2.7 Protocol of 4th Session of Indo-Russian Working Group on Environmental Protection and Natural Resources held on 6.2.2002 at New Delhi**

1. Both the parties endorsed the operation of last protocol signed in Moscow on 27th December, 2000.
2. On the investigations of seasonal migration of Siberian Cranes, the Russian Party informed us that activity on population monitoring using satellite marking of the Siberian crane and Common crane is proceeding, including the monitoring of the species at the nesting site. The work on restoration of the common population of the Siberian crane is under way.
3. Both the parties agreed on developing a joint project entitled "Indo-Russian Siberian Crane Restoration Project" It would also include involvement of other flyway countries at a later stage.
4. Concept notes on the following two projects were discussed:

- i) Conservation and monitoring of Migratory birds between India and Russia along the Central Asian Flyway in collaboration with the other flyway countries.
- ii) Determining, characterizing, monitoring and devising long term sustainability of the flyway of migratory birds in India.

Further action would be taken on receiving comments from Russian Scientists.

5. The parties recognized noticeable results on bird ringing. It is recommended that to improve the future interaction on information exchange on bird ringing and provide a new distribution of functions within the joint activity. Both the Parties agreed to initiate large scale bird ringing programmes simultaneously and to exchange data and experts.
6. The Russian Party has performed preparatory work on assigning the status of Ramsar Sites to the valuable wetlands located within the flyways. The Russian Party additionally approached 10 wetland sites in Russia to be included in the list of Ramsar sites which will be researched specially.
7. During the Session there has been an exchange of the scientific information and published materials on the inventory of prospective wetlands.
8. Whereas the Russian Party has performed the work to incorporate the sites of the Central-Asian-Indian Flyway located in the Western Siberia and important for the implementation of the Russian-Indian programmes into the GEF project "Protection of Globally Significant Wetlands and migration paths important for the conservation of the Siberian crane and other Asian migrating birds", the Indian Party has also submitted one such project on wetlands in India to GEF.

It was therefore, agreed to prepare a collaborative and comprehensive project on Conservation of Wetlands on Central-Asian Flyway. Other countries falling in the flyway route would also be requested to join the project.

9. The Parties agreed to support interaction with the authorized bodies and finalise the enforcement of the amendments to the Appendix of the Convention on Protection of Migrating Birds and their habitats.

Resolutions to be included in the protocol of the 8th Indo-Russian Inter-Governmental Commission

Section: Environmental Protection

1. The Commission recognized that the co-operation in the sphere of protection of the environment and natural resources demonstrated achievements in many aspects. The research institutes and the expert of the Parties have interlinks on information and scientific support of implementation of the bilateral obligations within the framework of the Russian Indian Convention on Migratory Birds and their Habitats signed in October 1984. For the period between sessions of IRIGC, a meeting of working group on Environment Protection and Natural Resources has been held.
2. It was agreed that the Siberian Crane is one of the most spectacular migratory species of the Central-Asian-Indian Flyway. The accumulated experience of bi-lateral co-operation with use of the advanced technical equipment provides a good opportunity to start implementation of long term plans for actions on conservation of rare species of migratory birds. During the sessions, the Parties discussed the long term joint Plan of Action on conservation and restoration of common Russian-Indian

Table 6.1 List of migratory wetland bird species under revised Indo-Russian Agreement on conservation of waterbirds (2003)

1. Black-throated Diver <i>Gavia arctica</i>	43. White-tailed Sea-Eagle <i>Haliaeetus albicilla</i>
2. Black-necked Grebe <i>Podiceps nigricollis</i>	44. Greater Spotted Eagle <i>Aquila clanga</i>
3. Red-necked Grebe <i>Podiceps griseigena</i>	45. Steppe Eagle <i>Aquila nipalensis</i>
4. Great White Pelican <i>Pelecanus onocrotalus</i>	46. Eastern Imperial Eagle <i>Aquila heliaca</i>
5. Dalmatian Pelican <i>Pelecanus crispus</i>	47. Western Marsh-Harrier <i>Circus aeruginosus</i>
6. Great Cormorant <i>Phalacrocorax carbo</i>	48. Osprey <i>Pandion haliaetus</i>
7. Grey Heron <i>Ardea cinerea</i>	49. Peregrine Falcon <i>Falco peregrinus</i>
*8. Purple Heron <i>Ardea purpurea</i>	50. Common Moorhen <i>Gallinula chloropus</i>
9. Large Egret <i>Casmerodius albus</i>	51. Common Crane <i>Grus grus</i>
10. Little Bittern <i>Ixobrychus minutus</i>	52. Siberian Crane <i>Grus leucogeranus</i>
11. Great Bittern <i>Botaurus stellaris</i>	53. Demoiselle Crane <i>Grus virgo</i>
12. Black Stork <i>Ciconia nigra</i>	54. Water Rail <i>Rallus aquaticus</i>
13. Oriental White Stork <i>Ciconia boyciana</i>	55. Baillon's Crake <i>Porzana pusilla</i>
14. Glossy Ibis <i>Plegadis falcinellus</i>	56. Spotted Crake <i>Porzana porzana</i>
15. Eurasian Spoonbill <i>Platalea leucorodia</i>	57. Little Crake <i>Porzana parva</i>
16. Greater White-fronted Goose <i>Anser albifrons</i>	58. Common Coot <i>Fulica atra</i>
17. Lesser White-fronted Goose <i>Anser erythropus</i>	59. Eurasian Oystercatcher <i>Haematopus ostralegus</i>
18. Bar-headed Goose <i>Anser indicus</i>	60. White-tailed Lapwing <i>Vanellus leucurus</i>
*19. Greylag Goose <i>Anser anser</i>	61. Sociable Lapwing <i>Vanellus gregarius</i>
20. Brahminy Shelduck <i>Tadorna ferruginea</i>	62. Northern Lapwing <i>Vanellus vanellus</i>
21. Common Shelduck <i>Tadorna tadorna</i>	63. Grey Plover <i>Pluvialis squatarola</i>
22. Northern Pintail <i>Anas acuta</i>	64. European Golden Plover <i>Pluvialis apricaria</i>
23. Marbled Teal <i>Marmaronetta angustirostris</i>	65. Pacific Golden-Plover <i>Pluvialis fulva</i>
24. Baikal Teal <i>Anas formosa</i>	66. Greater Sand Plover <i>Charadrius leschenaultii</i>
25. Common Teal <i>Anas crecca</i>	67. Common Ringed Plover <i>Charadrius hiaticula</i>
26. Spot-billed Duck <i>Anas poecilorhyncha</i>	68. Kentish Plover <i>Charadrius alexandrinus</i>
27. Mallard <i>Anas platyrhynchos</i>	69. Little Ringed Plover <i>Charadrius dubius</i>
28. Gadwall <i>Anas strepera</i>	70. Long-billed Ringed Plover <i>Charadrius placidus</i>
29. Falcated Duck <i>Anas falcata</i>	71. Whimbrel <i>Numenius phaeopus</i>
30. Eurasian Wigeon <i>Anas penelope</i>	72. Eurasian Curlew <i>Numenius arquata</i>
31. Garganey <i>Anas querquedula</i>	73. Black-tailed Godwit <i>Limosa limosa</i>
32. Northern Shoveller <i>Anas clypeata</i>	74. Bar-tailed Godwit <i>Limosa lapponica</i>
33. Red-crested Pochard <i>Rhodonessa rufina</i>	75. Spotted Redshank <i>Tringa erythropus</i>
34. Common Pochard <i>Aythya ferina</i>	76. Common Redshank <i>Tringa totanus</i>
35. Ferruginous Pochard <i>Aythya nyroca</i>	77. Marsh Sandpiper <i>Tringa stagnatilis</i>
36. Baer's Pochard <i>Aythya baeri</i>	78. Common Greenshank <i>Tringa nebularia</i>
37. Tufted Pochard <i>Aythya fuligula</i>	79. Green Sandpiper <i>Tringa ochropus</i>
38. Common Goldeneye <i>Bucephala clangula</i>	80. Wood Sandpiper <i>Tringa glareola</i>
39. Smew <i>Mergellus albellus</i>	81. Spotted Greenshank <i>Tringa guttifer</i>
40. Common Merganser <i>Mergus merganser</i>	82. Terek Sandpiper <i>Xenus cinereus</i>
41. White-headed Duck <i>Oxyura leucocephala</i>	83. Common Sandpiper <i>Actitis hypoleucos</i>
42. Pallas's Fish-Eagle <i>Haliaeetus leucoryphus</i>	84. Ruddy Turnstone <i>Arenaria interpres</i>

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| 85. Asian Dowitcher <i>Limnodromus semipalmatus</i> | 107. Black-winged Stilt <i>Himantopus himantopus</i> |
| 86. Solitary Snipe <i>Gallinago solitaria</i> | 108. Pied Avocet <i>Recurvirostra avosetta</i> |
| 87. Pintail Snipe <i>Gallinago stenura</i> | 109. Yellow-legged Gull <i>Larus cachinnans</i> |
| 88. Swinhoe's Snipe <i>Gallinago megala</i> | 110. Pallas's Gull <i>Larus ichthyaeus</i> |
| 89. Great Snipe <i>Gallinago media</i> | 111. Black-headed Gull <i>Larus ridibundus</i> |
| 90. Common Snipe <i>Gallinago gallinago</i> | 112. Slender-billed Gull <i>Larus genei</i> |
| 91. Jack Snipe <i>Lymnocyptes minimus</i> | 113. White-winged Black Tern <i>Chlidonias leucopterus</i> |
| 92. Eurasian Woodcock <i>Scolopax rusticola</i> | 114. Whiskered Tern <i>Chlidonias hybridus</i> |
| 93. Red Knot <i>Calidris canutus</i> | 115. Gull-billed Tern <i>Gelochelidon nilotica</i> |
| 94. Great Knot <i>Calidris tenuirostris</i> | 116. Caspian Tern <i>Sterna caspia</i> |
| 95. Sanderling <i>Calidris alba</i> | 117. Common Tern <i>Sterna hirundo</i> |
| 96. Rufous-necked Stint <i>Calidris ruficollis</i> | 118. Little Tern <i>Sterna albifrons</i> |
| 97. Little Stint <i>Calidris minuta</i> | 119. Sandwich Tern <i>Sterna sandvicensis</i> |
| 98. Temminck's Stint <i>Calidris temminckii</i> | 120. Small Blue Kingfisher <i>Alcedo atthis</i> |
| 99. Long-toed Stint <i>Calidris subminuta</i> | 121. Sand Martin <i>Riparia riparia</i> |
| 100. Dunlin <i>Calidris alpina</i> | 122. Common Swallow <i>Hirundo rustica</i> |
| 101. Curlew Sandpiper <i>Calidris ferruginea</i> | 123. Red-rumped Swallow <i>Hirundo daurica</i> |
| 102. Spoonbill Sandpiper <i>Calidris pygmeus</i> | 124. Red-throated Pipit <i>Anthus cervinus</i> |
| 103. Broad-billed Sandpiper <i>Limicola falcinellus</i> | 125. Water Pipit <i>Anthus spinoletta</i> |
| 104. Ruff <i>Philomachus pugnax</i> | 126. Yellow Wagtail <i>Motacilla flava</i> |
| 105. Red-necked Phalarope <i>Phalaropus lobatus</i> | 127. White Wagtail <i>Motacilla alba</i> |
| *106. Red Phalarope <i>Phalaropus fulicaria</i> | 128. Grey Wagtail <i>Motacilla cinerea</i> |

* Bird species supposed to be excluded from the list of bird species which migrate between Russia and India.

Population of the Siberian Crane. The Parties formulated the options on use of the opportunities of international programmes on conservation of biodiversity within the Central-Asian-Indian Flyway and also that of the international financial institutions for implementation of the projects of Russian-Indian co-operation in the environmental sphere.

6.3 Co-ordination of Action in the Asian Region

*6.3.1 Asia-Pacific Conservation Initiative

The cyclical migration of waterbirds across the globe has been long recognised as

a natural wonder. Annually millions of waterbirds fly many thousands of kilometres across a vast range of climates and habitats in response to the urge to nest and to avoid adverse weather conditions. These flights require them to replenish their reserves along the way. This cyclic pattern has occurred for aeons and predates the evolution of mankind.

In meeting the demands of their life cycles, birds depend on high quality wetlands and other habitats in many countries. However, this pattern of existence of migratory waterbirds has come under increasing threat. Rapid human development around the globe has dramatically increased pressure on wetlands and other habitats resulting in their degradation and loss, and their pollution. Efforts to conserve

*Source: Asia-Pacific Migratory Waterbird Conservation Committee, 2001. *Migratory Waterbird Conservation Strategy 2001-2005*. Wetland International Kuala Lumpur, Malaysia, 69 pp.

migratory species in one country can only be effective if they are complemented by actions in the other countries through which the species moves during its annual cycle. Complementary actions in all range states are, therefore, essential for the conservation of migratory species.

In recognition of the threats to migratory waterbirds and the need for action to conserve waterbirds and their habitats, the Asia-Pacific Migratory Waterbird Conservation Strategy: 1996-2000 was developed. The Strategy has been actively supported by the governments of Australia and Japan and co-ordinated by Wetlands International.

The Strategy has been most successful in promoting international co-operation and awareness of the need to work together to promote conservation. A number of international and national activities have been undertaken, primarily through the implementation of three regional migratory waterbird conservation Action Plans (shorebirds, cranes and Anatidae) including the establishment of three networks of sites of international importance for them. The networks (as at December 2004) comprised 82 sites in 13 countries with new sites added each year.

Based on the successes of the Strategy over the past five years, the MWCC recommended the development and implementation of this second Strategy for the period 2001-2005.

The Asia-Pacific Migratory Waterbird Conservation Strategy (2001-2005) aims to continue and expand on the successes of the previous strategy by providing the international framework for the conservation of migratory waterbirds and their habitats in the Asia-Pacific region in the 21st century. The strategy outlines eight key elements to promote their effective conservation.

Over the next five years the Strategy aims to have:

- Achieved implementation of Action Plans for three species groups in the East Asian-Australasian Flyway, selected globally threatened species, and the Central Asian-Indian Flyway;
- Established effective networks of sites in the flyways to conserve migratory waterbirds and their important habitats;
- Built and strengthened the capacity of governments and NGOs to sustainably manage waterbirds and wetlands, primarily by providing training to managers of important sites;
- Promoted conservation education, and public community awareness at the international, national and local levels through the development of products and programmes;
- Enhanced programmes to monitor waterbird diversity and abundance at important sites, through improving our knowledge of wetlands by contributing to regional inventories;
- Improved our understanding of migration patterns and the conservation needs of waterbirds;
- Promoted the implementation of national policy and legislation to ensure management of waterbirds and their habitats;
- Improved links between local communities at important sites;
- Promoted the sharing of knowledge and skills through various fora (meetings, publications, newsletters, and websites);
- And made use of at least USD 5 million to achieve these objects.

Implementation of the strategy will require co-operation between governments,

conventions, international and national corporations, bilateral and multilateral donor agencies, international and national non-governmental organisations and local communities.

During their annual migrations, the birds depend on a great diversity of habitats, ranging from the Arctic tundra to forests, rivers and estuaries, lakes and marshes, farm lands, rice fields, deserts, coastal marshes, sandy beaches, intertidal mudflats, coral reefs and atolls, and mangroves, most of which are wetlands.

Many waterbirds are migratory, undertaking annual migrations along different flyways spanning the length and breadth of the globe between their breeding and non-breeding grounds. During their annual migration, waterbirds stop for very short periods of time to rest and feed at staging sites - "stepping stones" that are essential for migration and crucial to their survival. They regularly cross national boundaries and, thus, conservation of migratory waterbirds is clearly a collective responsibility of all countries along the flyway.

Global Conservation Initiatives

Around the world, waterbirds have been demonstrated to serve as a powerful and efficient vehicle to focus attention and generate action for the conservation and sustainable use of wetlands and their biota. On the basis of the annual movement patterns of migratory waterbird populations, the world can be divided into three major flyway regions, with some overlapping areas:

- i. North and South American flyways
- ii. African-Eurasian flyways
- iii. Asia-Pacific flyways

The Geographic Region

This strategy broadly covers the breeding, staging and non-breeding areas of migratory waterbirds, using the three major flyways in the Asia-Pacific region. It encompasses the Asian continent east of the Ural mountains and south to the Caspian Sea and Arabian Gulf, through all the countries of the former Soviet Union and Asia, to Alaska (USA), Australia, and island countries and territories of the Pacific Ocean east to the Pitcairn Islands (Fig. 6.1).

Migratory Waterbird Conservation Strategy

Major Waterbird Flyways

In the Asia-Pacific region waterbirds generally migrate from north to south. For the long-distance migrants, especially shorebirds, three flyways are recognised, based on biological and geopolitical considerations:

1. Central Asian-Indian Flyway
2. East Asian-Australasian Flyway
3. West Pacific Flyways

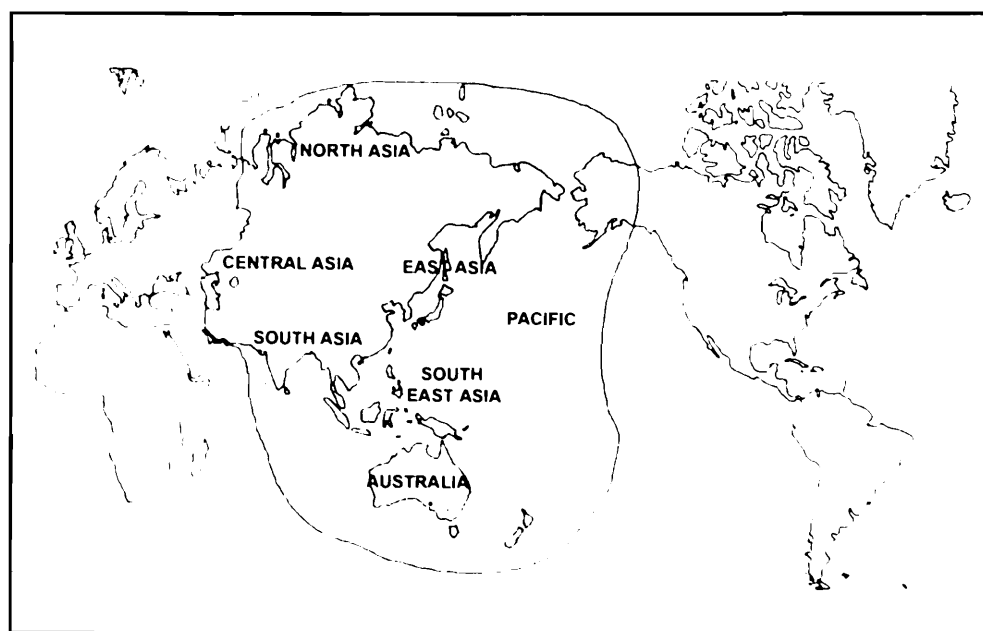


Fig. 6.1 Implementation area of the Asia-Pacific Migratory Waterbird Conservation Initiatives

The detailed picture of migration within the region is complex, as different species and populations vary in their migration strategies. Some populations do not follow these general flyways and spend the non-breeding period in areas covered by two or more flyways. There is also considerable overlap between the flyway areas, especially in northern latitudes where the birds breed. A conservation framework that encompasses the entire geographic region is needed to conserve these waterbirds. Within this framework, actions need to be implemented at the flyway level.

Waterbirds in the Asia-Pacific

The strategy adopts the definition of waterbirds of the Convention on Wetlands in its broadest sense as being “birds ecologically dependent on wetlands” Twenty families of waterbirds with the exception of wetland raptors are accepted under the definition, and these are listed in Table 6.2.

There are at least 243 migratory species out of the 404 waterbird species that are recorded in the region. They visit at least 57 countries and territories in the Asia-Pacific region.

Waterbirds in need of special action

The conservation status of waterbirds across the Asia-Pacific region varies greatly, and there is limited information on the sizes of most populations. A recent publication on *Threatened Birds of the World* (BirdLife International, 2000), identifies 50 species of threatened migratory waterbirds in the Asia-Pacific region (*cf.* Appendix 2). Efforts to conserve these species are needed.

In addition to these globally threatened species, it is also necessary to identify biogeographical populations of migratory waterbird species that are at risk in the Asia-Pacific region. Conservation efforts should also be targeted at maintaining (or restoring) viable populations of these waterbirds in their natural ranges.

Table 6.2 Waterbird families included in the Asia-Pacific Migratory Waterbird Conservation Strategy

Taxonomic Group	English Name
Gaviidae	Loons/Divers
Podicipedidae	Grebes
Phalacrocoracidae	Cormorants
Pelecanidae	Pelicans
Ardeidae	Hérons, Egrets & Bitterns
Ciconiidae	Storks
Threskiornithidae	Ibises & Spoonbills
Phoenicopteridae	Flamingos
Anatidae	Swans, Geese & Ducks
Gruidae	Cranes
Rallidae	Rails, Gallinules & Coots
Heliornithidae	Finfoots
Jacanidae	Jacanas
Dromadidae	Crab Plover
Haematopodidae	Oystercatchers
Recurvirostridae	Stilts & Avocet
Glareolidae	Pratincoles
Charadriidae	Plovers
Scolopacidae	Sandpipers
Laridae	Gulls, Terns & Skimmer

Note: Collectively, shorebirds include jacanas, crab plover, oystercatchers, stilts and avocet, pratincole, plovers and sandpipers.

Information Needs for Waterbird and Wetland Conservation

Baseline information is a prerequisite to planning and monitoring actions for waterbirds and their habitats. Without scientifically robust time series information on population status and distribution, success or failure of conservation actions cannot be assessed.

Comprehensive information on breeding ranges, migration routes, important staging areas, non-breeding sites, feeding requirements, quality of habitat and carrying capacity, plus seasonal/annual use of habitat

and population changes is not available for many waterbirds. Monitoring of bird distribution and populations during the migration cycle is still in its infancy; thus population sizes and trends of many species are unknown. As well, quantitative information is lacking on the socio-economic importance of the harvesting of waterbirds in the Asia-Pacific region.

The exchange of information on waterbirds and their habitats will facilitate their conservation. This can benefit greatly from computer-based information storage and retrieval systems, especially as access and operation of computer-based systems increase across the region.

There are four main global/regional computer-based databases that store information on waterbirds and their habitats:

- i. Database of Wetlands of International Importance (Convention on Wetlands)
- ii. Important Bird Area Database (BirdLife International)
- iii. International Waterbird Census Database (Wetlands International)
- iv. World Bird Database (BirdLife International)

The Asian Waterfowl Census, part of the International Waterbird Census collects, collates and disseminates information on the distribution of waterbirds and wetlands. The programme needs to be expanded in the Asia-Pacific region. An Asian Wetland Inventory database is being developed to collect standardised information on wetlands of international importance throughout Asia.

Overview of Threats to Waterbirds and Wetlands

The Asia-Pacific region supports more than half the world's human population and in recent years has achieved one of the

highest economic growth rates. The high economic growth has caused the rapid and often unsustainable use of natural resources and the degradation of the environment. The two main threats to the conservation of migratory waterbirds linked to this growth are the **loss and degradation of habitat**. Other threats include the introduction of exotic species and unsustainable harvesting of waterbirds.

A review of the status of wetlands in Asia undertaken during the late 1980s (Scott, 1989; Scott & Poole, 1989) revealed that 85% of the important wetlands were under some form of threat. The main threats were disturbance from human activities, including settlement and agricultural encroachment; drainage and reclamation for agriculture; domestic, industrial waste water and pesticide pollution; over-exploitation of fishery resources; commercial logging and other forestry activities in wetland-associated forests; and degradation of watersheds resulting in increased soil erosion and siltation and decreased water quality. Fifty percent of these wetlands were reported to be under moderate or severe threat, showing the severity of human impact on the habitats. The Wetlands Policy of the Commonwealth Government of Australia (Environment Australia, 1997) notes the loss of wetlands and major factors leading to degradation and loss; it also states that the greatest threat, even today, remains ignorance of the importance of wetlands and the roles they play. Wetlands of the Pacific Islands region, while generally subject to lower population pressure than Asia, are nevertheless increasingly under threat from expansion of agriculture, logging and unsustainable harvesting of marine and freshwater resources (Jaensch, 1996).

In order to address waterbird conservation issues, therefore, it is vital to consider issues associated with conservation

and sustainable use of wetlands and other habitats used by the birds during their annual migratory cycles.

Key Elements

The Asia-Pacific Migratory Waterbird Conservation Strategy (2001-2005) aims to enhance the long-term conservation of migratory waterbirds and their habitats in the Asia-Pacific region.

It will build and expand on the successes of the strategy: 1996-2000. The strategy: 2001-2005 is based on the following principles:

The strategy calls for action at international, regional and national levels. It divides the Asia-Pacific into broad regions determined by the migration pattern of species along three flyways: Central Asian-Indian, East Asian-Australasian and West Pacific. It also recognises sub-regions for some species-groups of shore birds, for example, within the East Asian-Australasian Flyway, for cranes in North East Asia and Anatidae in East Asia.

Action Plans are to continue as the main tool for promoting conservation initiatives at regional level. Three Action Plans have been reviewed and further developed for Anatidae along the East Asian Flyway, cranes along the North East Asian Flyway and shorebirds throughout the East Asian-Australasian Flyway. The three existing site networks will serve as a focus for site-based conservation work for these species-groups.

An Action Plan for the Central Asian-Indian flyway will be developed to promote action for all migratory waterbirds. In addition, all existing global and regional waterbird Action Plans will be reviewed and promoted. Single species Action Plans will be considered for selected species.

Interactions with other international migratory waterbird conservation programmes, such as the North American

Waterfowl Management Plan, United States Shorebird Conservation Plan, Western Hemisphere Shorebird Reserve Network and African-Eurasian Waterbird Agreement all need to be enhanced to provide expertise and linkages to enhance the implementation of activities in the Asia-Pacific region.

National programmes will need to be developed to provide detailed planning at national level. Action at national level will involve the national, state and local governments responsible for wetland habitats and conserving the biodiversity. These actions need to be supported and complemented by local people, national and international NGOs, conventions and the corporate and donor communities.

The conservation benefits must be clear to local people throughout the region, as only through recognizing the importance of waterbirds and their habitats, can such an ambitious conservation plan be achieved.

The challenge is to ensure that organisations in all countries are involved in the achievement of the outcomes before the end of 2005. National government agencies are encouraged to embrace the key elements of the strategy within their national agendas. It is recognised that specific actions may differ between countries depending on existing situations, current programmes and availability of resources.

NGOs play an important role in achieving the outcomes of the strategy, by working with governments and local people to develop innovative and cost-effective programmes to promote the conservation of migratory waterbirds and their habitats at the national and international levels.

Implementing the Strategy

The key elements of this strategy are as follows:

1. Planned action for species-groups and globally threatened species.
2. Efficiently managed networks of sites that are internationally important for migratory waterbirds.
3. Raised awareness of waterbirds and their link to wetland values and functions throughout the region and at all levels.
4. Increased capacity of government agencies and non-government organisations to implement conservation actions for migratory waterbirds.
5. An enhanced knowledge base and increased information exchange for the sound management of migratory waterbirds and their habitats.
6. Harmonised national and state policies and legislation as a foundation for the conservation of migratory waterbirds and their habitats.
7. Enhanced organisational relationships at all levels to increase co-operation and deliver greater conservation benefits.
8. Adequate planning and resources to implement the strategy.

Co-ordination of Action

Asia-Pacific Migratory Waterbird Conservation Committee

An international committee, the Asia-Pacific Migratory Waterbird Conservation Committee (MWCC) was established to monitor the implementation of the strategy. The MWCC now, comprises nine government representatives (Australia, China, India, Indonesia, Japan, Thailand, Republic of Korea, Russia and U.S.A.), the Convention on Wetlands (Ramsar Convention), the Convention on Migratory Species (Bonn Convention), international NGOs (BirdLife

International, World Wide Fund for Nature, World Conservation Union and Wetlands International), a representative of the United Nations Development Programme/Global Environment Facility, United Nations Environment Programme/Regional Office of Asia/Pacific, chairs of the three technical Working Groups (for Anatidae, cranes and shorebirds) and a Wetlands International Specialist Group Co-ordinator (Figure 6.2).

The MWCC will maintain overall responsibility for co-ordinating, monitoring and reporting on implementation of the strategy, fund raising, development of projects, and overseeing activities of the Strategy Co-ordination Officer. The terms of reference for the Committee are to:

- Promote and encourage support for implementation of the strategy by governments and other relevant organisations in the Asia-Pacific region.
- Monitor implementation of the strategy.
- Establish and provide guidance to Working Groups to oversee the implementation of species-group Action Plans and site networks.
- Provide advice to and monitor progress of Working Groups.
- Monitor and encourage partnerships and link between initiatives for conservation of migratory waterbirds and those for wetlands and other wetland species.
- Make recommendations for development of proposals for the conservation of waterbirds and their habitats.
- Provide advice to the Wetlands International - Asia Pacific Council and other agencies on priorities for funding and projects.
- Report on activities to the Wetlands International - Asia Pacific Council.

- Review the annual work programme of the Strategy Co-ordination Officer.

Working Groups

Co-ordination of activities to implement the shorebird, crane and Anatidae Action Plans during 1996-2000 was achieved through three international Working Groups. The Working Groups established by the MWCC, comprise 6-9 members drawn from governments, technical institutes and NGOs. Each Working Group has an elected Chair and is supported by a Flyway Officer.

The Working Groups are responsible for

developing, co-ordinating, monitoring and reporting on implementation of Action Plans, development of projects, supporting fund-raising activities, and overseeing activities of the Flyway Officer. Contact details for the Working Groups are provided in Appendix 6. These Working Groups will continue their support role to the MWCC. Additional Working Groups may be established.

Resourcing the Strategy

During 1996-2000, Environment Australia, the Environment Agency of Japan and Wetlands International provided core funding

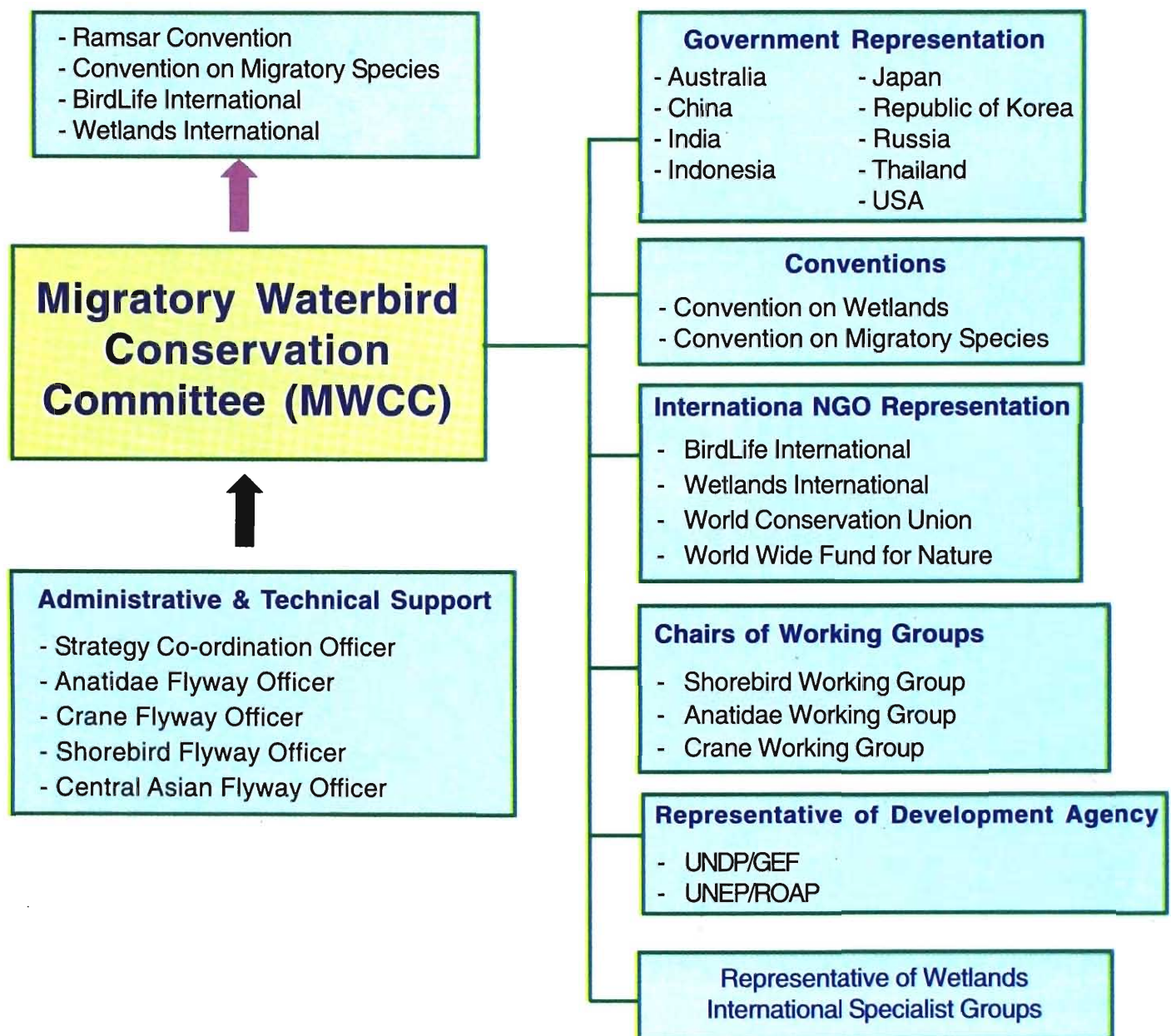


Fig. 6.2 Organisational structure of the Asia-Pacific Migratory Waterbird Conservation Committee (October 2004)

to support the Strategy and Action Plan implementation activities, and the meetings of the MWCC and Working Groups. Funding was also provided for the development of the Strategy (2001-2005). It is expected that these agencies will continue to work with governments and other agencies in the Asia-Pacific region to implement the Strategy (2001-2005).

Implementation of the key elements

outlined in the Strategy (2001-2005) will require considerable financial resources. A number of agencies and organisations are already undertaking some of these activities with funds from a variety of sources. Other activities can be supported through the re-allocation of existing resources. Additional financial resources will be necessary to ensure timely and sustainable implementation of most of the strategy.



Photo: K. S. Gopi Sundar

Siberian Crane

*6.4 A Strategy for Threatened Wetland Birds in India

The BirdLife Asia Partnership has prepared its *Strategy for the threatened birds of Asia* (November 2003), as a follow up to the *Threatened birds of Asia: the BirdLife International Red Data Book*.

The strategy is being designed for non-specialist audiences, so that the main conclusions of the RDB will be available to decision-makers in a simple, clear and straightforward form.

1. Tibetan Plateau Wetlands (W09)

Regional Overview: The many high-altitude lakes and marshlands on the Tibetan plateau support one unique waterbird species, the Black-necked Crane, which is widely distributed during the breeding season but moves to the relatively low eastern and southern parts of the plateau for the winter. Baer's Pochard and Pallas's Fish-Eagle also occur on the southern and eastern fringes of the plateau.

Threatened species	CR	EN	VU	Total
Breeding in this wetland region	-	-	2	2
Passage migrant	-	-	-	-
Non-breeding visitor ¹	-	-	1	1
Total	-	-	3	3

Key habitats: High altitude lakes and marshland.

Countries and territories: China (Xinjiang, Tibet, Qinghai, Gansu, Sichuan, Yunnan, Guizhou); India (Jammu and Kashmir [Ladakh], Sikkim, Arunachal Pradesh); **Bhutan**.

Outstanding IBAs for Threatened Birds:

Nine IBAs have been selected, including three important breeding areas and six important non-breeding concentrations of Black-necked Crane, of which seven are in China and the following two are in Bhutan.

Outstanding IBAs	Status	Territory	Threatened species
1. Bumdeling	PA	Bhutan	Non-breeding Black-necked Crane.
2. Phobjikha valley	PA	Bhutan	Non-breeding Black-necked Crane.

Current Status of Habitats and Threatened Species:

The human population density on the Tibetan plateau is very low, and many areas are relatively undisturbed. However, the wetlands are locally under pressure from wetland drainage, overgrazing, peat mining, reservoir construction, pesticide use and changes in agricultural practices, particularly in the relatively low-altitude areas in the south and east of the plateau.

*Source: BirdLife International (2003)

Species	Distribution and population		
Baer's Pochard <i>Aythya baeri</i>	Region estimated to support <10% of global non-breeding population	VU	Rare winter visitor to the eastern edge of the Tibetan plateau
Pallas's Fish-Eagle <i>Haliaeetus leucoryphus</i>	Region estimated to support <10% of global breeding population	VU	Occurs on the southern and eastern edges of the Tibetan plateau
Black-necked Crane <i>Grus nigricollis</i>	Region estimated to support >90% of global breeding population	VU	Widely distributed on the Tibetan plateau during the breeding season, in winter tends to concentrate in the relatively low eastern and southern parts

Conservation issues and strategic solutions

Conservation issues	Strategic solutions
Habitat loss and degradation	
<ul style="list-style-type: none"> ● Wetland drainage ● Peat Extraction ● Changing Agricultural Practices ● Livestock Grazing ● Development (Urban, Industrial, etc.) ● Pollution/ Pesticides ● Disturbance 	<ul style="list-style-type: none"> ● Minimise conversion of Black-necked Crane habitat for agricultural and urban expansion ● Limit peat extraction at key sites for Black-necked Crane ● Promote traditional farming practices which provide food for wintering cranes ● Improve the management of grazing at key sites ● Assess the environmental impact of development projects near key sites ● Legally regulate the use of pesticides and herbicides, and control pollution near key sites ● Regulate human activities at key sites, particularly near nest and roost sites
Protected areas coverage and management	
<ul style="list-style-type: none"> ● Gaps in protected areas system ● Weaknesses in reserve management 	<ul style="list-style-type: none"> ● Establish new protected areas for breeding and wintering Black-necked Cranes in China and India ● Develop community-based monitoring and protection schemes, at sites where Black-necked Cranes winter on agricultural land ● Prepare management plans for existing and new reserves, and develop the infrastructure and staffing required for their implementation

Exploitation of birds	
● Hunting and egg collection	● Improve enforcement of hunting laws
Gaps in knowledge	
● Inadequate data on threatened birds	● Investigate status of Pallas's Fish-Eagle on the Tibetan plateau, possibly using satellite tracking
Other Conservation Issues	
● Predation by feral dogs	● Conduct a co-ordinated dog culling and/ or sterilization programme in Ladakh

2. North Indian wetlands (W12)

Regional overview: This region includes the wetlands on the Gangetic plains, together with the coastal and freshwater wetlands of Rajasthan and Gujarat. It supports more breeding Sarus Cranes (on shallow wetlands and associated agricultural land) and Indian Skimmers (on the vast system of rivers) than any other region, and the scattered lakes and reservoirs also provide habitat for non-breeding flocks of Sarus Crane and significant numbers of breeding and wintering Pallas's Fish-Eagles. The "central population" of Siberian Crane winters in the region, but has declined to near extinction in recent years. The swampy wetlands of northern India, particularly in Bihar, were once the stronghold for the Pink-headed Duck, a species which may now be extinct, although it could possibly survive in the more inaccessible parts of its former range.

Threatened species	CR	EN	VU	Total
Breeding in this wetland region	1	-	3	4
Passage migrant	-	-	-	-
Non-breeding visitor ¹	1	1	3	5
Total	2	1	6	9

¹ = The Conservation Dependent Dalmatian Pelican is also a non-breeding visitor to this region.

Key habitats: Freshwater wetlands on riverine plains, and associated agricultural land; coastal wetlands.

Countries and territories: India (Punjab, Haryana, Delhi, Rajasthan, Gujarat, Uttar Pradesh, Madhya Pradesh, Bihar); Nepal.

Outstanding IBAs for threatened birds

Four IBAs have been selected, covering important breeding sites of Pallas's Fish-Eagle, Sarus Crane and Indian Skimmer, as well as wintering Dalmatian Pelican and Siberian Crane. More sites of value to these birds will be documented during BirdLife's on-going IBA Project.

IBA name	Status	Territory	Threatened species
1. Sultanpur NP	PA	Haryana	Breeding Sarus Cranes, wintering Dalmatian Pelican
2. Keoladeo NP	PA ^{R, WH}	Rajasthan	The main wintering site for the tiny central population of Siberian Crane, also breeding Pallas's Fish-Eagle and Sarus Crane
3. Etawah-Mainpuri wetlands	-	Uttar Pradesh	Large concentration of Sarus Crane
4. National Chambal WS	PA	Uttar Pradesh; Madhya Pradesh	A large Indian Skimmer population breeds in this riverine reserve, also Pallas's Fish-Eagle and Sarus Crane

Several of the waterbirds of this region also occur in IBAs listed for G02 (Dudhwa NP, Chitwan NP, Kosi Tappu WR and Royal Sukla Phanta WR) and G03 (Harike Lake WS).

Key - IBA name: NP = National Park; WS = Wildlife Sanctuary.

Status: PA = IBA is a protected area; R = IBA is wholly or partially a Ramsar Site; WH = IBA is wholly or partially a World Heritage Site. White-rumped, Indian and/or Slender-billed Vultures of region G03 have (or had) populations in several IBAs in this region.

Current status of habitats and threatened species

The vast Gangetic plains are densely populated and utilized throughout. The natural wetlands there have been greatly modified by drainage, irrigation and encroachment for agriculture and development over many centuries. Despite these changes, some extensive, rich wetlands remain, and this region is remarkable for the degree to which wildlife is able to coexist with man in wetland and agricultural areas, linked to the Hindu philosophical tradition. The region also includes extensive coastal wetlands in Gujarat, and freshwater lakes and reservoirs in Gujarat and Rajasthan, which are vital for both wildlife and man in these arid states. Huge numbers of waterbirds occur, including several threatened species, but significant recent declines are linked to wetland drainage, unsustainable exploitation for fuel and fodder, more intense agriculture, use of agrochemicals, human disturbance and hunting. Many of the major tributaries flowing into the Ganges have been dammed for hydropower and irrigation schemes, which have created some new wetlands, but is negatively affecting the habitat of riverine birds. The global range of the Pink-headed Duck was centred on this region, but it almost certainly became extinct during the twentieth century.

Species	Distribution and population		
Dalmatian Pelican <i>Pelecanus crispus</i>	Region estimated to support <10% of global non-breeding population	VU	Small numbers of non-breeding birds regular in Gujarat and near Delhi
Spot-billed Pelican <i>Pelecanus philippensis</i>	Region estimated to support <10% of global non-breeding population	VU	Small numbers of non-breeding birds on the larger wetlands
Lesser Adjutant <i>Leptoptilos javanicus</i>	Region estimated to support <10% of global non-breeding population	VU	Rare visitor, occasionally breeds

Species	Distribution and population		
Greater Adjutant <i>Leptoptilos dubius</i>	Region estimated to support <10% of global non-breeding population	EN	Rare non-breeding visitor
Pink-headed Duck <i>Rhodonessa caryophyllacea</i>	Probably extinct	CR	This region was historically a stronghold, but the species is now presumed extinct
Baer's Pochard <i>Aythya baeri</i>	Region estimated to support <10% of global non-breeding population	VU	Small numbers of non-breeding birds regular in Nepal
Pallas's Fish-Eagle <i>Haliaeetus leucoryphus</i>	Region estimated to support 10- 50% of global breeding population	VU	A significant but declining breeding population, augmented in winter by non-breeding birds
Siberian Crane <i>Grus leucogeranus</i>	Region estimated to support <10% of global non-breeding population	CR	Tiny numbers visit Rajasthan in winter
Sarus Crane <i>Grus antigone</i>	Region estimated to support 50- 90% of global breeding population	VU	This region supports a high proportion of the global population
Indian Skimmer <i>Rynchops albicollis</i>	Region estimated to support >90% of global breeding population	VU	A large population breeds along major rivers, but may be in decline
<p>Other threatened waterbirds recorded from this region as rare (or possibly extinct) visitors are: White-headed Duck <i>Oxyura leucocephala</i>, Lesser White-fronted Goose <i>Anser erythropus</i>, Baikal Teal <i>Anas formosa</i> and Marbled Teal <i>Marmaronatta angustirostris</i>. In addition to waterbirds the Greater Spotted Eagle <i>Aquila clanga</i> (VU) and the Imperial Eagle <i>A. heliaca</i> (VU) occur in winter.</p>			

Conservation issues and strategic solutions for birds of the North Indian wetlands

Conservation issues	Strategic solutions
Habitat loss and degradation	
<ul style="list-style-type: none"> ● Conversion to agriculture ● Increased cultivation of Water Chestnut ● Wetland exploitation ● Dams and irrigation ● Siltation and flooding 	<ul style="list-style-type: none"> ● Maintain patches of wetland within agricultural landscapes ● Encourage wet rice cultivation to provide additional breeding habitat for the Sarus Crane ● Develop government regulations and policies for wetland conservation, and remove wetlands from the 'wasteland' category in the current land classification ● Develop government regulations and policies for wetland conservation, and remove wetlands from the 'wasteland' category in the current land classification ● Regulate the cultivation of Water Chestnut in important wetlands

<ul style="list-style-type: none"> ● Development (urban, industrial, etc.) ● Disturbance ● Pollution/ pesticides ● Reduced food supply 	<ul style="list-style-type: none"> ● Plant nest trees or erect artificial nest platforms for Pallas's Fish-Eagles ● Manage wetlands created by dams and irrigation to maximize their value for waterbirds ● Assess the environmental impact of proposed dam projects, especially on important rivers for threatened waterbirds ● Control flow regimes below dams to protect Indian Skimmer colonies ● Regulate human activities at key wetlands to minimise disturbance ● Limit use of agrochemicals, and encourage traditional organic farming methods ● Improve management of fish stocks, and ban fishing with chemicals
Protected areas coverage and management	
<ul style="list-style-type: none"> ● Gaps in protected areas system ● Weaknesses in reserve management 	<ul style="list-style-type: none"> ● Develop networks of small, locally-managed community conservation areas to protect waterbird nest and roost sites ● Establish new protected areas for Indian Skimmer and Pallas's Fish-Eagle, and review the design and management of National Chambal Sanctuary and other riverine reserves ● Manage wetland reserves to maximise their value for threatened waterbirds
Exploitation of birds	
<ul style="list-style-type: none"> ● Hunting and persecution 	<ul style="list-style-type: none"> ● Improve enforcement of hunting laws, by patrolling protected wetlands and monitor the sale of waterbirds at markets in Bihar and elsewhere ● Minimise conflict between farmers and Sarus Cranes through education programmes and an award scheme
Gaps in knowledge	
<ul style="list-style-type: none"> ● Inadequate data on threatened birds 	<ul style="list-style-type: none"> ● Conduct surveys to map Pallas's Fish-Eagle eyries and Indian Skimmer colonies, and determine what measures are required for their protection ● Study dam management and river flow regimes to help determine what adjustments are required to protect Indian Skimmer colonies ● Search for the Pink-headed Duck, principally in its former strongholds in Bihar

3. South Indian and Sri Lankan wetlands (W13)

Regional overview: The wetlands of this region support a high proportion of the global population of Spot-billed Pelicans, with many colonies associated with the water storage reservoirs or “tanks” on the Deccan plateau in southern India and the dry zone lowlands of Sri Lanka. Lesser Adjutant also occurs, but in relatively low numbers, and small numbers of Spoon-billed Sandpiper have been found wintering in coastal wetlands.

Threatened species	CR	EN	VU	Total
Breeding in this wetland region	-	-	2	2
Passage migrant	-	-	-	-
Non-breeding visitor	-	-	1	1
Total	-	-	3	3

Key habitats: Freshwater and coastal wetlands.

Countries and territories: **India** (Karnataka, Andhra Pradesh, Kerala, Tamil Nadu, Orissa); **Sri Lanka**.

Outstanding IBAs for threatened birds

Seven **IBAs** have been selected in the Indian region, primarily for their importance to the Spot-billed Pelican.

IBA name	Status	Territory	Threatened species
1. Kokare Bellur	-	Karnataka	Large Spot-billed Pelican colony
2. Nellapatu WS	PA	Andhra Pradesh	Large Spot-billed Pelican colony
3. Pulicat lake WS	PA	Andhra Pradesh	Important Spot-billed Pelican foraging area
4. Point Calimere S	PA ^R	Tamil Nadu	Foraging Spot-billed Pelicans and occasional Spoon-billed Sandpiper
5. Chitrangudi tank	-	Tamil Nadu	Large Spot-billed Pelican colony
6. Koondakulam BS	PA	Tamil Nadu	Large Spot-billed Pelican colony
7. Chilika Lake	- ^R	Orissa	Foraging Spot-billed Pelican and Spoon-billed Sandpiper

Key – IBA name: BS = Bird Sanctuary; S = Sanctuary; WS = Wildlife Sanctuary; *Status:* PA = IBA is a protected area; R = Ramsar Site; - = unprotected.

Current status of habitats and threatened species

The water storage reservoirs or “tanks” favoured by Spot-billed Pelicans have been constructed close to virtually every rural village, and provide a vital source of water and other resources in this relatively arid region. They are therefore fairly secure, although some are being encroached for agriculture or industrial development, disturbed and/or polluted. The estuaries and coastal lagoons visited by non-breeding Spot-billed Pelicans and small numbers of Spoon-billed Sandpiper are being degraded by aquaculture, industrial development and siltation.

Species	Distribution and population		
Spot-billed Pelican <i>Pelecanus philippensis</i>	Region estimated to support 50-90% of global breeding population	VU	A high proportion of the global population nests in colonies in this region, with recent estimates of 2,000-2,500 birds in southern India
Lesser Adjutant <i>Leptoptilos javanicus</i>	Region estimated to support <10% of global breeding population	VU	Suspected to breed in southern India; scarce and local breeding bird on Sri Lanka
Spoon-billed Sandpiper <i>Eurynorhynchus pygmeus</i>	Region estimated to support <10% of global non-breeding population	EN	Small numbers regularly winter on the east coast of India
Other threatened waterbirds recorded from this region as rare (or extinct) visitors are: the Pink-headed Duck <i>Rhodonessa caryophyllacea</i> (extinct), Spotted Greenshank <i>Tringa guttifer</i> and Indian Skimmer <i>Rynchops albicollis</i> .			

In addition to the waterbirds, Greater Spotted Eagle *Aquila clanga* (VU) winters in southern India (but not Sri Lanka).

Conservation issues and strategic solutions

Conservation issue	Strategic solutions
Habitat loss and degradation	
<ul style="list-style-type: none"> ● Conversion to agriculture ● Conversion to aquaculture ● Development (urban, industrial, etc) ● Cutting of nesting trees ● Disturbance ● Pollution/pesticides ● Reduced food supply 	<ul style="list-style-type: none"> ● Control conversion for agriculture and the spread of aqua culture, and minimise encroachment of urban and industrial development into wetlands ● Assess the environmental impact of proposed development projects near key wetlands ● Establish community based projects at Spot-billed Pelican colonies to reduce cutting of nest trees and conflicts with local people, and plant additional nest trees ● Regulate the use of agrochemicals, and encourage traditional organic farming methods ● Improve management of fisheries at key wetlands for Spot-billed Pelicans
Protected areas coverage and management	
<ul style="list-style-type: none"> ● Gaps in protected areas system ● Weaknesses in reserve management 	<ul style="list-style-type: none"> ● Establish new protected areas at key Spot-billed Pelican and Lesser Adjutant breeding and foraging sites ● Strengthen reserve management through improved funding, infrastructure and staff training
Exploitation of birds	
<ul style="list-style-type: none"> ● Hunting and persecution 	<ul style="list-style-type: none"> ● Strengthen hunting and species protection laws, and improve their enforcement, including through education and awareness programmes

Gaps in knowledge	
<ul style="list-style-type: none"> Inadequate data on threatened birds 	<ul style="list-style-type: none"> Monitor all major Spot-billed Pelican and Lesser Adjutant colonies, and identify their main foraging areas Survey coastal wetlands for the Spoon-billed Sandpiper

4. W 14 Assam and Sylhet plains

Regional overview: In India, all wetlands in this region fall within the catchment of the Brahmaputra River, while in Bangladesh it includes inland wetland habitats associated with the Brahmaputra, -Jamuna and Meghna - Kalni rivers. This huge lowland area of marshy plains and large lakes is now the global stronghold of Greater Adjutant, following the historical crash of the vast breeding colonies in Myanmar. It also supports important breeding populations of Spot-billed Pelican, Lesser Adjutant and Pallas's Fish-eagle, and a large non-breeding population of Baer's Pochard.

Threatened species	CR	EN	VU	Total
Breeding in this wetland region	1	1	4	6
Passage migrant	-	-	-	-
Non-breeding visitor ¹	-	-	3	3
Total	1	1	7	9

¹ = The Conservation Dependent Dalmatian Pelican is also a non-breeding visitor to this region.

The Assam and Sylhet plains region is within Conservation International's Indo-Burma Hotspot

Key habitats: Freshwater wetlands on riverine plains.

Countries and territories: India (West Bengal, Arunachal Pradesh, Assam, Meghalaya); Bangladesh.

Outstanding IBAs for threatened birds

The following three outstanding IBAs have been selected in Indian region, primarily because of their importance to Greater Adjutant, Baer's Pochard and Pallas's Fish-eagle, as well as Spot-billed Pelican and Lesser Adjutant. Many more sites of these birds will be documented during BirdLife's ongoing IBA project.

IBA name	Status	Territory	Threatened species
1. Orang NP	PA	Assam	Breeding Spot-billed Pelican, Lesser Adjutant and Pallas's Fish-Eagle
2. Nagaon	-	Assam	Large breeding colonies of Greater Adjutant
3. Deepor Beel WS	PA ^R	Assam	Non-breeding Lesser Adjutant, Greater Adjutant and Baer's Pochard

Key – IBA name: NP = National Park; WS = Wildlife Sanctuary; **Status:** PA = IBA is a protected area; R= IBA is wholly or partially a Ramsar Site; - = unprotected.

Important waterbird populations occur in several of the IBAs listed for region (Jaldapara WS, D'Ering Memorial WS, Manas NP, Kaziranga NP and Dibru-Saikhowa NP).

Current status of habitats and threatened species

A century ago, the lowlands of north-east India and north-east Bangladesh were covered by shallow wetlands, seasonally flooded grasslands and swamp forests, but large areas have now been drained and converted to cultivation and pasture. The plains of Assam have been intensively developed, but there are still some extensive natural wetlands there. Habitat loss has been more severe in West Bengal and northern Bangladesh, where only a few fragments of wetland remain. Many of the surviving wetlands are included in the region's extensive network of protected areas, some of which are very large, having been established for the protection of Indian Rhinoceros *Rhinoceros unicornis* and other large mammals. However, some of these reserves are affected by the long-running political unrest in several north-east Indian states, which might also disrupt other conservation initiatives in the region.

Species	Distribution and population		
Dalmatian Pelican <i>Pelecanus crispus</i>	Region estimated to support <10% of global non-breeding population	VU	Small non-breeding population in Assam
Spot-billed Pelican <i>Pelecanus philippensis</i>	Region estimated to support 10-50% of global breeding population	VU	Several hundred pairs breed in Assam
Lesser Adjutant <i>Leptoptilos javanicus</i>	Region estimated to support 10-50% of global breeding population	VU	Fairly common breeding bird in Assam
Greater Adjutant <i>Leptoptilos dubius</i>	Region estimated to support 50-90% of global breeding population	EN	A high proportion of the known global population breeds in Assam
Marbled Teal <i>Marmaronetta angustirostris</i>	Region estimated to support <10% of global non-breeding population	VU	Several recent records of small numbers
Pink-headed Duck <i>Rhodonessa caryophyllacea</i>	Probably extinct?	CR	Recorded in the past, but the species is now presumed extinct
Baer's Pochard <i>Aythya baeri</i>	Region estimated to support 10-50% of global non-breeding population	VU	Large non-breeding population in Assam and, especially, north-east Bangladesh
Pallas's Fish-Eagle <i>Haliaeetus leucoryphus</i>	Region estimated to support 10-50% of global breeding population	VU	Significant breeding population in the haors (lake depression) wetlands of north-east Bangladesh and the Brahmaputra floodplain
Sarus Crane <i>Grus antigone</i>	Region estimated to support <10% of global breeding population	VU	A small population survives in Assam
Indian Skimmer <i>Rynchops albicollis</i>	Region estimated to support <10% of global non-breeding population	VU	Scarce non-breeding visitor along major rivers

Other threatened waterbirds recorded from this region as rare visitors are: White-bellied Heron *Ardea insignis*, Oriental Stork *Ciconia boyciana*, Lesser White-fronted Goose *Anser erythropus*, Baikal Teal *Anas formosa*, White-winged Duck *Cairina scutulata*, Hooded Crane *Grus monacha*, Spotted Greenshank *Tringa guttifer*, Masked Finfoot *Heliopais personata* and Spoon-billed Sandpiper *Eurynorhynchus pygmeus*.

In addition to the waterbirds listed above, the Greater Spotted Eagle *Aquila clanga* (VU) and the Imperial Eagle *A. heliaca* (VU) occur in winter

Conservation issues and strategic solutions

Conservation issue	Strategic solutions
Habitat loss and degradation	
<ul style="list-style-type: none"> ● Conversion to agriculture ● Development (urban, industrial, etc) ● Cutting of nest trees ● Reduced food supply ● Disturbance ● Pollution/ pesticides ● Introduced weeds 	<ul style="list-style-type: none"> ● Minimise drainage extraction of water for irrigation near key wetlands for threatened birds, including through awareness campaigns targeted at local governments with jurisdiction over these areas. ● Assess the environmental impact of proposed development projects, and develop new roads and industry away from key wetlands. ● Work with landowners to protect pelican, stork and eagle nest trees, and plant trees and erect artificial nest platforms to provide additional habitat. ● Reduce pressure on waterbird nest trees by promoting community forestry projects and alternatives to fuel wood, and replant native swamp forest. ● Improve management of fisheries at key wetlands, and ban fishing using chemicals ● Continue traditional management at waste disposal sites to ensure a supply of carrion for Greater Adjutants, and/or provide supplementary feeding ● Regulate human activities at key wetlands to minimise disturbance ● Limit the use of agrochemicals, and encourage traditional organic farming methods ● Control water hyacinth infestations using mechanical or biological methods
Protected areas coverage and management	
<ul style="list-style-type: none"> ● Gaps in protected areas system ● Weaknesses in reserve management 	<ul style="list-style-type: none"> ● Protect all extensive areas of natural wetland by establishing new protected areas or extending existing reserves ● Create wildlife sanctuaries in the haor basin of north-east Bangladesh ● Develop a network of sanctuaries to protect threatened fragments where threatened waterbirds nest and feed ● Improve the capacity of the government departments responsible for environment and forestry in India and Bangladesh
Exploitation of birds	
<ul style="list-style-type: none"> ● Hunting ● Persecution 	<ul style="list-style-type: none"> ● Strengthen hunting and species protection laws, and improve their enforcement, especially at key wetlands ● Control gun ownership
Gaps in knowledge	
<ul style="list-style-type: none"> ● Inadequate data on threatened birds 	<ul style="list-style-type: none"> ● Locate and monitor key waterbird colonies and foraging sites, notably those of the Greater Adjutant ● Conduct winter surveys for Baer's Pochard ● Search for the Pink-headed Duck

5. W 15 Bay of Bengal Coast

Regional overview: This region includes the extensive coastal wetlands, which extend from the Sundarbans of India and Bangladesh along the coasts of Bangladesh and Myanmar to the Irrawaddy delta. The highest known counts of Spotted Greenshank and Spoon-billed Sandpiper are from shifting intertidal mudflats and islands (known as chars) in the outer Ganges–Brahmaputra–Meghna delta in Bangladesh, and it is possible that this area and the poorly known coastal wetlands of Myanmar will prove to be the main wintering grounds of both species.

Threatened species	CR	EN	VU	Total
Breeding in this wetland region	-	-	2	2
Passage migrant	-	-	-	-
Non-breeding visitor	-	1	2	3
Total	-	1	4	5

The coast of Bangladesh also supports an important concentration of non-breeding Indian Skimmers.

Key habitats: Coastal wetlands.

Countries and territories: India (West Bengal); Bangladesh; Myanmar.

Outstanding IBAs For Threatened Birds

Two very large IBAs have been selected, including the intertidal flats of the Ganges–Brahmaputra–Meghna Delta, which support some of the largest known concentrations of Spoon-billed Sandpiper, Spotted Greenshank and Indian Skimmer. It is likely that the Irrawaddy delta and possibly other coastal wetlands in Myanmar will also prove to be important for these species.

IBA name	Status	Territory	Threatened species
1. Sundarbans	(PA) ^{BR,R,WH}	India & Bangladesh	Huge area of mangroves supporting breeding Lesser Adjutant and Pallas's Fish-Eagle
2. Ganges-Brahmaputra-Meghna delta	-	Bangladesh	Non-breeding Spoon-billed Sandpiper, Spotted Green Shank and Indian Skimmer

Key - Status: (PA) = IBA partially protected; - = unprotected; BR = IBA is wholly or partially a Biosphere Reserve (see pp.34–35); R = IBA is wholly or partially a Ramsar Site; WH = IBA is wholly or partially a World Heritage Site.

Current status of habitats and threatened Species: The coasts of this region are fringed with intertidal mudflats and mangrove swamps, with the most extensive areas of these habitats in the Ganges–Brahmaputra–Meghna and Irrawaddy Deltas. Some of these wetlands have been converted to agriculture and aquaculture, but large areas of natural habitat remain. The mangroves in both deltas are heavily exploited and degraded, however, the waterbirds there are also under pressure from hunting and human disturbance.

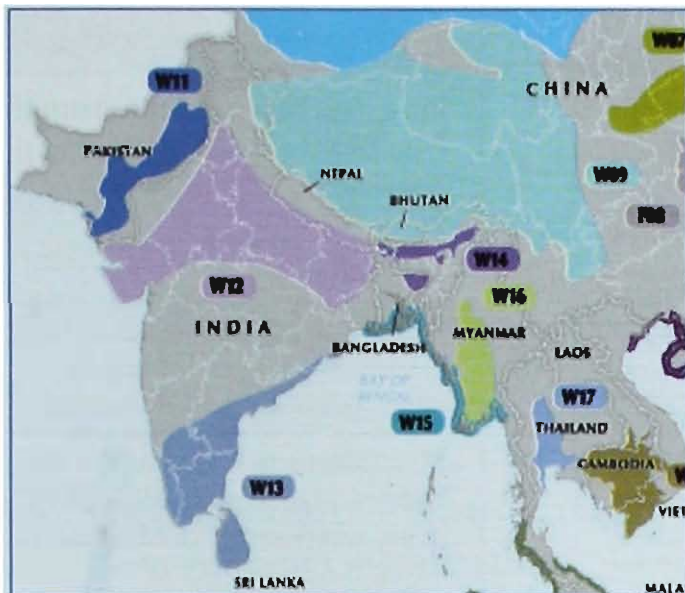


Fig. 6.3 Key wetland regions in South Asia

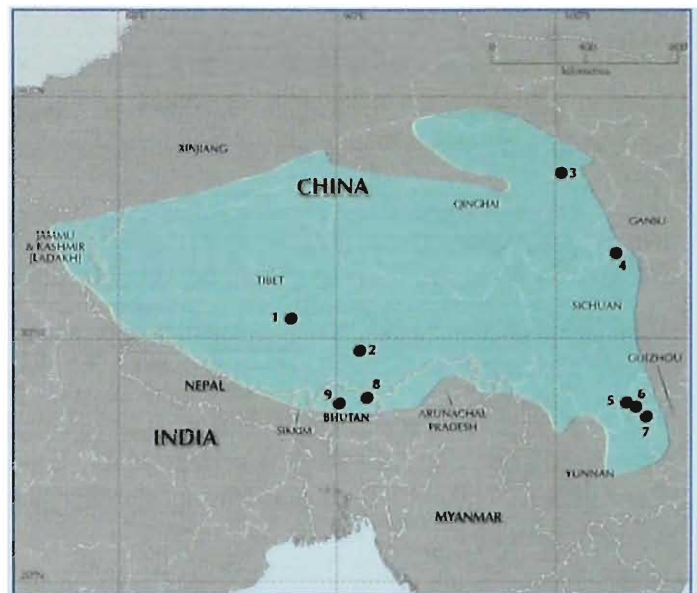


Fig. 6.4 Wetlands Tibetan Plateau (W09)

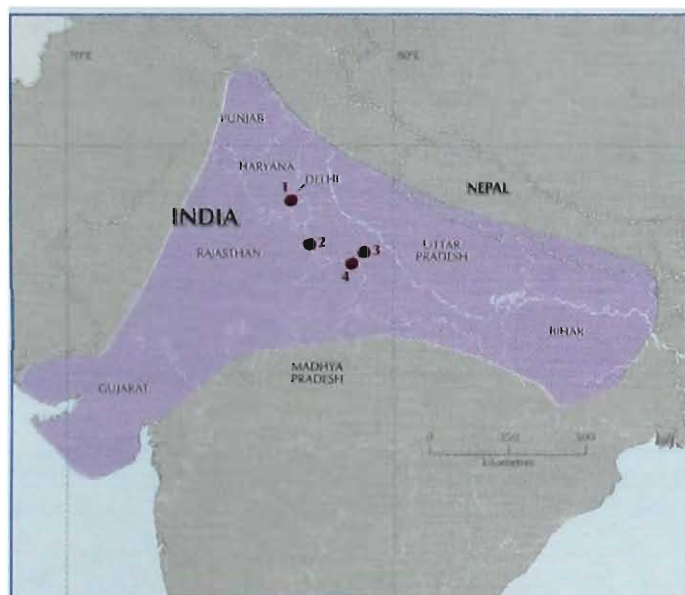


Fig. 6.5 North Indian wetlands (W12)

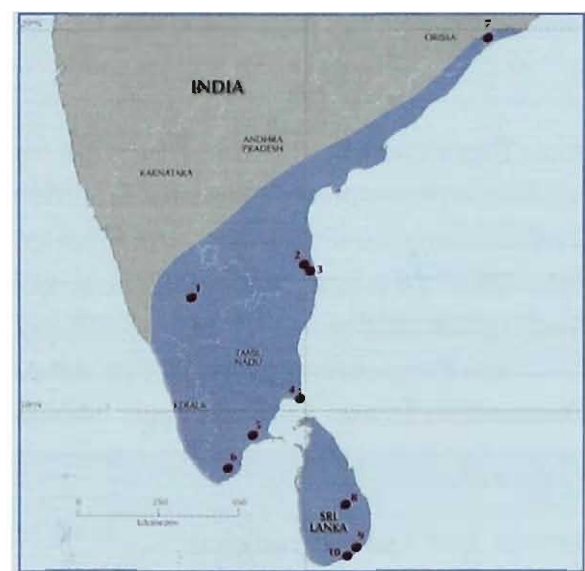


Fig. 6.6 South Indian and Sri Lankan wetlands (W13)

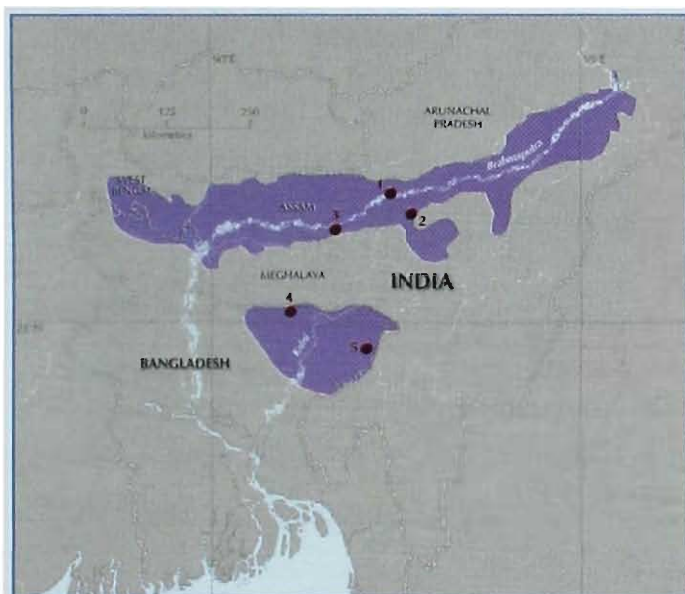


Fig. 6.7 Assam and Sylhet plains wetlands (W14)



Fig. 6.8 Wetlands of Bay of Bengal coast (W15)

Source maps: BirdLife International (2003).

Species	Distribution and population		
Lesser Adjutant <i>Leptotilos javanicus</i>	Region estimated to support < 10% of global breeding population	VU	Small breeding population in the Sunderbans of India and Bangladesh
Pallas's Fish-Eagle <i>Haliaeetus leucorhynchus</i>	Region estimated to support < 10% of global breeding population	VU	Small and declining breeding population
Spotted Greenshank <i>Tringa guttifer</i>	Region estimated to support 50-90% of global non-breeding population	EN	Significant numbers winter in the Ganges-Brahmaputra-Meghna delta, and possibly in Myanmar
Spoon-billed Sandpiper <i>Eurynorhynchus pygmeus</i>	Region estimated to support 50-90% of global non-breeding population	EN	Significant numbers winter in the Ganges-Brahmaputra-Meghna delta, and possibly in Myanmar
Indian Skimmer <i>Rynchops albicollis</i>	Region estimated to support 10-50% of global non-breeding population	VU	Large non-breeding congregation in Ganges-Brahmaputra-Meghna delta

Other threatened waterbirds from this region recorded as rare visitors are: Spot-billed Pelican *Pelecanus philippensis*, Greater Adjutant *Leptotilos dubius* and Sarus Crane *Grus antigone*. In addition to the waterbirds, the Greater Spotted Eagle *Aquila clanga* (VU) occurs in winter. Note: that Masked Finfoot *Heliopais personata* which occur in forested wetlands in the Sunderbans (and possibly elsewhere in this region), is covered in F 06.

Conservation Issues and Strategic Solutions:

Conservation issue	Strategic solutions
Habitat loss and degradation	
<ul style="list-style-type: none"> ● Coastal Reclamation ● Conversion to Aquaculture ● Cutting of Mangroves ● Development (Urban, Industrial, etc) ● Reduced food supply ● Disturbance 	<ul style="list-style-type: none"> ● Control reclamation of coastal wetlands for agriculture, especially in protected areas ● Prevent conversion of wetlands for aquaculture in protected areas, and promote traditional, extensive aquacultural practices ● Promote sustainable use of mangroves by local communities and commercial companies, with mature trees retained for nesting waterbirds ● Assess the environmental impact of development projects affecting key wetlands ● Help local communities to improve management of their fisheries, to benefit people and waterbirds ● Regulate human activities at key wetlands to minimize disturbance
Protected areas coverage and management	
<ul style="list-style-type: none"> ● Gaps in protected areas system 	<ul style="list-style-type: none"> ● Expand the existing protected areas in the Sunderbans and Irrawaddy Delta ● Protect key areas of tidal creek and waterbird roosts in the Ganges-Brahmaputra-Meghna Delta, possibly as seasonal wildlife sanctuaries

Exploitation of birds	
<ul style="list-style-type: none"> Hunting 	<ul style="list-style-type: none"> Control hunting and trapping of threatened birds, by patrolling protected areas, and reducing gun and net ownership at key sites
Gaps in knowledge	
<ul style="list-style-type: none"> Inadequate data on threatened birds 	<ul style="list-style-type: none"> Monitor the numbers and distribution of wintering Spotted Greenshank, Spoon-billed Sandpiper and Indian Skimmer

6.5 Government and Non-Government Organisations

6.5.1 International Organisations:

Wetlands International

This is a Global non-profit wetland conservation organisation created by integrating the Asian Wetland Bureau, the International Waterfowl and Wetlands Research Bureau, and Wetlands for Americas.

Objectives

Wetlands International seeks to be

- the world authority on the status and trends of wetlands;
- the source of "best-informed" opinion on priority actions for wetland conservation and management;
- a champion and catalyst for the wise use of wetlands.

Its major achievements include the launching of the *Convention on Wetlands of International Importance Especially as Waterfowl Habitat: Ramsar Convention, Ramsar, 1971*.

Secretariat

Wetlands International
P.O. Box 471
6700 AL Wageningen
The Netherlands
E-mail: post@wetlands.org
Internet: www.wetlands.org

India Office:

Wetlands International - South Asia
A-25, 2nd Floor, Defence Colony,
New Delhi -110 024, India
E-mail: wisa@hathway.com

Asian Waterfowl Census

The Asian Waterfowl Census (AWC) is a co-ordinated international scheme for collecting field data on waterbirds and wetlands since 1987 under the co-ordination of Wetlands International (formerly the Asian Wetland Bureau and the International Waterfowl and Wetlands Research Bureau).

Objectives

- Obtain information on an annual basis of waterbird populations at wetlands in the region during the non-breeding period of most species (January), as a basis for evaluation of sites and monitoring of populations;
- Monitor on an annual basis the status and conditions of wetlands;
- Encourage greater popular interest in waterbirds and wetlands, and thereby promote their conservation.

AWC is conducted during the 2nd or 3rd week of January throughout the region and undertaken by volunteers.

The census is co-ordinated by a number of regional co-ordinators at the National level. In India, the AWC is co-ordinated by the

Bombay Natural History Society with a number of regional/state co-ordinators.

AWC counts in India

As per the results of the Asian Waterbird Census (1997-2001) a total of 355 sites, including 19 Ramsar sites, were covered in India. Of these, 13 sites including 3 Ramsar sites, namely, Pong Dam Sanctuary (93,384), Chilika Lake (7,81,739) and Keoladeo National Park (61, 031) recorded a maximum of more than 20,000 birds.

In all, 161 species of waterbirds and nine species of wetland dependent raptors were counted. The following 10 species had 50,000 or more individuals, namely, the Northern Shoveller (1,93,205), Northern Pintail (1,58,115), Gadwall (1,41,520), Eurasian Wigeon (1,36,232), Tufted Pochard (1,15,234), Lesser Whistling Duck (91,619), Garganey (87,259), Common Coot (72,998), Common Teal (55,056) and Red-crested Pochard (54,542) (Figs. 6.9-6.19).

The highest count of 14 GT species were as follows: Siberian Crane (03), White-bellied Heron (10), Greater Adjutant Stork (06), Spotted Greenshank (03), Spot-billed Pelican (199), Lesser Adjutant Stork (74), Lesser White-fronted Goose (01), Marbled Teal (24), Baer's Pochard (1,534), Sarus Crane (178), Sociable Lapwing (17), Indian Skimmer (138), Pallas's Fish-Eagle (04) and Greater Spotted Eagle (04).

The co-ordinators organise a network of volunteers from all walks of life with varying levels of skill in identifying and counting of birds.

In addition to waterbird species recognised by the Ramsar Convention, counts species of birds of prey (raptors) that are regularly encountered at wetlands.

The information is entered into standard databases (using customized Microsoft

Access programmes) at the Wetlands International office in Malaysia. Processing of the data is in dBase IV™ and Access™ and Excel™.

Information collected from the census is published in a series of annual reports, which can be obtained from the Secretariat of Wetlands International Asia Pacific at the address given below.

For the purposes of the report, countries and territories providing information are divided into three main regions: South Asia (Bangladesh, India, Nepal, Pakistan and Sri Lanka), South-East Asia (Brunei Darussalam, Indonesia, Lao PDR, Malaysia, Myanmar, Papua New Guinea, Philippines, Singapore, Thailand and Vietnam) and East Asia (China, Hong Kong, Japan, Republic of Korea and Taiwan). Information on shorebirds is included from Australia.

Secretariat

Wetlands International
3A39, Block A, Kelana Centre Point
Jalan SS7/19, 47301 Petaling Jaya
Selangor, Malaysia
E-mail: david@wiap.nasionet.net
Website <http://www.wetlands.org/IWC/awc/awcmain.html>

Waterbird Population Estimates (WPE)

www.wetlands.org/IWC/WPEnote.htm

Wetlands International collates information on the status of waterbirds populations around the world and produces Waterbird Population Estimates, which form the basis for the identification of international sites based on the 1% criterion of the Ramsar Convention and the species on the CMS Appendices.

The third edition of the WPE was published in 2002 (Wetlands International 2002). It identifies 697 populations in Asia and

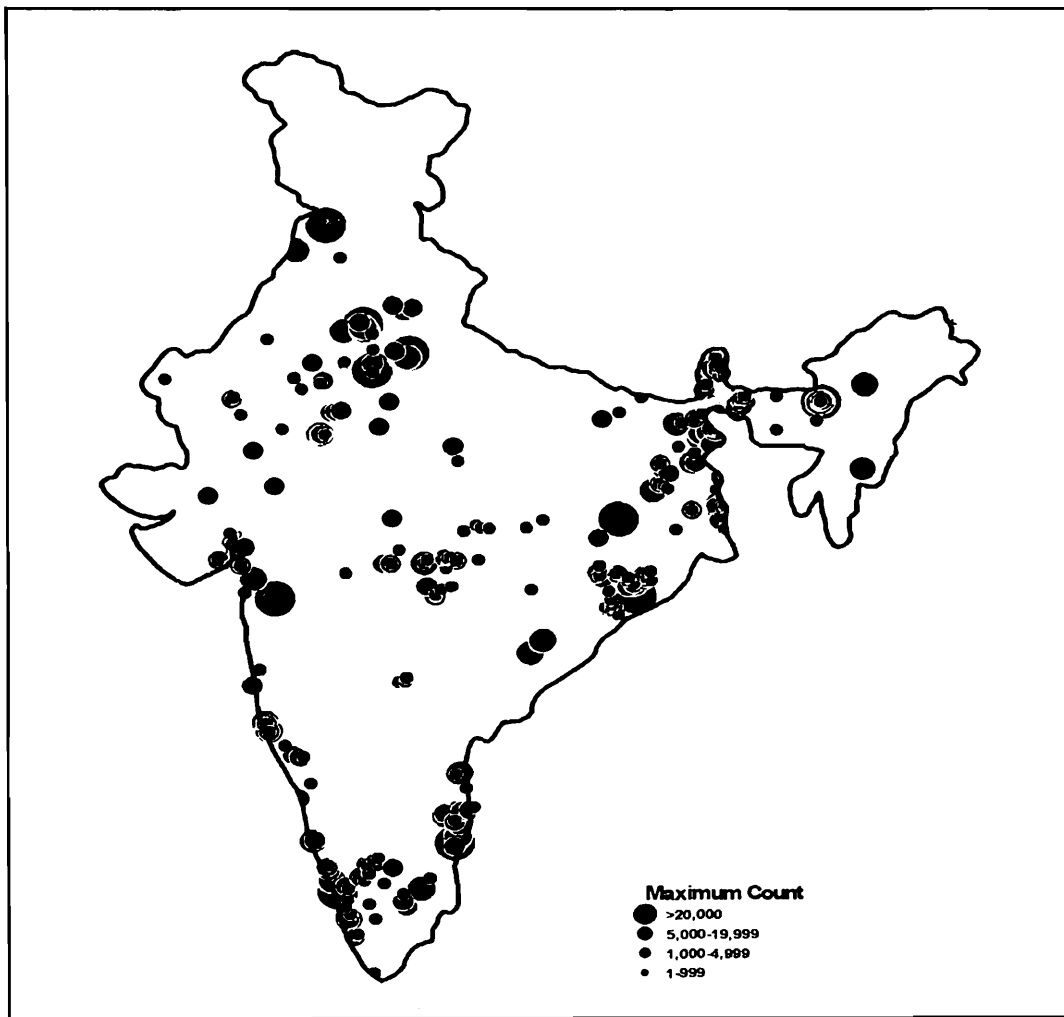


Fig. 6.9 AWC site coverage and numerical distribution of waterbirds in India, 1997-2001.

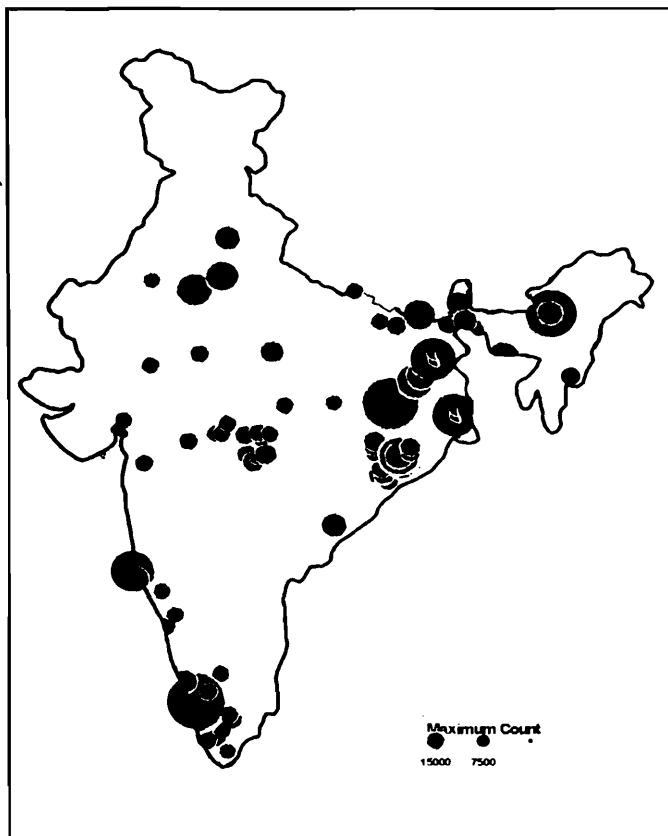


Fig. 6.10 Lesser Whistling Duck (*Dendrocygna javanica*) : AWC site coverage... in India, 1997-2001.

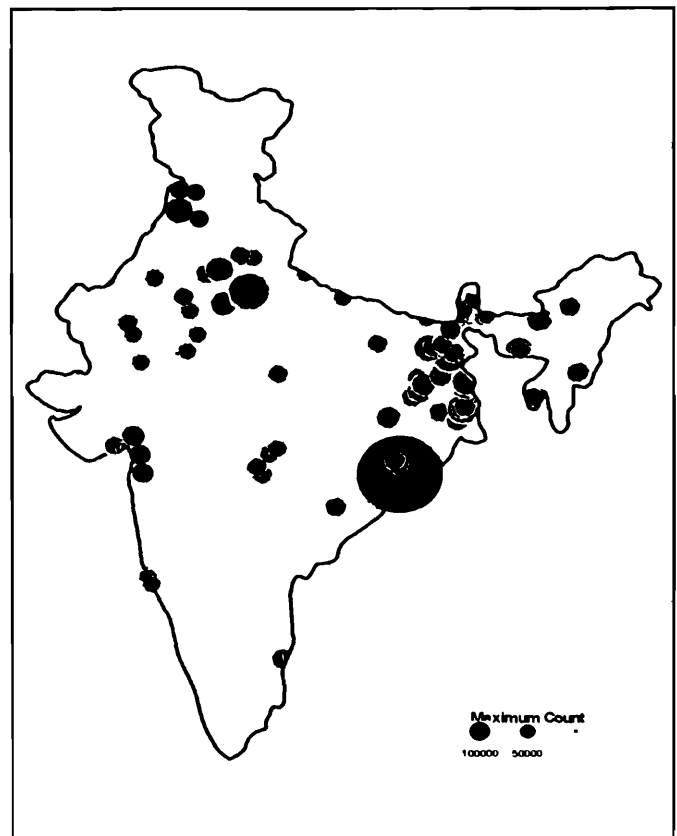


Fig. 6.11 Gadwall (*Anas strepera*) : AWC site coverage... in India, 1997-2001.

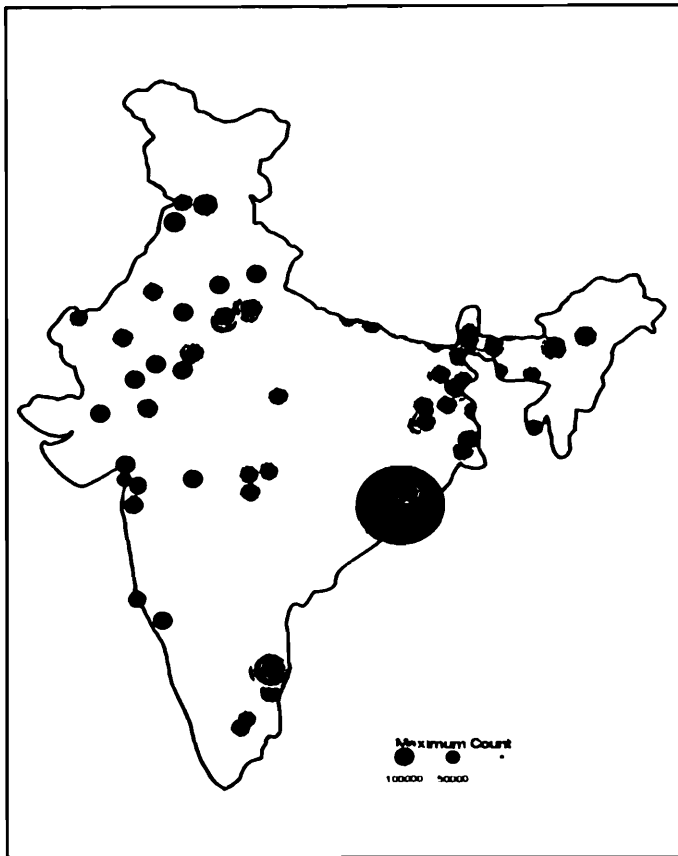


Fig. 6.12 Eurasian Wigeon (*Anas penelope*) : AWC site coverage... in India, 1997-2001.

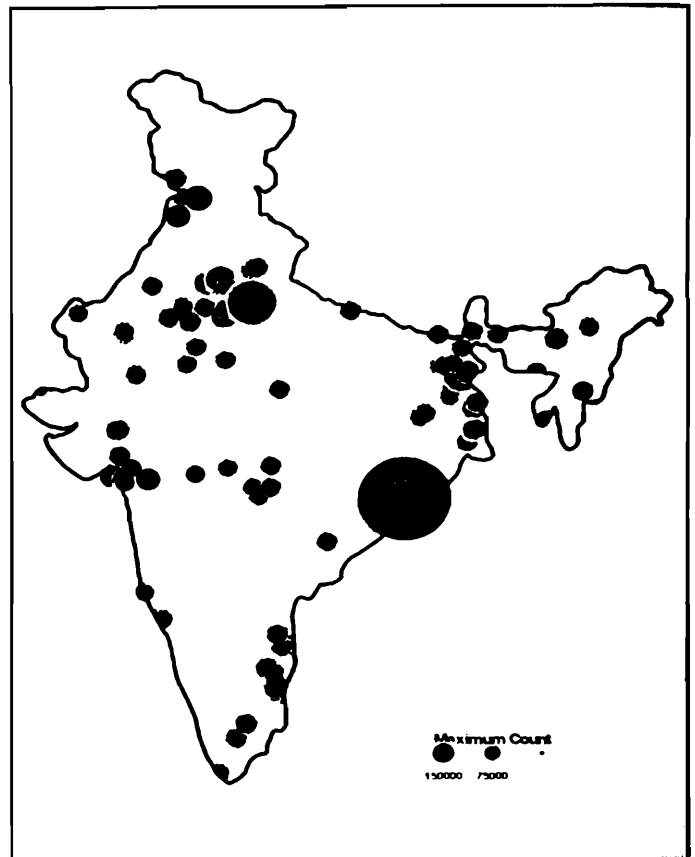


Fig. 6.13 Northern Shoveller (*Anas clypeata*) : AWC site coverage... in India, 1997-2001.

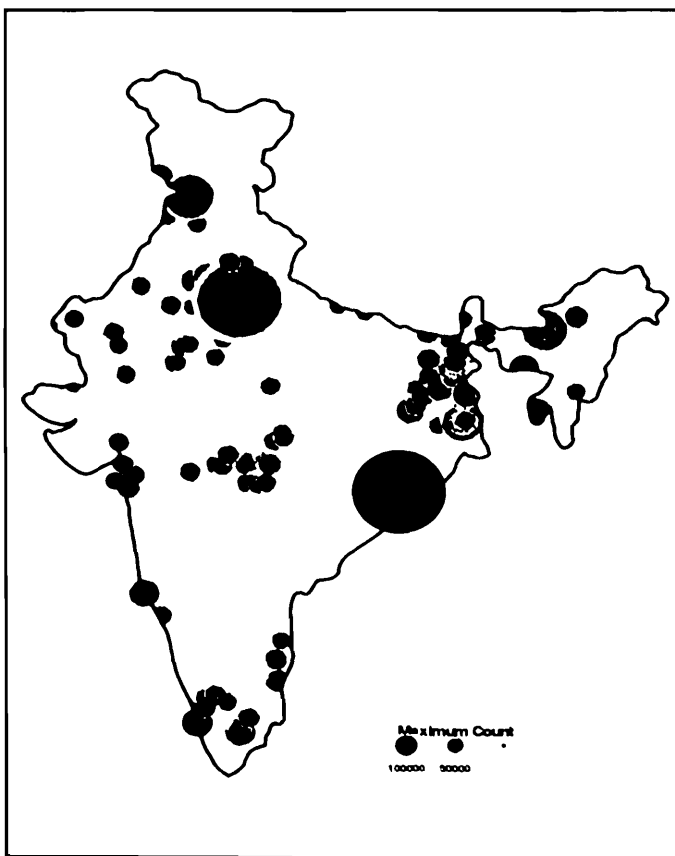


Fig. 6.14 Northern Pintail (*Anas acuta*) : AWC site coverage... in India, 1997-2001.

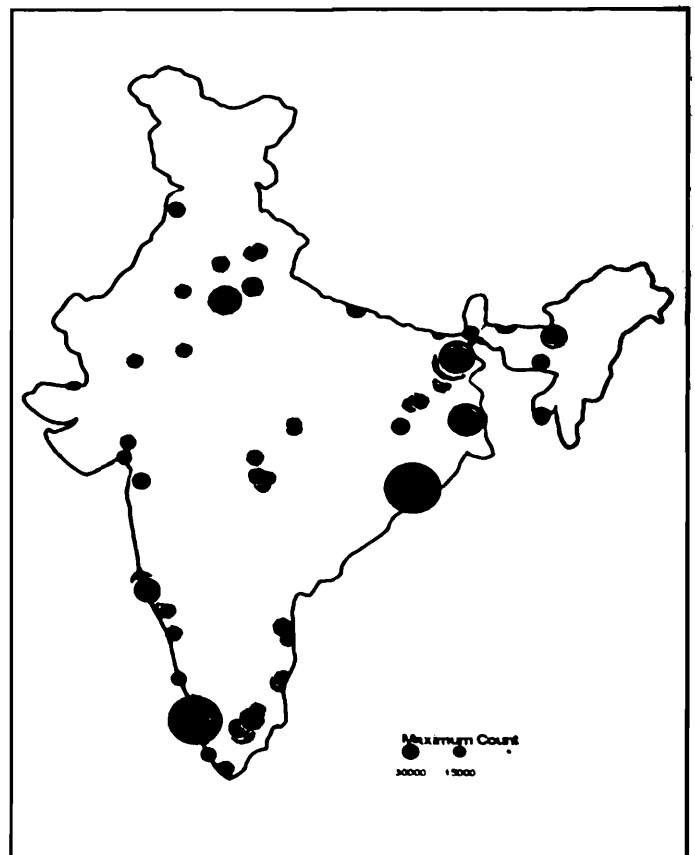


Fig. 6.15 Garganey (*Anas querquedula*) : AWC site coverage... in India, 1997-2001.

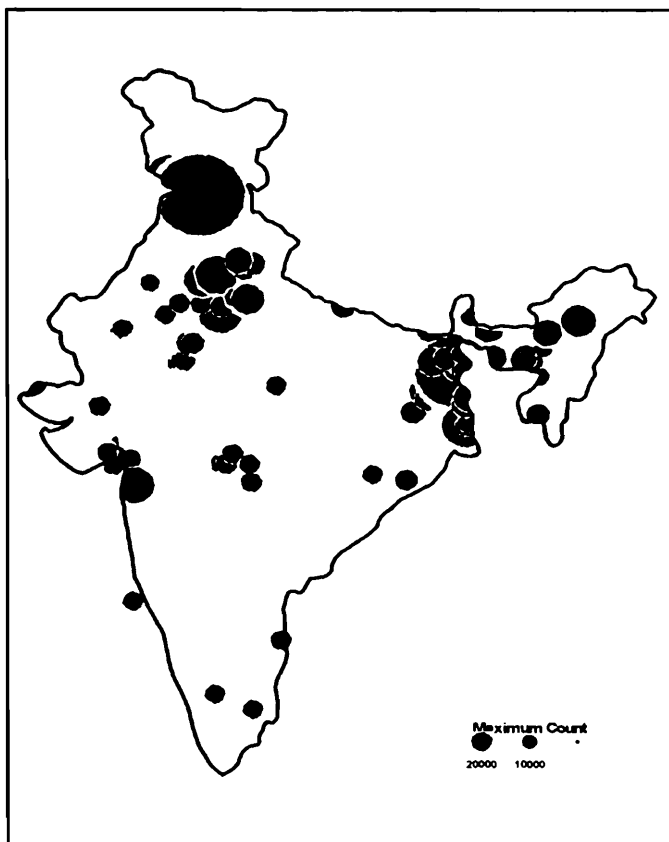


Fig. 6.16 Common Teal (*Anas crecca*) : AWC site coverage... in India, 1997-2001.

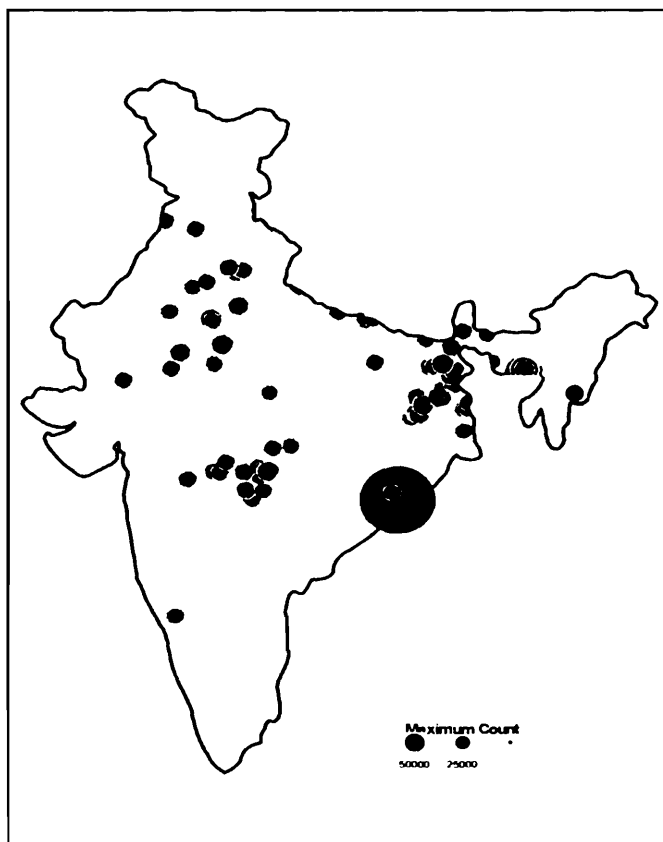


Fig. 6.17 Red-crested Pochard (*Rhodonessa rufina*) : AWC site coverage... in India, 1997-2001.

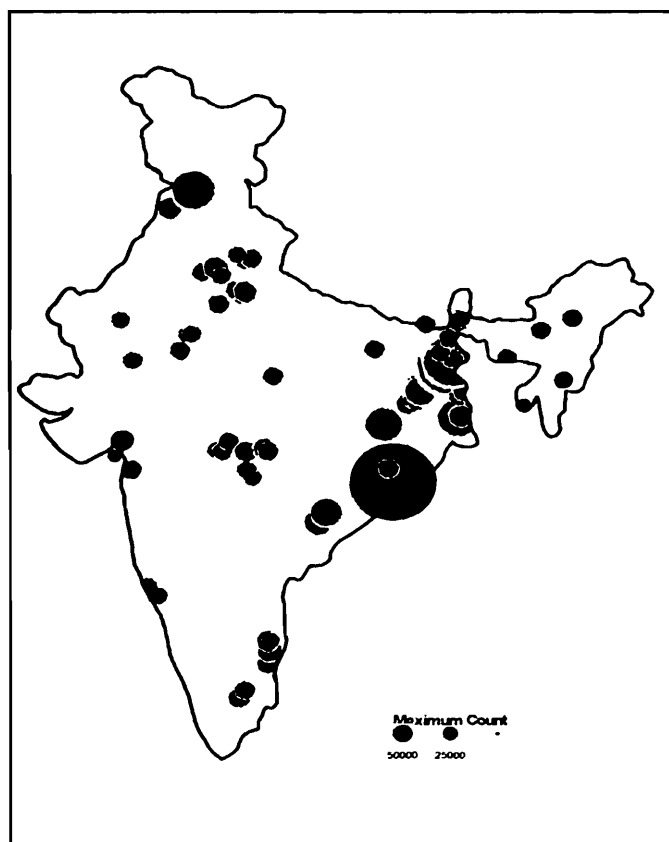


Fig. 6.18 Tufted Pochard (*Aythya fuligula*) : AWC site coverage... in India, 1997-2001.

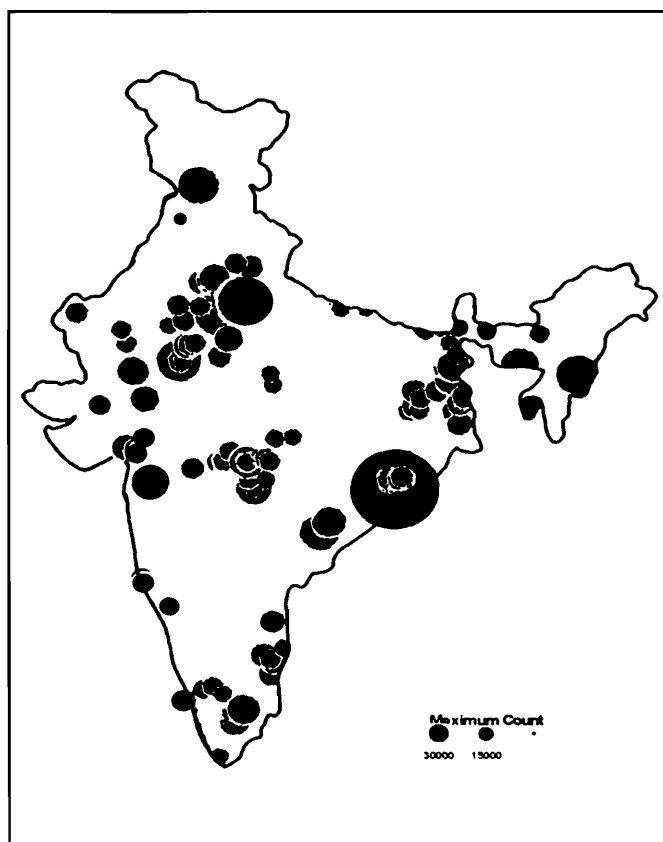


Fig. 6.19 Common Coot (*Fulica atra*) : AWC site coverage... in India, 1997-2001.

notes the lack of population trends for 60% of these; for populations with trend information, 59% are decreasing, 23% are stable and only 16% are increasing. It calls for collecting new information, recognising the absence of updated and reliable estimates for a high proportion of Asian species. The wealth of data collected through the AWC serves as a basis for collating and evaluating information on waterbird populations and trends for inclusion in the WPE.

Asia-Pacific Migratory Waterbird Conservation Strategy (APMWCS) •

www.wetlands.org/IWC/awc/waterbirdstrategy

The APMWCS 1996–2000, which serves as an international co-operative conservation initiative for waterbirds and wetlands in the Asia-Pacific region, was launched in 1996 with the core support of the Ministry of the Environment, Japan (formerly Environment Agency of Japan), the Australian Government's Department of the Environment and Heritage (formerly Environment Australia) and the involvement of other government agencies, wetland managers, Ramsar Convention, CMS, non-government organisations and technical experts in the region. The strategy was updated for 2001–2005 following the successful implementation of the first phase of the strategy.

Under the APMWCS, action plans have been developed for the three flagship species groups, namely, Action Plan for the Conservation of Migratory Anatidae in the East Asian Flyway, Action Plan for the Conservation of Migratory Cranes in the North East Asian Flyway, and Action Plan for the Conservation of Migratory Shorebirds in the East Asian-Australasian Flyway. The need for waterbird monitoring has been listed as a priority in all of these Action Plans. Such

actions are also required for identifying internationally important sites to enable their inclusion in the three Site Networks established under the three Action Plans.

In addition, an Action Plan for Migratory Waterbirds along the Central Asian Flyway, currently under development by Wetlands International, also identifies the monitoring of waterbirds and wetlands as top priority for the region.

The APMWCS acknowledges the importance of monitoring waterbirds and their habitats as a basis for promoting and enabling waterbird conservation, and encourages the implementation of further activities (Asia-Pacific Migratory Waterbird Conservation Committee 2001). The AWC has proved an ideal framework to respond to these monitoring needs and to promote conservation awareness for waterbirds and wetlands in the region. The monitoring activities also serve to strengthen the information base of the internationally important sites in the Site Networks and to identify new sites for incorporation into the Site Networks.

BirdLife International

BirdLife International is a global partnership of conservation organisations, represented in over a hundred countries. BirdLife seeks to conserve all bird species on earth and their habitats and, through this, it works for the world's biological diversity. It identifies and monitors worldwide the most threatened bird species and the most critical sites for the conservation of avian diversity.

Objectives

BirdLife International pursues a programme of:

- Scientific research and analysis
- Advocacy and policy development

- Field actions and country conservation programmes
- Network and capacity building

Secretariat

BirdLife International Office
Wellbrook Court, Girton Road,
Cambridge CB 3 0NA, UK
E-mail: birdlife@birdlife.org.uk
www.birdlife.org

BirdLife International's Important Bird Area (IBA) Programme

www.birdlife.net/action/science/sites/index.html

BirdLife International's IBA Programme is a worldwide initiative aimed at identifying, documenting and protecting a network of sites critical for the conservation of the world's birds. These sites are selected as IBAs under one or more of the following four global IBA criteria: A1: a site regularly holds significant numbers of a globally threatened species, or other species of global conservation concern; A2: a site holds a significant component of restricted range species whose breeding distribution defines an Endemic Bird Area (EBA) or Secondary Area (SA); A3: a site holds a significant component of the group of species whose distribution is largely or wholly confined to one biome; A4: a site holds on a regular basis >1% of the Biogeographic population of a congregatory waterbird, seabird or terrestrial species, or more than 20,000 waterbirds or seabirds of one or more species. To date, some 7,000 IBAs have been identified in 130 nations worldwide. A significant proportion of the wetland sites covered in the AWC meet criterion A4, and the AWC counts are the primary sources of data to support the identification of many of these sites as IBAs and their monitoring on an annual basis.

Globally threatened waterbirds

www.birdlife.net/action/science/species/globally_tbu/gtbu_main.html

BirdLife International leads on updating the status of the world's threatened birds. It is the official Red Listing Authority on birds and supplies this information to the IUCN (World Conservation Union) Red List of Threatened Species. It collates information from a global network of experts, and from published and unpublished sources, to assess each species extinction risk using standard quantitative. The four main types of criterion used to identify threatened species are: (a) rapid population reduction, (b) small range and fragmented, declining or fluctuation, (c) small population and declining, and (d) very small population or range. Species are assigned a Red List Category based on the standard IUCN Red List Categories (2001) as follows: Extinct (EX), Extinct in the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Least Concern (LC)), Data Deficient (DD); and Not Evaluated (NE).

Summaries of the IUCN Red List Categories (Table A2a.1) and Criteria (Table A2a.2) are given in chapter 3 (Table 3.1). Readers are referred to the full version of the system, however, available at http://www.iucnredlist.org/info/categories_criteria_2001.html. PDF versions in English, French and Spanish can also be downloaded from <http://www.iucn.org/themes/ssc/redlists/RLcats2001booklet.html>.

The detailed, long-term monitoring of waterbirds at wetlands, one of the world's most damaged and vulnerable groups of habitats, has already provided the basis for much important work by conservationists at local, national and international levels. Important (and perhaps the most urgent)

targets of conservation action are species in danger of extinction, listed in the publications *Threatened Birds of the World* (BirdLife International, 2000), *Threatened Birds of Asia* (BirdLife International, 2001) and *Saving Asia's Threatened Birds* (BirdLife International, 2003), which are based on Red List criteria. The AWC data have been used extensively to update the status of globally threatened waterbirds in Asia.

The World Conservation Union – IUCN

Objectives

- Secure the conservation of nature, especially of biological diversity, as an essential foundation for the future;
- Ensure that, where the earth's natural resources are used, this is done in a wise, equitable way;
- Guide the development of human communities towards enduring harmony with other components of the biosphere.

Secretariat

The World Conservation Union (IUCN),
Avenue du Mont-Blanc,
CH-1196 Gland,
Switzerland
<http://www.iucn.org/>

World Wide Fund for Nature – WWF

Objectives

- Conserve nature and ecological processes by preserving genetic, species and ecosystem diversity;
- Ensure that the use of renewable resources is sustainable both now and in the future;
- Promote actions to reduce pollution and wasteful exploitation and consumption;

- Create awareness of threats to the natural environment.

Secretariat

World Wide Fund for Nature (WWF),
World Conservation Centre,
Avenue du Mont Blanc,
CH-1196 Gland,
Switzerland
<http://www.worldwildlife.org>

India Office

World Wide Fund for Nature-India,
172-B, Lodi Estate, New Delhi 110 003
<http://www.wwfindia.org>

International Crane Foundation (ICF)

The International Crane Foundation is located five miles north of Baraboo, Wisconsin, and is home to all 15 species of cranes. The ICF was conceived by Ron Sauey and George Archibald in 1973 to save the cranes of the world. ICF helps scientists world wide to conserve cranes. The ICF has been the source of many scientific contributions and "firsts": like the first breeding of both Hooded and Siberian Cranes in captivity. ICF was the first to use crane puppets in the rearing of captive-bred chicks. Much of ICF's research is done in co-operation with other countries and institutions. There are crane working groups in five continents which share information through visits and publications.

Currently, the ICF is actively engaged in piloting the western flock of Siberian Cranes to Iran as a first step towards leading them back to Bharatpur.

Secretariat

International Crane Foundation,
E-11376, Shady Lane Road,
PO 447, WI-53913- 0447, USA
<http://www.savingcranes.org>

India Office

Indian Cranes and Wetlands Working Group
C/o Wildlife Protection Society of India,
M-52, Greater Kailash Part-I,
New Delhi- 110 048
E-mail: gopi@savingcranes.org

6.5.2 National Organisations in India:**Bombay Natural History Society (BNHS)**

The BNHS was founded in 1883, and is the largest non-governmental organisation in the subcontinent to be engaged in the conservation of natural resources, education and research in natural history. An invaluable collection of over 26,000 birds is housed in its HQ in Bombay. The society undertakes programmes on awareness, with training programmes for the Indian Army, journalists and trekkers. The scientists of the society have established a national bird-ringing programme and are carrying out extremely important research on Indian birds.

Address

Hornbill House,
Dr. Salim Ali Chowk,
Shaheed Bhagat Singh Road,
Mumbai 400 023
E-mail: bnhs@bom4.vsnl.net.in
<http://www.bnhs.org>

Indian Bird Conservation Network (IBCN)

This is a network of ornithologists, bird watchers and organisations working for the conservation of wild birds in India. Its mission is to promote conservation of birds and their habitat through development of a national network of individuals, organisations and the government. It is a non-political open network to help in exchange of information and ideas between the network partners.

Each state of the union of India will have a state coordinator for a term of two years,

who will promote participation of the people working in his state for bird conservation.

IBCN publishes a quarterly newsletter 'mistnet'

Secretariat

Bombay Natural History Society
Hornbill House,
Dr. Salim Ali Chowk,
Shaheed Bhagat Singh Road,
Mumbai 400 023
<http://www.bnhs.org>

Indian Important Bird Areas (IBA) Programme

The Indian Important Bird Area Programme is a collaborative project between the Bombay Natural History Society (BNHS), the Royal Society for the protection of birds (RSPB), UK, and BirdLife International. It was launched in India by BNHS in March 1999.

Aims

The main thrust of the IBA programme is to identify and protect the network of sites critical for the long-term survival of bird populations. The main aims can be summarised as follows:

1. To form a sound basis for the development of national conservation strategies, including the protected areas programme;
2. To highlight sites which are threatened or inadequately protected. To help build a national and regional network of ornithologists and conservationists;
3. To guide the work of national NGOs;
4. To influence global conventions like CBD and Ramsar;
5. To influence regional migratory agreements.

The IBA programme will gather as much information as possible on key bird species and sites that are important for them, especially those neglected or less studied in the past. The important sites will be identified by the active participation of interested persons.

Criteria and Categories

Criterion 1. Globally Threatened Species.

The site regularly holds a significant number of a globally threatened species or other species of global conservation concern as per the new IUCN criteria for threatened status.

Criterion 2. Restricted-Range Species. Those that have a total world range of less than 50,000 sq. km. An area where the range of two or more restricted-range species overlaps is known as an Endemic Bird Area (EBA).

Criterion 3. Biome Restricted Assemblages. The site is known or thought to hold a significant component of the group of species whose distribution is largely or wholly confined to one biome. The criterion covers all those species that are neither globally threatened nor restricted range but reflect the state of any habitat.

Criterion 4. Congregations. A site may qualify from any one of the criteria listed below:

- i. Site known or thought to hold, on a regular basis, >1% of a biogeographic population of congregatory waterbirds. This population or threshold numbers are defined by BirdLife International in consultation with Wetland International, which helps in selecting a site on the basis of these criteria.
- ii. Site known or thought to hold, on a regular basis, >20,000 waterbirds or > 10,000 pairs of seabirds of one or more species.

- iii. Site known or thought to exceed thresholds set for migratory species at bottleneck sites.

These are the sites that birds use as major flyways during migration and are vulnerable to hunting. Protection of such areas or sites is important, however, in order to ensure safe migration of birds.

Secretariat

Bombay Natural History Society,
Hornbill House, Dr. Salim Ali Chowk,
SB Singh Road, Mumbai – 400 023
E-mail: IBAbnhs@vsnl.net.in

Salim Ali Centre for Ornithology and Natural History (SACON)

SACON was set up in 1990 and has the following main objectives:

- i) to study India's biological diversity to promote its conservation and sustainable use
- ii) to study the ecology of Indian Avifauna with special reference to its conservation.

Address

Anaikatty, P.O.,
Coimbatore 641 108 (TN)
Email: salimali@vsnl.com;
sacon@vsnl.com

Wildlife Institute of India (WII)

The WII was set up in 1982 and has the following objectives:

- i. to train biologists and managers for protected area management and wildlife research;
- ii. to conduct and co-ordinate applied wildlife research;
- iii. to provide consultancy services in conservation matters; and
- iv. create a database leading to national wildlife information system.

Address

Post Bag No. 18,
Chandrabani,
Dehra Dun 248 001
Email:wii@wii.gov.in

Zoological Survey of India (ZSI)

The ZSI was established in 1916 and carries out surveys on Faunal Diversity of the country. The National Zoological Collection at ZSI HQ, Kolkata houses more than one million specimens of all faunal groups. It has 16 Regional Stations in various ecosystems spread all over the country.

Address

Headquarters

Prani Vigyan Bhawan,
535, M Block,
New Alipur,
Kolkata 700 053
E-mail: dirzsi@wb.nic.in

Regional Stations

1. Eastern Regional Station: Fruit Garden, Risa Colony, Shillong-793003 (Meghalaya).
2. Western Regional Station: Vidya Nagar, Sector No. 29, Post Box No. 3035, P.C.N.T. Post, Near Akurdi Railway Station, Rawet Road, Pune- 41 1044 (Maharashtra).
3. Northern Regional Station: 218, Kaulagarh Road, PO. IPE, Dehra Dun-248195 (Uttaranchal).
4. Central Regional Station: 424, New Adharsha Colony, Kamla Nehru Nagar, Jabalpur- 482002 (Madhya Pradesh).
5. Desert Regional Station: Jhalamandi Pali Road, Jodhpur- 342005 (Rajasthan).
6. Southern Regional Station: 100, Santhome High Road, Chennai- 600028 (Tamil Nadu).
7. Gangetic Plains Regional Station: Handloom Bhawan, 4th Floor, 11-D, Rajendra Nagar, Patna- 800016 (Bihar).
8. High Altitude Zoology Field Station: Opposite Saproon Gurudwara, Saproon, Solan- 173212 (Himachal Pradesh).
9. Marine Biological Station: 100, Santhome High Road, Chennai- 600028 (Tamil Nadu).
10. Andaman & Nicobar Regional Station: Haddo, Port Blair- 744101 (A & N Islands).
11. Freshwater Biological Station: 1-1-300/B, Ashok Nagar, Hyderabad- 500020 (Andhra Pradesh).
12. Western Ghat Field Regional Station: Kamala Buildings (1st Floor) 13/787-A, Annie Hall Road, Calicut- 673002 (Kerala).
13. Sunderban Field Research Station: Canning Town 24 Parganas- 743329 (West Bengal).
14. Estuarine Biological Station: Hill Patna, Berhampore- 760005 (Orissa).
15. Arunachal Pradesh Field Station: 158, P-Sector, Itanagar- 791111 (Arunachal Pradesh).
16. Marine Aquarium cum Research Centre: Digha, Midnapur- 721428 (West Bengal).



Slender-billed Gull



Photo: Chris Schenk

Spoonbill Sandpiper

7. REFERENCES

- Alfred, J. R. B., Kumar, A., Tak, P. C. and Sati, J. P. 2001. *Waterbirds of Northern India. Rec. zool. Surv. India, Occ. Paper No. 190*: i-xxiv, 1-227.
- Alfred, J. R. B. and Nandi, N. C. 2000. Faunal Diversity in Indian Wetlands. *ENVIS Newsletter, Zoological Survey of India* 6 (2): 1-3.
- Ali, S. 1960. The Pink-headed Duck *Rhodonessa caryophyllacea* (Latham). *Wildfowl Trust 11th Annual Report* 55-60.
- Ali, S. and Ripley, S. D. 1968-74. *Handbook of the Birds of India & Pakistan* (Vols. 1-10). Bombay: Oxford University Press.
- Ali, S. 1969. *Birds of Kerala*. Bombay: Oxford University Press.
- Ali, S. and Ripley, S. D. 1978 (2nd edn.). *Handbook of the Birds of India & Pakistan*. Delhi. Oxford University Press.
- Anonymous. 1994. *Biodiversity Action Plan for Vietnam*. Hanoi: Government of the Socialist Republic of Vietnam and the Global Environment Facility Project.
- Asia-Pacific Migratory Waterbird Conservation Committee. 2001. *Asia-Pacific Migratory Waterbird Conservation Strategy: 2001-2005*. Wetlands International-Asia Pacific. Kuala Lumpur, Malaysia, 67 pp.
- Baker, E. C. S. 1908. *Indian ducks and their allies*. Bombay Natural History Society, Bombay.
- Baker, E. C. S. 1922-30. *Fauna of British India. BIRDS* (Vols. 1-8). London: Taylor and Francis.
- Baker, E. C. S. 1935. *The nidification of birds of the Indian Empire*. Vol. 4. Tylor and Francis, London.
- BirdLife International. 2000. *Threatened Birds of the World*. Barcelona and Cambridge, U. K.: Lynx Edicions and BirdLife International, 852 pp.
- BirdLife International. 2001. *Threatened Birds of Asia : the BirdLife International Red Data Book*. Cambridge, U. K.: BirdLife International, 3026 pp.
- BirdLife International. 2003. *Saving Asia's threatened birds: a guide for government and civil society*. Cambridge, U. K.: BirdLife International, 246 pp.
- BirdLife International 2004. *Threatened Birds of the World 2004*, CD-ROM. Cambridge, U.K.: BirdLife International.
- Bombay Natural History Society. 2002. A BNHS review of the Avifaunal list of the Wildlife (Protection) Act, 1972. *Buceros*, 7 (3): 1-56.
- Caldwell, L. K. 1988. Beyond environmental diplomacy: the changing institutional structure of international co-operation. In *International Environmental Diplomacy* (ed. JE Carroll), pp 13-27. Cambridge University Press, Cambridge.
- Collar, N. J. Crosby, M. J. and A. J. Stattersfield. 1994. *Birds to Watch 2. The World List of Threatened Birds*. BirdLife International, BirdLife Conservation Series 4: 1-407.
- Choudhury, B. C. 1998. Data on Sarus Crane. *Newsletter for Birdwatchers*, 38: 69.

- Choudhury, B. C., Kaur, J. and Sundar, K. S. G. 1999. Sarus Crane count – 1999. Wildlife Institute of India.
- Choudhury, B. C. and Raghu Ram, T. L. 2003. The Need and Approach for a Wetland Protected Area Network in India in Sustainable management of wetlands: 373-387. SAGE Publications, New Delhi.
- Delacour, J. and Scott, P. 1954-64. *The Waterfowl of the World* (Vols. 1-4). Country Life, London.
- Directory of Indian Wetlands*, 1993. WWF-INDIA, New Delhi and AWB, Kuala Lumpur, xvi+264 pp., 32 maps.
- Eames, J. C. 2004. Northern Myanmar Wetland Survey. *The Babbler, BirdLife International in Indochina* 12: 9-10.
- Environment Australia. 1997. *Wetlands Policy of the Commonwealth Government of Australia*. Commonwealth of Australia, Canberra, Australia, 48 pp.
- Foot Lee, Pandey, S. and Krogman, N. T. 1996. Process of wetland loss in India. *Environmental Conservation* 23 (1): 45-54.
- Gole, P. 1989. *The status and ecological requirements of Sarus crane*. Phase I. Pune, India, Ecological Society.
- Gole, P. 1991. Welfare of the tallest flying bird in the world. *J. Ecol. Soc.* 4: 29-42.
- Gopal, B. 1995. *Handbook of Wetland Management*. World Wide Fund for Nature-India, 307 pp.
- Grewal, B. 2000. *Birds of the Indian Subcontinent*. Local Colour Limited, Hong-Kong. Helge Ole Bergesen, Magnar Norderhaug and Georg Parmann (eds.). 1992. Green Globe Yearbook. OUP, New York, pp. 1-303.
- Grewal, B, Harvey, B, and Pfister, O. 2003. *A Photographic Guide to the Birds of the Indian Subcontinent*, Singapore, Periplus.
- Grimmet, R., Inskipp, T. and Inskipp, C. 1998. *Birds of the Indian Subcontinent*. Oxford University Press, Delhi, 888 pp.
- Hume, A. O. and E. W. Oates (Eds.) 1889-1890. *Nests and eggs of Indian birds*. II ed. Vol. 3. R. H. Porter, London.
- Hussain, S. A. 1996. Summary Report on Status of Wetland Protected Areas in India, unpublished report, Wildlife Institute of India.
- Islam, M. Z. and Rahmani, A. R. 2002. Threatened Birds of India. *Buceros* 7 (1&2): i-x, 1-102. Compiled from Threatened Birds of Asia. Birdlife International Red Data Book (2001). Cambridge, U. K., Birdlife International.
- Islam, M. Z. and Rahmani, A. R. 2004. *Important Bird Areas in India: Priority Sites for Conservation*. Indian Bird Conservation Network: Bombay Natural History Society and BirdLife International (U. K.). Pp. xvii + 1113.
- Inskipp, T., Lindsey, N. and Duckworth, W.. 1996. *An Annotated Checklist of the Birds of the Oriental Region*. Oriental Bird Club, Sandy.
- IUCN. 2001. *IUCN Red List of Threatened Animals*, IUCN, Gland, Switzerland and Cambridge, U. K.
- Javed, S., Takekawa, J. Y., Douglas, D. C., Rahmani, A. R., Choudhury, B. C., Landfried, S. L. and Sharma, S.. 2000. Documenting Trans-Himalayan migration using satellite telemetry. A report on the capture, deployment and tracking of bar-headed geese (*Anser indicus*) from India. Department of Wild Life Sciences, A. M.U., Aligarh and Wild Life Institute of India, Dehra Dun, 44 pp.

- Javed, S., Higuchi, H., Nagendran, M. and Takekawa, John Y. 2003. Satellite telemetry and wild life studies in India: Advantages, options and challenges. *Curr. Sci.* **85** (10) 1439-1443.
- Jhunjhunwala, S., Rahamani, A. R., Ishtiaq, F. and Islam, Z. 2001. The Important Bird Area Programme in India. *Buceros* **6** (2): 1-50.
- Kaur, J. and Choudhury, B. C. 2003. Recognition of community involvement in Sarus Crane conservation in Kota, Rajasthan. *Mistnet* **3** (4): 6.
- Kazmierczak, K. and Perlo van, B. 2000. *A Field-Guide to the Birds of India, Sri Lanka, Pakistan, Nepal, Bhutan, Bangladesh and the Maldives*. Om Book Service, New Delhi, India.
- Kumar, A., Sati, J. P. and Tak, P. C. 2003. Checklist of Indian Waterbirds. *Buceros* **8** (1): 1-30.
- Li, Z. W. D. and Mundkur, T. 2003. *Status Overview and Recommendations for Conservation of the White-headed Duck Oxyura leucocephala in Central Asia*. Wetlands International Global Series 15, Kuala Lumpur, Malaysia.
- Li, Z. W. D. and Mundkur, T. 2004. *Numbers and distribution of waterbirds and wetlands in the Asia-Pacific region*. Results of the Asian Waterbird Census: 1997-2001. Wetlands Internationals, Kuala Lumpur, Malaysia.
- Mani, M. S. 1974. *Ecology and Biogeography in India*. Dr. W. Junk b.v. Publishers. The Hague. Pp. 1-773.
- Maheswaran, G., Rahmani, A.R. and Coulter, M.C. 2004. Recent records of Black-necked Stork *Ephippiorhynchus asiaticus* in India. *Forktail* **20**:112-116.
- Manakadan, R. and Pittie, A. 2001. Standardised Common and Scientific Names of the Birds of the Indian Sub-continent. *Buceros* **6** (1): i-ix, 1-37.
- Manakadan, R., Alagarrajan, S. and Daniel, J. C. 2003. The Post-Independence History of Indian Ornithology. In *Petronia* (eds. Daniel, J. C. and Ugra, G. W.), Bombay Natural History Society, Oxford University Press. Pp. i-vii + 1-342.
- Meine, C. D. and Archibald, G. W. (eds.) 1996. *The Cranes: Status Survey and Conservation Action Plan*. IUCN, Gland, Switzerland and Cambridge, U. K.
- Mukherjee, A. K. 1961. A report on the investigation of the status of the White-winged Wood-Duck in Assam and recommendations of a sanctuary for its protection. *Rec. Indian Mus.* **59**: 471-478.
- Mundkur, T. 1991. *Nesting and Feeding Ecology of Aquatic Birds in Saurashtra and Gulf of Kachchh*. Unpublished Ph. D. thesis Saurashthra University, Rajkot, Gujarat.
- Mundkur, T., Pandya, P., Jhala, N., Pravez, R. and Khachar, S. 1991. Snow Goose *Anser caerulescens* – an addition to the Indian Avifauna. *J. Bombay nat. Hist. Soc.* **88**: 446-447.
- Muralidharan, S. 1993. Aldrin poisoning of Sarus Crane (*Grus antigone*) and a few granivorous birds in Keoladeo National Park, Bharatpur, India. *Ecotoxicology* **2**: 196-202.
- Panini, D. 1998. The Ramsar Convention and National Laws and Policies for Wetlands in India: Case Study prepared for the Technical Consultation on Designing Methodologies to review laws and institutions relevant to wetlands (1998) <http://www.ramsar.org/wurchbk3cs4.doc>
- Parikh, Jyoti and Datye, Hemant 2002. Sustainable Management of Wetlands biodiversity and beyond. SAGE Publication, New Delhi, 444.

- Parikh, J. and Parikh, K. 1999. Sustainable Wetlands, Environmental Governance- 2. Indira Gandhi Institute of Developmental Research, Mumbai.
- Perennou, C., Mundkur, T. and Scott, D. A. 1994. *The Asian Waterfowl Census 1987-91: distribution and status of Asian waterfowl*. Kuala Lumpur: Asian Wetland Bureau, and Slimbridge, U. K.: International Waterfowl and Wetlands Research Bureau.
- Pfister, O. 1998. Breeding Ecology and Conservation of the Black-necked Crane (*Grus nigricollis*) in Ladakh/India, University of Hull, Hull (thesis), U.K.
- Pfister, O. 2004. *Birds and Mammals of Ladakh*. Oxford University Press, Delhi. Pp. i - xxi + 1-361.
- Prasad, S.N., Ramachandra, T.V., Ahalya, N., Sengupta, T., Kumar Alok, Tiwari, A.K., Vijayan, V.S. and Vijayan, L. 2002. Conservation of Wetlands of India - a review. *Tropical Ecology* 43(1): 173-186.
- Rao, Y. N. and Datye, Hemant 2003. Overview of Indian Wetlands. In *Sustainable management of Wetlands - biodiversity and beyond* (eds. Jyoti Parikh and Hemant Datye) Pp. 1-444. SAGE Publications, New Delhi.
- Ripley, D. 1982. *A Synopsis of the Birds of India and Pakistan*. Bombay Natural History Society, Bombay.
- Rodgers, W. A., Panwar, H. S. and Mathur, V. B. 2002. Wild Life protected Area network in India: A Review (Executive Summary). Wild Life Institute of India, 43 pp.
- Rose, P. M. and Scott, D. A. 1997. *Waterfowl population estimates*. Second edition. Wageningen, the Netherlands: Wetlands International (Publ. 44).
- Sashikumar, C., Palot, J. M., Meppayur, S. and Radhakrishnan, C. 2004. *Pictorial Handbook - Shorebirds of Kerala (Including Gulls and Terns)*. Zool. Surv. India. Pp. 1-165.
- Schoff, G. H. 1999 (reprinted from 1991). *Reflections: The Story of Cranes*. David H. Thomsom ed. International Crane Foundation. Pp. 1-40.
- Scott, D. A. (ed.). 1989. IUCN 'A directory of Asian wetlands'. Gland, Switzerland, and Cambridge, UK, International Union for Conservation of Nature and Natural Resources.
- Scott, D. A. and Poole, C. M. 1989. A Status Overview of Asian Wetlands. No. 53, AWB, Kuala Lumpur, Malaysia. 40 pp.
- Singh, A. P. 1991. Sighting of Longtail or Old Squaw Duck after 52 years in India. *Newsletter for Birdwatchers* 31 (3-4): 9.
- Smith, H. C. 1942. *Notes on birds of Burma*. Simla (privately printed).
- Smythies, B. E. 1986. *The birds of Burma*. Third edition. Liss, U. K., Nimrod Press, and Pickering, Ontario, Silvio Mattachione and Co.
- Sonobe, K. and Usui, S. eds. 1993. *A Field Guide to the Waterbirds of Asia*. Wild Bird Society of Japan, Tokyo, pp.1-224.
- Stroud David, A. International Policies and Conventions and Legal Responsibilities. Conference Proceedings - "Waterfowl" Information Network International Conference.
- Stuip, MAM, Baker, C. J. and Oostberg, W. 2002. The Socioeconomics of Wetlands. Wetland International and RIZA, The Netherlands, 34 pp.
- Subramanian, K. A., Gore Anil, Paranjpe, S. A., Madikunt Sonali, Pramod, P. and Gadgil, M. 2004. On Causes Of Endangerment of Bird Species of India. *Perspectives on Biosystematics and Biodiversity T.C.N. Com. Vol. March 2004*: 11-40.

- Subramanya, S. 1996. Distribution, status and conservation of Indian heronries. *J. Bombay Nat. Hist. Soc.* **93** (3): 459-486.
- Subramanyam, K. 1962. *Aquatic Angiosperms*. Botanical Monograph no. 34, CSIR, New Delhi, 190 pp.
- Sundar, K. S. G. 2003. Notes on the breeding biology of the Blacknecked Stork *Ephippiorhynchus asiaticus* in Etawah and Mainpuri districts, Uttar Pradesh, India. *Forktail* **19**: 15–20.
- Sundar, K. S. G. and Choudhury, B. C. 1999. Red Data Book for birds of India—Indian Sarus Crane (*Grus antigone antigone*). Unpublished report to BirdLife International.
- Sundar, K. S. G., Kaur, J. and Choudhury, B. C. 2000. Distribution, demography and conservation status of the Indian Sarus Crane (*Grus antigone antigone*) in India. *J. Bombay Nat. Hist. Soc.* **97**: 319-339.
- Sundar, K. S. G and Choudhury, B. C. 2001. A note on Indian Sarus Crane (*Grus antigone*) mortality collision with high-tension power lines. *J. Bombay Nat. Hist. Soc.* **98**: 108-110.
- Sundar, K. S. G and Choudhury, B. C. 2003. The Indian Sarus Crane *Grus a. antigone*: A literature review. *J. Ecol. Soc.* **16**: 16-41.
- Sureshkumar, R. 2003. Ring recovery from Great Cormorant *Phalacrocorax carbo* in India. *J. Bombay Nat. Hist. Soc.* **100**: 621-624.
- The Wild Life (Protection) Act 1972 as amended upto 2003. Wild Life Trust of India, New Delhi; 218 pp.
- Todd, Frank S. 1996. *Natural History of the Waterfowl*. Ibis Publishing Company, Vista, California, USA.
- Ueta, M. 2000. Satellite-tracking of bird migration and its effectiveness for the research of Black-faced Spoonbills. In *Conservation and Research of Black-faced Spoonbills and their habitats*, (eds. Ueta, et al.): 31-38. Wild Bird Society of Japan, Tokyo, Japan.
- Varu, S. N. and Trivedi, M. H. 2003. Recovery of a ringed Demoiselle Crane *Grus virgo* in Kutch. *J. Bombay Nat. Hist. Soc.* **100**: 634-625.
- Wetlands International. 2002. *Waterbird Population Estimates- Third Edition*, Wetlands International Global Series No. 12, Wageningen, The Netherlands.



Photo: Satpal Gandhi

Purple Moorhen



Photo: Otto Pfister

Indian Skimmer

APPENDICES

Appendix 1

Accession to international conventions directly relevant to the conservation of waterbirds in the Asia-Pacific region.

Nation and Territory	International Conventions ¹		
	Biological	CMS	Wetlands
Afghanistan			
Australia	Yes	Yes	Yes
Azerbaijan ²	Yes	(Yes)	
Bangladesh	Yes		Yes
Bhutan	Yes		
Cambodia	Yes		Yes
China, Peoples of Republic of	Yes	(Yes)	Yes
Cook Islands	Yes		
Fiji	Yes		
France (French Polynesia, New Caledonia and Wallis and Futuna Islands)	(Yes)	(Yes)	(Yes)
India	Yes	Yes	Yes
Indonesia	Yes		Yes
Iran, Islamic Republic of	Yes	(Yes)	Yes
Japan	Yes		Yes
Kazakhstan ²	Yes	(Yes)	
Kyrgyzstan ²	Yes		
Kiribati	Yes		
Korea, People's Democratic Republic of	Yes		
Korea, Republic of			Yes
Lao People's Democratic Republic	Yes		
Malaysia	Yes		Yes
Maldives	Yes		
Marshall Islands	Yes		
Micronesia, Federated States of	Yes		
Mongolia	Yes	Yes	Yes
Myanmar	Yes		
Nauru	Yes		
Nepal	Yes		Yes

Nation and Territory	International Conventions ¹		
	Biological	CMS	Wetlands
New Zealand	Yes	Yes	Yes
Niue	Yes		
Northern Mariana Islands			(Yes)
Pakistan	Yes	Yes	Yes
Palau	Yes		
Papua New Guinea	Yes		Yes
Philippines	Yes	Yes	Yes
Russian Federation	Yes	(Yes)	Yes
Singapore	Yes		
Solomon Islands	Yes		
Sri Lanka	Yes	Yes	Yes
Tajikistan ²	Yes		Yes*
Thailand	Yes		Yes
Tokelau	(Yes)		(Yes)
Tonga	Yes		
Turkmenistan	Yes	(Yes)	
Tuvalu			
United Kingdom (Pitcairn Islands)	(Yes)	(Yes)	(Yes)
United States of America (Alaska, Hawaii and Guam)			(Yes)
United States of America (American Samoa)			(Yes)
Uzbekistan ²	Yes	Yes	Yes*
Vanuatu	Yes		
Vietnam	Yes		Yes
Western Samoa	Yes		
Total	45 (3) 83%	10 (3) 19%	28 (6) 52%

Notes:

Yes - nation is party to the convention, (Yes) - territory of a nation is party to the convention, Yes* Deposition of Declaration of Succession, (Yes) - a non Contracting Party to CMS, but a member of agreements on waterbirds under CMS.

1 Wetlands - Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention); list as at 31 December 2000.

CMS - Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention); list as at 31 December 2000.

Biological Diversity - Convention on Biological Diversity; list as at 31 December 2000.

2 Nations belonging to the former Union of Soviet Socialist Republics (USSR) have undertaken in the Alma-Ata Declaration of 21 December 1991 to guarantee, "in conformity with their legislative procedures, the fulfillment of international obligations, stemming from the agreements signed by the former USSR". In December 2000, Kazakhstan, Kyrgyzstan and Turkmenistan are still to confirm their membership of the Ramsar Convention.

Appendix 2

Migratory waterbird species of special conservation interest in the Asia-Pacific region.

Species ¹	English Name	Category of Threat ²	Status ³	Population estimate ⁴
<i>Pelecanus philippensis</i>	Spot-billed Pelican	VU	MR	11,500
<i>Pelecanus crispus</i>	Dalmatian Pelican	VU	M	10,000-13,000 ⁵
<i>Phalacrocorax pygmaeus</i>	Pygmy Cormorant	LR/nt	M	<5,000 ⁵
<i>Egretta euophodes</i>	Chinese Egret	VU	M	1,800-2,500 ⁴
<i>Gorsachus gosagi</i>	Japanese Night-heron	EN	M	250-999 ⁴
<i>Ixobrychus eurhynchus</i>	Schrenck's Bittern	LR/lc	M	<1,00,000
<i>Anastomus oscitans</i>	Astan Openbill Stork	LR/lc	M	60,000
<i>Ciconia boyciana</i>	Oriental Stork	EN	M	2,500
<i>Threskiornis melanocephalus</i>	Black-headed Ibis	NT	MR	<1,00,000
<i>Platalea minor</i>	Black-faced Spoonbill	EN	M	700
<i>Phoenicornias minor</i>	Lesser Flamingo	NT	MR	1,50,000
<i>Anser cygnoides</i>	Swan Goose	EN	M	30,000-50,000 ⁴
<i>Anser erythropus</i>	Lesser White-fronted Goose	VU	M	14,000-16,000 ⁴
<i>Anser canagiea</i>	Emperor Goose	LR/nt	M	45,000-80,000
<i>Branta ruficollis</i>	Red-breasted Goose	VU	M	88,000 ⁴
<i>Aix galericulata</i>	Mandarin Duck	LR/nt	MR	70,000
<i>Anas formosa</i>	Balkal Teal	VU	M	2,10,000 ⁶
<i>Marmaronetta angustirostris</i>	Marbled Teal	VU	M	5,000 ⁵
<i>Aythya baeri</i>	Baer's Pochard	VU	M	10,000-20,000 ⁶
<i>Aythya nyroca</i>	Ferruginous Duck	NT	M	15,000 ⁵
<i>Polysticta stereni</i>	Steller's Eider	LR/lc	M	1,50,000-2,50,000 ⁵
<i>Somatenta fischer</i>	Spectacled Eider	LR/lc	M	<2,00,000 ⁶
<i>Mergus squamatus</i>	Scaly-sided Merganser	VU	M	3,000-4,500 ⁶
<i>Oxyura leucocephala</i>	White-headed Duck	EN	M	300 ⁵
<i>Grus nigricollis</i>	Black-necked Crane	VU	MR	5,500-6,000 ⁶
<i>Grus monacha</i>	Hooded Crane	VU	M	9,150 ⁶
<i>Grus japonensis</i>	Red-crowned Crane	EN	MR	2,200 ⁶
<i>Grus virgo</i>	White-naped Crane	LC	M	5,500-6,500
<i>Grus antigone</i>	Sarus Crane	VU	MR	13,500-16,000 ⁶
<i>Grus leucogeranus</i>	Sibiraian Crane	CR	M	2,500-3,000 ⁶
<i>Coturnicops exquisita</i>	Swinhoe's Rail	VU	M	2,500-10,000 ⁶
<i>Crex crex</i>	Corn Crake	VU	M	5,15,000-12,40,000 ⁶
<i>Helopais personata</i>	Masked Finfoot	VU	M	2,500-10,000 ⁶
<i>Vanellus gregarius</i>	Sociable Lapwing	CR	M	<1,000 ⁵
<i>Vanellus cinereus</i>	Grey-headed Lapwing	LC	MR	<1,00,000
<i>Charadrius plascicus</i>	Long-tailed Plover	LR/LC	M	<25,000
<i>Numenius totensis</i>	Bristle-thighed Curlew	VU	M	7,000
<i>Numenius tenuirostris</i>	Slender-billed Curlew	CR	M	<50

Species ¹	English Name	Category of Threat ²	Status ³	Population estimate ⁴
<i>Numenius madagascensis</i>	Far Eastern Curlew	LR/nt	M	21,000
<i>Tringa guttifer</i>	Spotted Greenshank	EN	M	2,50,000
<i>Gallinago hardwickii</i>	Japanese Snipe	LR/lc	M	36,000
<i>Gallinago nemoricola</i>	Wood Snipe	VU	M	2,500-10,000 ⁶
<i>Callinago media</i>	Great Snipe	LR/nt	M	<5,00,000 ⁵
<i>Limnodromus semipalmatus</i>	Asian Dowitcher	NT	M	15,000-20,000
<i>Eurynorhynchus pygmaeus</i>	Spoon-billed Sandpiper	EN	M	2,500-10,000 ⁶
<i>Larus relictus</i>	Relict Gull	VU	M	2,500-10,000 ⁶
<i>Larus saundersi</i>	Saunders's Gull	VU	M	7,000 ⁶
<i>Larus brevirostris</i>	Red-legged Kittiwake	VU	M	1,68,000 ⁶
<i>Sterna bernsteini</i>	Chinese Crested Tern	CR	M	<50 ⁶
<i>Rynchops albicollis</i>	Indian Skimmer	VU	M	2,500-10,000 ⁶

Notes:

- Species list adapted from BirdLife International (2000). The list covers species and populations that breed and migrate within the Asia-Pacific region. In addition, it includes three "globally threatened" species, Corn Crake, Slender-billed Curlew and Great Snipe, that breed within the region and migrate outside.
- Categories of threat follow BirdLife International (2000). Information provided below is abstracted from the publication which provides detailed information on the criteria used for the classification.

CRITICALLY ENDANGERED (CR). A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined in any of the criteria.

ENDANGERED (EN). A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the medium-term future, as defined in any of the criteria.

VULNERABLE (VU). A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined in any of the criteria.

LOWER RISK (LR). A taxon is Lower Risk when it has been evaluated, does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category can be separated into three sub-categories:

 - Conservation Dependent (CD). Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of this conservation programme would result in the taxon qualifying for one of the threatened categories above within a period of five years.
 - Near Threatened (nt). Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.
 - Least Concern (lc). Taxa which do not qualify for Conservation Dependent or Near Threatened.
- Status of species follows Perennou et al. (1994): M - *Migratory species*, MR - *migratory species with resident populations*
- Populations estimates are based on Perennou et al. (1994) and Rose and Scott (1997).
- The population estimated refers only to the population in the Asia-Pacific region for a species which has an extended range.
- Updated population estimates based on BirdLife International (2000).

Appendix 3

Convention on Wetlands, recommendation VI.4 on adoption of population estimates for operation of the specific criteria based on waterfowl Adopted at: 6th Meeting of the Conference of the Contracting Parties of the Conference of the Contracting Parties, Brisbane, Australia, 19-27 March 1996.

Source: http://ramsar.org/key_res_vi.4.htm

1. REAFFIRMING the particular ecological values of waterfowl in the identification of internationally important wetlands, as expressed by both the Convention and subsequent resolutions and recommendations of the Conference of the Parties;
2. RECOGNIZING the many Ramsar sites which are important to waterfowl, and the continuing need for reliable information to underpin the application of Criterion 3(c);
3. RECALLING Resolution 5.9 which, *inter alia*, called for the regular updating of international population estimates for waterfowl as the basis of the application of Criterion 3(c), and which further requested IWRB (now Wetlands International) to bring revised estimates to each future meeting of the Conference of the Parties;
4. AWARE of Technical Workshops, co-ordinated by the Joint Nature Conservation Committee in the UK, the National Environmental Research Institute in Denmark, and Wetlands International, to agree timetables for the revision of waterfowl population estimates in the Western Palearctic and East Atlantic Flyway, the conclusions of which were submitted to Technical Session E of the present meeting, and in particular aware of the need to avoid short-term changes in standard 1% thresholds given their value as “bench-marks”, against which sites of possible international importance can be assessed;
5. CONSCIOUS of the need for close technical co-ordination between the Ramsar Convention and the Bonn Convention’s Agreement on the Conservation of African-Eurasian Migratory Waterbirds, and also with other international treaties and agreements, to ensure consistency in the use of international waterfowl population estimates and 1% thresholds;
6. NOTING Wetlands International’s draft report summarizing revised population estimates and 1% thresholds prepared for the present meeting of the Conference of the Parties in response to Resolution 5.9;

The Conference of the Contracting Parties

7. URGES Wetlands International to continue to developing the International Waterfowl Census and enhancing its global coverage as an important basis for the application of Ramsar Criterion 3(c);
8. ENCOURAGES Wetlands International, using its network of Waterbird Specialist Groups, to work with the Ramsar Bureau, Contracting Parties, and other international treaties in order to review and keep up to date waterfowl population estimates and 1% thresholds, in particular giving priority to the assessment of the sizes of those populations for which no reliable population estimate or 1% threshold currently exists, and to report back the results of such activity to the 7th Meeting of the Conference of the Contracting Parties;

9. **AGREES** that, unless waterfowl populations are poorly known or are known to be rapidly changing, 1% threshold levels should be revised not more frequently than every third ordinary meeting of the Conference of the Contracting Parties; and
10. **CALLS** on Contracting Parties to use these estimates and thresholds, upon their publication, as a basis for designation of sites for the List of Wetlands of International Importance in the succeeding three triennia.

Appendix 4

Convention on Wetlands, Recommendation 7.3, The “Brisbane Initiative” on the establishment of a network of listed sites along the East Asian-Australasian Flyway 6th Meeting of the Conference of the Contracting Parties, Brisbane, Australia, 19-27 March 1996.

Source: http://ramsar.org/key_res_vi.4.htm

1. RECALLING Article 5 of the Convention, which calls for international consultation and co-ordination in the conservation and management of shared wetland resources;
2. NOTING Recommendation 4.4, which calls for networks of reserves to be established, and 4.12, which recognizes the flyway concept for the conservation of wetland bird species;
3. AWARE of the Kushiro Statement (Resolution 5.1), which calls for the strengthening of regional co-ordination on wetland issues, co-operation with other conventions and organizations, and the establishment of international networks of wetlands with significant ecological or hydrological links;
4. WELCOMING the proposed development of a Memorandum of Understanding, between the Ramsar Bureau and the Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals (CMS), as a mechanism to improve international co-operation on the conservation of migratory species;
5. CONVINCED of the need for a concerted multilateral approach involving governments, non-government organizations and local communities to the conservation of migratory waterbirds within each of the major flyways of the globe;
6. FURTHER CONVINCED that such an approach should have as a central feature a network of wetland sites of international importance, as defined by the Ramsar criteria, for the conservation of migratory waterbirds;
7. NOTING the socio-economic and cultural significance of some of these internationally important sites;
8. NOTING the Western Hemisphere Shorebird Reserve Network, developed in the Americas, as a useful model for international co-operation in the conservation of migratory shorebird species;
9. FURTHER NOTING the recent adoption of the Agreement on the Conservation of African-Eurasian Migratory Waterbirds under CMS;
10. NOTING that participants at the regional technical workshop on the Conservation of Migratory Waterbirds and their Wetland Habitats held in Kushiro, Japan, in December 1994 supported a concerted multilateral approach to the conservation of migratory waterbirds along the East Asian-Australasian Flyway, through the development of the Asia-Pacific Migratory Waterbird Conservation Strategy, and recommended the immediate establishment of an East Asian-Australasian Shorebird Reserve Network;
11. NOTING that the Delhi Declaration on the Conservation of Wetlands in Asia, adopted at the Ramsar Regional Meeting in March 1995, called for “the support of initiatives to develop frameworks for the co-ordination of efforts to conserve migratory waterbirds in the Asian flyways”;

12. **CONVINCED** that the Ramsar Convention, through the co-operative actions of its Contracting Parties along the major flyways, could facilitate the development of such multilateral approaches to waterbird conservation by supporting the development of networks of wetland sites of international importance for migratory waterbirds;

The Conference of the Contracting Parties

13. **ADOPTS** this Recommendation as the “Brisbane Initiative” which calls for the establishment of a network of Ramsar-listed and other wetlands of international importance for migratory shorebirds along the East Asian-Australasian Flyway, managed to maintain their suitability for migratory shorebirds;
14. **ENCOURAGES** Contracting Parties to consider supporting the implementation of the Asia-Pacific Migratory Waterbird Conservation Strategy;
15. **URGES** Contracting Parties within the East Asian-Australasian Flyway to demonstrate their support for an East Asian-Australasian Shorebird Reserve Network by nominating one or more appropriate sites for inclusion in the Network;
16. **COMMENDS** the “Brisbane Initiative” to other countries or territories along the Flyway who are not yet Contracting Parties, and urges their full participation in the Brisbane Initiative;
17. **FURTHER COMMENDS** consideration of the flyway site network approach to other species groups of migratory waterbirds in the Asia-Pacific region and in other flyways;
18. **FURTHER URGES** participating countries to work together to maintain and expand such networks in a coordinated manner, and to promote public awareness, training and information exchange and thus contribute to the long-term conservation of migratory shorebirds and their habitats.

Appendix 5

Convention on Wetlands, Resolution VIII. 38 on waterbird population estimates and the identification and designation of Wetlands of International Importance 8th Meeting of the Conference of the Contracting Parties, Valencia, Spain, 18-26 November 2002.

Source: http://www.ramsar.org/key_res_viii_38_e.htm

1. **RECOGNIZING** that the regular review and updating of estimates of waterbird population sizes is necessary to track the efficacy of measures for the conservation and wise use of waterbird populations, including the establishment of national and international networks of protected sites on migratory waterbird flyways, as called for in the Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance (Resolution VII.11);
2. **RECALLING** Resolution 5.9, in which the Contracting Parties requested IWRB (now Wetlands International) to provide information on the sizes of waterbird populations as a basis for the application of the Convention's site selection Criterion 3 (c) (now Criterion 6), and **ALSO RECALLING** Resolution VI.4, in which they outlined the desired timetable for such updates and requested Wetlands International to bring updated information to each future meeting of the Conference of the Parties;
3. **REAFFIRMING** the importance of data collected by Wetlands International through its International Waterbird Census for the assessment of wetlands against Criteria 2, 4, 5 and 6 of the Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance (Resolution VII.11);
4. **NOTING AGAIN** the value of regular waterbird counts at wetlands as an effective means of monitoring aspects of the ecological character of particular sites, especially for the purposes of management planning, environmental impact assessment, and the evaluation of national or regional wetland policies;
5. **AWARE** of the wide international consultation undertaken by Wetlands International to collate data and information for the third edition of its publication Waterbird Population Estimates, prepared for this meeting of the Conference of the Contracting Parties, which brings together the most recent information on the population sizes of waterbirds, as envisaged by Resolution VI.4, and which identifies 1% population thresholds for 1,138 (50%) biogeographic populations of waterbirds, but also **AWARE** that, despite this, there remain 1,133 populations of waterbirds for which there is no reliable population estimate from which to establish a 1% threshold for the application of Ramsar Criterion 6;
6. **WELCOMING** BirdLife International's publications Important Bird Areas and potential Ramsar Sites in Europe and Important Bird Areas and potential Ramsar Sites in Africa, and **RECOGNIZING** the value of BirdLife International's Important Bird Area (IBA) programme in assisting Contracting Parties in their identification of potential Wetlands of International Importance;
7. **NOTING** the publication by BirdLife International in 2000 of the most recent assessment of the status of the world's birds in Threatened Birds of the World, which indicated that 158 species of waterbird were globally threatened and that for a further six species of waterbirds data were so deficient that it is not possible to assign conservation status, and

- RECOGNIZING that this publication provides information in support of the identification and designation of Ramsar sites under Criterion 2; and
8. RECOGNIZING the role of the international Specialist Groups of the Species Survival Commission of IUCN – The World Conservation Union as well as those of Wetlands International in collecting, analysing and interpreting waterbird population data;
 9. AWARE of the need for monitoring information on alien, non-native and invasive waterbird populations and hybrid forms, as well as those waterbirds whose populations are rapidly increasing outside their native ranges, so as to inform management responses;
 10. FURTHER AWARE of the development of the African/Eurasian Migratory Waterbird Flyways project by Wetlands International, which will enhance the coverage and quality of data underpinning future versions of Waterbird Population Estimates and will lead to identification of potential Ramsar sites, by identifying critically important wetlands along migratory waterbird flyways, as well as to an enhanced capacity to survey and monitor them; and
 11. DESIRING to promote the application of a consistent global source of information on 1% thresholds for the application of Criterion 6 for designation of Wetlands of International Importance;

The Conference of the Contracting Parties

12. WELCOMES the publication of the third edition of Waterbird Population Estimates prepared for this meeting of the Conference of the Parties, and CONGRATULATES Wetlands International on the work undertaken to further develop this global and consistent source of data and information of importance for wetland and waterbird conservation and wise use, and for increasing the number of biogeographic populations for which population estimates and 1% thresholds are now available;
13. URGES all Contracting Parties to use appropriate 1% thresholds contained in the third edition of Waterbird Population Estimates as the official and consistent basis for their application of Criterion 6 of the Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance for the designation of Ramsar sites during the 2003-2005 triennium;
14. ALSO URGES Contracting Parties to work together to identify and designate coherent flyway-scale networks of Ramsar sites for migratory waterbirds, in line with Action 12.2.2 of the Convention's Strategic Plan 2003-2008, including working cooperatively with the Convention on Migratory Species (CMS) and African–Eurasian Migratory Waterbird Agreement (AEWA) through the Joint Work Plan between the Ramsar Convention, CMS and AEWA;
15. FURTHER URGES Contracting Parties to select Ramsar sites for globally threatened waterbirds in implementation of Action 12.2.1 of the Convention's Strategic Plan 2003-2008, noting also the value of selecting Ramsar sites to support conservation strategies for nationally or regionally threatened waterbirds;
16. REQUESTS Wetlands International, with the assistance of the Ramsar Bureau, to make widely available, including in electronic formats, the third edition of Waterbird Population

Estimates to all Contracting Parties, non-Parties and other organizations involved in the identification and designation of Ramsar sites;

17. **REQUESTS** Wetlands International to continue to bring an updated edition of Waterbird Population Estimates to each future Conference of the Parties, having first undertaken international scientific consultation on its contents, so that the population estimates and 1% thresholds it contains may be used as the basis for the application of Criterion 6 in the succeeding triennium;
18. **WELCOMES** the intention of Wetlands International to enhance the scope and coverage of future editions of Waterbird Population Estimates so as to include all waterbird taxa listed in the glossary to the Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance;
19. **ALSO WELCOMES** the proposed establishment by Wetlands International of a Global Waterbird Monitoring Steering Committee as a means of focusing the future development of the International Waterbird Census, and in particular its contribution to the strategic development of the Ramsar List, and **REQUESTS** this Committee, once established, to identify ways and means of increasing the availability of data and information from the IWC to Contracting Parties and others in support of their identification and designation of Ramsar sites;
20. **ENCOURAGES** Contracting Parties and others with relevant data and information to assist Wetlands International and BirdLife International through the continued collection and supply of population data on waterbirds, including globally threatened species and those species identified by BirdLife International in Threatened Birds of the World as being data deficient;
21. **ENCOURAGES** the Species Survival Commission of IUCN and Wetlands International to facilitate the establishment of further Specialist Groups for waterbird taxa where no such expert networks currently exist, so as to assist in the collation and critical interpretation of waterbird population data of value for the application of Criterion 6;
22. **ENCOURAGES** BirdLife International to make available to Contracting Parties and others information from its Important Bird Area (IBA) programme, including its analyses of IBAs and potential Ramsar sites for Europe and Africa, and to consider the preparation of such analyses for other regions;
23. **REQUESTS** the support of the Global Environment Facility to assist eligible countries in the implementation of the African/Eurasian Migratory Waterbird Flyways project; and
24. **URGES** Contracting Parties to apply waterbird monitoring data, and analyses drawn from them, when appropriate, as a means of providing objective information for site management planning and the evaluation of national or regional wetland policies.

Appendix 6

Convention on Wetlands, Recommendation 7.3 People and Wetlands: The Vital Link 7th Meeting of the Conference of the Contracting Parties to the Convention on Wetlands (Ramsar, Iran, 1971), San José, Costa Rica, 10-18 May 1999 Multilateral cooperation on the conservation of migratory waterbirds in the Asia-Pacific region.

1. RECALLING Article 5 of the Ramsar Convention, which calls for international consultation and coordination in the conservation and management of shared wetland resources;
2. NOTING Recommendation 4.4, which calls for networks of wetland reserves to be established, and Recommendation 4.12, which recognises the flyway concept for the conservation of wetland bird species;
3. NOTING Action 7.2.5 of the Strategic Plan 1997-2002 to “enhance Ramsar’s contribution to international co-operation on shared wetland species, notably through co-operative arrangements with the Convention on Migratory Species, flyway agreements, networks and other mechanisms dealing with migratory species”;
4. RECALLING the Kushiro Initiative of December 1994, which called for enhanced mechanisms for collaborative action to conserve waterbird species in the Asia-Pacific region, establishment of a network of sites critical for waterbird conservation, and sustainable management of waterbirds, which also recommended the development of a regional multilateral waterbird agreement;
5. NOTING that pursuant to Recommendation 6.4 (the Brisbane Initiative) of the 6th Conference of the Contracting Parties, an East Asian-Australasian Shorebird Reserve Network has been established and continues to expand;
6. FURTHER NOTING the development of the North East Asian Crane Site Network and the Anatidae Site Network in the East Asian Flyway;
7. RECALLING that the Asia-Pacific Migratory Waterbird Conservation Strategy 1996-2000 calls for development of an Asia-Pacific multilateral migratory waterbird conservation agreement;
8. NOTING the Guidelines on international cooperation under the Ramsar Convention, adopted at this Conference of Contracting Parties (Resolution VII.19);
9. ACKNOWLEDGING that Resolution 5.4 of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) lists development of Regional Agreements as a key priority and calls for continued support for the Asia-Pacific Migratory Waterbird Conservation Strategy 1996-2000;
10. AWARE of the Memorandum of Understanding between the Ramsar Bureau and the CMS Secretariat, through which they have agreed to intensify their co-operation in implementation of both conventions, as well as Agreements concluded under CMS;
11. CONVINCED of the need for a concerted multilateral approach to the conservation of migratory waterbirds within each of the major flyways of the globe;
12. RECOGNISING the African-Eurasian Waterbird Agreement as a useful model for international co-operation in the conservation of migratory waterbird species;

13. **CONVINCED** that the Ramsar Convention, through the cooperative actions of its Contracting Parties along the major flyways, can facilitate the development of a multilateral approach to waterbird conservation in the Asia- Pacific region;

The Conference of the Contracting Parties

14. **REQUESTS** Contracting Parties to extend their support to the Asia-Pacific Migratory Waterbird Conservation Strategy 1996-2000, and to work toward having in place a secure and extended framework for international co-operation aimed at the conservation of migratory waterbirds and their habitats in the Asia-Pacific region beyond 2000;
15. **URGES** Contracting Parties in the Asia-Pacific region to nominate additional sites to the Networks established under the Asia-Pacific Migratory Waterbird Conservation Strategy and to participate fully in the action plans developed under the strategy;
16. **COMMENDS** the Strategy to other nations within the Asia-Pacific region that are not yet Contracting Parties, and urges their full participation in its implementation;
17. **CALLS UPON** Contracting Parties to consider actively the development of a multilateral agreement or other arrangement, to provide a long-term conservation framework for migratory waterbirds and their habitats which is inclusive of all Asia-Pacific countries.

Appendix 7

Convention on Wetlands, Resolution VII.21“People and Wetlands: The Vital Link” 7th Meeting of the Conference of the Contracting Parties to the Convention on Wetlands (Ramsar, Iran, 1971), San José, Costa Rica, 10-18 May 1999.

Enhancing the conservation and wise use of intertidal wetlands

1. **RECOGNISING** the critical economic, social and environmental values of intertidal wetlands, including tidal flats, salt marsh, mangrove and seagrass beds, especially for fisheries, biodiversity, coastal protection, recreation, education, and in relation to water quality;
2. **AWARE** that the livelihood of substantial numbers of people around the world depend on the productivity and values of intertidal wetlands;
3. **CONCERNED** that a large proportion of intertidal wetlands and their values have already been lost or degraded, notably due to reclamation, unsustainable aquaculture, and pollution, and that, in some regions, the scale of reclamation continues to increase;
4. **NOTING** that there is growing scientific evidence of, and awareness by, local communities of the productivity and values of intertidal wetlands, in particular of tidal flats, and that the experiences and expertise in dealing with the conservation and wise use of intertidal wetlands at local and national levels is rapidly increasing;
5. **FURTHER NOTING** that there are not adequate mechanisms at the global level to share and benefit from these experiences and this expertise;
6. **RECALLING** Recommendation 5.1, which “calls on Contracting Parties along the East Asia flyway to designate additional wetlands for the Ramsar List, and in particular to designate additional intertidal wetlands”;

NOTING that yet these wetlands are still under-represented in the List of Wetlands of International Importance;

7. **FURTHER RECALLING** Recommendation 6.4, which urges countries to work together in the area of information exchange in order to contribute to the long-term conservation of migratory waterbirds and their habitats; and noting that many such migratory waterbird populations dependent upon intertidal wetlands are globally threatened yet remain poorly represented on existing Ramsar sites;
8. **DRAWING ATTENTION TO** Recommendation 7.3 of this Conference which calls upon Contracting Parties to support the development of a multilateral agreement to provide a long-term conservation framework for migratory waterbirds and their habitats which is inclusive of all Asia-Pacific countries;
9. **NOTING** that Recommendation 6.7 urges Contracting Parties to designate suitable areas of their coral reefs and associated ecosystems, including mangrove forests and seagrass beds, for inclusion in the List of Wetlands of International Importance;
10. **FURTHER NOTING** that Recommendation 6.8 on Strategic Planning in Coastal Zones calls for sound decision making on the conservation and wise use of coastal wetlands and other key environmental components;

11. **CALLS** upon Contracting Parties to document the extent of loss of intertidal wetlands that has occurred in the past and to inventory those intertidal wetlands which remain, and their conservation status;
12. **REQUESTS** Contracting Parties, in collaboration with the Ramsar Bureau, International Organization Partners, and relevant groups, to develop initiatives, which enable dissemination of information on the extent of loss of intertidal wetland area and its impacts, and on alternative development strategies for remaining intertidal areas that assist in maintaining their ecological character;
13. **URGES** Contracting Parties to review and modify existing policies that adversely affect intertidal wetlands, to seek to introduce measures for the long-term conservation of these areas, and to provide advice on the success, or otherwise, of these actions in their National Reports to Ramsar COP8;
14. **FURTHER URGES** Contracting Parties to identify and designate as Wetlands of International Importance a greater number and area of intertidal wetlands, especially tidal flats, giving priority to those sites which are important to indigenous people and local communities, and those holding globally threatened wetland species (as encouraged by Resolution VII.11);
15. **ALSO URGES** all Contracting Parties to suspend the promotion, creation of new facilities, and expansion of unsustainable aquaculture activities harmful to coastal wetlands until such time as assessments of the environmental and social impact of such activities, together with appropriate studies, identify measures aimed at establishing a sustainable system of aquaculture that is in harmony both with the environment and with local communities.

Appendix 8

*Assessment and Monitoring of Waterfowl Habitat using Remote Sensing techniques – A case study

On a conservative estimate more than three million waterfowl migrate into India every year from across the Himalaya from Eurasia during winters (November to March). The monitoring and management of their populations, distribution and habitats is important to check decline in their numbers. As the migration is essential for survival of the species, availability of suitable habitats, both on migratory routes as feeding/ moulting areas, as well as on the final destination as wintering sites, is critical to migratory waterfowls.

These ecologically vital habitats are under constant threat due to ever increasing anthropogenic pressures such as drainage of wetlands, agriculture, etc. Therefore, it is crucial to understand the correlation between the trends in waterfowl populations and the change in waterfowl habitat parameters.

The case study undertaken by Kumar, Porwal and Roy (2000) and Kumar (2000) presented here may be a useful guide in understanding this interrelationship.

Study Area: Asan reservoir- a manmade wetland, which came into being in the year 1967, is located in the geographical co-ordinates of 30°25' - 26'N and 77°40' - 41'E and its net geographical area is 3.2 km². It falls in biogeographic province 4.8.4 (Indo-Gangetic Monsoon forest) and belongs to Wetland type 17. The area experiences north Indian Monsoon climate with distinct summer and winter months, with SW monsoon. Chief aquatic vegetation comprises *Eichhornia crassipes*, *Potamogeton pectinatus*, *Typha elephantina* and *Ceratophyllum demersum*. Surrounding bushes include *Ipomoea festulosa* and *Lantana camara*. On the southern side agricultural fields surrounds the reservoir. There is mixed forest plantation on the eastern and northern fringes of the wetland, while further south there is mixed forest of *Shorea robusta* and *Anogeissus latifolia*.

Ancillary Data :

- (a) Topographical Sheet (SOI) scale 1:50,000 No. F 53F/11 for spatial features, ground control points, co-ordinates and geo-registration of Satellite Imageries.
- (b) Vegetation Inventory, both aquatic as well as of the shore and surrounding area with the help of BSI.
- (c) Inventorisation of Waterfowl species and their seasonal distribution was undertaken during the years 1994 - 95 to 1997 - 98 by a team of scientists from ZSI, Dehra Dun. Bird counts were made every month from the study area.

Satellite Data:

Imageries of IRS were used as follows:

- (a) IRS-1B LISS II, November 1996, path 96, row 50-3
- (b) IRS-1C LISS III, February, 1997, path 96, row 50-3
- (c) IRS-1C LISS III, March, 1998, path 96, row

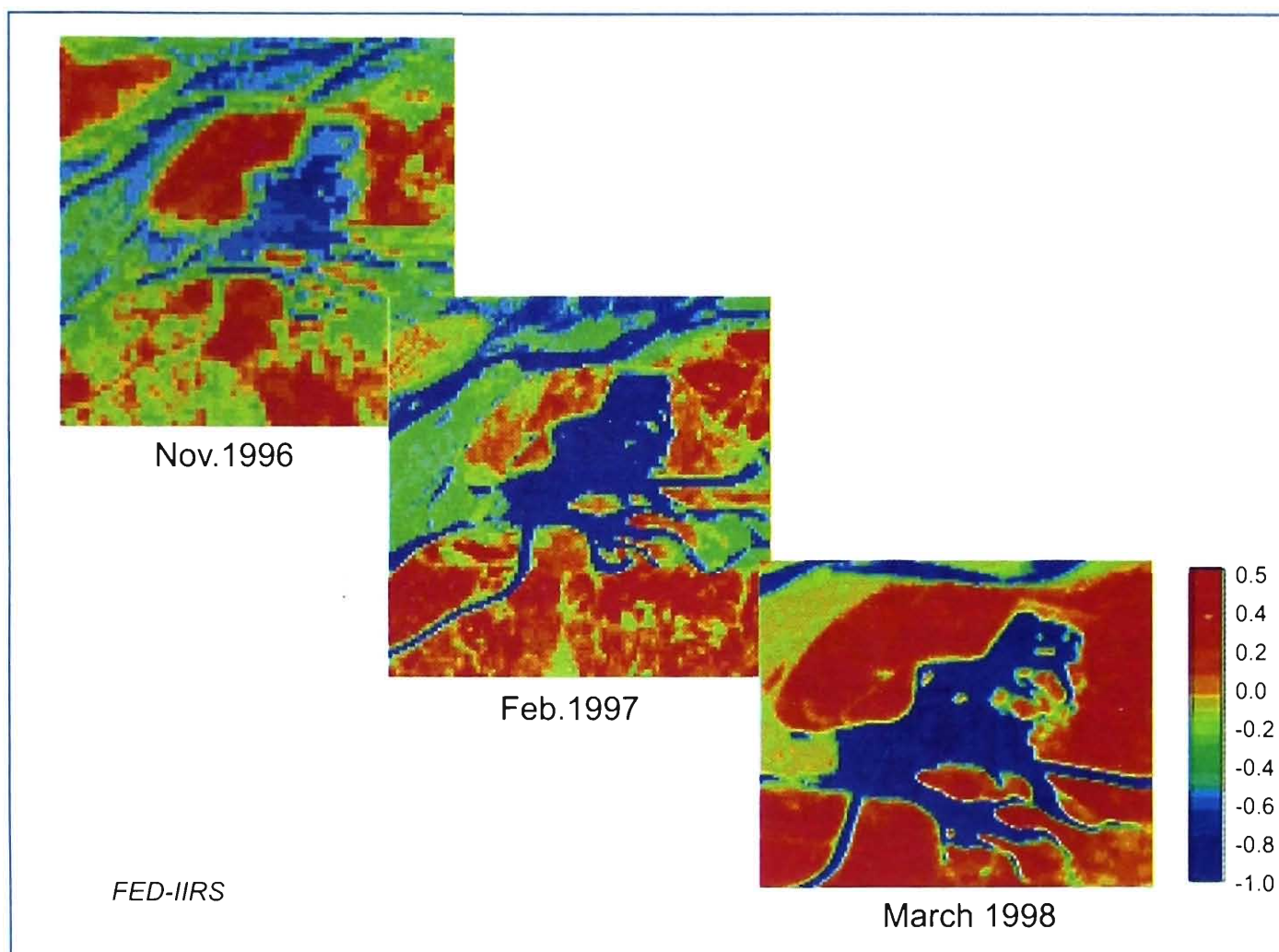


Fig. 1. NDVI images of Asan reservoir and surroundings

Analysis of Land Cover Classes at Asan Reservoir: Based on spectral variations in the images and subsequent digital analysis, eight classes were identified (figs. 2-4) namely, water, emergent vegetation, herbaceous vegetation, shrubs, trees, open land, dry bed and agriculture.

1. **Water:** The extent of open water within the reservoir was considered under this class. It was found to be most uniform and major class comprising an area of 1.8079 km² (1996), 1.6693 km² (1997) and 1.4285 km² (1998).
2. **Emergent vegetation:** This class comprised the dominant vegetation like *Typha*, *Ipomoea*, *Polygonum* and *Eichhornia*, which are growing in shallower parts of the reservoir. Their growth is very rapid and is converting the reservoir into marsh. The area of emergent vegetation was found to be 0.7233 km² (1996), 0.6250 km² (1997) and 1.1082 km² (1998).
3. **Herbaceous vegetation:** Comprises patches of young *Polygonum* under other grasses, which occur sporadically at the periphery of the reservoir in between the emergent vegetation and shrubs.
4. **Shrubs:** Adjoining the periphery of the reservoir especially on the southeastern side bushes like *Lantana*, *Eclipta* and *Ipomoea* are encroaching into the reservoir at an alarming rate. The area of the shrub within the reservoir was estimated as 0.2998 km² (1996), 0.5069 km² (1997) and 0.31088 km² (1998).

The remaining classes, namely, trees, open land, dry bed and agriculture did not form a significant component of the wetland.

Change estimation of Land Cover in Asan reservoir: The change analysis in Asan reservoir was done during 1996 - 97 and 1997 - 98; with respect to five major land cover classes, namely, 1. water to herbaceous; 2. water to emergent vegetation; 3. herbaceous to emergent vegetation; 4. emergent vegetation to shrub; 5. shrub to tree. Remaining classes did not show any change.

The total area of the wetland was estimated to be 3.2640 km², out of which no change was observed in 2.8118 km² during 1996 - 97 and 2.6649 km² in 1997, implying that the changes were restricted to 0.4522 km² area in 1996 - 97 and to 0.5991 km² in 1997 - 98. Water to emergent class showed maximum change, i.e., 0.3130 km² in 1996 - 97 and 0.3556 km² in 1997 - 98, which was about 69% in 1996 - 97 and 59% in 1997 - 98 of the total changed area during the respective periods (figs. 5 - 7).

Change Estimation of Migratory Waterfowl Population in Asan reservoir: The average total waterfowl counts in the month of February during the years 1996, 1997 and 1998 was 1,161; 3,174 and 3,741 respectively, of which nearly 90% of the population belonged to the following migratory species, namely, Brahminy Shelduck, Northern Pintail, Red-crested Pochard, Common Pochard, Eurasian Wigeon, Mallard, Gadwall, Common Teal, Tufted Duck, Northern Shoveller, and Coot (fig. 8).

The change estimation of the peak winter population of the waterfowl species shows a distinct upward trend. It is worth noting, that out of eleven migratory species, two species have shown more than 300% increase in their population, while five species have shown an increase of more than 200%, two species have increased by more than 100%, while one species, i.e., Coot has shown no appreciable change in population. When the peak populations of all the above species are merged together, there is an overall increase of about 193% between the years 1994 - 98.

Correlation between Waterfowl population trends and change in Landcover classes in Asan reservoir: All landcover classes other than water were merged into landcover category to study the ratio between landcover and water and the relationship between water - landcover ratio and migratory waterfowl population.

The ratio between water and landcover was obtained as 1.2415 (considering land cover as 1) (water 55%, land cover 45%) during 1996, it decreased to 1.0467 (water 51%, land cover 49%) in 1997 and further depleted to 0.7783 (water 44%, land cover 56%) in 1998 (fig. 9). During the same period five dominant herbivorous migratory species showed a definite upward trend in their winter population. The population of Ruddy Shelduck during the period between 1996 and 1998 increased by more than 250%, that of Red-crested Pochard by 145%, Common Pochard by 200%, Eurasian Wigeon by 180%, Gadwall by 306%, and that of Coot by 125%, a species which feeds on animal materials as well (fig. 9).

Thus a positive relationship is so far definitely indicated between the vegetation cover and waterfowl population, which are generally acceptable in the ratio of 50:50 to 30:70, where the value of landcover is 70.

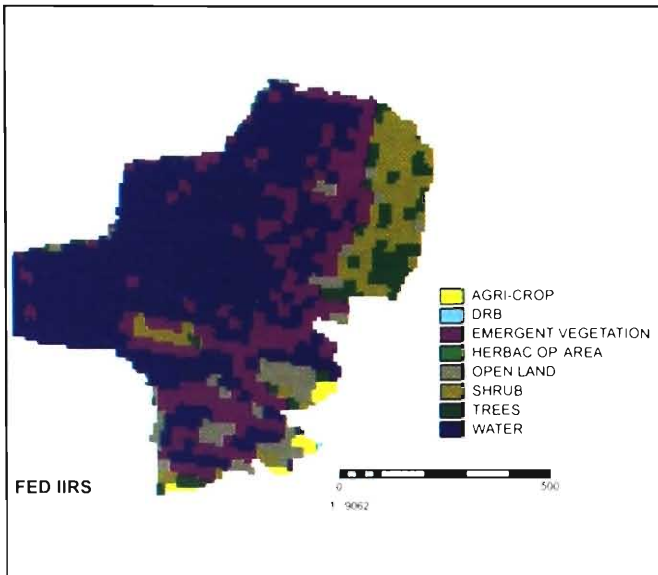


Figure 2. Habitat map of Asan reservoir (1996)

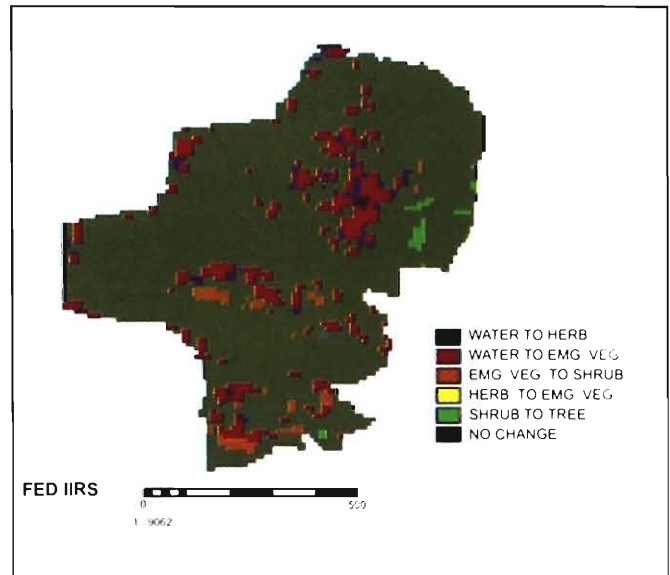


Figure 5. Habitat change map of Asan reservoir (1996-97)

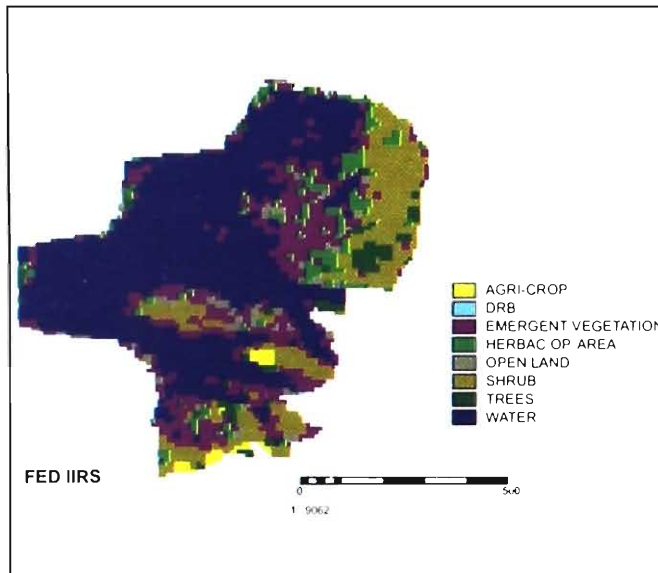


Figure 3. Habitat map of Asan reservoir (1997)

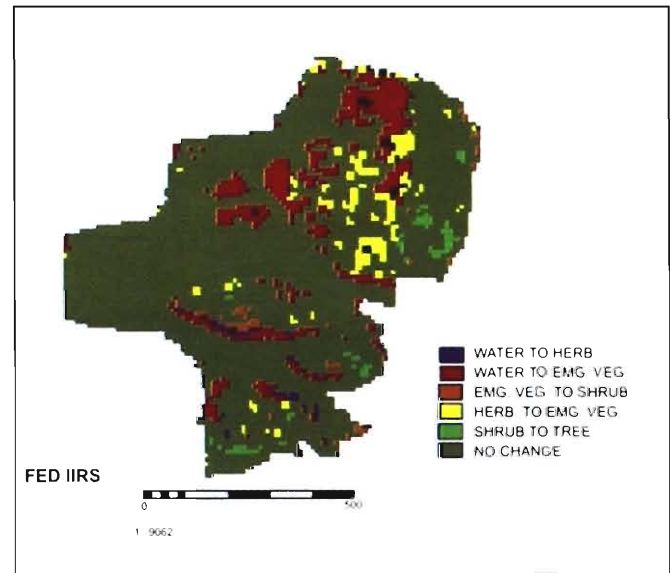


Figure 6. Habitat change map of Asan reservoir (1997-98)

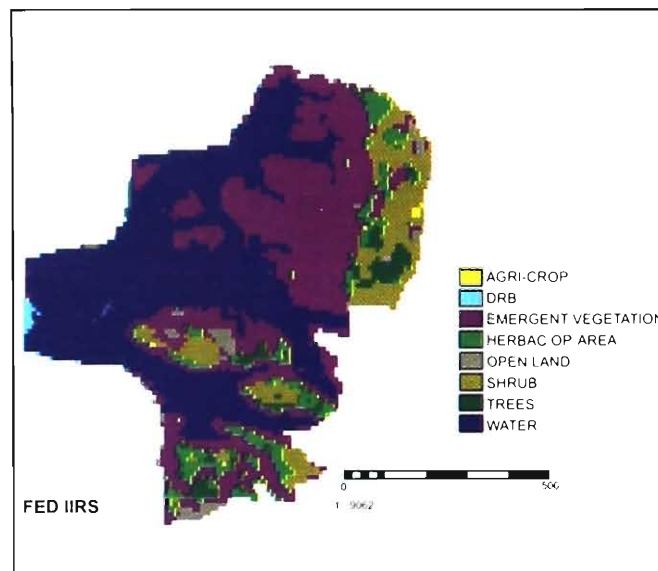


Figure 4. Habitat map of Asan reservoir (1998)

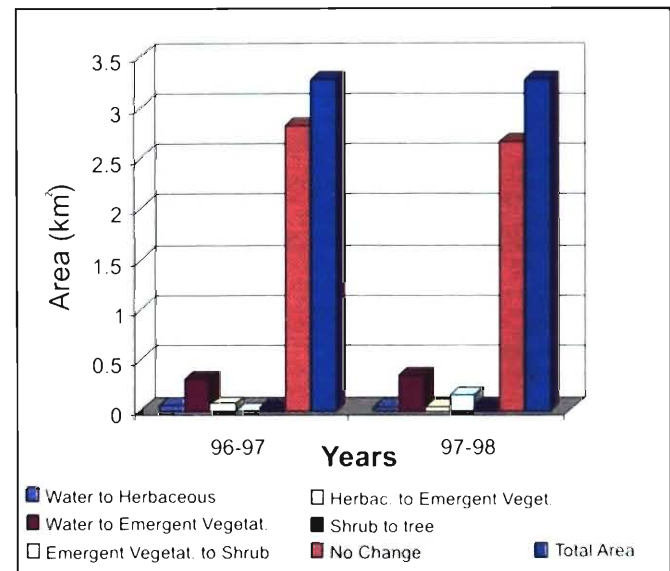


Figure 7. Changes in land cover classes in Asan reservoir during 1996-97 and 1997-98

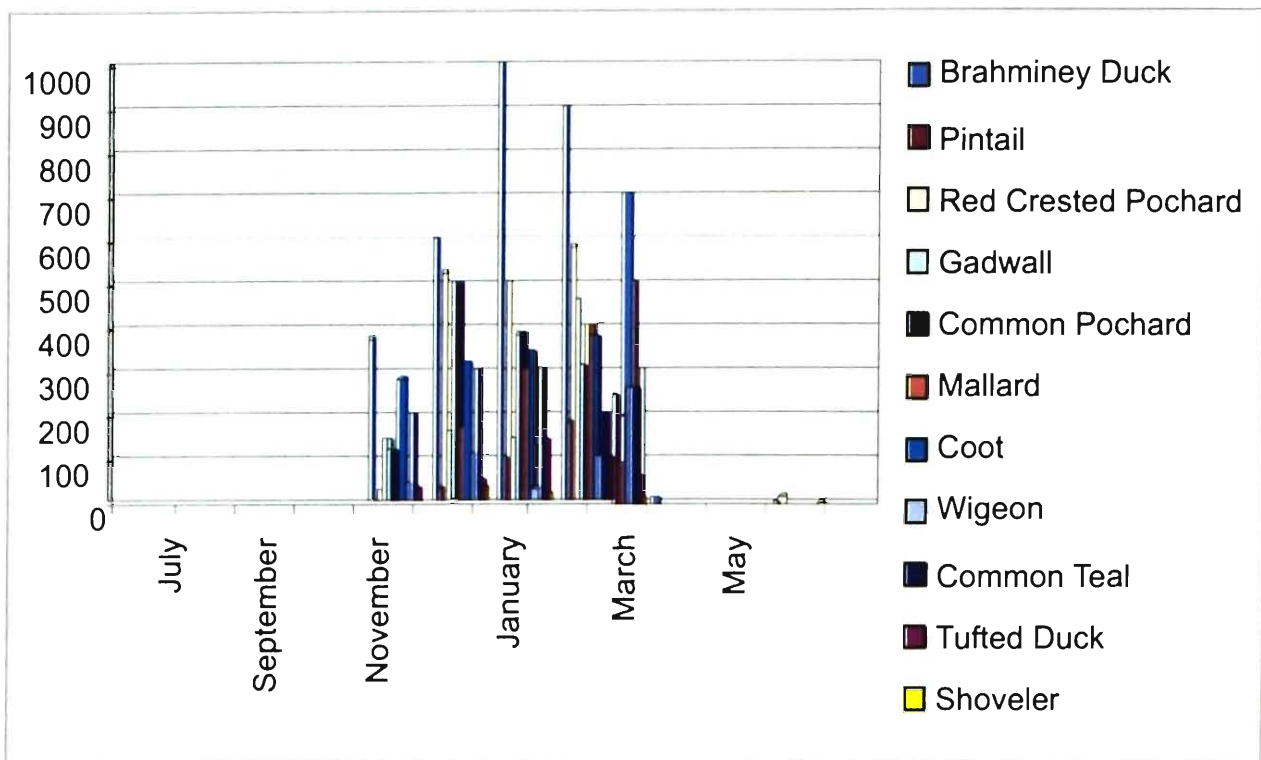


Fig. 8. Monthwise population of commonest migratory waterfowls at Asan reservoir during 1996-98

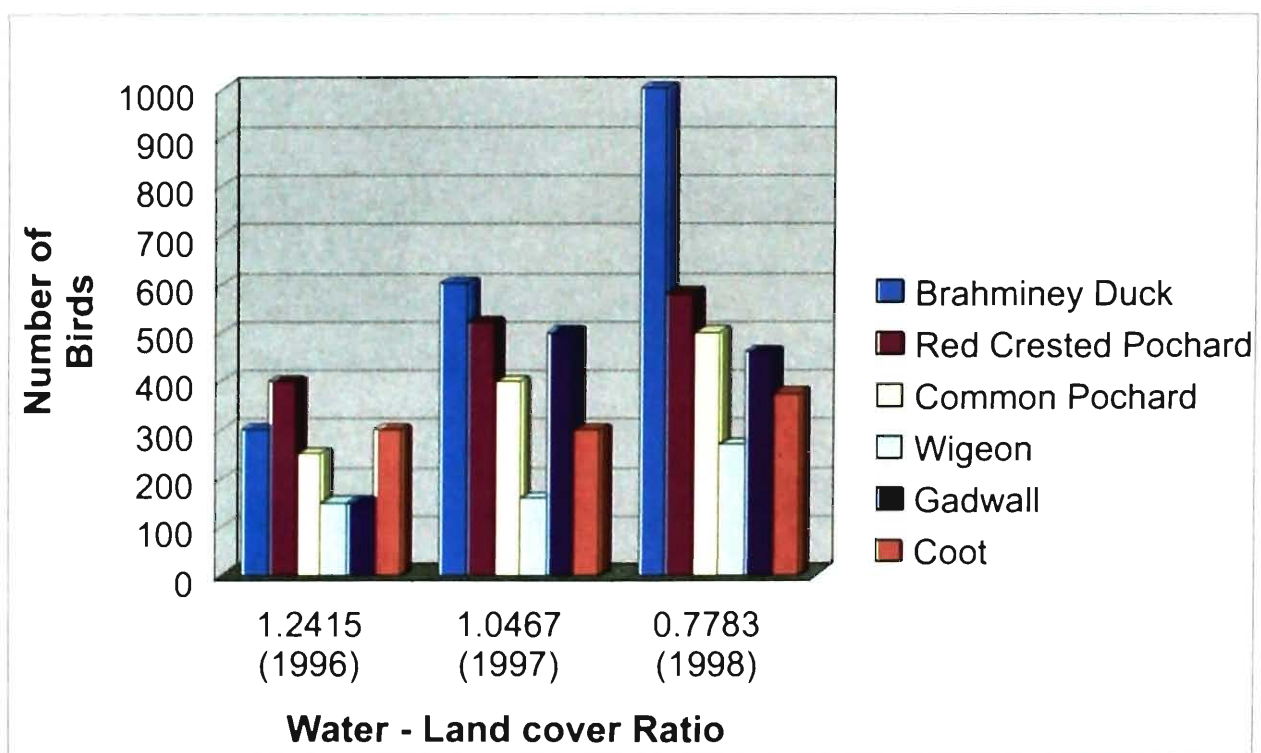


Fig. 9. Correlation between water-landcover ratio and migratory waterfowl population in Asan reservoir

References:

Kumar, A., Porwal, M. C. and Roy, P. S. 2000. Monitoring of Waterfowl Habitat using Remote Sensing Techniques. *Post Conference Proceedings volume, Trends in Geoinformatics Technology and Applications*: 251-263.

Kumar, A., 2000. Assessment and Monitoring of a migratory Waterfowl habitat using Remote Sensing Techniques. *ENVIS News Letter, ZSI, 6(2)*: 4-7.

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