

# HORNBILL

DISCOVER THE LIVING WORLD

OCTOBER-DECEMBER, 2008

*Celebrating 125 years*



**BNHS**  
India

**125**  
Years

**BOMBAY NATURAL HISTORY SOCIETY**





Long-billed Vulture *Gyps indicus*  
(Photo for representation purpose only)

## Critically En-dangered White-backed Vulture

The White-backed Vulture (*Gyps bengalensis*) was till the 1990s widespread occurring from Pakistan east to Arunachal Pradesh, along the Himalayas and throughout the peninsula of southern India as well as Bangladesh, Nepal, Bhutan, Myanmar, Thailand, Laos and Cambodia. It has been recorded from south-east Afghanistan and Iran. However it has seen a drastic, sudden decline and the species is now classified as Critically Endangered by BirdLife International/IUCN (the World Conservation Union). Its population has declined by 99% in the Indian subcontinent.

Sexes alike, the adult plumage is mainly blackish with neck-ruff; back, rump and underwing-coverts white. Juvenile is usually dark brown with prominent white shaft-streaks, especially below. The White-backed Vulture is a scavenger feeding entirely on carrion and usually feeds gregariously. It inhabits open areas, plains as well as light woodland and areas near human habitations. It nests in colonies in tall trees. Both sexes cooperate in nest-building, the male probably supplying most of the nest material, the female repairing and enlarging the nest.

Diclofenac an anti-inflammatory veterinary drug given to cattle has been identified as the major reason of mortality in vultures feeding on livestock. Vultures feeding on cattle treated with diclofenac suffer from renal failure resulting from visceral gout. The current population is the range of 2500-9000 birds. The disappearance of



vultures has raised new problems like disposal of carcasses and increase in number of feral dogs and consequently the incidents of rabies. The Indian government

has banned diclofenac for veterinary use. Efforts to replace diclofenac with suitable alternative drugs like meloxicam are in progress. NPCIL's volunteers have been monitoring the local population of vultures at Rawatbhata Rajasthan site and also working with the local communities to create awareness about the use of Meloxicam.

The Environment Stewardship Programme (ESP) of NPCIL, a voluntary programme, envisages scientific study of bio-diversity, particularly avi-fauna, in the Exclusion Zones (EZs) and the environs of its seven nuclear power stations. EZ is a 1.6km radius area around the centre of nuclear plant. While only a fraction of this area is used for the plant structures, remaining is used for green-beltting. Large numbers of bird species have made EZs their homes. The programme also includes training of local volunteers, public awareness campaigns to sensitize members of public on environment, improving habitat, particularly of avi-fauna, etc.

NPCIL as a responsible corporate citizen believes that these efforts will help in promoting habitat conservation and awareness on the importance of a healthy environment to make the world a better living-place.

Photo: Rajasthan Atomic Power Station, Rawatbhata, Rajasthan

**Nuclear Power Corporation of India Limited**

(A Govt. Of India Enterprise)

Vikram Sarabhai Bhawan, Anushakti Nagar, Mumbai- 400094, <http://www.npcil.nic.in>





# HORNBILL

October-December, 2008



## EXECUTIVE COMMITTEE

### President

Mr. B.G. Deshmukh, IAS (Retd.)

### Vice Presidents

Mrs. Pheroza Godrej

Mrs. D.S. Variava

Mr. Hemendra Kothari

### Honorary Secretary

J.C. Daniel

### Honorary Treasurer

Mr. E.A. Kshirsagar

### Director

Dr. A.R. Rahmani

### Members

Mrs. Sumaira Abdulali

Dr. A.M. Bhagwat

Dr. Ravi Chellam

Mr. Ashish Kothari

Dr. Ashok Kothari

Mr. Debi Goenka

Dr. A.J.T. Johnsingh

Mr. Sunjoy Monga

Mr. Prakash Gole

Ms. Pratibha Pande

Dr. R. Sukumar

The Joint Secretary, Ministry of Environment & Forests, Govt of India  
The Adtl. IG Forests (WL) Ministry of Environment & Forests, Govt of India  
The Director of Archaeology & Museums, Govt of Maharashtra

### Editors

Asad R. Rahmani

Isaac Kehimkar

Vibhuti Dedhia

### Editorial Assistant

Priyanka Iyer

### Consultant Editor

J.C. Daniel

### Layout

V. Gopi Naidu

### Cover Design

V. Gopi Naidu

Published and printed quarterly by J.C. Daniel for the Bombay Natural History Society, Printed at Stusa Mudra Pvt. Ltd., Lower Parel, Mumbai.

Reg. No. RN 35749/79, ISSN 0441-2370.

For more information on the Society and its activities,

write to the Honorary Secretary, Bombay Natural History Society, Dr. Sálím Ali Chowk, S.B. Singh Road, Mumbai 400 001, Maharashtra, India.

Tel.: (91-22) 2282 1811

Fax: (91-22) 2283 7615

E-mail: bnhs@bom4.vsnl.net.in

Website: www.bnhs.org

Views expressed by the contributors in the Hornbill are not necessarily those of the BNHS. Unsolicited articles and photographs, and materials lost or damaged are not our responsibility and no claims will be entertained.

# C O N T E N T S



## Chousingha: A Living Legend

— Koustubh Sharma



## Giants of the Reefs

— Deepak Apte



## The Critically Endangered Forest Owllet

— Girish A. Jathar



## Caecilians: the little known wonders!

— Varad B. Giri



## Mangroves- Nature's Coastguards

— Nishigandha Pednekar



## A Tale of Two Birds

— P. Jegannathan



## Pristine Forests in Metropolitan City

— Krishna Tiwari



## Mysterious Mollusca!!!

— Deepak Apte,  
Dishant Parasharya and  
Bhavik Patel



# C O N T E N T S



62

**Elephants on the Run!**  
— Ranjit Manakadan



68

**Conservation Department  
— the core of the BNHS**  
— Rushikesh Chavan



74

**Marine Protected Areas:  
Need of the Hour**  
— Deepak Apte



79

**Biodiversity  
Conservation through  
Important Bird Areas**  
— M. Zafar ul-Islam



84

**IBA/IBCN: Advocacy  
Initiatives**  
— Anand Chandrashekar



90

**Oh Pulicat!**  
— Ranjit Manakadan



96

**The Natural History  
Collection of the  
BNHS**  
— Varad Giri



106

**Sriharikota - Wilderness  
Regained**  
— Ranjit Manakadan



112

**The Highlands of Nilgiris**  
— Asad R. Rahmani



122

**Partners for Life**  
— S. Balachandran



130

**Tiger Conservation ...  
the challenge ahead!**  
— Sanjay Karkare



138

**Need for Project  
Bustards**  
— Asad R. Rahmani



147

**Race to Save  
Vultures**  
— Asad R. Rahmani



158

**Fragile Beauty!!!**  
— Usha Lachungpa



## EDITORIAL

## BNHS: A proud 125 years

“No one can stop an idea whose time has come.” The eight visionaries who established the Bombay Natural History Society on September 15, 1883, probably never thought that an idea – “to collect and exchange natural history information” – would result in a Society that would not only survive 125 years, but grow into one of the most important natural history organisations in the world. They must definitely not have thought that the BNHS, which mostly consisted of hunters and royalty at the time of its establishment, would within 50 years of its establishment talk about conservation (although in the context of better *shikar*), and by the time it would a little older, it would attract only individuals whose main concern would be to save the natural world.

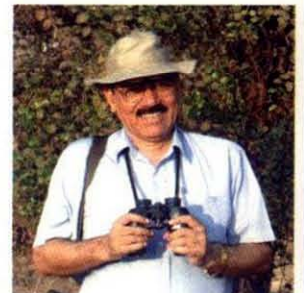
Another interesting development over 125 years was that from being mainly a natural history organisation of amateurs, it turned ‘professional’. Although we still have many amateurs or ‘wildlife enthusiasts’, most of BNHS research projects are executed by qualified professionals, as you will read in this special issue of *Hornbill*.

I think the *raison d’être* of BNHS is its vast and professionally curated collection. Soon after establishment, the members started bringing in specimens and the Society started expanding to keep these specimens. The 18th and 19th centuries, and also the early 20th century were the age of exploration, hunting and collection. Anything exotic and new had to be collected and deposited, either in a private collection or in a museum. The age of specimen collection is now more or less over (except for the so-called lower form of taxa); we are now not adding much to the collection. Varad Giri, the present Curator, gives a good account of what treasures the BNHS holds in its chest, or museum cabinets, to be more prosaic, in his article ‘The Natural History Collection of BNHS’.

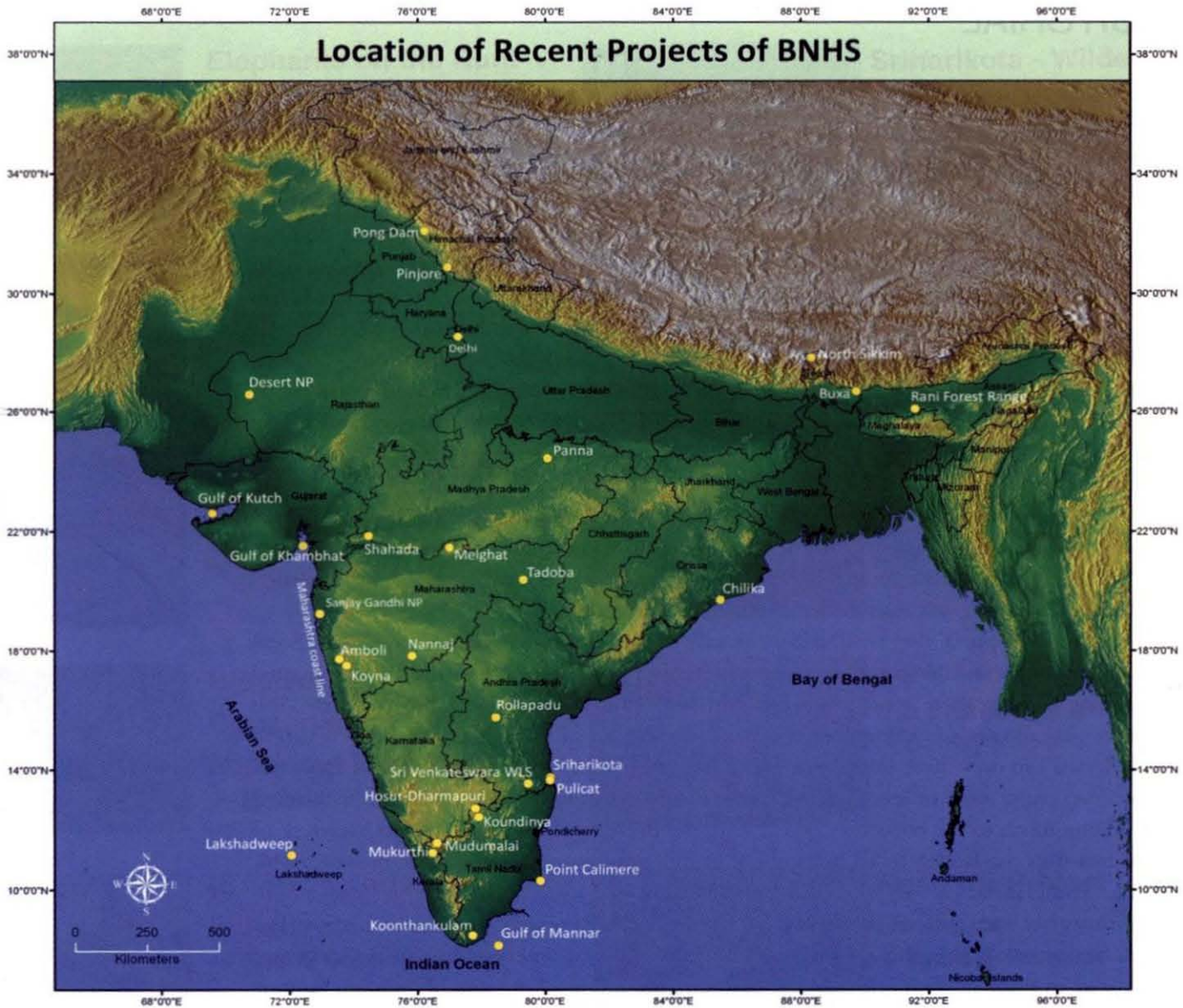
Another strength of the BNHS is its research. Research on natural history and conservation issues gives BNHS the aura and respect that it deserves. BNHS also does not believe in working only on glamorous species and lamenting all the time about their demise. As you will read in this special issue, we work from invertebrates to the largest vertebrates.

Our major focus for research is threatened species, both terrestrial and underwater. There is a lovely account by Jeganathan ‘A Tale of Two birds’ on how he feels about the critically endangered Jerdon’s Courser and endangered Great Indian Bustard. Giant Clam is a species not many conservationists would have heard about, but BNHS scientists are working on this species in the famous Lakshadweep islands. Two years ago, Deepak Apte, Assistant Director, and the Principal Investigator of Project Giant Clam took me to his exotic study area. Snorkeling with the help of his two assistants revealed a whole new magnificent world of marine life to me. You have to be an imaginative poet and craftsman of words to fully describe the beauty of a tropical reef ecosystem. But do we have enough words in our dictionaries to describe the natural beauty in our world. The maxim that a picture speaks a thousand words is clearly understood when you turn to pages 24-25, 40-41, 72-73 etc.

The lovely caecilians were unknown animals, at least amongst conservationists and naturalists before Varad Giri made them popular. His passionate article about these beautiful animals will delight the readers of *Hornbill*, and increase the admirers of these neglected







taxa. Varad not only spends his time upturning stones and boulders to locate these limless amphibians, but also spends time in museums unearthing cryptic species. Till now he has described five species new to science. He is living up to his job of being a Curator of one of the best maintained natural history museum collection in South Asia.

It is rightly said that the best way to protect a species is to protect its habitat. Most of BNHS research leads to habitat protection, whether it is the neglected grasslands of Naliya or the thin-strip of Koundinya forests or the vast Pulicat lake in Andhra Pradesh. The Important Bird Areas programme, in collaboration with BirdLife International and Royal Society for the Protection of Birds, is a fine example BNHSs international cooperation to save habitats. Till now, 466 IBAs have been identified in India by BNHS, mostly in collaboration with members of BNHS and Indian Bird Conservation Network. Read Zafar's article on how biodiversity conservation can be achieved through the IBA approach. Almost 200 IBAs are outside the protected area systems, and even many IBAs within the PAs system are not fully safe. How can one give them long-term protection is the job of successful advocacy.



That is what Anand Chandrasekhar is doing for the last one year, and learning that it is not easy to convince a dodgy bureaucrat. But the fight to save nature by BNHS goes on.

In a nation of more than a billion people (and still growing!), how can you neglect Man? Read the article by Sanjay Karkare and how we are making a difference in one of the best tiger areas in the world. As the article admit, there are many challenges ahead, but what is the use of an organisation that cannot take challenges.

We also work in cooperation with government agencies. A shining example is our work during the last 30 years in Sriharikota, in collaboration with the Indian Space Research Organisation. BNHS has documented the biodiversity of this southern tropical dry forest, miraculously saved and restored, because ISRO decided to have its space launching station there. Ranjit Manakdan's article shows how one person's vision could not only take our country to new heights (space), but also restore the natural vegetation that was destroyed due to human over-use. Prof. Satish Dhawan was not only a brilliant space scientist, but also a lover of nature. Fortunately, his legacy is being carried forward by his predecessors at ISRO.

Another neglected southern coastal tropical forest is being protected in the Point Calimere Wildlife Sanctuary, where Balachandran, one of the best bird ringers in India, and a gritty field worker, has established a 'Bird Migration Study Centre'. His interesting article tells how he devoted all his life to his feathered friends, much to the chagrin of his wife. From the tropical, humid and salty forests of Point Calimere, the readers can go to the frosty north Sikkim where Usha Lachungpa keeps on fighting for the living rights of marmots, Alpine Accentor, Tibetan Argali and local *dokpas*. Her frequent trips to the frontier border areas in the remote north Sikkim, and interactions with the army and para-military forces leaves them convinced that defending ecological security is as important as national security. Twice I went to her study area and left transfixed with the beauty of the alpine meadows and snow peaks, notwithstanding the horrible sight of five semi-domestic dogs digging out an innocent marmot baby. The dying cries of baby marmot gave me the determination to fight the menace of stray dogs everywhere.

Like the biodiversity of a forest, an organisation is also made of different individuals – a whole 'ecosystem of human beings', each contributing in his/her own way to keep an organisation running. It was not easy to get the articles from our scientists, especially when some believe that climbing a tree to watch a Forest Owlet nest or diving underwater to collect molluscs is much more interesting than writing an article. With dogged determination Vibhuti, Head of the Publications Department and her chirpy assistant Priyanka chased the stubborn scientists to bring their field observations in words. I think both have done a tremendous job in compiling the articles for this special issue of *Hornbill*. The talented Gopi Naidu, Designer, who is an asset to the Society like many others, spent long hours to design this issue. The results are for everyone to see. I hope this special issue will become a collectors' item and will be admired by the future generations when the BNHS is 150 year old. Most seniors at the BNHS may not be there, but the young and enthusiastic younger staff will ensure that the issue then is as good, if not better, than this issue of the *Hornbill*.

I have not given a peek into all the articles in this special issue as I believe in the dictum "To become boring, say everything."



# Chousingha: A Living Legend

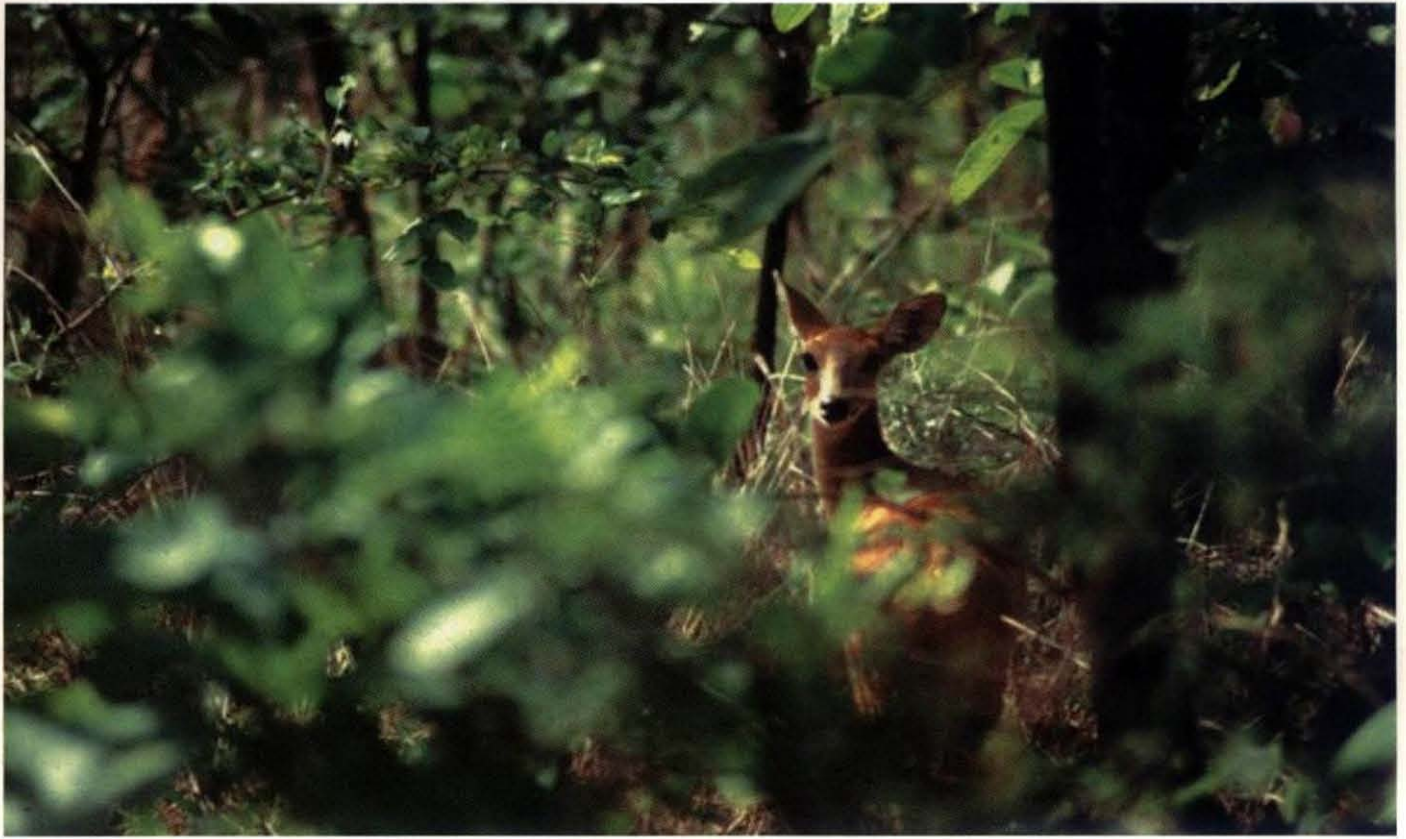
Text and Photographs: Koustubh Sharma

## About the Project

The Four-horned Antelope project was funded by the Department of Science and Technology (DST), Government of India; the field work was started in November 2002. In 2005, the study was extended for another year after receiving financial support from the Madhya Pradesh State Biodiversity Board. The Project was aimed at studying the ecology and for a better understanding of the habitat preferences, demography, population status and distribution, behaviour and some evolutionary traits of the Chousingha.







It was an afternoon in February, the trees were shedding their leaves and the grasslands were turning golden near the cliff of Hinauta plateau of Panna. I was standing on the rear seat of an open hooded gypsy, along with our field assistant, Madan, and looking around. We were counting animals using roads as transects. As soon as our car turned with the bending forest road, we saw a Leopard walking about 50 m ahead of us on the forest road. I was visibly excited as it was more difficult to see a Leopard than a Tiger in Panna, given the status of the latter. In no time, Madan whispered into my ears, "Sir, Chousingha!" I shrugged at him and said, "Don't you see, it's not a Chousingha, it's a Leopard!" Understanding my irritation, he quickly pointed his finger towards the Leopard, missing it by a few degrees. I looked carefully and quietly pulled out my binoculars. To my utter surprise, it was a handsome male Chousingha with two distinct pairs of horns. The Chousingha (Chou-four, singha-horn) was approximately six metres from the Leopard. It is anybody's

guess that a Chousingha is good meal for a Leopard, but interestingly, neither did the Chousingha move, nor did the Leopard spot it. The Chousingha did not twitch an ear; it stood partially protected by a small *Ziziphus* bush until the Leopard walked past it. Once the Leopard had walked past the 'frozen' Chousingha, we slowly started following the Leopard in our vehicle. We stopped as we reached the Chousingha, and in a fraction of a second it broke into a sprint and vanished into the golden grasses. It was the first time during my three-year study that I had seen a Chousingha use its anti-predatory skills in front of a real predator, a leopard.

I was working as a researcher for the BNHS and was studying the Chousingha or Four-horned Antelope, the only antelope with four distinct horns, for my Ph.D. It was a dream come true for me when I was offered this research project that was funded by the Department of Science and Technology, Government of India, under the supervision of Dr. Asad R. Rahmani, Director, BNHS. Reported as data deficient by the International

Male Chousingha has two fully developed pairs of horns





Union for Conservation of Nature (IUCN), the Chousingha was never studied before apart from some natural history observations and some short term investigations. Almost everybody I met after joining this project said that it was going to be difficult as one does not get to see a Chousingha easily. The more people I met, the more determined I got, largely crediting it to the immense support and faith I had from my supervisor. We were looking at various aspects, starting from basic ecological questions such as population sizes, demography, foraging, to more specialised questions, such as habitat use, behaviour, and my favourite, the significance of the four horns. The forest department of Madhya Pradesh was very supportive and provided us with immediate permission to study the species in Panna Tiger Reserve, a tropical dry forest situated in north Madhya Pradesh, near Khajuraho. We were so happy to work at that site that we could not say no. The reason: Dr. Raghunandan Chundawat, another renowned scientist, was studying Tigers in the same protected area. We foresaw an immense potential to work together considering his experience and great understanding of natural history and science. Not only was Panna a great site to see the

Chousingha, it used to be a fantastic place to do wildlife research considering the experienced field assistants one would get to help at every level of the research. I was fortunate to have got an experienced assistant, Uttam, who had lived in the forest ever since he was born. Uttam could not read or write, but had tremendous knowledge about wild animals and vegetation. Apart from being good in the field, he was a great cook, something that ensured that he was an important part of our research project, throughout.

The Chousingha is a small, golden brown antelope, barely weighing about 20 kg, averaging about 55-60 cm at shoulder height. While the male and female cannot be differentiated by colour, the adult male sports four small, smooth, and dagger-like horns and the female is hornless. Living solitary, the Chousingha is found nowhere in high abundance. Its unique four horns probably intrigued the taxonomists so much that they named it on the basis of these. Known scientifically as *Tetracerus quadricornis*, where both terms mean four horns, the Chousingha is in fact a close cousin of the much larger Nilgai *Boselaphus tragocamelus*. Both of these species are native to the Indian

The (male) Nilgai is more than ten times the size of a Chousingha, its closest relative ▶







subcontinent and have features that are similar to the primitive antelopes. They are often termed as the most ancient antelopes living today.

Being a small animal, the amount of food that a Chousingha can eat is limited. At the same time, small size means high metabolism, and more need for nutrition. As a herbivore, the only sources of nutrition rich food for a Chousingha are fresh green browse, fruits and flowers. However, since the Chousingha is exclusively found in dry deciduous forests across its range, access to green leaves and fresh browse is limited only to the monsoon as the green leaves dry up fast to prevent water loss due to transpiration in the harsh dry seasons. So, the only remaining sources of nutrition rich food available to a Chousingha in seasons following the monsoon are fruits and flowers of the various species of trees that grow in these dry deciduous forests. But there is another twist here; none of the trees provide fruits or flowers throughout the year. The bloom of a particular tree lasts about a month, or may be less. But, if there are different tree

species blooming in different seasons, a Chousingha could be happy as it will have one or more trees providing it the nutrition rich food on any given day. So, while a Chousingha may live in dry forests, it does not thrive in those which have poor diversity, and hence fewer seasons with food availability. While this logic defines their distribution, it, along with their anti-predatory strategies, also throws some light on their low densities and solitary living. High nutrition food is not always in high abundance, and having competitors while foraging such scarce resources may never be a good idea. Moreover, had the Chousingha frozen near the Leopard been in a group, there was no way the Leopard could have missed seeing it, and hence, the strategy of hiding rather than running would have never succeeded.

Chousingha are never seen in large herds. Females, at most with young ones or with a male are what the associations would usually comprise of. Only after reaching maturity at the age of about 12-14 months, males start developing their second pair of horns. From

▲  
Chital males sparring –  
Chousingha populations  
seem to be adversely  
affected by rapid growth  
in Chital population







▲  
Chinkara, despite being nearly similar in size and weight to the Chousingha, occupies open terrain with low grass, a niche nearly exclusive from the latter

small knobs to dagger-like horns, usually smaller than the rear ones, these horns are a clear indication of the age and fitness of a male. Chousingha drinks frequently, though the frequency may vary across seasons and availability of fluids in the food (e.g. very few animals drink water during the *Mabua* flowering season when these yellow-white juicy flowers lie on the forest floor, to be eaten by a battery of species, including the Chousingha). They defecate repeatedly at the same spots, thereby making middens of dung. These middens are defecated upon by not only male, female and fawns, but also by other species such as the Nilgai and Chinkara. Possibly used for communication, middens with Chousingha fecal pellets are a confirmatory evidence, given correct identification, of their presence. They also seemingly communicate by marking twigs and thorns by their pre-orbital glands located just a few centimetres in front of the eyes.

The main predators of this species are the Leopard, Dhole, Golden Jackal and Tiger, apart from humans, who do not mind

occasionally poaching the animal for little amount of food. Since Chousingha prefers to be inconspicuous against a predator, it is rare to hear the alarm calls. However, occasionally one may hear the alarm call, which is more like a hoarse honking — a call between that of a Chital and a Nilgai. When inevitable, Chousingha does run pretty fast. It usually flees with a few conspicuous gaits followed by inconspicuous movements in thick grass or understorey, again, possibly attempting to be out of sight of the predator.

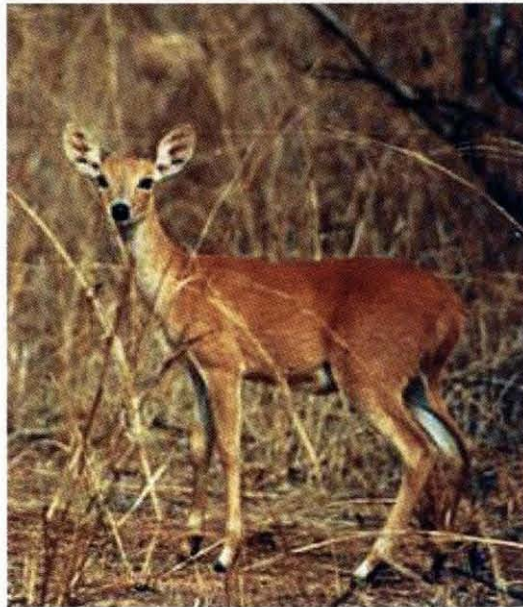
It was not long after having understood the basic ecology of the species that we started exploring the possibilities of logical theories that would explain this extra bit of energy spent in growing an additional pair of horns. We studied various theories that dealt with evolution of horns in ungulates, and discussed with many scientists across the world regarding the same. It was an exciting bit of an exercise to compare the Chousingha's natural history and ecology with many other horned bovids in order to justify its additional set of horns. While we had






ample empirical data to suggest that the four horns are an indicator of age and fitness, there was a clear understanding that these served as deterrent to conspecific males and attractant to conspecific females. The same is true for all of the other horned species, such as the Blackbuck or Chinkara with significant keratin accessories. However, considering the tendency of the Chousingha where it prefers to hide rather than run, an audacious structure on the head would possibly compromise its anti-predatory skills of hiding. This is what could have led the Chousingha to evolve with smaller horns, but an additional pair balanced the loss of size as display. The Nilgai, closest relative of the Chousingha, also has small horns, but uses more of an open terrain. The fit and strong males have darker body colour, which, if adapted by a Chousingha, would again put it in a tight spot by making it more visible! Although there are a few caveats in this theory, it best explained the additional bit of energy spent by a male on developing a new pair of horns at maturity.

The Chousingha is distributed across the dry deciduous forests of India and southern Nepal. The Gangetic Plains and the grasslands of central India, including the deserts in the west have never recorded this species even historically. Its stronghold is in central and southern India where the species would live almost exclusively in the dry tropical forest types as against other forest types. Habitat, comprising of a forest with high diversity, moderately high grasses and understorey, low disturbance and good availability of water is crucial for the survival of this species. From foraging requirements to avoiding predators, Chousingha is extremely sensitive to habitat alterations, and is often amongst the first ones to be affected by these. From direct habitat alterations by anthropogenic activities to indirect ones by dominance of specific species such as Chital, the changes influence their populations dramatically. In a changing



Male Chousingha fawns start developing their first pair of horns at an early age of a couple of months. The second pair grows later at an age of nearly 12-14 months

world with fragmented habitats and small protected areas, it becomes mandatory to have specific conservation goals for these species. 



Koustubh Sharma is currently working with the International Snow Leopard Trust as Regional Field Biologist after studying the Chousingha in Panna Tiger Reserve for four years for his Ph.D.



▲  
Male and Female Chousingha are similar in size and color. The only difference between the two sexes is absence of horns in the females



# Giants of the Reefs

Text and Photographs: Deepak Apte

Project Giant Clam was started in 2004 with the aim to conserve Giant Clams through community participation. The BNHS, in collaboration with LEAD International, has successfully completed phase I of Project Giant Clam with financial support from Darwin Initiative, United Kingdom. The phase II of this project is ongoing and is funded by the Whitley Fund for Nature and HSBC.

Giant Clam





Most children, in fact even adults, are fascinated as to what is contained within a clam, even the tiny dead ones that we can collect off the shore. These fascinating organisms, that form a part of almost every child's life, range from the size of 1 mm to 1.2 m. Most clams, excluding mussels, oysters and Giant Clams, burrow into sand and filter-feed.

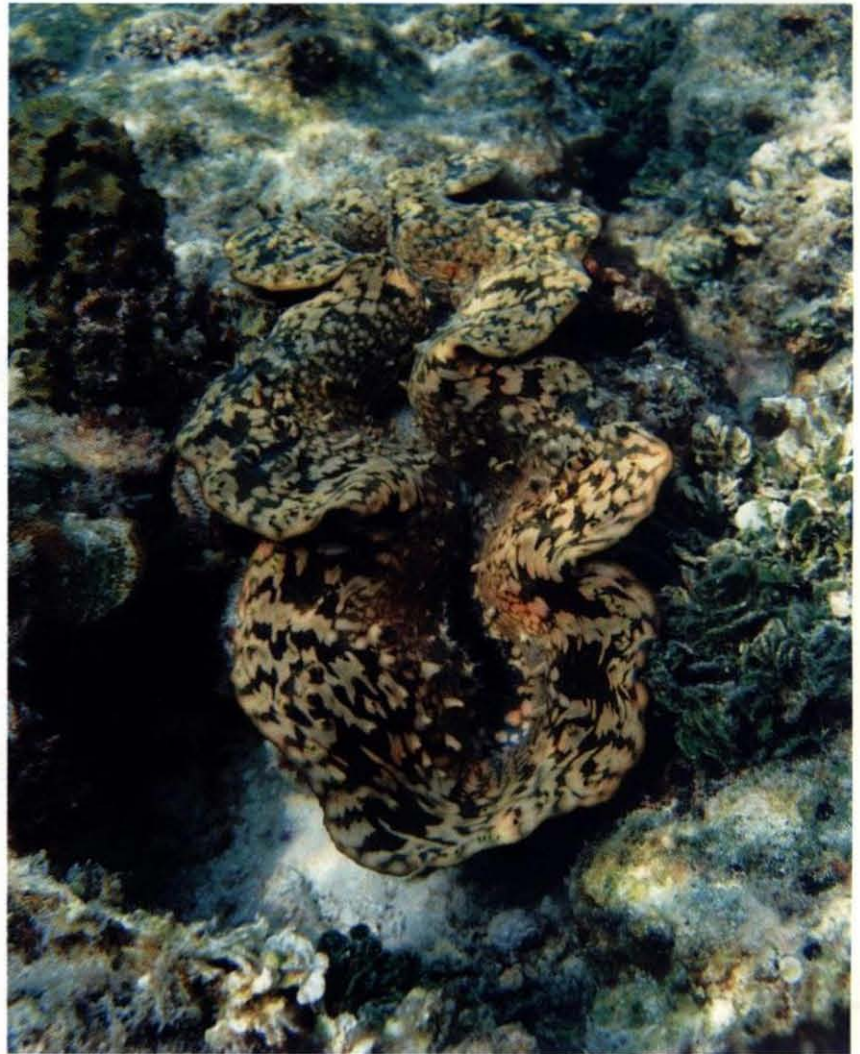
Giant Clams have mystified people with their remarkable size and fluorescent mantle. They may not be as charismatic as the big cats, but play an important role in a reef ecosystem. With a lifespan of over 100 years they are the symbols of reef health.

Very little was known about Giant Clam populations in India, until the BNHS undertook a research project on Giant Clams titled 'Conserving Giant Clams through a community reserve in the Lakshadweep Island'. The study provided valuable insight to the Giant Clam population in Lakshadweep and its conservation issues. Giant Clams are low density species in Lakshadweep, especially in Kadmat, Amini and Minicoy. Herbivorous fish highly influence recruitment of Giant Clams, and thus reef fishing can influence clam populations. Such and many other findings are now helpful in monitoring and restoring the relic populations in Lakshadweep.

### What are Giant Clams?

Giant Clams are majestic animals that belong to a group of animals commonly called as bivalves (animals having two valves joined by a hinge). These boneless animals belong to Phylum Mollusca (soft bodied animals), and are commonly seen in tropical reefs in shallow waters.

Giant Clams are impressive in many ways. They can grow over a metre long and are the largest living molluscs. They are known to live for more than 100 years. These animals have developed the ability to cultivate plant in their body tissue (called as Zooxanthellae, an unicellular algae), demonstrating an unusual phenomenon of



endosymbiosis (one symbiotic organism living inside another). Endosymbiosis can be seen in many animal species; Giant Clams are unique because they have improved this strategy significantly. In contrast to other animals, they cultivate zooxanthellae in a special circulatory system, thus, keeping higher number of symbionts per square unit.

The most remarkable feature of a Giant Clam is its fluorescent and colourful mantle, which on close observation reveals tiny iridophores – a very basic adaptation of eyes, which can only sense light. There is no explanation as to why a Giant Clam mantle shows such colour variation, a reason why they are most sought after molluscs in marine aquarium trade.

▲  
The need for such a wide range in mantle-colour is still unclear





Giant Clams are fixed to a solid substrate, and have therefore evolved a number of morphological and physiological adaptations such as 'broadcast spawning', i.e. release of eggs and sperms in open water. Giant Clams like most molluscs are 'simultaneous hermaphrodites' – a type of hermaphrodite which has both male and female organs, and

clam.

To compensate the high mortality of larval life, clams produce enormously large number of eggs and sperms, more than 500 million eggs per clam.

Giant Clams require specific substrate for anchorage. *Tridacna maxima* and *T. crocea* prefer to anchor on two species of massive corals



Clams cannot anchor on bleached corals

is able to produce both sperm and eggs at the same time. Such an organism is also able to fertilize its eggs with its own sperm (self-fertilization). However, as self fertilization is not preferred in nature, clams staying in colonies have evolved synchronised spawning. This is achieved by a Spawning Inducing Substance (SIS) which prevents clams from releasing sperms until such time that all clams complete release of eggs; decrease in concentration of SIS stimulates release of sperms, thereby reducing the probability of self-fertilization. Fertilization takes place in open water and is followed by a planktonic larval stage. The larvae (veligers) swim and feed in the water column until they are sufficiently developed to settle on a suitable substrate, and begin their adult life as a sessile

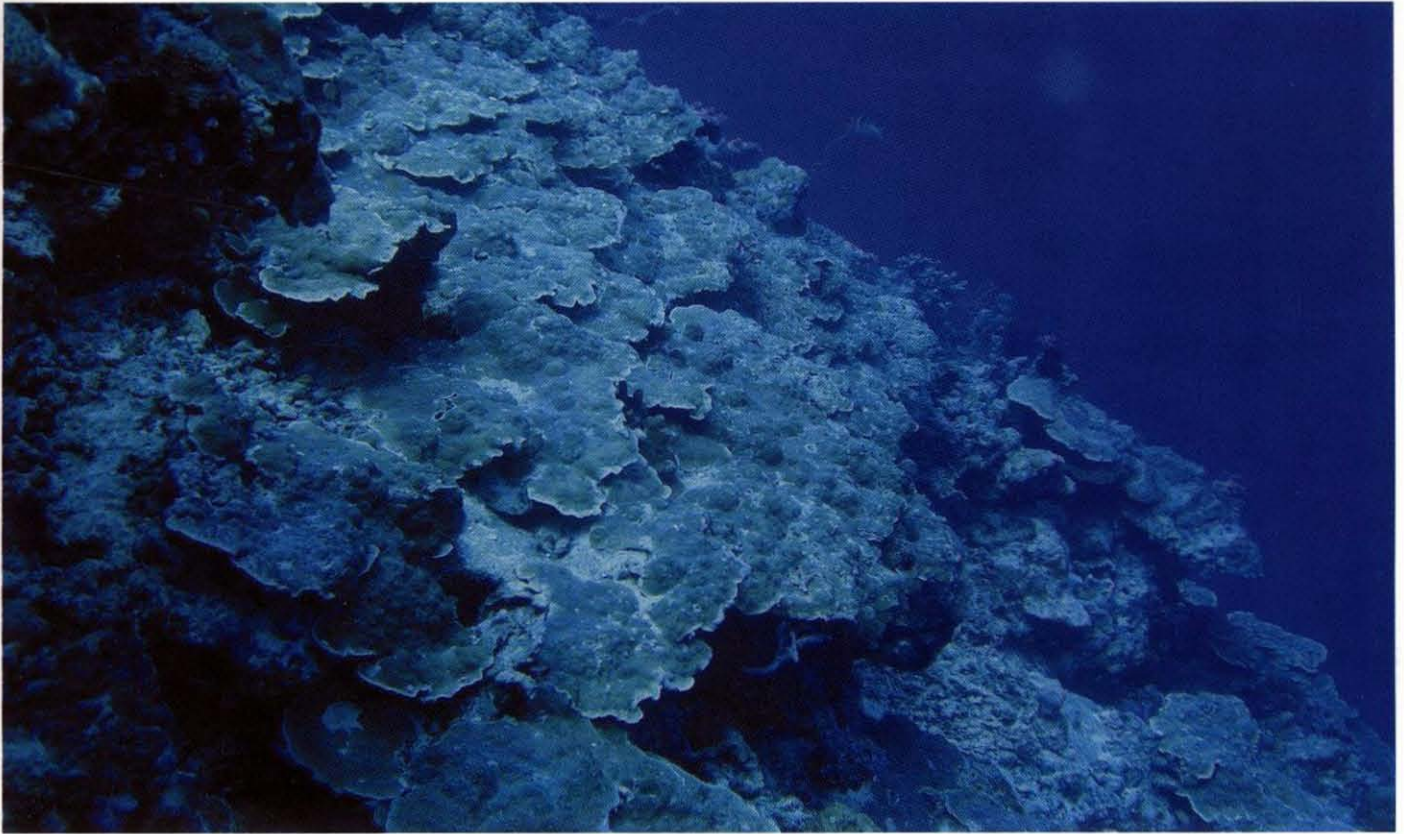
– *Porites lutea* and *Porites solida*. Interestingly, Giant Clams occupy a specific niche on a coral reef. They avoid growing near wave break or too close to sea bed as high wave actions, especially during monsoon, can easily dislodge them from their anchor. They avoid proximity to the sea bed also as they are filter feeders and sand can choke a Clam to death.

### Myth and Science

In the western world, Giant Clams remain as lore in adventure stories. Several horror movies and novels have depicted these animals as dangerous beasts ambushing divers, though there is little truth in such stories. The myth is mainly due to the large size these animals attain and freak accidents, due to unintentional over-stepping or uncalled







for adventures by divers. These large animals have powerful adductor muscle (muscles that keep the valves together), and heavy valves that can seriously damage fingers or foot. This is mainly due to the natural tendency of the Clam to close its valves at the slightest of touch on its mantle. The best way to avoid such freak accidents is to watch a Clam from a distance and not to touch its mantle. These animals are purely plankton feeders (feed on microscopic animals and plants by filter feeding), and have no taste for human flesh!

### Species Diversity

Nine species of Giant Clams are known world over. A new species from Red Sea was added to the list as recently as August 2008 taking the total to ten. These are:

- Small Giant Clam *Tridacna maxima*
- Scaly Giant Clam *Tridacna squamosa*
- Smooth or Southern Giant Clam *Tridacna derasa*
- Crocus or Boring Giant Clam *Tridacna*

*crocea*

- Giant Clam *Tridacna gigas*
- *Tridacna tevoroa*
- *Tridacna rosewateri*
- Horse's Hoof or Strawberry Giant Clam *Hippopus Hippopus*
- China Clam *Hippopus porcellanus*
- *Tridacna costata* (from Red Sea)

Of the ten species, four are known to occur in India; *Tridacna costata* may also occur in Indian waters, but this needs to be confirmed. *Tridacna maxima* is one of the most common among the four followed by *Tridacna crocea*, *Tridacna squamosa* and *Hippopus hippopus*. *Hippopus hippopus* is known to be restricted to only Nicobar Islands; not much information is available on it.

### Threats

*Harvesting for food:* Giant clams are considered delicacy in many parts, especially the South-east, hence their populations have crashed beyond recovery in heavily harvested areas.



Few Giant Clams are found in open reef system







*Tridacna squamosa* is one of the nine species of Giant Clams found across the world

*Harvesting for medicine:* Chinese pay a fortune for the Giant Clam adductor muscle, which is considered an aphrodisiac.

*Harvesting as souvenirs:* Empty Giant Clam shells are traded in large numbers worldwide as souvenirs. Large species like *Tridacna gigas* are used as bath tubs for children. Internationally, Giant Clams are used commercially as aquarium specimens, shells and shellcraft.

*Habitat loss:* Fast deterioration of coral reefs is one of the important causes of Giant Clam decline. Polluted waters are also responsible for its decline.

*Poor densities of adult clams:* If adult clam densities fall below a certain number (for Lakshadweep it is between 60-100 adult clam/ha) the chances of recruitment of juveniles becomes poor.

*Absence of habitat:* Larvae of Giant Clams are free floating and drift with water currents up to 70 hours. If a suitable habitat or substrate is not available for anchorage on the sea floor the larvae will die.

*Predation:* Though adult clams are less vulnerable to predation, there are several natural predators of juvenile Giant Clams.

Shells of Pyramidellidae or Muricidae (rock shells) bore hole in juvenile clams and suck out juices from its flesh, killing them.

*Bleaching:* Giant Clam needs two important environmental conditions to maintain the zooxanthellae on its mantle: a) shallow waters which would allow enough sunlight to the zooxanthellae for photosynthesis, and b) water temperature regimes of 18-25 degree celsius for optimal growth of zooxanthellae. In the event of temperature rise (mainly due to global warming, a recent global threat), the zooxanthellae will die out in turn killing the Giant Clam.

*Accidental killing:* Sometimes fishing in shallow reefs can uproot Giant Clams causing mortality. There are instances of Giant Clam deaths due to boat anchors.

*Late maturity:* Giant Clams reach maturity late (over 20 years and some species over 30 years). This fact coupled with the harvesting of juveniles is a critical factor for their large scale decline in many parts of the world. Juvenile clams are much more beautiful with intricate scales on the valves, and thus most sought after as souvenirs.





**Pollution:** Giant Clams are sensitive to heavy metals; high concentrations of heavy metals can be fatal.

**Diseases:** Clam mortality is known to occur due to bacterial infections, flatworms and boring sponges.

### Protection status of Giant Clams National

Three species of Giant Clams are protected in India under Schedule I of Wildlife (Protection) Act, 1972. Thus, any use of Clams dead or alive is an offence.

### International CITES

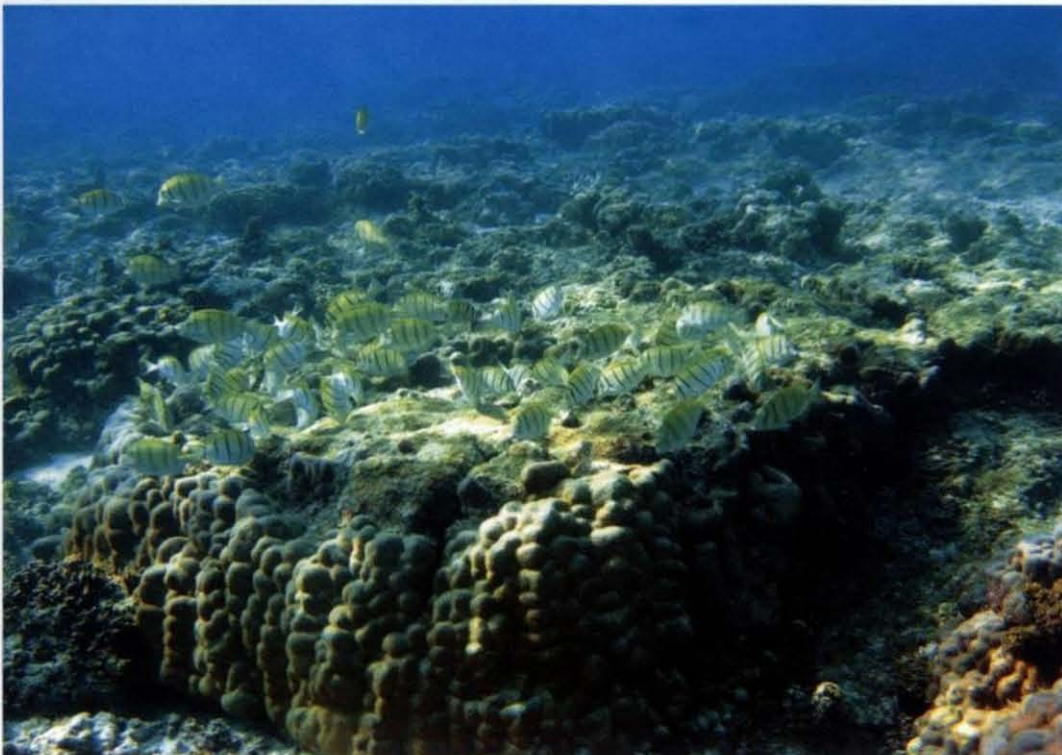
Giant Clams have been listed in CITES Appendix II since 1985. Species listed in Appendix II are deemed not currently threatened with extinction, but are at risk of becoming so unless trade is regulated. International trade is permitted in CITES Appendix II listed species provided appropriate export permits are issued. All living or dead clams, including all readily recognisable parts and derivatives, are subject to the treaty's provisions for Appendix II species.

### How are Indian Giant Clam populations doing?

Though there is no information on Clams from the Andaman and Nicobar group of Islands, in Lakshadweep *Tridacna maxima* is a very low density species. Among Lakshadweep Islands Agatti had the highest Clam density: 227.84 clams/ha which declined to 188.40 clams/ha, while Amini had the lowest density of 20.84 clams/ha which has declined to 13.66 clams/ha. The population models for Kavaratti and Agatti suggest a predicted decline of 35 per cent over the next 10 years. Bangaram and Tinnakara populations, are however, comparatively stable.

### Project Giant Clam

BNHS established a field station at Lakshadweep Is. in 2004 to study the ecology, biology and conservation of Giant Clams. We have successfully completed phase I of Project Giant Clam in collaboration with LEAD International, with financial support from Darwin Initiative, United Kingdom. Project Giant Clam aims to conserve Giant Clams through community participation. The proposed Agatti Conservation Reserve,



◀ Giant Clams require specific substrate like *Porites* sp. for anchorage







Researchers making transects which are vital for research

which is a culmination of four-year work of the BNHS at Lakshadweep Is., will be India's first marine conservation reserve. The Project has paved way for new approaches in conservation of marine biodiversity. The unanimous support of the local community further confirms the idea that by involving communities right from the inception of the Project can yield fruitful results and help gain community confidence. The Project findings can be seen at [www.lead.org](http://www.lead.org).

The phase II of this project is also being handled by the BNHS and is funded by the Whitley Fund for Nature and HSBC will go on for about three years. The phase II studies will be a continuation of phase I, and will include a few more islands that were not part of phase I.

In the end I must say, with countless dives in several islands in Lakshadweep, every time I descend down the reef, I encounter something I have not seen earlier. And it is

#### What is unique about Giant Clams?

- Found exclusively in Tropical Reefs
- Grow in shallow waters (maximum depth up to 40 m)
- Permanently anchored on a coral substrate
- Symbiotic association with zooxanthellae
- Synchronised mode of spawning
- Long life (over 100 years)
- Short larval life (less than 70 hours)
- Slower growth rate

this beautiful bounty of nature that instills a sense of responsibility we owe to this natural realm. Whether it is a Giant Clam or a tiny sea slug, their survival strategies give me some of the best lessons on natural history. 🐚



Deepak Apte is currently Assistant Director, BNHS and the Principal Scientist, Project Giant Clam.



# The Critically Endangered Forest Owlet

Text: Girish A. Jathar

## About the Project

The Forest Owlet Project was started in 2001. The main Project was funded by Ministry of Environment and Forests, Government of India, and partially funded by the Smithsonian Institute and Justice Peter Helm Foundation. Its main aim was to collect baseline information on status and distribution, habitat utilisation, breeding biology, behavioural ecology, threat and conservation issues with regards to the Forest Owlet and to provide recommendations for effective conservation of this elusive bird.





GIRISH JATHAR



The Forest Owllet is one of the few diurnal Indian owls

It was a wet morning of June 9, 2004; our project on the critically endangered Forest Owllet was drawing to an end. We drove our skidding four-wheeler with great difficulty in the rugged terrain of the Melghat Tiger Reserve. On seeing a huge swarm of termites, we stopped the vehicle in an open patch of the forest. And there, feasting on the alates (winged termite), were many drongos, treepies, rollers and flycatchers. I stepped down on the mud track and started scanning the trees as it is usual to find Forest Owllets near termite swarms. Suddenly, a medium sized brown grey bird swooped down and caught one of the alates, it was none other than the Forest Owllet. After a few minutes we located another Owllet; a part of the pair. This was the 25th pair of Forest Owllets in Melghat Tiger Reserve for 2004. Our survey ended with a lot of questions in our mind about the life of this elusive bird.

The Forest Owllet *Heteroglaux blewitti* was considered extinct until it was rediscovered after 113 years by eminent American ornithologists Ben King and Pamela Rasmussen on November 25, 1997 in



Toranmal Reserve Forest of Shahada, Maharashtra. Earlier attempts to rediscover this bird had failed due to its resemblance to the common and widely distributed Spotted Owllet *Athene brama*. The Forest Owllet has been listed as critically endangered by BirdLife International and it is protected under Schedule I of the Wildlife (Protection) Act, 1972. After the discovery, in 1998-99, Dr. Farah Ishtiaq of BNHS carried out a year long study on the Owllet in Toranmal Reserve Forest.

In October 2001, we started our work on the Project, titled 'Ecological Studies of the Forest Spotted Owllet *Athene (Heteroglaux) blewitti*', in Toranmal Reserve Forest. Toranamal lies in the Akrani hill ranges of Satpuda mountains. The forest is mainly of dry deciduous type with a mixture of various types of habitat from open and dense forests to riparian forest, and from small reservoirs to patchy grasslands. It has a wide altitudinal variation of 350-1,200 m above msl. So far, 430 plant species, 258 birds, 15 reptiles, mammals like Leopard *Panthera pardus*, Sloth Bear *Melursus ursinus*, Four-horned Antelope *Tetracerus quadricornis*, Striped Hyena *Hyaena hyaena*, Jungle Cat *Felis chaus* and fifteen species of small mammals have been recorded from the study area. This diversity also extends to the human culture, with nine different tribal communities inhabiting this remote and scenic terrain along the banks of Narmada.

From January to May 2004, a survey across ten protected areas of the Satpuda mountains revealed that the Forest Owllet is spread across central and western Satpuda. During our survey, we located 98 individuals of this species in Toranmal Reserve Forest and Melghat Tiger Reserve. The Melghat Tiger Reserve is one of the safe refuges for this critically endangered species as compared to the Toranmal Reserve Forest. This is due to less anthropogenic pressures and good forest management practices in Melghat.

The Forest Owllet is unique among owls due to its diurnal and crepuscular (i.e. active



during day and twilight hours) habits. It is very selective in its habitats and prefers areas near streams with teak dominated open type of forests, interspersed with patches of grasses and herbs. Such habitat also attracts humans that seek luxuriant pastures for their livestock. The uncontrolled grazing not only destroys the microhabitat of the Forest Owllet but also directly affects its prey base. This happens to be only one of the many conflicts between the Owllet and humans.

The Forest Owllet is an efficient predator and kills big lizards, wood rats and even birds. For a small owl stalking such huge prey is really a challenge, but its stout legs and powerful beak help hunt the prey skillfully. The prey species of the Forest Owllet includes twelve species of small mammals (rodents and shrews), five species of reptiles and a variety of insects. It occasionally feeds on amphibians and birds.

The behaviour of the Owllets is interesting. They are very territorial and protect their territory vigorously. The territories are well defined, but they shrink and expand depending on availability of food and environmental conditions. Nest site fidelity is extremely strong. Males are intolerant of the presence of other males in their territory and territorial fights are commonly observed during October and November. Interestingly, they show Reverse Sexual Dimorphism (i.e., males are smaller than females), a phenomenon commonly seen in most raptors. This interesting evolution must have taken place over years due to natural selection. Under this natural selection the male and female perform different roles and responsibilities. This is called as 'Sex Linked Resource Partitioning'. The male protects the territory and brings food for the young and the female incubates the eggs and protects them from predators. After hatching, the female joins him in feeding the young. This reduces the stress on the parents and contributes to breeding success.



GIRISH JATHAR

This Owllet has a prolonged breeding season starting from October and lasting till May. It prefers to nest in softwood trees either in natural cavities or those excavated by woodpeckers.

▲  
Encroachment in the Toranmal Reserve Forest is taking its toll on the Forest Owllet habitat

There are many natural and anthropogenic factors involved in the breeding success of the Forest Owllet such as dearth of suitable nesting trees, predation, infertile eggs and cannibalistic behaviour. Anthropogenic interference like egg removal from the nest, hunting of juvenile birds, and destruction of nesting trees worsens the already critical condition of this species.

### Threats

*Encroachments:* A major threat in Toranmal Reserve Forest is encroachment. Officially 3,170 ha of forest is encroached, but much more is under encroachment. Fringes of all Forest Owllet territories are encroached.

*Grazing:* It is a persistent problem. There are three villages near the Forest Owllet area that hold at least 500-800 cattle, and are entirely dependent on the forest for survival. The cattle graze daily in the forest and this destroys the habitat of the prey species of the Forest Owllet. The Owllet is known to abandon the area when cattle graze extensively in its habitat.

*Fire wood collection:* Our socio-economic studies indicate that two villages near the Forest







GIRISH JATHAR

▲ Rampant cattle grazing prevalent in the Forest Owllet habitat is also contributing to the bird's decline



GIRISH JATHAR

▶ A witch doctor performing rituals in which they use the eggs and certain body parts of the Forest Owllet



Owlet site require at least 572 tonnes of fuel-wood annually, which is collected from the Forest Owllet's area affecting its prey species. *Forest fires:* Accidental as well as intentional forest fires are annual events from March to May. Tribals intentionally burn forests to acquire land for cultivation. This destroys important flora and fauna. In recent times, a 5 ha plot near the Forest Owllet site has been intentionally burnt by tribals. This was a crucial problem for the Owlets as very few patches remain where they can survive. *Belief:* The tribals in this area have numerous misconceptions about owls. They use owl

body parts for witchcraft, especially, using owl eggs for gambling is a part of Toranmal's tribal tradition. It is a mis-conception among the tribals that owl eggs bring good luck in gambling. Generally, the owl eggs are collected from active nests. These eggs are then taken to a witch doctor, who performs a ritual and applies black soot on the egg. Later, this egg is kept under an earthen pot for an entire night. The next day the number formed on the egg under the earthen pot is checked; this is considered as the lucky number that is to be played for that day. This weird misconception has taken a heavy toll of owls in this area. During my field work the Forest Owllet's eggs were stolen twice by tribals.

*Use of Pesticide:* Almost 70% tribal use pesticides, generally BHC (a pesticide), endosulfon, endrin, to protect their crop from pests. Entry of pesticide in the food chain of the Forest Owllet can exterminate the surviving population from this area.

### Nest Site Protection Campaign

In 2002, tribals in Toranmal intentionally burned down a nesting tree of the Forest Owllet to encroach the area. The pair residing in the area, since 1998, was forced to move to another area, where it failed to get a suitable nesting tree and could not breed that year. To avoid such mishaps BNHS promoted protection of Forest Owllet nests. A nesting site that was facing severe anthropogenic pressure was selected. A constant vigilance of the site with the help of locals throughout the breeding season minimised human activity in this area resulting in survival of a fledgling and prevented further damage to the habitat. This conservation awareness programme motivated tribals to protect the species. Eventually, the long term programme may give them livelihood and in return the nest sites will be protected. Schemes like community management or joint forest management can also help in long-term survival of the Forest Owllet.





BNHS PHOTO LIBRARY

A meeting with the locals during the nest site protection campaign in Toranmal Reserve Forest

## RECOMMENDATIONS

- Restriction on grass cutting and grazing in Forest Owlet area.
- Regular monitoring of Forest Owlet area to restrict illicit woodcutting and firewood collection.
- Protection of nesting sites during breeding season with involvement of locals.
- Restriction on all forest management activities by Forest Department in Forest Owlet area during the breeding season.
- Creation of separate plots for cattle grazing at least 1,000 m away from Forest Owlet area.
- Removal of all encroachment within 500 m of the Forest Owlet area.
- Large-scale conservation-education programme for locals.
- Declaration of Toranmal Reserve Forest as a bird sanctuary.

### Conservation

Some human-right activists believe tribals to be people of the ecosystem, i.e., individuals that live in harmony with the ecosystem. This, however, is not true because of the increasing population. Anthropogenic interference is a major cause of change in the forest cover of the area. Long term conservation education and awareness programs for tribals will change their thinking over a period of time and it will ensure the future survival of the Owlet. Programmes like nest site protection and involvement of local people in protecting

the habitat can be carried out successfully. Even ecotourism highlighting Forest Owlets can bring awareness and generate income for the tribal. There is an immediate need to declare this site, which is a forest reserve, as a sanctuary by involving the locals. This may help in the survival and conservation of species.



Girish Jathar is presently working at Centre for Environment Education, Ahmedabad as Programme Officer. He worked with BNHS from 2001-2008 and completed his Ph.D. on the Forest Owlet.





**Brilliant Agama *Trapelus agilis***

The slightest hint of threat and the brilliant colours, apart of this lizard's breeding display, disappear





# Caecilians: the little known wonders!

Text: Varad B. Giri

## About the Project

The Caecilian Project was started in 2001 and is generously funded by Rufford Small Grants (For Nature Conservation), Declining Amphibian Population Task Force (DAPTF) and Ministry of Environment and Forests. The main aim of the project was to document the diversity of caecilians in northern Western Ghats, Maharashtra.





It was raining heavily and I was vainly trying to keep myself dry under a 'branded' raincoat. I expressed my anxiety to Vithoba Hegde, my colleague and a guide in the field of herpetology. "What do you expect? It is a typical Western Ghats monsoon and one does get wet despite due precautions", exclaimed Vithoba! It was June, 2000 and we were in Amboli, Sindhudurg district, Maharashtra, studying amphibians and reptiles for a short duration survey funded by the Charles's McCann Grants of the BNHS. This was my first field survey after joining the BNHS as Research Assistant, my first exposure to the world of 'jumpers and croakers' – the amphibians! A beautiful world unknown to many!

We returned by midnight, a bit early for such surveys. The heavy rain had dampened not just my spirits; it seemed to have silenced the male frogs too, as we did not locate a single frog during our long futile night search. While approaching the hotel, I saw a small snake-like animal moving slowly on a road. Tired and wet, I tried to catch the animal with the help of my snake hook; after two to three unsuccessful attempts my curiosity was raised, for snakes do not slip from snake-hooks! I tried grabbing the animal, but it slipped from my hand and started moving away from us. After immense struggle and with great difficulty I managed to get hold of this 'mysterious' creature! It took some careful observation before I realised that it was a 'prized catch' – a caecilian! This was really a big find for me, my first live caecilian! Vithoba was also equally happy. He had accompanied renowned amphibian experts of the Society like Mr. Humayun Abdulali and Mr. A.G. Sekar for years, but even for him this was the first live caecilian in the field. With the specimen in hand, and too many questions swarming my head I decided it was time to get some answers.

After returning to Hornbill House, BNHS, I managed to identify the caecilian up to genus, *Ichthyophis*. My quest to learn more about this unknown creature motivated me to search the available literature, which to my surprise was very little. All the available

information was in the form of scientific publications and not a single popular article! Interestingly, there was an unanimous view of all the experts, caecilians are rare. In wildlife research, I associate 'rarity' with chance as it helps one make some valuable contributions. And thus, apart from literature, I also began searching for caecilians during my subsequent field visits.

What are caecilians? They are legless amphibians. What are amphibians? These are vertebrates with a dual mode of life cycle, i.e., first half of their life is in water and remainder on land. They evolved from their aquatic ancestors – fishes – and have conquered land, the first vertebrates to do so. Based on certain external characters, the amphibians are divided into three major groups. The first big group of amphibians is without tail, i.e., frogs and toads, the second is of amphibians with a tail, e.g. salamanders and newts, and third group is of legless amphibians – the caecilians!

Caecilians are primarily, burrowing, mostly living in leaf litter, loose soil, under rocks and decaying logs and only surface during the monsoon. They have an elongated body covered with smooth and slimy skin. The smaller caecilians resemble earthworms, while the larger ones snakes. They differ from earthworms as they have eyes, tentacles, teeth and skeleton and from snakes in lacking scales on the skin. Because of their burrowing habits the eyes are not well developed though.

The caecilian diversity of India is represented by three families (Ichthyophiidae, Uraeotyphlidae and Caeciliidae), four genera (*Ichthyophis*, *Uraeotyphlus*, *Gegeneophis* and *Indotyphlus*) and 21 (presently 27) species. From distributional records, it is apparent that the hot spot of known caecilian diversity in India is the Western Ghats, especially the southern part. The northern Western Ghats, which mainly comprises of Maharashtra, is poorly documented. Indian caecilians are known to be oviparous, i.e., they lay eggs and have a free-living, aquatic larval stage. The shortest Indian caecilian *Gegeneophis krishnii* is about 142 mm in length, and the longest *Ichthyophis malabarensis* is about







VARAD GIRI

▲  
One of the first colour  
photographs of  
*Gegeneophis seshachari*

545 mm in length. From the available information, most caecilians are opportunistic feeders and feed on earthworms, termites, larvae and pupae of a variety of insects. The observation of the faeces of captive caecilians indicates that they may be detritivores, i.e., feeding on dead and decomposed organic matter.

This was the only information available and with this I started my voyage into the unknown world of these mysterious animals. This entire mission resulted in one of the major projects on caecilians of northern Western Ghats, especially Maharashtra and many path breaking findings.

Despite their uniqueness, and more than 100 years of research in the region, caecilians were never the focus of attention except when experts like E.H. Taylor, Dr. G.K. Bhat from Karnataka, and Dr. Oomen from Kerala took interest and made valuable contributions.

Apart from its unique topography and geography, the Western Ghats of Maharashtra was least explored, in terms of caecilians. Till 2001, there was confirmed report of only one species *Indotyphlus battersbyi* from Lonavala and Khandala region of Pune district. The report of *Ichthyophis subterresteris* and *Ichthyophis beddomei* needed confirmation. While searching through literature I discovered that the report on *I. subterresteris* was based on a specimen in the Collection of the BNHS. The specimen, however, was in bad condition; making it difficult to check any of the taxonomic characters. Though

there is a published report of *Ichthyophis beddomei* a specimen is not traceable for further confirmation. In my view, especially considering the present taxonomic scenario of Indian caecilians, authentication of species based on damaged or non-traceable specimens should be considered as stray until further verifications. I was not happy with this situation as the Western Ghats of Maharashtra is equally rich in amphibians and reptiles. In these circumstances, I opted to conduct an intensive survey on caecilians in this region. In doing so, I wanted to test an alternative hypothesis, that, the currently recognised relatively low diversity of northern Western Ghats caecilians is a true reflection of their biodiversity, or an artifact of previously uneven sampling and study.

The best results in wildlife research are possible with determination, persistence and hard work. My efforts were intensified after meeting the two caecilian experts Dr. Mark Wilkinson and Dr. David Gower of Natural History Museum (NHM), London. My mentor, Mr. Ashok Captain brought them to study the caecilian collection at BNHS. When I showed them the caecilian I had collected from Amboli, they added that it was an interesting species. This small interaction opened an avenue for my quest to learn more about caecilians.

We managed to get a real breakthrough during one of our earlier surveys in Amboli in 2001. During this survey I was accompanied by Sameer Kehimkar and





Vithoba Hegde. Though this five-day survey focused on herpetofauna, we were also looking for caecilians. And on the last day, we got what we were looking for, one more caecilian, but this time a different species! With my limited knowledge, I managed to identify it as a *Gegeneophis* with entirely different characters from the known species in this genus. I drew these characters and emailed them with some photos to Mark and David. They replied saying that it was an interesting species and would work on it



VARAD GIRI

(L-R): Haresh Kulkarni and Ravindra Bhambure actively looking for caecilians



ASHOK CAPTAIN

An unidentified striped *Ichthyophis* from Maharashtra

during a visit to India after six months. They studied this specimen in their subsequent visit, which was later described as *Gegeneophis danieli*, a new species to science.

Healthy collaborations are always fruitful. According to me, science is a global phenomenon and for its betterment, interaction of knowledge is always essential. My collaboration with Mark and David is vital as they have contributed immensely to whatever I learned about caecilians. With this additional knowledge, my efforts were now more concentrated on caecilians. According to published literature, caecilians are mostly associated with moist soil and litter. In Koyna Wildlife Sanctuary, we also looked for them in the aforementioned habitat with no results. The study area was mainly composed of undulating terrain dominated with semi-

evergreen forest on the slopes of the hills and rocky plateaus locally called *sada*. They look 'barren' as they are full of laterite rocks dispersed all over the scene interspersed with few patches of grass. In summer, they are hot like an oven. But this 'inhospitable' looking habitat was a refuge to some interesting herpetofauna. During the monsoon of 2002, we were able to get some interesting specimens of caecilians on these plateaus. Subsequent interactions and collaborative studies with Mark and David on these specimens resulted in the discovery of one more new species, *Indotyphlus maharashtraensis*.

It is relatively difficult to conduct longer duration survey without considerable funding. And getting funds for conducting baseline research on 'non charismatic' species like caecilians is very difficult. But based on our







VARAD GIRI

▲  
Experts Mark and David  
digging for caecilians

two new discoveries and collaboration with NHM, we managed to raise funds to continue our survey. This time Declining Amphibian Population Task Force (DAPTF) and Rufford Small Grants (For Nature Conservation) generously supported our endeavours. This enabled us to conduct some intensive surveys in different parts of the northern Western Ghats.

This survey also resulted in the first report of *Ichthyophis bombayensis* from Maharashtra. This is one of the largest species of caecilians in India and was only known from Dangs area of Gujarat, the type locality of this species, and some stray reports from Karnataka also. Though considered rare, we counted

23 live individuals and around the same number of road kills in a single drive for two hours. All this was fascinating for me as I was looking at a 'band' of rare caecilians, on a road! Apart from this, I contributed for a major collaborative project on the taxonomy of long tailed, unstriped caecilians. In 1960, a renowned caecilian taxonomist, E.H. Taylor described four new species: *I. bombayensis*, *I. malabarensis*, *I. peninsularis* and

*I. subterrestris* from the Western Ghats, India. Interestingly, these four species were based on only seven specimens. Consequently, considerable confusion and taxonomic uncertainty existed over Taylor's four nominate species. Our recent study, which was headed by David and Mark, confirmed that the Western Ghats long-tailed, unstriped *Ichthyophis* constitute a single, widely distributed, but extremely genetically homogeneous species and not four as described by Taylor. Based on the precise, known locality and most detailed low-level study of morphology we selected *I. bombayensis* Taylor (1960) as the name to be applied to this species. As per our study, *Ichthyophis bombayensis* is the longest caecilian (630 mm) in India, and we have specimens in our study collections which support this information.

Another major contribution of our study is the rediscovery of *Gegeneophis seshachari* from its type locality. This species was described in 2003 from a preserved specimen in the collection of the Zoological Survey of India. This specimen was originally collected from Dorle village, Ratnagiri district in 1967, and since then no specimen of this species was known. In October 2003, we rediscovered one more specimen of this species from Dorle village. Slowly the picture of caecilian diversity in this region is getting clearer.

*Ichthyophis bombayensis*  
– one of the largest,  
common but unnoticed  
caecilian ▶



ASHOK CAPTAIN





SWAPNIL PAWAR



SWAPNIL PAWAR

I always believed that caecilians are rare. But the results of our field work were showing a different picture as we reported caecilians from most of the areas surveyed by us. One of the major concerns of the earlier studies was the lack of focused efforts towards caecilian studies. Most of the species were known from a small number of specimens, and mostly from the type locality. Apart from this, there was no follow up and very few efforts were made to upgrade this knowledge. This resulted in the lack of information on their present conservation status. And thus, most of the caecilians were considered as 'Data Deficient'. To overcome this barrier, we continued our search in different habitats and new localities. Our efforts were fruitful and the best example is the occurrence of *Gegeneophis seshachari*. In 2003, this species was reported from only one village in Ratnagiri district and our continued efforts resulted in the fact that this is one of the most widely distributed species in the Western Ghats region of

Maharashtra. Presently, this species is known from around 28 localities from Kolhapur, Ratnagiri and Sindhudurg.

As per our present knowledge, *G. seshachari* is one of the commonest species of caecilian in the northern Western Ghats. One of the main reasons may be its wide array of habitat preference. We collected this species from leaf litter, loose soil, near villages, in paddy fields, in the forest and interestingly on the plateaux as well. Plateaux are found near sea shore, just like plateaux in the mountains of the Western Ghats. These plateaux flourish with interesting herps, but no caecilians were reported from such habitats before. During one of the surveys on a plateau near Malvan in Sindhudurg district we reported 21 individuals of *G. seshachari* under one 0.60 x 0.60 m rock. In my experience, this is the highest concentration of caecilians in a small area.

Of the many lacunae, there is no proper information regarding breeding behaviour of many caecilians. Our study was responsible

▲  
The area where 21 individuals of *Gegeneophis seshachari* (inset) were found is a habitat considered unsuitable for caecilians







VARAD GIRI



Unidentified *Uraeotyphlus* sp.  
from Kerala: up close and  
personall

for one of the major finding in this regard. We collected a specimen of *G. seshachari* from Baraki, Kolhapur district, in June 2006. This proved to be a pregnant female containing four well developed foetus. On further study, mainly by David in association with Dr. Yogesh Schouche and Dr. Mahesh Dharane of National Centre for Cell Science, Pune, proved that *Gegeneophis seshachari* is 'viviparous' – the first live bearing amphibian known from Asia.

I feel that once we describe a species our responsibility increases. For this one should try to collect more information about their conservation status. Most of the earlier species are known from the type locality and no information is available about their distribution. *Gegeneophis danieli* was originally known from Amboli in Sindhudurg district. We reported this species from four new localities during our subsequent surveys. The present distribution of this species ranges in two districts, Sindhudurg and Kolhapur, covering an area of 150 sq. km.

One of the major complexities with Indian caecilians is their unstable taxonomy and lack of concentrated efforts towards their studies. But the current picture in the northern Western Ghats is encouraging and is well illustrated by recent discoveries, about eight new species in five years from northern Karnataka, Goa and Maharashtra. Apart from this there are many unidentified species in the genus *Ichthyophis*. In view of the

historical evidences, focused and intensive efforts with modern taxonomic techniques are needed to address these problems holistically.

This is just an overview of the caecilians of Maharashtra. We have covered a small area during this survey. Many interesting habitats, mostly in the northern part are yet to be surveyed. Frankly, this is a Herculean task and by looking at the vastness of the area, much more man power is needed. At BNHS, we are trying to develop collaborations with local colleges and NGOs for this study. As a part of this Project, we

are already working with local NGOs like Green Guards, Kolhapur, Malabar Nature Conservation Club, Amboli and ENCA, Satara. We have also developed collaboration with DBJ, College, Chiplun. This is just a small beginning and we are keen to extend our reach.

As per recent reports, about 31 per cent of the amphibians of the world are on the verge of extinction. This is quite an alarming situation. Many more species are yet to be discovered; and if the situation remains the same then they will be extinct without our knowledge. These amphibians play a dual role in the food chain. They are predators, keep check on the insect population, and are themselves prey for some animals. Their decline is surely going to disturb the balance of the entire food chain, which is ultimately going to affect humans.

Much has to be done in future. A long-term project is needed for such endeavours! Interestingly, most funding goes for enigmatic animals. Though caecilians are not 'fascinating' species, their role in nature is of great help and the sole existence of the food chain is based on them. So, I think equal attention needs to be paid to these little known wonders of nature. ■



Varad B. Giri is presently the Curator,  
at the Collection Department, BNHS.



# Mangroves – Nature's Coastguards

Text: Nishigandha Pednekar

## About the Project

The Mangrove Project began in March 2007. Funded by the Oil and Natural Gas Corporation Ltd. (ONGC), the Project is based in two states on the western coast of India, Gujarat and Maharashtra. This Project aims to undertake mangrove restoration and large scale education campaigns to generate people's support for mangrove conservation.





NISHIGANDHA PEDNEKAR

▲  
*Avicennia marina* is one of the common mangrove species found in most mangrove patches

I have been familiar with mangroves since the time I was a child, as the area around my native place had a number of these beautiful plants. But then, all I believed was that these were trees or shrubs that grow in marshy areas and serve no great purpose towards the welfare of mankind. I presume that many individuals think like I did, for if they did not they would be respecting them more.

I got interested in mangroves when I was in college and this interest grew into a passion after I joined the BNHS team working on Project Mangrove. The Project, titled 'Mangrove Restoration and Conservation Education Unit', aims to conserve and restore mangroves of Gujarat and Maharashtra through community participation. As soon as I realised the importance of mangroves, I was eager to learn more and more about this important ecosystem. I started studying them in detail and working in coastal areas of Maharashtra to create awareness about mangroves.

So, what are mangroves? Biologically,

"Mangroves are salt-tolerant plants that can survive in conditions of high salinity, extreme tides, strong winds, high temperatures and muddy soils at the interface between intertidal, tropical and sub-tropical coastlines" Mangroves have evolved various adaptations to survive and thrive in these harsh conditions. They have amazing roots, which are unique to them. No other group of plants are known to have pneumatophores or breathing roots having upward extensions to absorb oxygen. This is because the soil of mangrove forest does not contain enough oxygen.

Literally, the origin of the English word 'mangrove' is uncertain and there are various theories relating to its etymological evolution. The most popular being: "mangrove is derived from the Portuguese word 'mangue', which means into the sea. 'Mangrove' may also be a simple derivative of the English word 'grove', which means a dense stand of tropical trees. The term 'mangrove' can be either used for an individual plant in a mangrove community, or the entire community itself consisting of biotic components.





Mangroves are an ecosystem by themselves and provide shelter, protection, and food for numerous organisms including us, human beings. They utilise their habitat optimally; they have developed a number of physical and physiological adaptations to overcome problems like propagation, oxygen deficiency, high salinity, frequent tidal fluctuations and water loss.

To prevent the loss of limited fresh water, mangroves have characteristic aqueous tissue or mucilaginous cells (water retaining tissue), and a waxy cuticle (a waxy layer on the leaves that prevents water evaporation) like xerophytes (plants that survive in arid conditions).

Another interesting adaptation is vivipary, a type of germination in which the seeds germinate while they are still attached to the mother tree. As a result, each dispersed seedling is already developed and has a better chance of surviving. When these seedlings drift into suitable area they can root quickly.

Mangroves serve as natural barriers to shoreline erosion, and help to stabilise sediments from rivers, thus, reducing the effects of storm surges and heavy surf of pollutants in the sediments. They also help in preventing the entry of seawater into the terrestrial water sources and protect the underground freshwater systems of the coastal region.

The plants and animals found in mangrove ecosystem have adapted morphological and physiological mechanisms to make a home where most other organisms do not have a chance to survive. Among invertebrates, myriad species of insects and arachnida, crustacea, molluscs, nematodes, and planktonic and benthic organisms are known to reside in mangroves. The planktonic and benthic animal communities also play a very important role in the mangrove ecosystem just like the terrestrial animals. There are different species, such as macaques, otters, deer, fishing cat,



VISHWAS SHINDE

snakes and wild boars, which have adapted to the mangrove system. In mudskippers, we can see well developed adaptation of pectoral fin that act as walking apparatus. The mangrove swamps always attract a variety of birds, both migratory and resident. A well known example is the Sewri mudflat in Mumbai which attracts flamingos and numerous other waders.

In India, mangroves are found on both coasts. The mangrove forest of West Bengal – Sunderban is the largest mangrove area of the world and it is a world heritage site declared by UNESCO. The mangrove wetlands of the east coast are larger and more diverse, and are characterised by the presence of large brackish waterbodies and a complex network of tidal creeks and canals. This is mainly due to a larger delta created by the east flowing rivers and gentle slopes of the coast. On the other hand, the west coast is narrow and steep, probably due to the presence of the Western Ghats. As a result, mangrove wetlands on the west coast of India are small in size, and less in diversity, and less complicated in terms of tidal creek network.

Mangroves are highly productive areas contributing to the food chain of the coastal oceanic areas. Mangrove forests also serve as important nursery, feeding, and refuge areas for a wide variety of terrestrial and aquatic

▲  
Mudskipper is one of the common inhabitants of mudflats







Mangroves are regularly used as firewood and it is one of the serious threats

organisms including mammals, birds, reptiles, fish, and invertebrates. Some of these species are threatened and others are highly valued by commercial fisheries, inshore and offshore.

In India, about 23 million people live in coastal areas, a larger percentage of these live in coastal cities, such as Mumbai and Chennai. The Indian coastline (including mainland and islands) stretches about 7,500 km.

Many coastal communities depend on a mangrove ecosystem for their livelihood as it provides opportunities such as fishing and sale of mangrove products. Mangrove forests are a good source of economically important products such as timber, firewood and charcoal. In coastal areas, mangroves are a substitute for fodder. Mangroves were the main source of tannin for the leather industry and are still exploited in many areas in India for this purpose. Honey collection from mangrove areas is practiced only in West Bengal and Orissa. A high quality honey is collected from mangroves. Apart from this, many important medicines are formed from ingredients found in mangrove forests.

Mangrove forests are now among the most threatened habitats in the world, due to expanding human population and resultant

unsustainable economic development. Exploitation for firewood, charcoal and timber, deliberate land reclamation for urban and industrial development, shrimp farming and dumping of pollutants cause serious damage to the mangrove forest.

Further, mangrove forests are considered as wasteland by Government and they were used for construction of bridges, roads and settlements. The estuaries and creeks are an overharvested source of sand, used for construction. The fishermen, on the other hand, create routes through mangrove patches by cutting them to avoid anchoring far from the coast. Water diversion and dams for water storage reduce freshwater availability to mangroves. As salinity increases, only high salt tolerant species survive and diversity

diminishes.

Salt pans are shallow open pans used to evaporate seawater for the production of salt. In many areas, these pans are constructed by clearing mangroves. Years and years of salt production from the pans has increased the salinity of the soil negatively affecting the neighbouring mangrove patches, as well as other plant life.

Activities like bunding for erosion control and deposition of construction debris cause changes in flow patterns of the creek or sea, which in turn have strong impact on mangroves. The herbicides and insecticides used in the coastal crop lands are polluting the mangrove habitats through surface runoff.

Mangroves are highly vulnerable to oil exposure and it affects them drastically. More subtle responses include germination failure, decreased canopy cover, increased rate of mutation, and increased sensitivity to other stresses. Pollutants like heavy metals reduce growth and resistance to diseases in plants.

Timber of mangroves is durable and is used for making boats, fishing gears and for this purpose big trees are cut.







Bunding is done to prevent saltwater intrusion directly affecting the mangroves



Oil slick and factory discharge at Sewri, Mumbai, adversely affect the mangroves

### Non-implementation of rules

Mangroves are protected under Coastal Regulation Zone notification under the provisions of Environment Protection Act (EPA), 1986, Maharashtra Tree (Felling) Act, 1972, The Water (Prevention and Control of Pollution) Act, 1974, and Wildlife (Protection) Act, 1972. However, the implementation of these acts leaves much to be desired.

Mangroves are sensitive to rising sea levels, which are now occurring at an alarming rate. A one metre rise, predicted to occur by the end of this century, with no major cuts in greenhouse gases would submerge about 1,000 sq. km of the Ganges Delta. As per the UP IN SMOKE? ASIA AND THE PACIFIC, IPCC report on climate change, over the past two decades, four islands have been submerged leaving 6,000 families homeless in this very Delta. Some of the most recent predictions suggest that development along India's coastline has damaged natural ecosystems that have historically provided defence against coastal erosion and acted as a buffer to prevent flooding from wave action or tidal surges. Climate change related sea-level rise could create climate refugees by the millions along the coasts of India and in other countries of the world.

Maharashtra has 118 sq. km while Gujarat has 911 sq. km of mangrove forest (Forest

Research Institute; 2001). Realising the need for conservation of mangroves, the BNHS initiated a Mangrove Restoration and Conservation Education Unit, popularly known as Project Mangrove. The Project was started in March 2007, and is funded by Oil and Natural Gas Corporation Ltd. (ONGC).

This Project aims to undertake large scale education campaigns to generate people's support for mangrove conservation and to undertake plantations in the Gandhar region of Gujarat. Though the effectiveness of mangrove plantations will be visible only after 5-10 years of plantation, it can be the best long term protective measure. This plantation will help in establishing a natural shoreline protection mechanism. The plantation unit developed three nurseries onsite and offsite. Mangrove nurseries of the BNHS at Gandhar region of Gujarat have over 3,00,000 saplings of various mangrove species. Besides this, about 2,00,000 saplings, propagules and seeds have already been planted at various locations. Apart from this, a small restoration site has been identified in the Konkan region of Maharashtra. The Maharashtra Unit of Project Mangrove was mainly involved in conservation education and the collection of seeds and propagules.

Under conservation education, activities like slide shows, film shows, teacher training workshops, painting competitions, quizzes,







Mangrove ecosystem support livelihood to many communities by providing fish and shells



slogan were carried out. In fact, awareness programmes like mangrove rally and community meetings were held to reach out to a larger audience. Also, the Education Unit developed a brochure, pamphlets, and leaflets in regional languages for the locals. And till date, we have reached about 10,000 people and about 20,000 students through different activities. The locals have been very cooperative and are eager to help out in their own little way. They are able to understand the seriousness of the situation and some can be very informative.

We also aim to develop resource materials and training modules on environment, specifically on mangroves, education for teachers and students, and awareness programmes on mangroves, mudflats and bird migration. Also, as an aid to teachers, a teacher

training manual, is under preparation. This manual will act as a text book for teachers to help them teach the new subject of 'environmental science' with better efficiency.

We also believe in encouraging mangrove plantation in various coastal areas of Maharashtra through community participation. The work done by the team is proving to be very useful for educational institutes as the information provided by them is helpful with reference to the new subject in their curriculum. In fact, it is encouraging that Gogate Joglekar College from Ratnagiri has developed a nursery within their campus. They are also one of the local partners at Ratnagiri. Other local partners at different locations in Maharashtra are Nisarga Mitra Mandal at Panvel, Sahyadri Nisarga Mitra at Chiplun and Shri Pancham Khemraj College at Sawantwadi.

During our surveys we discovered mangrove patches that have come up in the paddy fields of some villagers. It is difficult in some places as these new patches have resulted in anchoring problems for boats; the villagers have

to anchor their boats far from the shore. On the other hand, these very mangroves protect their boats from the tidal runs that may damage their boats.

We need to realise the importance of these interesting ecosystems. As an effort towards this, the 'Project Mangrove' plans to start a Wetlands Club for schools, which will include many fun filled activities that help the next generation learn about these misunderstood ecosystems. We need to protect mangroves if not for their sake at least for our sake. After all they are nature's very own coast guards indeed, they are *our* coast guards ... 🌿



Nishigandha Pednekar has completed her M. Sc. in Environmental Science, and is presently the Education Officer for Project Mangrove at BNHS.



Some of the well-known species of mangroves and mangrove associates are described for better understanding of their role in the environment.

### *Salvadora persica*

Toothbrush plant *Salvadora persica* is also known as 'Meswak'. It is not a true mangrove species as it does not have special adaptations like in true mangroves. It can survive just beyond the line of high tide. The leaves are thick and waxy, with an eye catching green colour. There are two varieties based on the colour of the fruit – white and dark red. The plant is well known for its medicinal properties and its roots are used as toothbrush.



NISHIGANDHA PENDEKAR

### *Xylocarpus granatum*

Cannon-ball Mangrove *Xylocarpus granatum* is named so after its fruit which is large in size occurring on the landward side, roots are buttress type. It is one of the highly endangered mangrove plants of the west coast of India. Used as timber, its fruits have medicinal properties.



NISHIGANDHA PENDEKAR

### *Sonneratia alba*



NISHIGANDHA PENDEKAR

Mangrove apple *Sonneratia alba* has thick cone-shaped pneumatophores. It is a front mangrove, i.e. mangroves that are nearest to the sea as they prefer open area. These trees grow as tall as 30 m. The flowers are whitish, bloom at night and are pollinated by bats. Leaves are used as fodder, fruits are edible and are used to make pickle.

### *Acanthus ilicifolius*



NISHIGANDHA PENDEKAR

*Acanthus ilicifolius* has leaves with spiny edges that give it its common name Sea Holly. Sometimes, salt can be seen as a white crystalline layer on the upper surface, which is excreted through the leaves. The plant covers large areas and forms thickets as its growth is stunted due to disturbances in mangrove ecosystem. Forming the undergrowth in mangroves, it provides shelter for small creatures, and food for those that manage to graze their thorny leaves. It is also an indicator of degrading habitat.



**Painted Bat *Kerivoula picta***

This is probably the first published image capturing the startling coloration of this rare bat in its natural habitat





# A Tale of Two Birds

Text: P. Jeganathan

## About the Project

BNHS has been studying the Jerdon's Courser since August 2000. The Jerdon's Courser study was funded and sponsored by the Darwin Initiative, Andhra Pradesh Forest Department, University of Reading and the Royal Society for the Protection of Birds (RSPB). The main objective of the Project was to study the ecology, distribution and to collect more information about this elusive bird.



Jerdon's Courser

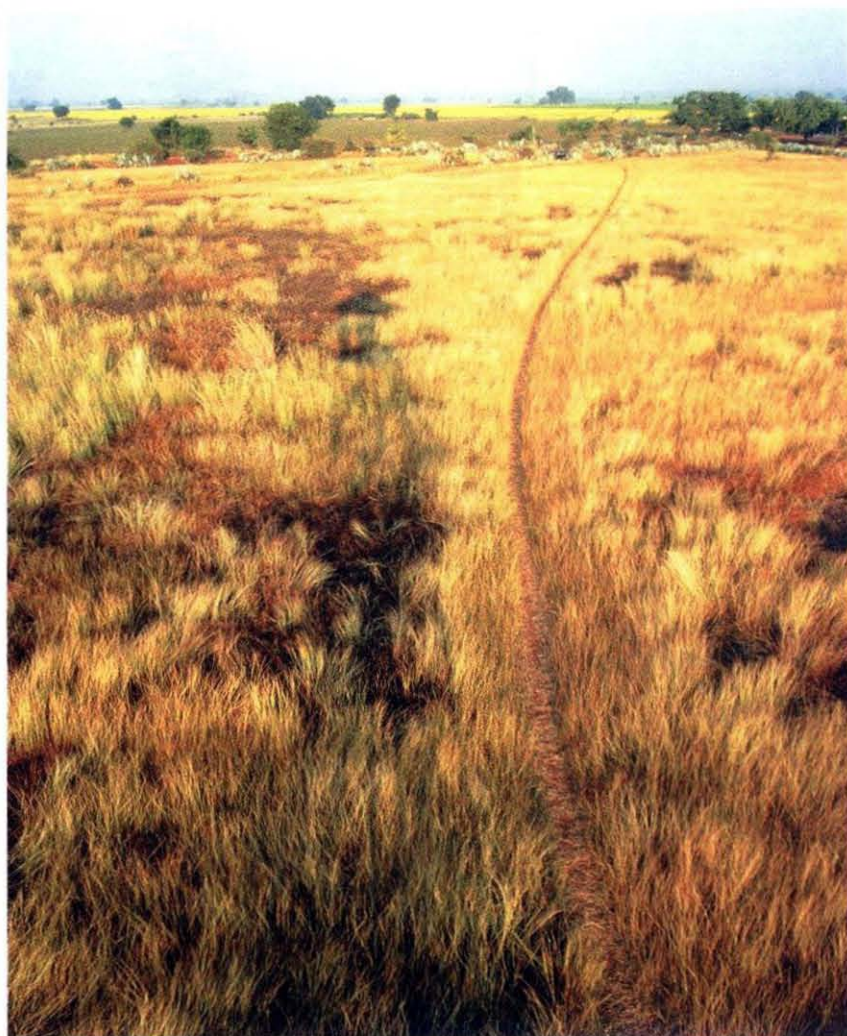
PAINTING BY D.M. HENRY



**M**y eight years stay in Andhra Pradesh for studying the critically endangered Jerdon's Courser was filled with several exciting moments watching wildlife. Although on most occasions it was either frustrating or depressing witnessing the mindless destruction of the critical habitats in some of the Important Bird Areas (IBAs). My study area was in Cuddapah district, but I could also explore other beautiful forested areas of southern Andhra Pradesh, during this period. In this article, I share some of my happy and annoying moments in two IBAs that have two important bird species – the Jerdon's Courser and the Great Indian Bustard. This article is not only about these two birds, but also about their habitats; as well as two important personalities who are trying to conserve these two birds and their habitats. Also, it is about the project titled, 'Large-scale habitat mapping and local conservation initiatives for Jerdon's Courser'.

These two birds have quite a few things in common. Both are globally threatened. Both are ground nesters. Both birds are very special for every person living in Andhra Pradesh, especially since the Jerdon's Courser is found only in Cuddapah, and Rollapadu is a stronghold for the Great Indian Bustard (GIB) population in Andhra Pradesh. Not only the birds but their habitat too is endangered. Both these birds have got a similar threat – their habitat is threatened by the Telugu-Ganga Canal.

In September 2000, my research guide Dr. Asad R. Rahmani introduced me to these two birds and their habitats during our short survey in Andhra Pradesh. I met two important persons during my visit. Mr. Aitanna, a forest guard at Sri Lankamaleswara Wildlife Sanctuary, who was instrumental in rediscovering the Jerdon's Courser and Mr. Adhisheshaya, a forest watcher at Rollapadu Wildlife Sanctuary, who was a field assistant for Dr. Rahmani and Dr. Ranjit Manakadan when they studied the GIB there in the 1980s and 1990s. Both these local men are extremely skilled, passionate, knowledgeable and good at locating their respective species in their habitat. They have



P. JEGANATHAN

been protecting their habitat for years and the experience speaks for itself.

During our survey on one of the nights, after about five hours of tiring search in the stony and thorny scrub jungle, Aitanna showed us one of the rarest birds in the world – the Jerdon's Courser; a special sighting for me since it was my first sighting. Besides the bird, Aitanna was also very special to me as he had been one among the fortunate few who had seen the Jerdon's Courser a number of times! After a while, I asked Aitanna, "How many times have you seen this species?" "I do not know", replied he in a matter-of-fact manner.

In the early period of my field work (2001-2003), the rate of encountering the Jerdon's Courser was relatively frequent. For instance, in the main Jerdon's Courser area, near Reddipalli, if I searched for a total of twelve

▲  
Careless vehicular  
trespassing into the fragile  
ecosystem destroys the  
habitat





P. JEGANATHAN



Aitanna - the forest guard instrumental in rediscovering the Jerdon's Courser

hours I would sight the bird at least once or hear its calls in the evening. Those were the golden days of my field work.

During those days I have experienced some of the rarest moments in my life, which I will treasure forever. One such memorable sighting was seeing a Jerdon's Courser in ample sunlight while it was calling (*Hornbill*, January-March, 2005). On January 1, 2002, I was in the main Jerdon's Courser area listening for its call. On hearing the call, I returned to our jeep satisfied, but nature had something more incredible in store for me. On my way back to the jeep, while scanning the ground my torch beam caught something move. I realised it was a bird as it squatted immediately after the light hit it. I knew that if I moved the torch beam away from the bird it would be difficult to locate the bird, which was just 20 m from me.

The bird was a Jerdon's Courser! Crouching immediately after getting exposed to a torch beam is a characteristic behaviour of the Jerdon's Courser; neither the Stone Curlew nor the Red-wattled Lapwing behave in this manner. In the crouching position, the bird is perfectly camouflaged, especially if it is on a stony ground and can be located only by the shiny appearance of its feathers. But this too is possible only if the bird is about twenty to thirty metres away and there is not much grass. As soon as I recognised that the crouched bird was a Jerdon's Courser, I decided to observe it



and was curious to know what it would do next.

I froze at that spot; for the next twenty-five minutes both the Jerdon's Courser and I were still. Then the Courser slowly got up to its knees and took nearly five minutes to return to its original standing posture. The torch light had dimmed by now as the battery was almost drained. Once it was almost dark the Jerdon's Courser was in front of me and all I could hear was chirping of crickets, a few nightjar calls in the distance and my breathing. The bird then fluffed its feathers and defecated. To get vital information about its food habits, I mentally noted the exact location so that I could collect the dropping later. Then came the best part of this wonderful episode, the Jerdon's Courser started walking slowly, along the torch beam, towards me, and when just about a metre away from my feet it stopped walking and looked up. I could see the confusion in its eyes when it shot straight up in the air and flew away.

I do not know what made that bird walk along the light source. Was it attracted to the small flying insects on the face of the torch? Was it because the illumination was dull? Or was it as curious as me, to learn what was on the other end? Only the Jerdon's Courser has the answers to these questions. For me, witnessing that twenty metre walk, which lasted for about a minute, was the best event in my life, so far. It was a perfect gift for me from the Jerdon's Courser that New Year.

Things were not routine for long. On my regular visit to the main Jerdon's Courser area one morning I saw a bulldozer digging a trench. Jerdon's Coursers prefer scrub jungle with open area. At night they forage in the open area and during the day they presumably roost near or inside the bushes. So both these microhabitats are vital for the survival of this rare species. However, the newly appointed Forest Officer thought that these open areas could be 'developed' by planting some exotic tree species and digging trenches would help to increase the water table in that area. When I reached the site in the morning they had already dug half a dozen trenches, each one about a kilometer long and five metre wide. The





P. JEGANATHAN

bulldozer and its driver were very efficient and were accomplishing their work fast. So, though I was in a state of shock I knew that I had to act faster than them. Immediately, I went to the nearest forest office at Siddavattam and met the Officer-in-charge of the trenching work. He was polite and apologised for what was happening, but added that he needed permission to stop the work. I then went to Cuddapah to meet the Divisional Forest Officer, who was unfortunately not there. I tried to contact other officers at Hyderabad and informed Dr. Rahmani about the problem, who explained the situation to several higher officials at Hyderabad. In those days mobile phones were not common and the official in the field got the message to stop the trenching work only the next day at noon. By then it was almost all over for the existence of the Jerdon's Courser main area. I visited the site in the evening and heard the Jerdon's Courser as well as the sound of the bulldozer! This site has been a laboratory for me. Aitanna had shown me my first Jerdon's Courser here, I recorded



P. JEGANATHAN

The *Cajanus* sp. is a deadly weed that is suppressing the growth of the native grass species

and identified the call, and confirmed the Jerdon's Courser footprints by setting up camera traps here. But now, I would neither hear nor see the Jerdon's Courser in that place!

After this incident when I met Aitanna, I took him to the site and could see utter annoyance on his face, to him the place looked like a graveyard. He was not around when this tragedy occurred as he has been transferred from Redipalli. Had he been around this would

▲  
The Telugu Ganga Canal near Sri Lankamaleswara Wildlife Sanctuary, Cuddapah





Although the course of the Telugu Ganga Canal is diverted away from the Jerdon's Courser habitat the increase in the ground water level will change the scrub jungle habitat in the long run



P. JEGANATHAN

not have happened! He would have explained the importance of the place to his Officer. He had been sighting the Jerdon's Courser in this area since the day he had rediscovered this bird. It took me nearly a year after this tragedy struck to find them again near the main Jerdon's Courser area. Although they are using places adjacent to the main Jerdon's Courser area I have not seen or heard them in the place they once frequented, till date.

If a small trench can have such an adverse impact on this bird what will happen if a canal 100 m wide and 40 km long, cutting across the entire suitable habitat of this bird, is built? Timely intervention by several conservation organisations and individuals resulted in redirecting the canal away from the main Jerdon's Courser area, as well as securing about 3,000 acres of vast stretch of scrub jungle habitat around Sri Lankamaleswara Wildlife Sanctuary. Although we have saved the habitat of the Jerdon's Courser, the main challenge now is to make sure that it is managed properly for the future of the bird.

Aesthetically, a scrub jungle may not be very appealing to a common man. But anyone will fall in love with the grasslands of Rollapadu

Wildlife Sanctuary, especially if they visit during monsoon; it is one of the most beautiful places on this Earth. I was there eight years ago on a pleasant September evening. The sun was setting and its rays reflected on the blades of grass. It appeared as if I was standing in the middle of a vast golden carpet. The place was filled with chirping and resounding calls of Zitting Cisticolas and Rain quails. Montagu's and Pallid Harriers were flying gently.

I was with two individuals who are passionate about grasslands and the Bustard, Dr. Rahmani and Adhisheshaya. They had shown me my first Great Indian Bustard at Rollapadu. It was a male standing in a slightly elevated area in that gently undulating terrain and displaying, producing a deep booming call, an amazing sight! Adhisheshaya spotted two females bustards around that area and one Lesser Florican. We had also seen a pack of wolves. I could hardly contain my happiness! There was one more pleasant surprise when we got back to the guest house near the Sanctuary. There was a female Great Indian Bustard chick, which has been raised in captivity. Adhisheshaya has been taking care of her ever since nearby villagers brought her





there when she was about a month old. He feeds her regularly with grasshoppers and other insects, and also takes her for a walk to the nearby grassland patch.

Next morning we visited a few other parts of the Sanctuary. After the excitement of the previous evening we witnessed some unpleasant things. There was a watch tower constructed amidst the grasses. Palm saplings were planted inside the grassland! I could see the sadness and frustration on Dr. Rahmani's face. He said, "You will see the consequences in coming years". His words stand true; since that visit in 2000 I have been to that place almost once a year till 2008.

My first alarm was when I re-visited in 2002. Collecting bird footprints in Sri Lankamaleswara WLS for my Jerdon's Courser work has made me a 'footprint freak'. I carried a bag full of fine soil to deploy a track plot to get a footprint of the captive Bustard. But was very disappointed and depressed when I learnt that she was killed by stray dogs. Although my visits were only for a day or two I sighted bustards on four of my eight visits. All my sightings were up to 2005. After that I

started witnessing the gradual deterioration of that beautiful grassland habitat.

For constructing the watchtower and planting exotic tree saplings the authorities had to take heavy vehicles inside the grassland. Tourists were allowed to walk and drive inside the grassland to reach the watchtower; this took a heavy toll of the delicate grassland ecosystem. By 2006, the entire patch of grassland invaded by exotic weeds. During the same trip I heard from Sanctuary authorities that they had received an egg of a Great Indian Bustard, laid in a farm. It came from villagers, of a nearby village, who had kept the egg in their refrigerator for two days!

In 2007, things were much worse. There was a percolation pond inside the grassland. A large area of grassland had been cleared and ploughed. And more depressingly, there was a report of an abandoned egg of the Great Indian Bustard. This had happened probably due to the disturbance at the nesting site by people. During my recent visit in September 2008, I was shocked to see that nearly 40 ha of the grassland had been cleared. When I questioned authorities I got an interesting



Interesting representation of the Great Indian Bustard, Florican and Courser created by the Forest Department

P. JEGANATHAN





Adisheshaya, a forest  
watcher who has been  
taking care of abandoned  
Bustards and the  
Rollapadu grasslands  
since a long time



P. JEGANATHAN

answer; “instead of removing the exotic weeds manually, to make things quicker, we used bulldozers.” I can’t express my reaction at this mindless act. Earlier in this article, I had mentioned that the grasslands of Rollapadu are one of the most beautiful places on this Earth. Not anymore. The problem has now gone beyond the Sanctuary. The major crops around the Sanctuary are ground nut and sunflower where the bustards forage and nest. The Telugu Ganga Canal, which passes close to the Sanctuary has been widened recently and it may lead to change in crop pattern in coming years.

During his visit to Rollapadu in 2000, Dr. Rahmani, after witnessing the mismanagement of grassland, wrote in the visitors’ notebook that, “... Karera Wildlife Sanctuary was established mainly for the Great Indian Bustards in 1981. Now it has got DFO, Forest Rangers, Foresters and Forest Watchers, but there are no Bustards...” He clearly recommended in his ‘Need to Start Project Bustards’ (for details visit: [www.bnhs.org](http://www.bnhs.org)) that “habitat protection and proper maintenance of core areas could help in increasing bustard population; and support from the local population is imperative since the bustard lives in marginal agriculture areas.” These words have to be followed as a gospel by the

authorities to save the only remaining population of the Great Indian Bustard in Andhra Pradesh. If not, the bustards in Rollapadu will go the way of the bustards of Karera.

Habitat alteration and destruction is a major threat for many birds around the world. Scientists proved that even a subtle change in the habitat will have an adverse effect on survival of birds. Scientific studies show that extinction rate is higher for species that occur at lower elevation since their habitats are easily accessible and prone to various anthropogenic activities. For example, it is very easy for a bulldozer to wipe out about hundred hectares of scrub jungle or grassland habitat in a day. What can we do to stop this and save these precious habitats from further deterioration? It is not possible for a birdwatcher or a nature enthusiast or a scientist or even an activist to stop this single handedly. We need a collective effort from politicians, bureaucrats, scientists and locals to tackle this issue effectively.



P. Jeganathan is a former researcher of BNHS. He spent eight years in Andhra Pradesh studying the critically endangered Jerdon’s Courser. He is presently working with Nature Conservation Foundation, Mysore.



# Pristine Forests in a Metropolitan City

Text: Krishna Tiwari

## About the Initiative

The 'City Forest Initiative' aims to conserve the last remaining natural habitats of Mumbai and Thane, especially the Sanjay Gandhi National Park (SGNP) and the Tungareshwar Wildlife Sanctuary (TWLS), with the objective of systematic documentation of flora and fauna, conduct awareness campaigns to gather local support for the protection and advocacy with Government for better protection measures and conservation of urban diversity. This Initiative was initially supported by DSP Merrill Lynch and Mr. Sunjoy Monga, and is currently supported by the India Book House-City Forest Fund, BNHS.



Leopard



Leopard awareness campaigns are important to sensitise people living along the Park periphery



BNHS PHOTO LIBRARY

I have spent most of my childhood playing and wandering in the hills of Sanjay Gandhi National Park (SGNP), Mumbai. As a child, my mischievous interactions with frogs, butterflies, crabs, fishes, and snakes induced an immense love for nature so insistent that it led me to opt for a career in wildlife conservation. Even as a youngster, I assisted on rescuing snakes, birds, at times even Sloth Bears, extinguishing forest fires and so on. Further, my associations and workings with NGOs, like WWF, Bombay Environmental Action Group (BEAG) and Indian Wildlife Club helped my passion to grow into a full time profession with the BNHS.

### SGNP, An Urban Forest

Mumbai has a priceless wilderness within its municipal limits. The SGNP covers an area of c. 104 sq. km; it is rich in biodiversity and supports more than 1,000 species of plants, 40 species of mammals, 150 species of butterflies, 250 species of birds and 36 species of herpetofauna.

Situated towards the north of SGNP is the Tungareshwar Wildlife Sanctuary (TWLS) of 95 sq. km. It was classified as a sanctuary in 2003, after sustained efforts by the BNHS to protect the forest. The Park and Sanctuary together form a 200 sq. km protected area

for the flourishing urban biodiversity.

The BNHS has been associated with SGNP for more than three decades, and this was largely due to the vision and foresight of Mr. Humayun Abdulali, an emeritus naturalist of the BNHS. In 1975, with the assistance of distinguished lawyers and members of the BNHS, he filed a Public Interest Litigation against the Central Government's plan to build a road connecting Goregaon to Mulund, two suburban areas of Mumbai city. Finally, the Bombay High Court gave a stay order and work on the road was halted.

The BNHS under its Conservation Department initiated the City Forest Initiative, more than a decade ago, to protect the forests of SGNP and adjoining forests. The Initiative focuses on systematic documentation of the conservation issues of urban biodiversity, conducting awareness campaigns among locals for the protection of flora and fauna, and advocacy for the promotion of environmentally friendly policies from the Government.

### Human-Leopard Conflict

The beautiful forests of SGNP house Leopards – its main predator, and also numerous illegal settlements. More than 55 *nagars* and *padas*, and two revenue villages







Awareness campaigns are at present conducted in human-leopard conflict areas in the Park

– Chena and Yeur – with a population of more than 2.5 lakhs, are situated inside the Park. The ever growing population in Mumbai's suburbs have eaten into the buffer zone, encroaching parts of SGNP, further reducing the Leopard's habitat. With their natural prey base depleted, the Leopards wander from the forest into these settlements, which provide abundant prey in the form of dogs, chickens, goat, and pigs. Furthermore, the absence of boundary walls in residential complexes makes human life vulnerable to Leopard attacks. Human-Leopard conflicts have become a serious and sensitive issue for the authorities, and people staying in and around the Park.

### Leopard Awareness Campaigns

Between 2001 and 2007, 105 cases of Leopard attacks were reported; 57 people died in the attacks and more than 48 were injured. Around 80 per cent of the victims were reported to be women and children. These Leopard attacks prompted the formation of a Leopard Committee in 2004, initiated by the Maharashtra State Forest Department, with the help of BNHS, and other experts. Based on recommendations, it was decided that the Human-Leopard conflict should be addressed and resolved through public awareness campaigns. In 2005, BNHS under its City Forest Initiative started

awareness campaigns on Human-Leopard conflicts. Educational materials in Marathi, on banners and posters, were displayed to help avert Leopard attacks. Local community leaders and representatives participated for the coordination of the campaigns in their respective areas.

The BNHS campaign focused on sensitive *nagars/padas* with high frequency of Leopard sightings and attacks. The Education team interacted with more than 15,000 individuals in around 37 *nagars/padas* in 2005, and more than 45 *padas* in 2006, during these campaigns.

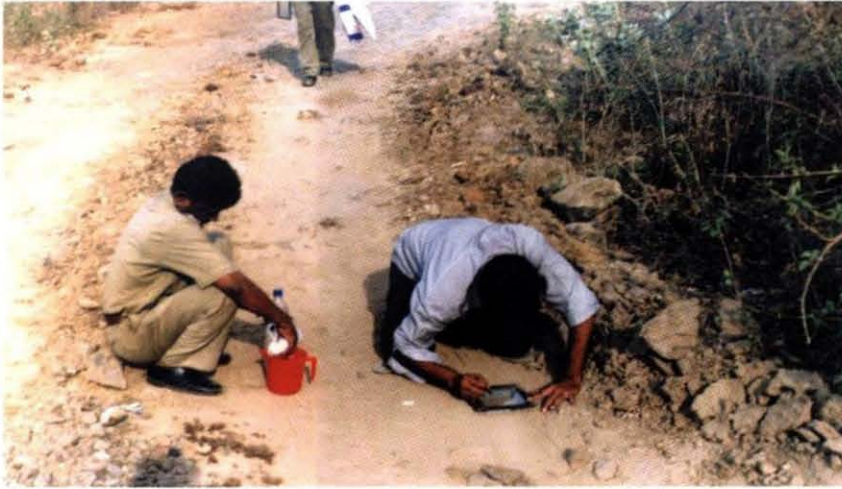
The initial challenge was to convince the residents of the need to co-exist with wildlife, as the locals were agitated with the Leopard attacks. The results of the continuous work are evident from the reduction in conflict incidences since the inception of the campaigns. However, reductions in conflict cannot be entirely credited to the campaigns; following a series of Leopard attacks in 2004 the Forest Department conducted massive Leopard-trapping exercises, trapping more than 22 Leopards from the affected areas of SGNP.

### Additional Threats

Three Leopards, between 5-6 years old, died mysteriously between October 2007 and January 2008. It was alarming that these







▲  
Wildlife Census – BNHS supports the Forest Department in collecting data for Leopard census

deaths occurred within three months in the Kavesar beat of Yeur range, SGNP. A survey was conducted to resolve the mystery behind these deaths. The study revealed startling factors, like swelling and position of the body, common in all the three incidents, and rumours of a possibility of the leopards being poisoned by local villagers.

Such incidents can go unnoticed in core areas and there is an urgent need to check the entire Park. The reply to a letter sent by BNHS to the Forest Department requesting them to share the post-mortem reports is still awaited.

Leopards also face potentially fatal threats from speeding vehicles, especially in the night, when the animals cross Ghodbunder road to get from one side of the Park to the other. More than 13 leopards have been killed since 2005 due to accidents on Ghodbunder road.

Two separate incidents of leopards straying into Thane city were witnessed within a year. In December 2007, one of them attacked two people, before being tranquilised and taken back to the Park. Recently, on November 17, 2008, a Leopard was captured outside the Park in Majiwade, Thane. An assessment of the leopard population living outside the boundaries of SGNP is needed, as frequent leopard sightings are reported in Aarey Milk Colony and areas outside the Yeur Hills. Leopard attacks on children living in complexes close to or in the periphery of SGNP are also reported. Two leopard cubs were caught by

locals and handed over to the Forest Department in May-June 2008 from the periphery of Yeur hills, these cubs later died.

### Leopard Research Project

BNHS has undertaken a project with the Forest Department to understand the diet composition of Leopards in SGNP, through the study of scats. More than 140 samples of Leopard scats were collected from different areas. A questionnaire on 'Human-Leopard conflict' and 'livestock population' was circulated in and around SGNP as part of this Project. Analysis of the Leopard scats is ongoing and the final report will be ready by March 2009.

### Maharashtra State Wildlife Census

The Maharashtra State Wildlife Census in SGNP is conducted in April and May every year, and involves a four-day pugmark census followed by a two-day waterhole census. Active participation, coordination and volunteer support for the Maharashtra State Wildlife Census at SGNP and TWLS is run by the City Forest Initiative.

### Festivals within SGNP and TWLS

*Mahashivratri:* SGNP houses temples, ashrams and Kanheri Caves, an archaeological site. The Buddhist stupa in the Kanheri caves of SGNP, misconceived as a Shivling, prompts lakhs of devotees to visit the Park on Mahashivratri, a Hindu Festival, in the auspicious month of Shravan. Tungreshwar Wildlife Sanctuary (TWLS) houses the ancient Tungar Temple, visited by more than 200-250 thousand devotees on Mahashivratri day.

Serious ecological disturbances such as forest fires and littering are caused by the huge crowds. Private vehicles are not allowed within the Park on Mahashivratri, but some belonging to the Temple Trust, Police and Forest Department are allowed up to the Temple.

Since 1997, BNHS under its City Forest Initiative has been running public awareness campaigns and managing the crowds at the SGNP and TWLS along with the support of the Forest Department and other local organisations. Crowd management is crucial





to reduce incidents of forest fires and curtail littering.

Information banners are posted at crucial points of entry of the forest. More than 100 volunteers take the responsibility of controlling and monitoring the situation at several locations in SGNP. The situation with sustained efforts over years is under control.

At Tungreshwar Wildlife Sanctuary, around 30 BNHS volunteers along with the Forest Department are placed at the entry point, i.e., Satvli and Tungar temple. Private vehicles are restricted on Mahashivratri. The strict control was brought to effect from 2004.

Noise pollution is another nuisance during Mahashivratri, but since a few years selling of blow horns is strictly prohibited and blow horns in possession of vendors are confiscated. The most encouraging sign over the years is the awareness among the locals. Also, there is a marked decline in the number of visitors to Sanjay Gandhi National Park since the past three years.

*Urs*: BNHS noticed the celebration of Urs – a Muslim festival, within SGNP in 2005. Since the last four years, the festival is being documented and a strict vigil is kept along with the Forest Department every year on the activities. Urs is celebrated every year in May for three days in honour of a holy man.

About 10,000 people visit the illegal dargah of Mama Bhanja and Mastaan, situated at around 389 m and 183 m respectively in the hills of the Yeur Range, in the core area of SGNP and very close to a defence installation in Yeur. The crowd trespass into the Yeur hills from a broken forest wall and from other entrances, and put up tents in the forest for three days and nights. Generators are used for lighting. Food is provided to the visitors and around 12-15 goats are sacrificed during the festival.

Forest fires are reported and water holes dry up due to over usage by the visitors during Urs. Hawkers sell refreshments, tobacco products, water, and contribute to large scale scattering of garbage and non-biodegradable wastes like plastics bags, and bottles. Crackers and bands disturb the serenity of the forest.

#### **Balyogi Sadanand Ashram**

The main threat to TWLS is from the religious encroachment by Balyogi Sadanand Ashram for which more than 0.6 ha of forest land is claimed and a motorable road is built through the reserve forests. This activity has been carried out silently for almost two decades. Hundreds of trees were uprooted, resulting in soil erosion due to the mining and blasting activity done in the past.



Large pandals are put up for Mahashivratri celebration at both SGNP and TWLS



KRISHNA TIWARI



Officials from the Forest Department – Assistant Conservator of forests (ACF), Range Forest Officer (RFO) and Guards were beaten up by the devotees of the Ashram when they tried to confiscate illegally kept peafowls from the ashram premises. Since then no personnel of the Forest Department has dared to venture into the Baba's premises. Recently, the Central Empowered Committee of India has given orders to demolish the temple, which is a positive step towards conservation. But the

Department, Police and Excise Department appeared to take cognizance. Nevertheless, some illicit liquor dens continue to exist and are scattered in the forest area of SGNP inspite of the frequent raids by the Forest Department. Trees are cut rampantly to heat the boilers for making liquor. The waste is also disposed off nearby, thus polluting the water holes and threatening the wildlife. The BNHS under the Initiative conducts regular check ups with the Forest Department and appropriate action is initiated.



The vast crowds arriving at TWLS during Mahashivratri cause a lot of disturbance in the Sanctuary

KRISHNA TIWARI

demolition is still awaited.

### Agricultural Encroachments

In SGNP, villages have encroached forest land and practice agriculture. They receive complete support from tribal organisations. Paddy is the main crop here, but *Jatropha* sp. (plant generally used for bio-diesel) is now being promoted actively by the *Shramjivi Sanghatna* and more than 250 hectares of forest land is encroached upon. There is an ongoing conflict between the village agriculturists and Forest Department.

### Liquor dens

The forests of SGNP has been infested with illicit liquor production in the past, but after the Government banned the production and sale of illicit liquor, the Forest

The destruction of forest habitats due to encroachment for cultivation, massive tree felling, illegal mining activity and brick kilns along the periphery of the Sanctuary are commonly faced threats.

### Tree Felling

Tree felling is active in SGNP, mainly in the Nagla block and Yeur hills. Trees are felled very systematically and left to dry and later taken away. Boats used for patrolling to check illicit felling in Nagla block are out of order for a long time, and the lowered levels of vigilance has led to massive tree felling in the Nagla block.

### Forest Fires

Almost every exposed area of the SGNP is vulnerable to forest fires. The ecological





damage as a result of forest fires has never been estimated, as it is not practical, but it may be assumed to be severe. Human interference throughout the Park areas, mainly local encroachers and picnickers, as there is no boundary wall, makes the situation difficult. Insufficient work force and infrastructure adds to the problem; the Forest Department cannot be blamed as most fires are lit up late in the evening and the steep terrain of the hills makes the task of extinguishing the fires more difficult.

The City Forest Initiative is planning to include an awareness programme on forest fires in SGNP.

### Encroachments

Conservation of SGNP involves tremendous physical strain as research and conservation can take you miles into the forests. One recent study involved an intensive survey on the encroachment into SGNP. It was conducted in collaboration with French researchers from the Centre for Human Sciences. The Study resulted in a paper on "Social Exclusion, Territories and Urban Policies (SETUP)".

### The Future of SGNP

There is no doubt that SGNP contributes to public health and welfare of the present and future generations. The Tulsi and Vihar lakes (whose watersheds lie within the park boundaries) supply about 5 per cent of Mumbai's drinking water. SGNPs contribution as the natural carbon sink of Mumbai and also as a sponge during the monsoon season speaks volumes about its importance. The heritage value invites educational and historical excursions by both local and foreign students.

The serenity of SGNP clashes with the dangers that threaten to destroy all biodiversity within the Park. SGNPs proximity to the buzzing city of Mumbai – popular as the financial capital of India makes the Park even more vulnerable to threats. We are actively destroying the small patch of nature that we have been graced with. The need of the hour is to be involved now for there may never be a tomorrow! 🐦



Krishna Tiwari is presently Project Officer, City Forest Initiative with Conservation Department at BNHS.

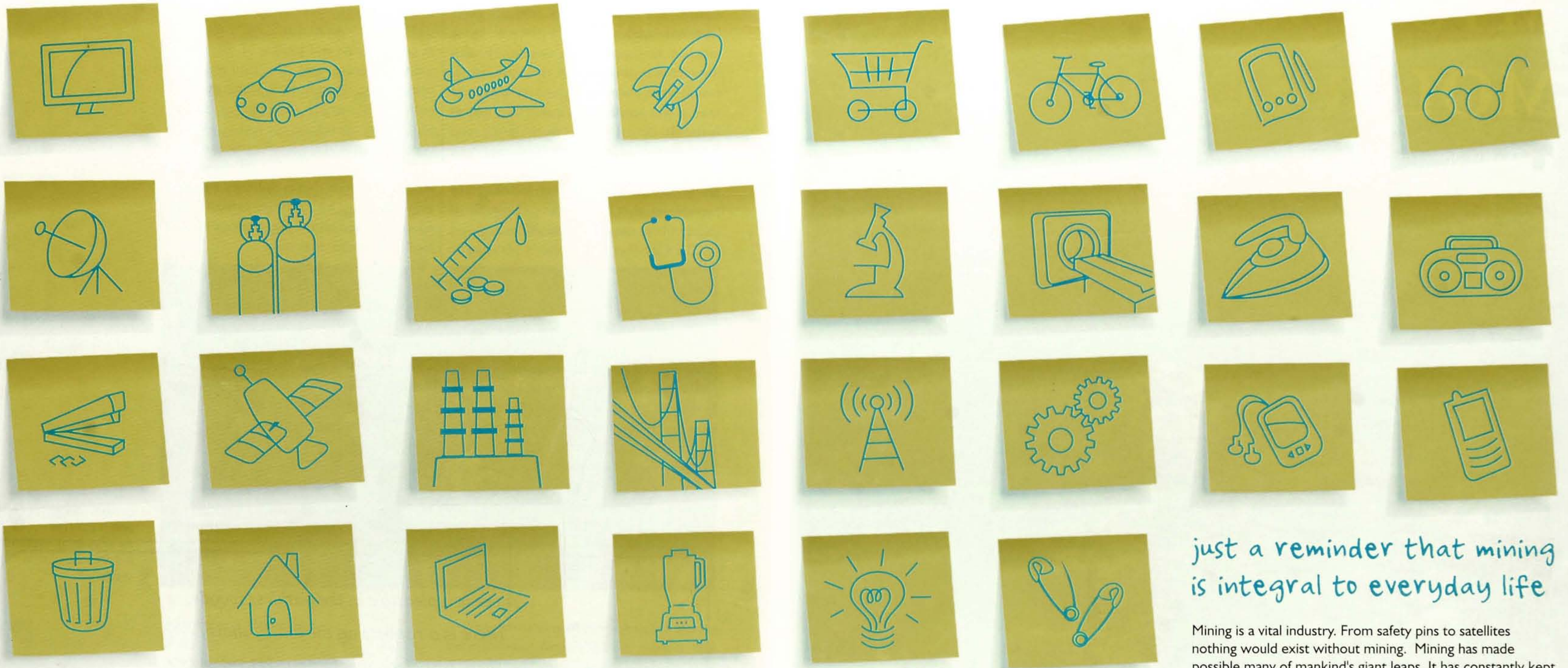
*There is a pleasure in the pathless woods,  
There is a rapture on the lonely shore,  
There is society, where none intrudes,  
By the deep sea, and music in its roar:  
I love not man the less, but Nature more.*

— George Gordon, Lord Byron,  
*Childe Harold's Pilgrimage*

We are grateful to  
**SETH PURSHOTAMDAS THAKURDAS & DIVALIBA CHARITABLE TRUST**

for a generous donation to the  
*Pratap Saraiya Hornbill Fund*  
to support the publication of *Hornbill*





just a reminder that mining  
is integral to everyday life

Mining is a vital industry. From safety pins to satellites nothing would exist without mining. Mining has made possible many of mankind's giant leaps. It has constantly kept pace with change and changing priorities of the world.

The industry has leveraged modern technology, computers, advances in geochemistry, to embrace responsible mining and established systems to independently verify compliance with environmental, human rights and social standards.

Mining continues to add value to nature's resources in a sustainable way.





# MYSTERIOUS MOLLUSCA !!!

Text: Deepak Apte, Dishant Parasharya and Bhavik Patel

## About the Project

In 2001, Ministry of Environment and Forests started an All-India coordinated project on 'Taxonomy – Mollusca'. BNHS was identified to coordinate the Project and document the molluscan fauna of Gujarat. The prime objective of the project was to fulfill the lacuna in the knowledge of marine mollusca in India.



Octopus





BHAVIK PATEL

The basic colours and patterns of some molluscs are genetically inherited, while some are the result of diffraction of light

**T**axonomy is the practice and science of classification. The word comes from the Greek word *taxis* (meaning order or arrangement) and *nomos* (meaning law or science). Taxonomies, or taxonomic schemes, are composed of taxonomic units known as taxa, or kinds of things that are frequently arranged or rearranged in a hierarchical structure.

Some of you may argue, not a very interesting introduction! Well, let us put it this way the human mind naturally organises its knowledge of the world into systems, making it easy to understand. Once we know what we have, only then can we protect it better. And the 'All-India Coordinated Project on Taxonomy – Mollusca' was started with the intention of documenting the taxonomy of Mollusca. The BNHS and few other organisations undertook this project which was divided in sections to make it easier to study. The reason for this may be that Mollusca is the second largest phylum consisting of 1,25,000 living species and 35,000 extinct ones.

So, what are Molluscs? Molluscs may be defined as, animals having a soft body whose

shells are either fully developed, reduced, and internal or absent. In other words, clams, snails, squids, octopuses, sea slugs form a part of molluscs. So one can say that, molluscs are found in almost all major waterbodies, moist soil in gardens or various forest types.

They have found their niche and range from the deepest ocean trenches to high up on mountains, but among these, the maximum number of species thrive in the seas. In this article, we focus exclusively on marine mollusca.

From shallow intertidal areas to deep sea zones, molluscs occupy every niche. To overcome various environmental stresses, molluscs show remarkable adaptations to survive in varied marine environment. Brilliantly coloured nudibranchs defend through toxins they possess, while an octopus shows remarkable ability of camouflage. Squids and nautilus are among the swiftest invertebrates. Giant Clams are the largest bivalves. Molluscs greatly vary in size, ranging from 400  $\mu\text{m}$  (micrometre - one millionth of a metre) to several metres long (Giant Squids). Depending on the shape, and



Among shells, several species of textile cones are known for their lethal neurotoxic venom



Most cowrie have beautiful and colourful patterns on their shells



DEEPAK APTE

structure of their shell, molluscs are classified into six classes. There are mainly two systems of classification used to classify molluscs.

One of the systems is based on the structure of radula, a tongue-like structure with transverse rows of denticles (teeth-like structure) on the upperside. Different molluscs have different feeding habits: herbivores, carnivores, scavengers, detritus feeders. The radula is modified depending upon the feeding habits. Changes in the radular structure give clear evidence of evolution from the lower algal scrapppers to the predatory molluscs.

The other system of classification is based on the structure of shells. The shell of any mollusc is secreted by the 'mantle', which is, in some cases, the respiratory and protective membrane of the animal. The outer layer of the shell is the peristocratum and the inner layer is the nacre or the mother-of-pearl. Nacre, is an organic-inorganic composite material produced by some molluscs. It is strong, resilient, and iridescent and is found in some bivalves, gastropods and cephalopods. The inner layer of the shell in most molluscs is merely porcellaneous and non-nacreous, resulting in a non-iridescent shine. The peristocratum is made up of



DEEPAK APTE

Leopard Doris are one of the surreal looking Nudibranchs (Sea slugs)

organic material and the remaining shell is made up of calcium carbonate. Two types of crystallized calcium carbonate are usually observed in a cross section of the shells. A combination of various characters, such as external morphology and radula, form the basics for taxonomy. In recent times, the DNA system of classification, an innovative tool, is used for classifying molluscs. This classification system has helped tremendously in the taxonomical restructuring of many genera and species in the last decade.

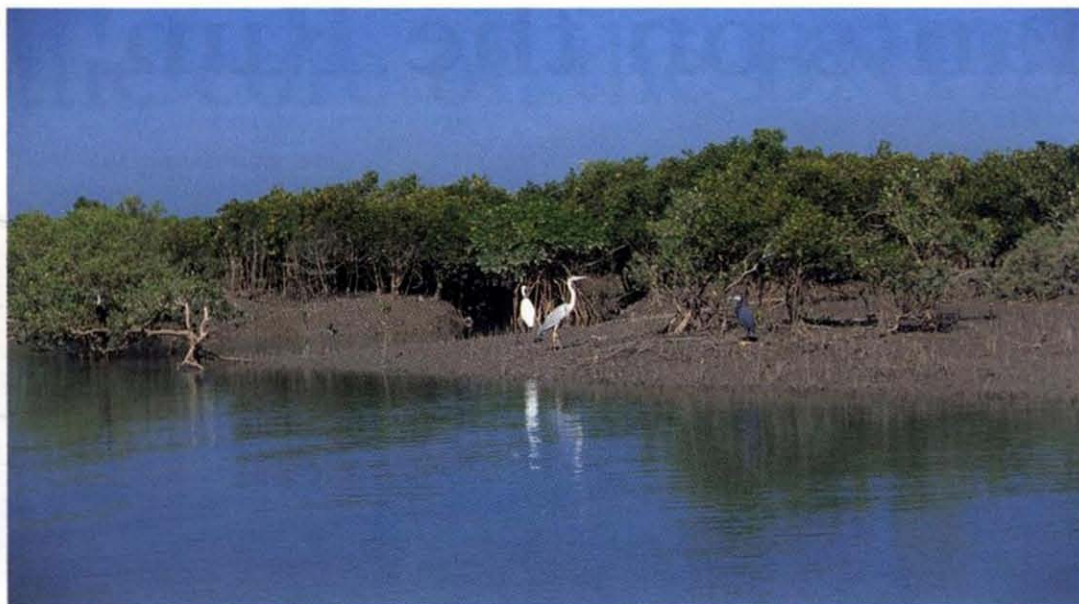
#### All India Coordinated Project on Taxonomy – Mollusca

The diversity of marine mollusca is poorly documented in India, especially along the west



The largest mollusc that lacks a shell is the Giant Squid of New Zealand, which can grow up to 22 m





DEEPAK APTE

Mollusca are found in large numbers in almost all major waterbodies

coast. In 2001, the Ministry of Environment and Forests (MoEF) started an All-India coordinated project on "Taxonomy Mollusca". The prime objective of the project was to fulfill the lacuna in the knowledge of marine mollusca in India. Being the largest and oldest NGO working in the field of nature conservation, the BNHS was identified to coordinate the project and document the molluscan fauna of Gujarat. Gujarat has a coastline of 1,650 km, the longest in the country; hence to cover all the coastal locations was not an easy task.

The Gujarat coast offers a wide variety of habitats: sea grass beds, mud-flats, sandy and rocky shores, coral reefs and mangrove. Each habitat is represented by distinctly different molluscan life.

The data collected also shows an overlap of distribution of the molluscan fauna with

that from the Persian Gulf and Mekran Coast to the Gulf of Kutch, thus, supporting the theory of a large hydrographic influence of the Indus fan on the species diversity of this region.

Under the capacity-building program of the Project, BNHS prepared a toolkit on 'Molluscan Fauna of Gujarat State, India' that illustrates 188 common species found on the Gujarat coastline. About nine workshops have been arranged, so far, for post graduate students and two workshops for the forest department.

Gujarat state is undoubtedly very rich in molluscan diversity. The documentation is ongoing as the complete study of the diversity of bivalves, cephalopods, scaphopods and nudibranchs still remains. BNHS will continue its work to understand the popular, but least studied molluscan fauna. ☺



Deepak Apte is Assistant Director, BNHS and Principal Scientist of "Project Taxonomy - Mollusca".



Dishant Parasharya is the Project Officer on the Molluscan Taxonomy Project of the BNHS.



Bhavik Patel, is the Education Officer in Project Mangrove (Gujarat Unit).

We are grateful to  
**RISHAD NAOROJI**  
for a generous donation to the  
*Kekoo Naoroji Memorial Fund*  
to support the publication of *Hornbill*



# Elephants on the Run!

Text: **Ranjit Manakadan**

## **About the Project**

The Elephant Project was conducted in two phases (January-December 2005 and September 2006-March 2008), and was funded by the US Fish and Wildlife Service (USFWS). The main objective of the Project was the assessment of a case-history of dispersal and colonisation of the elephants in Tamil Nadu and Andhra Pradesh.





Once distributed over a wide geographical region in Asia, the Asian Elephant *Elephas maximus* has declined over much of its range and has an estimated world population of around 40,000 animals. More than 50% of these occur in India, confined largely to the forests of the Himalaya and the Western Ghats. Even in these last refuges, elephants face increasing pressures due to India's alarming human population growth. Since the 1980s, elephant populations in the fringe areas of these refuges have started to disperse, colonising habitats in which they did not occur for centuries. One such case was the dispersal of elephants in the 1980s from the Hosur-Dharmapuri forest areas of Tamil Nadu to *c.* 60 km north-east into what was later declared as the Koundinya Wildlife Sanctuary (Chittoor district, Andhra Pradesh). Later, herds and bulls (male elephants) from Koundinya further dispersed *c.* 100 km northwards into Sri Venkateswara Wildlife Sanctuary-National Park (Andhra Pradesh) and *c.* 40 km south-east into the Javadi hills of Tamil Nadu.

The elephants of Koundinya Wildlife Sanctuary were subject to a BNHS-US Fish and Wildlife Service collaborative research project. The Project (January 2005 to



RANJIT MANAKADAN

December 2005) provided substantial information on the situation of elephants and their habitat in Koundinya Wildlife Sanctuary (see *Hornbill*, January-March 2006: 12-15). Nevertheless, the study was incomplete in two major aspects. One was that it was essential to know the situation of elephants and habitat in the other colonised site in Andhra Pradesh, the Sri Venkateswara Wildlife Sanctuary-National Park, to assess the long-term potential of the elephant

▲ Recording food plants of elephants along a feeding trail helps to understand the plant species they prefer



ASHOK KUMAR

◀ Elephants at a saltlick for nutrient intake





populations now in Andhra Pradesh. The other was to know reasons for elephants deserting their original home, the contiguous Hosur and Dharmapuri reserve forests. Was it a consequence of habitat loss, degradation and disturbance or an increase in elephant populations beyond the carrying capacity of the habitat? This was the genesis of another

we were involved in some of the census exercises and workshops conducted by them. Significant was our involvement and inputs in the drafting of the first working plan of the Koundinya Wildlife Sanctuary for the Chittoor Forest Division. The studies undertaken under the Project estimated the population/density, distribution and

movements of elephants in the study sites, assessed the quality of the habitat in terms of food, water, saltlick resources and the degree of human related pressures, assessed the loss of forest cover over the years through GIS techniques, and investigated the problem of human-elephant conflict occurring in these areas.

Our earlier project in Koundinya Wildlife Sanctuary (KWS) had established the numbers of elephants at 13 animals – a population theoretically not viable in the short- or long-term survival of a species. Additionally, the situation of the Sanctuary, a relatively small, isolated, narrow, linear strip of forest patch, appears grim due to the pressures on its natural resources from about 60 bordering villages, besides

towns of Tamil Nadu in the plains. What is the status of elephants and the habitat in the other colonised site in Andhra Pradesh, the Sri Venkateswara Wildlife Sanctuary-National Park and in their original home, the Hosur and Dharmapuri forest tract?

The Sri Venkateswara Wildlife Sanctuary and National Park (SVWS-NP) is one of the more well-known wildlife refuges in southern India due to the Tirumala temple nestled in the Seshachalam hill range. Compared to KWS, the site conditions are better in SVWS-NP. SVWS-NP is larger (526 *vs.* 357 sq. km), more compact (*vs.* linear), and there are no villages in its confines except for the Tirumala temple settlements. Additionally, the reserve forests that border it serve as a buffer against human and human related disturbances and pressures. Bamboo (a sought after food plant for elephants in grass deficient areas) was



M. RAMESH BABU

▲  
Elephants are intelligent animals and learn to break even sophisticated electrified fences to raid crops

one-year BNHS-USFWS project, titled, 'The Population, distribution, habitat, and problems of the Asian Elephant in Andhra Pradesh, India, including an assessment of the causes of their migration from the Hosur-Dharmapuri forests of Tamil Nadu into Andhra Pradesh'. The fieldwork of this Project ended in March 2008. On a larger scale, the study was significant as its findings would help wildlife managers to better understand and manage problems associated with dispersal and colonisation of elephants.

The team was headed by J.C. Daniel, with Ajay Desai as the 'Species Consultant' and Mohan Raj as the 'GIS Consultant'. The field staff consisted of S. Swaminathan, M. Ramesh Babu and G. Balasubramanian, besides me. The Andhra Pradesh and Tamil Nadu forest department staff extended us generous help in the three study sites, and

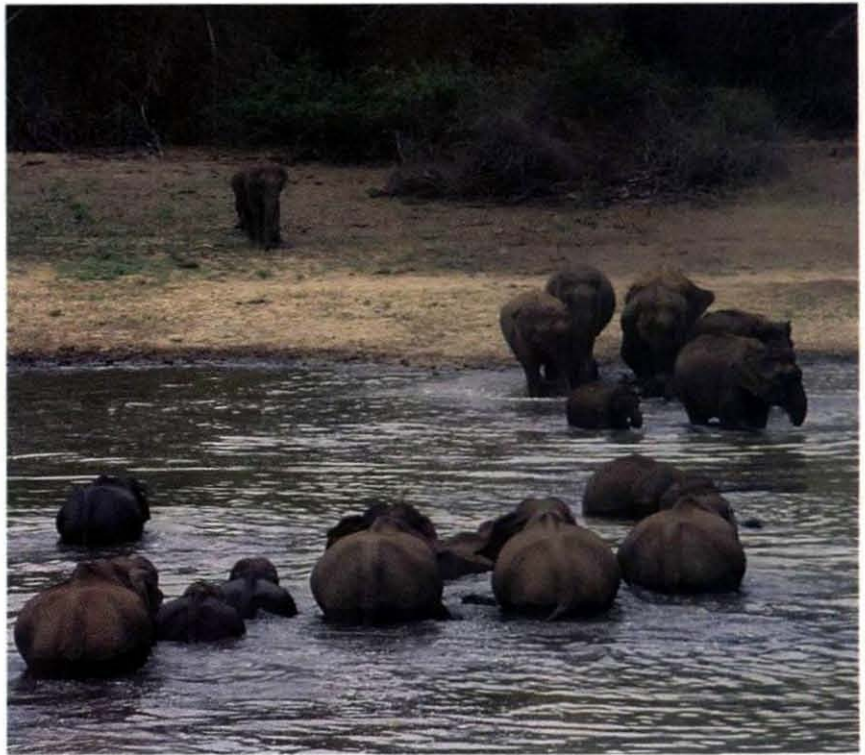




found in abundance in the Talakona area of SVWS-NP, unlike in KWS where it is a scarce commodity. Water is not scarce in the forest (unlike in KWS) due to the presence of a number of reservoirs, and thus, elephants do not have to depend much on village tanks, thereby reducing the incidences of human elephant conflict.

However, SVWS-NP does face pressures and disturbances. Having a large number of villages along its fringes, makes it extremely difficult to control wood-cutting and grazing pressures. Though the hill areas are less subjected to pressures from locals due to distance and difficult accessibility, comparison of 1990 and 2003 satellite imageries revealed that the hilltop areas have become more open than the plains. This is probably due to a combination of skeletal and crystalline soils, poor regeneration (due to poor soil) and higher frequency and intensity of fires due to the tall *Cymbopogon* grass dominant on the hilltop. Wood-cutting and movement of people were recorded much more in the plains, and especially along the eastern part that borders the state highway and the Chennai-Cuddapah-Mumbai railway line. The SVWS-NP has Red Sanders *Pterocarpus santalinus*, whose wood is highly priced in Japan for making musical instruments. There are regular reports in newspapers about seizure of smuggled Red Sanders during transit to Chennai for export. Besides villages, there are also a number of towns along the borders of SVWS-NP. The largest town Tirupati sees an influx of about 40,000 pilgrims on a normal day for the onward journey to Tirumala temple placing huge demands on water resources. Renigunta, Kodur, Rajampet, Rayachoti, Piler, Nerabylu, Bhakarapet and Rangampeta are the other towns along its borders. The Talakona area, with its spectacular waterfalls, has a peculiar problem of being a favourite site for shoots for Telugu films. Besides being a disturbance to wildlife, litter gets generated and we even saw elephant dung lined with plastic bags (see picture on page 66).

The population and distribution of elephants in SVWS-NP was difficult to



M. RAMESH BABU

▲  
Cow elephants with calves  
at a water hole in the  
Hosur area

estimate due to the vast area, poor accessibility and difficult field conditions. We obtained only three sightings of elephants, comprising of a *makhna* (tuskless bull), and two herds of probably seven or eight animals. We also found the decomposed remains of an elephant in the Talakona area and saw the dung of a (abandoned/lost?) newly born calf around the Kodur area. Interviews with villagers, herdsmen, woodcutters, Forest Department staff, and augmented by our direct and indirect records, indicate that there were around 30 animals in the area. The population though higher than KWS is still short of 50, hypothesised as the minimum viable population for survival of a species in the short term (to avoid in-breeding depression) and way off 500 (for long term survival from an evolutionary point of view). With this small population and human related pressures on the habitat (that is bound to increase with the passing years), the animals of SVWS-NP, as in KWS, also do not really have a future.

The Hosur-Dharmapuri forest area (2056 sq. km) occupies the receding slopes of the Mysore plateau, mainly the Melagiris hills.





The Cauvery river, the major water source, forms its south-western and southern boundary. Wildlife sanctuaries and forest tracks that adjoin the Hosur-Dharmapuri reserve forests are the Bannerghata National Park to the north, Kanakapura Forest Division to its north-west and Cauvery Wildlife Sanctuary to its west and south. The former (prior to bifurcation) Dharmapuri district was once considered as a backward district of Tamil Nadu, but things have changed with the demand for its sizable high-



Plastic bag in elephant dung

M. RAMESH BABU



View of a healthy forest patch in Hosur Forest Division

M. RAMESH BABU

quality black granite resources. It has also become a major cultivation area for mangos in Tamil Nadu. Hosur, once a sleepy village, is now a major industrial hub. Another drawback from the conservation point of view is its proximity to the metropolis of Bengaluru (earlier Bangalore), 40 km from Hosur. The rich have started buying land in the area to develop farm houses and resorts. Brick kilns are now widespread throughout the area to meet the infrastructure growth of the nearby towns and cities. We came across around 70 brick kilns during a survey of the area with a concentration around the Jawalagiri Range. To fire the bricks, fuelwood

is required, which is sourced (illegally) from the forests. The pressures will only increase with the years with the growing human population. Bengaluru has witnessed a human population growth of 34.8% during the last 10 years and its population is now c. 6.5 million.

A brief survey of the Hosur-Dharmapuri forest is sufficient for one to know why elephants had dispersed from their original home. Its shape is a classical example of what a wildlife sanctuary should not be. Its convoluted boundary with several projections and indentations and the presence of numerous small and large village enclaves within its expanse exposes the habitat to





human related biotic pressures and increases the interface with agriculture, thereby resulting in a high degree of human-elephant conflict. The Forest Department receives a regular stream of crop damage claims from farmers each year. An alarming twenty-one human deaths (2001 to 2008) and seventy-four elephant mortalities (1991 to 2008) have been reported. Does one need further proof to know if the situation is grim for the elephants in Hosur-Dharmapuri?

As for the population of elephants in Hosur-Dharmapuri forests, Ramesh Kumar of the BNHS (who carried out an intensive 4-year study during the late 1980s and early 1990s) estimated a minimum of seventeen bulls and two hundred and forty one individuals of family units resident in the area, totaling two hundred and fifty eight animals. Though our study was not intensive and long-term to estimate the population, it is likely that there has been a decline in elephant populations over the years. Besides a decline in population, the sightings suggest a skewed sex ratio in favour of females. Analysis of the herds sighted and photographs taken by us and Forest Department personnel revealed very few males in the age group of 5-15 years. Only juveniles, with small tusks were recorded in family herds. Poaching of bulls is known to have resulted in severe skewed sex ratios of the Asian Elephant almost all over its range in India.

All the three study sites lie in the Eastern Ghats, a disjointed stretch of hill ranges of peninsular India that support the last tracts of remnant forests (and wildlife) of the eastern parts of the peninsula. In spite of the role it plays, the Eastern Ghats are facing serious threats due to the pressures for natural resources from the growing human population and industry. Can this stretch, generally considered a poor cousin of the Western Ghats, especially support elephants in the long run with all the tremendous pressures they face now? Another serious problem is that all the three study sites have been overrun by the invasive weed *Lantana camara* (except in crystalline soil tracts). To add to these problems, elephants have



Source: HOSUR FOREST DIVISION

▲  
Post mortem of a train-hit elephant by officials

destructive feeding habits pushing down trees, debarking, breaking branches, thus killing trees and shrubs. This was beneficial (to both elephants and other wildlife) and sustainable in the long run when elephant ranges were vast, but not now with elephants surviving in remnants of what were once large forest tracts. The impact of elephant's feeding habits in isolated or fringe habitats like SVWS-NP, KWS and Hosur-Dharmapuri will be severe in the long-term.

Summing up, I really wonder whether we were investigating a case of dispersal and colonisation of elephants. Dispersal usually connotes to cases of increasing populations: the excess animals moving out to colonize new areas for survival, thus increasing their overall population and distributional range. But in the case history of Hosur-Dharmapuri – KWS – SVWS-NP investigated by us, this appears to be a case of 'elephants on the run!' They 'ran out' of their original home to survive, are still on the run in the colonised areas, and will in all eventuality, be hopelessly on the run for the rest of their lives till extinction. 🐘



Ranjit Manakadan has been working with the BNHS since the early 1980s. He is presently an Assistant Director at the Society.





# Conservation Department – the core of the BNHS

Text: **Rushikesh Chavan**

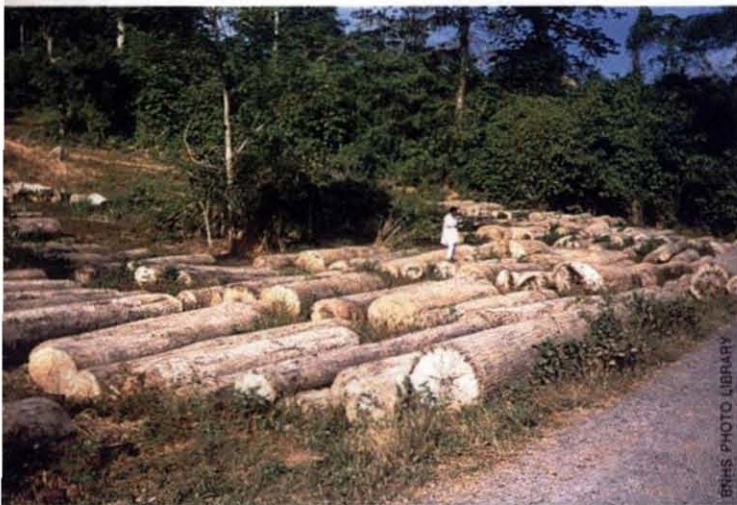
BNHS Mission: Conservation of nature, primarily biological diversity, through action based on research, education and public awareness.

RUSHIKESH CHAVAN

Jim Corbett National Park







**C**onservation of nature has always been a core area of interest of the BNHS. The first major conservation effort of the Society can be traced back to 1933 when S.H. Prater, a former curator of the Society, presented a paper on “Problems of Wildlife Protection in India”, during the Society’s Golden Jubilee Function. Later, the BNHS was closely involved in the development of the Bombay Wild Animal and Wild Bird Protection Act, 1951, which subsequently formed the basis of the present Wildlife (Protection) Act, 1972. The Conservation Department of the BNHS works on a three pronged approach – core research on issues of national and global significance, advocacy with various stake holders and education for creating public support for conservation. The Department has launched several initiatives, such as City Forests and Urban Biodiversity, Islands and Oceans Initiative, Armed Forces Cell, Conservation Education Unit, and BNHS Legal Cell.

### Conservation Fund

BNHS organises advocacy campaigns through independent impact assessment studies of development projects in ecologically important areas. Seven surveys have been conducted on critical conservation issues. BNHS has carried out several assessments along with other organisations and has made considerable contributions to

conservation of species and habitats, such as surveys and advocacy in north-east India in association with the Kalpavriksh, Wild Buffalo surveys in central India in collaboration with Satpuda Foundation. Some of the important issues covered are existing and proposed dams in the north-east, such as downstream impacts of the Ranganadi dam with special emphasis on the hydrological impact of the flow diversion plan.

On the basis of the ecological and sociological assessment carried out for the proposed Human (pronounced as hooman) dam, BNHS filed a Public Interest Litigation (PIL) in the Supreme Court for protection of this wildlife corridor connecting Tadoba Andhari Tiger Reserve and the Bhramhapuri Forest Division, Maharashtra. After hearing the case the Supreme Court passed an interim order “As regards Human River Project – it is noticed that it involved felling of very large number of trees and have serious environmental repercussions, therefore for the time being this project as proposed is not cleared.” However, subsequently, the Supreme Court cleared the project.

Other issues looked into are rapid ecological assessment of the proposed uranium mining near Nagarjunasagar Tiger Reserve, coral reef poisoning and impact on sea turtles in the Gulf of Kutch, rapid survey for the assessment of Wild Buffalo habitat in central India, regional meeting on dams in north-east, at Assam with Lower

▲  
**Left:** BNHS along with SANE filed a PIL to stop rampant logging at Andaman and Nicobar Islands

**Right:** A proposed uranium mining site is less than half a kilometre from the Nagarjunasagar Reservoir







P. M. LAD

**Left:** The last confirmed figures of Central Indian Wild Buffalo was seven in Udanti Wildlife Sanctuary

**Right:** The Chief of Army Staff Gen. Deepak Kapoor, PVSM, AVSM, SM, VSM, ADC at BNHS furthering the strong bond between the Indian Army and the BNHS



BNHS PHOTO LIBRARY

Subansiri site visit, impact of the proposed Dhamra port on sea turtles in Orissa, Sethusamudram Ship Canal and its environmental impact.

### BNHS Legal Cell: Justice D.E. Reuben Legal Fund

The Fund is used only for conservation related litigation. The Fund addresses issues related to violations of a) the Wildlife (Protection) Act, 1972, b) Forest (Conservation) Act, 1980, c) Coastal Zone Regulation Act, and any other acts related to environment, which may already exist or may be enacted in the future. BNHS along with Kalpavriksh and Society for Andaman and Nicobar Ecology (SANE) filed a petition in the Supreme Court to ban logging in Andaman and Nicobar Islands. In 2001, the Supreme Court gave a ruling in favour of the petitioners, banning all logging activities in the Islands.

### BNHS Armed Forces Cell

Today, the Indian Army is one of the largest land holders in the country with establishments located in different ecosystems and biogeographic zones, such as Rann of Kutch, Thar Desert, the length and breadth of the Himalaya, the tropical rain forests of north-east India. BNHS-Armed Forces Cell, therefore, works very closely with the Indian Army towards nature

conservation. We have conducted over fifteen Command level seminars in the last three years. Besides, we have supported few brigade and battalion level seminars as well. The programmes are important as they provide platform for officers of various ranks to come together and discuss core issues of nature conservation.

To further strengthen the bond between the Armed Forces and the BNHS towards nature conservation, the Chief of Army Staff Gen. Deepak Kapoor, PVSM, AVSM, SM, VSM, ADC visited BNHS on July 18, 2008. Gen. Kapoor in his speech reiterated the support of the Indian Army to protect wildlife and the activities of the BNHS. In continuation with the visits of top brass to the BNHS, Indian Army has laid down a time bound action plan to take further concrete steps towards nature conservation through exclusive environmental education programmes for the Indian Armed Forces.

### Sálim Ali Nature Conservation Fund

It is a fund that provides small grants for young students, individuals, institutions, and scientists to take up programmes for conservation of nature. The Fund has supported several small initiatives throughout India, such as assessing the distribution and status of wild tiger population outside the protected areas in Maharashtra, conservation







NISHIGANDHA PEDNEKAR

of freshwater chelonians (turtles and tortoises) in Barak Valley, Assam, a re-survey and monitoring of arboreal (mainly tree-dwelling) mammals along the riverine habitats on Mundanthurai Plateau, Kalakad-Mundanthurai Tiger Reserve, Tamil Nadu, viability of forest corridors between Bhimashankar and Goa, photographic survey of Kudremukh National Park, Karnataka, status survey of the Edible-nest Swiftlet *Aerodramus fuciphagus* in south Konkan, conservation of sea turtles through community participation in Maharashtra, and conservation of endangered Hispid Hare *Caprolagus hispidus* and tall grassland habitat in Jaldapara Wildlife Sanctuary, West Bengal.

### Forest Guard Fund

Invariably a forest guard is placed in one of the most remote places and has a large

area to patrol, usually, on foot. These forest guards sometimes do come in conflict with poachers and wild animals. BNHS through this fund provides financial support to such forest guards for their extraordinary courage to protect forests and wildlife.

The BNHS's mission of conservation of nature, primarily biological diversity, through action based on research, education, and public awareness is truly observed in practice through its Conservation Department. The Department is also a people's department as many BNHS members and others have generously contributed to its activities. 🐾



Rushikesh Chavan is at present the Conservation Officer at the BNHS.

▲  
It is important  
to protect  
the wetlands of  
our country





## Nudibranch

The bright colours of a nudibranch warn its predator of its obnoxious nature





# Marine Protected Areas: Need of the Hour

Text: Deepak Apte

## About Marine Protected Areas

In order to protect marine biodiversity 20-30% of the seas must be under protection (currently 1%). To achieve this IUCN and other influential organisations have called for action to set up a global network of Marine Protected Areas by 2012. According to IUCN, Marine Protected Areas is any area of the intertidal or subtidal terrain, together with its overlying water and associated, flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment.





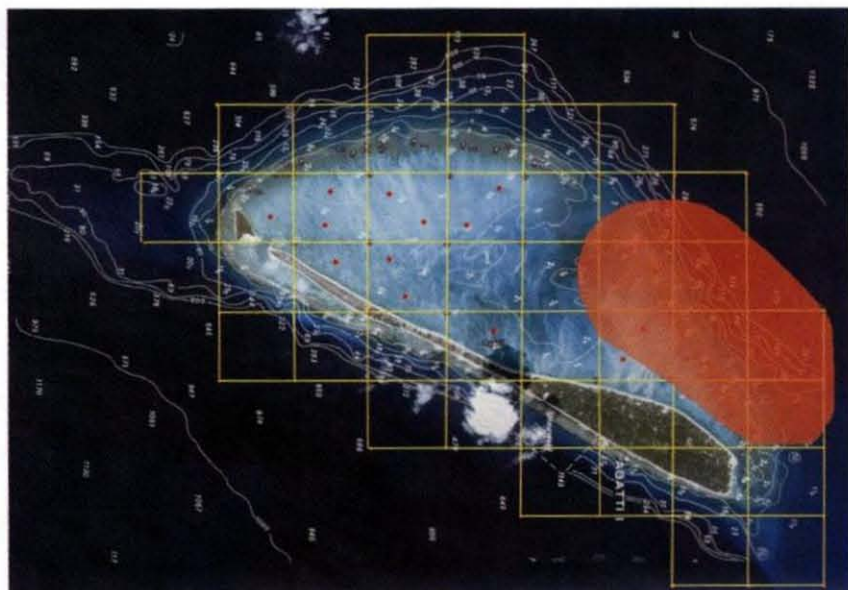
Archbishop Ullathorne of Birmingham in his autobiography 'From Cabin Boy to Archbishop' talked about his early life on ships that ran from Hull to Scandinavia. During one of his voyages to the Baltic, he wrote "we have been held here in port for three days, so thick have been the shoals of fish that we cannot leave the harbour." There could not be a starker contrast with the experience today; in fact, this change is confined to not just the northern waters, the story is the same across all continents.

Over the last 50 years, scientists and policy-makers across the world have developed a profound understanding of the way in which oceans, as complex and dynamic systems, influence many facets of daily life of people around the globe. This understanding among government officials has led to new efforts to develop comprehensive policies on the use and protection of the waters that comprise more than 70 per cent of our planet's surface.

Protection and sustainable development of the oceans and their resources are critical to the future of our planet, its people, and the myriad life forms. Worldwide, more than 50 per cent of the population lives in coastal areas, a figure that will rise to 75 per cent by 2025. Our daily lives are affected by weather systems with oceanic origins.

For generations, we have believed that it was beyond our power to damage the oceans or to deplete its vast resources. We now see the fallacy of this view, as mounting evidence demonstrates the human impact upon oceans. The oceans and their resources, by their very nature, are international matters, for no nation acting alone can effectively manage and protect them. It is not surprising then that issues of marine conservation have risen in various international forums.

This is the time of great promise for humanity to act upon our ever-growing understanding of the oceans and their connection to land, the climate, and all of life. Over the last decade, the debate on the needs of Marine Protected Areas (MPAs), and in particular trans-boundary MPAs has gathered momentum. In fact, realising the immense



SOURCE: GOOGLE EARTH.COM

▲  
Boundary of the  
proposed Agatti  
Conservation Reserve

value of MPAs, International Union Conservation Network (IUCN) hosted its first International Marine Protected Areas Conference in Australia in 2005. The agenda of the conference was very clear – putting forward a goal of enhancing MPA network in various ocean regimes. In order to protect marine biodiversity effectively, 20-30 per cent of the seas must be under protection. However, at present only one per cent is under protection. To make this happen, IUCN has called for action to set up a global network of MPAs by 2012. In 2007, during the IUCN World Commission on Protected Areas (WCPA), Marine Summit, it was again urged that their efforts be redoubled to establish and implement national MPA networks by the targeted 2012.

Marine Protected Areas, including underwater parks, fishery reserves, wildlife sanctuaries, and the likes, are an increasingly popular policy instrument designed to conserve coral reefs and sustain reef benefits for the society. According to IUCN, a Marine Protected Area is "any area of the intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment". Explicit reference is made to "no-take" MPAs (i.e. MPAs where no extractive uses are permitted). MPAs have been demonstrated







IDREES BABU

▲  
Baitfish collection in lagoons form an important part of tuna fisheries in Lakshadweep

to increase coral reef fish and invertebrate abundance, biomass, and species richness, as well as redistribute stakeholder access to reef resources, and thus, redistribute wealth in coastal communities. The promise of MPAs as a tool for biodiversity conservation and sustainable development has yet to be fully realised, because both the natural and social science underlying effective MPA development and management are poorly understood. Presentations at the 9th International Coral Reef Symposium (ICRS) underscored the scientific uncertainty that surrounds the biophysical design of MPAs, but provided some basic guidance for policy-makers.

Research indicated that coral reef MPAs are more likely to function as relatively independent units than inter-dependent ecological systems, especially over large spatial scales. Research also indicated that the biological performance of “no-take” MPAs is not correlated with their spatial extent, suggesting that bigger is not necessarily better.

MPA decision-making must be an adaptive and broadly participatory process. Such processes permit social learning, draw upon



diverse sources of knowledge, build trust, and enhance the legitimacy of MPA rules and regulations. Exactly *how* and *when* participation should occur is a matter of contention.

The biological rationale for establishing a network of small MPAs has been to:

- Protect vulnerable species and habitats (i.e., biodiversity and ecosystem function),
- Protect susceptible life history stages (i.e., spawning and nursery grounds), and
- Enhance fisheries productivity in the region.

### Lakshadweep Archipelago: Can we have a MPA?

Extended marine jurisdictions and other factors, besides increasing fishery management obligations, have raised the economic development aspirations of governments and fish workers in Lakshadweep.

The problems unique to small islands are naturally that of scale. Islands, whatever their size, are expected to be, or to become, self-sufficient in their capacity for marine development and coastal management. Yet they are usually too small to be able to develop the requisite specialised human resources. Few economies of scale are available on small islands, and the pooling of resources becomes a pragmatic necessity for economic upliftment and survival.

The geographical, economical and social situations of small islands vary considerably. Islands can be considered to comprise of various sub-systems: economic, social, demographic, cultural, political, physical and ecological. These systems are particularly inter-dependent in small islands. The interaction of these sub-systems defines the behaviour and sustainability of an island in the face of external influences and internal adjustments.

Island economies tend to be narrow based, and highly exposed to external economic and





JAFER HISHAM

political influences. On the other hand, external trading partners today, are rarely 'captive' to an individual island, and hence, have not been induced to invest in the long-term diversification and sustainability of island enterprises.

Inhabited islands all over the world are undergoing a difficult transition from traditional isolation to the 'invasion' of civilisation, technology and changing political pressures. The dilemma currently facing small islands is the natural desire for cultural stability and economic growth on one hand, while the limitations on resources and fragile environments loom as deterrents to sustainability on the other.

Tropical lagoons are environments of low ecological resilience that are vulnerable to human disturbances. However, with livelihood so closely linked with the reef, formal means of protection such as a sanctuary or national park is a remote and non-practical approach. However, the new amendments in the Wildlife (Protection) Act, 1972, recognise

establishments of community and conservation reserves. The site-based implementation of community managed marine protected areas requires the identification of not only major biological and ecological processes, but also the socio-cultural, economic, and political processes patterning the targeted area.

#### Why a MPA is so vital for Lakshadweep?

Many types of disturbances, separately and in combination, are changing the face of reefs not only in Lakshadweep, but across the tropical belt. These include: hurricanes, coral bleaching, diseases of corals, over fishing, destructive fishing, nutrient loading, sedimentation, hyper and hypothermic stress, various forms of pollution, harvesting of reef invertebrates, coral mining, trampling by tourists and divers, and the destruction and devastation caused by ship anchors and groundings. It is obvious that this resource needs protection, and that many of the cited anthropogenic causes can be reduced or

▲  
Effective patrolling of marine protected areas can also benefit nesting areas







IDREES BABU



IDREES BABU

Protection of areas will increase fish stocks benefiting local communities


avoided by implementation of scientifically based management programmes.

However, the real threat to the reefs comes from the most critical issue of 'Climate Change'. In a study examining the consequences of the sea level rise near the islands due to global warming, it was found that the predicted sea level rise of one metre would be responsible for 11-21 per cent land loss in the islands of Kiltan, Kavaratti, Kadamat, Kalpeni-Cheriyam and Agatti-Bangaram. In the event that this becomes a reality, population pressures on the remaining land could turn into an ecological nightmare.

Nevertheless, oceanic reefs are intrinsically less vulnerable to climate change, because of the absence of effects transmitted from and amplified by neighbouring terrestrial environments. In addition, most reefs are distant from significant human populations, and this removes or reduces the most serious immediate threats. The remote oceanic reefs represent the best available resource, both for preserving coral reef biodiversity into the future, and for understanding the interactions of reef ecosystems with climatic change.

Undoubtedly, a community/conservation reserve holds a great promise for Lakshadweep. However, the value of science cannot be undermined while doing so. Realising the need for reef conservation, BNHS launched 'Project Giant Clam' in Lakshadweep in 2004, in collaboration with

LEAD International and with financial support from the Darwin Initiative, UK. The Project stands on four main pillars – research, education, tourism and livelihood. The role of community is central to the project that culminated successfully recently. The local community has consented for establishing a Conservation Reserve at Agatti, India's first co-managed MPA. The consent and the proposal are now with the Department of Environment and Forests, for consideration.

Only time will tell us about the benefits of Agatti Conservation Reserve, however, the entire project has helped raise environmental awareness of local community, which is central for reef conservation. After the success of Agatti Conservation Reserve, we have been flooded with requests for other islands in the Lakshadweep Archipelago. This rise in environmental awareness will go a long way in reef conservation in Lakshadweep. Encouraged by the success, and assessing the potential for reef research and conservation, BNHS has decided to start a long term research station at Lakshadweep. 

For further details write to Deepak Apte, Assistant Director, BNHS.



Deepak Apte is currently Assistant Director, BNHS and the Principal Scientist, Project Giant Clam.



# Biodiversity conservation through Important Bird Areas

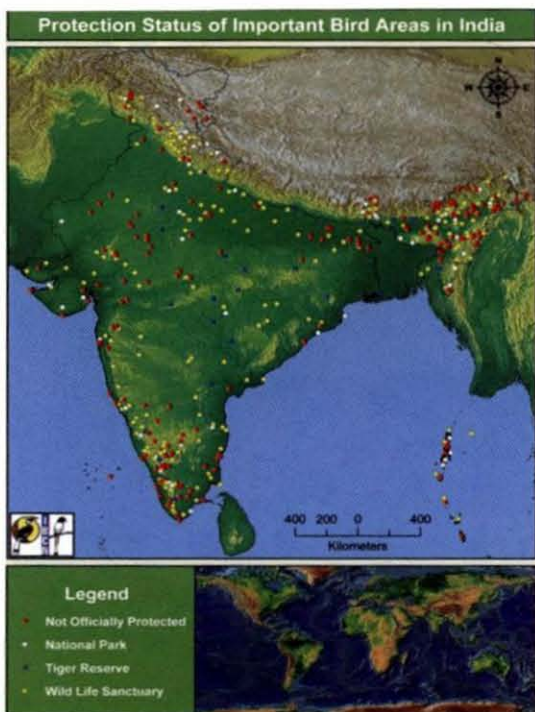
Text: M. Zafar-ul Islam

## About the Programme

Important Bird Areas (IBA) are practical networks of sites vital for the conservation of birds and their habitats. They help the decision makers to identify their priorities and to conserve and manage sites sustainably.







Until now 466 IBAs have been identified, using globally agreed criteria, in India

Seventy-five out of 1,300 bird species in India are threatened with extinction, in fact, many common birds are also disappearing, so the list could grow in the future. They are at risk due to anthropogenic activities such as deforestation, agriculture, hunting and trapping. Species extinction is no longer an isolated natural event, but a worldwide and mainly man-induced occurrence. Birds are important indicators of the state of our environment and the decline of many bird species reflect our unsustainable use of natural resources. Three-quarters of all threatened species depend on forests, but widespread deforestation continues unabated. Wetland birds are threatened because of drainage of marshes and pollution of river systems.

Research programmes of the BNHS, on the Forest Owlet *Heteroglaux blewitti*, which was rediscovered after 117 years, and the Jerdon's Courser *Rhinoptilus bitorquatus*, which was rediscovered after 86 years by a BNHS scientist, are attempts to save these Critically Endangered species. These along with the Himalayan Quail *Ophrysia superciliosa* are endemic to India and have very small breeding ranges. The Himalayan Quail has not been seen for more than 100 years. The Siberian Crane *Grus leucogeranus* that used to



visit Keoladeo National Park, in Rajasthan, has not been reported since 2002. The Oriental White-backed Vulture *Gyps bengalensis*, Slender-billed Vulture *Gyps tenuirostris* and Long-billed Vulture *Gyps indicus* have declined by more than 99 per cent during the last 20 years as a result of diclofenac poisoning. The BNHS had initiated a nationwide effort for the protection of vultures and was instrumental in banning Diclofenac from the Indian market.

### About Important Bird Areas

For a high proportion of threatened bird species, especially those with restricted ranges and strict habitat requirements, effective site protection and management are the key measures for their survival. The 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.

The IBA programme has produced an Inventory of internationally recognised sites vital for the conservation of birds. These sites were identified using a set of four standard global criteria: (a) presence of globally threatened species, (b) restricted range or endemic birds, (c) biome restricted assemblages, and (d) sites having large congregations of birds. These criteria are designed by BirdLife International to select representative areas of the most important bird habitats, particularly those which are under severe pressure.

Several bird species can be conserved by protection of their habitats. The selection of sites with rich biological diversity can save many species at the same time, making the best use of the scarce resources that are available for conservation. IBAs are selected so that they form a network throughout a species' range. As habitats become more threatened, this network will become increasingly important to ensure that birds survive across their ranges. IBAs may also include the best examples of the species' natural habitat. They might have high numbers or densities, or be 'typical examples'. Some IBA sites could be the last refuge for certain species, and if we lose such sites, the species would be in danger of extinction.



## IBAs in India: an attempt for biodiversity conservation

The IBA programme in India, started in 1999, is addressing site-oriented research and action, encompassing management, monitoring, education, advocacy, and national and international legal protection. The BNHS is working on the threatened bird species through its Important Bird Areas (IBA) programme, and 466 IBAs in India have been identified using globally agreed criteria. BNHS has also established a programme for IBA and bird species protection through the Indian Bird Conservation Network (IBCN), a network of ornithologists, conservationists, NGOs and forest officials.

The book *IMPORTANT BIRD AREAS IN INDIA - PRIORITY SITES FOR CONSERVATION* was released by the Minister of Environment and Forests, Government of India on November 4, 2004. The book provides comprehensive information on IBAs and species, and is used as an advocacy tool for site and species conservation to enable informed decision making. Considering that birds are good indicators of overall biological diversity, most IBAs will also be important for other animals and plants, particularly those which are under threat. The following are the key areas where the IBA Inventory would be useful:

- Help identify high biodiversity areas.
- Form a sound basis for the development of national conservation strategies, including protected areas programme.
- 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.
- Help identify future priorities for birds and biodiversity conservation action.
- Provide decision makers with high quality biodiversity information for sustainable land and resource use.
- Assist governments in the implementation of international agreements, such as the Convention on Biological Diversity.
- Provide material for education and training.
- Help build national and regional networks of ornithologists and conservationists



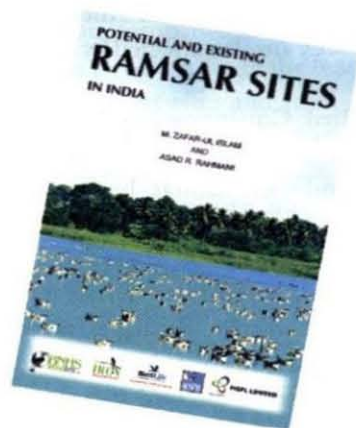
Source: IBCN PHOTO LIBRARY

through the Indian Bird Conservation Network.

- Influence global conventions, e.g. Biodiversity, Ramsar Convention.
- Influence regional migratory bird agreements.

There are some additional sites proposed for listing under Ramsar Conventions. At present, there are 25 declared Ramsar Sites in India, but through the IBA programme 135 more sites have been identified, which qualify Ramsar criteria. This is detailed in the book, *POTENTIAL AND EXISTING RAMSAR SITES IN INDIA* by M. Zafar-ul Islam and Asad R. Rahmani released in 2008. Many of these wetlands are community/gram panchayat owned wetlands, and facing numerous threats. These include poor agricultural practices and deforestation in catchment areas, leading to

IBC members across the country share their information on Indian Birdlife



A book on the potential and existing Ramsar sites was released recently

soil erosion and siltation of rivers and lakes. Direct drainage for cultivation has destroyed many small wetlands and severely damaged others, often with little economic benefit.

One of the main threats for some of the species is their trade nationally and







▲  
The IBCN is one of the leading membership network that promotes conservation of birds in India

internationally for commercial purpose. According to the Convention on International Trade on Endangered Species of Wild Flora and Fauna (CITES), trade in some species, listed in the CITES appendices is banned or regulated, depending on the level of threat. Species which are morphologically, but not themselves threatened, but may be confused with endangered ones, are also listed.

Several threatened and restricted range species are declining because of invasive species introduced in their habitat. For example, domestic goats were introduced in Narcondam island of Andaman group of islands which affect the nesting sites of Narcondam Hornbill *Aceros narcondami*. Some more island species such as Nicobar Bulbul *Hypsipetes nicobariensis*, and Andaman Crane *Rallina canningi* are also affected by alien species.

### Indian Bird Conservation Network

In India, a number of studies have been on birds and their habitat, but there was no common platform from where the information could be disseminated and pooled. BNHS started the 'IBAs Programme' in collaboration with BirdLife International and the Royal Society for the Protection of Birds. To conserve the bird species and their habitat, in 1998, the BNHS organised a Strategy Planning workshop in Mumbai and invited key ornithologists of India to discuss the issue. All of them decided to have a strong network of ornithologists and conservationists, and hence the IBCN came into existence with the following mission:

"To promote conservation of birds and their habitats through development of a national network of individuals, organisations and the government."

The objectives of the IBCN are (a) research and monitoring, (b) conservation action, (c) network development, (d) awareness and education, (e) policy and advocacy, and (f) fund raising.

The IBCN is one of the leading membership networks of Indian organisations and individuals who collaborate to promote the conservation of birds in India, and the conservation of biological diversity as a whole through its members. At present, the IBCN has about 1000 individuals and 100 organisations as partners, supporting the bird conservation movement in India. Some of the partners are not ornithologists, but work on different aspects of environment in India.

The Network brings together diverse strengths and expertise focused on strategic conservation objectives. It provides assistance in a way that encourages local communities to focus and combine efforts for greater impact. In this way, IBCN acts as a conductor, inspiring and directing a network of partners all helping to implement a larger strategy for concrete conservation outcomes in India.

The IBCN publishes a quarterly newsletter *Mistnet*, which contains articles and information on threatened bird species, and IBAs, along with conservation issues, threats to IBAs/species, interventions required, advocacy for the protection of biodiversity, and partner fact-file. For further details about IBAs, IBCN visit: [www.ibcn.in](http://www.ibcn.in).

### Bird Conservation

Conservation action may take many forms, including legislations, monitoring, research, prioritisation, and management of populations and land. Such an approach is often taken for species of economic or cultural importance, and increasingly for species that are threatened with extinction at a local, national or global level.

The IBCN and BNHS, with the collaboration of BirdLife International, has identified species that are threatened with extinction or are otherwise of global conservation concern, of which some 75 out





of 1,300 bird species are extinct in India.

BNHS through its IBCN programme could set up an Indian Species Working Group to promote species conservation. The IBCN with the Working Group could also develop a Species Action Plans for globally threatened bird species in India. IBCN aims to build the capacity of its NGO and individual members, as well as forest department, to develop action-based approaches for the conservation of threatened birds in 32 Indian states.



ASAD R. RAHMANI

### Site Protection

Site protection is essential to conserve species and habitats, and to maintain the integrity of ecosystem process by designating areas for the conservation of natural resources, and regulating and managing them according to the needs of the biodiversity they contain. Many people in India depend on biodiversity and ecosystem functions for their livelihood – fuelwood, timber, medicinal plants, food gathered from the wild, and water supply that relies on forested watersheds. Apart from the long-term benefits gained by conserving biodiversity, sites also have other important functions for society, including education and research, and have non-material and non-monetary values, as well as providing the focus for local or national pride. In moving towards a more sustainable society, all these functions will be increasingly valued. The protection and conservation of sites is an integral part of any attempt to achieve sustainability.

The IBAs programme, aims to facilitate the conservation of birds via this approach. The IBA programme also recognises the importance of community-based conservation. In fact, many sites were identified as IBAs only because they were being protected by communities. The best examples are many Spot-billed Pelican breeding sites in south India.

### Working together for Biodiversity Conservation

A consistent theme underlying all IBCN



ASAD R. RAHMANI

IBA sites are protected areas that prove to be vital habitat of numerous species of birds

Trappers are one of the serious threats faced by Hill Myna

and BNHS programmes is the over-riding need to work with and for local people by building national capacity for biodiversity conservation, empowering site-adjacent communities to have a say in the management of high biodiversity sites and strengthening a country-wide network of conservation organisations, and a general public that values wild birds, biodiversity and the wider environment. The members of IBCN are producing and executing regional plans for advocacy, communication, education, establishing Site Support Groups, training and fund-raising and by all members undertaking activities to build awareness of the importance and value of birds.



M. Zafar ul-Islam, ex-employee of the BNHS, is presently working as Research and Field Monitoring Manager (Reintroduction Programs) with the National Wildlife Research Centre, Taif, Saudi Arabia.





# IBA/IBCN: Advocacy Initiatives

Text: Anand Chandrasekhar

## About IBA Advocacy:

The Important Bird Areas (IBAs) Advocacy Strategy aims to get rid of the lacuna between research and policy. It also aims to facilitate informed and effective decision making.



NIKHIL BHOPALE

Sarus Crane



India has one of the most comprehensive wildlife legislations and a well developed Protected Area Network (PAN). However, there is a disturbing trend towards diluting existing legislations in the face of pressure from development. Weak legislation, compounded by ineffective enforcement, can have disastrous consequences for India's bird diversity. Thus, there is a need to influence policy and to ensure that conservation of wildlife habitats gets the priority it deserves. To influence policy, information based on sound scientific principles through diligent field and desk based research is indispensable. In addition to this, it is equally important to ensure that this information is available to key decision makers at the right time. The Important Bird Areas (IBA) Advocacy Strategy aims to bridge the gap between research and policy, and facilitate informed decision making.

In order to accomplish this, an Advocacy Strategy that clearly lays out objectives and actions is necessary. The IBA Advocacy Strategy follows a four-pronged approach. First, the emphasis is to raise the profile of the IBA programme in India. Targets are briefed on the IBA concept and distribution of IBAs in the country. The aim is to get IBAs recognised as sites of vital importance for conservation of Indian birds and get them adopted within the existing management framework. Second, the strategy aims to incorporate appropriate 'unprotected' IBAs into the Protected Area Network. This would offer a higher level of legal and site level protection where required. Third, responding to threats to IBAs. This could involve providing timely information, participating in consultations and appealing against unfavourable decisions concerning IBAs. It would involve identification of potential threats, regular monitoring and excellent communication within the Indian Bird Conservation Network (IBCN). Fourth, increase the capacity of the IBCN for

advocacy work. This is crucial to achieving advocacy objectives, especially at the State and local levels in a country with 466 IBAs. This in turn, would result in IBAs being incorporated into the environment decision making process at all levels.

### Influencing Policy

Influencing policy is an important part of the IBA advocacy strategy. Though an arduous and protracted process, it is a worthwhile objective in the long-term. It helps provide enduring solutions and minimises 'fire-fighting' on a case by case



ANAND CHANDRASEKHAR

basis. By providing inputs to policy makers, the Indian Bird Conservation Network (IBCN) can become a bigger stakeholder in the overall environmental decision making process.

Some policy issues the IBCN has been involved in are as follows:

- The Critical Wildlife Habitats (CWH) process under the Scheduled Tribes and other Forest Dwellers (Forest Rights) Act, 2006.
- Climate change and its impacts on IBAs.
- Access to environment information through platforms like the proposed National Biodiversity Portal.
- Identifying appropriate IBAs for Ramsar Site designation.
- National Biodiversity Strategy and Action

▲  
Large scale destruction of the habitat can have detrimental effects on birds species of an area



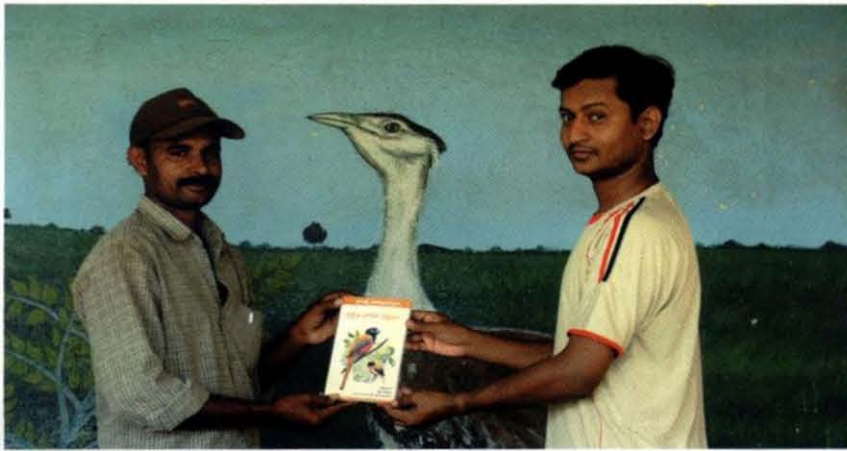


Plan (NBSAP) process under the Convention on Biodiversity.

- Environmental Impact Assessment notification under the Environment Protection Act 1986.

### Enhancing the Protection Status of IBAs

The IBA advocacy strategy aims to lobby for the inclusion of IBAs lacking formal protection into the Protected Area Network.



ANAND CHANDRASEKHAR

The regional translations of the bird book helps forest officials immensely

In addition to conventional protected area categories (wildlife sanctuaries and national park), the Government has introduced new categories for a more holistic approach to conservation. These include: Conservation reserves, Community reserves (both under the Wildlife Protection Act, 1972), Biodiversity Heritage Sites (under the Biodiversity Act, 2002) and Ecologically Sensitive Areas (under the Environment Protection Act, 1986). These new categories are less rigid, allow space for community participation and are easier to declare than conventional protected areas. They address different concerns and offer varying degrees of protection, and thus provide location specific options that were not available earlier.

### Safeguarding IBAs from Development Threats

There is increasing pressure on IBAs to meet the growing demand for minerals, fossil fuels and hydroelectric power. With the rapid spread of urbanisation, IBAs (especially those in the vicinity of urban areas) have acquired



high commercial worth in terms of land value alone. The IBAs lacking official protection status are particularly vulnerable to impacts associated with a rapidly developing economy. The tremendous pressure on bird habitats, from rapid economic development and population growth, presents the greatest challenge to bird conservation in India.

The IBCN aims to utilise all available platforms to participate in the environmental decision making process. This includes: attending public hearings, accessing relevant information and appealing against environment and forest clearances through official channels.

Some relevant IBCN initiatives:

- Cessation of mining lease in Sitanadi Wildlife Sanctuary (Chattisgarh).
- Appealing against Reliance SEZ in the vicinity of Sultanpur National Park.
- Minimising negative impact of the Telugu Ganga Canal on the Critically Endangered Jerdon's Courser within Sri Lankamaleswara Wildlife Sanctuary (Andhra Pradesh).
- Litigation to prevent further submergence of Sitanadi Wildlife Sanctuary under Sindhur Reservoir (Chattisgarh).
- Campaigning against location of hydroelectric projects in the north-east in biodiversity rich areas.

### Unique State-level Advocacy Initiatives

State-level initiatives are vital for the long-term conservation of IBAs. Issues affecting IBAs are usually state-specific and so are the solutions. The structure of the IBCN is geared towards learning from and replicating local conservation initiatives.

Some unique State-level initiatives are as follows:

- Release of State IBA book (Sikkim).
- IBA signboards in all IBAs of Chattisgarh.
- Hill Myna designated State Bird of Chattisgarh.
- Nilgiri Wood Pigeon Recovery Plan for Nandi Hills (Karnataka).
- Door-to-door advocacy campaign at Gangapur Dam (Maharashtra).



- 'Duda' Mobile Education Van at Melghat Tiger Reserve (Maharashtra).
- Site visit of Mayor of Mumbai to Mahul-Sewri IBA (Maharashtra).
- Protection of Greater Adjutant breeding areas (Bihar and Assam).

### Capacity Building

A series of 15 IBCN workshops were organised in different regions of the country. These workshops dealt with a wide range of issues including advocacy related components. A specific two-day 'Advocacy and Livelihoods Workshop' was held in Mumbai for State Coordinators of the IBCN. An advocacy specific brochure was also released at this workshop and distributed to participants. We are grateful to the RSPB and the Darwin Initiative for supporting these workshops and publications. We would like to express our gratitude to the various State Forest Departments who have co-hosted many of the regional workshops and provided invaluable assistance. The State Coordinators have also been very helpful in organising the workshops and lobbying at the State-level. Resource persons from other IBCN organisations like Kalpavriksh, Legal



BNHS PHOTO LIBRARY

Initiatives for the Environment (LIFE), and Aaranyak have selflessly provided their expertise to IBCN members during these workshops. We are indebted to them as they demonstrate how the skills and expertise within and outside the IBCN can be channeled for advocacy actions.

While the achievements of the IBCN are laudable, a lot more has to be done to protect our birds and wildlife habitats. We need to understand and get involved in issues that may seem far removed from bird conservation, but have a great impact on IBAs. Issues like forest rights, energy policy, commercial use of biodiversity, biofuels, climate change, coastal management and tourism affect our IBAs in many ways. We need to look at the bigger picture and influence decisions at the policy level. As a civil society network, we owe it to ourselves and the country to participate in the environment decision-making process. The diverse nature and reach of the IBCN is its greatest strength. Together, we have the capacity to initiate change. 🐦

▲  
The growing number of IBAs is a positive sign in conservation of birds

### Some relevant IBCN initiatives

- Proposed Delhi Okhla Bird Sanctuary in New Delhi.
- Greater Adjutant breeding site in Bihar, as a proposed Community Reserve.
- Corporate conserved site in Bihar in the form of Indian Oil Corporation (IOC) Eco Park.
- Army conserved area (Danapur Cantonment in Bihar) and Air-Force conserved area (Ozhar airforce base in Maharashtra).
- Ramnagaram Hills (Karnataka) as proposed Vulture Sanctuary.
- Dihaila *jheel* Halali, Rangawa and Yeshwantsagar reservoirs as proposed Biodiversity Heritage Sites in Madhya Pradesh.
- Mahul-Sewri mudflats in Mumbai as a proposed Conservation Reserve.



Anand Chandrasekhar is the Advocacy Officer for the Important Bird Areas Programme in India. He has a Masters in Conservation Biology from the Durrell Institute for Conservation and Ecology (DICE), UK, and is passionate about protecting wildlife habitats. He believes that unsustainable development is the greatest immediate threat to wildlife in India, and aims to use the Indian Bird Conservation Network (IBCN) to halt destruction of IBAs.





**Indian Red Scorpion** *Hottentotta tamulus*

Parental care is a common phenomenon  
seen in most scorpions





# Oh Pulicat!

Text: Ranjit Manakadan

## About the Project

The Projects on the Spot-billed Pelican and water birds spanned in the time frame of April 2000-March 2003 and October 2004-September 2007 was funded by the Ministry of Environment and Forests. The Project on the Spot-billed Pelican was the assessment of its population, distribution and conservation issues in southern India. The Project on waterbirds was to assess their population and distribution in Pulicat lake and in the adjoining wetlands.



Source: SDSC-SHAR PHOTOGRAPHY DIVISION

Spot-billed Pelican





SUJIT NARWADE

**I**t was late one evening in December 1980. I was trudging back alone in the Great Vedaranyam Swamp (Tamil Nadu) after a waterbird census as a fresh BNHS recruit. As I plodded humming an old Tamil movie tune, large shadows formed on the ground below me – a flock of Spot-billed Pelicans *Pelecanus philippensis* was flying above. On passing, it descended to glide just above the water's surface with slow, steady wing-beats, 'nature's hovercrafts'. What grand birds I thought. Half a decade later, I was on a rickety bus journey to Nellore from Chennai and came across a vast expanse of idyllic waters towards the east dotted with blue sailboats. Later, I learnt that it was Pulicat lake. What a nice place to work, I thought.

Call it destiny or fate, but by the turn of the Century, I got to be in Pulicat and know more about the pelican through two research projects. The first one (2000-2003) was on the Spot-billed Pelican titled, 'A study of the Spot-billed Pelican in southern India with special reference to its conservation', and the other (2004-2007) on the waterbirds of Pulicat lake, titled, 'An ecological account of the waterbirds of Pulicat lake with special reference to conservation'. I was the

Principal Investigator, and V. Kannan the researcher, and practically the backbone of both these projects. These projects were funded by the Ministry of Environment and Forests, Government of India and we received generous support and facilities from the Andhra Pradesh Forest Department for our stay and work in the Pulicat area. Furthermore, I got to know Pulicat lake and its avian fauna more intimately through a three-year stay (2001-2004) in Sriharikota Island that adjoins Pulicat lake with funding of the Indian Space Research Organisation.

Pulicat lake derives its name from Pulicat (a corruption of the Tamil name *Pazhaverkaddu*), a fishing village to its south. *Pazhaverkaddu* means 'jungle of roots' possibly implying to mangrove vegetation, as mangrove forest was reported to be luxuriant in Pulicat lake till around the end of the 18th Century. Historical documents attest that Pulicat lake was buzzing with activity as early as the 16<sup>th</sup> Century. Pulicat was the earliest settlement of the Dutch on the mainland of India, and there used to be considerable trade between Pulicat and the Straits Settlement (Malaya). The Dutch stayed on at Pulicat until about 1690 and their ships were able to enter

▲  
A flight of Painted Stork  
and Eurasian Spoonbill







V. KANNAN

▲  
Pelicans occasionally  
gather near fishermen's  
boats for food

Pulicat lake, which was then about 3.8 m deep (at the southern lagoon part). Possibly, because of exploitation of the mangroves and several human interventions, the depth of the Lake reduced to 2 m by about 1800 AD. Due to this, the successors of the Dutch, the British, were not able to bring their ships into Pulicat lake, and hence, abandoned Pulicat as a natural port.

Pulicat lake is the second largest brackish water lagoon after Chilika in India, and is a major wetland for wintering waterbirds in southern India. It is also identified as an Important Bird Area (IBA) and a potential Ramsar site by the BNHS. Sprawling across the states of Andhra Pradesh (84%) and Tamil Nadu (16%) in Nellore and Tiruvallur districts respectively, it encompasses an area of 720 sq. km. Pulicat lake has three openings into the Bay of Bengal, the major at the southern end of Sriharikota Island, another at the northern edge of Sriharikota Island, and the third at the extreme northern part near Durgarajupatnam. Four rivulets of the River Pennar flow into Pulicat during the North-east monsoon season. During the dry season, water is generally present only in the southern lagoon part of Pulicat lake and near the openings into the Bay of Bengal in the northern areas. The other areas may receive



occasional inflows from the Bay of Bengal during spring tides, especially when aided by strong winds.

Pulicat lake has a number of islands, the largest being Sriharikota Island (c. 181 sq. km) at its eastern edge, which serves as the spaceport of India. The islands are of recent origin in the geological time-scale, and are nothing more than low ridges of sand with marine and aeolian deposits rising only a few metres above the sea level. Some of these islands are now connected by road to one another and to the mainland by roads cutting into Pulicat.

My first field trip to Pulicat lake was to say the least, great. It was sparkling, bright sunshine after three days of incessant rains. A number of fishing boats lay docked off Sriharikota. The boats were being cleaned and emptied of the water in the hulls. I spied a flock of pelicans about a kilometer south. One took off in my direction, and as if by cue, the others followed. I held my breath as all of them (65), landed within 10 m off me, just in front of a few boats. After feeding around each boat that was being cleaned, they would fly off to another, and another, venturing quite close, but with some anxiety of the boatmen. Judging by the movements of birds, it appeared that the scraps of fish in the hull attracted fish, which in turn brought in hovering gulls and terns, and finally the pelicans – nature's play. The water around the boats was too deep for the herons, egrets and storks that watched in desperation some distance away. A pink mass of Greater Flamingo foraged at the distance and an assortment of plovers, sandpipers and other waterfowl fed frantically in the shallows and mudflats as if time was running out for them!

Our first project was, as said earlier, on the Spot-billed Pelican. The Spot-billed Pelican is among the three species of pelicans found in India. Its strongholds in India are in the





Source: SDSC-SHAR PHOTOGRAPHY DIVISION

Along with the Spot-billed Pelican, Flamingos are also the *Prima donna* of Pulicat

North-east (Assam) and southern India (Andhra Pradesh, Karnataka and Tamil Nadu). Formerly common across much of South Asia, the Spot-billed Pelican has undergone widespread decline with known breeding populations now confined to India, Sri Lanka and Cambodia. The most well known example of its decline is the loss of a nesting colony of 'millions' discovered in 1877 by W. Oates in the Sittang valley plains in Myanmar. The colony was found to have disappeared without a trace when B.E. Smythies visited it in 1939! A significant outcome of our project on the Spot-billed Pelican (with the base camp in Pulicat Lake

and surveys carried out in the other pelican habitats in southern India) was that we found the population in southern India to range from 2,850 to 3,700 birds. Along with the population estimate of around 3,000 birds for Assam, the population in India was estimated to be around 6,000-7,000 birds, significantly higher than estimates of earlier worker at about 3,000 birds. In fact, our studies revealed that the population of the Spot-billed Pelican in southern India seems to be holding on or even increasing. However, the scenario was not overall rosy as pelicans and their habitats face a number of serious problems, mainly in the foraging grounds.

Our project on the waterbirds of Pulicat lake filled in an important lacuna in information on the waterbirds of Pulicat lake, as almost all the previous information on the waterbirds were based on studies and surveys from its central region (the Sriharikota-Sullurpet stretch and around Tada). Through our studies, and taking into account the records of earlier workers, a total of 113 species of waterbird are now known to occur in Pulicat lake (including those in the adjoining wetlands and heronries). The *prima donnas* of Pulicat lake are no doubt the Spot-billed Pelican and the flamingos (Greater



Painted Storks breed during the monsoon



V. KANNAN





SUJIT NARWADE

▲  
The Purple Swamphen is found in freshwater wetlands on the mainland



V. KANNAN

▲  
The Little Cormorant is common in Pulicat Lake and in freshwater wetlands

*Phoenicopterus roseus* and Lesser *Phoeniconaias minor*), and to a lesser extent the Painted Stork *Mycteria leucocephala*.

Pulicat lake primarily serves as the foraging ground for brackish water preferring bird species comprising of resident, seasonal migrants, and winter migrants from the Palearctic region. Freshwater preferring species are distributed in a number of wetlands either on the mainland or on the wetlands in the islands. Within Pulicat lake, important foraging ground for waterbirds are the shallow regions in the central part of the Lake between Sriharikota and Kudiri (which is mostly visited by birders due to easy accessibility), the Moolah Kuppam area on the western edge of Pernadu Island



(especially after the Kudiri-Sriharikota stretch dries up) and the Annamalaicherry area in the southern end. The Moolah Kuppam and Annamalaicherry areas are sites where the Greater Flamingo can be seen almost throughout the year. The northern areas, which are prone to drying and the southern lagoon areas (except for some sites and during certain periods) are generally bird poor. As for the populations of waterbird species of Pulicat lake, it was difficult to arrive at estimates due to the vastness of the area, difficult logistics involved in reaching most areas, and the movements of birds primarily influenced by changing water regimes.

Besides Pulicat lake, a major attraction for birders in the area is the Nelapattu heronry on the mainland. Species breeding in Nelapattu include the Little Cormorant *Phalacrocorax niger*, Indian Shag *Phalacrocorax fuscicollis*, Spot-billed Pelican, Little Egret *Egretta garzetta*, Eastern Cattle-Egret *Bubulcus coromandus*, Black-crowned Night-Heron *Nycticorax nycticorax*, Asian Openbill *Anastomus oscitans*, Oriental White Ibis *Threskiornis melanocephalus* and Eurasian Spoonbill *Platalea leucorodia*. The 'Flamingo Festival' organised by the Tourism Department in collaboration with other governmental departments sees an influx of thousands of visitors during the breeding season. This event appears to be a huge disturbance, but it has not stopped the birds from breeding successfully! There are also a few smaller and lesser known heronries in the areas, of which the Beripeta heronry in Sriharikota is an upcoming heronry with more than 200 pairs of Painted Stork breeding each year.


As for adjoining wetlands, the southern Kudiri Tank on the outskirts of Sullurpet is an important wetland for waterbirds. This wetland becomes especially attractive for waterbirds when the northern and central parts of Pulicat lake starts to dry up over large tracts around February. The Lake gets more or less filled by an assortment of freshwater and brackish waterbird species till it dries up in May/June. Realising the






importance of the Kudiri Tank for the Spot-billed Pelican and other waterbirds, we have recommended that part of the tank be developed on the lines of Nelapattu. It is almost certain that birds will start breeding at this site once it is developed, judging from the new heronries that have got established in Sriharikota. Kudiri Tank could also turn out to be a very important tourist attraction in the Pulicat area due to easy accessibility as it is at the outskirts of Sullurpet and on the road to Sriharikota.

Like the majority of wetlands in India, Pulicat lake is besieged by problems. Over 30,000 fishermen spread over 50 settlements depend on Pulicat lake for their livelihood. Other problems include decrease in freshwater flow from rivers, siltation, pollution, presence of salt works and prawn farms, hunting, and electrocution of birds by power lines. Recent threats include the future impacts of growth and development of bordering towns and tourism traffic. Many of the problems facing Pulicat lake

are complex, some of which extend much beyond the confines of Pulicat (e.g., the issue of inflow of waters from rivers) and/or associated with the livelihood of local communities. Recently, there have been talks, initiated by the Indian Space Research Organisation, for the establishment of a Pulicat Lake Development Authority (on the lines of the Chilika Development Authority) for the conservation and management of Pulicat in consultation with the two state Forest Departments and wildlife experts should be a boon for Pulicat lake. As for me, I only hope that days will always remain in India for me to trudge into swamps like Pulicat to see flocks of nature's hovercrafts flying into the setting sun. 



Ranjit Manakadan has been working with the BNHS since the early 1980s. He is presently an Assistant Director at the Society.

 Poaching of waterbirds: feathers are passed through the nostrils of captured birds (see inset) to 'calm them' for use as decoys to trap more birds





# The Natural History Collection of the Bombay Natural History Society

Text and Photographs: Varad B. Giri

## About the Collection

The BNHS Collection is one of the oldest collections in India and forms a part of the National Heritage. It includes: bird, mammal, reptile, amphibian and insect collections. All of these are a result of numerous contributions of the members, researchers and other well wishers of the BNHS.



Collection



**N**atural History Collections are considered as one of the important tools for the study of biodiversity of a country. Properly identified and classified specimens with complete data, such as date, locality of collection, name of the collector and remarks, act as a time machine and provide information on the status, abundance and distribution of a particular species, or a group in the past. This information is vital to plan proper conservation measures for the survival of a species or a group in the present and future.

The BNHS, since its inception in 1883, has been involved in the study of flora and fauna of the Indian subcontinent. The movement, which was started in 1883 by eight people for exchanging notes on natural history, and deposition of the specimens collected by them, has today resulted in one of the finest Natural History Collection in Asia. The present collections are a result of the extensive surveys that were undertaken in different regions of the Indian subcontinent. The collection was mainly initiated by contributions from early members of the Society, especially the British Army, Police and Civil Service Officers. Later, special surveys were conducted and specimens were collected from different parts of the Subcontinent. It began with the Mammal Survey in 1911 to 1923, followed by the Vernay Survey of the Eastern Ghats in 1929. About 25 such surveys were undertaken by a number of naturalists of the day, at different locations in the Subcontinent, from the beginning till the end of the last century; the last of this series being the Orissa and Andhra Pradesh survey in 2000. As the collections were mainly made during pre-independence days, these include specimens from the Oriental Region, mainly the present day India, Pakistan, Afghanistan, Bangladesh, Nepal, Bhutan, Myanmar and Sri Lanka. This is indeed a very prestigious collection of the faunal diversity of India and one of the first major collections from the Oriental Region in Asia. These meticulous efforts over a long period of time resulted



▲  
The Bird collection  
of the BNHS

into a dynamic collection of specimens of 18,500 mammals, 29,000 birds, 5,430 bird eggs, 8,500 amphibians and reptiles, and 50,000 insects. Thus, the 125 year-old specimen collection of the BNHS is a unique index of biodiversity of the Indian subcontinent, and an invaluable database of Indian mammals, birds, reptiles, amphibians and insects.

### Bird Collection

The primary focus of the collection is research and education. Thus, for easy accessibility the specimens are properly classified and arranged systematically in 63 cabinets, each cabinet consisting of trays or boxes. There are about 29,000 specimens of birds in this collection. The bird collection is arranged as per the *SYNOPSIS OF BIRDS OF INDIA AND PAKISTAN* by S.D. Ripley.

Most of these specimens were collected during special surveys. The Vernay Survey of the Eastern Ghats in April 1929 is one of the pioneering efforts in this regard. Subsequent additions of specimens were from the surveys carried out mainly by Dr. Sálím Ali. About 20 such major surveys on different localities including Iraq, Hyderabad state, Travancore and Cochin states, Mysore state, central Indian states, Gujarat, Orissa, Berar, Sikkim, Bhutan, Goa, Arunachal Pradesh and Andaman and Nicobar islands were carried out by Dr. Sálím Ali. Apart from the collection of specimens, these surveys potentially resulted in some of the pioneering publications in the field of







The Mammal collection  
of the BNHS

ornithology like THE BIRDS OF KUTCH (1945); INDIAN HILL BIRDS (1949); THE BIRDS OF TRAVANCORE AND COCHIN (1953) revised and renamed as BIRDS OF KERALA (1968); THE BIRDS OF SIKKIM (1962) and THE BIRDS OF EASTERN HIMALAYAS. The collection also formed the basis for the ten volumes of HANDBOOK OF BIRDS OF INDIA AND PAKISTAN (1968-1974). The series of research papers based on these surveys and published by Mr. Humayun Abdulali on birds of Andaman & Nicobar Islands are equally valuable reference to ornithologists.

Apart from large number of specimens, this collection is unique in many ways and one of them is the presence of specimens of rare, endangered and or extinct species of birds. The most important holding in the bird collection is the five specimens of the Pink-headed Duck. This species is thought to be extinct as the last reliable record of this bird in the wild was in 1935. There are 275 specimens of Pheasants, including five skins of the highly endangered Western Tragopan and six skins of the Cheer Pheasant. Apart from these there is a single specimen of the Jerdon's Courser, 1 Siberian Crane, 13 White-backed Vulture, 6 Long-billed Vulture, 4 Megapod, 10 White-winged Wood Duck, 7 Great Indian Bustard, 5 Lesser Florican and 9 Bengal Florican in the Collection.



The collection of type specimens (the specimens from which the species are described) is of immense value as it is unique in itself. There are two Holotypes, nine Paratypes and one cotype of birds in the collection.

### Mammal Collection

There are about 18,500 mammal specimens in the collection, most of which are skins and skulls. The majority of these specimens were collected during the Mammal Survey of India undertaken by the Society from 1911 to 1923. Like birds, these specimens are also properly classified and arranged systematically in 64 cabinets. The smaller mammals are stored in trays, whereas the larger mammals are in boxes. Mammal collection is arranged as per the CHECKLIST OF MAMMALS by Ellerman & Scott.

The collection is equally broad in its systematic coverage with 347 species (633 species and subspecies). The mammal collection is also equally unique as there are type specimens of *Cynocephalus sphinx gangeticus* Anderson, 1910 (Cotype), *Latidens salimalii* Thonglongya, 1972 (Holotype), *Hipposideros hypophyllus* Kock & Bhat, 1994 (Paratype), *Felis libyca iraki* Cheesman, 1921 (Paratype), *Moschus memina* Erxleben, 1777 (Topotype), *Tragulus javanicus lampensis* Miller, 1903 (Topotype).



The skull of the Asian Cheetah is one of the precious assets in this collection; this species is thought to be extinct in the wild. Apart from this there are specimens of rare species of mammals like Wroughton's Free-tailed Bat and Large Spotted Civet, Lion-tailed Macaque, Hoolock Gibbon, Tiger, Nilgiri Tahr, Hispid Hare, Bonhote's Mouse. Also, there are specimens species like Red Panda and Indian Giant Squirrel.

### Herpetofauna Collection

The herpetology section has a unique collection of herpetofauna, i.e., amphibians and reptiles. The specimens of amphibians are mainly deposited by the experts from BNHS who have carried out short surveys in different parts of the Indian subcontinent. In recent years, there is considerable contribution from researchers and experts working on herpetofauna in different parts of India. As this is a wet collection, the specimens are stored in glass jars containing rectified spirit and are arranged systematically in 12 cabinets. Herpetofauna collection is organised as per the FAUNA OF BRITISH INDIA by M.A. Smith.

#### Amphibian Collection:

The collection has about 5,000 specimens of 150 species of amphibians of the Indian subcontinent. This section holds one of the largest collection of Indian caecilians in the world which comprises of 19 species from 4 families. Apart from this there are specimens of the Himalayan Newt *Pleurodeles verrucosus*, the only known tailed amphibian from India. There are specimens of poorly known amphibians like Koyna Toad *Bufo koynayensis*, Malabar Tree Toad *Pedostibes tuberculosus* and Purple or Pig-nosed Frog *Nasikabatrachus sahyadrensis* in this collection. Apart from this it is also unique as the type specimens of most of the newly described species of caecilians are present in the collection.

There are 43 type specimens belonging to 10 species of caecilians of which, 7 are holotypes, 13 paratopotypes belonging to 2 species, and 23 specimens of paratypes of 6 species. This is mainly due to the valuable



The Type collection of the BNHS that proves vital for the researchers referring to them

### Type Definition

**Holotype:** The holotype is a single specimen used by an author, either the only specimen he found or one of the several found, but the only one designated as a type. When people talk about the type, they are referring to this single specimen.

**Syntypes:** These are two or more specimens selected from the available material to serve as types.

**Lectotype:** One specimen of the syntype set (or one specimen known to have been used by the author if no type was identified) may be selected as the lectotype by the author or a later worker. It should be the specimen illustrated in the original description, if not all were depicted.

**Neotype:** This is a specimen selected (and designated in a paper in the literature) to serve as a type when the original material has been lost or destroyed.

**Paratypes:** Paratypes are specimens that the person making the original description examined while carrying out the work. They may be from the same or a different locality, but they clearly (at least in the mind of the describer) are members of the new species. Although they are not types in the nomenclatural sense, they are often distributed to other museums as vouchers for the new species, and like holotypes and syntypes they are often catalogued and stored separately from the rest of the collection.

**Topotype:** These are specimens collected from the same locality as the type material (although not necessarily at the same time).

contributions from Dr. Mark Wilkinson and Dr. David Gower, renowned experts on caecilians from the Natural History Museum (NHM), London and Dr. G.K. Bhat, a well known expert on Indian caecilians from Karnataka. There is collaboration between experts on caecilians from BNHS and NHM. This partnership is responsible for the







contribution from Dr. S.D. Biju of Delhi University and Dr. Kuramoto of Japan.

*Reptile Collection:*

This collection is mainly divided into two parts: lizards and snakes. The rich collection of lizards with about 1,900 preserved specimens belonging to 11 families and 185 species collected from the Indian peninsula represents the uniqueness of the collection.

▲  
The Insect collection of the BNHS

discovery of two new species of caecilians from Maharashtra. Another major contribution from this group is the first report of viviparity in Asian amphibians and Indo-Seychellean caeciliids.

There is an exceptional collection of type specimens of frogs and toads represented by 69 type specimens belonging to 2 species of toads and 17 species of frogs. Of which, 16 are holotypes and 53 specimens of paratypes belonging to 16 species. Interestingly, the type specimens of most of the recently described species of frogs are in this collection. This is a result of the valuable

There are specimens of the Persian Gecko *Hemidactylus persicus* and the Persian Sand Gecko *Tropicolotes persicus*. These two species are recently reported from India. There is a specimen of a recently described species of a gecko, *Hemidactylus aaronbaueri*, which is probably the largest of all the *Hemidactylus* in India.

There are 10 type specimens belonging to 5 species of lizards of which 3 are holotypes, 6 paratypes and 1 neotype.

This diverse collection of lizards is responsible for recent publications on the taxonomic status of some of the endemic geckos of India. This study was a collaborative effort between Dr. Aaron M. Bauer of Villanova University, USA, a distinguished lizard taxonomist and the BNHS. This collaboration has resulted in the discovery of two new species of lizards also.

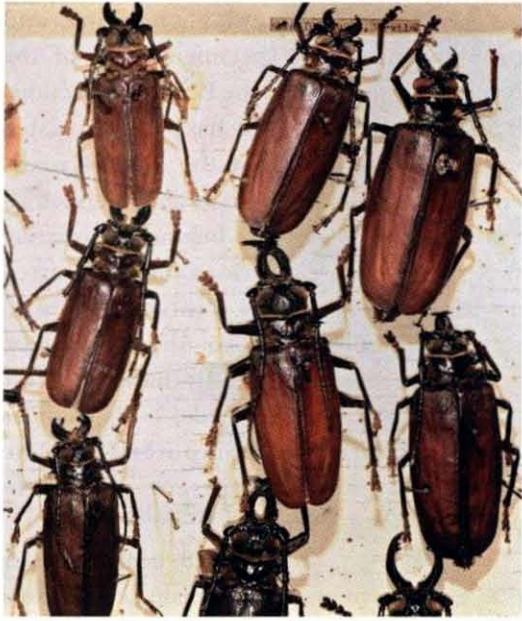
With a total of about 3,400 specimens from 10 families and 240 species, the collection of snake is also equally diverse. Apart from this, there are a few extralimital species of snakes also present in the collection. One of the invaluable holding are the specimens of Indian Egg Eater *Elachistodon westermanni*. This species was thought to be extinct and was recently rediscovered in Maharashtra by Mr. Ashok Captain and his team.

The type collection of snakes is also rich with 44 specimens belonging to 4 families, 13 genera and 16 species. Of this 6 are holotypes, 26 specimens of paratypes, 7 are

The specimen of a recently described species of a gecko, *Hemidactylus aaronbaueri* ▲







Few specimens of the beetle collection

syntypes and 2 cotypes.

### Insect Collection

There are about 50,000 insects in the collection. The geographical areas covered are India, Pakistan and Myanmar. The major groups represented in the collection are Lepidoptera (Butterflies and Moths). Out of the 1,500 species of butterflies found in India, around 700 species are present in the collection. Some of the butterflies were collected from Myanmar and are difficult to get in the present circumstances. There are also small collection of beetles (Family: Cerambycidae, Chrysomelidae, Scarabidae), and Dictyoptera (Mantis and Cockroaches). The insects are preserved and stored in wooden boxes and cabinets.

The butterflies from Sri Lanka collected by Mr. Ormiston are also present in the collection. The collection is referred by students/scientists from Forest Research Institute and was the basis for the book titled, BUTTERFLIES OF SIKKIM HIMALAYAS.

### Use of the Collections

These collections are regularly referred by wildlife researchers from various Indian universities and Institutes such as Wildlife Institute of India, Dehradun; Zoological

Survey of India, Sálím Ali Centre for Ornithology and Natural History, Coimbatore; Zoo Outreach Organisation, Coimbatore and Indian Institute of Science, Bangalore for scientific studies. The collection is also referred by scientists and taxonomists of various international research Institutes, such as Smithsonian Institute, Washington DC; Field Museum, Chicago; Natural History Museum, London, U.K.; Harrison Zoological Museum, U.K.; and several other organisations from SAARC countries.

The collections provide a basis of identification of hair and feathers for Wildlife Custom Officials, State Forest Departments and Ministry of Defence for their specific purposes. Apart from this the collection is also a good place to confirm field observation pertaining to identification, and in this regard several individuals, amateur naturalists, ornithologists, lepidopterists, herpetologists and mammalogists refer the Collection.

This is also a very good tool to impart basic knowledge about the faunal diversity to a wider audience. For this purpose students, trainee forest officers (IFS) and forest rangers regularly visit this collection. This department also organises theme based programs like 'know your birds and mammals' and 'the world of amphibians and reptiles' for the members of the Society on regular basis.

The BNHS collection is also a basis of publication of books like THE BOOK OF INDIAN BIRDS by Sálím Ali, THE BOOK OF INDIAN ANIMALS by S.H. Prater, THE BOOK OF INDIAN REPTILES AND AMPHIBIANS by J.C. Daniel, BUTTERFLIES OF SIKKIM HIMALAYA by Meena Haribal, THE BOOK OF INDIAN BUTTERFLIES by Isaac Kehimkar, BOOK OF INDIAN SNAKES by Whitaker and Captain.

According to me, these collections are a biological gold mine, a base for many studies related to biological science and a treasure which has an immense value but has not been highlighted. Systematics is the basis of biological science. The natural history







The skull of the extinct Asian Cheetah



A specimen of Kaiser-e-hind



A specimen of the thought to be extinct Pink-headed Duck



A specimen of the elusive Jerdon's Courser

collections are the foundation on which the science of systematics is built. As a recent trend, a well-preserved collection is also a tool for molecular studies. In a broader sense this is a treasure trove for researchers from varied fields like ecology, evolution, pollution and climate change.

### Present Scenario

Presently, the collection is housed at the ground and mezzanine floors of Hornbill House, the head office of the BNHS in Mumbai. The Collection is a valuable asset for today and for the coming generations, and thus, it needs utmost care. The collection is managed by the staff specifically appointed for the purpose, and they are the 'soldiers' who protect this 'precious wealth'. Though it sounds interesting, one needs to be passionate and hard working as the job



mainly includes regular checking and maintenance of the specimens. One of the prominent 'soldiers' in the BNHS Collections is Mr. Vithoba Hegde. He has been associated with this collection for the last 24 years, and his technical expertise and meticulous efforts are the real force behind the existing well maintained collections. He is assisted by his colleague Mr. Vinod Patil, and Parshuram Parvate and Shyam Jadhav, attendants, who are equally hard working. Collection data of mammals, birds, reptiles and amphibians is computerised. The work of cataloguing insect data is in progress.

Simply put, the BNHS collection is priceless. It is impossible to evaluate the actual value of the collection, which is the store house of the genetic information of more than a century of the Indian subcontinent. This is the reason for the BNHS Collection having been accorded the status of a National Heritage Collection.

In Dr. James F. Clements' words, "extinction really is forever" and the future generations may have to satisfy themselves seeing the museum specimens, unless due to the leaps and bounds progress of molecular biology we are able to clone and revive the extinct species using the museum specimens as a source of genetic material!

By looking at the present scenario most species are facing problems for their mere existence in the wild and the specimens in the collection will surely play a vital role in future.

Each specimen has a history that can contribute enormous amounts of knowledge of past events. It is high time we utilise the knowledge of these 'experts' to plan appropriate strategies for present and future conservation problems related to faunal diversity.



Varad B. Giri is presently the Curator, at the Collection Department, BNHS.



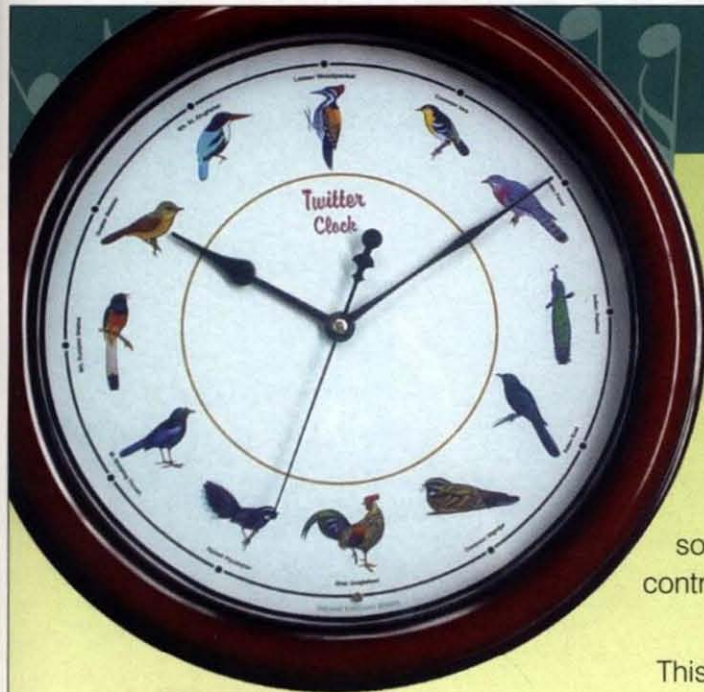
www.ecomantra.com  
Live the Adventure!



**Yak rides in Sikkim,** tribal art in Chattisgarh, river rafting on the Kali, jungle safaris in the Nilgiris, nature walks in Himachal, canoeing in Kerala, forest treks in Goa, night camping in Darjeeling, kayak trails in Konkan, rhino watch in Assam, island jacuzzi in Dandeli, scuba diving in the Andamans and much more!

 **ecom mantra**  
Connect to nature

**Ecomantra Nature Adventures Pvt. Ltd.**  
Tel: 022-42155222/3/4/5/6, 022-65248646 / 25007347  
Email: info@ecom mantra.com; Website: www.ecomantra.com



## Twitter Clock



Ideal as a gift article, this wall clock chimes the hour with songs of different birds. This clock creates a pleasant environment in your living room. Thanks to the sweet calls of 'Indian Singing Birds'. Designed by team of bird watchers, first time in India. The calls are recorded from birds in wild, 'Twitter Clock' dial has replaced conventional hour numbers with coloured birds like Peacock, Fantail, Koel, Jungle Fowl, Malabar Whistling Thrush etc.

The electronic micro-controller with light sensor puts off the sounds during dark hours of night, not to disturb your sleep and controls the battery only during calls. This helps to have prolonged battery life. The sound can be adjusted as required.

This 'Twitter Clock' will help an increased awareness about nature conservation in your family.

### Available at :

**Thane** : ANIL KUNTE, MAK SERVICES, D-252, Amargian Ind. Estate, Khopat, Thane - 400 601, Maharashtra (India).  
Tel.:+91 (0) 22 2547 4901 Mob.: +91 9820245470 E-mail : anilkunte@yahoo.co.in

**Mumbai** : BNHS, Hornbill House, Product Counter, Dr. Salim Ali Chowk, S.B.Singh Road, Mumbai 400 023, Maharashtra (India).

**Sangli** : Mr. Apte (09890384400) **Pune** : Mr. Purandhare (020-25444031)

**Nasik** : Mrs. Bhave (09326049215) **Pandharpur** : Mr. Sabnis (09423335136)

Looking for Distributors in other regions



Black-backed Dwarf Kingfisher *Ceyx erithaca*

A magnificent small kingfisher seen in the moist-deciduous and evergreen forests





# Sriharikota – wilderness regained?

Text: Ranjit Manakadan

## About the Project

The Sriharikota projects were conducted from November 2001-October 2004 and November 2004-October 2007, and were funded by the Indian Space Research Organisation (ISRO). The basic aim of the two projects was the documentation of the faunal diversity of Sriharikota Island.

Sriharikota

RANJIT MANAKADAN







RANJIT MANAKADAN

The Indian Chameleon is one among the many reptile species of the Island

**M**y first visit to Sriharikota came out of the blue – to attend a meeting of the team of the U.S. Fish and Wildlife Service’s funded Bird Migration Project of the BNHS in 1991. A jeep ride in the Island’s wilderness and birding in the adjoining waters of Pulicat lake made me fall in love with the place in no time. How nice it would be to work in this place, I thought! Well, wishes do sometimes come true, and in December 2001, I was back in Sriharikota to work on a three-year (2001-2004) project on the faunal diversity of Sriharikota Island at the invitation of the Indian Space Research Organisation (ISRO). The BNHS has a history of working in the Island, the first team was headed by Sálím Ali to carry out a survey of the birds of the Island in 1970 and 1971. In the second project, the BNHS carried out bird banding and census on the Island and Pulicat lake under the Bird Migration Project funded by the U.S. Fish & Wildlife Service. The third, in which I was

involved, was an inventory project, titled, ‘An ecological account of the faunal diversity of Sriharikota Island and its environment, with reference to mammals, birds, herpetofauna, fish and butterflies’.

The three years spent in Sriharikota are till date the best in my life as I got to work on fish for the first time, my passion in life. Not to say that I did not enjoy the birding and field trips to document the wildlife, ranging from the nocturnal Slender Loris *Loris hydekkerianus* to the smallest amphibian in the Island, the Ornate Microhylid *Microhyla ornata*, which grows to a maximum size of 25 mm. The variety of habitats ranging from tropical dry evergreen forest, scrub jungle, sandy beaches, grasslands, brackish-saline water lakes and marshes, freshwater ponds and streams and creeks, with Pulicat lake on one side and the Bay of Bengal on the other, was enchanting. The Project ended in October 2004 and now the macro-fauna of the Island is fairly well-documented for science. The







RANJIT MANAKADAN

The Malliplate (Mavalam Vagu) a freshwater stream serves as a refuge and nursery for fish and other aquatic fauna



S. SIVAKUMAR

The Olivaceous Keelback *Atretium schistosum*, an aquatic snake of Sriharikota

illustrated reports published through the faunal diversity project have generated much interest in the wildlife wealth of the Island among the people, and especially school children. The Project also resulted in a Conservation Education Centre getting established, putting to good use the database generated from the studies. This Project was followed by a three-year project (Investigations into some ecological aspects of Sriharikota Island) on frugivory by birds and mammals in Sriharikota and a small study on the Slender Loris, which ended recently, and hopefully, the association of the BNHS with Sriharikota (and ISRO) will continue for the years to come.

“As for an introduction to the Island, I quote what was described in an earlier article on Sriharikota published in *Hornbill* (Jul-Sep. 2006) to make the article complete:

Sriharikota (181 sq. km) is a spindle shaped Island with its southern tip about 40 km north of Chennai (former Madras). The waters of Pulicat lake (460 sq. km) skirt its western, northern and southern borders, while the Bay of Bengal laps up its eastern shoreline. Early records reveal that the forests of Sriharikota were being exploited even as far back as the 17th century. Recorded systematic exploitation of the forests goes back to 1898, when the forest areas were divided into compartments and clear-felled (except for minor forest produce species). A particular area of the forest was felled once

every 25 years so to not exploit it completely, that is, in rotation of 25 years. In fact, there was a system of tramways established by the British, and in operation till 1970. These were used for transport of wood to collection sites on the Buckingham Canal on its western boundary, and from there to be sent by boats to Chennai! Additionally, plantations of casuarina, eucalyptus and cashew were raised over the years by the forest departments during the prior independence period, by locals and then ISRO. In addition to all these disturbances, the Island had about 20 villages, inhabited mostly by settlers from the mainland, who had more or less usurped the land from their original inhabitants, the tribal Yanadis.

Between the late 1960s and the early 1970s, the ISRO took over the Island to establish India's spaceport, recently renamed as the Satish Dhawan Space Centre-SHAR (SDSC-SHAR). As part of a resettlement package, the displaced villagers were relocated to the other islands in Pulicat lake or on the mainland. Another major development was that the Island got connected by road to the mainland (at Sullurpet) – prior to this, access was via boats from Tada”.

Judging by the former scenario in the Island, it would not be wrong to presume that very little of the forest or wildlife would have remained if ISRO had not taken over the Island. A number of factors have been







S. SIVAKUMAR

The Starred Tortoise is one of three tortoise-turtles of the Island, besides the Olive Ridley that nests on the beaches

responsible for this. The first by change in the status of the Island to that of a high security zone and the resulting rehabilitation of the human population to other areas. This resulted in an absence or near-absence of human pressures (and disturbances) on the natural resources and wildlife. Another was that ISRO took a pro-conservation initiative from the onset, the catalyst being its former Chairman, the late Prof. Satish Dhawan who had a love for the wilderness. It was he who was instrumental in inviting the BNHS to work in the Island in the bird survey of the early 1970s and the faunal diversity project, and it was his dream that the tropical dry evergreen forest of Sriharikota should be preserved for posterity. Fortunately, the wildlife conservation and research ethos of Prof. Satish Dhawan has rubbed on to his successors.

A visit to the areas outside Sriharikota easily provides one with a clear picture of what would have happened to Sriharikota if ISRO had not taken over the Island. The bane of India, its human population (now unfortunately touted as its strength – Indian politicians know how to create slogans to skirt issues!) is taking a toll even in what were earlier considered ‘far off places’ through the laying of a 6-lane road. Industrialisation is now taking place in the

towns bordering Pulicat lake some with Special Economic Zone (SEZ) status. These once small towns are growing rapidly and teeming with people. Sewage, plastics, wastes and pollution that plague our cities are now problem issues in these former shanty towns. Considering these changes, it is quite certain that Sriharikota would have ended up as nothing but a cluster of overgrown fishing villages if ISRO had not taken over the Island.

We have a good case of wilderness regained in Sriharikota, but what are the long term prospects? Like all the wilderness areas of India, even those in Sriharikota are not without conservation issues. These issues are primarily related to the expansion and infrastructure development of the spaceport’s facilities, resulting in loss and fragmentation of forest cover and their related impacts on the fauna. Another is the raising of plantations, carried out as part of afforestation and for work and revenue-generation for tribals (who now live in a colony in the residential area in the Island), and creation of shelter-belts along the sea coast for protection against cyclones. The pauperization of fauna in general as a result of monoculture plantations had been highlighted in our project reports, and fortunately, the authorities have put a stop to further eucalyptus plantations and are also







PATRICK DAVID

▲  
*Strychnos nux-vomica*, food for bats, is widely used in homeopathic medicines and is also poisonous if consumed in certain forms

planning to remove eucalyptus in phases to allow the native forest to regenerate and get back their pristine glory. However, casuarina plantations are to continue 'as a shelter-belt along the sea-coast' – overall foresters have a 'weakness' for plantations for the 'quick, show-results greenery', especially important in cases of 'compensatory afforestation' programmes. However, it appears that even this will change as during a recent seminar in Sriharikota, it was agreed that the wealth of the Island is its tropical dry evergreen forest and conservation of this forest type should be the focus of nature conservation in Sriharikota. At the same time, there was an ominous statement that there will be unavoidable and increasing need for land in the years to come for development of the spaceport.

A different but somewhat similar case of wilderness regained is the case of Neyveli Lignite Corporation (NLC) area in Neyveli, Tamil Nadu. I was part of a team that conducted a faunal survey of the areas that had been afforested after mining in the past. On arrival, it was shocking to see the vast

areas scarred by open cast mines. A visit to the reclaimed areas was soothing with the created forests that had become habitats for birds and other fauna, and where I saw my first Dusky Eagle-Owl *Bubo coromandus*. There was also a small heronry adjoining a waterbody that had been created. In fact, I had to rethink on whether mining had been overall good or bad for the area after seeing the barren areas outside the complex during the return trip. But, I also wondered what would happen once the lignite deposits get exhausted and NLC finally abandons the area. Will the created forests (and their wildlife) be gifted back to 'the people'? Another similar situation was in the Kalpakkam Atomic Power Plant area in Tamil Nadu, where a heronry had got established around a small wetland in the complex and where I saw the largest flock of 32 Oriental Darters *Anhinga melanogaster* in my birding experience.

What are the lessons that can be learnt from the Sriharikota and other similar examples? One is that organisations that have vast tracts of land at their disposal can play





a major role in protecting wilderness areas provided there is a pro-conservation attitude among those at the helm of affairs. The second is that such wilderness areas appear to have better possibilities of survival, especially those having high security status, e.g., ISRO, atomic power plants and defence establishments (who most people do not realise are India's largest landlords!). However, as seen in the case in Sriharikota, even such wilderness havens may face threats in the not too distant future due to expansion programmes, and it will be wise that policies are framed so that these wilderness areas survive into the future or threats are minimised.



Source: SDCS-SHAR PHOTOGRAPHY DIVISION

To conclude, I need to deviate to issues of a more global concern. It is now becoming very evident that the 21st century is going to be the most testing and destructive time for the earth's wilderness areas. India, once known as a land of beggars, sadhus, yoga, kamasutra and snake charmers, is emerging as a superpower. This is something that all Indians should be proud of, but what is frightening about this is that it will be a superpower with a billion plus human beings without any signs of a slowdown (unlike China). And the central and state governments dare not even whisper about population control as it will affect their vote bank. The demands for natural resources and need for more land due to the burgeoning human population growth will place huge pressures on the last remaining wilderness areas. We are losing wildlife habitats and species, and polluting ecosystems at a pace and extent like never before. The impacts of climate change have now finally started confronting countries all over the world. Devastating floods earlier more of a problem for Bangladesh, unheard of tsunamis hitting India, hurricanes making the USA look like a third world country, etc., make one wonder what is going on! We can expect more catastrophes or changes in the climate to aid in the destruction of wildlife



S. SIVAKUMAR

Feral cattle roam the southern grassland areas

Sriharikota has an estimated population of c. 250-300 Slender Loris

habitats. With a maximum elevation of 4 m above sea level, I wonder what impact rising sea levels will have on Sriharikota! Would the tropical dry evergreen forests disappear under the seas – and what about the spaceport? Only time will tell. 🐔



Ranjit Manakadan has been working with the BNHS since the early 1980s. He is presently an Assistant Director at the Society.





# The Highlands of the Nilgiris

Text: **Asad R. Rahmani**

## **About the Project**

The Shola Grassland Project was started in 2001 and contributes information ranging from biodiversity inventories of the study sites to intensive ecological processes and bird community ecology. The Project was funded by U.S. Fish and Wildlife Services and advocated the need for protection and conservation of these neglected grassland ecosystems.







ASHFAQ A. ZARRI



BNHS Research Station at Avalanche, Nilgiris served as our base for field research from 2001-2005 and also became a landmark for any naturalist visiting that area

From 1991 to 1996, the BNHS carried out a series of ecological investigations on six grasslands of India, in a project funded by the U.S. Fish and Wildlife Service (USFWS). The intensively studied grasslands included the wet grasslands of *terai* in Uttar Pradesh, the dry grasslands of Banni in Kutch, semi-arid grasslands of Velavadar National Park in Gujarat, Solapur in Maharashtra, and Rollapadu in Andhra Pradesh, and the tropical grassland of Dahod in the Panch Mahal district of Gujarat. The project was the first of its kind in India and highlighted the need for habitat management for several flagship species of these grasslands, such as the Great Indian Bustard *Ardeotis nigriceps*, Lesser Florican *Sypheotides indica*, Bengal Florican *Houbaropsis bengalensis*, Swamp Francolin *Francolinus gularis*, and Grey Wolf *Canis lupus*. The project contributed information ranging from biodiversity inventories of the study sites to intensive ecological processes and bird community ecology.

Towards the end of the first phase of the study, the BNHS and USFWS realised the need to carry out similar studies for the alpine grasslands of Sikkim and the *shola* grasslands of the Western Ghats. This article deals with a study in the *shola* grasslands of the Nilgiris from 2001 to 2004, conducted under the project titled 'Ecology of Shola and Alpine Grasslands Project' the Sikkim part is dealt on page 158.

The study was carried out in the Nilgiris hills of the Western Ghats, recognised as one of the unique and distinctive biogeographic regions within India. The region has also gained international attention as a globally important ecoregion, along with Sri Lanka, and as a biodiversity hotspot. It has also been described as an Endemic Bird Area and Centre for Plant Endemism.

The Western Ghats is a 1,600 km long chain of hills running along the west coast of the Indian peninsula, from near Kanyakumari at 8° N the southern end to River Tapti in the north at c. 21° N. The







ASHFAQ A. ZARRI

▲  
A rare view: Kurunji shrub in flower (know to flower once in 12 years) near Thaishola Tea State

Western Ghats is distributed narrowly between 73° and 77° E and is less than 100 km wide over most of this length, being widest in the region of Anamalai and Nilgiri ranges. The Western Ghats passes through the states of Gujarat, Maharashtra, Goa, Karnataka, Tamil Nadu and Kerala; a number of hill ranges in these states link up to form the range.

The chain of hills is interrupted by the 30 km wide Palghat Gap at around 11° N, being immediately to the south of the Nilgiris, and a few other breaks along the length (e.g. Shencottah Pass at around 9° N, altitude 160 m). Most of the hills over 1,500 m in the Western Ghats are found towards the south between 8° and 13° N. These include peaks, such as Anaimudi (2,695 m) in the Anamalai hills, Dodabetta (2,637 m) in the Nilgiri hills, Vandaravu (2,554 m) and Kodaikanal (2,328 m) in the Palni hills and Agasthyamalai (1,868 m) in the Agasthyamalai range of hills. Several major rivers drain the Western Ghats, including the Godavari, Krishna, Cauvery and Tambiraparani. These

rivers are a life line for millions of people in the plains and foothills, being critical for agriculture as well as hydro-electric power generation. These rivers also support an amazing aquatic and terrestrial biodiversity all along the length of their course. Moist forests, including tropical wet evergreen rainforest, are found largely south of 16° N, particularly south of Palghat Gap in the southern Western Ghats. This is also a region that contains higher diversity and a greater number of endemic rainforest plants and animal taxa. The pattern is also evident in mammals where species, such as the Nilgiri Tahr *Hemitragus hylocrius*, Nilgiri Langur *Trachypithecus johnii* and Brown Palm Civet *Paradoxurus jerdoni* are found largely to the southern portion of the Western Ghats, south of 13° 45' N. Over 4,000 plant species are known from the Western Ghats, of which around 1,500 species (c. 35%) are endemic to this region. Of the 490 tree species found in low- and mid-elevation forests, 308 species (63%) in 58 genera are endemic, of which 42 are monotypic.





Like the flora, the fauna of the Western Ghats is also characterised by a high degree of endemism, which is pronounced in the lower vertebrates. More than 500 species of birds have been listed in the Western Ghats, mostly widespread species, that occur typically in the dry and moist deciduous forests and dry thorn forests. The tropical evergreen forests contain fewer species, but a greater proportion of endemic and restricted range species, than similar

the Western Ghats.

Mukurthi National Park (MNP) is the only protected area located in the western edge of the Upper Nilgiri Plateau and lies between 11° 10' and 11° 22' N and 76° 26' to 76° 34', and covers an area of 78.46 sq. km. It is situated in the Nilgiris district of the State of Tamil Nadu. The area was declared a sanctuary in 1980 under the Wildlife (Protection) Act of 1972 and a national park in 1990 mainly for the protection of the



ASHFAQ A. ZARRI

A view of Scotch Broom invasion along road to Mukurthi National Park which is home to several endemic flora and fauna

rainforests in north-eastern India. Till 2005, 16 endemic bird species were recorded from the Western Ghats, including 14 tropical evergreen rainforest species and two restricted range species occurring in the high-altitude *shola*-grasslands: the Nilgiri Pipit (*Anthus nilghiriensis*) and the Broad-tailed Grassbird (*Schoenicola platyura*). All the three laughingthrushes, and White-bellied Shortwing, Nilgiri Flycatcher and Black-and-Orange Flycatcher are restricted to the montane forests in the higher elevations. In 2005, Pamela Rasmussen and John C. Anderton in their book *BIRDS OF SOUTH ASIA: THE RIPLEY GUIDE*, have upgraded many subspecies to full species, as a result of which now we have about 25 endemic species in

Nilgiri Tahr. It is also a key protected area for conservation of high altitude grasslands and their flora and fauna, and is a part of the Nilgiri Biosphere Reserve, which is the first, notified in 1986, among the 18 biosphere reserves of India.

The word Nilgiris finds its origin in 'Nila' meaning blue and 'Giri' meaning hills. It is generally presumed that this name was suggested by those living on the neighbouring plains for the blue haze, which envelopes the range as is common with most distant hills of considerable size. The Nilgiri hills came into possession of East India Company in 1799 by the treaty of Srirangapatnam and the first phase of European settlement may be said to have taken place between the years





1820 to 1830. With the British occupation of the plateau, the destruction of forests and natural grassland was initiated and this continues unabated till date.

The pristine habitats suffered a major loss mainly due to immigrant inhabitants and not by the original inhabitants, the "Todas". Little is known about when and where from Todas arrived here. It is a matter of record that the "Badagas", another community have been settled on the hills for approximately 400 years.

Introduction of Australian eucalyptus and *Acacia* spp. for supplying firewood, pulpwood, rayon and tannins to the viscose industries has done serious damage to the ecology of this region. Tea plantation emerged as another major industry in the Nilgiris leading to further conversions of original habitats. Ecologically the Nilgiris faced another setback from the development of hydroelectric power projects.

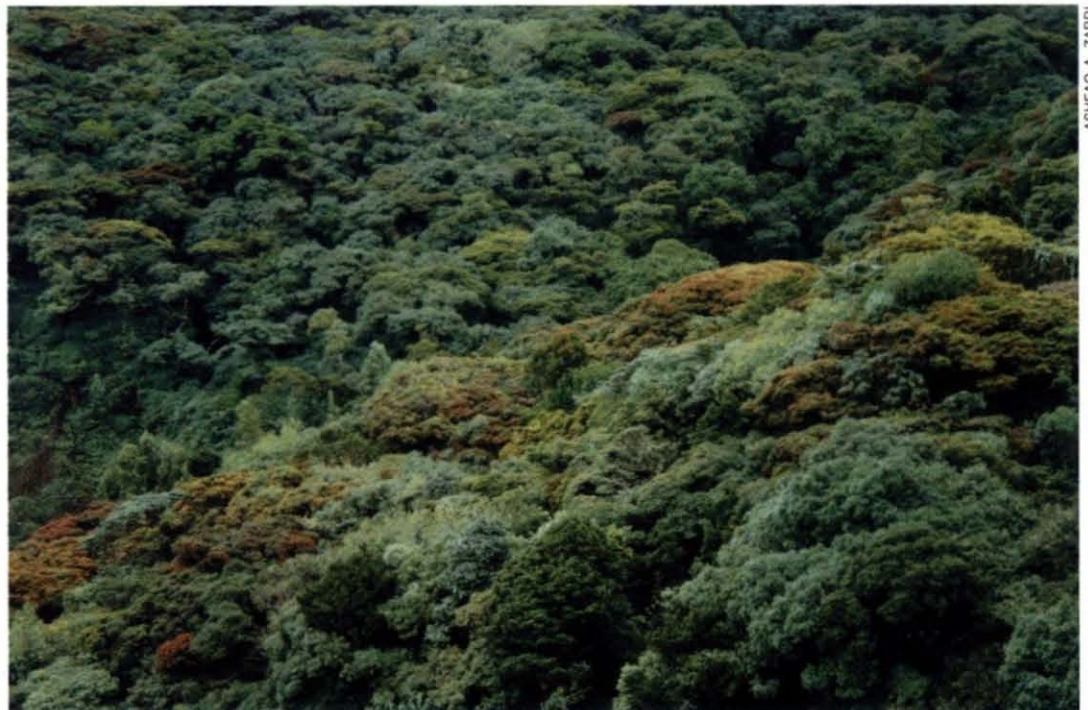
With the impetus provided by the National Forest Policy of 1952, attempts were made to convert the pristine grasslands of the Nilgiris Upper Plateau into plantations of exotic origin. Around 15 species of eucalyptus, five of *Acacia*, *Pinus* and some

other non-natives were planted in every possible terrain. Several evergreen forest patches were clear felled for these commercial plantations. Tea plantation took an equal toll on the natural vegetation mainly between 1,000 to 2,200 m elevations.

Under the stress of anthropogenic pressures and rapid changes, several weed species have invaded the natural grasslands. *Cystisus scoparius*, *Ulex europia* and *Lantana camara* are the major invaders having caused serious damaged to native vegetation.

The grasslands of the Nilgiris have been categorised as *Sehima-Dicanthium* type in the famous book THE GRASS COVER OF INDIA, by P. M. Dabadghao and Shankaranarayan, published by the Indian Council of Agricultural Research in 1973. Grasslands in Mukurti National Park and surrounding areas mainly comprise of two major communities, namely *Chrysopogon zeylanicus-Eulalia* and *Andropogon polytychus-Themedra*. Several associated species to these communities are of tropical origin. We found that *Chrysopogon zeylanicus* dominates in areas of disturbance, while in areas with no grazing or human pressures *Andropogon polytychum* dominates. We also found that the grass-

Shola forest with their intact canopy becomes a safe home for a range of fauna including several Western Ghats endemics



ASHFAQ A. ZARRI





ASHFAQ A. ZARRI

Nilgiris Laughingthrush, endemic largely to the Upper Nilgiris is endangered largely due to habitat loss: according to our study only 320 sq. km habitat remains suitable for this species

association in an area changes with change in moisture, landscape and other microclimatic factors, showing different ranges of tolerance of individual species. However, I will not go into too much detail. This can be read in our final report *Ecology of Shola Grasslands*, 2005.

I was fortunate to have a very bright and hard working student, Ashfaq Ahmed Zarri, who was not only fascinated by birds but all aspects of ecology. With the technical help of Prof. Mark J. Behan, an Emeritus Professor, Montana State University, USA and one of the finest teachers that I have seen, Ashfaq and his colleague B. Senthilmurugan, were able to conduct various field studies and experiments to study the seasonal variation in grass biomass, productivity and turnover rates, species contribution to biomass, net accumulation and disappearance rates, and system transfer function. Each trip to Mukurti National Park with Mark would open my eyes to the fascinating world of plants, their behaviour, adaptability and ecology. From being an old professor, he would suddenly into an enthusiastic teacher when in the field. From him we learnt about the invasive Scotch Broom *Cytisus scoparius* that is destroying the grasslands of Mukurti.

We also studied the bird communities of



BNHS PHOTO LIBRARY

Spraying Herbicide (2-4D) to test its efficacy for controlling Scotch Broom, a shrub that is invading the native habitats across continents

Mukurti and how these communities change due to deforestation, plantation and fragmentation. I am basically a naturalist with limited knowledge of statistics, so for me listing bird species, studying their foraging and breeding behaviour, finding their conservation status and habitat requirements, and how to protect them would have been sufficient, but for Ashfaq this was not enough. More 'science' should be brought in. He studied bird species diversity, richness and evenness in different habitats, pattern of rarefaction across different habitat and seasons, abundance patterns, and feeding and composition guilds, using fascinating statistics tools.

In order to know the conservation status of bird and mammal species, we poured





Ashfaq with his Field Assistant carrying our grassland ecology work: the study unravelled several intricacies of grassland turnover rates, productivity, litter recycling growth patterns of several grasses forming shola grassland



BNHS PHOTO LIBRARY

through old literature, and found that some birds that were common 100 years ago had either totally disappeared or become very rare, while many common species of the plains have invaded the Upper Nilgiris. We found that the Eurasian Woodcock and three species of snipes quite common and prized game birds during the early twentieth century had drastically declined, mainly due to disappearance of wetlands, pollution, excessive use of pesticides and habitat transformation. Between December 2000 and January 2004, our main study period, we were able to list 192 species, including 47 species reported earlier in the Nilgiris, but not seen by us.

For his Ph.D. Ashfaq chose to study the highly endemic Nilgiri Laughingthrush now known as Black-chinned Laughingthrush *Trochalopteron cachinnans*, a bird confined to the Nilgiris, above 1,200 m in the sholas. For three years, Ashfaq surveyed all the extant sholas, their areas, connectivity, nearest distance from other shola patches, habitat around the sholas, ecological status of the forests, patch dynamics and abundance of the Black-chinned Laughing-thrush in each shola. He went to the Indian Institute of Remote Sensing (IIRS), Dehradun to learn remote sensing and Geographical

Information System (GIS). In collaboration with Dr. A. Singh and Dr. S.P.S. Kushwaha of IIRS, we wrote a paper *Habitat suitability assessment for the endangered Nilgiri Laughingthrush: A multiple logistic regression approach*, published in the prestigious *Current Science*. Based on the synergistic use of field surveys and digitally processed satellite imagery and features mapped using GIS data layers, we were able to show that only 320 sq. km of the area of the Nilgiris is suitable for the Black chinned Laughing-thrush, not in one or two compact blocks, but in 1,352 fragments distributed across the Nilgiris, above 1,200 m. The smallest suitable patch was only 400 sq. m and the largest was 17.64 sq. km. Of the total 1,352 patches found suitable in our habitat suitability model, the majority (>90%) were equal to or smaller than 0.5 sq. km.

The Nilgiris consists of about 5,000 sq. km. In most of the bird books, the whole of the Nilgiris is shown as the distribution range of the Black-chinned Laughingthrush, which our study shows is wrong. The bird is confined to less than 320 sq. km in the whole world! And that also in highly fragmented small patches, which may not be suitable on the long run due to increasing anthropogenic pressures. It means we are dealing with a bird





which is not only highly endemic, but also with an uncertain future.

Like all studies, we have also given our recommendations for the protection of biodiversity of the Nilgiris, particularly threatened and endemic species, but who cares when you can make quick profit by cutting the forest and growing vegetables. We also found that 87 sq. km Mukurti National Park is well protected, perhaps the finest example of the original landscape of the Nilgiris. We were also able to identify some shola patches in the tea estates, some even qualifying as Important Bird Areas. Although the extensive plantation done in the 1960s and 1970s by the Forest Department has destroyed the original grasslands, these plantations now acts as corridors for many species to go from one shola to another. Even Scotch Broom, the bane of grassland, plays an important role in the distribution and abundance of Sambar, and its predators, Tiger and Wild Dogs.

One of the coincidences was the discovery of wintering population of the Kashmir Flycatcher, a globally threatened species, close to our field camp at Avalanche by Ashfaq, an inhabitant of Jammu and Kashmir. This species was earlier considered as occasional winter visitor to the Western Ghats, mostly migrating to Sri Lanka from its breeding areas in Kashmir. Ashfaq found three birds in March 2001 at Avalanche and he excitedly phoned me. I told him to keep track of them but the time for their migration had come and the last was seen on March 27. When the next winter arrived, Ashfaq was ready. In his spare time, he conducted extensive surveys to study the bird from his native Kashmir. He found 16 of them, some individuals very close to his field station. By the time I visited him in December 2001, he had studied them well to show me where they forage, where they roost and which habitat they prefer. This side-study resulted in a paper *Wintering records, ecology and behavior of Kashmir Flycatcher (Ficedula subrubra)*, perhaps the most detailed paper on this species, in *JBNHS*. Lot more has to be learnt about this rare bird. I wish I have someone like Ashfaq who can do more



Kashmir Flycatcher  
*Ficedula subrubra* is a regular winter visitor in the Nilgiris

extensive work on this fascinating little bird.

The Kashmir Flycatcher is Vulnerable and is included in the Red Data Book species found in the Indian subcontinent. Besides India, it has been recorded sparingly in Pakistan, Nepal and Bhutan. While its wintering is confirmed in Sri Lanka, there have been very few records of its exact wintering status and distribution in the Indian limits. Of the total 28 site records of this species from the Indian limits, only two published records go to prove its wintering in Peninsular India. Rests are passage records from across much of India during migration. Our studies prove that it regularly winters in southern Western Ghats.

I know many Ph.D. students who are so focused in their study that they do not look on other things. As the axiom goes, a Ph.D. student is one who knows more and more about less and less. The beauty of working in BNHS is that we try to make students interested in all aspects of natural history. Ashfaq is a good example of such a student. He not only took data on the grasslands and grassland ecosystem of the Nilgiris, but he also collected and published information on the invasive Scotch Broom, Sambar populations, distribution of tiger in Mukurti National Park, flowering plants, general birdlife, and the Kashmir Flycatcher. He also helped us in identifying Important Bird Areas of the Nilgiris. 🐦





**Gliding Frog *Rhacophorus translineatus***

Generally seen at an altitude of 700-1,500 m,  
this photograph is the second official record of  
this species from India.





# Partners for life

Text: S. Balachandran

## About Bird Ringing

Bird ringing is one of the major aspects of bird migration studies and bird population monitoring studies. It is the method of monitoring the movement and migratory path used by any particular bird species by fitting a ring to its leg. A bird migration study centre has been set up by the BNHS at Point Calimere, to train more researchers in bird ringing. The Bird Population Monitoring Studies is funded by Chilika Development Authority, Government of Orissa and Ministry of Environment and Forests.



Curlew Sandpiper



Born the son of a teacher cum farmer in a village near the southern tip of India, I was involved in our farm and garden works such as collection of cashew nuts, tamarind, mango, and sweet toddy (making palm sugar). While going with my kin to the gardens in my childhood and adolescent days, the aroma of cashew, tamarind and mango flowers, the calls of the Hoopoe, Spotted Dove, Coppersmith Barbet, and Koels kept me close to nature. The long walks through the ploughed and planted paddy fields filled with hundreds of egrets, White Ibis, and Pond Herons during rainy days are still fresh in my memory. The pet birds that my brother and I kept also enhanced my affection to birdlife. Through this article I would like to delve deep into my past experiences from my 'hey days' as a research scholar with the Bombay Natural History Society's field projects under the stewardship of Dr. Sálím Ali, and other eminent ornithologists, to elucidate how I got interested in bird-ringing and to highlight the long term importance of bird ringing.

I learned about the BNHS and Dr. Sálím Ali through my professor when I showed him the advertisement for the post of Field Biologist in a BNHS field project, after my masters in Marine Biology in 1981. Three days after joining as a Junior Field Biologist in the Bird Hazard Project at Hornbill House, I was sent to Point Calimere for three months field training. During my first field visit to Point Calimere Wildlife Sanctuary, I was asked to accompany the field assistants to the bird-ringing site. After wading through some waterlogged areas and crawling through the jungle at 5:30 in the morning, we reached the netting site where a Blyth's Reed Warbler entangled in a mistnet was shown to me. It was the first migratory bird that I touched in my life! All the 23 birds collected from 20 mistnets (a net made up of fine nylon threads) were brought to the ringing site where I waited with my senior colleagues to see the remaining birds brought in for ringing. Bird ringing became a lifetime terminology for me. Bird ringing is a technique of marking birds with numbered metal rings on their legs



VARAD GIRI

to identify the individual birds, with a script which basically describes where to inform if it is found. If a marked bird is subsequently recaptured by another ringer, it makes it possible to understand the movement between the place of ringing and recapture. When the birds were taken out from the cloth bags one by one, I was happy to look at more colourful birds, which were fitted with different sized numbered aluminium rings with the script "Inform Bom. Nat. Hist. Soc", on their tarsi. Out of the 13 species caught on that day, I could recognise Black Drongo *Dicrurus macrocercus*, Eurasian Golden Oriole *Oriolus oriolus*, Spotted Dove *Streptopelia chinensis* and Purple Sunbird *Nectarinia asiatica*, but by their local names.

After folding the mistnets at 10:30 a.m. we were taken for breakfast, then directly to the field station where I saw two baskets full of smaller birds guarded by three bird trappers in olive green uniform. It was only when the trappers referred to the birds as *Ullan* (local names of waders) did I realise that it was these birds that my colleagues had relished in private hotels in the seventies during our masters program. A total of 140 birds of six species were taken out from the baskets species-wise and rings were placed very fast by my seniors before lunchtime. I was soon tired and bored watching the ringing that lasted over two hours, as 95 per cent of the birds belonged to just two species – Little Stint and Curlew Sandpiper. All the birds were checked for wing and tail moult, and weighed. Measurements of wing, bill and tarsus were

▲  
The ring informs a person as to when, where and by whom a bird was ringed







SATHYASELVAM

▲  
Waders caught and kept in an enclosure for ringing

taken for the first ten individuals, whilst the remaining individuals were measured only for wing and bill. On the same night by referring to the colour plates in THE BOOK OF INDIAN BIRDS by Sálim Ali, I made a list of 60 birds known to me by recollecting the local names and the images of birds imprinted in my mind during my boyhood days, which revived my bird watching instinct. At Point Calimere, the sightings of fabulous clouds of waders, terns, gulls and ducks in the sky, huge flocks of Greater Flamingo *Phoenicopterus roseus* on a long line stretching for a few kilometers, huge mixed hunting flocks of egrets, Spot-billed Pelican *Pelecanus philippensis*, Brown-headed Gull *Larus brunnicephalus* and Eurasian Spoonbill *Platalea leucorodia* fascinated me further towards waterbirds.

After two weeks, one evening when all our senior colleagues had left for the neighbouring town on official work, I had an opportunity to handle three birds caught for ringing in the last slot of the day, with the help of our field assistants. As three of my senior colleagues left the project at Point Calimere during my three-month probation period, I was entrusted to undertake bird ringing independently for both forest birds and water birds on some days. After three months, when I was called back to Mumbai



to undertake bird surveys in airfields for the Bird Hazard Project I left Point Calimere with a heavy heart. While surveying birds in and around Mumbai airport, I felt homesick whenever I recollected my field experiences at Point Calimere. Eventually, I persuaded the administration to transfer me to Point Calimere, where I was given the charge of ringing birds, my favourite job. After two years, following the standard techniques adopted internationally in bird ringing, the project staff was trained by a British bird-ringer, especially on measurements, moult scoring and aging of waders. At the conclusion of the training I was labelled as less careless in measurements and ranked among

the best for moult (renewal of feathers) scoring and aging of the birds. This was a motivating step in my career. In fact, it is necessary to mention that before this training all the waders were entered in the data sheet as adults. The training cleared my delusion that the breeding origin of migratory birds can be understood through recoveries (recapturing at places other than ringing place). But also that bird ringing is a scientific method to investigate many aspects of birds, besides tracking their movements.

### Bird Capturing Methods

For ringing, birds are caught using different types of nets/traps. Small birds are often caught in fine mistnets (carefully choosing the mesh size and material of the netting). Small and medium sized waders can be caught with the traditional "Clap Trap" method, which can also be used for gregarious birds like ducks and terns. Bigger birds like flamingos, storks and long-legged waders are often caught in noose traps, which pose no serious safety problems. After removal from a net or a trap, birds are usually placed in soft cotton bags or in special holding boxes, where they remain quiet until they can be ringed and released.



### 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 and sex of the bird, a variety of measurements (biometrics), which can be used to characterise different populations, the amount of fat stored by migratory species, the state of feathers (moult), as well as the habitat in which the bird was caught. Recognition of the age and sex of a bird can be important for studying many aspects of avian ecology. Age ratios of trapped birds and catches of juveniles and adults in standardised trapping programmes can provide information on breeding success. Ornithologists use a variety of characteristics to identify, sex and age based on plumage coloration, feather tear and wear, and feather shape.

The records of banded birds also yield other information pertaining to migration such as arrival and departure dates, the length of time different birds pause on their migratory journeys to feed and rest, the relation between weather conditions and starting times for migration, the degree of regularity with which individual birds return to the summer and winter quarters used in previous years. If networks of ringing stations are operated simultaneously, movements can be monitored by recovering ringed birds between different localities. Simultaneous bird ringing carried out during late 1980s at a network of wetland habitats located along the east coast from Gulf of Mannar (Tamil Nadu) to Chilika (Orissa) has yielded interesting information on the migratory movements of birds between these sites during their northward return migration. For instance, the birds ringed in Point Calimere were reported in Kaliveli, Pulicat lake and Chilika lake in the same season. A few waders ringed in Point Calimere and Chilika lake were recovered in China and Hong Kong.

Another interesting aspect of the wader ringing is observing birds in different plumage (colour) at different seasons (autumn, winter and spring). The birds observed in partial breeding plumage at arrival time (August to



SATHYASELVAM



SATHYASELVAM

October) can be accurately identified as more than two years old. Similarly, all the first year birds at arrival (less than six months old) can be easily recognised by the fresh and dark plumage with lot of markings on the wing coverts. The moult will also help to identify the second-year birds during the same period. The variation in the pattern of breeding plumage between the two sexes in certain species like the Lesser Sand Plover and Ruff, can also be recognised. The moult in waders, especially wing feathers, are very interesting to study as feather growth are mostly accurate in timing for similar age groups (first-year, second-year and older than second year) of specific species. These special phenomena of the waders inspire not only the experienced ringers, but also the trainee ringers.

The brood patch is an area of bare skin on the belly developed by incubating birds, which serves to increase the transfer of body heat to the developing chicks. In the brood patch blood vessels increase in size and skin becomes thicker and fluid-filled. From the

▲  
Top: Noose traps used for catching birds

Above: Rings and equipment used during ringing







VARAD GIRI

▲  
Two adult  
Curlew Sandpipers in  
breeding plumage (dark  
colour) and one young in  
non-breeding plumage

stages of the brood patch, the breeding status can be determined.

### Fat Reserves for Migration

The migration of ducks or Arctic shorebirds, between breeding and wintering grounds, regularly exceeds 5,000 kilometers. In order to perform these extraordinary endurance flights, these migrants require considerable energy reserves in the form of fat. Some species of birds put on small amounts of fat at a series of fattening sites, spread along their migration routes, whilst others store large amounts of fat and then undertake very long journeys. During ringing, the amount of fat accumulated by an individual bird can be calculated by comparing the weight gain to the known mean winter weight of that species. Similarly, the difference in weight between the first and second capture will give the weight gain/loss for the bird ringed and recaptured in the same season. Migrants which fail to acquire sufficient 'fuel' along their migratory route will possibly perish on their journey. As the identification and protection of important 'fueling' areas are a prerequisite for the effective conservation of migrants, the disappearance/degradation of any key wintering/stop over site will have serious impact on the global population of the species, which utilise the site for wintering or 'refueling'.

Ringing can provide information on population levels and is the main source information on survival. Apart from

movement data, ringing provides other fascinating data, for instance longevity. Two waders, Lesser Sand Plover *Charadrius mongolus* and Common Redshank *Tringa totanus* were recaptured after 20 years at Point Calimere. Another instance is of a non-migrant, a Large Golden-backed Woodpecker *Chrysocolaptes lucidus* ringed at the Parambikulam Wildlife Sanctuary, Kerala in May 1983 and recaptured in the same patch of forest in November 1999, after more than 16 years. In Palni

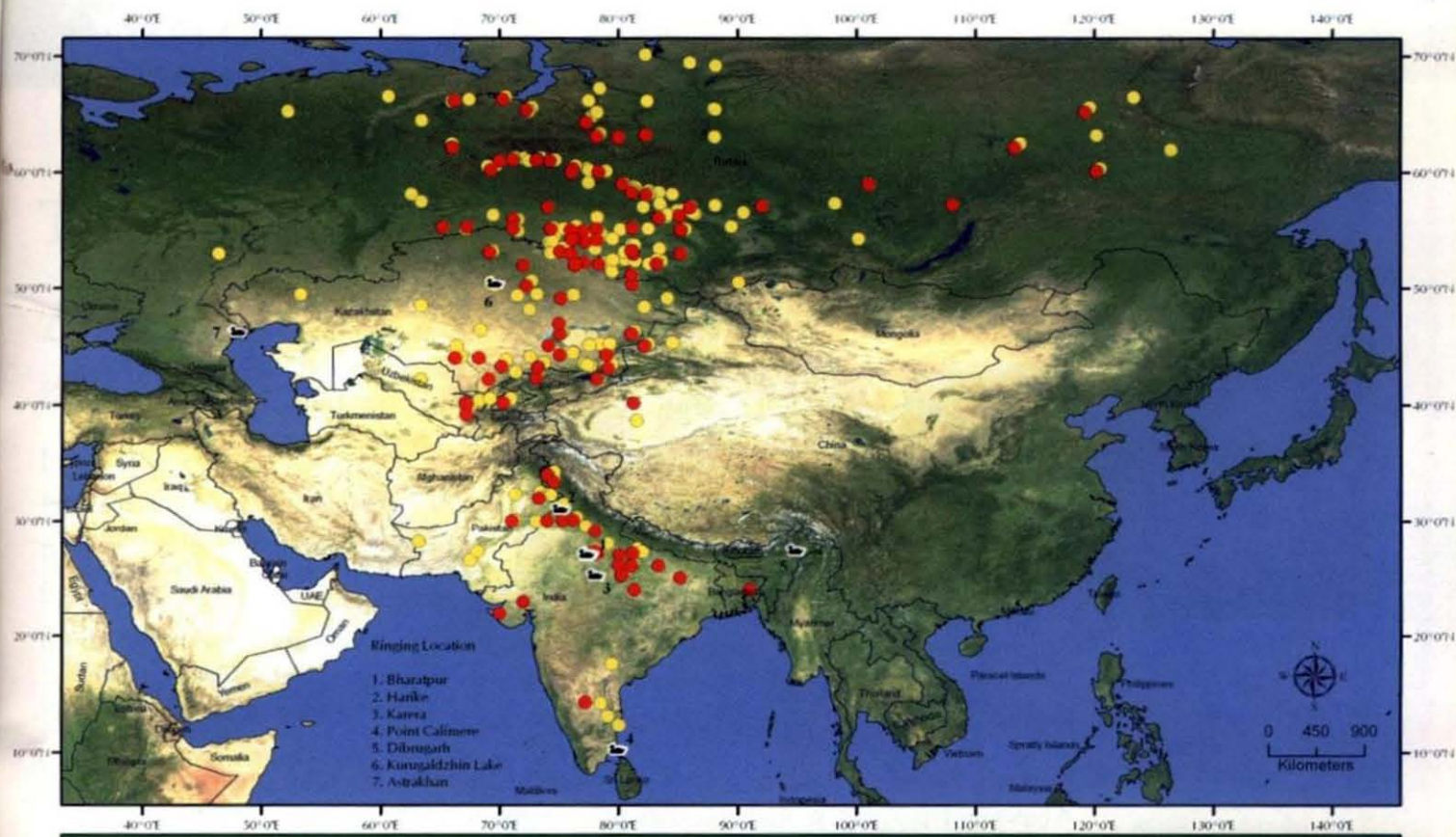
Hills, Grey-breasted Laughingthrush *Garrulax jerdoni* and White-bellied Shortwing *Brachypteryx major*, the two endemic species of the Western Ghats, were recaptured after 14 and 13 years respectively. It is exciting to recapture migrant waders in subsequent years from the same site on the same day.

I would like to share two rare and unforgettable events that happened while recovering birds.

After taking independent charge of the bird-ringing in Rameshwaram in 1985, I was bothered about the progress of fieldwork for the first month catch of 200 birds here was equivalent to a day's catch at Point Calimere. One day when travelling in a local bus from the field station to the field site, and sulking over my decision of moving from Point Calimere to Rameshwaram, my attention was drawn by the trappers to a lady in the bus who held a Lesser Sand Plover *Charadrius mongolus* with a ring in her hand. The ring on the right leg indicated that it was ringed in an even year (normally rings will be placed on the right leg for even years and left leg for odd years), 1985 being an odd year the ring should have been in the left leg, had it been ringed at Rameshwaram. Taking this into consideration I realised that the bird had got its ring from a place other than Rameshwaram. The ring number confirmed my doubts, but I needed to do something more: a release of the bird would be fine? The usual Indian customs of cajoling and haggling for a certain price started, and headed to a futile deadlock. The failure







### Northern Pintail - *Anas acuta* Ringing and Recovery Locations

Legend Recovery Location  
 Ringing Location MAPS Project  
 Countries BNHS

Source: Ducks, Geese and Swans of India

Map prepared by: Sham Dey, ebird

prompted me to use a different approach; I threatened to take her to the local police station and lodge a complaint against her. All this commotion within a bus got the locals involved too. The lady finally gave in to the threat. Later, the details of the ring which I received from the head office, indicated that the same bird had passed through my hand an year earlier at Point Calimere. Subsequently, the increase in bird catch and the recovery of a Russian-ringed Curlew Sandpiper and Crab Plover encouraged me to complete my doctoral thesis at Rameswaram.

During January 1989, when I was on a five-day leave to celebrate my 'first pongal' (harvest festival) after marriage, I received a telegram from the headoffice to proceed to Point Calimere to involve a Russian scientist in wader banding. My wife, disenchanted with the telegram, cursed the Russian and me for proceeding to Point Calimere, as I was absent from home during my first Diwali as well. We left on January 15, 1989 and netted a Grey Plover ringed in Moscow. From the

serial number the Russian guessed that the bird may have been ringed by him at Kazakhstan. His anxiety knew no bounds till he went back to refer to the data sheet. He was amused that it was he himself that had earlier ringed that very same bird in Kazakhstan in September 1988 *en route* to Point Calimere. He informed us joyously, that he had handled the plover twice in the same migratory season in two different countries, separated by long geographical barriers. I could gauge his happiness because of the event's rarity. I too had handled several migratory waders in two different localities of India in the same migratory season.

### Point Calimere Bird Migration Study Centre

The study of bird migration has been one of the Society's major activities since 1959, and bird ringing at Point Calimere started in 1969 is being continued till date. In the past four decades, BNHS has ringed about five lakh birds in various parts of India. Out of which over 50 per cent were from Point

▲  
The map gives information on the ringing of Northern Pintail







▲  
The recently built Bird Migration Study Centre of the BNHS at Point Calimere

Calimere. Point Calimere and the Great Vedaranyam Swamp together support 275 species of birds including 63 long distance migrants from the Arctic tundra and temperate regions of central and northern Siberia.

The scientific conferences, workshops and trainings, which I attended overseas, are mostly due to my involvement in wader research and the interesting results generated through waders ringing. It is these small migrant waders that visit Point Calimere in large numbers to spend their winter months with us after breeding in Arctic Russia during summer. But their continuous decline in numbers is a warning to protect them from hunting and habitat degradation. They need special conditions, shallow waters and tides rhythmically flushing acres of mudflats. I realised such an area was Point Calimere, perhaps the largest wader congregation area in India during the 1980s. Reaching birds at Point Calimere is not as difficult as reaching Point Calimere itself. This is because the bird habitats are closer to human habitation. Moreover, this is the only site monitored for birds consistently since 1970, it is an ideal site to gauge the changes in bird population and recognise causes for the changes. Hence, I proposed the establishment of a Bird Migration Study Centre to the BNHS administration, which approved the concept in principle in 2000. After five years of hectic endeavours I have succeeded in generating the funds for the establishment of the Centre



mostly through the contribution and influence of participants of the bird ringing training programmes. The Centre aims to study the population status of migratory species and initiate management measures to restore the degraded waterbird habitats of the Sanctuary. Imparting training to volunteers, researchers, students and amateur bird watchers on wetland ecology and monitoring waterbird population. This is the first centre for the bird migration studies in India. Moreover, the establishment of this Centre coincides with BNHS's

125-year celebrations and the Golden Jubilee of the Indian bird ringing studies.

### Bird Banders Training programme

Besides scientists' contribution through ringing, 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.

The bird banders training programme of the BNHS was conceptualised with the primary objective to build a volunteer based group of bird ringers as in other countries, so that bird ringing could be carried out on a much larger scale. Through this programme training has been imparted to wildlife and conservation oriented organisations and individuals from different parts of India. To date 250 individuals have been trained in bird ringing and identification at different places in seven states of India.

A young lady who had participated in a bird banding training programme aptly mentioned to me, "Sir, I'm not married, so I'm putting rings on birds", and I agreed that all who had ringed birds were engaged to birds; they were 'partners for life'. 🐦



S. Balachandran, Assistant Director, BNHS, is working on Bird Migration and Wetland Ecology, Avian Influenza surveillance and Satellite tracking of migratory birds.



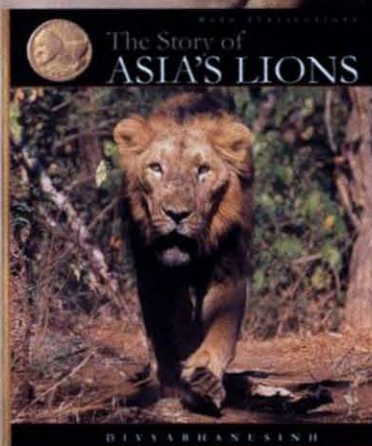
## The Story of ASIA'S LIONS

By Divyabhanusinh

Lions once roamed the Asian continent from Palestine to Palamau. Why they have been reduced to a beleaguered relict population in Gir is described, with implications for their future in the 21st century.

DIVYABHANUSINH is well known in the field of nature conservation. His book *The End of a Trail: The Cheetah in India* (1995) was a pathbreaking history of a species.

ISBN13: 978-81-85026-87-9  
280 x 215 mm Hardcover  
268 pages 162 illustrations  
First printed February 2005  
Rs 1950.00 / US\$ 50.00



When you purchase *The Story of Asia's Lions* you are supporting the Gir Welfare Fund which is engaged in welfare work with the forest staff in the Gir Protected Area. The Gir Welfare Fund will receive 5% of the net sales value per copy.

### ORDER FORM

I would like to buy \_\_\_ copy/ies of **The Story of Asia's Lions** at the list price per copy inclusive of postage: Rs 2050.00 / US\$ 70.00

Name \_\_\_\_\_

Billing Address (of the card used for payment) \_\_\_\_\_

Delivery Address (if different from Billing Address) \_\_\_\_\_

Tel \_\_\_\_\_ Fax \_\_\_\_\_ E-mail \_\_\_\_\_

### Payment

Enclosed is a cheque/draft payable to NCPA (MARG PUBLICATIONS) payable at Mumbai, India for Rs / US\$ \_\_\_\_\_, OR

Please charge my  VISA  MasterCard  \_\_\_\_\_ Credit Card number \_\_\_\_\_

Card expiry date \_\_\_\_\_ for Rs / US\$ \_\_\_\_\_ Date \_\_\_\_\_

Signature \_\_\_\_\_ Date of birth (required for payments by credit card) \_\_\_\_\_

Please complete this order form and post it with your payment or fax it with credit card details to the attention of:

The Sales and Marketing Department, Marg Publications, Army & Navy Building, 3rd Floor,

148 Mahatma Gandhi Road, Mumbai - 400 001, India.

Tel.: (91-22) 22842520, 22821151, 22045947/48 Fax: (91-22) 22047102 E-mail: margpub@tata.com Website: www.marg-art.org

PLEASE ALLOW 3-4 WEEKS FOR YOUR ORDER TO BE PROCESSED THROUGH CREDIT CARDS.

A PHOTOCOPY OF THIS ORDER FORM MAY BE USED.



# Tiger Conservation ... the challenge ahead!

Text: Sanjay Karkare

## About the Project

The Satpuda Landscape Tiger Programme (SLTP) under the Tiger Cell of BNHS, is funded by Born Free Foundation, UK and was started in February, 2005. It aims at educating the villagers around the tiger reserves and address the needs of the tigers of central India, especially in the Satpuda mountain range, which is perhaps the largest contiguous tiger habitat left in India.



Tiger





Sanjay Karkare interacting with students and creating awareness about tiger conservation

"After the camp I am very satisfied. Now I know the importance of forests, wildlife and human-wildlife relations. I will speak to the villagers about this and tell them about the importance of nature" were the words of Dhanraj Shalikram Inwate from Sawra village, a youth who attended a two-day *Paryavaran Janive Jagruti Shibir* (Environment Awareness Camp) at Sillari of Pench Tiger Reserve, Maharashtra. Such camps are a part of the awareness activities of the Satpuda Landscape Tiger Programme (SLTP) conducted by the Mobile Education Unit of the Tiger Cell, BNHS, which is currently funded by Born Free Foundation, UK.

The Satpuda Landscape Tiger Project (SLTP) aims at addressing the needs of the tigers of central India, especially in the Satpuda mountain range, which is perhaps the largest contiguous tiger habitat left in India. The major issues of tiger conservation are dealt by securing their habitat and reducing conflict with the local communities. The Project titled, 'Satpuda Landscape Tiger Programme' has four partners focusing on different aspects – BNHS Conservation Education, Nature Conservation Society, Amravati (Mobile Health Unit),

Satpuda Foundation (Conservation Unit) and Tiger Research and Conservation Trust (Research Unit). This Project was started in February, 2005.

The Education Unit selected 153 villages along the periphery of Tadoba-Andhari Tiger Reserve, Pench Tiger Reserve, Madhya Pradesh, and also, Pench Tiger Reserve, Maharashtra in the Satpuda Ranges of central India. These villages were selected on the basis of dependency of the villagers on forest and their attitude towards tiger conservation. Students, local youths, women from the Self Help Groups (SHG) and underprivileged communities were selected as target groups for the programme.

The Mobile Education Unit (MEU of BNHS) conducts various activities at school level to promote conservation of tigers. The Education Unit has conducted many activities for school students. With the help of photographs and slide shows, the Unit explains the basics of natural history and role of wildlife. Field visits for students in tiger reserves were a major success with reference to awareness among the youngsters. Film shows, lectures, competitions, exhibitions and

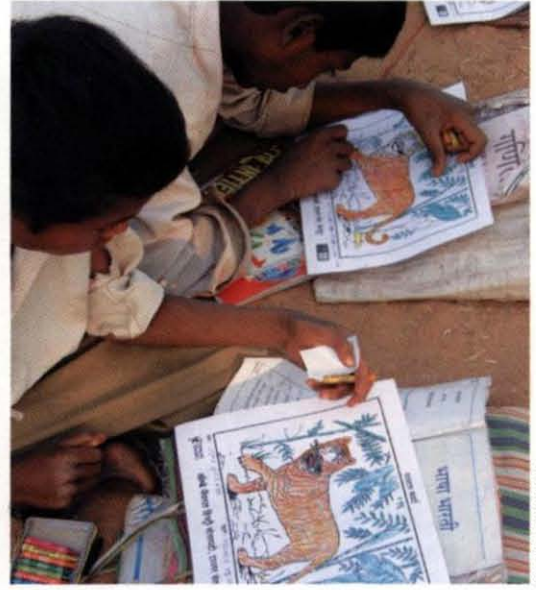






ANIL DAHULE

Experiential learning is a unique way of imparting vital information about issues regarding tiger conservation



SANJAY KARKARE

Students taking part in the painting competition held by the Unit

nature games are also popular with schools. However, among all the activities, films are the main attraction in most villages. In fact, entire villages gather for these film shows, which cover the issues of tiger conservation as well as human-wildlife relation. These programmes are so popular that many villagers demand these programmes.

In the last three years, more than 30,000 students were sensitised. Teachers also got the opportunity to understand the basics of nature conservation. Out of these, 2000 students could visit the tiger reserves around their villages, 90 per cent of these had never visited a tiger reserve before. This is an achievement for the Education Unit as educating teachers is critical in the long run. The popularity of the Unit has motivated other schools, which were not covered under these programmes. Many of these schools approached the Unit for conducting similar programmes in their respective schools.

During the third year of SLTP, the Education Unit focused on building on the efforts carried out during the previous years. The Unit is now making a shift from general awareness to more focused, issue based conservation education and strengthening the sensitised target groups. Acknowledging the fact that education and awareness cannot be

carried out without addressing livelihood issues, the Unit is focusing on issues like fuel wood collection, poaching, illegal grazing and forest fires. More than 30 villages on the periphery of three tiger reserves are covered. The Unit is also concentrating on educating locals on direct benefits of tiger conservation to the locals.

The woman of a house is an important member of the family from the environment awareness point of view. In rural areas, almost all activities related to running a household are done by women, including collection of fire wood and water. The Education Unit knows the importance of educating women on conservation of natural resources. In fact, the unit arranges special one-day trips only for women to the tiger reserve near their village. Also, slide shows on tiger reserves, importance of forest, threats such as forest fires and their impacts are explained to them. Group discussions are arranged later, wherein topics such as water related issues, sanitation, health, self help group activities are also discussed.

As we worked more with the locals, we realised that a number of youth in the villages were unemployed. As a result, sometimes, these youngsters get involved in illicit activities. Our Unit decided to concentrate





on this dimension and organised youth meetings in the villages. Data were collected and a module was made for these youngsters. It was followed by two-day awareness camps for the local youth. The main concept behind these camps is to create awareness amongst youth, and try to establish awareness groups in villages. This also helped us to spread the message of conservation. We select 5-7 youths for camps from every village.

The Unit's programmes for women and youth received a positive response and a marked change in their attitude was noticed.

Voluntary participation of women and youth in the activities of the Unit increased. Building on the impetus, the Unit is facilitating greater coordination between locals and Tiger Reserve Authorities.

Firewood collection is the main problem in the periphery of Tadoba-Andhari Tiger Reserve (TATR). During the Environment Education Programmes of the Project, we noticed the use of large quantity of fuel wood for cooking by villagers. This problem was discussed in the camps and alternate solutions such as biogas, kerosene, LPG and waste material from agriculture were discussed. Youths gave their suggestions on how these resources could be used properly.

To minimise cutting of trees in forest areas, the Project Tiger of the MoEF had installed biogas plants in the peripheral villages. Our unit did a survey to determine the present status of the scheme; 61 per cent of the biogas plants out of the 101 installed are non-functional. Thus, the need for restarting non-functional biogas plants is paramount. To begin advocacy, baseline data on biogas was collected. According to the information provided by Project Tiger, ten villages were short listed for the preliminary work by the



ANIL DAHULE

Unit. A survey was conducted in all the households in these villages. A biogas plant holder generally has two to fifteen cattle; some cattle have been lost due to tiger attacks in a few villages.

The average consumption of fuel wood / family is about 1000 to 1200 kg / year (one family requires four bullock carts per year and each cart weighs about 300 to 400 kg). All the wood is collected from the fringes and inside TATR. Thus, the revival of biogas will certainly help to reduce dependency on wood from the forests. The other advantages of biogas are to reduce human-animal conflict, reduced health issues for women, especially lung disorders and will save time for fire wood collection. To start non-functional biogas plants, RPS Energy provided financial assistance for this burning issue.

New initiatives such as bamboo sapling distribution were carried out. These initiatives were designed based on experience of previous years and will be carried out as ongoing projects in future as well.

As bamboo is the major source of livelihood in the Tadoba periphery (over 30 per cent of the population), it was imperative

▲  
Forest Department Officials  
examining projects under-  
taken by students under the  
SLTP







ANIL DAHULE

▲  
Training of forest guides is an essential part of the Unit's activities

to suggest alternatives to reduce their dependency on Tadoba for bamboo collection. We believe that unless we provide alternate livelihood options, getting community support for conservation will be difficult. Thus, as a part of our Education Unit Advocacy, we have decided to collaborate with some agencies to provide them with bamboo saplings and encourage them to take up bamboo plantation either on their own land or lands allocated by the Forest Department. If this could be done successfully, the dependency of these people on bamboo, which at present is collected from TATR will be reduced. This in turn will help to reduce the human-wildlife conflict and clashes with the Forest Department.

Since the last two years, the Education Unit has been discussing this issue in villages involved in bamboo extraction. The Unit has been successful in changing the attitude of the villagers and making them understand that they are responsible for the future availability of bamboo, thus, promoting the sustainable use of bamboo. The Unit has succeeded in getting the villagers to take up bamboo plantation by distributing more than 1,500 bamboo plants free to some selected farmers and bamboo workers, who have their own farms in Kolara village. Apart from this, plants were distributed in seven schools in Chimur taluka. It was encouraging to see



many farmers coming forward to cultivate bamboo.

One of the significant achievements of the Unit is establishment of good rapport and coordination between the local Forest Department and villagers. The Unit is making efforts to bring the community and Forest Department on a single platform. This is vital to garner long term support of the community for conservation. We invite Tiger Reserve officials for these camps as this helps to better relations. Tiger Reserves Authorities came forward for providing financial support to

conduct additional programmes for schools in the villages around the tiger reserves. Nagzira Wildlife Sanctuary authorities approached the Unit and requested the unit to conduct conservation education activities in their Sanctuary. They also requested the Unit to conduct Guide Training Programmes.

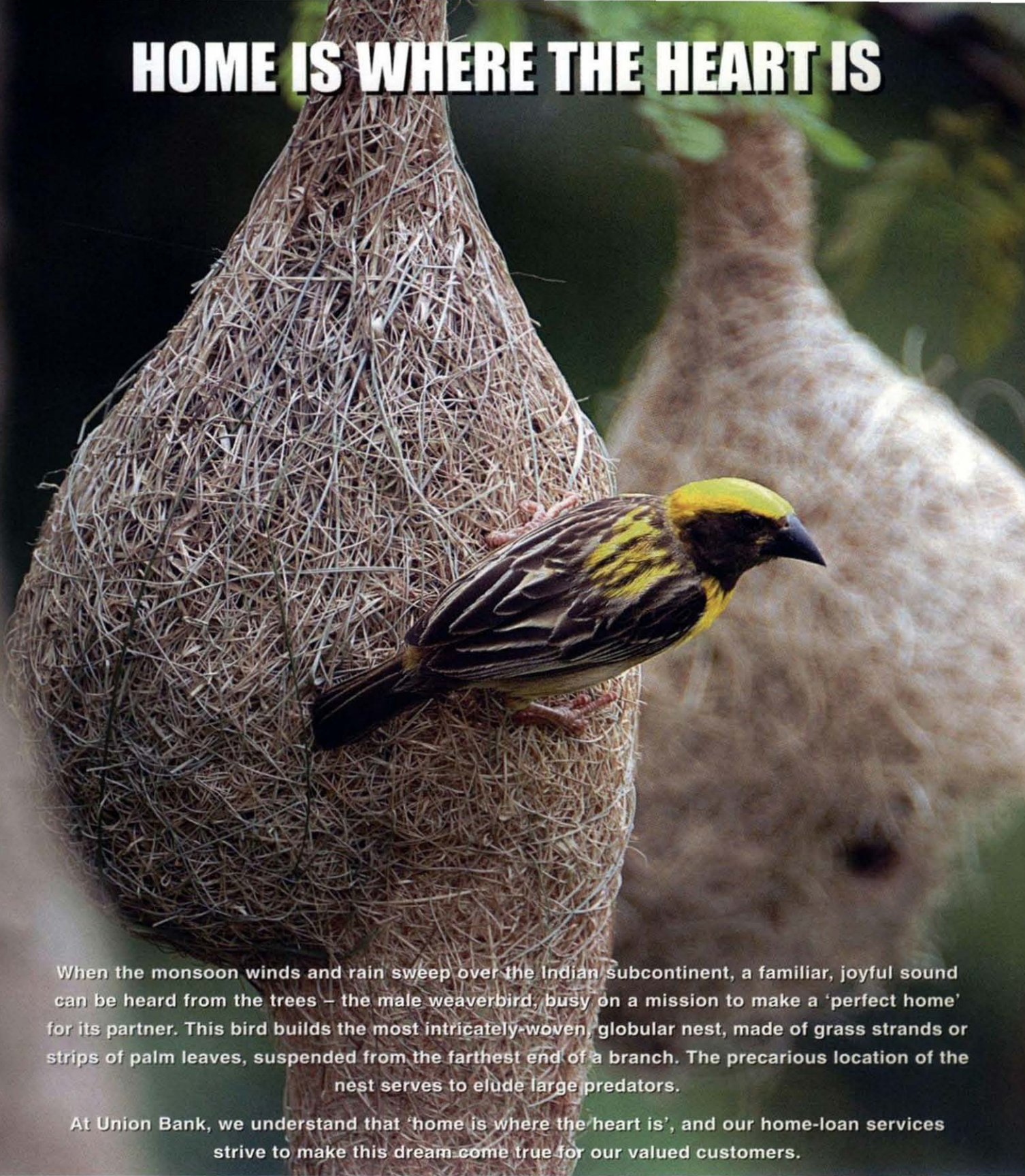
The Education Unit is continually striving towards spreading awareness and reaching out to more people. All the achievements are a positive sign and there has been a marked difference in the attitudes of people but lots more is still to be done. As most of us know, tigers are facing a serious crisis and protecting this majestic animal and its home has become a tough challenge. We require everyone's support for this cause. As mentioned at the start of the article, the opinion of Dhanraj Shalikram Inwate and many other like minded youngsters is an encouraging sign and there is still hope. This reaction has given us lot of confidence, strength and support for our activities. We hope that there are going to be many more people joining us because, after all, saving the tiger for the future generations lies in our hands – yours and mine! 🐅



Sanjay Karkare is at present Education Officer, Tiger Cell, BNHS.



# HOME IS WHERE THE HEART IS



When the monsoon winds and rain sweep over the Indian subcontinent, a familiar, joyful sound can be heard from the trees – the male weaverbird, busy on a mission to make a 'perfect home' for its partner. This bird builds the most intricately-woven, globular nest, made of grass strands or strips of palm leaves, suspended from the farthest end of a branch. The precarious location of the nest serves to elude large predators.

At Union Bank, we understand that 'home is where the heart is', and our home-loan services strive to make this dream come true for our valued customers.



**Union Bank**  
of India



## Koyna Wildlife Sanctuary

Wetlands often host considerable biodiversity necessitating their protection





# Need for Project Bustards

Text: Asad R. Rahmani

## About the Projects

All the three members of the bustard family are threatened with extinction, with Bengal Florican being recently listed as critically endangered. If immediate measures are not taken up quickly, the Great Indian Bustard and the Lesser Florican will also join this category. This article deals with BNHS projects that involve local communities to save the Great Indian Bustard.





Whenever we talk of wildlife protection, the normal tendency is to think of a forested area that needs protection from cutting or encroachment, or other human use. Grasslands, wetlands, coasts, rivers, and rural landscapes rarely find a place in conservation priority, although some of the most endangered Indian species are found in such habitats.

Four members of the bustard family are found in Indian grasslands: the Great Indian bustard *Ardeotis nigriceps* of the short grass plains and deserts; the Houbara Bustard *Chlamydotis undulata* (winter migrant to the desert regions of Rajasthan and Gujarat); the Lesser Florican *Sypheotides indica*, found in the short grass plains in western and central India; and the Bengal Florican *Houbaropsis bengalensis* of the tall, wet grasslands of the Terai and the Brahmaputra valley.

Like the tiger is considered the 'spirit of Indian forests', I consider the majestic Great Indian Bustard as the 'essence' of grasslands of the Indian plains. The Great Indian Bustard forages, shelters, displays and breeds in grasslands, and its absence warns that the grassland is deteriorating. The Great Indian Bustard is now on the brink of extinction. It is locally extinct from almost 90% of its former range, and ironically it has disappeared from three sanctuaries made especially for its protection. In a few sanctuaries it is declining rapidly. Earlier it was mainly poaching and habitat destruction that resulted in such a pitiable situation of this grand bird of the Indian grassy plains, but now mismanagement of the habitat, sentimental protection of certain problem animals, and apathy would exterminate this species.

In the early 1980s, the five states where the Great Indian Bustard was still found took some conservation measures and eight protected areas were declared. Despite all these conservation measures, the status of the Great Indian Bustard has sharply deteriorated during the last 25 years. This raises the question: Is the sanctuary approach appropriate for the protection of species that live in low density in scattered extant



ASAD R. RAHMANI

grasslands and marginal crop fields? The answer is yes and no. The sanctuary approach certainly helps in curtailing poaching, but unless appropriate habitat protection measures are taken, declaring a sanctuary for bustard does not help in the long run. Now the question comes: how does one take 'appropriate habitat conservation measures' in someone's private land? Or, what do you do if the conservation measures result in increase crop damage by wild ungulate? Should we kill the problem ungulates to get the support of rural communities for the rare bustards, or should we allow the problem to fester and see the disappearance of highly endangered species?

In the 1980s, BNHS executed a five-year project to study the ecology and distribution of the Great Indian Bustard, and later from 1985, the two florican species, the Lesser Florican and the Bengal Florican, were also studied in another project. I got the opportunity to survey the whole country from Gujarat in the west to Assam in the east in search of these rare birds, along with my colleagues Ranjit Manakadan, Bharat Bhushan, Ravi Sankaran, Goutam Narayan, Lima Rosalind and Usha Lanchungpa. In the early 1990s, we got a project on the Grassland ecology, which further gave me an opportunity to monitor the status of these birds. After that I took up smaller and short duration projects to study the Great Indian

▲  
Bustard campaign in a primary school in Jodhpur







K.R. SENACHA

▲  
Republic day parade in  
Jaisalmer with BNHS  
Godawan campaign vehicle

Bustard, while Ravi, now Director of the prestigious Sálim Ali Centre for Ornithology and Natural History, studied the Lesser Florican, and Goutam Narayan, settled in Assam, kept a watch on the Bengal Florican. Due to lack of space in this article I will concentrate on the Great Indian Bustard, and our attempt to save it with the cooperation of local communities.

By 1990s, I was fully convinced that saving the Great Indian Bustard (GIB) was not going to be easy as it lives in vast landscapes in very low numbers, and its grassland habitat is under tremendous pressure. Ironically, one of the biggest threats to grasslands is not from the graziers, but from the forest department. To live up to their name, officials of the forest department, consider their



RAJAT BHARGAVA

Bustard campaign in a school





ASAD R. RAHMANI

◀ Godawan rally in a village in Bikaner

solemn duty to convert every grassland (and even wetlands) into a forest. Plantation of exotic trees is their business, and a source of 'personal income' as a lot of money can be made by employing people for digging pits, bringing samplings, planting them, watering them, and employing 'chowkidars'. It is another thing that half of such things happen only on paper, but the money is drawn from the coffer. In every meeting, every report and every discussion, we emphasised that the GIB and Lesser Florican need pure grasslands, with some naturally occurring scattered bushes and an occasional tree. However, everywhere from Gujarat to Andhra we faced similar problems – a District Forest Officer or Sanctuary in-charge deciding to 'improve the habitat' by planting trees or making waterholes. During my visit in 2001, I found 16 waterholes in the 6 sq. km Rollapadu Bustard Sanctuary. Bustard is a facultative drinker and drinks water when it is available – it can go without water for months getting all its water requirements from the food. Secondly, in Rollapadu there was already a small waterhole within the grassland, and a big waterbody just one kilometre away. We had seen bustards flying or walking to reach them for drinking water. But then how would one pocket the money allocated for 'habitat improvement'. Another very interesting incident was that sometimes in the monsoon

of 2002, Dr. Erach Bharucha, a famous conservationist and surgeon, organised a two-day workshop at Nannaj near Solapur on the importance of grasslands in Maharashtra. Everyone agreed that grasslands are very important for GIB, Blackbuck, Grey Wolf and a host of other others, and also for graziers. On the second day we found fewer participants. On enquiring I was told that they had gone to plant trees in nearby grasslands!

Looking at the rapid habitat changes in Maharashtra, Andhra Pradesh, Karnataka and Gujarat (the four states where the GIB is still found in decreasing numbers), I realised that the long-term survival of this grand bird would be only in Rajasthan, where it occurs in the vast Thar desert in low numbers. Perhaps more than 50% of the world's GIB are found there. This percentage will increase as their populations will decrease in other states. During my travel in the Thar desert, I learnt that a number of rural people knew about the GIB, popularly known as Godawan, but were unaware that the Godawan was their State Bird. Whenever I asked them to name their state bird, the answer would be 'mor' (peafowl). I found an undercurrent of sympathy for the Godawan which I decided to exploit. The motto being – make Rajasthanis proud of their State Bird.

From 1999 to 2006, I visited the Thar Desert every year for a month or more. First







▲  
A long way to go!!

we had a project titled “Environmental Education in the Thar Desert for Saving the Great Indian Bustard and other Desert Wildlife”, funded by the Ministry of Environment and Forests, and later we got another project “Conservation Education and Population Assessment of the Great Indian Bustard in Rajasthan and Maharashtra”, funded by The Royal Netherlands Embassy, New Delhi. We printed 15 thousands posters and 10 thousands pamphlets and cards, all in Hindi and Marathi, for distribution among villagers, schools, teachers, district officials and decision makers. Along with Mr. Manoj Kulshreshtha, my constant companion and organiser of my surveys, we must have visited hundreds of villages and interacted with hundreds of thousands of villagers.

The bustard pamphlet was released by the Governor of Rajasthan on February 1 1999, and the poster was released by Maharajah Gagsingh of Jodhpur in his palace on February 3. In order to dramatise the *Godawan Bachao Abhiyan* (Save Bustard Campaign), we organised a *padyatra* from Bikaner to Jaisalmer, a distance of 335 km. It not only helped me get rid of some unwanted flab, but it had a huge impact for the bustard campaign in the Thar desert. Our *padyatra* started from Bikaner with thousands of children and citizens shouting to save bustards. Mr. Rajeev Dasot, a friend of Manoj and BNHS life member, was Superintendent of Police of Bikaner so he provided all help. It started in the morning from Dayanand Public School, winding its way in the city, collecting school children and concerned citizens all along, finally leaving us on the outskirts of Bikaner – in front of us was 335 km, to be covered on foot in 10 to 12 days - which we did despite the biting cold, sleeping in uncomfortable places, eating at *dhabas*, avoiding unruly traffic and answering inquisitive questions from innocent villagers.

All along the *padyatra*, we got tremendous response. One *dhabha* owner refused to take money for food (we were ten of us), a cycle tyre repair man garlanded us when he heard about our mission, school children greeted us with slogans. We made a point to visit all villages within 1-3 km from the main Bikaner-Jaisalmer road, so the distance covered was more than 335 km. My most memorable day



*Padyatris* near Ranery



*Godawan padyatris* 100 km from destination



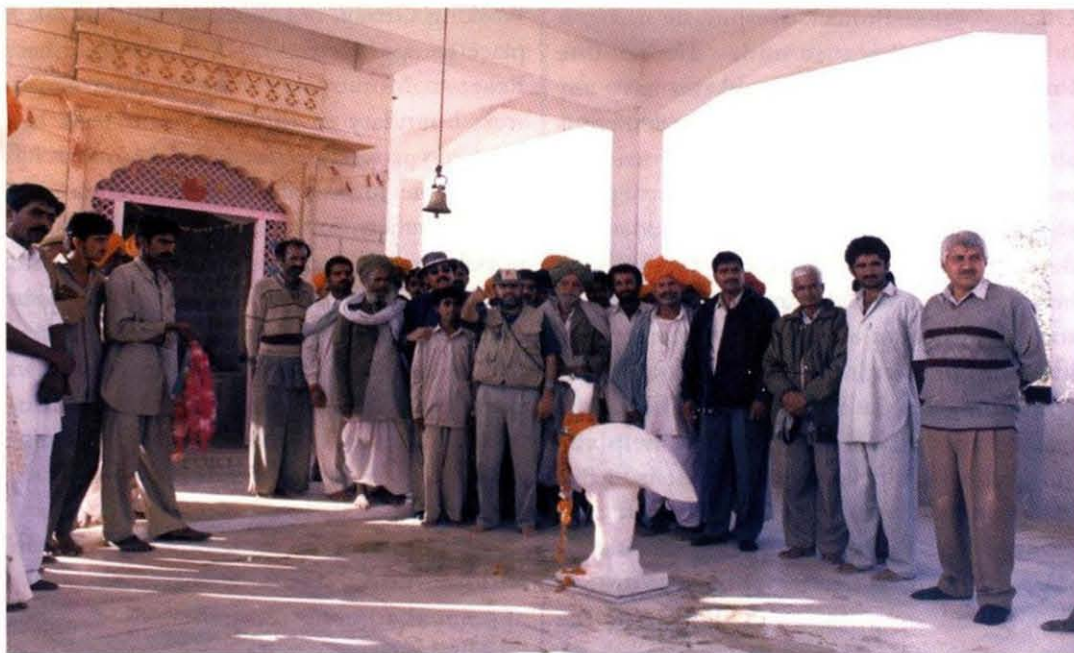
was when we entered Jaisalmer on February 14. We were enthusiastically welcomed by the citizens of Jaisalmer. It looked as if the whole town has joined us. That night we had a party on the terrace of Manoj's friend's hotel. As his contribution to the cause of bustard conservation, he refused to take boarding and lodging charges, despite it being peak tourist season.

During a survey in 2000 in a remote village called Sankhala in the Jaisalmer district, a village elder told us, "we are building a temple for the local deity, Harbujimaharaj. Why don't you give us a *Godawan moorti* (statue), which we shall call his *vahan* (chariot) and install in the temple". We all liked the suggestion and started working on it. It took Manoj a year to get the correct *moorti* from a craftsman in Jaipur. The first *moorti* which he made was a cross between a *Godawan* and a *Sarus*. Manoj personally supervised the design, size and chiselling. I sent measurements and numerous pictures of the GIB. After six months and many visits by Manoj, the marble piece looked like an adult bustard. We went back to Sankhala to find out whether they were still interested in the *moorti*. Once satisfied about their full support, in December 2001, I went to Jaipur and then with Manoj and

other team members, we drove to Jaisalmer with our precious cargo. After reaching Jaisalmer, we did the recce of Sankhala, saw the place where the *moorti* would be installed and visited nearby villages where bustards were still found. On December 16, we started the procession from the famous Gadhisar lake area, also called Gopa Chowk. The garlanded *Godawan* proudly looking at the enthusiastic supporters winded its way in the historical and congested Jaisalmer town.

From Jaisalmer we took the *moorti* to 14 villages, stopping for a night in one village where villagers took turn to guard their *Godawan*, albeit in the form of marble. Next day, at the auspicious time, selected by Sankhala villagers, the *moorti* was installed after reciting mantras. It was a proud moment for me. After working for exactly 20 years for the protection of this bird, a day had come when the bustard had received a religious status, at least for some people. But can love alone of some simple villagers save this dying species?

In our land, the Tiger is sacred as Durga's *vahan*, elephant is a God, peafowls are sacred, but they are still being killed. More needs to be done to save the *Godawan*. The 3,162 sq. km Desert National Park (DNP) is one of

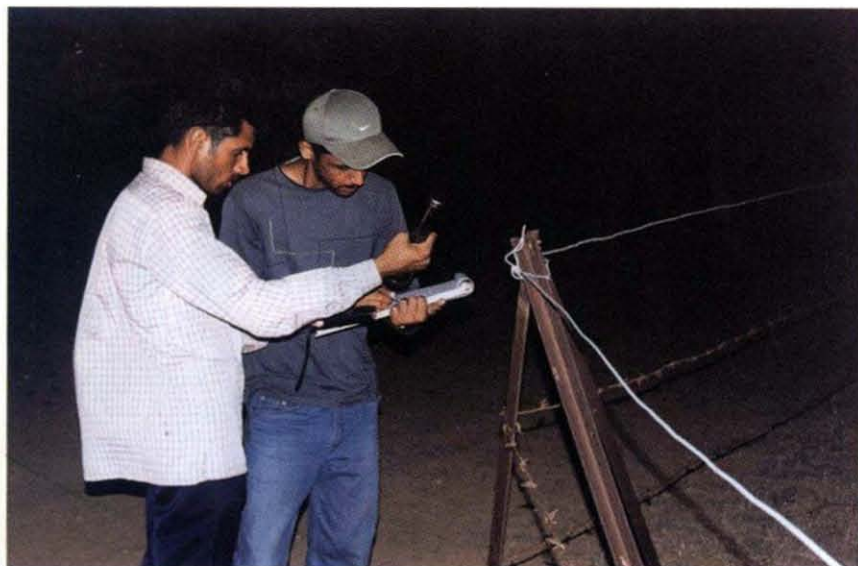


K.R. SENACHA

After installation of *Godawan moorti* in Sankhala temple







▲  
Mohit Kalra and Narayan Dan  
taking GPS readings of  
Ramdevra enclosure

the most important areas for the bustard, but it is under tremendous pressure of denotification. The Forest Department has enclosed some areas such as Sudarasi, Sam, Miyajlar but the remaining area of the Park is over-grazed and overused. Moreover, proper land-use zonation is not present. There are about 70 villages and settlements inside the Park which need to be provided basic facilities such as electricity, roads, water, schools and hospitals. There is a threat of bifurcation of the Park through the ill-conceived Gadra-Road Branch of the Indira Gandhi Nahar Project. Despite its name, it is not a Park because under the Wildlife Protection Act, a park should not have any human settlement and if such a settlement is already present, attempts should be made to relocate it. Moreover, no new settlement should be allowed in a park. How does one deny villagers basic modern facilities of health, education and transport, just because someone decided to have the area they had lived in for hundreds of years as a park? Something needs to be done to save the biodiversity of DNP as well as help the villagers, who incidentally had protected this biodiversity all these years.

Biosphere Reserve Programme could be the solution. The Biosphere Reserve Programme emphasises the need for the conservation of the whole environment, including man and his traditional activities.



The concept of establishing Biosphere Reserve (BR) is the major aim of the UNESCO'S Man and the Biosphere (MAB) programme launched in 1974. By now a network of about 356 Biosphere Reserves has developed in more than 90 countries. The Indian Biosphere Reserve's Programme, initiated in 1979, intends to preserve representative biotic communities in 10 potential biogeographical regions of country. The Thar Desert has been included as one of the 10 biomes.

The Ministry of Environment and Forests constituted a working group in 1988 to draw a project document on the Thar Desert Biosphere Reserve. The objective of Biosphere Reserve was oriented in such a way that the BRs are units wherein the biological, socio-economic and cultural elements are integrated together. The main emphasis of this concept is the need for conserving ecosystems capable of being restored to natural condition. Being the most populated desert in the world, undisturbed large areas are not available in the Indian Thar Desert. Therefore, the Working Group recommended upgrading the status of the DNP, established in 1980, as the Thar Desert Biosphere Reserve.

Despite strong recommendation of this Working Group, not much action has taken place to upgrade the DNP into a Biosphere Reserve. Moreover, even the exact southwest boundary of this important Park had not been properly defined, and not much has been done to inventorise and compile data on biodiversity, land use, human and livestock populations, future development needs etc. Realising the importance of the biogeography of the area, a research project entitled "Development of Desert National Park as a Biosphere Reserve" was undertaken during 2004 by us in collaboration with the Wildlife Institute of India, and funds provided by the MoEF.

This project gave me another opportunity to visit the DNP and meet villagers. We appointed a young researcher Mohit Kalra, whom I first met in Dudwa National Park where he was working on the Rhinos with





A snooty look at the rally!!



Godawan rally in Jaisalmer

my friend Dr. S.P. Sinha. As a Director of BNHS, my aim is to bring good researchers in BNHS, so whenever I meet a potential candidate, I encourage him/her to join BNHS. I am happy to write that in most cases my judgement was right, and Mohit was a good example. He not only turned out to be good field worker, but also a good scientist. During my visits to Mohangarh in 1999, I had met a callow lad, Narayan Dan studying in 12<sup>th</sup> standard. He had showed me bustards in his farm, since then I had kept in touch with him. He would also write to me regularly about bustard sightings. Narayan was one of the more enthusiastic volunteers in our *Godawan Bachao Abhiyan*. When the DNP Biosphere Project was started in 2004, we employed Narayan, now a young active man. He and Mohit became good friends and spent another six months mapping the boundary of DNP, and visiting each village and hamlet, called *dhanis* in the Thar, to take their GPS location, studying the vegetation and wildlife in general. Mohit was crazy about remote sensing and spatial data, which greatly helped the project. He did a 9-month course in the Indian Institute of Remote Sensing, Dehradun, and like all good researchers, we could not keep him in BNHS and by 2007, he got a prestigious European Union Scholarship to work in different universities of Europe. BNHS lost a good budding scientist but not before he produced an excellent report titled *Development of the Desert National Park as a Biosphere Reserve*.

All these scientific reports and public campaigns are fine but do they result into ground action to protect species. Yes, in some cases, no, in most cases. As pressure on land increases, problems for *Godawan* will increase due to roads, canals, over-grazing, irrigation, military expansion, tourism, and climate change. Presently, between 400-500 bustards survive in India, making them one of the most endangered species of bustards in the whole world.

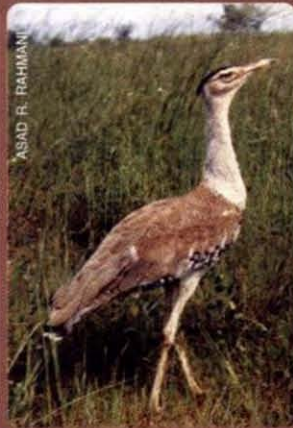
#### Need for Project Bustard

Project Tiger and Project Elephant have shown that by identifying an indicator species and focusing attention on it and its habitat, a substantial part of our natural ecosystem that benefits an array of threatened species can be protected. Bustards and floricans can be considered as indicators of the grassland ecosystems and by conserving them and their habitats, a very large number of species of the Indian grasslands will also be protected. Protection and proper management of these grasslands would also benefit the local communities. The grasslands that are the preferred habitats of the bustard/florican are under-represented in the protected area network in India. Some of the bustard sanctuaries have been destroyed by misguided management practices. There is no coordination between states and among managers within states. We have nearly 20% of the world's livestock, but no attention is given to protect grasslands on which this





**Present situation in Bustard Sanctuaries**



Name of the Sanctuary/Area	No. of Bustards in 1985	No. of Bustard now
1. Karera Bustard Sanctuary, M. P.	25-30	Extinct
2. Ghatigaon Bustard Sanctuary, M.P.	15-18	2-3
3. Rannibennur Blackbuck Sanctuary, Karnataka	5-10	Extinct
4. Nannaj Area, Maharashtra	15-25	25-30
5. Sorsan, Rajasthan	10-15	Extinct
6. Sonkhaliya, Rajasthan	80+	5-10
7. Desert National Park, Rajasthan	200-400	50-60
8. Rollapadu, Andhra Pradesh	60	5-10

Beside, the Great Indian Bustard is still found in many parts of the Thar desert, especially in Jaisalmer, Jodhpur, Barmer and Bikaner district but in most areas, it is declining due to various reasons. Perhaps the total bustard numbers in the Thar desert is less than 300. It is likely that some unknown populations are surviving in the vast Deccan plains, like the two populations 'discovered' in 1998 in Nashik.



Lesser Florican *Sypheotides indica*

Some other/new areas	No. of Bustards in 2008
1. Lala and Naliya grasslands, Kutch	15-20
2. Near Nasikh, Maharashtra	6-7
3. Nasikh-Aurangabad border	20-25
4. Karnataka	4-6

livestock feeds. There is no long-term research on bustards and at present we do not know even the basic biology of these highly endangered and declining species. I urge the Government of India to start 'Project Bustard' on the line of Project Tiger, with the following objectives:

- To conserve all the four species of bustards in India.
- To conserve the habitat types of the Indian bustards and their associated species.

- To establish with the cooperation of the state government and local people more bustard conservation areas.
- To supervise and coordinate management of bustard conservation areas.
- To coordinate long-term studies on bustards and their habitats in different states.
- To produce educational material for publicity for decisions makers, stake holders, and students.
- To integrate bustard habitat conservation with national grazing policy and over-all land use pattern.





# Race to save Vultures

Text: Asad R. Rahmani

## About the Project

The Vulture Conservation Programme of the BNHS aims to restore the wild vulture population through a two pronged approach-Conservation breeding of critically endangered *Gyps* species of vultures and removal of killer drug Diclofenac.

NIKHIL BHOPALE



Vultures





▲  
The decline of the *Gyps* species of vultures is the fastest decline of any known species in the world

“*Abh toh gidh bhee kum ho rahe hain*”, an innocuous statement by my former animal keeper Ram Gopal alerted me and perhaps resulted in the biggest bird species rescue project in India. It was at the end of 1996 when I was working as Chairman of the Centre of Wildlife (now Department of Wildlife Sciences) at Aligarh Muslim University, Aligarh, I heard Gopal talking with his office colleagues about vulture population declines. I at once called Gopal and asked him where have you heard that vultures are declining? He showed me a small news item in a Hindi newspaper *Amar Ujala*, published from Agra. The news was from Meerut, a fast-growing town in western Uttar Pradesh, about 150 km from Aligarh. After reading the news, I kept wondering why it was published, and if true, what was happening to vultures, still very common in Aligarh and other areas? Nevertheless, I started keeping a watch on vultures which still filled the skies over Aligarh.

Since joining Aligarh in late 1991, I used to take students to Patna *jheel*, an excellent wetland in Jalesar *tehsil* of Etah district. On the way, there was a railway crossing after Sikandrarao, a crowded and dusty town of Uttar Pradesh. On the other side of the railway crossing there was a carcass dumping ground where we used to see hundreds of



vultures, mainly Oriental White-backed *Gyps bengalensis*, Long-billed *Gyps indicus*, and Egyptian *Neophron percnopterus*. They were there all the time and very common, thanks to the constant supply of cattle carcasses, jostling with stray dogs, sitting on old trees after a heavy meal, or flying around. A cursory glance was all they expected from us at that time. After seeing the news in *Amar Ujala*, after a few days when I went to Patna *jheel*, I stopped at Sikandrarao carcass dump to count the vultures. They certainly were now in lower numbers. After a few months, I drove to Dehradun, enroute stopping at the Meerut carcass dump. I asked the people there, and they all said that *gidhs* have decreased in number. One incredulous villager said, “Sahib, Americans have taken them away!” I thought that we can blame Americans for a number of things, but certainly not for the disappearance of vultures. On my visit to WWF-India office at Lodhi Road, New Delhi I was told by Parikshit Goutam, a former student of AMU and now Head of the Wetlands



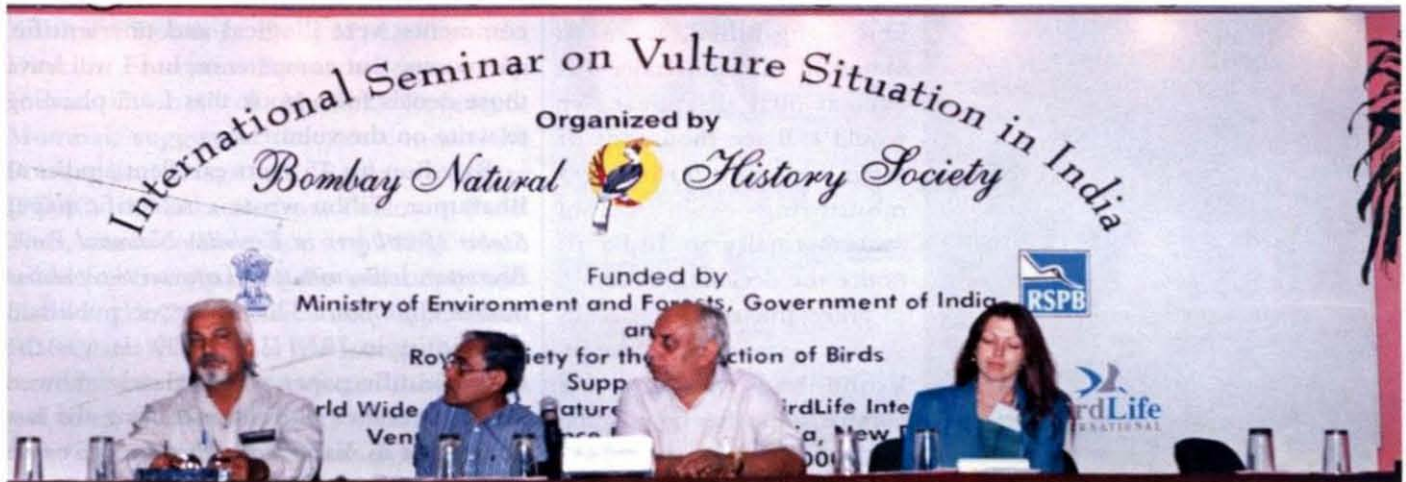
Stray dogs seem to be replacing vultures at carcass dumps

K.R. SENACHA

Division of WWF-India, that vultures, once common, have stopped breeding on the tall avenue Neem trees and less and less are seen in the Lodhi Garden. A visit to Bharatpur further confirmed my fear by Vibhu Prakash. By the end of 1996, he had 15 years experience in Bharatpur and he knew his raptors like no one else.

Vibhu's Ph.D. thesis was on the *General Ecology of Raptors in Keoladeo National Park*, so he had excellent census data on all species





L-R: Dr. R.L. Singh, Chief Wildlife Warden of Uttar Pradesh, Mr. S.K. Mukherjee, Director, Wildlife Institute of India, Mr. S.C. Sharma, Additional I.G.F., Ministry of Environment and Forests and Ms. Debbie Pain of Royal Society for the Protection of Birds during Vulture Seminar in September, 2000

of raptors, including vultures. A quick comparison of data of 1983-86 with 1997-98 showed a shocking decline of the population of vultures. There was something really going wrong. By May 1997, I joined BNHS as Director and asked Vibhu to look into this problem more seriously. Was the problem restricted to Bharatpur-Aligarh-Meerut – the so-called cow-belt, or more widespread? In 1993-94, I had done four extensive surveys in the Thar desert, each consisting of not less than 3 weeks, mainly looking for Stoliczka's Whinchat now named White-browed Bushchat (Oriental Bird Club funded) and general wildlife (funded by WWF-India). In the Thar desert, we noted encounter rates of important birds and mammals in a total distance of more than 5,000 km. The vultures were still so common that I never bothered to take detailed notes about their numbers. These four surveys funded by the Oriental Bird Club and WWF-India resulted in a book *Wildlife in the Thar*, published by WWF-India. Regarding vultures, in 1996 I wrote a short note *Status of vultures in the Thar Desert of India* in a newsletter *Vulture News*, published from South Africa. At that time, there was no inkling that something was wrong on the 'vulture front' at least in India, although Nigel Collar of BirdLife International had suggested to bring them in the threatened list, mainly due to their decline in south-east Asia. The problem was that *Gyps*

species of vultures, particularly White-backed and Long-billed, were so abundant in north India that even if 50% disappear, we would still see thousands of them. Secondly, no one was monitoring them systematically in India to notice the declining trend.

Here the role of BNHS studies gained importance. Vibhu had the data for comparison. After completing his Ph.D. and many projects on raptors, Vibhu did an extensive study of raptors all over the country under the project *Ecology and Behaviour of Resident Raptors with Special Reference to Endangered Species* from 1990-93, funded by the U.S. Fish and Wildlife Service. When his final report was published in 1995, I remember a respected zoologist telling me derisively "What is this? Driving and counting raptors from the road. Is this science?" Vibhu's simple roadside encounter rate data became a key benchmark to compare the vulture numbers between 1990-93 and 2000-03, and became our biggest tool to prove to the government that vultures have declined all over India, and not only in some selected places.

Still not knowing what was causing the vulture population decline, I organised a small meeting in 1998 with the limited funds that although Nigel Collar of BirdLife International had suggested to bring them in the threatened list, mainly due to their decline in south-east Asia. The problem was that *Gyps* species of vultures, particularly White-backed







▲  
Gyps species of Vultures at  
the Vulture Breeding  
Centre of the BNHS and  
RSPB

and Long-billed, were so abundant in north India that even if 50% disappear, we would still see thousands of them. Secondly, no one was monitoring them systematically in India to notice the declining trend.

Here the role of BNHS studies gained importance. Vibhu had the data for comparison. After completing his Ph.D. and many projects on raptors, Vibhu did an extensive study of raptors all over the country under the project 'Ecology and Behaviour of Resident Raptors with Special Reference to Endangered Species' from 1990-93, funded by the U.S. Fish and Wildlife Service. When his final report was published in 1995, I remember a respected zoologist telling me derisively "What is this? Driving and counting raptors from the road. Is this science?" Vibhu's simple roadside encounter rate data became a key benchmark to compare the vulture numbers between 1990-93 and 2000-03, and became our biggest tool to prove to the government that vultures have declined all over India, and not only in some selected places.

Still not knowing what was causing the vulture population decline, I organised a small meeting in 1998 with the limited funds that BNHS had. Various theories were given for their decline, and concerns expressed. At the end of the day, we all agreed that we need more scientific data to find out what was killing vultures. Meanwhile I wrote a short article in the *Newsletter for Birdwatchers*, published from Bangalore, perhaps the first article, albeit in a newsletter, about the decline of vultures in India. By this time, internet revolution had started in India. I remember, Bittu Saghal, Editor of *Sanctuary* magazine and a good friend, showed me the use of internet in early 1998 at his house. One of my first emails was about vultures, called 'Vulture Alert'. This email resulted in an interesting discussion for many years. Some theories given for vulture decline in the email discussion were downright absurd and some

comments were illogical and unscientific, questioning our competence, but I will leave those details for a book that I am planning to write on the vulture saga.

Based on his 15 years excellent studies at Bharatpur, Vibhu wrote a scientific paper *Status of vultures in Keoladeo National Park, Bharatpur, India, with special reference to population crash in Gyps species*. This paper was published on priority in *JBNHS* in 1999. It was the first scientific paper which clearly showed massive declines of vultures during the last 10 years or so. Various theories for the cause of decline were discussed in this paper, but we needed more research to find out the real cause(s).

In August 1999, we organised a Vulture Conservation Strategy Planning Meeting, attended by 28 people, mainly from BNHS, but also from the Wildlife Institute of India, WWF-India, MoEF, Biodiversity Initiative Trust, Centre of Wildlife and Ornithology, Sanctuary, Bombay Environmental Action Group and Birdwatchers' Society of Andhra Pradesh. Based on the discussion, three issues were prioritized for detailed investigation: outbreak of disease, chemical contamination, and poisoning. By this time, we were discussing long-term collaboration for bird conservation with BirdLife International and the Royal Society for the Protection of Birds (RSPB), a UK-based organisation and BirdLife Partner. The RSPB sent a young vet to work with Vibhu but she, like us, could not fathom the problem. Vibhu had seen sick vultures, sitting with head down, so we knew that something was killing them slowly. Post mortem investigation in the Hisar Veterinary College showed the vulture suffering from visceral gout. We were told that visceral gout could be due to some virus, so we contacted the National Institute of Virology, Pune but there was no response from them for a long time. Later, I had to go there personally and found that they work only on viruses infecting humans. As the situation was becoming desperate, BNHS organised another meeting in February 2000, when RSPB sent Dr. Andrew Cunningham, a very respected veterinary pathologist of the Institute of





Zoology, London. Dr. J.M. Deshpande, Director, Entrovirus Research Centre of the Indian Council of Medical Research, Mumbai, suggested that we contact the Poultry and Diagnostic Research Centre (PDRC) of Venkatareshwar Poultry in Pune. Thus, started collaboration with PDRC which lasted for five years till the real culprit was discovered in 2004. Andrew and Vibhu visited PDRC, and many other labs, conducted post mortems of vultures, conducted field studies and came to the preliminary conclusion that *Gyps* species of vultures are dying due to some virus, but this needs to be confirmed by sending the samples to some good virus lab. Andrew suggested sending the samples to Dr. Alex D. Hyatt, Director of Australian Animal Health Laboratory for identification of the virus. Indian law does not allow sending 'genetic material' outside the country! So, this was another hurdle to tackle. It took us two years to get permission to send the samples, but unfortunately, the Australian lab had a major fire accident so it was closed for many months.

By 1999-2000, we had started writing to the Ministry of Environment and Forests (MoEF), Government of India that something should be done quickly to arrest the decline of vultures. Thanks to the wide publicity by BNHS in the media, by 2000 the vulture problem was known to everyone. However, the MoEF rightly wanted hard scientific data. Comparative population data of Keoladeo National Park of mid 1980s and 1990s was not sufficient to convince the MoEF that this problem is widespread, and not limited to Bharatpur. Fortunately, Vibhu's nationwide surveys in many parts of India between 1990 and 1993 came to our rescue. The survey was repeated in 2000 in the same areas. The results were shocking. Vibhu and his team found more than 90% decline of *Gyps* vultures all over the country. Further surveys in 2002 and 2003 showed that between 2000 and 2003 alone, the White-backed vulture has declined by 48% and the Long-billed vulture by 22%. What more any government wants to know to act? We have widespread news and anecdotal accounts of vulture decline from Gujarat to Assam.



Chris Bowden, International Species Recovery Officer and Vulture Programme Director and Nita Shah, Advocacy Officer at the OIE Conference of 2008. Along with Dr. Vibhu Prakash, they are the pillars of Vulture Conservation Programme in India

Carcass dumps had very few or no resident *Gyps* vultures. Delhi where in the early 1980s, there used to be nearly one hundred thousand *Gyps* vultures was left with a few hundred by 1998-1999 and almost none by 2000-2001. We have intensive data from Keoladeo National Park from 1980s and extensive comparative data of numbers from 1990-93 to 2000-2003. All showing the same results – vultures were dying at a fast rate. But what was killing them?

In September 2000, we organised an International Conference, funded by the MoEF and RSPB. This Conference was a turning point of the vulture saga. The 3-day Conference was attended by experts from over 10 countries, officials of MoEF, and scientists of Indian Veterinary Research Institute (IVRI), Wildlife Institute of India (WII), WWF-India, Salim Ali Centre for Ornithology and Natural History (SACON), US Fish and Wildlife Service, BNHS, RSPB, The Peregrine Fund, BirdLife, Cambridge University, AMU, and many others.

Meanwhile, in 2001-03, we kept gathering more and more evidences that vulture populations were declining all over India, Nepal and Pakistan. The prevailing view at that time was that they are dying due to some infectious disease, most likely a virus, which was spreading from east to west, that is why, Pakistani scientists reported the decline from 2000 onwards. The fear was that if the virus spreads through the Middle East to Africa, it







▲  
Delegates of Vulture  
Seminar in September,  
2000

would also devastate African vulture populations, the way it was doing in Asia. In 2000, The Peregrine Fund (PF) initiated its Asian Vulture Crisis Project with the Ornithological Society of Pakistan (OSP), and in Nepal with the help of Bird Conservation Nepal (BCN).

Munir Virani, a Kenyan-born of Indian origin, working with The Peregrine Fund, and Martin Gilbert were the team leaders of the field work, and J. Lindsay Oak of the Department of Veterinary Microbiology and Pathology, Washington State University did the diagnostic investigations. While we were still awaiting permission from the Government of India to send the samples to the Australian lab, scientists of The Peregrine Fund took the samples from Pakistan to the USA and found no virus or any other pathogen that could have caused vulture mortalities. If this was not killing them, then who was the culprit? The Peregrine Fund and OSP conducted a survey in over 37 villages. The aim was to look at what was getting into the livestock carcasses. Basically, they were looking for something that was relatively new in the market, a something that causes visceral gout in birds, something that was effective and yet inexpensive – diclofenac sodium perfectly fitted that profile. It was a new pain-killer introduced recently in Pakistan. A quick google-search indicated that diclofenac is lethal to some species. Scientists of The Peregrine Fund delivered a paper in May 2003, during the World Conference on Birds of Prey, in Budapest where they clearly demonstrated



that the painkiller diclofenac sodium was causing visceral gout in vultures that consumed livestock carcasses contaminated with the drug. Bob Riseborough, an American expert sent an email to me (and others) in May 2003. As soon as I read the email, I literally jumped from the chair and phoned Vibhu that probably we now know the culprit for mass deaths of vultures. However, it was premature to disclose this to the society at large without more comprehensive data to satisfy the scientific community including skeptics, particularly those who were advocating the virus theory all those years. There were also genuine questions as how diclofenac was reaching vultures to such an extent that it has killed over 90% vultures in about a decade. Good science grows with questioning and constructive criticism. The scientists of The Peregrine Fund, Washington State University and Ornithological Society of Pakistan went back, did some more experiments and re-analyzed the data, and published a paper in the prestigious journal *Nature* in January 2004. I would say that this paper was the second turning point in our struggle to save the vultures. The beauty of this paper was that it was very simple, with basic statistics (which even I could understand!), and clear results. This paper with 13 authors belonging to six institutions, with Lindsay Oaks as the lead author, showed 100 per cent correlation between the presence of diclofenac in vultures and their kidney failures. After this paper, Vibhu and his team also analyzed the vulture carcasses, which we had meticulously kept in deep freezers. We also found direct correlation between visceral gout and presence of diclofenac in vulture bodies. The evidence was all over the place – in research papers, in labs, in widespread dead birds, and in diclofenac ampoules in vet shops. Someone has to just knit them together.

This is exactly what Dr. Rhys Green, a brilliant field biologist, of the Cambridge University did. Returning to BNHS after attending the Workshop at Parwanoo on the Vulture Recovery Plan in February 2004, Rhys asked some fundamental questions: what is the livestock population in India, how



many livestock deaths take place every year, what is the life span of a vulture (*Gyps* species), how much food they eat and how often, how much long diclofenac remains in a live animal, and what happens when an animal dies which was injected with diclofenac sodium? After knitting all this information and using some intricate statistics, Rhys came up with a paper in *Journal of Applied Ecology*, which showed through simulation modeling that even if less than 1 per cent of the livestock carcasses available to vultures have diclofenac residues lethal to vultures, they will die in the same way they have been dying. Later, through carcass sampling studies we found that nearly 10 per cent of the cattle carcasses have diclofenac residue. No wonder the vultures had disappeared so quickly, leaving our skies empty.

On 5-6 February 2004, The Peregrine Fund organized a 'Summit Meeting on the veterinary use of the drug diclofenac', in Kathmandu, Nepal, attended by nearly 50 experts, veterinary scientists, field biologists and decision makers from India, Nepal, Pakistan, UK and USA. After few days, from 12 to 16 February, BNHS, RSPB, ZSL, MoEF and Government of Haryana organized an international workshop to discuss a Vulture Conservation Action Plan (For details visit: [www.bnhs.org](http://www.bnhs.org)). Both these meetings suggested two major recommendations to save vultures: to start a vulture conservation breeding programme in India, Nepal and Pakistan, and to immediately ban veterinary use of diclofenac. Time had come for action, but it is more easily said than done. BNHS, in collaboration with other institutes can give recommendations on the basis of good science, but implementation of the recommendations is the job of government agencies.

With the financial support of the RSPB, BNHS appointed a Vulture Advocacy Officer, Dr. Nita Shah, to work with varied Government agencies both at the Central and State levels. Regular meetings took place with the Drug Controller General of India, officials of Ministry of Environment & Forests, Ministry of Health, Agriculture

Ministry, Animal Husbandry Department, Ministry of Chemical & Fertilizer, Ministry of Commerce, Veterinary Council of India, Veterinary Colleges, Chemists Associations, pharmaceutical companies, Indian farmers associations to ban the use and manufacture of veterinary diclofenac. In this interesting story, the pharmaceutical companies were the most positive. In April 2004, a meeting was organized with the pharmaceutical companies, expecting resistance from them as they will lose the market, but strangely, they said that if the Government bans diclofenac we will stop manufacturing it for veterinary use. This is one of the fastest decisions taken in a country like India. Interestingly, it took a

while for the Government to comprehend the gravity of the vulture decline and its implications. When there are ministries not dealing with forests, species and environmental issues, the going got tougher, nevertheless, Nita pursued with a constant inter-ministral dialogue, organizing and conducting meetings comprising of top decision makers and were thus able to get the right policies and amendments in the Drug and Cosmetics Act. The biggest task being addressed by Nita in the vulture advocacy program is to get the policies implemented right to the ground. Time was running out, we were battling against time as the vulture populations continue to crash. Press conference, letter-writing campaigns, meetings and discussions were organized. As a last resort, the Drug Controller came up with the plea that unless we have an alternative, we cannot ban diclofenac, as if our livestock was not surviving before this killer-drug was released in India in 1992-93, in Nepal in 1996, and in Pakistan in 1998. BNHS, RSPB, IVRI and other organizations have to do research to come up with an alternative to diclofenac. Dr. Swarup of the Indian Veterinary Research Institute, Barielly, came to our rescue and

**We would like to acknowledge the help of the following agencies:**

- Royal Society for Protection of Birds
- Haryana Forest Department
- West Bengal Forest Department
- Assam Forest Department
- State Forest Department
- Ministry of Environment and Forests
- Birdlife International
- Zoological Society of London
- Darwin Initiative for the survival of species
- Indian High Commission in UK
- The Peregrine Fund
- National Birds of Prey Trust
- Indian Institute of Veterinary Sciences
- Oriental Bird Club
- Bodyshop Foundation
- Rufford Foundation
- Boehringer Ingelheim
- Global Environment Facility of British High Commission, Delhi
- Asia Bird Fund, BirdLife International







▲  
Feeding of White-backed vulture nestlings at the Vulture breeding centre

helped in conducting research in his Institute. Nita was able to get this issue listed for dialogue on the agenda list for the National Board for Wildlife (NBWL) in March 2005. Only through the intervention of the Prime Minister, the Chairman of NBWL, the first circular banning this drug came out in May 2006.

My main argument was that when we have banned hundreds of drugs once they were found to have side effects, why can't we quickly ban a drug which has killed more than 90% of vultures, and which is still killing the remaining vultures at the rate of 40-50% every year. Why are we so selfish and uncaring – selfish when it comes to us human being, and uncaring when it comes to other species. Are we really a 'thinking animal' (*Homo sapiens*) which we claim to be?

Nita is a multi-talented lady. Besides being a good field worker (she worked on the Wild Ass for her PhD), she is (was) a Bharatnatyam dancer, swimmer, skater, and creative artist. She worked with Mike Pandey, the celebrated wildlife film maker, to produce a documentary *The Vanishing Vultures*. Nita got it translated into 8 Indian languages. During the last four years, we have used this documentary very effectively for publicity. Besides the documentary, she also designed posters, pamphlets, stickers and vulture badges. A vulture story *Jassi Jassus aur Rangeen Atma* using muppets was also produced in collaboration with Ranjana Pandey. Nita was also instrumental in using the dying art of communication i.e. string puppetry, in conservation. She trained a team of Rajasthani puppeteers and built a vulture story line. This has been most popular amongst



the urban and rural folks. Nita has been able to engage various target groups across the country for mobilizing the quick actions in vulture conservation.

In this vulture conservation saga, two names stand out for their yeoman support: Dr R. D. Jakati and RSPB – Dr. Jakati for his moral and in-kind support (free land) and RSPB for technical and financial support.

Our relationship with Dr Jakati started in 1998 with an innocuous enquiry from the Haryana Forest Department to BNHS to come and suggest a remedy for an injured Cinereous Vulture which the Department had caught. I sent Dr Vibhu Prakash, who was at that time still working at Bharatpur, to go to Haryana. Dr Jakati had heard about the vulture decline so he suggested to Vibhu to start a vulture breeding centre. The rest as they say is history.

To cut the story short, Vulture Conservation Breeding Centre at Pinjore in Haryana is one of the finest vulture breeding centres in the world, thank to the visionary support of Dr Jakati and his team, and also to the financial and technical support of RSPB, ZSL, MoEF and Darwin Initiative for the Survival of Species and some others. It was started in 2001 as a small vulture rescue centre where sick and dying vultures were kept, but now it is a fully-developed centre with nearly 150 vultures. Its success can be judged by the fact that now every state wants a similar centre. We have established two smaller centres – one at Buxa in West Bengal, and another at Rani Forest Range in Assam. According to the Vulture Conservation Action Plan, four centres should be established in India, one in Nepal and two in Pakistan, with 25 pairs of each species (White-backed, Long-billed and Slender-billed vultures) in each centre. We are still far short of this target due to absence of vultures and some states not allowing 'their' vultures to be taken outside the states to the breeding centres. It is another matter that such states are not doing anything to totally ban the killer drug and punish the culprits who are selling them. Diclofenac is still unfortunately easily available. But when it comes to give the remaining vultures, particularly young ones, state's xenophobia



comes in to play.

Vibhu, and his team, and Chris Bowden of RSPB are tirelessly working to see that these centres start producing vultures which can be released one day when the killer-drug vanishes from the veterinary market. Despite skeptics' view that BNHS does not have the expertise to breed vultures, in 2007-08 season, two chicks of vultures fledged successfully. The first time ever these species have been bred in captivity. We also benefit from the regular expert input of Jemima Parry-Jones from UK who has successfully bred over 60 species of raptors. In this season (2008-09) we expect more chicks as methodology develops and more birds mature. In another 3-4 years, when the juveniles which were brought in captivity as nestlings mature, we expect more successes.

The Vulture Conservation Programme has also shown the importance of collaboration and capacity building. BNHS philosophy is to work with government while retaining independence. Our collaboration with the governments of Haryana, West Bengal and Assam, and also the MoEF proves that if NGOs and government come together, we can achieve some level of success. In its long history of 125 years, particularly after Independence, BNHS has worked with international agencies such as IUCN, ICBP (now BirdLife International), US Fish and Wildlife Service, Smithsonian Institution, Yale University, World Pheasant Association, WWF, Wetlands International, International Crane Foundation and many more. Our collaboration with BirdLife, RSPB and ZSL further cements this relationship.

The BNHS, being the largest non-governmental and membership conservation organisation in India was the natural ally of BirdLife International. Within a year of I joining as Director in May 1997, we started discussing BNHS becoming BirdLife Partner. By the end of 1998, BNHS was selected as BirdLife Partner-designate (now it is full Partner). This relationship resulted in financial and technical support of RSPB, the largest and most successful partner of BirdLife International, to BNHS. The vulture conservation programme in India and Nepal



BNHS PHOTO LIBRARY

is one of the biggest overseas programmes of RSPB. Besides actually funding the three breeding centres, and supporting the advocacy programme, I think the biggest contribution of RSPB is through their technical support in the form of experts like Chris Bowden, Debbie Pain, Rhys Green, Richard Cuthbert, and bringing in other experts such as Andrew Cunningham, Andrew Routh and Nick Lindsay of ZSL and Jemima Parry-Jones. Moreover, RSPB and BirdLife have also helped the vulture programme through raising funds, and overall raising the profile of this extremely important programme of BNHS. In the long history of 125 years, the vulture conservation programme is perhaps the largest long-term programme of BNHS. It also shows how various conservation bodies have to come together and work with governments to save species.

However, the success of this multi-institution programme will be judged when our skies will be again filled up by these majestic masters of the sky. Perhaps papers like *Umar Ujala* will one day write that vultures have come back. I am sure nothing will make Jakati, Vibhu, Nita, Chris, Rhys, Richard, Andrew, Riseborough, Munir and host of other vulturophils happier than seeing these grand birds majestically mastering the sky as they had done for millions of years. The brief interregnum due to this killer drug will only remain a bad memory. ✈



Slender-billed Vulture  
at the Vulture breeding  
Centre





**Indian Fox *Vulpes bengalensis***

This slender-limbed animal is common in the waste and scrub of our desert zone





# Fragile Beauty!!!

Text: Usha Lachungpa

## About the Project

The Alpine grassland Project was started in 2001 and contributes information ranging from biodiversity inventories of the study sites to intensive ecological processes and bird community ecology. The Project was funded by U.S. Fish and Wildlife Services and advocated the need for protection and conservation of these neglected grassland ecosystems.



SANDEEP TAMBE

Jonsang





USHA LACHUNGPA

The majestic Mount Chimiomo in all its grandeur

“Madam, *aba swarga jaanu pardainaa.*” Yes we really need not go to heaven. My driver Ramesh Tamang’s comment after we watched speechlessly an unnaturally gargantuan moon rise over the Changri ridge, just said it all. Imagine Ladakh miniaturised, a piece of all the grandeur, beauty and ethos of India’s slice of the Roof-of-the-World condensed into a tiny hotspot of biodiversity, the trans-Himalayas and alpine grasslands of north Sikkim.

It was a late winter evening when we reached the Tso Lhamo Cold Desert, Sikkim’s piece of Tibetan Plateau and my study area for the BNHS Alpine Grassland Ecology Project (GEP) in 2000. We parked our trusty 18-year old M&M jeep outside the *Dokpas* or Tibetan nomads shelter at Lukrep situated at an altitude of c. 5,000 m. Ramesh had the unenviable task of draining off all the radiator water (along with his euphoria), and lugging the batteries indoors to the centre of the little stone cabin to the small fire, which was just a tin full of smoky yak dung that gave him a violent headache and utter nausea. After putting a blanket of sacks on the jeep’s bonnet to keep it warm (!) we retired for the night in our sleeping bags on some wooden planks kindly vacated by our hosts.

We were in the lap of luxury what with our host being the oldest and most respected nomad on the plateau, ‘Dongkung’ Nyima

or Nyima from Dongkung (‘Dong-Kung’ meaning Wild Yak Corner). Sleeping fitfully that first night, we awoke early next morning to see our host boiling water in another tin, some for tea and the rest for our radiator. Yes, we actually put boiling water in the radiator, and by the time the batteries were refitted and a hurried breakfast packed in our bellies the radiator began cooling off. Ramesh’s internal radiator also let him down and soon we found ourselves pushing the cold heavy jeep around in the snow getting more miserable by the minute. One of the nomads came rushing up with a few sacks (from the bonnet last night) which we soaked with some kerosene and after a while we had a small fire roaring under the jeep’s chest. Glad as I was that my mother was not there to see this, I got distracted by a rush of wings in the air. A flock of over 500 Brandt’s Mountain Finches had landed in the nearby clearing fearlessly. After considerable effort we were off to survey the plateau and its glories.

Along the way we stopped to look at a Tibetan Wolf, and the radiator water just froze up. After some pathetic attempts to restart, I got off along with a nomad guide and walked up to the nearest army camp a few kilometers away. You can imagine their surprise and horror after learning that we had possibly walked through a minefield as







The stark beauty of Gyam Tsona speaks volumes about the beautiful landscape of the North

the barbed wire was lying all broken and awry under some snow. That day we had to be towed into their camp, defrosted and put away for the night in Siachen sleeping bags, which were two bags in one, the inner down-filled.

All mornings are not so bad. Awakening in the cold desert and coming out of the *dokpa* shelter will always remain exceptional, especially in July which is spring season here. Hume's Groundpeckers hopping in the doorway too close to even photograph, picking rice crumbs from last night's washing with their strange bills, a pair of Yellow-billed Choughs scavenging in the garbage nearby, Horned Larks and lots of Plain and Brandt's Mountain Finches, the marshy meadow with various species of alpine herbs, grasses and sedges, the whistling of Himalayan Marmots, Mouse-Hare peeping out of rocky areas, a Tibetan Fox loping away when I came around looking for a convenient corner. All the while the soothing tinkling of yak bells, with frisky yak calves under a brilliant blue sky.

Each foray into the study area is followed a pattern. After informing the Indian Army headquarters and provisioning ourselves fully at Gangtok, the biggest township, Ramesh and I left with full tank and up to six 20 litres jerrycans of petrol. Our first halt was Tsunghang, at the junction of the Tista with the Lachung Chu. Here we would call up the

Brigade Commander at Chaten so he could inform the forward areas to expect us and not hold us up. After a courtesy call, which was a very useful sensitization opportunity, we proceeded through Lachen (c. 3,000 m), meeting the village headman or 'Pipon', if he was in, and halted for acclimatisation at Thangu Dak Bungalow at c. 4,000 m. Sometimes people fall prey to pulmonary edema and blinding headaches here itself, but thanks to a well equipped army establishment, there is not much to fear. Thangu was our base from where we could go north to survey the plateau for a few days along with the nomads, then return to survey Lashar Valley to the east, return to base and set off for Lhonak valley to the west. Having covered all three sites, we would go back down to Tsunghang and into Lachung Valley, stay at the village and survey Yumthang-Yumesamdong areas at almost the same altitudes as Thangu and above. A round trip of 15-20 days in the field saw us back in Gangtok satisfyingly tired, our clothes permeated with the smell of the desert for days together. Since I was working with the Forest Department, our staff would eagerly look forward to the strings sown with hard dried yak cheese pieces called *Churpi* (Nepalese), more valued than Cadbury chocolates! These, however, grimy or fungoid in the heat of low altitude Gangtok were so

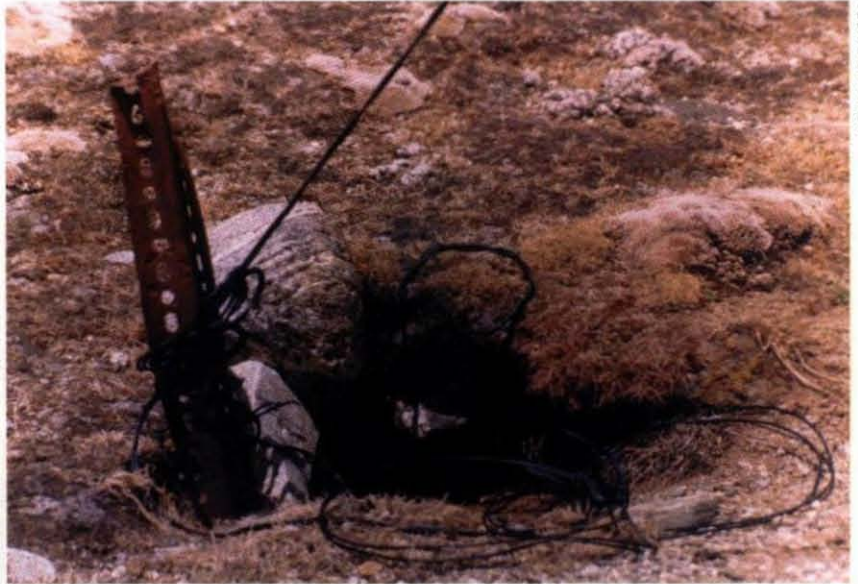




highly prized that I learnt of a new concept “clean dirt”!

Our first destination after crossing the Giagong-Checkpost beyond Thangu was usually the Lake Gyam Tsona area, where it was almost mandatory to meet the military official in charge and survey this ‘Ocean Lake’ for waterfowl. This is perhaps the only brackish water lake in the Eastern Himalayas, kept alive over millennia by a spring from Mirdo above it. The place gets its name from the flintstones (‘Mi-Doh’ – Tibetan) lying around. The presence of this spring, the only source of freshwater in the area is vital for the survival of the guardians of our border. Today however, this Ocean Lake, which hosted the largest concentration of waterfowl in Sikkim is dying, what with the Mirdo Spring diverted over a decade ago towards the camp.

The nearby Chulung Valley holds astounding numbers of the globally threatened wild sheep called Tibetan Argali *Ovis ammon hodgsoni* or ‘Nyen’ (Tibetan), which use this little sheltered area for grazing and rest. And the wonder of it all, they do not flee even when approached as close as 100 m. You can in fact see them from inside the camp. Over various visits we have counted over 300 individuals spread over this little valley on the international border of Sikkim. During a 2003 conference by BNHS at Mumbai, Dr. George Schaller commented that even he had not seen so many Argali in



USHA LACHUNGPA

one location, which was perhaps the last surviving population of its size in the world.

The next stop was the famous Gurudongmar Tso, revered by Sikkimese as the footprint of their patron saint Guru Rimpoche. Here we find the occasional Ruddy Shelduck pair or a couple of seagulls and some pochards, but not much else. The milky waters of this lake are home to the Sikkim Snow Toad *Scutiger boulengeri*, which are perhaps the world’s highest altitude amphibians. Most years these over-winter as tadpoles, metamorphosing into adults only when the weather is warm enough. After sighing at the sight of garbage left by tourists and pilgrims, unsightly toilets, other structures

▲  
Snare laid to trap Himalayan Marmots at Giagong



USHA LACHUNGPA

Tibetan gazelle beyond Gyam Tsona







GANDEN

▲  
The scenic view of  
Gurudongmar Tso

and the unnecessarily excavated seldom used terraced parking lots, we attempt a hurried clean-up and head back over some difficult icy patches at Gurudongmar's outlet for Tso Lhamo. Very few civilian vehicles survive this trip unscathed. An aquamarine lake at the northern base of the Dongkea La (Pass), Tso Lhamo (or the Lady of the Lake) is a very pristine area with tadpoles, snails and amphipod-like creatures along its shallow edges and among the flowers on its banks, a wild onion.

We forge further ahead to the Khangchung Tso, a lake at the mouth of the Tista Khangtse Glacier at the north-eastern corner of Sikkim. This is the source of Sikkim's lifeline. The River Tista meanders through the desert, collecting waters from Tso Lhamo, Gurudongmar and Gyam Tsona, bringing life in its wake to the entire area. We return to Lukrep having toured the three great lakes which form a major part of the water bank on Sikkim's roof-top and a significant stopover for a host of migratory waterfowl. We had also come across a small flock of Mongolian Plovers *Charadrius mongolus* breeding at Bam Tso, which has since dried up.

Another study site was the spectacular Lashar Valley with its achingly beautiful Lasha Chu, meandering ox-bow lakes, smooth ski-slopes, and another small nomadic *dokpa* community which migrates out of the valley onto the plateau in winter and shares grazing space with the resident *dokpas* in winter. This valley which links up with the Yumesamdong area at the head of Lachung Valley to the east is perhaps the last home outside our national park for Snow Leopard, another globally threatened species in Sikkim as so far there is no jeepable road into the valley. Plenty of Blue Sheep sightings is typical for this area.

The third study site was the Lhonak Valley an international migratory flyway accessed over the formidable Lungnak La, in north-west Sikkim. The route, around 14 km is difficult, dangerous and long. Hardy people can walk in this high altitude region with some difficulty, but many prefer to go on horse or yak back. The steep ascent and descent and tiring journey is not for all. Other than the local *dokpas*, who need to traverse this route for supplies and the Indo-Tibetan Border





Police (ITBP), the only others are occasional mountaineers seeking a downhill route to Zemu glacier / Green lake and a handful of annual pilgrims for the *Drukpa Tseshi* festival with its added hype of the Yak-Race. Our 'Headquarters' there was at Muguthang from where we accessed lakes at the foot of North and South Lhonak glaciers on the Sikkim-Nepal boundary, where we saw four Avocets, the Chorten Nyima La and the Naku La. The last was interesting when we hopped over boulders in the ground taking care not to step on loose soil (don't ask why) to reach closer to the lake to count Ruddy Shelduck and saw attempts to 'push back' Tibetan graziers who had strayed in with their yaks. At present *dokpas* are like unpaid chowkidars for the forest department as they roam the entire valley with their yaks and can see what is going on. Even the military and police depend on them to some extent and one of them has a commendation of honour for his services during the 1965 skirmish with the Chinese. They are perhaps the least known people of Sikkim despite their extraordinary way of life in a biodiversity rich ecosystem. The Tso marshes in the Lhonak valley are perhaps the only place in eastern Himalayas where the Black-necked Crane *Grus nigricollis* has attempted albeit, unsuccessfully, to breed.

The fourth and last study site was Yumesamdong, just south of the plateau and accessed from the Lachung Valley. Hot-springs in the area together with limited space for grazing, defence exigencies and tourism has left the sparse mammalian wildlife like Blue Sheep and Himalayan Marmots very shy, but there are plenty of birds of this biome including the spectacular Grandalas *Grandala coelicolor*. Mountain and Snowfinches, Red-billed Choughs, accentors, pipits, wagtails and rosefinches breed here among the dwarf rhododendron and juniper shrubbery.

The Alpine GEP was in collaboration with the Sikkim Forest Department of the Government of Sikkim of which I am an employee. We sought to document the unique wild biodiversity, study bird communities, census livestock, identify key habitats for

endangered fauna and importance of the lakes to migratory waterfowl; we studied various conservation concerns in these little studied alpine and trans-Himalayan grasslands and could then devise and suggest a conservation strategy, which would involve all the stakeholders. These included the yak and sheep herding nomadic Dokpas, the Bhutia tribals of the two villages of Lachen and Lachung on the southern border of the plateau, the military and para-military units, and the road maintenance force in addition to the civil administration. The entire area is



USHAK LACHUNGPA

a sacred landscape and classified as Reserve Forest with only a nominal presence of the forest, animal husbandry and ecclesiastical departments.

Based on the study we found the entire Tso Lhamo Plateau, the alpine grasslands of Lashar, Yumesamdong and Muguthang to be breeding grounds for hole-nesting and burrowing birds (larks, mountain finches, snowfinches and Hume's Groundpecker), as well as a whole range of cold desert mammals, many of which are trans-border migrants breeding in the area. Our visits highlighted the dominant pressure on the habitat by domestic livestock, feral dogs and possibly seasonal harvesting of medicinal plants. Observations showed rotational grazing of c. 3,000 heads of livestock, being practiced by 27 *dokpa* families in an area of c. 1,000 sq km. on the plateau. This area forms part of the home range of Schedule-I species

▲  
Dokpas of Lhonak Valley





The expanse of Tista  
Khangtse and  
Khangchung Tso has a  
charm of its own



USHA LACHUNGPA

such as Kiang *Equus kiang*, Nayan *Ovis ammon*, Tibetan Gazelle *Procapra picticaudata*, Black-necked Crane *Grus nigricollis*, large numbers of ground nesting finches, larks and breeding grounds for Mongolian Plover *Charadrius mongolus*, Common Redshank *Tringa totanus*, Tibetan Snowcock *Tetraogallus tibetanus*. Wildlife of these areas is vulnerable to various biotic pressures, an important one of which is a population of at least 150-200 stray and feral dogs living off defence establishments. The peak breeding season for both flora and fauna is July-September. During this period, most of the nomadic *dokpas* move around on the plateau, some come from Lashar. Around seven families restrict their livestock migration out from Lhonak valley. The movements of camps have a distinct pattern with restricted grazing areas and imposition of fines by the Pipon for irregular grazing. Major medicinal and aromatic plants harvested were *Nardostachys grandiflora*, *Picrorhiza kurroa*, *Juniperus procata*, *Podophyllum hexandrum*, *Rhododendron setosum*, *R. nivale*. Overall, the major concerns were low wildlife sightings, seasonal pressure of livestock grazing, large scale road construction activities, feral dogs, wildlife casualties in landmine fields, unsustainable collection of medicinal plants, and plants with religious significance. However, the most immediate concern was the drying up of Lake Gyam Tsona.

We identified three major landscapes, namely sheltered river valleys (Lashar), exposed river valleys (Thepley Tso, Muguthang; Yumesamdong) and high elevation plateau (Tso Lhamo). Lake Gyam Tsona (Ocean Lake) was

one of the three main lakes on the Tso Lhamo plateau. It was the best lake in Sikkim for migratory waterfowl until the Mirdo spring feeding it was diverted towards the nearby settlement due to lack of awareness of its importance. Besides it is perhaps the only brackish water lake on the Indian side in the eastern Himalayas. Over the last decade, the continual diversion to the camp on its banks caused the lake to shrink from over 50 hectares to just a few hectares. The shallow waters also encouraged feral dogs breeding around the establishment there to hunt the resident Ruddy Shelduck. They were even spotted swimming after the ducklings. Today hardly any water birds visit the drying lake and one can even drive on the dry bed!

It was around this time that the National Biodiversity Strategy and Action Plan process began, and we linked it with the Alpine GEP in north Sikkim. Keeping all objectives, observations and threats / issues in mind, a comprehensive conservation strategy was drafted with the involvement of the local community and all stakeholders in the study area, including the Indian Army and various state and central government departments. A whole hearted effort, this was then incorporated into the Sikkim State Biodiversity Strategy and Action Plan.

#### Some achievements

- Sikkim State Biodiversity Strategy and Action Plan published and released during the World Environment Day-2005 by the State's Chief Minister.





### A Conservation Strategy as diverse as the Biodiversity

#### Main stakeholders

1. Indigenous nomadic community  
Developing local capacity
  - *Inside Protected Area:* Institution building of nomads, livelihood improvement and alternative energy issues, culture conservation, protection of sacred landscapes, rehabilitation of Tibetan Mastiff ('Dokhyi')
  - *Outside Protected Area:* Strengthening of 'Dzumsa' or the traditional system of local administration practiced in Lachen and Lachung villages, non-governmental organisations network (Lachung and Lachen Conservation Committees), trans-Himalayan Joint Forest Management Committee (JFMC) formation
2. Indian Army
  - Sensitisation through biodiversity training booklet
  - Sikkim Eco Task Force
3. State Forest Department
  - Joint monitoring with Army
  - Medicinal Plant Conservation Network
  - Declaration of Cold Desert Conservation Reserve
  - High altitude Research Station, tie-ups with institutions

■ Three Important Bird Areas covering the entire study area documented and incorporated in national document of BNHS. All 11 (eleven) IBAs of Sikkim recognised by the Sikkim State Government.

■ Proposal for declaration of India's first Conservation Reserve, namely the Tso Lhamo Cold Desert conservation reserve (TLCDCR) encompassing the entire study area prepared and presented to the state government after stakeholders consultations.

■ Publication of colour poster on the endangered fauna of the proposed TLCDCR, which was released during the World Environment Day-2005 by the State's Chief Minister.

■ Formal dialogue opened with the military at state level regarding issues like drying up of Lake Gyam Tsona, fencing of minefields, removal of stray and feral dogs and removal of non-biodegradable garbage which was used

to snare wildlife; joint patrolling and regular monitoring by forest and military recommended.

■ Local interest generated in revival of cultivation of rare high altitude edible beans *Phaseolus coccineus*, and reintroduction and rehabilitation of livestock guardian Tibetan mastiff for local income generation.

■ Initiatives taken for formation of at least two local NGOs the Lachen and Lachung Conservation Committees and a Trans-Himalayan Joint Forest Management Committee has also been proposed.

■ At least three new altitude records for Sikkim, namely Eurasian Lynx, Sikkim Snow Toads, Long-eared Bat.

■ Local publicity together with official dialogue regarding the plight of Gyam Tsona Sikkim's only brackish water lake was responsible for military action to re-divert water from feeder spring at Mirdo back into the original natural channel.

■ Interesting aspects of the study were highlighted for local awareness and publicity by publications in media.

#### Last of the Dokhyi or Phyu-Khi the Tibetan Mastiff

Over a gradual period of three decades or so, Sikkim lost its Tibetan Mastiff, a magnificent pure breed of livestock guardian dog belonging to the nomadic *Dokpas* in trans-Himalayan Sikkim. Lonely army personnel diluted the breed with mongrels brought up to the cold desert as pet pups from lower altitudes. On finishing their stint in this difficult region, usually over a year or two, they left leaving their dogs behind. These fed off the kitchen and mess wastes and multiplied over the years. They have now taken to roaming in packs on the plateau in Tso Lhamo, Lhonak and Lashar, hanging around army camps and the village of Thangu, preying upon wildlife. Dr. Rahmani was with us when a pack was hunting a Himalayan Marmot. Of late, they have taken to preying upon domestic livestock. We do not find them at Yumesamdong where there are no army camps. In 2000, the pure breed was reduced to one very old male at Thangu Monastery,







USHA LACHUNGPA



Cushionoid vegetation are seen on slopes above Gyam Tsona

who was later eaten by the Naga/Kuki regiment of the Assam Rifles.

### The *Dokpa* Tragedy

Today the last 24 *Dokpa* families remain most of who are old and fallen back to Lachen, their children in Gangtok, even Delhi, in schools and colleges and not expected to return. Few have Nepali assistants to shepherd their livestock. For over 200-300 years the *Dokpas* spent the winters in Tibet. Summers were spent in Sikkim. Since the 1960s, they stay here permanently. They are perhaps the least known people of Sikkim despite their extraordinary way of life in a biodiversity rich ecosystem. Lhonak valley is the only place in Sikkim and perhaps the only place in eastern Himalayas where the Black-necked Crane has attempted, albeit unsuccessfully, to breed. Trans-Himalayan Sikkim, in the world's youngest mountain range, is home to these most marginalised and virtually forgotten *Dokpas* practicing trans-humance, with grazing as their main livelihood. Their unique lifestyle of co-existence with wild biodiversity under harshest weather conditions is being impacted by Bhutia tribals living in lower temperate regions, who exploit the cold desert as well as temperate habitats. Hemmed in by the international border with Tibet Autonomous Region (TAR) of China and the Lachen



village, *Dokpas* have accepted many adjustments in the interest of national security as well as the livelihood security of the Lachenpas. Their survival strategies are in danger of being permanently lost to humanity because of issues like feral dogs, land-mined areas and other biotic interferences at a time when global warming issues put focus on conservation of the water banks of the roof the world.

### Need for a Cold Desert Conservation Reserve in Sikkim

Sikkim is in the highest and youngest mountain range in the world, in the wettest region in the Himalaya, supporting perhaps the largest bird diversity in the world in just 7,096 sq. km ranging from about 300 m to 8598 m, the height of Mount Khangchendzonga, the world's third highest mountain. Among our other superlatives are the country's highest altitude national park and biosphere reserve, Khangchendzonga again! And the best protected area network in the country. To think we have almost 700 butterflies, probably thrice as many moths, beetles and other invertebrates. At our feet lie the Sal-Teak forests contiguous with West Bengal, and to our north, our very own fragment of Ladakh! Now here is an area that needs to be both publicised, as well as hidden away from predatory attention. In the famous place that Sikkim has now become, most of us are still relatively ignorant of the fragile natural heritage we have to our north. This is the Reserve Forest land of the Cold Desert.

The area is ecologically very fragile and vulnerable. It is also the only Cold Desert in the entire eastern Himalaya. Sikkim is internationally famous because of so many globally threatened and endangered species like Snow Leopard, Tibetan Argali or Nayan and Black-necked Crane. How many of us know that these are all cold desert species unique to this region? As the area is entirely along the international border (IB) it is also under defence deployment. Consequently, defence priorities, including those of road construction, often overshadow its enormous biodiversity values.



Hardly any information was available on this high cold area since Sir Joseph Dalton Hooker was chased back from Dongkia La by Tibetans over 150 years ago. We are truly blessed to be crowned by such a fantastic wonderland where Kiang or Tibetan Wild Asses gallop freely and Tibetan Gazelles fly across stark landscapes pursued by a loping Wolf or furtive Lynx, where Gem Silverspot butterflies pollinate medicinal plants like gentians, snow toads shelter under mossy stones of Tso Lhamo and seagulls stop to catch their breath. The few local people practicing nomadic grazing of yak, sheep and Pashmina goats are largely dependent on this forest land for their survival and are a part and parcel of this exceptional ecosystem. This is indeed the true and last home for the yaks in Sikkim.

It is for all these reasons that the area needs constant monitoring. National security will always be paramount, but our precious wildlife and domestic livestock like Nayan and yaks need to be safeguarded from dying in minefields or being killed by stray/feral dogs or poached by humans. Important lakes like the brackish water Gyam Tsona, which are also dying due to lack of awareness, need to be saved. Negative impacts of unregulated tourism already visible in the garbage accumulating at Thangu, Gurudongmar and Yumesamdong need to be addressed. So far the state government has found it difficult to handle these vital issues due to the area's difficult access and remoteness, as well as lack of awareness and manpower.

It is now imperative that this unique area be formally recognised and accorded due protection by joint cooperation between the Indian Army, State Forest Department and the tribals inhabiting the area. A detailed proposal is ready documenting notable features like peaks, passes, glaciers, lakes, thermally active areas including hot-springs, rivers, wetland/marshes, as well as important wild animals, birds and plants, not forgetting the obvious biotic or human-induced interferences. After acceptance, the area



USHIA LACHUNGPA

would get formal recognition and will not be just policed by the forest department, but managed by a committee of the people residing in and around the reserve. They would advise the CWLW on how to conserve, manage and maintain the reserve, and safeguard their traditional and cultural values. We would need to formally involve and harness manpower resources available with the BRO/GREF and military personnel in wildlife conservation. Issues like the drying up of brackish water relict lakes, impacts of garbage accumulation, control of feral/stray dog menace, poaching of wild animals, maintenance of fencing of minefields and use of fuelwood alternatives all need to be addressed. Free and frank discussions between the various stakeholders on one platform would increase awareness of the long-pending biodiversity issues of this part of Sikkim. It would be the most important prelude to declaration of the Tso Lhamo Cold Desert Conservation Reserve, which in turn would fulfill the objectives mentioned above. This way everyone using the area would be in charge of its conservation while using the area sustainably and responsibly. A win-win situation all the way! ▲▲

▲  
Dokpa Chingya expressing  
trauma of yaks in  
minefields



Usha Lachungpa, ex-employee of the BNHS, studied the Bengal Florican and is presently Senior Research Officer Wildlife in the Sikkim forest department



Care A TATA ENTERPRISE



Over the years, we've led cross-country vaccination drives. Set up rural housing projects. Pioneered a computer-enabled adult literacy programme. Established the Tata Memorial Centre for Cancer Research and Treatment, the first of its kind in India. And provided employees with maternity benefits, retiring gratuity and the provident fund, decades before they were enacted by law.

The belief:  
"No success...is worthwhile unless it serves the needs or interests of the country and its people..."

- JRD Tata

A Century of Trust







# A flame that has stood the test of time.

LIC has over 23 crore policies in force.  
The Most Trusted. Always.

*More than Rs. 8 Lac crores in assets | Invested over Rs. 80,000 crores  
in peoples' welfare | 139 lakh claims settled*



[www.licindia.in](http://www.licindia.in)

Insurance is the subject matter of solicitation



## BNHS Mission

Conservation of nature, primarily biological diversity through action based on research, education and public awareness

