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JULY-SEPTEMBER, 2006

BNHS India

BOMBAY NATURAL HISTORY SOCIETY

Vanishing Vultures

Devkinandan, RAPS, NPCIL

Vultures, nature's most efficient scavengers, are on the verge of extinction. Nine species of vultures are recorded from the Indian subcontinent, of which five belong to the genus *Gyps* while the others are monotypic. Historically, and until recently, the White-backed vulture *Gyps bengalensis,* Long-billed vulture *Gyps indicus* and Slender-billed *Gyps tenuerostris* vultures were by far the most populous species in India. Over the last decade, however, there has been a drastic crash in the populations of these vultures over most parts of the country.

Scientific studies have indicated that use of Diclofenac, a painkiller, in livestock is the major cause of vulture decline. Vultures are exposed to Diclofenac when they consume carcasses of livestock treated with Diclofenac before death. This results in the poisoning of vultures leading to their death because of kidney failure.

NPCIL's volunteers have been monitoring the local population of vultures at Rawatbhata site and also working with the local communities to create awareness about use of Meloxicam, an alternate to Diclofenac.

The Environment Stewardship Programme (ESP) of NPCIL, a voluntary programme, envisages scientific study of bio-diversity, particularly avifauna, in the Exclusion Zones (EZs) and their environs of its seven nuclear power stations. EZ is a 1.6 km radius area around the center of nuclear reactor. While only a fraction of this area is used for the plant structures, remaining is used for green-belting. 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 avifauna, 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.

G. Parashar, RAPS, NPCIL

Rajasthan Atomic Power Station at Rawatbhata in district Chittorgarh, Rajasthan (above) comprises four operating units, one of 100 MWe, one of 200 MWe and two of 220 MWe each. Two additional units of 220 MWe each are at an advanced stage of completion. Many Gyps Vultures can be spotted in and around Rawatbhata.

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Preventing Extinction of Birds

Extinction is a natural process. Some scientists say that nearly 95% of the species that ever lived in this world (during the last 4 billion years) are extinct. Evolution too is a natural process. When a taxon becomes extinct, it is replaced by another taxon. Both extinction and evolution are extremely slow processes that occur simultaneously. It takes millions of years for a species or taxon to evolve, and perhaps millions of years to become extinct. Nature does not like a void, hence when some species become extinct they are replaced by other robust species. For example, extinction of dinosaurs is considered to be very quick — perhaps the result of a large asteroid hitting the Earth. In fact complete extinction of dinosaurs took almost 100,000 years. Meanwhile, the primitive mammals, which were until then 'suppressed' by the more dominant dinosaurs, started flourishing. Birds – the glorified reptiles, as some unimaginative zoology teachers like to call them, also started evolving into a multitude of species.

Such mass extinctions and replacements (evolution) have already occured five times in the history of our Earth and the sixth is currently going on. So, why do we worry when we see many species going extinct today? That is because the sixth extinction is very different from the earlier five mass extinctions. It is not the extinction, but the rate and the reasons for extinction that worry the conservationists, animal lovers and anyone who cares for this world. Recent extinction rates are considered 1,000 to 11,000 times higher than the natural rate of extinction. More importantly, these extinctions are human induced, and hence artificial. But are these extinctions preventable? Yes, in most cases. If we humans have the will to do so! But will alone is not enough to prevent extinction of species. We need strong scientific data and equally strong legal, administrative, and political backing from governments and strong public support.

In an extremely interesting paper titled "How many bird extinctions have we prevented?" Stuart H.M. Butchart, Alison J. Stattersfield and Nigel J. Collar of the BirdLife International prove that 16 bird species would have become extinct if conservation programmes had not been undertaken for them. The article was published in *Oryx* (Vol. 40, No. 3, July 2006), the journal of the Fauna and Flora International. In 1994, 168 bird species were considered Critically Endangered. The authors of this interesting paper also included 73 species that would have qualified that status, if the current information had been available earlier.

They took a ten year period, from 1994 to 2004, to examine 27 candidate species that

a) Are currently still recognized taxonomically as species,
b) Had a known population during 1994-2004,
c) Are believed, on present knowledge, to have still been in existence in 1994 and remained in existence in 2004,
d) Had a minimum population estimated to be <100 individuals in 1994 or had a population that was estimated to be <200 individuals and estimated, inferred or suspected to be declining at a rate >80% over 10 years or three generations, and.
e) Received direct conservation interventions during 1994-2004 that significantly mitigated a key threat to the species.

Based on their elaborate threat assessment, Butchart and his colleagues found that from 27 candidate species, 16 species would probably have gone extinct in the absence of conservation intervention from 1994 to 2004. All the 16 species had very small population sizes, ranging from 8 to 118 breeding individuals. For example, Chatham Island's Taiko *Pterodroma magentae* was left with four breeding pairs, and Norfolk Island's Green Parrot *Cyanoramphus cookii* with only four surviving females. The Californian Condor *Gymnogyps californianus* became extinct in the wild, before some captive individuals were released.

In India, we have eight Critically Endangered bird species: Pink-headed Duck *Rhodonessa caryophyllacea*, Himalayan Quail or Mountain Quail *Ophrysia superciliosa*, Siberian Crane *Grus leucogeranus*, Jerdon's Courser *Rhinoptilus bitorquatus*, Forest Owlet *Heteroglaux blewitti*, White-backed Vulture *Gyps bengalensis*, Long-billed Vulture *Gyps indicus* and Slender-billed Vulture *Gyps tenuirostris*. BNHS scientists are actively working on the last five species. Fortunately, our studies indicate that the Forest Owlet is not as rare as was supposed earlier; nearly 80 individuals were sighted / detected in Melghat Tiger Reserve and another 19 in Shahada Forests. There could be some more individuals in the un-surveyed areas of western Maharashtra and eastern Orissa. The Jerdon's Courser is also being intensively studied by BNHS scientists. It was the timely intervention by BNHS that resulted in the diversion of the Telugu Ganga Canal, which would have destroyed about 200 ha of scrub forest, the main habitat of this Critically Endangered bird.

Perhaps the most important conservation breeding programme undertaken in India is the vulture breeding initiative by the BNHS, with financial support from the Royal Society for the Protection of Birds (RSPB), a UK-based organization. This collaboration was possible only because both these important organizations are partners of the BirdLife International. The Vulture Conservation Programme of the BNHS shows that we need good science to take appropriate conservation action.

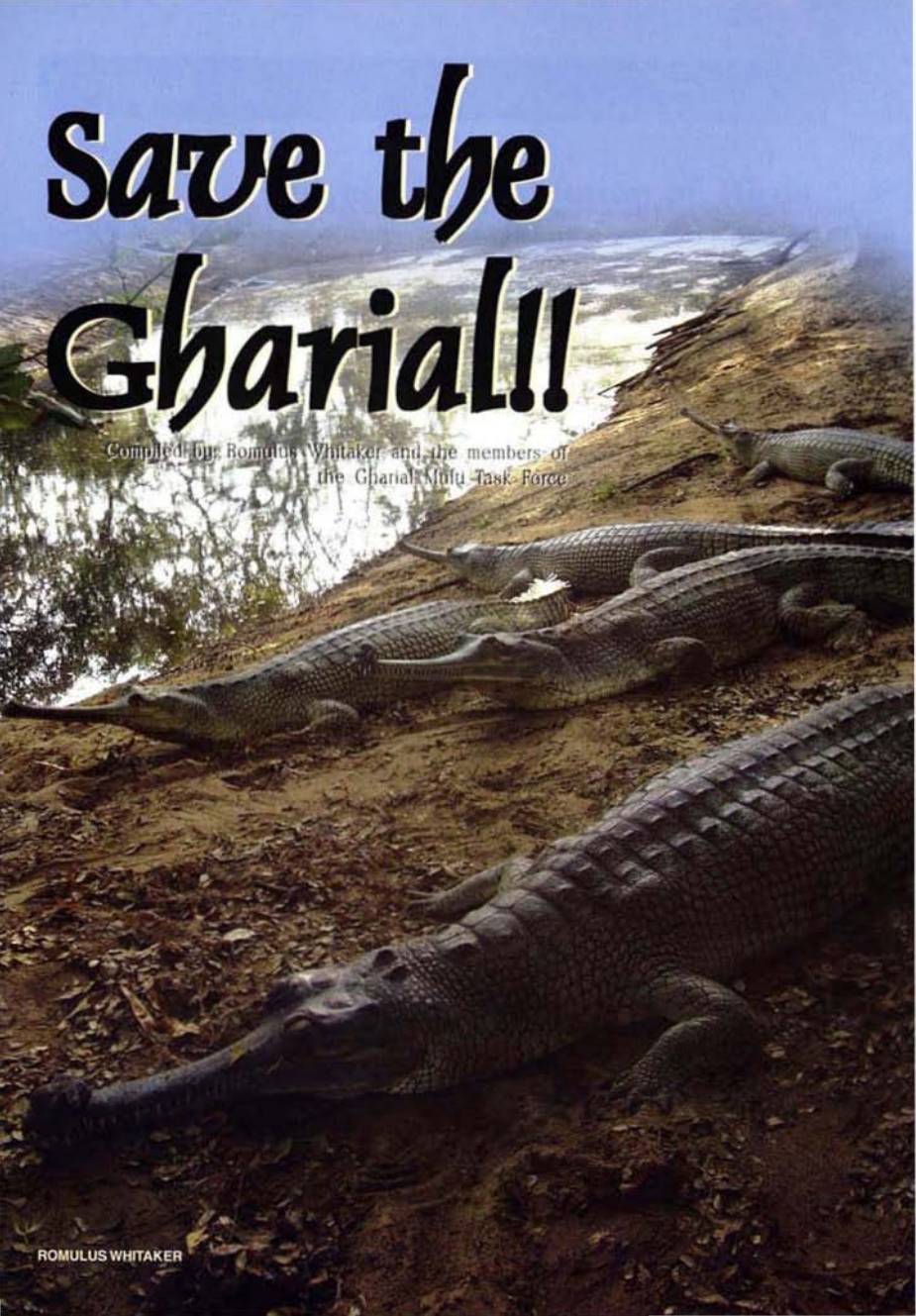
Any organization would be proud of undertaking action to save five of the eight Critically Endangered species of the world. For the three remaining species – Siberian Crane, Pink-headed Duck and Mountain Quail – the BNHS scientists are in touch with experts and conservationists working on these species. There are some unconfirmed reports of sightings of the Pink-headed Duck in Myanmar. Just like the Jerdon's Courser and Forest Owlet, two species that were considered extinct, it is hoped that the Pink-headed Duck in Myanmar and the Mountain Quail in the Himalaya too are rediscovered some day. Regarding the Siberian Crane, BNHS was in the forefront for the protection of this migratory species; BNHS scientists worked on a project on introduced Siberian Cranes during the late 1990s and early 2000s.

Besides Critically Endangered species, BNHS is also working on Endangered bird species, such as the Great Indian Bustard, Lesser Florican, Bengal Florican and the Nilgiri Laughingthrush. If Government authorities follow the recommendations made by the BNHS, the status of many species would improve. Perhaps, the future generations would say that that many Critically Endangered and Endangered bird species were saved due to timely intervention of the BNHS. Your Society would then be proud of its *raison d' etre*.

Asad R. Rahmani

Save the Gharial!!

Compiled by: Romulus Whitaker and the members of the Gharial Multi-Task Force



ROMULUS WHITAKER

In the Beginning

In 1970, S. Biswas of the Zoological Survey of India, alarmed at reports of the decline of the Gharial, carried out the first scientific surveys for this species. His findings were grim. Gharial once abundant almost everywhere, had now simply disappeared. In 1973-74, my colleagues Dhruvajyoti Basu, E. Mahadev, Irula V. Rajamani, and I carried out surveys in much of the known Gharial range in India, as well as Nepal. These surveys were carried out with help from the Bombay Natural History Society, World Wildlife Fund-India and the Madras Snake Park. The estimated total population of wild gharial in the 1940s was 5000 to 10,000 or more. By 1974, it became apparent that the gharial was on the brink of extinction with less than 200 left in the wild, a decline of about 96%. It became apparent that the Gharial was on the brink of extinction.

The drastic decline in the Gharial population since the 1940s was due to over-hunting for skins and trophies, egg collection for consumption, killing for indigenous medicine, and drowning in fishing nets. In addition, dams, barrages, irrigation canals, siltation, changes in river course, artificial embankments, sand-mining, riparian agriculture, domestic and feral livestock have combined to cause excessive and irreversible loss of riverine habitat, which had resulted in the extreme limitation to Gharial range.

Action

It was time to do something and in those idealistic days of Indira Gandhi's concern for wildlife and the environment, the Government was quick to act. Robert Bustard, crocodile consultant for the Food and Agriculture Organization of the United Nations, was called in to design a crocodile recovery programme for India. The other two species in India, Saltwater crocodile and Mugger crocodile, were also endangered, but not like the Gharial.

Gharial *Gavialis gangeticus* is the last surviving species from a very ancient lineage of crocodilians, going back to pre-dinosaur years, over 100 million years ago. It grows to over 6 m in length. The adult male grows a large bulbous projection on the tip of his long snout called a 'ghara', which gives the Gharial its name. Once common in all major rivers in the northern area of the Subcontinent, this exclusive fish-eater is harmless to humans, and now faces imminent extinction.

Bustard's scheme was to locate wild nests and collect the eggs before predators (including people) got them or flooding ruined the nests. The eggs were incubated for 70 to 80 days, the number of days it takes them to hatch. The hatchlings were reared in specially constructed pens with the right amount of water, shade and little fish for the baby Gharial to feed on, for Gharial are fish-eaters and shun anything else.

Protection at Last

Six hatching/rearing stations and five protected areas were established for the Gharial. Captive breeding of Gharial was achieved at several zoos. A school for crocodile researchers was started in Hyderabad in the 1970s, where some of the

ROMULUS WHITAKER

NICK BAKER

The decline of Gharial has gone hand in hand with the decline of other riverine wildlife once reportedly abundant and now endangered.

country's top crocodile biologists, including Lala Singh, B.C. Choudhury, Sudhakar Kar helped to pioneer crocodile studies and conservation.

Over the next ten years, when Project Crocodile was in action, over 12,000 Gharial eggs were collected from wild and captive bred nests and over 5,000 Gharials reared to about a metre or more in length before releasing them in the wild. Over 3,500 of these were released in the Chambal river, which is the biggest of all the protected areas for Gharial at over 425 river kilometers in length. Researchers like S.A. Hussain of the Wildlife Institute of India, R.J. Rao of Jiwaji University and R.K. Sharma of the Madhya Pradesh Forest Department spent weeks along the Chambal, conducting surveys.

Decline

After the 1980s, slowly but surely Project Crocodile started to wind down. Locals were not involved in conservation of river resources and were told that the river is now for Gharial, not for fishing or anything else. More often than not, the locals were left alienated and angry. Funds were withdrawn from the egg collection and head-starting[1] programmes and finally, in 1992, the then Inspector General for Wildlife in the Ministry of Environment and Forests called a halt to any further captive propagation of crocodiles.

Committed researchers in the state wildlife departments, the Wildlife Institute of India and others continued to carry out surveys as and when they could or as part of research projects. But despite the hard work by these dedicated field people, not enough was being done by the Government to ensure the survival of the Gharial, even in protected areas. In the meantime the threats have not ceased; they have increased. The misguided mega-plan to interlink the major Indian rivers will be the final nail in the coffin. The decline of Gharial has gone hand in hand with the decline of other riverine wildlife once reportedly abundant and now endangered. These endangered species include the Ganges River Dolphin and the Mugger Crocodile, besides numerous well-known fish species, including the Mahseer and Hilsa. Damming, sand mining, commercial fishing with gill nets (the 'walls of death' that can tangle and drown even big 5.5 m long male Gharial) made sure that the Gharial was facing the deadliest period in its hundred million year existence.

[1] It was believed that babies reared for 2 or 3 years till they are about a metre long have a much better chance of surviving than fragile hatchlings.

Summary of the Gharial Head-Starting Programme

From one perspective, it seems that little more was accomplished than to throw over 5,000 juvenile Gharials into largely inhospitable habitats in Indian and Nepali rivers and leave them to their fate.

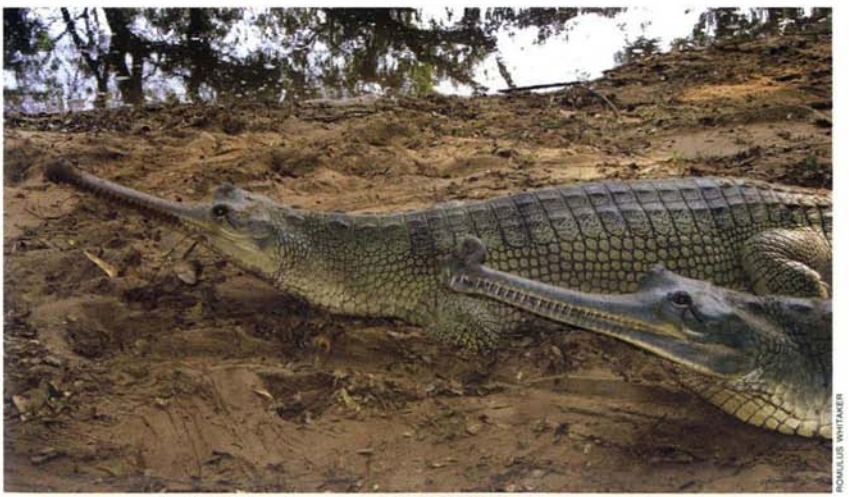
Chitawan National Park, Nepal: A decrease in nesting was recorded (Table). Although reintroduction didn't work so well there, yet it is argued that at least total extinction had been averted by supplementation. The blame for this situation goes largely to growing and uncontrolled human pressures, including depletion of the fish resources.

India's Girwa River: Katerniaghat Sanctuary, which has a mere five kilometers of ideal gharial habitat, recorded 16 nesting females (Table), which amounts to 2% of the total pre-2006 releases resulted from 30 years of reintroductions. This is seemingly not a great achievement for the money and effort spent. But as several knowledgeable researchers have suggested, perhaps carrying capacity has been reached there.

Protected Area	Total number of Gharial released	No. of Nests 1977/78	No. of Nests 2006
Chitawan National Park, Nepal	457	16	6
Girwa River, Katerniaghat Sanctuary	909	4	20
Chambal River, National Chambal Sanctuary	3776	12	68

The Chambal River: This is the third and most important remaining Gharial breeding habitat. Although nesting has apparently increased by over 500% (Table), these recruited mature, reproducing females are only about 2% of the total number released. As has been pointed out many times, the linear, riverine habitat of the Gharial is an extreme disadvantage with annual monsoonal flooding when the newly hatched young are especially prone to being flushed downstream out of the protected areas to their inevitable doom.

With recruitment or retention of reintroduced Gharial (plus natural nests) over the last 30 years being as low as 0.02% in the Mahanadi river, Orissa and averaging 3-10% elsewhere, the entire reintroduction strategy needs to be reassessed. Scarce conservation funds and human resources needs to be also focused on other rigorous actions such as habitat assessment, studies on gharial 'migration', fisheries assessment/enhancement and conflict mitigation: getting river people on the side of conserving the very river resources they depend upon in order to improve the survival odds of the Gharial. It should be noted that the four places where Gharial are still breeding today already had small breeding populations when the restocking programmes began. Nowhere has restocking established a viable Gharial population.



ROMULUS WHITAKER

The Gharial is today facing the deadliest period in its hundred million year existence

Save the Gharial

Gharial Problems

The problem is, even without human interference, Gharials have a hard enough time surviving in their strictly riverine habitats with the heavy monsoon floods rushing down the river and flushing Gharial down into shallow, inhospitable river stretches outside the protected areas.

Although carrying out census surveys of endangered species like the Gharial should be a routine function of the Wildlife Departments, yet scant attention is paid to them. Mammalian mega-fauna species like the Tiger, Elephant and Rhino and even deer are counted in annual state wildlife censuses. But Gharial is just not deemed important enough. During 1999 to 2003, no surveys were carried out at the Chambal and what the Gharial census-takers found in 2003 was a shock. Gharial numbers were reported to have dropped 60% from a total of 1,289 in 1998 to 514.

River Tsunami

A horrible example of how the best plans can go wrong can be seen in the beautiful Sathkosia Gorge, part of the Mahanadi river in Orissa. Since 1978, over 700 'head-started' Gharials were released in the 24 km Sathkosia Gorge Sanctuary. Today there are two left! Gharial killing fishing nets were effectively stopped, bamboo rafting (which disturbed basking and nesting females) was halted and the Sanctuary was well managed. So why did the Gharial fare so poorly? The answer lies with the Irrigation Department. Every year the huge Hirakud dam upriver fills with monsoon surplus and before it reaches the danger level it is released and creates what must be a tsunami for a Gharial. Any that are unlucky enough to be in the main river and not sheltered in a tributary (of which are very few in that part of the river) are swept downstream, sometimes all the way to the sea to perish.

The Disappearing Act

There are a few scattered Gharial in other parts of India, a small number of adults in Corbett Park, a few in the Jamuna and maybe one or two left in the huge Brahmaputra river in the Northeast. None of these are breeding populations, but it can be hoped that better protection and higher awareness can change the situation for the better.

Besides India, the only other country where some Gharials survive is Nepal, where over 500 head-started Gharial were released and which now has only about 35 wild adults and about the same number of juveniles. Six nests were reported from the Rapti/Narayani rivers in 2006, down from 12 in 1980.

Gharials are extinct in Pakistan, Bhutan, Bangladesh and Myanmar. India and Nepal are now responsible for the survival of this remarkable reptile, which causes no threat to humans or livestock. It remains a strong religious icon as the vehicle of

RAJIV CHAUHAN

An adult male Gharial drowned in an illegal fishing net within the National Chambal Sanctuary

Ma Ganga, the top river goddess, and as a top river predator. It can also be considered as a living symbol of the health and vitality of a river ecosystem.

What can we do?

The world population of wild adult Gharial is now down to about 180, with probably fewer than 20 adult males. It is 20 times more endangered than the Tiger!

When news of this drastic decline of Gharials was relayed to the croc conservationists, they reacted by starting the Gharial Multi-Task Force. Based at the Madras Crocodile Bank, the Task Force is attempting to galvanize all the important players into hammering out a realistic Action Plan for Gharial recovery.

The poor survival percentage of the thousands of Gharial that were reintroduced into our rivers at great expense of time, money and energy is now prompting a total re-examination of the head-starting programme. Perhaps the answer lies in something very basic. Maybe Gharials cannot survive in rivers that have no sheltering tributaries for them to retreat to during the monsoon floods. Or perhaps upriver deforestation has changed the character and water flow of the rivers irreversibly and there is no future for the Gharial in most of its former range.

A combination of good science, continuing surveys, population monitoring and judicious restocking in carefully assessed Protected Areas are key components of the developing Action Plan. Such a plan would be incomplete without solving the problem of the river 'tsunami flush' effect on Gharial by studying migration, home range and habitat. This Action Plan is being drawn up with inputs from the field people with experience in conserving the Gharial.

Can we save the Gharial?

HARRY ANDREWS

The answer is an emphatic YES! If you are a reader who can carry out any of these conservation activities in your official or informal capacity, don't wait to be asked. The Gharial needs your help and there is little time left to save the most extraordinary of all the crocodiles in the world. ■

To bring the Gharial back from the brink of extinction yet again and to keep it safe forever, this is what the Gharial conservationists say needs doing:

- Lobby for political support for Gharial and river biodiversity conservation, particularly in the three main Gharial states in India; Uttar Pradesh, Madhya Pradesh and Rajasthan.
- Total enforcement of the existing wildlife laws and protection by the Forest and Police Departments in the tri-state National Chambal Sanctuary, as well as in the crucial Katerniaghat and Son River Sanctuaries.
- To increase support staff, infrastructure and equipment for patrolling, protection and Gharial population status monitoring.
- Formulation of Management Plans for each of the key Protected Areas for Gharial, in the framework of the International Gharial Recovery Action Plan.
- Annual monitoring of all surviving Gharial populations.
- Development of research programmes on key aspects of Gharial biology, such as dispersal and migration, hatchling survival and habitat requirements (in particular to survive the monsoon 'flush' effect).
- Continued surveys of alternative habitats for Gharial reintroductions to be carried out cautiously after assessing the entire habitat and negative influences and their mitigation.
- Assessment of all the negative influences to Gharial survival from sufficient prey base (fish) to people pressures like over-fishing, sand mining, water extraction and general disturbance of nesting areas.
- Research on river water management, fisheries, future development plans and the socio-economics of the riparian people living in and around the remaining gharial habitats.
- Development of appropriate awareness campaigns along with eco-development programmes to increase the standard of living for riparian people, and to minimize unsustainable dependence on river resources.
- Fund-raising, international and national awareness programmes and involvement of all those with an interest in gharial, river conservation and the welfare of river people: the ultimate custodians of the gharial.

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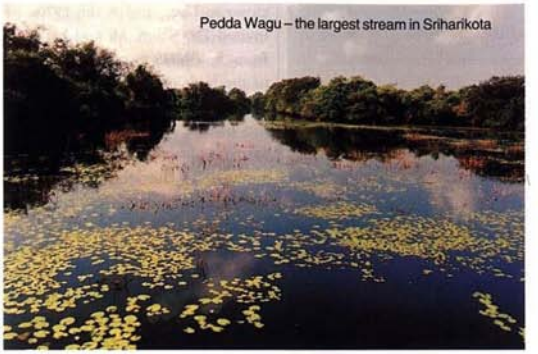


Pedda Wagu – the largest stream in Sriharikota

RANJIT MANAKADAN

Sriharikota – spaceport and biodiversity refuge

Ranjit Manakadan

"It was one of our initial field visits at Sriharikota under a faunal diversity project of the Bombay Natural History Society (BNHS) sponsored by ISRO – the Indian Space Research Organization. S. Sivakumar and I reach the culvert over Mavalam Vagu. A group of tribal Yanadi men and women sit quietly fishing in the deeper pools. We watch them fishing with live-bait of fingerlings of the exotic (now naturalized) Mozambique Tilapia *Oreochromis mossambica*. I twitch on seeing the impaled fingerlings struggling on the hooks before each cast, but get through this by deciding to adopt the policy of 'see no evil'. The catch is good and landings include Striped Snakehead *Channa striatus*, Indian Climbing Perch *Anabus testudineus*, Ox-eye Tarpon *Megalops cyprinoides*, Barramundi *Lates calcarifer* and eels. The fishermen are quite happy. It is great to be back in the field after six years of 'incarceration' on a desk-job at the BNHS headquarters."

Sriharikota (181 sq. km) is a spindle shaped island towards the north of Chennai in Tiruvallur and Nellore districts of Tamil Nadu and Andhra Pradesh respectively. The Island is bounded by the waters of Pulicat Lake (460 sq. km) at its western, northern and southern edges, while the Bay of Bengal laps up the eastern shoreline. Besides being India's spaceport, Sriharikota has also one of the last remaining and largest tract of tropical dry evergreen forest in India. The forests of Sriharikota had been exploited as far back as the 17th Century. The Island had a system of tramways (till 1970) for transport of wood to collection sites on the Buckingham Canal on its western boundary for the onward journey to Chennai!

Due to the history of exploitation and raising of plantations, edaphic (soil) and hydrology, the Island is a varied mix of vegetation types. There is scrub in sandy areas, grasslands or savannah like formations in the extreme southern part of the Island, and areas with salt marsh, mangrove and coastal vegetation. There are also 'abandoned village forests', i.e. jungle that has overgrown former settlements. It's great to see forests taking over human habitation for a change! There are also plantations of eucalyptus,

V. KANNAN

Yanadi fishermen setting-up fish traps in Pulicat lake

casuarina and cashew. Other exotics that have got a foothold on the Island are the Chilean Mesquite (*Prosopis chilensis*) and the Australian Acacia (*Acacia auriculariformis*).

Between the late 1960s and early 1970s, ISRO started to lay the foundation of India's spaceport, now known as the Satish Dhawan Space Centre-SHAR. Till then, the Island supported about 20 villages inhabited by settlers from the mainland, who had more or less usurped the land from the tribal Yanadis. As part of a resettlement package, the displaced villagers were relocated to the other islands in Pulicat Lake or on the mainland. Some of the Yanadis slipped back into the Island unable to cope with the harsh outside world; ISRO permitted them to stay in designated areas. Logistics being important for a spaceport, ISRO got the Island connected to the mainland (at Sullurpet) – prior to this access was by boat.

ISRO's arrival turned out to be a blessing in disguise for the biodiversity as it was facing pressures from the locals for natural resources. Fortunately, ISRO, in spite of its preoccupation with space science, was conscious of nature conservation and the need to document the biodiversity of the Island. The man who set this trend was the late Prof. Satish Dhawan, one of the stalwarts of ISRO. Visits to Sriharikota and the adjoining Pulicat Lake gave him opportunities to be closer to birds, and in the 1970s, he invited Dr. Sálim Ali and his team from the BNHS to carry out a survey of the birds of the Island. After this, and a gap of two decades, the BNHS was back at the Island in the 1990s, carrying out in-depth studies on the avifauna of the Island and Pulicat Lake under projects funded by the U.S. Fish and Wildlife Service and later ISRO. Even after his retirement, Prof. Satish Dhawan's interest in wildlife did not cease and through his initiatives, ISRO again invited the BNHS to work on the Island under a 3-year faunal diversity inventory project (2001-2004). A nature education centre also got recently established at Sriharikota, an offshoot of the project. Fortunately, the conservation and wildlife research ethos of Prof. Satish Dhawan have been imbibed by his successors, and the BNHS presence still continues on the Island with an on-going 3-year (2004-2007) project on plant-animal interrelationships with special reference to food plants of mammals and birds.

RANJIT MANAKADAN

Unlike the nearby Nelapattu, the Spot-billed Pelicans are yet to breed at Sriharikota, but may probaby do so in the future

Our work at Sriharikota involved documenting and carrying out ecological studies on the mammalian, avian, amphibian, reptilian, fish and butterfly fauna of the Island. I looked after the mammal, bird, and fish part, while Sivakumar handled herpetofauna and butterflies. Among mammals, the interesting finding was that the Island has good populations of the Rusty Spotted Cat *Felis rubiginosa* and Slender Loris *Loris lydekkerianus*. As for birds, we made 15 additions to the earlier checklist of 200 bird species recorded during the earlier two BNHS studies; discovered three nesting colonies of waterbirds on the Island; and obtained the southern most record for the Water Rail *Rallus aquaticus* in India. With regard to herpetofauna, we recorded 12 species of frogs,

S. SIVAKUMAR

The Indian Flap-shell Turtle (*Lissemys punctata*) is a common species at Sriharikota

12 species of lizards, 18 species of snakes and 3 species of tortoises/ turtles – quite bit of a surprise for us. The beach is also the nesting ground for around 100 Olive Ridley Turtles *Lepidochelys olivacea* from February to May each year. A startling record was that of the Beddome's Cat Snake *Boiga beddomei*, a species thought till then to be endemic to the Western Ghats! As for fish, I was quite awestruck at the diversity of wetland habitats, ranging from small lakes (both freshwater and brackish-saline), streams (both freshwater and brackish), natural and man-made freshwater ponds, and creeks flowing into Pulicat Lake or the Bay of Bengal. Due to this diversity, the waters in the Island supports a high diversity of fish species (44 species recorded) comprising of freshwater, brackish and marine forms. As for butterflies, even with step motherly treatment – due to our focus more on more interesting (to us) wildlife – we managed to record 50 odd species from the Island.

As quite a few species on the Island are nocturnal, our work involved fieldtrips at night too. Fieldwork at night can provide exciting moments, especially when one sees the head of a civet peeping out of a bush or the sight of a pair of red glowing eyes of the Slender Loris staring from treetops. Or when one stands motionless at a wetland with torches surrounded by an assortment of frog species of different sizes emitting a deafening din of diverse calls in the throes of sexual excitement. However, mosquitoes can play spoilsport – for man and probably the frogs! Or, it could be unnerving as when the torch goes kaput for some reason and one stands all alone in pitch darkness. It could even be dangerous as on the night when Sivakumar and I were chased by an angry, snorting feral bull while

Above: The Indian Cobra (*Naja naja*) is one of the four species of deadly venomous snakes of Sriharikota

Below: Russell's Earth Boa (*Eryx conicus*) quickly burrows into the sand on approach

S. SIVAKUMAR

Sriharikota is a safe refuge for the nocturnal Slender Loris (*Loris lydekkerianus*)

sampling frogs and snakes. I almost met my maker that day – as for Sivakumar, he was safe up in the trees!

One area where we made few visits – which I still regret – due to difficult logistics was the southern portion of the Island that was more grassland or savannah like. Some stretches of this region are narrow enough for one to see Pulicat Lake and the Bay of Bengal on either side. For one who is familiar, this area resembles the Blackbuck (*Antilope cervicaprae*) habitat of Point Calimere Wildlife Sanctuary, but with a much more 'wild country' appearance. The most impressive 'wildlife' of this area are some specimens of feral bulls. Due to the mixing of various breeds, the bulls come in a variety of builds and colours, but the most majestic is the whitish-grey bull with pronounced blackish hump, 'kaajal-drawn' eyes and a pair of 'killer' horns. There are also feral buffaloes and a small population of feral horses (formerly owned by Muslim settlers, who hired them out during marriages). ISRO has been mulling over the idea of removal of the feral cattle population from the Island, but this may increase the risk and intensity of forest fires as there is no wild coarse herbivore in the Island to keep the grass down. The only large herbivore on the Island – but restricted to the forest - is the Chital *Axis axis*.

S. SIVAKUMAR

The Starred tortoise (*Geochelone elegans*) is a favourite of the illegal pet trade

It's more than two years that I left Sriharikota to work on elephants in Koundinya Wildlife Sanctuary (see *Hornbill* Jan-Mar, 2006). The days spent wading in the wetlands in search of fish and frogs, trekking the forests for birds, combing the seashore for turtle nests, and biking in the wilderness will always be unforgotten memories. However, there are conservation issues that I ponder over and wonder what the ultimate future will be for the wild areas and wildlife of Sriharikota. The Island has its share of problems: habitat loss and fragmentation due to developmental activities, the problem of exotic plantations, road-kills of wildlife due to the increasing network of roads, over-exploitation of fish resources, silting of wetlands, and the problem of waste disposal, all discussed in our report. One thought that especially worries me are the ambitious expansion plans for the spaceport, including the planned mission to the moon in the near future. These projects will place huge demands on land. However, as I said earlier ISRO has been fortunate to have been headed by a number of conservation-oriented officials and I hope the dream of Prof. Satish Dhawan *that the tropical dry evergreen forests of Sriharikota shall be preserved for its biodiversity that is beneficial for posterity* will always hold. ■

Dr. Ranjit Manakadan, Senior Scientist, BNHS. His current projects are on the Asian Elephant, plant-animal inter-relationships in Sriharikota and waterbirds of Pulicat Lake.

Reviewed by Asad R. Rahmani

This is a book which any author and publisher should be proud of. I had known for the last five years that Pradip Krishen was working on a book on the trees of Delhi, but I never thought that he would come up with such a marvelous book. I am neither an expert on taxonomy nor am I a botanist, and shall therefore keep off from the subject of nomenclature (it keeps on changing as we get more information). In this review I shall concentrate on the quality of printing, design and uses of this book.

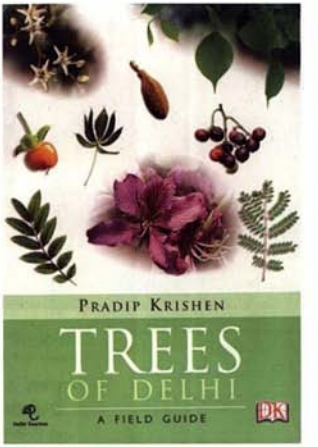
The Introductory chapter is divided into a one or two page subchapters on 'What is a tree?', 'Tree Names' and 'The Parts of a Tree' described in lucid language for amateurs. The other chapters 'Delhi as a habitat for trees', 'Delhi's natural ecology' and 'Delhi's micro-habitats' make interesting reading. Delhi is famous for its leafy avenues. The chapter on the 19th century Delhi is wonderful to read.

As leaves are present through most of the year, the trees are arranged on 10 types of leaf categories (p. 13). I tried identifying some trees in Mumbai using this method and found it very useful. The difference between simple and compound leaves, and true leaf and leaflet also make the identification simple. Each species has a common name, followed by the scientific name, alternative names, sometimes trade name, and a brief description and its country of origin. The height of the tree is given in metres, and also compared with a silhouette of a standing man. The description of the bark, leaves, flowering and fruiting seasons also help in identification. Pictures of fruits and flowers, wherever necessary, are given. The book also mentions the exact locations in Delhi where a particular species can be seen easily.

One of the most interesting part of the book is the last chapter enigmatically called 'Relating to the Character, Uses or Distribution of Trees' (pp. 321-341). In this chapter, Pradip tells us about why we do not see the flowers of a peepal tree, or which is the largest banyan tree in the world? Or, what was the origin of the name banyan. Read this chapter for the little nuggets of knowledge about our trees.

Pradip is very passionate about trees and gardens. A sample of his views (p. 40): "Trees will not, of course, solve Delhi's ecological problems. But while we search for the will and means to undo what we have done, trees are balm and salve to our mistakes. They are witness to our foolish tinkering with nature, embellishments of our dour cities, symbols of renewal and growth, our reasons for hope and for keeping faith." These profound statements can only come from the heart of a person who truly loves trees.

It is a well written book. I would say that Delhites are lucky to have such a book. Should we have similar books on trees of Mumbai, Kolkata and other metropolitan cities? Pradip has set a standard. Any takers in other cities?



Trees of Delhi: A Field Guide
by Pradip Krishen, 2006.
Dorling Kinderley (India) Pvt. Limited, Delhi.
Co-published by INTACH and Delhi Tourism.
Pp. 360. Size: 23 x 15 cm.
Price in India: Rs. 799/-.
Paperback.

We are grateful to
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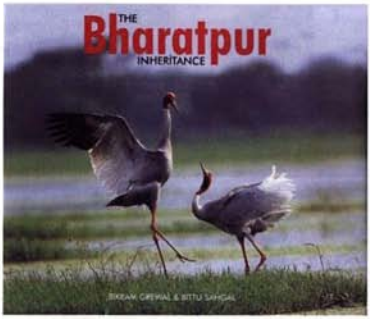

The Bharatpur Inheritance
by Bikram Grewal and Bittu Sahgal, 2006.
Sanctuary Asia, Mumbai.
Pp. 160.
Size: 25.5 x 31 cm.
Price: Not mentioned.
Hardback.

Reviewed by Asad R. Rahmani

This is a coffee table book that will dazzle you with its beautiful pictures and delightful text. How can one have anything less than superlative when Bittu Sahgal is in charge of the production, the selection of pictures and text on a subject like the famous Keoladeo National Park.

I will start with the image of the two dancing Sarus Cranes on the front cover. Is there any other photograph that depicts freedom, *joie de vivre*, filial affection, purity of love and the vulnerability of nature better then this photograph does? Short-sighted politicians and insensitive bureaucrats, who are bent on destroying the last homes of the Sarus, should be given this picture to hang in their offices, where decisions are made to take away more Sarus habitat for development. Only an extremely inhuman person would take such a decision after seeing this picture? The photographer, Nayan Khanolkar, should be congratulated for epitomizing the beauty of nature in just one frame, which even a tome cannot justify. Another picture that I liked very much is the Rose-ringed Parakeet (p. 87) drinking water from a leaking facet. I am sure every reader will have their own favourite picture(s) in this book. Some of the pictures are not taken at Keoladeo (e.g. Indian Skimmer on p. 86), but that is okay as long the species is found there.

The book is well-designed, with some of the best natural history writers adding to the beauty of the lovely pictures by their 'to the point' articles. All the writers have some personal anecdotes and stories to tell, based on their experiences at Bharatpur. This book should be compulsory reading for government *babus* sitting at Jaipur, who decide whether water should be given to Keoladeo during the drought years. Unless the politics of water is solved in the coming years, this gem of the wetland will deteriorate further. With that will go the earnings of hotel owners, rickshaw-pullers, bird guides and thousands of citizens of Bharatpur town, who directly or indirectly benefit because of the hundreds of thousands of tourists that visit Keoladeo National Park every year. These are direct and tangible benefits to a large number of people, but what about intangible benefits, such as recharged wells all around the Park? Will the important roles of protected areas be recognized by politicians? Places like Keoladeo are our natural treasures. We can build another Taj Mahal, but can we bring back the Siberian Crane or the Pallas's Fish Eagle to the marshes of Keoladeo? One thing that always surprises me is that when we all benefit from the bounties of nature, why do we not stand up to protect nature? Two years ago, when water was denied to the marshes of Bharatpur, why did the citizens of Bharatpur town not revolt against the decision? Can't we protect a 29 sq. km Park that brings glory to the nation and money to the people of Bharatpur?

I wish the Government of India and the State Government of Rajasthan would rise above petty politics and assure the citizens of this country that dams will not block the water coming to the marshes of Bharatpur. And that the water regime, so assiduously maintained by the former Maharajah of Bharatpur, would be restored.

We may never see the Siberian Crane

or the Pallas's Fish-Eagle in the marshes of Keoladeo again, but I hope that the Pheasant-tailed Jacana always comes back to raise its brood on the floating vegetation, that the Fishing Cat continues its nocturnal haunts to catch fish and that the Painted Stork always finds food to raise its large hungry family. I also hope that Nayan Khanolkar and many other always find dancing pairs of Sarus Cranes in the marshes of Keoladeo National Park, and also that Hakim Singh and Ratan Singh can show 'their' birds to grateful tourists for decades to come.

Reviewed by Asad R. Rahmani

Prerna Singh Bindra is one of the most talked about journalists among Indian conservationists. She passionately writes about wildlife in newspapers and magazines to protect animals with which we share this planet. Unlike most journalists, she is well read and her recent book reveals that she is well travelled too. *The King and I*, as the name indicates, is her personal experience in the tigerlands of India.

Although I liked all the chapters, my favourite is 'The Vicerine's Bounty', Prerna's trip to Kaziranga. She rightly calls this 430 sq. km wonderland as a 'forest asylum'. Yes, this is what India's forests have become – small pockets of asylums in the natural world amongst the vast multitudes of croplands, villages and cities, and peopled by more than a billion souls. The real miracle of India is that despite tremendous population and development pressures, we still have such 'forest asylums' left in our country. As pointed out by Bindra, Kaziranga is a success story (touch wood!) in the world where we have horrors like Sariska, Indravati and Hazaribagh. She rightly says "pure lethargy and sense of defeat plagues most of India's parks".

The book is a delight to read for its pithy sentences and dry humour. Penning her encounters with the Rhinos in Kaziranga, she writes, "I saw several, including one precariously positioned over a female for the purpose of procreation. I couldn't see the poor lady's face as she bore his bulk, but the male had a curiously bland, almost bored expression for one engaged in such a task. With a final heave, he detached himself, sauntering off without a glance at the future mother of his children. Men are the same across all species!"

This profusely illustrated book has 21 chapters, covering almost all the well-known tiger areas of India. The book is on tigers and tiger conser-vation, as the preface, cover and numerous pictures indicate, but the author has also described her ventures in Lion and Snow Leopard haunts. She has been able to collect relevant pictures from 35 photographers/ sources. She is a photographer too, revealed by 44 pictures taken by her.

I like her pictures of the famous tiger Bumbooram of Ranthambore (p. 14) and Changeable Hawk-eagle (p. 184).

This is a wonderful book, partly gloomy, partly energising, but never boring. Recently, Prerna has travelled to the Thar Desert. Let us hope she will write more books and articles about other species, as Indian wildlife is much more than just a large striped cat!

The King and I – Travels in Tigerland
by Prerna Singh Bindra, 2006
Rupa & Co., New Delhi.
Pp. 256. Size: 22 x 14 cm.
Price: Not mentioned.
Paperback.

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Kekoo Naoroji Memorial Fund
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Photo: AJIT DESHMUKH

Knights of the Night

I was just seven years old when my father and I were at the famous Mahalaxmi temple of Kolhapur to get an auspicious day and time for a pooja at home. My father was with the head priest, when two small birds caught my attention and I their. We both stared at one another for long before I turned to my father with questions about them. But before my father could answer my questions the priest yelled "Never look at a *pingla* it is bad omen", 'Pingla' is owlet in Marathi. This was my first encounter with the most neglected and misunderstood species of our times – the Owl.

Years later, I was stationed at Kulgi Nature Camp in Dandeli Wildlife Sanctuary in northern Karnataka. It was a cold December night, when we heard the scream of a woman. A while later the scream became louder and appeared to be approaching us, fear gripped all of us. After a quick discussion some of us decided to follow the scream. We followed it until it became weaker and finally faded into the dense jungle. When back home I remembered Jim Corbett's description of an owl and looked up the **Handbook** by Sálim Ali and Dillon Ripley, I had my answer at last. The blood curdling scream was the call of the Forest Eagle-Owl *Bubo nipalensis*. The fact that this species can be seen at Dandeli confirmed it. The incidence has since been etched on my mind, though I am yet to encounter this bird in the wild.

The evolution of owls dates back to the Cretaceous period (i.e. 65 million years ago). The oldest owl fossil was found in the upper Cretaceous deposits in Romania. Another – *Ogygoptynx wetmorie*, believed to be a giant owl standing 3.5 feet tall – was discovered in Colorado, USA in Paleocene deposits (about 58 million years ago). Owls evolved through the Eocene or late Paleocene epoch (more than 50 million years ago) to their current forms. Some genus evolved during that period still exist, e.g. *Bubo* and *Strix*.

There are around 189 species of owls worldwide and 39 species in the Subcontinent of which the Barn Owl and Spotted Owlet are the most common and the Forest Owlet and the Nicobar Scops Owl are the rarest.

Barn Owl *Tyto alba*

One of the most common owl species in the world. In India, found everywhere except the Thar desert and high altitude Himalaya. Seen in almost all type of habitats; strictly nocturnal, feeds exclusively on rodents. In West Bengal, it is called 'Lokhi Pecha', which means vehicle of Goddess Laxmi.

Photo: SAMEER KEHIMKAR

Nicobar Scops Owl *Otus alius*

First described as a new species in 1998 by Dr. Pamela Rasmussen, it is endemic to the Great and Central Nicobar Islands. Inhabits coastal forests and mangroves; feeds on spiders, insects and geckos. Further investigations may reveal more information on this species.

Photo: S.P. VIJAYKUMAR / A. BANDANA

Indian Eagle-Owl *Bubo bengalensis*

One of the largest owls of India, it is found almost all over India. Strictly nocturnal and roosts on cliffs and cavities during daytime. Gives deep resonating hooting calls. Feeds on rodents, big birds, snakes, lizards and insects, is known to kill hares and fawns. Shows strong site fidelity. Persecuted in many parts of central India for witch craft.

Photo: AJIT DESHMUKH

Indian Scops Owl *Otus bakkamoena*
One of the most widely distributed owls in the Indian peninsula, Sri Lanka and southeast Arabia. A typical forest dweller, it can be seen dozing in the cavities of huge tree trunks. Generally found in pairs or small groups. Feeds on insects, and occasionally on vertebrates.
Very aggressive and defends its nest ferociously. The call is a subdued mellow song, often heard during dusk and dawn.
Photo: MEETHIL MOMAYA

Jungle Owlet *Glaucidium radiatum*
A common forest dweller throughout India, except at high altitudes in the Himalaya. Generally occurs in well-wooded country with good vegetation cover. It is diurnal and crepuscular; feeds exclusively on beetles. The call is very peculiar and can be heard very often during early mornings. A highly territorial and aggressive owl.
Photo: RAMNATHCHANDRASHEKHAR

Spotted Owlet *Athene brama*
One of the most common and widely distributed owl species. Inhabits crop fields, peripheries of human habitations, old buildings and huge trees. Feeds on rodents, insects and other invertebrates; is one of the top predators of the agricultural ecosystem. It can be identified by its very prominent screeching call during night.
Photo: VARAD GIRI

Brown Fish-Owl *Ketupa zeylonensis*

A widely distributed species, found entirely over South and Middle-East Asia, it prefers riverine forests and well-wooded streams. Feeds on crabs, fish and frogs; sometimes kills birds and rodents. The featherless legs and rough claws help in hunting slippery animals, like fish.

Photo: MEETHIL MOMAYA

Forest Owlet *Heteroglaux blewitti*

A critically endangered and endemic to the Satpuda mountains of central India. Prefers teak dominated forests. An opportunistic feeder, it feeds on rodents, reptiles, birds and insects. Predominantly diurnal. Highly threatened due to consistent habitat degradation and persecution.

Photo: GIRISH JATHAR

The owls are threatened all over the world due to rapid habitat destruction, indiscriminate use of pesticides and rodenticides. Direct persecution, hunting, myths and misconceptions aggravate the problem.

Owls play a very important role in the environment as they feed on rodents and insects that are considered as pests by farmers. In many European countries the owl is considered as a friend of the farmer and a protector of his barn yards. However, in our country the owl was always ignored and considered ignoble.

There is urgent need to protect these magnificent birds. Only then will we hear the hoot of the wise owl in future.

Girish Jathar is Scientist-In-Charge at the ENVIS Centre at the BNHS. He has recently been awarded a doctorate for his work on the Critically Endangered Forest Owlet.

EDITORS' CHOICE

Except, of course, man

– Sahir Doshi
(Age: 12)

The crocodile once lay on the riverbank, predatory instinct in every vein,
No creature ventured near its gaping mouth, its powerful whip of a tail,
Except, of course, man.
Today the crocodile exists as a bag, hanging from a woman's shoulder,
Never again will it slide into the water, hunt frogs, or rest on a boulder,
Hang, is all it can.

The black rhino once roamed the African scrub, browsing on Acacia thorn,
No predator attacked it, for fear of its long, powerful, goring horn,
Except, of course, man.
Today that horn is no longer on a rhino snout, but in an Omani shop,
On display for the odd interested person to consider on an evening stop,
Far from African land.

The tiger once stalked the spotted deer, muscles rippling in the tall grass,
Alarm calls rang, langurs; shrieked, the deer fled, no animal dared pass,
Except, of course, man.
Today that tiger is all over China, claw hanging on a house door,
Bones in a medicine jar, meat in a café, skin draped across a floor,
All oblivious to the ban.

The sea turtle once swam the seas, searching for jellyfish in the blue,
Flippers propelling him forward, protected by the shell too thick to chew,
Except, of course, for man.
Today the shell lies motionless, a mere showpiece in a seaside hotel,
Ignorant tourists overlook it, the poor creature's beautiful shell,
Neither in the sea or sand.

The elephant once roamed the Indian terai, ripping bark off the trees,
No animal challenged the 5 ton powerhouse, ruler of all he sees,
Except, of course, man.
Today all that remains is an ivory table piece, small, insignificant,
Reduced to an 8-inch model, from long tusks once magnificent,
By man's cruel hand.

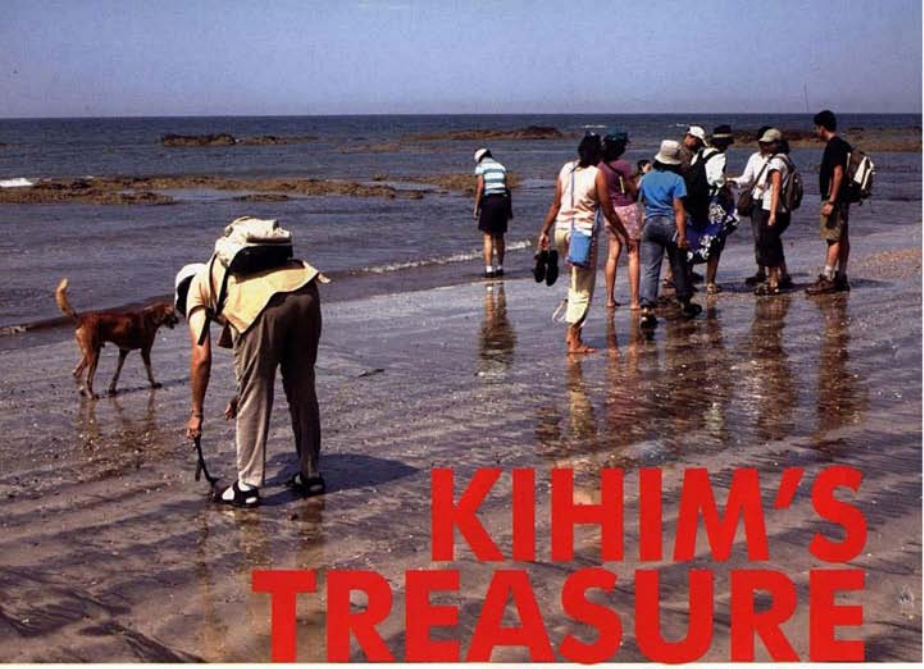
Today the world's great species are dying, the forests falling too,
But every species is helpless, there is nothing any creature can do,
Except, indeed, man.
The fuel for the massacre is the demand, stop that and that is it,
We're facing a crisis, someone needs to take action, stop all of it,
We all I can.

ABOUT THE POSTER

Peafowl *Pavo cristatus*, India's National Bird, is one of the largest members of the Phasianidae family. It is widely distributed all over India from up to 1800 m in the Himalaya in the north to Kerala in the south, and from Gujarat in western India to Manipur and Nagaland in the east. It has also been successfully introduced in many countries as an ornamental bird. The peafowl is common in both forests and villages, especially where protected on religious or sentimental grounds. Although not a threatened species, its numbers may have gone down in some areas due to poaching for meat and long-tail feathers of cocks. The long metallic, bronze-green 'tail' of peacock is called 'train'. There are numerous cases of peafowl death after eating pesticide-laden seeds. There is need for an all-India survey of peafowl to know its numbers and threats facing the National Bird.

Indian Peafowl
(*Pavo cristatus*)

AJIT DESHMUKH



KIHIM'S TREASURE TROVE

Text and Photographs: Sanjay Marathe

A group of 10 students embarked on a three-day trip to study the marine biodiversity along the western coast near Kihim and Alibag beaches, about 125 km south of Mumbai. These nature enthusiasts were participants of BNHS's 'Leadership Course in Biodiversity Conservation'. As on any other BNHS nature trip, they were all hopeful that the trip would be a successful one.

Right from the start, our schedule was packed with various treks and activities. As soon as we reached Kihim and checked into our modest accommodation, a stone's throw away from the beach, we set out for our first trek on the beach. The low tide had set in,

Seashores can broadly be classified into three major zones: the Splash or Supralittoral zone remains mostly dry except for getting splashes of salt water during the extreme spring tide; the Intertidal or Eulittoral zone comprises of an Upper shore area between the Splash zone and the average high tide level, the Middle shore between the average high and low tide levels and the Lower shore between the average low tide level and the extreme spring tide level. The last is the Sub-littoral Zone, which lies to a maximum of about 20 m depth beyond the extreme spring tide level. All marine plants and animals have adapted to their own zones in a manner in which there is minimal competition for food and living space.

Bivalve molluscs *Gafrarium divaricata* on the rocks at the Kulaba fort at Alibag. Most bivalves have a well-developed foot that is used for burrowing and creeping

allowing us easy access to almost 500 m below the high tide water level.

Prof. Purushottam Kale, reader at the Zoology Department of Ramniranjan Jhunjhunwala College in Mumbai, and our guide for this trip, informed us that we were standing on the upper edge of a broad continental shelf, covered by relatively shallow seas. This meant that one can walk into the sea for a couple of kilometres at low tide, in only knee-deep water!

We spent the morning exploring the Supralittoral and Eulittoral zones, collecting different mollusc shells and identifying each one of them after studying their physical characteristics, albeit with assistance from Prof. Kale and a reference book. After some hard work, we managed to identify over 30 varieties, like Top shell, Whelk, Cowrie, Triton, Conch, Cone and Button shell. Molluscs are soft-bodied animals that build a hard shell of calcium carbonate around their bodies to protect themselves from predators. The shell attracts hobby collectors, some of who collect it while the mollusc is still living in it, which is a reason for threat.

As we ventured on, we came across rocks covered with Basket shells and Nerite shells – some of which are edible. On taking a closer look at the rock pools, we found our first living marine organisms – a good beginning at last. We found gobies and shrimps, which were well camouflaged in the dark sandy background.

Next, we came across a dead fish that had just been discovered by Basket shells (*Nassarius ornatus*) that were rushing in droves for the feast. In a span of a few minutes, they were upon the dead fish and had started their meal. They would have just a few hours before the next high tide washed away their food. Basket shells use their sharp tongues, called radula, to dig into their prey. Primarily omnivorous, they also feed on other shellfish such as mussels. They secrete digestive enzymes inside the prey's shell to break the soft body down into a 'soup' which can be sucked out. Basket shells come in a wide range of colours, stripes. The thickness of the shell varies; it tends to be thicker on shores with surf.

The next visual treat that the wet sand had in store for us was an assortment of shore crabs. Crabs, as you know, are crustaceans. They are found in all zones of the shoreline, to great depths. Most crabs

Droves of Basket shells *Nassarius ornatus* feeding on a dead fish at low tide. These are common marine gastropods and are primarily omnivorous

A Hermit crab has to often look for a larger shell when it has outgrown its old shell and is very vulnerable to attack by predators at this stage

have equal-sized chelae (claws), unless one is broken off and is re-growing. Males usually have much larger chelae than the females of the same species. Crabs are omnivores, they feed primarily on algae and other food, including molluscs, worms, other crustaceans, fungi, bacteria and detritus, depending on their availability and the crab species. They also scavenge on decaying plant and animal matter, and use their strong mouthparts to smash their food into smaller pieces. The Hermit Crab should be given the first prize for adaptation, as most Hermit Crabs salvage empty seashells to shelter and protect their soft abdomens, from which they derive the name "hermit".

A goby and a shrimp – a common crustacean, camouflaged in the sand

As we continued along the shore, we saw colonies of Sea Anemones. scouting with their tentacles for prey. Though capable of slow movements, sea anemones usually attach themselves to rocks. Sea anemones are armed with tentacles that defend it, and also help capture prey. Tentacles carry nematocysts (stinging cells) that possess powerful toxins, which are used to paralyse the prey. When a food particle is detected, the tentacles reach out to trap it and send it to its mouth. Once the food is consumed, it is digested and the remains are ejected through the mouth.

Elated with our findings of the morning's trek, we returned to our base camp for a much needed lunch. The typical Konkani lunch was served on a large table in the open garden, and tasted like a home-cooked meal.

Later in the afternoon, we walked up to the local fishing village to meet and interact with the local fishermen. It was a pleasant stroll along the meandering village road, with houses and *wadis* (traditional farm houses surrounded with local fruit, medicinal trees and herbs) on both sides of the road. We came across locals collecting dry firewood to cook their meals and perhaps to sell the excess at a price to earn some revenue for the house. A little girl accompanying her mother and grandmother on this mission was no more than 8 or 9 years old, and was happily carrying her share of the load. She reminded me of my own children, Akshay and Maanasi, who are about the same age as her, but there was a striking contrast in their way of life.

As we proceeded along the road, there was plenty of vegetation on both sides; the blooming flowers attracted a variety of insects, including butterflies that lured the photographers in the group, who lingered on at each spot, like bees on a fresh flower. Roopa, the group coordinator, had a tough time rounding-up everybody during the walk.

Male Striped Tigers and Common Crows flock on plants like Crotalaria for essential alkaloids

Clusters of Bracket Fungi growing on dead wood also managed to catch our attention. The unique juxtaposition with other fungi, against the different backgrounds that ranged from lush green grass, to soft brown soil, to dark rocky floor was like a piece of art. No matter how often one has seen them, they never fail to attract attention the next time.

As we moved on, Ketki spotted a male garden *Calotes* perched proudly in the bushes; he was enjoying the fading sunshine. With his golden hued head and tail, and silver body, he appeared like a dragon in a fairy tale; the magic had been created by his moulting skin that gave him a two-coloured appearance.

We reached the fishing village late in the evening and contacted some villagers. The next morning we headed for the jetty for a dialogue and to observe the fishing activity.

Blue Crotolaria flowers in bloom, enticing butterflies and other insects

The Common Garden Lizard (*Calotes versicolor*) (seen moulting in this picture) is an agile climber. It feeds largely on insects, and at times smaller lizards.

The fishing boats were returning at intervals of a few minutes, the colourful flags and buntings seemed to announce the good catch of the day.

Traders were waiting to buy the fresh catch, after the due customary bargaining. Close by, various kinds of fish were being sun dried for preservation and future consumption. There was the famous Bombay Duck, Tuna, Squid, and also other lesser-known varieties. Our interaction with the fishermen taught us that duties in a fishing village are quite organized and well distributed among all family members. The younger men venture out to sea with the boats, while older ones take on the mending of nets. The womenfolk manage the selling and drying activities, and like to convert their savings into gold jewellery.

Earlier in the morning, we had walked through the beach up to the village. The entire stretch of the beach, where the sand met the vegetation, was covered with flowering plants that had attracted hundreds of Common Crow and Striped Tiger butterflies. Oblivious to our presence, they were busy enjoying the morning sun and nectar. It was the most rewarding butterfly watching experience. Never before had I seen butterflies in such large numbers!

Further ahead, we saw a snake, a moth and a locust. The snake was about a metre in length, its grayish brown colour was the perfect camouflage for a sandy background. We later identified it to be a Glossy Marsh Snake.

After lunch on the second day, we headed for Alibag, *c.* 12 km away, a very popular getaway for Mumbaikars. We had timed our visit to coincide with the low tide, so that we could walk through the sea to the Kulaba fort located in the sea. Chhattrapati Shivaji's naval Commander Kanoji Angre had built this fort in 1668, on a rocky island about 1 km from the coast. All that remains of

A Glossy Marsh Snake (*Gerarda prevostiana*) on the beach, close to the sea

Myriad shades of orange and blue paint the sky when dusk falls over the fishing village at Kihim

this fort is the outer wall. Tourists frequent this island for the adventure of walking through the sea. We waded through knee-deep water on clean sand that had tiny ridges formed by the waves. The island is level, with a rocky terrain, about the size of a cricket ground. Besides the usual mudskippers, we also saw hermit crabs, shells, and oysters. Many rocks were covered with barnacles; we were surprised to find them growing on mangrove stems as well.

All over the island, there were large pools of water left behind by the receding tide, and were brimming with many forms of marine life. What looked like an ordinary rock in water was a microcosm, a sanctuary for marine organisms. Prof. Kale turned over one such rock that had a thick growth of pink coloured sponge. Another rock showed up *Spirorbis* (the tortuous tubes) and spat or recently settled larvae, probably of oysters that needed a magnifying glass to be seen clearly.

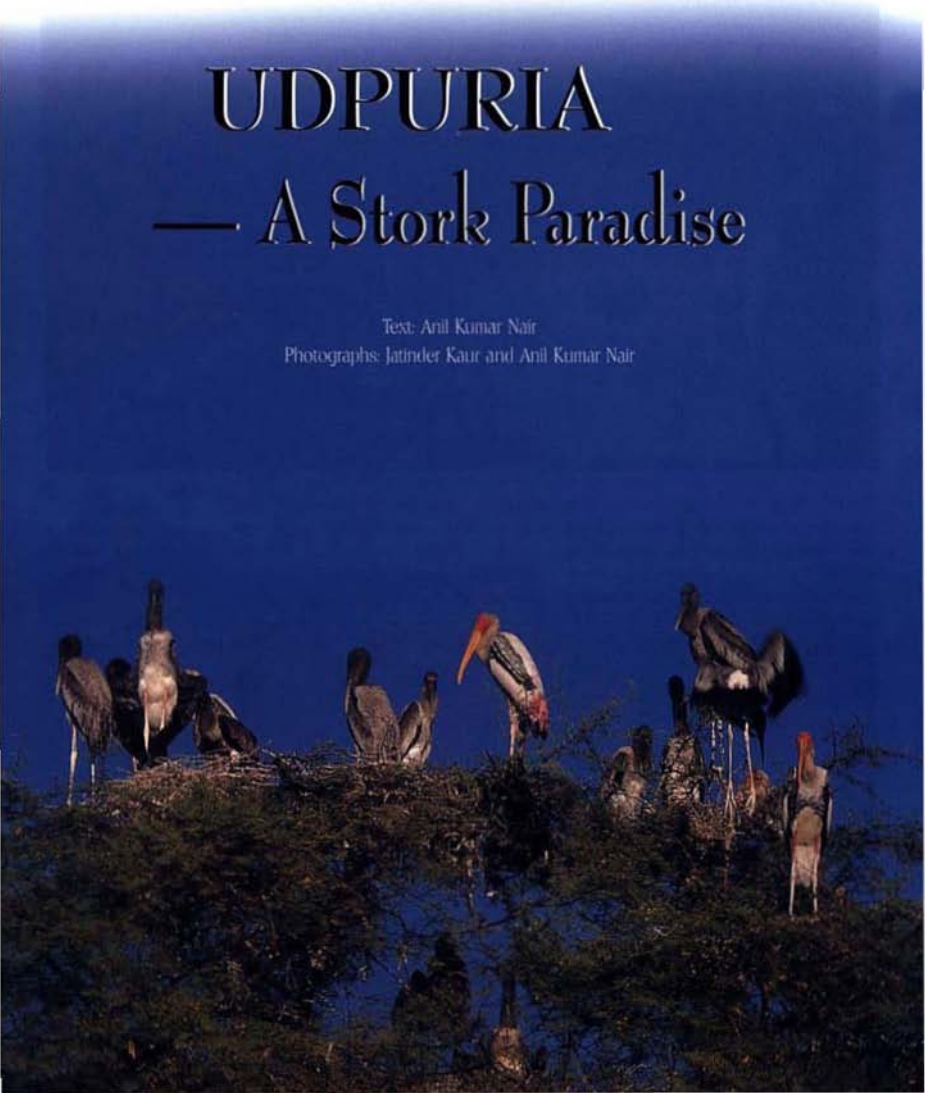
Karen found a mangrove plant with nylon entangled all over it. Being an avid naturalist, she promptly took out a pair of scissors and painstakingly rid the plant of its unwanted garbage.

We had four hours to head back to the coast before the tide came in again. Back on the beach, our last walk of the trip, the experts in the group had already started locating and identifying the gastropod shells with a satisfactory nod of approval from Prof. Kale. It was a job well done by a teacher and his students, and a trip that ended well. ■

Sanjay Marathe is a commercial photographer, and also teaches in colleges. He is currently pursuing travel and nature photography and is a regular contributor to travel magazines. Besides volunteering for activities at the BNHS-CEC, Mumbai, he conducts activities of the eco-club at IES's Manik Vidyamandir, Mumbai.

UDPURIA — A Stork Paradise

Text: Anil Kumar Nair
Photographs: Jatinder Kaur and Anil Kumar Nair



It was a cold winter morning of January 1997, when the beautiful sight at the Udpuria village pond greeted us. The trees at the pond were pink with more than 250 young and adult Painted Storks, including *c.* 70 nesting pairs on *Acacia* spp., *Tamrindus indica*, *Ficus bengalensis*, *Ficus religiosa* and *Azadirachta indica*. Besides storks the pond was inhabited by the Lesser Whistling-Duck, Common Coot, Purple Moorhen, White-breasted Waterhen, Cotton Teal, Common Teal, Northern Pintail, Northern Shoveller, Eurasian Wigeon and Spot-billed Duck. According to the villagers, the Painted Storks had started colonizing this place about three years back and returned regularly around the third week of August to breed. During May, we saw a pair of Black Ibis nesting and raising two chicks to adulthood.

Udpuria is about 10 km from River Chambal, and 28 km from Kota district. The pond has a spread of about 2 ha and is filled with canal water, whenever the water level goes down and the canal is operative. Therefore, a section of the pond is always covered with water hyacinth, boosting the breeding of jacanas, waterhens and moorhens.

During the summer of 1997 almost 90% of the pond was covered with water hyacinth. The storks arrived on time, but only 28 nests were built, probably due to paucity of food. The chicks and juveniles were later attacked by bees when a hive on one of the nesting tress was accidentally disturbed by the villagers! Twelve chicks and twenty-three subadults were found dead up to 200 m from the colony.

In 1998, Udpuria had twenty nine pairs nesting, but most left for unknown reasons leaving only seven pairs to raise their family. The pond was completely covered with water hyacinth during the summer of 1999. Hadoti Naturalist Society – a local NGO took up the onus of removing the water hyacinth with active support of the villagers, who were finding it difficult to use the tank water for domestic needs.

By July 1999, the pond had attained its past glory. This time besides 250 Painted Storks, the pond had a new visitor – a Black-necked Stork. In 2000, a pair of Black-necked Storks visited the pond; 2001 had three storks and a pair attempted to nest, but gave up later after a fight for the right place and nesting material with Painted Storks. One day they may finally raise a family here?

Does nature need national parks, protected areas or laws to survive? I think all it needs is a little support from us humans! ■

A local NGO took the onus of clearing the pond choked with water hyacinth

Anil K. Nair is a member of the BNHS and an Executive Member of the Hadothi Naturalists Society, Kota. A naturalist, he has been working in southeast Rajasthan for the last twelve years.

All that nature seeks from man is a little support

Just to Save Vultures

Some volunteers from the Nature Club of Surat recently observed vultures trying to feed on six buffalo carcasses.

The buffalos had died after drinking water poisoned by industrial waste at Hazira. The volunteers reached the site early in the morning and saw around eight vultures flying over the dead buffalos. They decided to bury the carcasses to prevent the vultures from eating them. About an hour later, 200 vultures had gathered around the carcasses making it difficult to remove them.

The volunteers had to finally arrange for an excavator to remove the dead bodies. A strange situation, as they were forced to keep the hungry vultures away from their food just to save them!

Snehal, Nirmala and
Mukesh Bhatt
Surat

We can also swim

Worm snakes (*Ramphotyphlops braminus*) are well adapted to live underground, but I have watched

them swim too. Many worm snakes frequently fall in the water tank at my house. These incidents increase during monsoon.

On June 2002, I observed a long worm snake (*c.* 100 mm) swim continuously for more than 2 hours in the water tank. It swam powerfully for about an hour and a half with lateral undulations and its head well above the water surface; just like a Checkered Keel back (*Xenochrophis piscator*). It kept coming to the wall of the tank, probably to get out of the water. It remained suspended on the water surface for about 20 minutes with the head anchored to the wall. Finally, it stopped swimming and floated for a while with its head above a firmly coiled body.

On April 19, 2003 I saw another worm snake (*c.*145 mm) floating on the water for about 30 minutes and the body of this worm snake too was tightly coiled. I presumed it to be dead, but when rescued it showed vigorous movements. Worm snakes may not dive into water like sea snakes, but when required can swim like one

Vikas Upadhyay
Indore

Troubles of Kite festival

Makar Sankranti and the Kite festival – a festival that coincides with it – is a joyous festival for some but agony for others. It is not surprising to witness entangled birds on trees post Makar Sankranti. Most birds eventually suffer grave wounds. This year too I had seen two birds entangled in strings and suffering. I called the fire brigade Officers who finally rescued them.

I too enjoy celebrating the festival of kites, but strongly feel an urgent need to lay down some laws to stop activities that harm the flora and fauna around us. The sight of the trees after January 14 every year is a sad sight. When will man learn to coexist in harmony with nature?

Dhruv Mehta
Mumbai

We are grateful to

MR. UKAMRAJ NAHAR

for a generous donation of Rs. 10 lakhs for the BNHS Bird Banding Centre at Point Calimere. A senior Chartered Accountant, Mr. Nahar is a life member of the Society for over two decades and his interests include travelling, wildlife and nature conservation.

A Trustee of the 'Rotary Trust for the handicapped', he runs a centre 'AASHA' to provide calipers and artificial limbs to Polio affected children.

Birds and People: The New Relationship

Text: Neema Pathak and Ashish Kothari

Neema Pathak and Ashish Kothari are members of Kalpavriksh-Environment and Action Group

In our last article, we described traditional conservation of birds as continuing into present times. In this follow up article, we shall talk about some more initiatives taken by communities to conserve bird habitats and populations. Though we focus here only on efforts specific to birds, it should be noted that the more general ecosystem conservation efforts of communities also help in bird conservation.

Where, how and what do people protect?

Many bird habitats and populations have recently been converted to Community Conserved Areas (CCAs). Wetlands are more common amongst them. At the edge of Chilika lagoon, an IBA in Orissa, for instance, the village Mangalajodi witnessed a remarkable turn-around in the last decade or so. From a settlement, where nearly everyone hunted birds, to one where

ASHISH KOTHARI

Birds flock to the Mangalajodi wetland, unmindful of villagers carrying about their business

everyone zealously protects them has been a remarkable journey (*Hornbill* Jan-Mar, 2006). In the winter of 2005-2006, several hundred thousand waterbirds and waders were noticed in the wetland around Mangalajodi. Two ex-hunters, who rowed us through the marshes, proudly gave us names of birds in English and Oriya, and explained their motivation for protecting the birds. A part of it was ethical (they had earlier sworn by the Chilika lake deity, Maa Kalijai, not to harm nature), a part of it was pride in being able to harbour such a spectacular assemblage of birds, and a part was the hope that visiting bird watchers would bring some income their way. Mangalajodi's villagers, Wild Orissa (an NGO), and the Orissa Forest Department are now trying to see if this initiative could spread to neighbouring villages, to help spread a ring of protection around Chilika.

Forests in the Khonoma Nature Conservation and Tragopan Sanctuary, Nagaland, protected by villagers

ASHISH KOTHARI

Though, perhaps not as remarkable in terms of bird numbers and diversity, there are a number of other waterbodies that have come under recent protection by communities. In 1994, villagers of Udpuria (near Kota in Rajasthan) noticed the influx of Painted Storks in their two-hectare wetland. Subsequently, some bird watchers noticed the congregation, and also that water hyacinth was beginning to threaten the wetland. They convinced the villagers to take action on this. Through the participation of the entire settlement and a local NGO, Hadothi Naturalist's Society, the water hyacinth was cleared and villagers started actively protecting the storks. Some 250 storks were counted in later years, with several dozen able to nest. Villagers have also done some plantation along the wetland, to provide greater nesting sites. Other waterbirds have also benefited, including Black-necked Storks, several species of ducks, waders and peafowl.

At Kallagadu village, Karnataka, people experienced a strange phenomenon in 1999. Hundreds of Painted Storks arrived and started building nests on privately owned as well as government owned tamarind trees. A local farmer, who was aware of the threatened status of migratory birds, called upon the villagers to do their best to protect these unusual guests. Subsequently an NGO, Wildlife Nature Club, also got involved. Many villagers have even abandoned the sale of tamarind from the nesting trees, and have persuaded the government to do the same for the trees owned by it.

There are also initiatives relating to the habitats of threatened terrestrial birds. Amongst the most interesting is that of Khonoma village in Nagaland. In 1998, this picturesque village decided to stop all hunting (previously rampant) and to declare a part of their territory as the Khonoma Nature Conservation and Tragopan Sanctuary. This extends over about 2,000 ha, but a much larger surrounding area is also protected from all hunting, and from destructive resource uses. The Angami tribals of this village are now discussing with their counterparts in neighbouring villages to see if the CCA could be extended to cover the whole of the Dzuku valley, an enormously critical area for several endemic and threatened species.

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Pauline Rohatgi is an art historian, currently preparing a publication on the collections of British artists in India in the Victoria and Albert Museum, London.
Pheroza Godrej, founder of the Cymroza Art Gallery, Mumbai, has extended her speciality to British artists in India.

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Khonoma is not alone in its efforts. Several dozen other Naga villages have banned hunting or declared forest/wildlife reserves, though most of them are more general habitat conservation initiatives not necessarily aimed at specific bird species or populations. One other that is specifically for birds is Ghoshu Bird Reserve, declared by Gikhiye village in Zunehboto district. This preceded Khonoma by several years. Villagers explained that they had been witnessing here a unique phenomenon of thousands of birds congregating at a salt lick at the foot of the forest, and had decided to stop the earlier practice of hunting in the area.

There is also revival of traditional practices that may have died down. For instance, in Sangti Valley of Arunachal Pradesh, the age-old tolerance of villagers towards Black-necked Cranes was being affected by new practices, such as excessive use of pesticides and fertilizers and noisy picnics. In 1991, after ornithologist Dr. Prakash Gole came upon this site conservation was resumed with the help of the villagers, a local school teacher, the army and the Forest Department.

Emerging threats

Some of the threats that we spoke of in the previous article, relevant to traditional bird conservation, are also faced by the new initiatives. There is at times conflict with neighbouring villages or hunting communities, who come to hunt birds, steal eggs, or carry out unsustainable commercial fishing. A number of bird CCAs are affected by the increasing use of pesticides and chemical fertilizers in agriculture and effluents from industries. Many are threatened by insensitive 'development' activities imposed by the government or by private corporations, including mining, dams, and industries. Tourism, unless well regulated from the start, could cause disturbance.

What can be done?

As in the case of traditional bird conservation, new initiatives also need urgent attention if they are to continue to flourish. They need more documentation, which includes their wildlife and socio-economic values. Local people, especially the youth, could do with some inputs of modern science to supplement the traditional knowledge their elders can give them. Awareness needs to be raised in adjacent urban areas (e.g. in Bhubaneshwar relating to Mangalajodi), so that town dwellers can appreciate the efforts of communities and extend a supporting hand through sensitive community-based bird tourism. Facilitating activities by NGOs and officials need to be encouraged.

ANIL KUMAR RAJIR

Local participation has benefited a number of bird species like the Painted Stork at Udpuria village

Finally, all these initiatives need appropriate legal backing, which could safeguard them against external threats. This is unfortunately not available in the Wildlife Act 2003, since the category of 'Community Reserve' applies only to private or community lands, whereas most CCAs are on government land (other than those in states like Nagaland). The use of the Village Forest category in the Forest Act 1927, the environmentally sensitive areas designation under the Environment Protection Act, Biodiversity Heritage Sites under the Biological Diversity Act (though this is yet to be defined), and others under various state laws, needs to be explored.

Most of all, the country's conservation organizations need to recognize that community conservation of birds and bird habitats is a growing phenomenon, and we must concentrate on it as much as we focus on government managed protected areas. ■

Conserving Marine Turtles of India

Compiled by: Rushikesh Chavan, Conservation Officer, BNHS

DEEPAK APTE/SIKANDER HUSSAIN

Sea turtles represent a group of fascinating marine reptiles that evolved during the Upper Triassic and Jurassic period. During the Cretaceous period they were widely distributed across all the oceans. Ever since their evolution, sea turtles have undergone very little morphological change, and most species still continue to survive.

Five species of sea turtles are found along the Indian coastal waters – Leatherback, Green, Loggerhead, Hawksbill and Olive Ridley. Except for the Loggerhead turtles, all others nest along the Indian coastline.

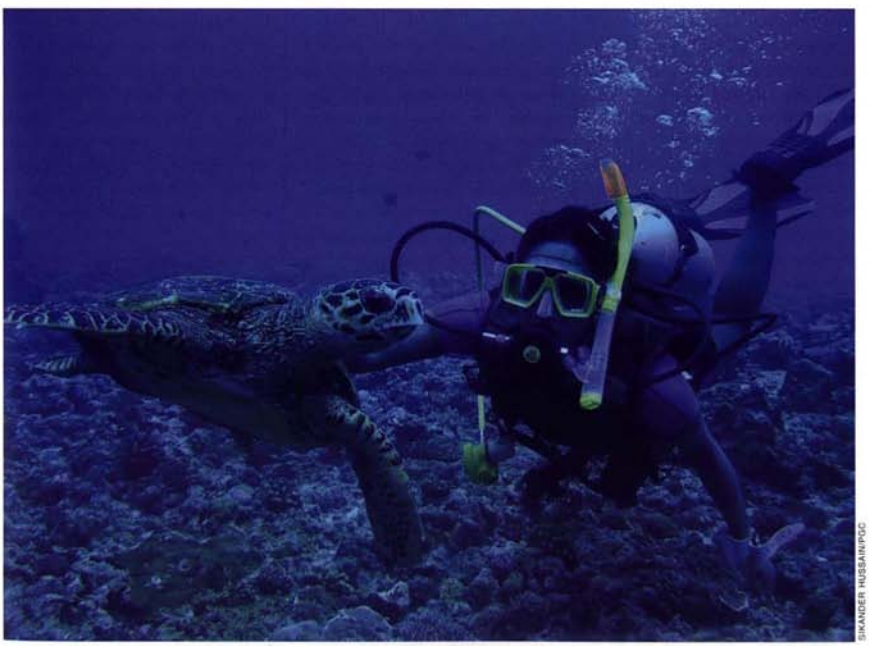
Arribada of Ridleys

Among sea turtles, only the Olive Ridley *Lepidochelys olivacea* and Kemp's Ridley *L. kempii* form reproductive aggregations, a phenomenon popularly known as arribada. At present, there are only six such mass nesting beaches in the world, two are located in the Pacific coast of Costa Rica, one in Mexico and three in Orissa. The world's largest known sea turtle mass nesting beach is located at Gahirmatha along the northern Orissa coast. India's second largest mass nesting beach is located at the mouth of River Rushikulya, along the southern Orissa coast. Besides the Gahirmatha and Rushikulya rookeries, mass nesting of ridleys also occurs near the mouth of River Devi, 100 km south of Gahirmatha. An estimated 300,000 Olive Ridleys nest at these rookeries along the Orissa coast, which is a significant proportion of the world's sea turtle population.

Studies on sea turtles in India have been restricted mainly to the east coast, and very little information is available of the population on the west coast. There are two known studies along the west coast, one a Wildlife Institute of India study in Gujarat. The second, a joint study between BNHS, Sahyadri Nisarga Mitra (SNM), and Green Cross in Maharashtra and Goa, which was essentially to monitor the nesting sites of sea turtles, discover potential nesting sites, and assess the treats to sea turtles.

Lakshadweep

Climate change and rise in sea level is inevitable. Intrusion of sea water



SIKANDER HUSSAIN/PGC

Coral reefs of Lakshadweep are ideal habitats for the Hawksbill turtles

BIVASH PANDAV

Thoughtless plantations of *Casaurina* on beaches have significantly reduced turtle nesting areas in Orissa

and its ecological consequences can no longer be ignored. However, addressing of issues arising out of such circumstances varies from government to government, from place to place and from individual to individual.

The first and most significant casualty of such an eventuality will be the sea turtles.

At Lakshadweep, all inhabited islands are being cordoned by millions of tetrapods that are directly restricting access of sea turtles to nesting beaches. It is not surprising then that sea turtle nesting on these inhabited islands is declining continuously (our personal information on nesting activity and that of earlier work of Wildlife Institute of India, together estimates the decline to almost 60-70%). Recent information indictaes that the tetrapods are also proposed to be put along the uninhabited islands of Lakshadweep, such as Suheli and Tinnakara. Together Suheli and Tinnakara are among the largest nesting beaches for the Green and Hawksbill turtles in India. It is then needless to say that the consequences will be catastrophic. This is all the more significant especially for Hawksbill, since Lakshadweep is the second largest nesting area for this species after Andaman and Nicobar.

One cannot deny that shoreline protection and human lives are paramount. However, it's time to come together and think of better structures and technology that can perform the task of both, protection of shoreline and property, as well as biodiversity.

Sea turtles are the symbols of climate change implications on biodiversity. They are the immediate victims of our response to counter the issue of sea erosion, when ironically sand mining, the key for shoreline stability, still goes unabated in many places. Without adequate shore sand even tetrapods will prove ineffective to protect shoreline.

The real challenge is to work together, first to find whether tetrapods are really best structures to protect shoreline specially in open oceanic islands like Lakshadweep? Second, can we design other alternatives that do not affect turtle movement to nesting beaches?

Threats to the Sea Turtles in India

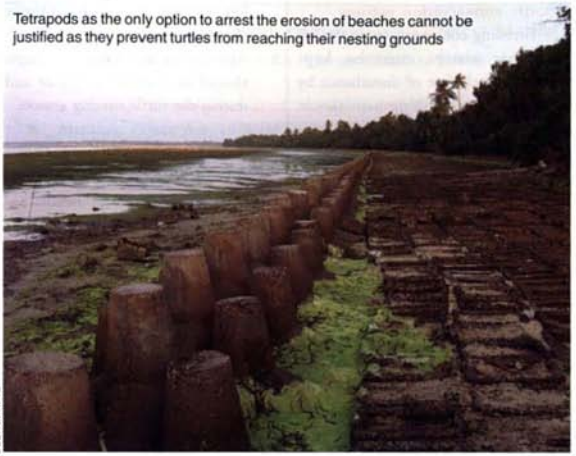
1. **Alteration of nesting habitat by anthropogenic activities**

a. *Plantation at nesting sites*: The root growth and litter fall of plantation on nesting beaches changes the beach topography and reduces the available space for turtles to nest.

b. *Construction activities*: Roads, hotels and aquaculture ponds near a nesting beach, alter the beach topography and surrounding areas.

BIVASH PANDAV

Millions of eggs get washed off every year due to coastal erosion at Orissa


Tetrapods as the only option to arrest the erosion of beaches cannot be justified as they prevent turtles from reaching their nesting grounds

DEEPAK APTE

c. *Artificial illumination*: Adult sea turtles and hatchlings are extremely sensitive to any kind of artificial illumination as it disorients them. In the presence of artificial lights, hatchlings after emerging from their nests tend to move towards the source of light instead of their normal journey towards the sea. As a result, large numbers of hatchlings remain stranded on the beach during the day time, and get predated on or die because of heat generated from the beach sand and solar radiation.

2. **Sand mining**: Beach sand is extremely crucial for survival of sea turtles, since it acts as the incubation chamber for sea turtle eggs. Mining of beach sand for rare earths or for construction directly alters the nesting habitat of sea turtles. This practice is prevalent along parts of northern Andhra.

3. **Beach armouring**: Huge concrete structures or tetrapods are put along the coast to prevent beach erosion. However, these structures completely restrict the access of sea turtles to a nesting beach. This practice is prevalent in many states and along parts of northern Andhra Pradesh.

4. **Incidental catch in fishing nets**: Incidental capture of sea turtles during off shore fishing operations have been identified as one of the major problems that threatens the survival of sea turtles. Mechanised fishing activities and specifically shrimp trawling has been the cause of death of several thousand sea turtles worldwide. In Orissa alone, more than 47,000 dead adult Olive Ridleys have been recorded between 1994 and 1999. Most of these deaths are due to illegal near shore fishing activities.

5) **Exploitation for meat and eggs**: Uncontrolled exploitation of adult females from the nesting ground, as well as over harvesting of eggs from nesting beaches has exterminated many Green Turtle colonies in Central American and southeast Asian countries. The best example is that of the Kemp's Ridley Turtle. Uncontrolled exploitation of adult females coupled with over harvesting of


BIVASH PANDAV

Until Turtle Excluder Devices are adopted such scenes will remain a common sight


JAFER HISHAM

Killing of turtles for meat, fat and eggs is a major threat to the surviving turtle population

eggs, and large scale mortality in fishing nets reduced its population from an estimated 40,000 in 1967 to less than 500 in just three decades. It is now the world's most endangered sea turtle.

6) **Reef Poisoning**: During the surveys carried at the Gulf of Kutch by BNHS it was observed that some turtles were unable to swim or sink. Investigations revealed that a few fishermen spread pesticide (mostly organochlorine) on the exposed reef or sand bars during the beginning of the low tide to catch fish. Once affected by the poison, according to local fisherfolks, turtles are unable to sink and either drift to the shore where dogs and jackals kill them or get smashed on rocks with strong waves. On examination, these turtles undoubtedly showed symptoms (drooping eyelids and loss of ability to sink) of poisoning. Further studies on blood and tissue analysis are required to confirm the cause of affect or death.

Some features of the Central Empowered Committee's interim order to protect Olive Ridley turtles in Orissa

1. Forest Department should establish permanent camps for protection of turtles at Devi and Rushikulaya river mouths.
2. The Fisheries Department should suspend licences of boats not using the TEDs.
3. Coast Guard at Paradeep should be notified as Authorised Officer under the Orissa Marine Fishing Regulation Act, 1984.
4. Within 5 km of the entire coastline, traditional non-motorized gill-net vessels should use only small-mesh, monofilament nets up to 300 m long.

Priority conservation actions

1. Breeding congregations in the off shore waters must be kept completely free of disturbance by ensuring no fishing activities in such areas.
2. Turtle Excluder Devices along the Indian coast will minimise turtle mortality due to trapping and drowning in fishing nets.
3. Nesting beaches must remain disturbance free during the nesting, incubation period and hatching season. Activities such as plantation of vegetation on the beach, sand mining and beach armouring should be completely avoided at important turtle nesting beaches.
4. As far as possible, artificial illumination near turtle nesting beaches should be avoided during the breeding and hatching season. Under unavoidable circumstances, low pressure sodium vapour lamps should be used.
5. Appropriate awareness campaigns should be conducted before and during the turtle nesting season.

Sahyadri Nisarga Mitra

Sahyadri Nisarga Mitra, an NGO based at Chiplun, Ratnagiri district has started a conservation movement for sea turtles along the coast of Maharashtra. SNM has been organizing awareness campaigns in villages where sea turtle nesting is reported, they have also started protection of sea turtle nests in several beaches all along the coast of Maharashtra. So far, they have successfully protected more than 100 nests and released more than 5,000 hatchlings.

SNM has instituted an award for turtle conservation called as 'Kasav

'Save the Sea Turtle'

Bombay Natural History Society's year long campaign 'Save the Sea Turtles' is presently underway at Lakshadweep. The primary focus of the campaign is to

1. Create awareness among students, teachers and the general public on 'sea turtle conservation' through audio-visuals, competitions, projects, hand outs, campaigns, open air interpretation centers, and field visits.

2. Develop a team of volunteers from the local community to undertake beach and nest protection measures.

As part of the campaign a painting competition was successfully held at Agatti and Kavaratti islands to celebrate World Environment Day this year. The theme for the competition was Save Sea Turtles'. 279 students participated in the programme.

IGHEES BABU

Some Regulations to Protect Marine Turtles

The legislation provides a two-fold protection to marine turtles: to the species and to its habitat.

Laws relating to conservation of marine areas

- Maritime Zones Act, 1976 (MZA) – Apart from differentiating into Exclusive Economic Zone, Continental Shelf, etc. the Republic of India has exclusive jurisdiction to preserve and protect the marine environment, including prevention and control of marine pollution.
- Environment Protection Act, 1986 (EPA) – it's an umbrella legislation that empowers the Central government to take all necessary measures for protection and improving the quality of the environment.
- Costal Regulation Zone Notification, 1991 (CRZ) – this notification prohibits as well as regulates the setting up/or expansion of industries in pre-designated CRZ zones. It has various degrees of protection to each of the zone.

Laws and Conventions protecting marine turtles

- Wildlife (Protection) Act, 1972 (WLPA) – The highest protection to marine turtles is provided by WLPA. All species of marine turtles found in India are included in Schedule I, which means that they are accorded the highest degree of protection. Hunting, which includes damaging or destroying, the eggs/ nests, possession of eggs, hatchlings, adults is strictly prohibited and entails maximum penalties, including imprisonment.
- Biodiversity Act, 2000 – it seeks to 'provide for conservation of biological diversity, sustainable use of its components and equitable sharing of benefits' arising thereform.
- Convention on International Trade in Endangered Species of wild fauna and flora (CITES) – it explicitly recognizes that 'international cooperation is essential for the protection of certain species of wild fauna and flora against exploitation through international trade. The contracting parties (which India is) are required to take appropriate measures, including provisions for penalty and confiscation, to prohibit trade in specimen of listed species and to enforce the Convention.

Mitra' (friend of turtle). Kasav Mitra for 2004-05 for his efforts to protect sea turtlesz was Mr. Nandakumar Patil from Velas.

BNHS has in the past provided funds to SNM under its Sálim Ali Nature Conservation Fund to undertake sea turtle conservation in Maharashtra.

SNM still continues its work for turtle conservation throughout Maharashtra and requires generous support and invaluable participation in the form of volunteers. You can volunteer services to protect the sea turtles of Maharashtra. ■

For details contact
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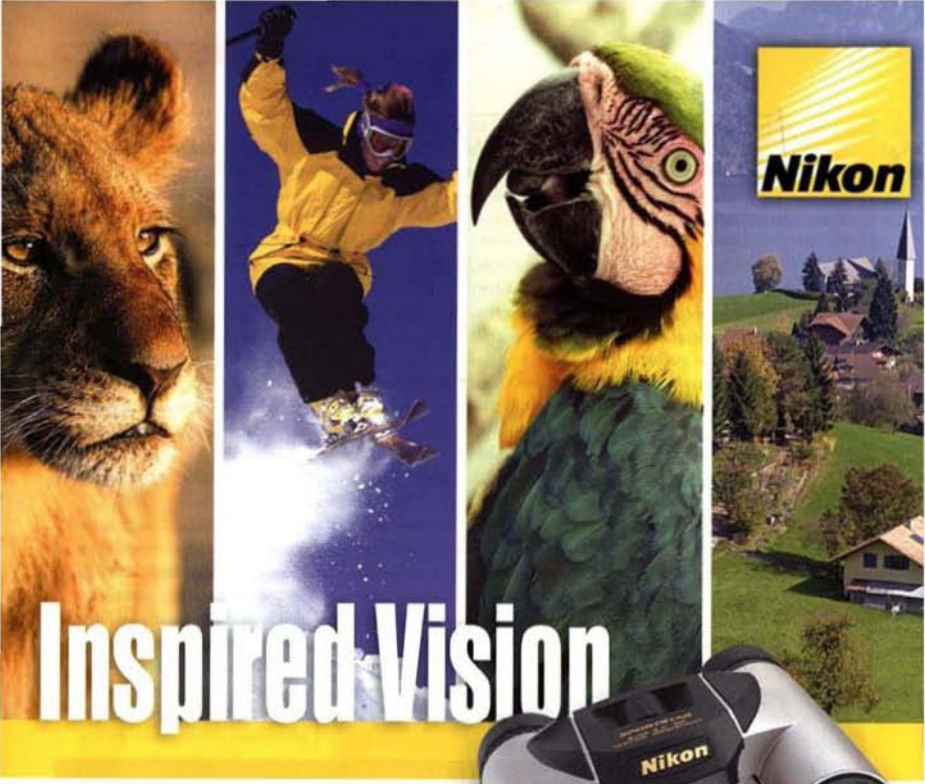
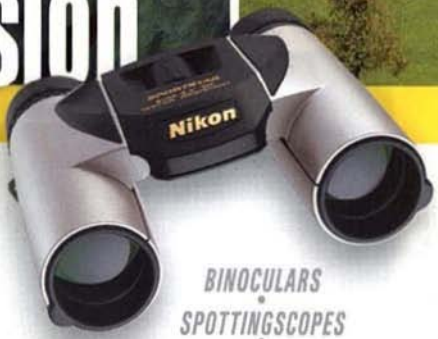
Conservation Officer, BNHS at
rushikesh@bnhs.org

IDREES BABU

Only timely action can save the sea turtles





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Wildlife Week 2006

Wildlife Week is celebrated during the first week of October across the country. The BNHS celebrated Wildlife Week in 2006 with three major events.

At Nagpur on October 1, 2006, Mr. Majumdar, Principal Chief Conservator of Forests, Maharashtra released a conservation film by BNHS. The film '*chala nisargat bhramantila*' is conceived and directed by Mr. Sanjay Karkare, Project Officer, Tiger Cell, BNHS. The VCD is available for sale at Hornbill House. For further inquiries, contact Mr. Santosh Mhapsekar at 22821811.

At Mumbai, Smt. Noorjehan, Sr. Post Master General, Maharashtra & Goa, released a series of postal stamps on four endangered birds of India and inaugurated the exhibition 'Butterflies of India' on October 5, 2006, at Hornbill House. She said, "It's a pleasure to release the stamps here at the Society. I would be happy if the Postal Department of India helps the Society to spread the message of bird conservation to thousands through a series of postal stamps."

Ms. Shubhangi Gokhale, famous theatre performer, a BNHS Life Member and brand ambassador for the BNHS butterfly programmes said at this occasion, 'I wanted to give my daughter a long lasting gift for her birthday. I chose to gift her a breakfast with butterflies. It was an amazing way of introducing her to nature.'

The exhibition on 'Butterflies of India' was open to public from October 5 to October 9, 2006. Over 1,500 people, including students, visited the exhibition. ■

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Above: (L-R) J.C. Daniel, Honorary Secretary, BNHS, Pheroza Godrej, Vice President, BNHS, Ms. Noorjehan, Sr. Post Master General, Maharashtra & Goa, Shubhangi Gokhale, and Dr. A.R. Rahmani, Director, BNHS releasing a series of postal stamps on the endangered birds of India.
Below: Mr. N. Chaturvedi, Curator, BNHS, guided Ms. Noorjehan through the butterfly exhibits from the BNHS Collection

Breakfast with Butterflies

This was the third year of a fun-filled environmental event designed to create awareness about the butterfly diversity of Mumbai. This event was conducted at the Conservation Education Centre-Mumbai on October 29, 2006. Over 150 participants attended and enjoyed the activities held during the event. ■


GOPI NAIDU

Learning about Reptiles and Amphibians

Nature Information Centre, Sanjay Gandhi National Park (SGNP), Borivli organized an event 'Herpetofauna of SGNP' on September 10, 2006. Mr. Varad Giri led a nature trail, followed by a slide show. Over 50 people attended the programme.

ARVIND CHUDASAMA

The experts had undivided attention of all the participants

The Sanjay Gandhi National Park (SGNP) has approximately 12 species of amphibians which include frogs, toads and the lesser known caecilians, and 45 species of reptiles which include the snakes, crocodiles, lizards, geckos, skinks and fresh water turtles. ■

Symposium at BNHS

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Dr. A.D. Sawant, Pro-Vice Chancellor, University of Mumbai addressed a gathering during the symposium

As part of the University of Mumbai's sesquicentennial celebration, the Bombay Natural History Society, with sponsorship from University of Mumbai, organized a one-day symposium – 'Biodiversity of India' on September 25, 2006. The symposium was inaugurated by Dr. A.D. Sawant, Pro-Vice Chancellor, University of Mumbai. Dr. Sawant appreciated the research and conservation work that the BNHS has done since its inception.

Twenty two lecturers from the Zoology, Life Sciences, and Environmental Biology departments of University of Mumbai attended the symposium that covered a wide variety of topics. ■

NIC Volunteer Training Programme

Nature Information Centre (NIC), SGNP, Mumbai conducted a 'Volunteer Training Programme' on October 7 and 8, 2006. The two-day, non-residential programme aimed at training people who could later assist in the dissemination of environment education, with special focus on conducting nature trails for groups visiting the NIC.

The programme was concluded with the valedictory function. Dr. P.N. Munde, Conservator of Forests & Director, SGNP graced the occasion. ■

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BNHS volunteers are the strength of educational programmes organized by the Society

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