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CBD-COP 11 SPECIAL

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July-September, 2012

Published and printed quarterly by Mrs. Sumaira Abdulali for the Bombay Natural History Society, Printed at Stusa Mudra Pvt. Ltd., Lower Parel, Mumbai.
Reg. No. RN 35749/79, ISSN 0441-2370.

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BNHS Presence Across India

Convention on Biological Diversity

A meeting of the Conference of the Parties (COP) of the Convention on Biological Diversity (CBD) of United Nations, held at Nagoya city in the Prefecture of Aichi, Japan, in October 2010, adopted a resolution titled Aichi Targets 2020 for the conservation of the world's biodiversity. As the largest and oldest conservation NGO in India, the BNHS is playing an important role in achieving Aichi Targets. In order to properly understand the Convention on Biological Diversity, Conference of the Parties (COP) and Biodiversity Strategy and Action Plan (BSAP), we bring to you a special issue of *Hornbill*.

Despite limited funds and resources, we have played a major role in protecting species and their habitats for more than six decades. For almost 40 years after India's Independence, BNHS was the only NGO working for wildlife conservation, and many leading initiatives in India were started by the Society. It is heartening to see that now we have numerous active NGOs and government institutions working in this field. Our work is complementary and much more can be achieved if we all come together. Conservation has now become a very complex issue and it may not be possible for one organisation to tackle all the dimensions of a conservation problem. These days conservation is not just collecting good scientific data on a species or a habitat and giving recommendations, and hoping that these recommendations will be accepted by the Government. These days, conservation means involving communities, regular monitoring, advocacy, implementation of policies, and capacity building of managers and bureaucrats.

In this issue of *Hornbill*, we have included a brief description of CBD-COP and Aichi Targets, and articles on advocacy, conservation education and research and the publication work of the BNHS. Our major strength lies in species and habitat studies, which is dealt in detail. With an illustrious history of 129 years, obviously, we could not describe all our work in detail. We briefly describe BNHS's work on species and habitats during the last 20 years in short articles. Even this was so much that we could not include all our projects and programmes – only representative ones are included.

There is never enough in conservation. In order to achieve Aichi Targets 2020 of the Convention on Biological Diversity, and zero extinction aim of BNHS, we have a huge task ahead. We need to build our own capacity to take up more initiatives and tackle complex conservation issues. We have to network with other organisations that are doing similar and related work. We need more human resources and funds to achieve our aim of species and habitat conservation through involvement of local communities and decision-makers. Would anyone listening come forward to help the Society?

Asad R. Rahmani

Aichi Biodiversity Targets

- Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society
- Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use
- Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity
- Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services
- Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building

Strategic Goal A

Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society

- **Target 1**: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

Target 2: By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

Target 3: By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio-economic conditions.

- **Target 4**: By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

Strategic Goal B

Reduce the direct pressures on biodiversity and promote sustainable use

- **Target 5**: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

Target 6: By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

- **Target 7**: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

- **Target 9**: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

Target 10: By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

Strategic Goal C

To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity

- **Target 11**: By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

- **Target 12**: By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

Target 13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

Strategic Goal D

Enhance the benefits to all from biodiversity and ecosystem services

- **Target 14**: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

- **Target 15**: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

Target 16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

Strategic Goal E

Enhance implementation through participatory planning, knowledge management and capacity building

- **Target 17**: By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

Target 18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

- **Target 19**: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

- **Target 20**: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.

● **Aichi Targets being achieved through BNHS activities**

ASAD R. RAHMANI

Conference of the Parties - a brief history

Atul Sathe

Primary Source: www.cbd.int

Rapid industrialisation, urbanisation and 'developmental' activities in the 20th century created a drastic situation where, on the one hand, the GDPs of some nations started rising phenomenally and the perceived quality of life of some sections of the population improved, while on the other hand the natural environment of the planet and the well-being of the masses in poorer nations was severely threatened. The scientific discoveries and rediscoveries of the previous couple of centuries, along with a steady decline of age-old sustainable practices and the spiritual core, led to a situation where greed, limitless consumerism and an attitude of "conquest of nature" became the norm, at the expense of the deep-rooted philosophy of "live and let live". Realising the impending danger of an ecological catastrophe, individuals, organisations, and governments across the globe felt an urgent need to take corrective steps to slow down the damage process and eventually facilitate recovery.

It has now been realised, albeit late, that the Earth's biological resources are vital to economic and social development. There is, therefore, a growing recognition of biological diversity as a global asset for the well-being of the present and future generations. We, however, cannot ignore the fact that destruction of the natural environment continues unabated and the threat to species and ecosystems has never been as great as it is today ... "better late than never".

The Genesis

In November 1988, the United Nations Environment Programme (UNEP) convened the Ad Hoc Working Group of Experts on Biological Diversity to explore the need for an international convention on biological diversity. Thereafter, in May 1989, it established the Ad Hoc Working Group of Technical and Legal Experts to prepare an international legal instrument for the conservation and sustainable use of biological diversity. Their objective was to understand the need to share costs and benefits between developed and developing countries, and ways and means to support innovation by local people.

Subsequently, the Ad Hoc Working Group became known as the Intergovernmental Negotiating Committee and its work culminated in May 1992, when the Nairobi Conference for the Adoption of the Agreed Text of the Convention on Biological Diversity was organised. The Rio Earth Summit in June 1992 initiated the procedure for countries to sign the Convention at the United Nations Conference on Environment and Development. It remained open for signature till June 1993, by which time it had received 168 signatures, from those who came to be known as the Parties. The Convention came into force on December 29, 1993. The first session of the Conference of the Parties (COP) was held in November-December 1994 in Bahamas.

The Convention on Biological Diversity (CBD) was inspired by the growing feeling of need for sustainable development. It was a major step towards conservation of biological diversity, sustainable use of its components, and equitable sharing of benefits arising from the use of genetic resources. The CBD Secretariat is based in Montreal, Canada.

COP Meetings

The Conference of the Parties is the governing body of the Convention. The objectives of COP include adoption of programmes, review of achievement of targets and to provide policy guidance. It advances implementation of the Convention through decisions it takes at periodic meetings of the signatories held every two years, or as per the requirement, to review progress of the implementation of CBD. COP is the backbone of CBD, which in turn provides a global legal framework for action on biodiversity conservation.

Till now COP has had 10 ordinary meetings and one extraordinary meeting. The latter was to adopt the Biosafety Protocol and was held in two parts. From 1994 to 1996, COP held its ordinary meetings annually. Since then these meetings have been held somewhat less frequently. After the change in the rules of procedure in 2000, COP is now organised every two years. Till date, COP has taken a total of 299 procedural and substantive decisions. The 10th meeting of COP was held in Nagoya, Japan, from October 18-29, 2010. The 11th meeting takes place in Hyderabad, India, from October 8-19, 2012.

COP is assisted by a Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), which is made up of government representatives with expertise in relevant fields and observers from non-signatory governments, scientists and other concerned organisations. SBSTTA provides recommendations to COP on the technical aspects of the implementation of the Convention's agenda.

Various other subsidiary bodies have been established by COP to deal with specific issues as and when they arise. These bodies are called Ad Hoc Open-ended Working Groups, since they are established for a limited mandate and a limited period of time. Moreover, they are open for participation to all Parties, as well as observers. The following are the different Working Groups existing at present:

- *Working Group on Access and Benefit-Sharing* (ABS): This is the forum for negotiating an international regime on access and benefit sharing of biological resources.
- *Working Group on Article 8(j)*: This addresses issues pertaining to protection of traditional knowledge.
- *Working Group on Protected Areas*: This is engaged in guiding and monitoring implementation of the programme on protected areas.
- *Working Group on Review of Implementation of the Convention* (WGRI): This group examines implementation of the Convention, including national biodiversity strategies and action plans.
- *Open-ended Ad Hoc Intergovernmental Committee* (ICNP) *for the Nagoya Protocol on ABS*: This group was established as an interim governing body for the Nagoya Protocol until the next meeting of the Parties.

Pre-CBD Meetings

Dates and Venue	Nature of Meeting
May 20-21, 1992, Nairobi, Kenya	Conference for the Adoption of the Convention on Biological Diversity
May 11-19, 1992, Nairobi, Kenya	Seventh Negotiating Session / Fifth Meeting of the Intergovernmental Negotiating Committee for a Convention on Biological Diversity
February 6-15, 1992, Nairobi, Kenya	Sixth Negotiating Session / Fourth Meeting of the Intergovernmental Negotiating Committee for a Convention on Biological Diversity
November 25-December 4, 1991, Geneva, Switzerland	Fifth Negotiating Session / Third Meeting of the Intergovernmental Negotiating Committee for a Convention on Biological Diversity
September 23-October 3, 1991, Nairobi, Kenya	Fourth Negotiating Session / Second Meeting of the Intergovernmental Negotiating Committee for a Convention on Biological Diversity
June 24-July 3, 1991, Madrid, Spain	Third Negotiating Session / First Meeting of the Intergovernmental Negotiating Committee for a Convention on Biological Diversity

Working Groups make recommendations to COP. As seen in the case of the Working Group on Access and Benefit-Sharing, the groups may also provide a forum for negotiations of a particular instrument of CBD. COP and SBSTTA may also establish expert groups or call for organisation of workshops and meetings. Participants of such meetings can be experts nominated by governments, representatives of international organisations, and local and indigenous communities. The purpose of such meetings may vary. For instance, expert groups may provide scientific assessments and workshops may be used for training or capacity building. On the other hand, liaison groups advise the CBD Secretariat or facilitate cooperation with other organisations.

Working of COP

Ordinary meetings of COP are held at regular intervals, while extraordinary meetings are held when deemed necessary or as per the request of any Party, provided it is supported by at least one third of the Parties. COP adopts rules by consensus, including financial rules governing the funding. At each ordinary meeting, it adopts a budget for the financial period. COP also reviews scientific, technical and technological advice on biological diversity. Other roles of COP include adoption of protocols, amendments to protocols, adoption of additional annexures, establishment of subsidiary bodies to provide scientific and technical advice, cooperating for dealing with matters of CBD and achieving the purposes of CBD.

Venue and Year	Number of documents	Decisions taken
COP10 - Nagoya, Aichi Prefecture, Japan, October 18-29, 2010	194	47
COP9 - Bonn, Germany, May 19-30, 2008	110	36
COP8 - Curitiba, Brazil, March 20-31, 2006	106	34
COP7 - Kuala Lumpur, Malaysia, February 9-20, 2004	94	36
COP6 - The Hague, Netherlands, April 7-19, 2002	114	32
COP5 - Nairobi, Kenya, May 15-26, 2000	81	29
EXCOP1 - First Extraordinary Meeting of COP, Cartagena, Colombia and Montreal, Canada, February 22-23, 1999 and January 24-28, 2000	24	3
COP4 - Bratislava, Slovakia, May 4-15, 1998	71	19
COP3 - Buenos Aires, Argentina, November 4-15, 1996	112	27
COP2 - Jakarta, Indonesia, November 6-17, 1995	56	23
COP1 - Nassau, Bahamas, November 28-December 9, 1994	33	13

ASAD R. RAHMANI

Almost all CBD signatory countries participate in the COP

MOHIT KALRA

During COP10 at Nagoya, the baton of NGO Alliance was handed over to BNHS, the largest conservation NGO of India

ASAD R. RAHMANI

During COP10 at Nagoya, banners and posters were displayed all over the city

It has been decided that the United Nations, its specialised agencies, International Atomic Energy Agency and any state not Party to CBD, may be allowed as observers at COP. Moreover, any other agency, whether governmental or non-governmental, that is qualified in the fields of conservation and sustainable use of biodiversity, and has informed the CBD Secretariat, may be admitted. This is unless at least one third of the Parties present object to the same. The admission and participation of observers shall be subject to the rules of procedure adopted by COP.

COP themes

The agenda of COP meetings varies significantly and reflects the programme that has been decided. At its first meeting, COP had decided on a medium-term programme for 1995-97. Implementation of this programme prepared the foundation for the long-term CBD objectives. It developed a number of thematic programmes and identified a series of key issues relevant to CBD.

Thereafter, the fourth meeting of COP established a programme to cover the period up to the seventh meeting. It also established a process to review the operations of CBD and set out a longer term programme. An inter-session meeting on the operations of CBD was held in 1999, the results of which were reported to the fifth meeting of COP. COP also sets out a series of standing items for the provisional agenda of its meetings, as follows:

- Organisational matters
- Reports from subsidiary bodies, the financial mechanism and the Executive Secretary
- Review of the implementation of the programme
- Priority issues for review and guidance
- Other matters

COP10 – Highlights

The tenth meeting of COP was held in Nagoya, Aichi Prefecture, Japan from October 18-29, 2010. COP10 included a high-level ministerial segment organised by the host country in consultation with the CBD Secretariat from October 27-29, 2010. COP10 took place during the International Year

for Biodiversity (IYB), declared by the United Nations General Assembly. Thus, during that year events were conducted all over the world to raise awareness of the importance of biological diversity to humans. COP10 considered strategic issues for evaluating the progress and supporting the implementation of CBD. During COP10, the Nagoya Protocol on Access and Benefit-Sharing was also adopted.

During COP10, the issues for in-depth discussion were:

- Inland waters biodiversity
- Marine and coastal biodiversity
- Mountain biodiversity
- Protected Areas
- Sustainable use of biodiversity
- Biodiversity and climate change

Other substantive issues discussed in COP10 were:

- Agricultural biodiversity
- Biodiversity of dry and sub-humid lands
- Forest biodiversity
- Biofuels and biodiversity
- Invasive alien species
- Global taxonomy initiative

ICNP

During COP10, the Parties decided to establish an Open-ended Ad Hoc Intergovernmental Committee for the Nagoya Protocol (ICNP) on Access and Benefit-sharing (ABS) as an interim governing body. It was agreed that ICNP should meet twice during the inter-session period. The first meeting of ICNP was held from June 5-10, 2011 in Montreal, Canada and the second from July 2-6, 2012 in New Delhi.

During the first meeting of the ICNP on ABS, the following issues were discussed:

1. Modalities of operation on ABS.
2. Measures to assist in capacity building, capacity development and strengthening of human resources and institutional capacities in developing countries.

ASAD R. RAHMANI

All railway stations, malls, streets and large shops were decorated with COP10 banners in Nagoya

ASAD R. RAHMANI

A huge amount of literature related to biodiversity is freely distributed during COPs

MOHIT KALRA

The Indian Pavilion was very popular during COP10 at Nagoya, Japan

3. Measures to raise awareness of the importance of genetic resources and associated traditional knowledge.
4. Cooperative procedures and institutional mechanisms to promote compliance with the Protocol and to address cases of non-compliance.

During the second meeting of ICNP on ABS the following issues were considered:

1. Development of a programme budget for the Protocol.
2. Guidance for the financial and resource aspects of the Protocol.
3. Consideration of procedures for COP.
4. Elaboration of the draft provisional agenda for COP.
5. Modalities for a global multi-lateral benefit-sharing mechanism.

COP11 – The way ahead

The 11th meeting at Hyderabad in India from October 8-19, 2012, is another milestone in addressing the conservation and sustainability issues plaguing the world at present. BNHS is the nodal organisation-host of global NGO alliances for COP11. It plays a vital role in providing a platform for local NGOs in this global event, while the Government of India is

ASAD R. RAHMANI

ASAD R. RAHMANI

Side events by NGOs, institutes, and governments play an important role in taking forward the mission of the CBD

ASAD R. RAHMANI

COPs give opportunity to organise large side events by international NGOs (above) and smaller discussions (below)

MOHIT KALRAA

ASAD R. RAHMANI

Participation in a COP is a proud moment for every country and nature conservation organisation

the official host of the entire event. COP will be preceded by the sixth Meeting of Parties (MOP) from October 1-5. BNHS has initiated an Indian NGO Forum for the Convention on Biological Diversity (INFC). It works towards inviting more groups and individuals working on biodiversity issues to take common interests forward. The thematic issues of INFC for COP11 are as follows:

1. Looking at ten years of Biological Diversity Act (BDA)
2. Access and Benefit-sharing
3. Traditional Knowledge and Intellectual Property Rights
4. Community Conserved Areas
5. Biodiversity and Economic growth/de-growth (BRICS)
6. Bio-safety and Agro-biodiversity
7. Review of 2020 targets, called the Aichi Targets
8. International Trade Agreements, Business & Biodiversity (outside of WTO, EU-India rules might dictate EU-other country rules, bilateral trades, trade rules)
9. Internal trade and biodiversity, livelihoods (National)
10. Threatened Ecosystems

ASAD R. RAHMANI

The most important message of COP is the need for international collaboration

COP11 is an important step towards sustainable development and equitable sharing of resources in the world. The coming days, months and years will decide whether the targets are met and whether sustainability is made an integral part of the global economy. We are optimistic ... ■

ASAD R. RAHMANI

Working with decision-makers

Neha Sinha

The afternoon was like any other in Mumbai. The air, hot and sticky, splintering down on the skin with physical force. In our stuffy little taxi, we crossed streets with people glued to a cricket match on television. Everything was ordinary. A few crossings and a turn later, we stopped to get out. And the breath was knocked out of my body.

Overlooking the grey and brown mudflats of Sewri, I could see vivid splashes of pink, white and scarlet. Standing on elegant legs, preening, poised perfectly, a vision in polished pink 10,000 Lesser Flamingos. They looked, almost, like they didn't belong to Sewri. The wonder of birds, often times, is how they choose habitats, even after we have defiled those habitats. The habitat in Sewri is as you would expect it: polluted, with effluents from refineries, and the flotsam of Mumbai. And yet these birds come here year after year, colouring the landscape in fluid splashes of colour. They take the Mumbai landscape to levels above the ordinary.

But this landscape is far from what Mumbai's civic authorities have planned. Nearly a decade ago, BNHS heard of off-and-on plans for a mega-crore project, the Mumbai Trans Harbour Link (MTHL), which would shear the Sewri mudflats down the middle. Over the past decade, BNHS has been patiently corresponding with the civic authorities, advocating for a realignment of the MTHL. It has been a long battle of meetings, round tables, dialogue and letter-writing. Several letters have gone to and fro, but civic authorities have not agreed to a suggested realignment. A concerned citizen filed a petition with the National Green Tribunal (NGT) challenging the project, which was sanctioned based on an obsolete 2005 Environmental Clearance (EC). BNHS provided ecological inputs to the petition, fortifying it with the declaration of Sewri as an Important Bird Area (IBA) in 2004, exhaustive bird lists, articles written by citizens calling for Sewri's protection, and ecological information on the mangroves, crustaceans and other fauna of this unique, inter-tidal mangrove and mudflat ecosystem.

Following this the National Green Tribunal (NGT) said the case involved a 'substantial question to the environment'. It has now ordered that a new Environment Clearance needs to be obtained for any construction at the site.

The battle is not over, and BNHS will fight to protect this cultural and ecological gem for the future of Mumbai. This example also demonstrates two important characteristics in our chosen battles: battles for conservation are cyclical and unflinching, and often last decades. Second, with our strong science base, we have to go out of our way to advocate conservation policies that are sound, not shrill. Crucially, we have to also differentiate between 'green-wash' policies and what is unsound ecologically. We are also constantly uncovering the truth behind the 'given' and 'understood' facts. This takes us much beyond just natural history. We are, in effect, attempting to change conservation and development policy and action for a better future.

Preventing Extinction T12

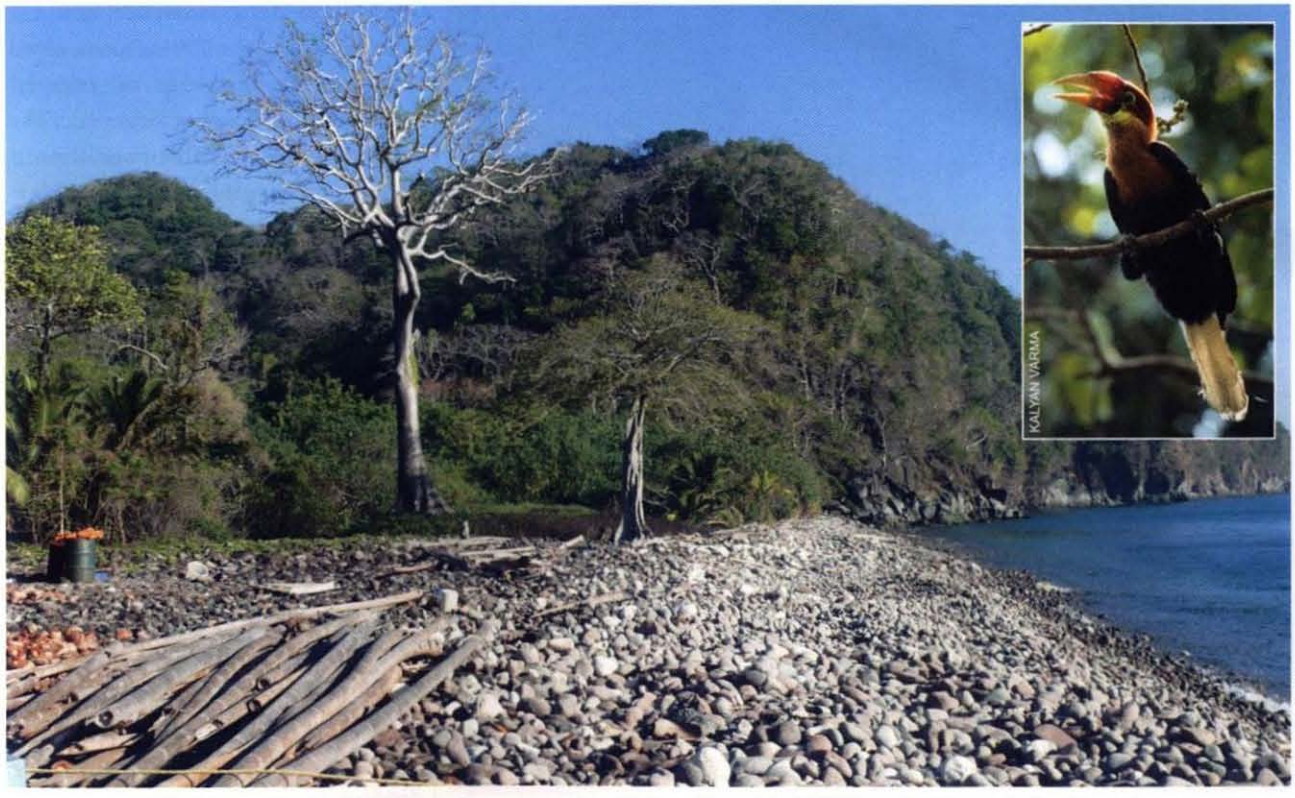
There are several Indian species which are in the maw of extinction; and only well-thought out, scientifically rigorous policies can save them. The last Conference of the Parties (COP) meeting of the Convention on Biological Diversity (CBD) had countries agreeing to 20 Aichi Targets for saving biodiversity by 2020. Aichi Target 12 aims to prevent extinction of species before 2020, an ideal that has been guiding our work for more than 127 years.

In many cases, BNHS has been the first in bringing to attention the plight of many little-known and endemic species, such as the Narcondam Hornbill, the Nicobar Megapode, the Great Indian Bustard, and endemic species of nudibranchs. Thanks to our campaigns, the critically endangered Gyps vultures are getting attention from different forest departments, though much more needs to be done to ensure species survival. We have also constantly brought to attention species that will need more and more conservation attention, as they are suffering a rapid decline and they have specialist needs, e.g., the Indian Skimmer.

Dr. Asad R. Rahmani in his latest, pivotal work, THE THREATENED BIRDS OF INDIA, has discovered that India is a guardian country to as many as 110 threatened bird species. These are species which are found predominantly in India, and if India stops protecting these birds, then the species will become extinct. The guardian species concept is set to be an important tool, which we hope will shape good conservation policy. Take the case of the Indian Skimmer. This beautiful bird with a striking, conical, flame-orange beak nests only on sandy, riverine islands. These islands in themselves are few enough, and nests are constantly under threat from various quarters. There is direct predation of eggs and chicks by all manner of creatures: crows, rats, cats, dogs, mongoose; and there is also the tragic trampling of nests by buffaloes out to graze.

Narcondam Hornbill

In the Andaman sea lies a tiny (6.8 sq. km), volcanic island – Narcondam, covered in thick, evergreen forest. It is here that the endemic Narcondam Hornbill lives. As it is found nowhere else on earth, and has no other home, India is the guardian country of



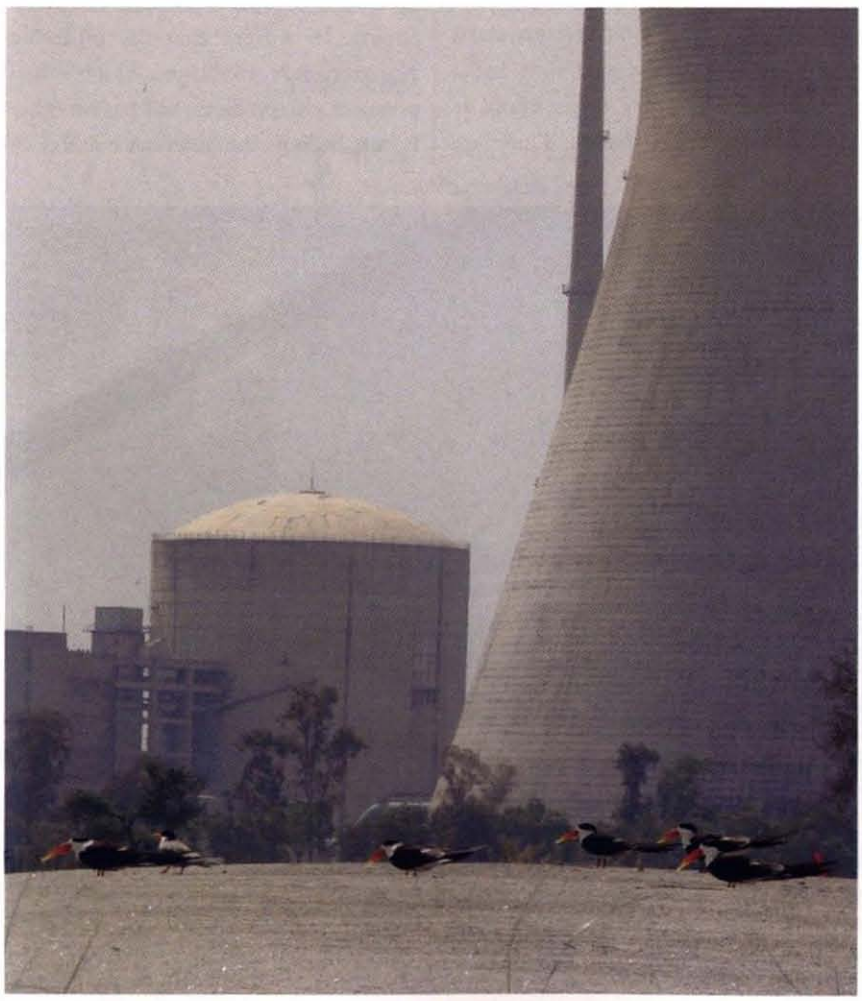
BNHS intervention in the Standing Committee of the National Board for Wildlife and advocacy helped in saving the habitat of the endemic Narcondam Hornbill (inset)

RAJAT BHARGAVA

Advocacy and policy interventions of BNHS, Wildlife Trust of India and other organisations have helped in reducing poaching of hornbills in the Northeast

this hornbill species. BNHS was the first to highlight the danger to the Narcondam Hornbill. The Indian Coast Guard has been pushing for erecting a radar station on the island. The proposal also entails erecting a power station, a road and felling of trees. In a site inspection report for the National Board for Wildlife (NBWL), BNHS has said a firm no to this proposal. Radars can be installed elsewhere, but can the same be said for the Narcondam Hornbill?

This site inspection report and BNHS's strong 'no' to the project has ushered in a national focus on the Narcondam Hornbill. Several people, who did not previously know about this species, have written to the MoEF, urging it to nix the proposal. It is with great delight that we report that the campaign for the Narcondam Hornbill has been successful. Apart from the BNHS report to the NBWL, scores of conservationist NGOs, like NCF and WWF, and birdwatchers and concerned citizens made representations to the MoEF against the rador project. As a result, Smt. Jayanthi Natarajan, Minister of State (Independent Charge) Environment and Forests, has rejected the proposal.



A.I. SIDDIQUI

BNHS has worked with the Nuclear Power Corporation of India (NPCL) on seven sites for the protection of wildlife, particularly threatened species

Nicobar Megapode

The Andaman and Nicobar Islands are a world biodiversity hotspot, a unique place with speciation found nowhere else on earth. Like the Narcondam Hornbill, the Nicobar Megapode is endemic to this island complex. The 2004 tsunami wiped out 70 per cent of the islands' populations of Nicobar Megapode. The biggest and most stable population is found on Tillangchong Island, which is a sanctuary. But the Navy has a proposal to erect a missile firing structure, to test dummy missiles on Tillangchong! Would this be permissible in any other sanctuary? Should this take place on Tillangchong simply because it is an isolated remote island? As in the case of the Narcondam Hornbill, BNHS was the first to bring to light the facts about this species, and its tiny, fragile island ecology. In a site inspection report for the NBWL, BNHS has said a firm 'no' to this project.

Indian Skimmer

This year, BNHS, working along with the forest department and IBCN (Indian Bird Conservation Network) members has brought to light the

ASAD R. RAHMANI

The BNHS and RSPB Vulture Conservation Breeding Programme is one of the major conservation programmes of India

destruction of nests in the Rajasthan stretch of the National Chambal Gharial Sanctuary. The forest department is now helping in protection of nests of the Skimmer. We hope to start schemes on the lines of existing gharial and turtle egg protection in the Chambal IBA. BNHS is also closely involved in creating a first of its kind tri-state (Rajasthan, Madhya Pradesh, and Uttar Pradesh) Chambal management plan, which will provide guidance on conservation of Chambal at a landscape level. This will expand the role that India should take as a guardian country for the Indian Skimmer.

Gyps Vultures

India is also a guardian country to three Gyps vulture species: Long-billed, Slender-billed and White-backed. In the last two decades, all three have suffered a population crash, which can only be described as cataclysmic. BNHS has been advocating for removing the veterinary drug diclofenac responsible for the decline of vultures from the vulture's food chain. In 2006, due to sustained efforts by BNHS in partnership with the Royal Society for Protection of Birds (RSPB), UK, the Drug Controller General instructed drug controllers to not only phase out diclofenac but also to use the safe substitute, meloxicam, in its place. Similar directives were sent out by the Department of Animal Husbandry, Dairying and Fisheries, and

ASAD R. RAHMANI

BNHS and RSPB were successful in captive breeding of the Critically Endangered Slender-billed Vulture

SAMAD KOTTUR

Tracking the Bustards: not extinct, but close to it

How do you track a bird which is an enigma? Bustards fly long distances and come together for breeding, and so they cannot be fully protected only through protection of breeding sites. We plan to start a project on satellite-tracking Bengal Florican to understand foraging and dispersing habits. We are also in dialogue with the government for captive breeding of the GIB, but this should be done with an aim to release birds in the wild and not simply increase captive populations.

the Ministry of Agriculture. BNHS went a step ahead by establishing vulture breeding centres along with various state governments. But this is not the end. Rather it is just the beginning. The BNHS dream is to see these vultures soaring in the skies, performing their natural, vital ecosystem service of scavenging carcasses. Now we are in the process of setting up Vulture Safe Zones where vultures can be released. We are happy to say that we are not alone. Following our sustained vulture advocacy campaign, the Government of India has signed a joint resolution with Pakistan, Nepal, and Bangladesh to save Gyps vultures and prevent diversion of human-use diclofenac into the vulture food chain. Yet, even as we write this, we are working to solve a new problem plaguing vultures – death following collision with power lines.

Great Indian Bustard

The GIB is both 'Great' (a heavy, very handsome bird) and intensely 'Indian'. India is a guardian country for this species. But this unique quality has sadly not been enough to save the GIB – it continues to disappear and was recently uplisted as Critically Endangered on the IUCN Red List. Spanning entire decades when Indian conservation focused only on the tiger, BNHS repeatedly brought up the issue of conserving this magnificent and truly Indian bird. In 2007, BNHS wrote to Maharashtra officials with the important information that GIBs were dying of pesticide poisoning – a threat that is only now being recognised. Since 2007, BNHS has been formally working with states for road maps on Bustard conservation. For years, we have been advocating for a specialised Project Bustards, for the GIB, Lesser Florican and Bengal Florican. This year has finally seen a breakthrough. Working with WWF-India and the Government of India, BNHS has produced guidelines for Bustard Recovery in record time. The Government of India has now accepted these guidelines and they are being discussed at the state level. BNHS will be providing support for state action plans.

Black-necked Crane

The Black-necked Crane (BNC) is a long-living and slow-breeding bird, found in only two places in India – Ladakh and Arunachal Pradesh. To add to this,

Courtesy: WWF-India

BNHS has collaborated with a number of organisations to develop species recovery plans

Educating our Legislators T 1, 17

As part of our core philosophy, BNHS has been disseminating science-based information to all levels of society.

Over several years and many Parliament sessions in both Upper and Lower Houses, BNHS has been called upon to provide answers to questions asked by parliamentarians with the latest research, conservation lapses and needs. Over the years, we have provided information on birds, mammals, and even amphibians to our Legislators. A recurring question is the status of endangered birds in India.

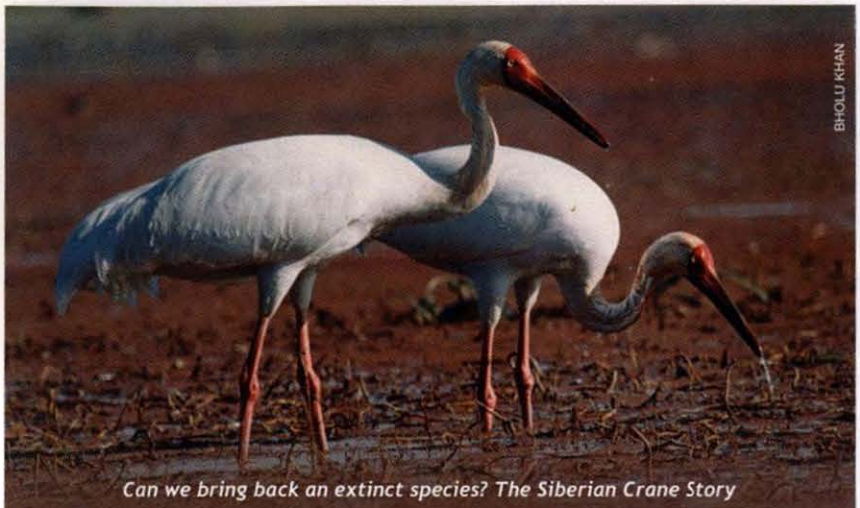
- BNHS efforts on 'Citizen Sparrow', in 2012, were widely recognised and appreciated. The Lok Sabha asked about the Citizen Sparrow project and what it was telling us about the fate of the House Sparrow. Our reply - BNHS has launched an online survey on the House Sparrow. The response has been tremendous and we are now in a position to compile a first of its kind, national database on this supposedly common bird which has shown a decline in populations, recording its presence and absence from more than 10,000 locations from different parts of India.
- In 2012, we were also asked about the conservation status of the Black-necked Crane (BNC). *BNHS reply*: in places like Chushul and Hanle (Ladakh), it is tree plantations in marshes which are a problem. There is a strong, 'understood' belief that tree plantation is good for all landscapes. This is not true - if we have to maintain the ecological integrity of ecosystems like wetlands and marshes, then trees should not be planted. The BNC also has another immediate problem, nearly 50 per cent of chicks are eaten by feral dogs (pets gone wild) left by the army.
- The MoEF was asked if the populations of Purple Swamphen declined in Uttar Pradesh (UP). *BNHS reply*: Bakhira IBA wetland in UP is one of the largest freshwater lakes (*jheels*) of the state. With 5,000 Purple Swamphen, this may be the most important area for swamphens in the country! Of the total 2,894 ha, only 15 ha is with the forest department, the remaining is gram samaj (commons) and agricultural land. It will be important to secure the future of this *jheel* for swamphens.
- Has breeding biology of raptors and Sarus Cranes been affected by pesticide contamination? *BNHS reply*: Yes, it has - Sarus Cranes have been affected by pesticide levels. BNHS has studied samples of Sarus in KNP between 1985 and 1990. Unsuccessful breeding of Himalayan Grey-headed Fish-eagle at Corbett National Park has been reported. More studies on different trophic levels are needed, and we emphasise that this matter should be treated as urgent. This is also a goal for the National Biodiversity Action Plan.
- A recurring question (asked both this year and last year) has been on the number of birds on the verge of extinction. BNHS response is unwavering in that bird species need immediate and urgent attention. There are 15 Critically Endangered bird species, and 14 Endangered bird species on the verge of extinction. Out of 158 globally threatened species, India is the guardian country for 110 species, including the Great Indian Bustard. We need targeted species recovery plans for species like the White-winged Wood Duck, Nilgiri Laughingthrush, Lesser Florican, Bengal Florican, Great Indian Bustard, Narcondam Hornbill, and Swamp Francolin. Existing conservation schemes for endemic birds, like those found in Andaman and Nicobar Islands, are not adequate!
- Are owls slaughtered for black magic? This was a question asked in the Rajya Sabha. BNHS response is that owls are certainly slaughtered for black magic. This is a sad state of affairs as owls are a farmer's best friend! Declaring and protecting Important Bird Areas (IBAs) is a good way of saving owls. The government needs to help dismantle the trader-poacher nexus.
- In 2009, a question was asked on caecilians - limbless, burrowing amphibians - in Manipur and Nagaland. BNHS informed that three new species have been found - two in Manipur and one in Nagaland.
- In the same year, Parliament also asked if malaria was a cause of vulture deaths! BNHS response was that diclofenac poisoning is the major cause for Gyps mortality. Malaria has not been known to cause vulture deaths.

In some cases though, we have gone beyond providing information. In many cases, we have had to uncover the truth through investigation, close study and relentless information gathering and propagation.

A striking example is that of wetlands. What does a wetland look like in the dry season? Answer: a wasteland, according to some 'experts'.

Wetland? Wasteland? *Mudlands*!

In 2010, the matter of a 2,640 MW thermal power plant proposal near Naupada Swamp, an IBA near Kakrapalli village, Srikakulam district, Andhra Pradesh, came to our notice. The project proponents were East Coast Energy. The EIA for the project had already been 'done' by BS Envitech. The EIA claimed that there were no endangered animals at the site, leaving out the Spot-billed Pelican, Painted Stork, and even the Olive Ridley Turtle! Our study revealed that the EIA was conducted between March and May 2007, at a time when water levels were lowest in the swamp, and when migratory birds had already flown! NBWL set up an expert committee with Dr. Asad Rahmani and Wildlife Institute of India's Dr. Asha Rajvanshi as members. They advocated strongly against the thermal project, for which the EIA itself was laced with untruths. They also advocated that the entire area be declared a conservation reserve; and also to protect the livelihood of local fishermen. The battle to save the site is still on - an Aichi Target 14.


BHOLU KHAN

Can we bring back an extinct species? The Siberian Crane Story

The striking Siberian Crane was on every birdwatcher's list in the 1990s. From the entire country, Siberian Cranes chose only Keoladeo, Rajasthan and rarely Karera, Madhya Pradesh to winter in. Keoladeo was a regular haunt, with the forest department recording the presence of the bird, formally or informally, from the 1960s onwards. The populations began to drop by the end of the 1990s and 2002 onwards, the Siberian Crane stopped coming to Keoladeo, and thus to India. It is now considered locally extinct here. It is often difficult to address the root problems plaguing migratory birds, as problems span many countries and latitudes. However, we still have to think about the future of this bird: can the Siberian Crane be brought back? BNHS believes it can and should be done. On the heels of an MoU signed by India under the Convention on Migratory Species (CMS) in 2010, it was agreed to bring some Siberian Cranes to Keoladeo. However, the technical and feasibility aspects needed to be discussed by conservation groups and experts. A workshop to explore the feasibility of the programme was jointly organised by WWF and BNHS in Keoladeo this year. Workshop participants, including the Rajasthan Forest Department, unanimously agreed that the Siberian Crane should be brought back to India. BNHS recommended the creation of an exhibit facility as a very good step towards the fulfillment of India's commitment to conservation of the Siberian Crane. BNHS has assured its support and has committed a veterinarian for the initiative. As BNHS has the experience of running a captive breeding centre for the critically endangered Gyps vultures, it has also offered help in capacity building and training for vets. The aim will be to build a resident population of Siberian Cranes, which as they stand today, run the heart-breaking risk of being completely forgotten by us all.


SAKUREOLIS GUJARATICA by VISHAL BHAVE

The MoEF rejected the Poshitora port project based on strong recommendations against the project by the BNHS

almost 50 per cent of BNC chicks get killed by feral dogs! For the first time, the MoEF has accepted recommendations for the conservation of this dwindling species. Last year, along with WWF, BNHS organised a dedicated workshop on the BNC. Through strong advocacy and brainstorming, a set of recommendations have been produced which have been accepted by the MoEF. These include studying the ecology of BNC, their migration routes, and safeguarding their habitat in Arunachal and Ladakh. The threats, meanwhile, are already making themselves visible. Dams are proposed in Arunachal Pradesh that will directly impact Zemithang Nelya IBA, which is prime BNC habitat. The time to act is now, and the battle is far from over.

Not Just birds: On an endemic Nudibranch, *Sakureolis gujaratica*

There is an old joke in conservation circles: we never value what we cannot see. This is also the core philosophy behind green accounting, which seeks to measure the value of biodiversity. Marine conservation has many miles to go in India, despite marine biodiversity being very rich along our 8,000 km long coastline. India has a wealth of corals and other sea creatures like Nudibranchs, a group of soft-bodied molluscs, noted for their extraordinary diverse colour and shape.

One of the simple reasons given by forest departments for this apathy towards marine biodiversity is: "We can't really see what is down there. It is difficult to make policies for what we can't see." This is a paradox faced throughout the world, and recognising this, the CBD has chosen marine biodiversity as a special theme this year.

BNHS has been fighting for marine biodiversity on various fronts, apart from running a robust marine conservation plan.

In 2009, BNHS was made part of a team to conduct a site inspection report for the establishment of a port in

Poshitora in Jamnagar, Gujarat. As is often the case, project proponents argued that the site they chose was like any other, even though 19 islands of the Marine National Park were in the port area, and four in the immediate project area. On closer study, it was revealed that the site had extremely rich coral diversity. To a few rock pools in Poshitora clung an endemic nudibranch, found nowhere else on earth – *Sakureolis gujaratica*, whose very name honours its location. It was further found that the site was vulnerable to geographical isolation from other reefs, therefore it ran the risk of being cut off from the rest of the reefs. It also had extreme variations in environmental conditions.

The port was likely to have four berths with 2,000 containers each. Dredging would destroy corals, and one can only imagine what it would do for the softer nudibranchs. BNHS made a strong recommendation against the project. We stressed that the country cannot have both the port and the Marine National Park. A choice had to be made between the two. Finally, the project was rejected by the MoEF.

Socially Conscious Development – moving ahead of Aichi Target 7

Aichi Target 7 calls for sustainable use of forests and other natural resources. At BNHS, we have been advocating Sustainable Development (SD), but our SD is even more nuanced: it stands for 'Socially-conscious Development', which is also sustainable.

In the case of the Radhanagari Wildlife Sanctuary (WLS) in Maharashtra, BNHS was tasked in 2010 by the National Board for Wildlife (NBWL) to conduct a site inspection report for considering the Sawarde Minor Irrigation Project, proposed to come up on a stream originating in Radhanagari WLS. Radhanagari WLS is nestled at the base of the Sahyadri hills, and has unique grassy plateaus. The Forest Department tends to believe these are not biodiversity rich, as they do not have trees. This is deceptive, for these

ASAD R. RAHMANI

BNHS organises annually a Flamingo Festival at Sewri, Mumbai, for members of civic society for education and conservation advocacy

plateaus harbour their own unique biodiversity. The story of 'development' in this area is not straightforward. Other irrigation projects in the state have led to farmers switching to sugarcane crops, which tend to increase human-wildlife conflict as they attract wild animals. Also, Radhanagari has endemic plants, rich grazing pastures for wild herbivores, and is a catchment for two major irrigation projects. However, the people to be benefited from the Sawarde Minor Irrigation project are poor and disadvantaged. Bearing this in mind, BNHS decided to recommend the project, but with socially conscious conditions. We proposed that the entire area be made into an Eco-Sensitive Zone (ECZ) to ensure future sustainability of water. We also advocated that the water from the project should go to poor villagers.

Similar was the case of a proposal for Somasila dam from Sri Penusila Narasimha WLS, which is also an IBA, in Andhra Pradesh. People in this

BNHS PHOTO LIBRARY

BNHS efforts were instrumental in declaring March 20 as World Sparrow Day to highlight the plight of the House Sparrow and other common birds. The Citizen Sparrow Programme of the BNHS has been very successful; the House Sparrow has been declared the State Bird of Delhi

K.S. GOPI SUNDAR

BNHS is a member of the Sarus Protection Society of Uttar Pradesh. The state has nearly 60% of India's Sarus population

drought-prone area are impoverished. BNHS was once again tasked by the NBWL to conduct a site inspection, in 2009. Given the socially conscious development that was likely to arise, BNHS recommended the diversion of 1,016 ha of forest land for the project, but with the condition that an equal amount of land be added to other sanctuaries in the state. We also advocated for special emphasis on adding dry scrubland, which is the habitat of the Critically Endangered Jerdon's Courser.

Another example of wetlands being disregarded (in violation of Aichi ideals) is from Gujarat.

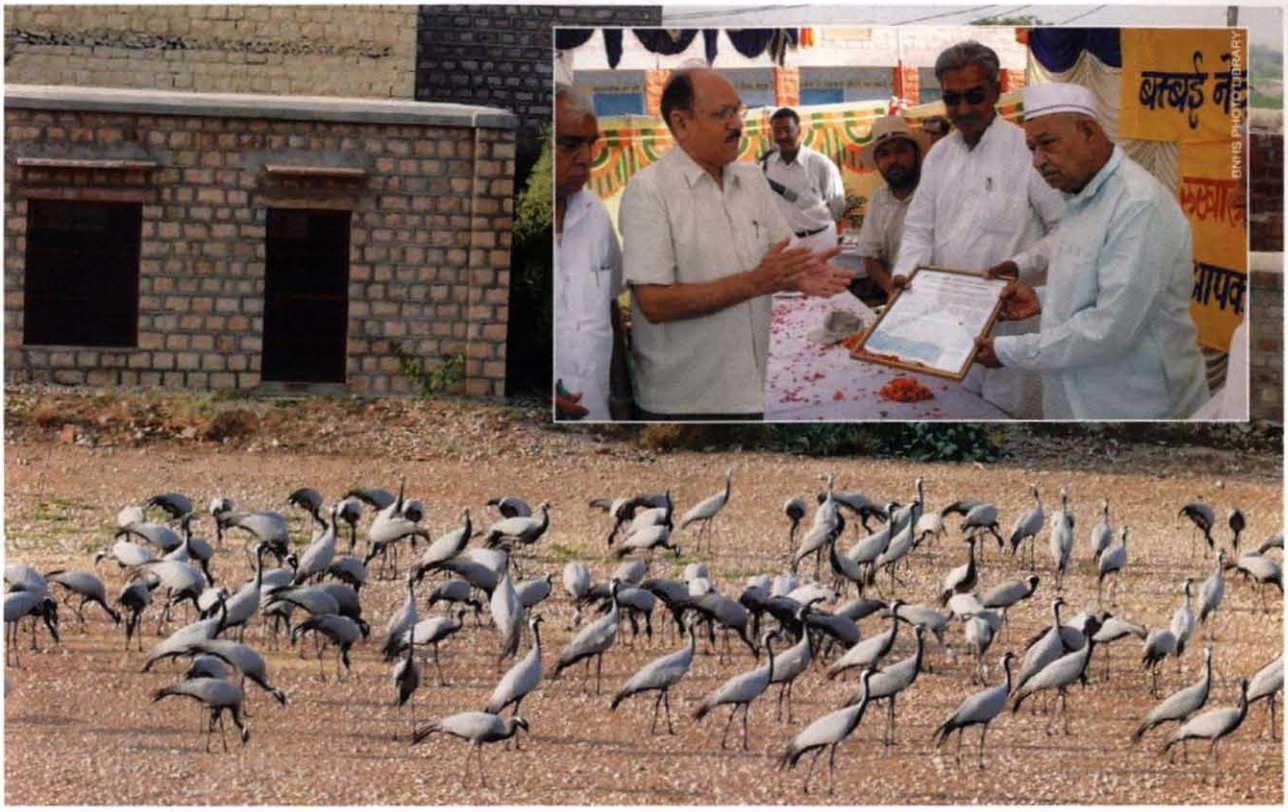
The Nirma group had several projects proposed in Gujarat – a project for a coke oven plant, cement plant and captive power plant, in what Nirma called a 'wasteland' area. BNHS, invited by the NBWL to be part of an Expert Committee, found that this was far from the truth. The 'wastelands' were in fact wetlands, they were also common property resources, and an important source of drinking water for local settlements. We stressed a second point: common lands (here used for drinking water and irrigation) cannot be exploited for profit motive. This is a common property resource and it should be used for social and public good. The matter was taken up in the Supreme Court, which took a similar view, ruling that the area was not a 'wasteland'. The matter is now with the National Green Tribunal. In a reiteration of the importance of common lands that we had stressed, another Supreme Court order (Jagpal Singh vs. state of Punjab, 2011) stressed that common land, including common property resources like water bodies, cannot be used for private or profit motives (Aichi Target 11).

Who do rivers belong to?

Arunachal Pradesh is the dam capital of India. In a rush to create dams for hydro-electricity, the state has often been found to sign MoUs with project proponents even before EIAs are conducted and clearances granted! Yet another dam is proposed on the Lower

ASAD R. RAHMANI

For the last many years, BNHS has been highlighting the impact of a large number of hydro-electric dams on biodiversity



The first Sálim Ali Conservation Award of the BNHS was given to the villagers of Kheechan, Rajasthan, who have been feeding Demoiselle Cranes for many generations

Demwe river. In 2011, BNHS was tasked by the NBWL to conduct a site inspection for this proposed 1,750 MW project. The proposed area is in an IBA, and holds the globally threatened White-winged Wood Duck, the Black-breasted Parrotbill, and the Marsh Babbler. But while the site of the IBA itself will get affected by the project, that is not all. BNHS is a firm advocate of the concept of 'Cumulative Impact Assessment', particularly for water bodies. This means that the impact of a project should be measured not just on-site, but in all other areas where the ecological impact will be felt. In the case of the Lower Demwe project, the proposed dam will impact the ecology downstream. It will be devastating for the Bengal Florican, a resident of the Indian terai and the Brahmaputra River Systems, and a bird which is down to a tiny population of *c.* 300 individuals.

Outreach advocacy is an important tool of the BNHS to influence locals and garner their support for conservation actions

This grassland species needs a mosaic of grasses; it needs short grass for breeding displays, medium grass for feeding and tall grass for nesting. To manage such a mosaic, the forest department often burns grasses in Kaziranga and Orang. Once the Lower Demwe project comes through, these lower plains will get submerged, which will result in severe loss of florican habitat. Further, when we studied the Environmental Clearance granted for the project, we found that the downstream impact on the charismatic and Endangered Gangetic Dolphin was not studied at the time of the clearance. These are issues that do not emerge in hurried or faulty EIAs. But these issues have to be considered if the future of species like the aquatic dolphins, as well as grassland species like the Bengal Florican, have to be secured. ■

Ambassadors of Indian Natural History

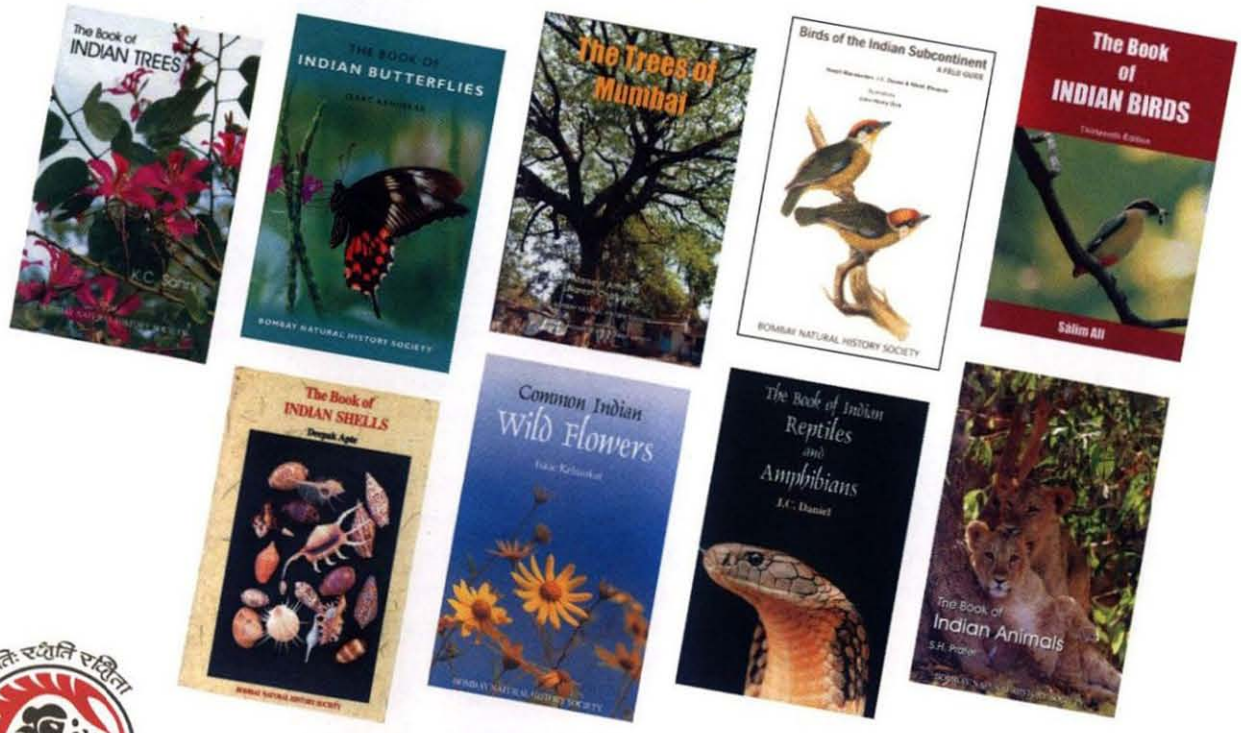
Isaac Kehimkar

Soon after the founding of the BNHS in 1883, the very first publication of the Society was published in 1886: the *Journal of the Bombay Natural History Society* (*JBNHS*), under the editorship of E.H. Aitken. Since then the *Journal* has enjoyed the status of the most read reference on natural history of the Indian subcontinent. Though after Independence in 1947 the *Journal* became more insular and articles from neighbouring countries became fewer, it remains the standard reference for natural history studies of the Indian subcontinent.

Today the *Journal* is in its 108th volume. Commemorative issues were also brought out to mark the 50th anniversary of the BNHS and to celebrate the BNHS centenary in 1983. Some of the early volumes of the *Journal* are now collectors' items. Volume 93(3) was dedicated to Dr. Sálim Ali's Birth Centenary, while Vol. 100(2&3), 2003 was also a special *JBNHS* Centenary issue, both edited by the Late Mr. J.C. Daniel. During the 125th year of the Society, the first 100 volumes of the *Journal* were made available on a DVD.

It was W.S. Millard, the third Honorary Secretary, under whose careful supervision that the first book of the Society, titled INDIAN DUCKS AND THEIR ALLIES was published in 1921. Initially, E.C. Stuart Baker's series were published in parts in the *Journal*. The first part was published in Vol. 11(1), 1898, and the series ran in ten parts till Vol. 13(2), 1901. The popularity of the series led the Society to launch it, though cautiously, as a book. Similarly, IDENTIFICATION OF INDIAN BUTTERFLIES by Col. W.H. Evans, and SOME BEAUTIFUL INDIAN FLOWERING TREES by E. Blatter and W.S. Millard, were published as a series in the *Journal*, and later as books.

POPULAR PUBLICATIONS



Numerous papers in botany helped in documenting the floral wealth of India. For example, the paper *The Flora of the Indian Desert (Jodhpur and Jaisalmer)* by the renowned botanists E. Blatter and F. Hallberg started in Vol. 26 (1918), and continued for many years. These seminal papers helped in establishing the foundation of natural history of the Indian subcontinent.

Then followed several publications on Indian natural history, and some of them are popular even today, like THE BOOK OF INDIAN ANIMALS, THE BOOK OF INDIAN BIRDS, SOME BEAUTIFUL INDIAN CLIMBERS AND SHRUBS, and THE BOOK OF INDIAN TREES. THE BOOK OF INDIAN ANIMALS published in 1948 is now in its 3rd edition and THE BOOK OF INDIAN BIRDS, first published in 1941, is now in its 13th edition, and is still among the bestselling books on Indian birds.

TECHNICAL PUBLICATIONS

Later, in 1976, a popular magazine *Hornbill* was started when the need was felt to reach the common man, who found it difficult to understand the increasingly scientific jargon used in the *Journal*. Beginning as a small pocket-sized periodical to felicitate Dr. Sálim Ali on his 80th birthday, *Hornbill* soon found popularity among BNHS members who could write and publish photographs in this magazine. A special commemorative issue of the *Hornbill* was brought out during the BNHS Centenary celebrations. Special issues were dedicated to the memory of Dr. Sálim Ali in 1996 and recently to Mr. J.C. Daniel in 2012. Today, a full-fledged Publications Department takes care of the publication of the *Journal*, *Hornbill*, and numerous books of the Society.

Celebrations of the BNHS centenary brought forth several new publications. Notable among them was A CENTURY OF NATURAL HISTORY that had some interesting articles gleaned from the BNHS *Journal*. During this time other popular titles like THE BOOK OF INDIAN REPTILES and A PICTORIAL GUIDE TO THE BIRDS OF THE INDIAN SUBCONTINENT were also published.

While all the publications had been in English, there was a constant demand for natural history books in regional languages. However, due to paucity of funds, BNHS could manage to bring out only some publications in regional languages with sporadic financial assistance received from state

governments. It was around early 2000, under the Important Bird Areas Programme, that bird guides specific to different regions of India were translated into several regional languages. And soon with the Department of Science & Technology's assistance, even the BNHS bestseller THE BOOK OF INDIAN BIRDS authored by Dr. Sálim Ali was translated by Dr. Gayatri Ugra into Hindi. Translations of this bestseller in Marathi and Gujarati are to be published as soon as funds are made available.

All through the history of BNHS, it was the altruism of members and philanthropic institutions that helped the Society to survive and achieve its aims. One such incident was when a popular series on Indian wildflowers by the present author in the quarterly *Hornbill* was appreciated by the former Chairman of the Tata Trust, Mr. R.M. Lala, who asked BNHS to put up a funding proposal to enable BNHS to publish a book on Indian wildflowers. After the presentation, the Tata Trust informed BNHS that they would fund 50% of the required six lakh rupees, if BNHS could match the donation from its own resources. While BNHS struggled to collect the other 50%, a message was received from the Tata Trust that their cheque was ready. The cheque turned out to be not for three lakh rupees – it was an unconditional donation of thirty lakh rupees to initiate a Tata Social Welfare Publications Fund at the BNHS!

REGULAR PUBLICATIONS

Another surprise was THE BOOK OF INDIAN BUTTERFLIES, released in 2008, when it broke the THE BOOK OF INDIAN BIRDS's monopoly of being the only bestseller among BNHS publications. The newly released FIELD GUIDE TO THE BIRDS OF THE INDIAN SUBCONTINENT too has joined this list. This was the last publication Mr. J.C. Daniel, Vice President, BNHS, had worked on – it turned out to be his splendid parting gift to the BNHS.

In 1999, BNHS launched its Important Bird Areas (IBA) programme funded by the Royal Society for Protection of Birds (RSPB), and supported by BirdLife International UK. The IBA Programme proved to be a boon for the BNHS when several landmark publications were published. The first major work, IMPORTANT BIRD AREAS OF INDIA, was a trend-setter where several specialists, as well as amateur bird enthusiasts, contributed by compiling information from all over India. Soon to follow this trend was the IBA programme's EXISTING AND POTENTIAL RAMSAR SITES OF INDIA, and DUCKS, GEESE AND SWANS OF INDIA. Recently, a magnum opus – THREATENED BIRDS OF INDIA has come out.

Nearly around the same time the Indian Bird Conservation Network (IBCN) was established in 1998 in collaboration with BirdLife International and the RSPB. The IBCN is a network of organisations and individuals promoting conservation of birds and their habitats in India, and strengthening the biological diversity of the region. To keep the members of the network connected and updated on conservation issues, interventions and advocacy for globally threatened species, and protection of IBAs, *Mistnet* – a quarterly magazine, was launched in 1999. Similarly, the ENVIS Centre at the BNHS publishes, since 1996, the *Buceros* newsletter to disseminate information on Avian Ecology.

COFFEE-TABLE BOOKS

EDUCATION

E-PUBLICATIONS

Identity characters, distribution maps, calls and more all in one DVD

100 years of research and conservation of Indian natural history in one DVD

Many BNHS publications were possible only because of the financial support that the BNHS received from several corporates and altruistic members. One such successful endeavour initiated by Dr. Ashok Kothari and Dr. B.F. Chhapgar, resulted in a series of premium quality art books on Indian natural history, the first in the series being SÁLIM ALI'S INDIA.

On the nature education scene, GREEN GUIDE and IN HARMONY WITH NATURE proved to be important resources for school teachers who were struggling to teach the newly introduced subject, Environmental Science. Besides these, five natural history field guide folders, published recently by the Society's Conservation Education Centre, are popular among students and amateur nature enthusiasts.

Through all these years and with all these publications, the BNHS's aim is to educate and convey the need to preserve India's natural heritage (Aichi Target 1). With more than a century of publication history, BNHS has brought out some of the finest publications of their kind in Asia. It has excelled in this tradition of publishing in natural history and strives to spread the message of conservation of nature. ■

ISAAC KEHIMKAR

Exploring our Wilderness

Asif Khan

It is pouring in the forest of the Sanjay Gandhi National Park; we are waiting with a group of 25 excited people at the edge of the forest, just after orienting the crowd on rules and ethics of a forest trail, when a young lad asks "Will we be seeing anacondas on this trail?"

Some of you might find this incident humorous, but to us it is shocking! We are often asked such questions: "Can we see cheetahs in this park?" during our national camps. Such questions enlighten us on how ill-informed our general public is about Indian biodiversity. Not their fault, as most TV channels showcase wildlife of the Serengeti or the Amazon more often than documentaries on Indian forests. How could we expect our participants to fall in love with our amazing biodiversity, and thus want to save it, until they have had an opportunity to experience it?

The Programmes Department organises nature camps and trails for BNHS members. The first BNHS camp was held in Gir National Park in 1974. Since then, a number of new destinations, national and international, have been added along the way. One lifetime is not enough to explore the varied wildlife and habitats of India, leave alone all the foreign destinations to choose from. Our members have access to more than they can experience in a lifetime. BNHS held its first international camp at Masai Mara – the Mecca of nature lovers – in East Africa in the late 1990s; last year BNHS members became the first Indian nature group to visit Madagascar to enjoy its wildlife.

However, the purpose of BNHS Programmes Department is far greater than merely ticking off new locations on a wish list. Even though the word 'eco-tourism' has reached new heights in recent times, most people who are part of this 'industry' have lost sight of the crux of the experience. Eco-tourism plainly means visiting pristine habitats, like national parks and sanctuaries, to enjoy its wilderness with least impact on its biodiversity, and if possible, to contribute to its betterment.

ISAAC KEHIMKAR

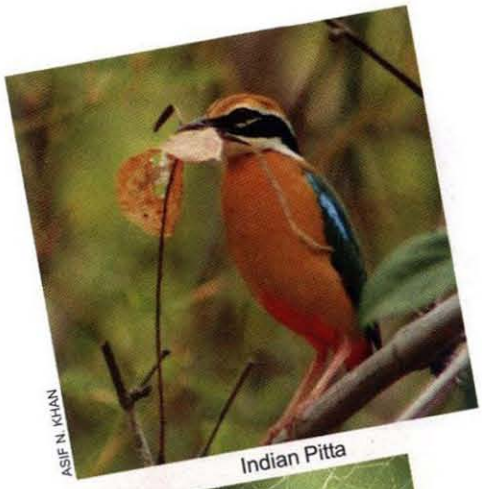
Rugged beauty of the vast slopes: though fragile, the landscape of Ladakh has a great deal to offer to every visitor

ISAAC KEHIMKAR

BNHS members enjoying wildlife watching in Africa

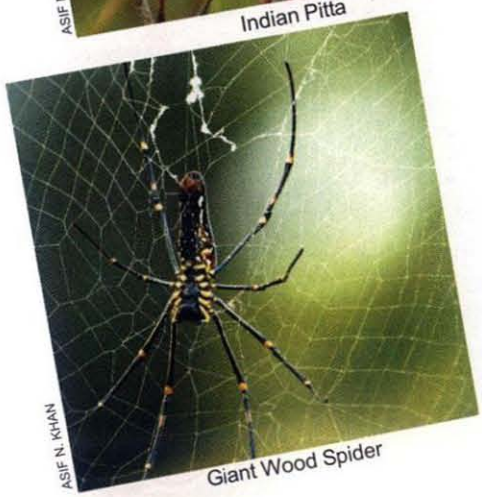
ISAAC KEHIMKAR

The adrenaline rush on seeing this magnificent animal in the wild can never be replaced by a photograph or film



ASIF N. KHAN

Indian Pitta



ASIF N. KHAN

Giant Wood Spider

The BNHS Programme Department, started in the 1970s, primarily aims to make people fall in love with and hence value biodiversity. The department's activities help to achieve Aichi Target 1, 19 and 20.

To educate with experience

If a photograph is worth a thousand words, then the subject of the photograph is surely worth a million. There is nothing like seeing a brilliantly coloured Crimson Sunbird darting among flowers in the forests of north-east India, being surrounded by a herd of elephants while they walk to the river for a drink, or watch the charismatic Chousingha run across the road in front of your jeep, on a safari in the bamboo forest of Tadoba. During our trails, when people see these wonderful beauties, they are amazed and enchanted by Indian wildlife.

It is important to make people realise the difference between a natural habitat and wasteland. During a camp to Nannaj, when our group reached the Sanctuary, a participant was very disappointed, he exclaimed, "What will we see in this barren land!" At times like this we let the habitat, in this case the grassland, speak for itself. For within a few minutes the group heard and saw the "bombardier" Ashy-crowned Finch-Lark. A little later, the group stumbled upon a Sykes's Lark that flew up at that moment. As the evening set in, harriers returned to their roosting ground a few hundred feet from the watch house. The participants witnessed hundreds of harriers flying in from all directions to roost, and it was then that the disappointed participant realised that this "barren land" was alive. It is important to show people how different ecosystems work and why they are as important as for example a rain forest. The delicate niche of biodiversity and ecosystems can be understood better if one experiences what one has read in

ISAAC KEHIMKAR

Wildlife captivates all irrespective of experience or age

books. Education is as important for conservation as is research.

Alternative income to locals

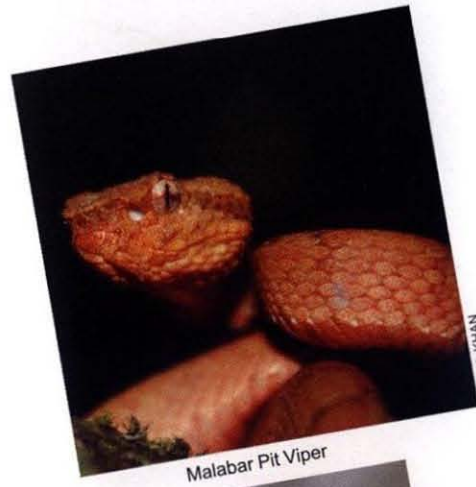
If the local people do not want to save the forest, or would rather exploit it ruthlessly, no conservation effort, law or policing can save it. But if the locals are shown a way to earn a living while conserving the forest, and they learn that they can earn only if the forest is there, they will work hard to protect it and the animals within it, even from foreign threats.

BNHS holds camps in places like Manas National Park with help of societies like the Maozigendri Eco-tourism Society in north-east India, where the Bodos play host to people who come to experience the wildlife of the Park. Bodos, who once hunted animals for food, have now accepted alternative livelihoods and are protecting the very wildlife they used to hunt. Similarly we stay in Garo Hills in places run by local people cooperatives. Our programmes are also held in collaboration with organisations that work for the betterment of the locals and/or work on the local wildlife.

Added Tool for Conservation (Aichi T19, 20)

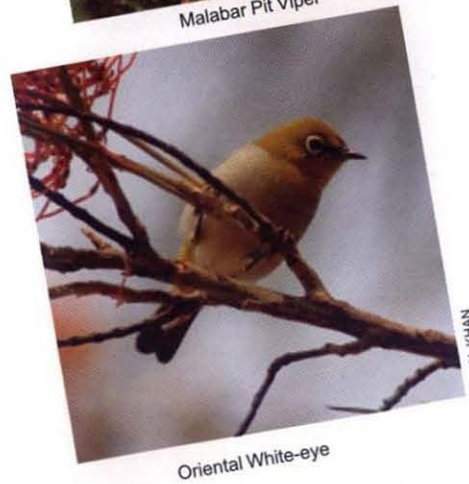
BNHS Programmes are also a tool that can be used for conservation through direct and indirect means, like the exciting Bird Banding camps at our field station in Point Calimere. The participants get an opportunity to spend time with BNHS scientists, and are able to experience a true participation in the huge exercise of Bird Migration Studies which extend across national borders.

Special BNHS workshops give participants a chance to study animals from specimens in the BNHS Collection which has been deemed as a National Heritage. Our camps and trails have inspired many, young and old, to step into the world of nature conservation.



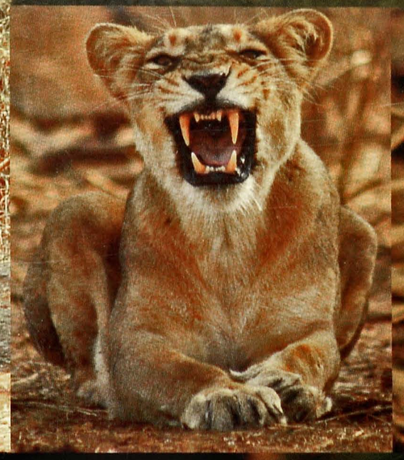
ASIF N. KHAN

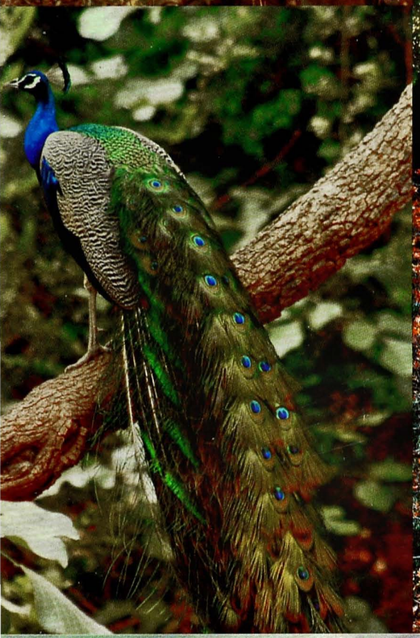
Malabar Pit Viper

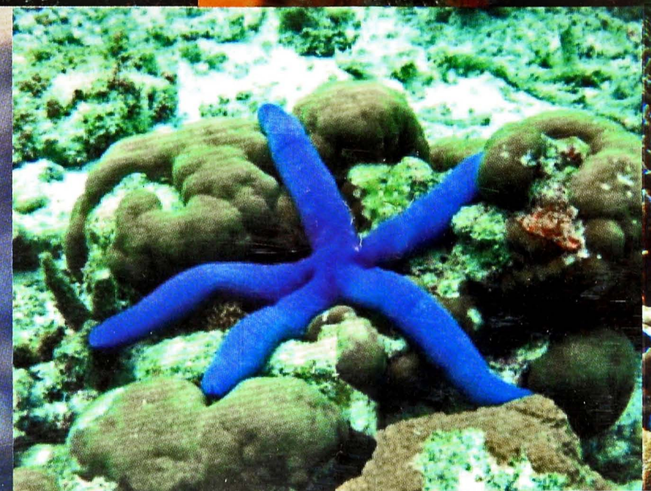


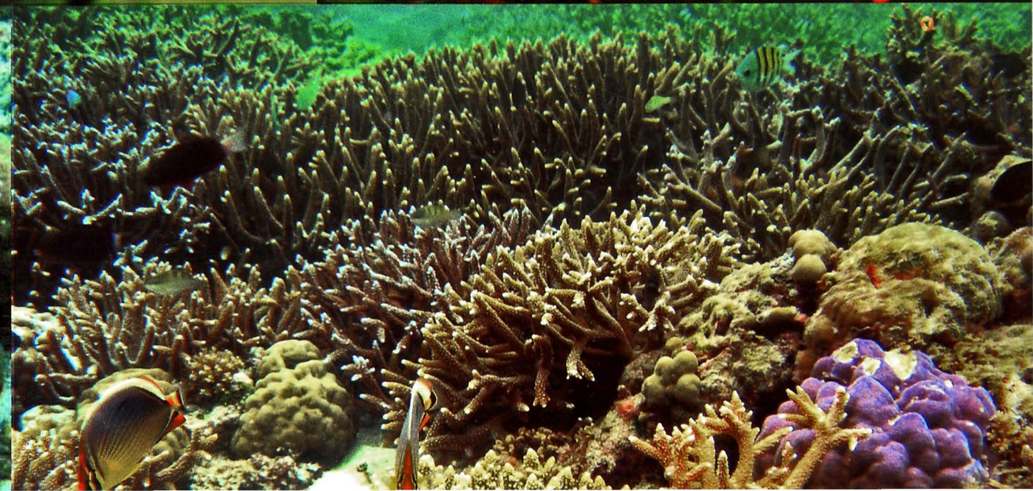
ASIF N. KHAN

Oriental White-eye









ASIF N. KHAN

The beauty of flowers never fails to capture the attention of the beholder

The surplus generated from BNHS Programmes is used for the conservation efforts of the Society.

Programmes as a preliminary survey

Since the 1970s, programmes have helped in preliminary surveys of the Indian wilderness. We conduct camps to new places as well as repeat locations; each batch of participants comes back with a list of sightings, many a times adding new records for the region. This lends BNHS additional volunteers to document and monitor the biodiversity of the country.

BNHS Programmes also enable members to experience nature and learn about the importance of biodiversity conservation, and help people contribute to conservation in the most pleasant, stress-free manner, while on vacation. ■

KEY TO PAGES 32-33

Asif N. Khan
1. Sambar
2. Blue Oakleaf
3. Ceylon Cat Snake
4. Great White Pelican
5. Rock Agama
6. Indian Peafowl
9. Asiatic Lion
10. Grey Francolin
12. Yellow Staghorn
13. Glory Lily

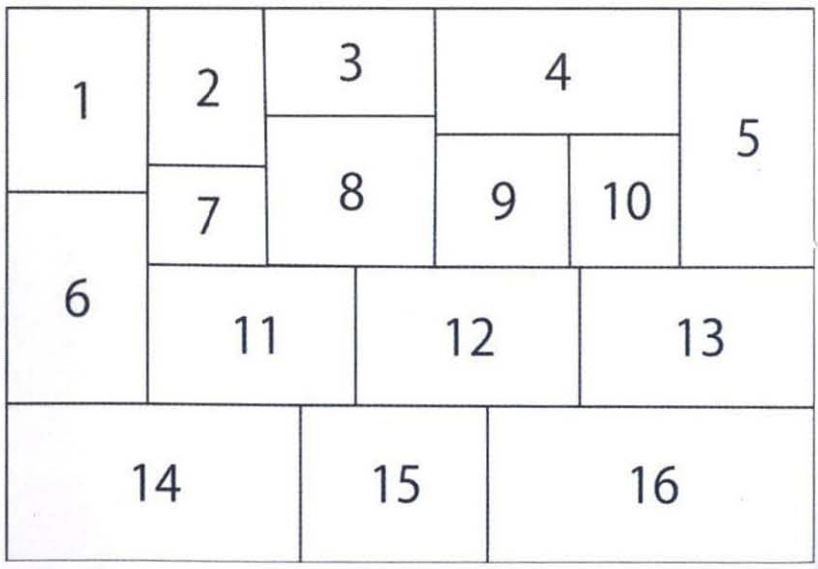
Sameer Kehimkar
7. Malabar Gliding Frog

M. Ramesh Babu
8. Indian Elephant

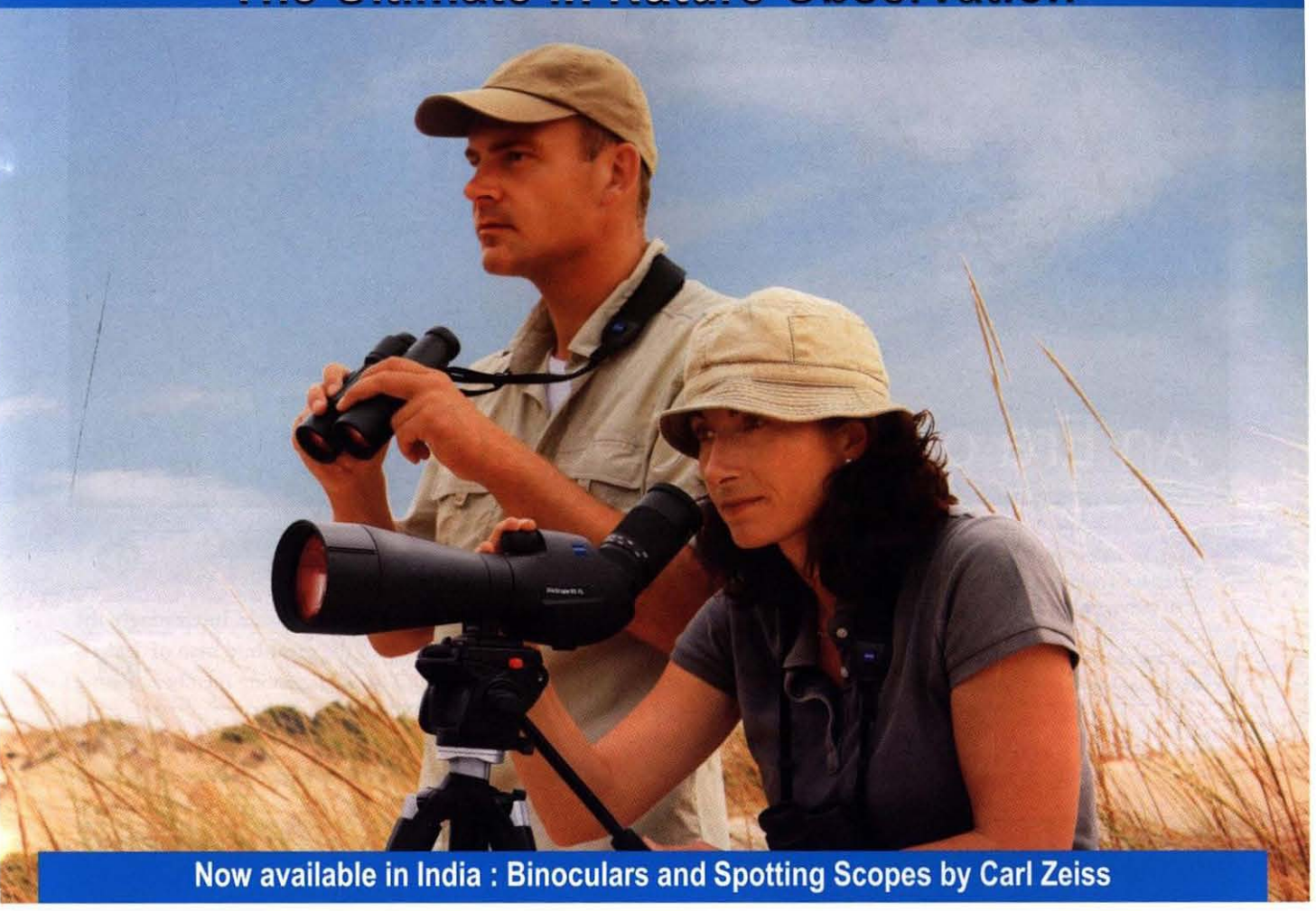
Isaac Kehimkar
11. Subtropical Forest

Vishal Bhave
14. Green Algae

Deepak Apte
15. Starfish
16. Coral



The Ultimate in Nature Observation



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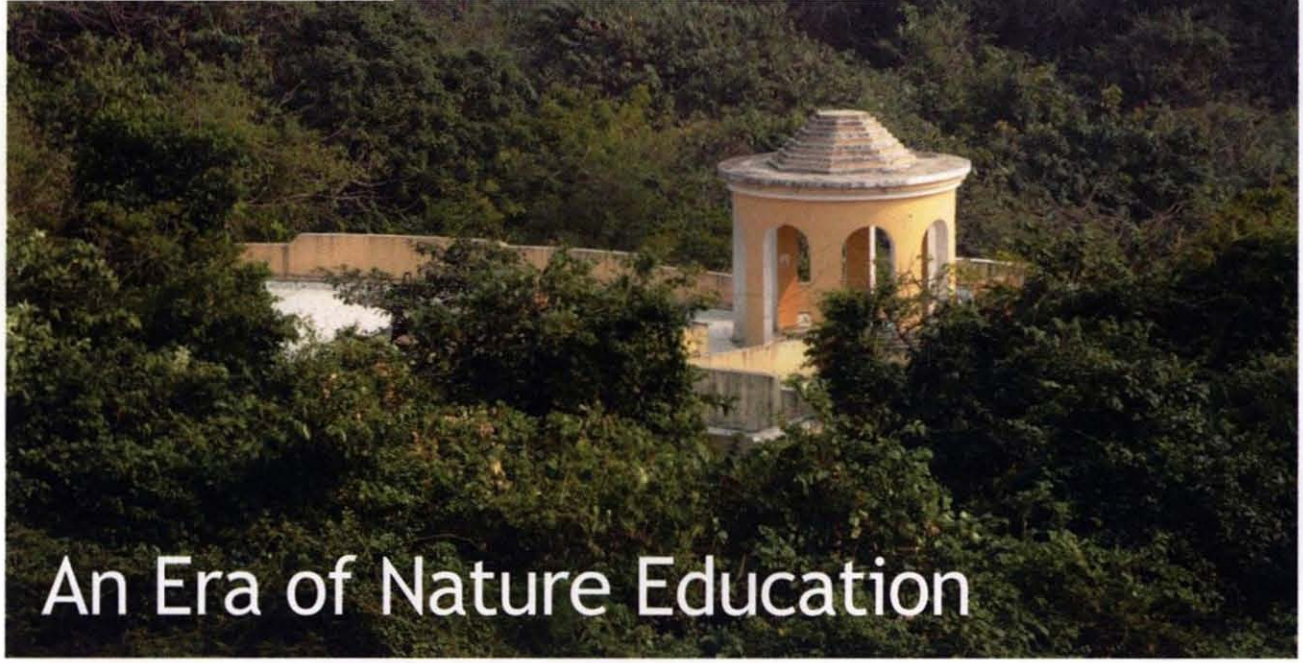


An Era of Nature Education

V. Shubhalaxmi
Photographs: **BNHS Photo Library**

Nature education was initiated by the BNHS in the 1930s on a small scale. Interestingly, the first education officer of the BNHS was none other than the great bird man of India – Dr. Sálim Ali. From a humble beginning of creating awareness among members, nature education has today become one of the major activities of BNHS.

The BNHS Nature Reserve (BNR) at Mumbai came into existence in 1983, when the then Prime Minister of India Mrs. Indira Gandhi announced during BNHS's Centenary celebrations that the Government of Maharashtra would lease 33 acres of forest land to BNHS to conduct nature related activities. The Conservation Education Project launched in 1993 got its first full-fledged Conservation Education Centre (CEC) in Mumbai in 1997. Since then, there has been no looking back; the Conservation Education Centre at Delhi, situated in Asola Bhatti Wildlife Sanctuary, became functional in 2005, thanks to the personal initiative of Mrs. Sheila Dixit, Chief Minister of Delhi. Today, both are proactive centres that educate young and old alike, and work towards cultivating an ethos that will benefit the natural environs of our country.

CEC-Mumbai

CEC-Mumbai was the first of its kind to promote conservation education in Mumbai. It rose to fame with its unique formula of 'education with fun'. The Centre's anthill-like building intrigues every visitor. An oasis of serenity, the CEC attracts nature lovers from the city. People from all walks of life visit the Centre throughout the year, and more than 26,000 participate in various programmes. Though there are several government designated Centres of Excellence for environment education across the country, none are as vibrant and uniquely positioned as CEC-Mumbai. It is probably India's first of its kind nature education centre and aims to become better.

Surrounded by a pristine, sprawling, moist deciduous forest that changes colour with every season, CEC-Mumbai's proximity to the Sanjay Gandhi National Park is an added bonus to its visitors. Much of the richness of plant and animal life flows into the Centre's environs. Occasionally the prince of this jungle – Leopard – roams the terrain; Sambar forage around in the late evenings, frequenting the water hole behind the building. In summer, the water hole becomes a swimming pool for many forest birds like bulbuls, doves and flycatchers. Troupes of Bonnet Macaque and Hanuman Langur assemble on the towering trees around the Centre. The forest is also home to some internationally acclaimed wildlife: the Atlas Moth (world's largest moth), Painted Lady butterfly (a migrant) and the Pied Crested Cuckoo, which arrives a few days ahead of the SW monsoon. There has been a new record of a Cobra Lily and Earth Star Mushroom in recent years. The main

AICHI TARGETS ACHIEVED BY CEC

Aichi Target No.	Activities by CEC-Mumbai
1	For the past 15 years CEC-Mumbai has been actively creating environmental awareness among its audiences and the number of individuals visiting CEC have increased from 6000 in the first year to 26,000 this year. The emphasis of the programmes has been largely on appreciation of biodiversity and local environment improvement.
4	Since 2006, a Workshop on Green Lifestyles has been initiated wherein participants are encouraged to use environment-friendly products. This has been extended to 26 housing societies through an ENVIS project of the Maharashtra State Government. We have also a tie-up with waste recycling companies, such as Hanjer Pvt. Ltd and E-carnation Pvt. Ltd, to promote waste recycling and e-waste disposal. CEC is also promoting waste segregation and compost making with help from demonstration units.
5	The BNHS Nature Reserve has enjoyed complete protection since 1984 when it was a degraded forested area. Over the years the vegetation has been regenerated and the secondary forest has flourished well. The biodiversity of the area has been enhanced and new species can now be recorded at the site.
9	Currently CEC has included de-weeding programmes in its corporate volunteering programmes to remove invasive alien species, such as *Eupatorium* and *Gliricidia*. All BNHS tree plantation activities emphasise planting of indigenous species.
11	CEC has helped government agencies such as City Industrial Development Corporation (CIDCO), and Film City is safeguarding their green zones. In 2008, we conducted a biodiversity study and provided a masterplan for a Nature Park in Navi Mumbai for CIDCO. Currently, we are working with Film City, Mumbai, to establish a biodiversity park.
14	There are a few hamlets in the vicinity of the BNHS Nature Reserve that depend on ecosystem services, such as firewood, forest produce and water. These locals are also employed at CEC as support staff and casual labourers.
15	The BNHS Nature Reserve has been successfully restored through protection.

In the last 15 years, CEC-Mumbai has designed and implemented 38 educational projects, developed 325 educational resources and two online courses in natural history.

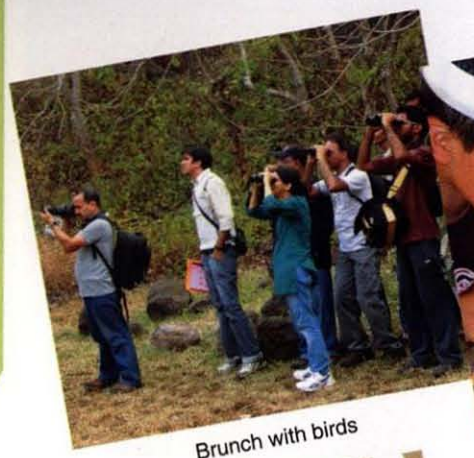
attraction for all programmes at the Centre is its enthralling nature trails. There are five diverse tracks – Stream trail, Karvi trail, Leopard trail, Sálim Ali Trail and Temple Trail – that lead into the heart of the forest, offering a peek into the myriad wonders of wilderness. The observation tower on the forest road oversees the forest valley and highest Sálim Ali Point. In the monsoon, the forest turns magical as the seasonal streams come alive amidst abundant greenery.

What started as basic environmental programmes for schools soon evolved into active Hornbill Nature Clubs (named after the BNHS's signature bird) with emphasis on curriculum-based outdoor activities. The Centre redefined the meaning of excursions for colleges with the launch of 'Be a Scientist for Day' programme, wherein students were able to learn field biology techniques. Corporate Social Responsibility and employee engagement programmes of corporates experienced a dynamic change when employees from the corporate sector were offered opportunities to volunteer in CEC activities and to support local environmental causes. Eco-Birthday programmes are helping inculcate green values at a tender age. By embedding environmental consciousness in every programme, the Centre has become an agent of change; these activities are now being adopted at Thane and Navi Mumbai.

CEC-Mumbai announces internships for undergraduates to learn job skills in environmental nonprofit sector every summer.

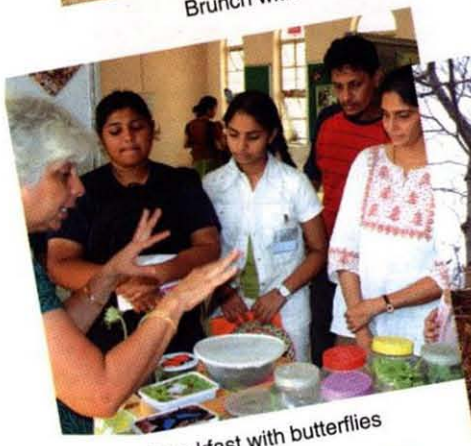
A Sambar at a water hole near CEC-Mumbai

Nature camps are another popular activity from the bouquet of the programmes that keep the Centre buzzing during summer and winter vacations. Altogether 15 theme camps have

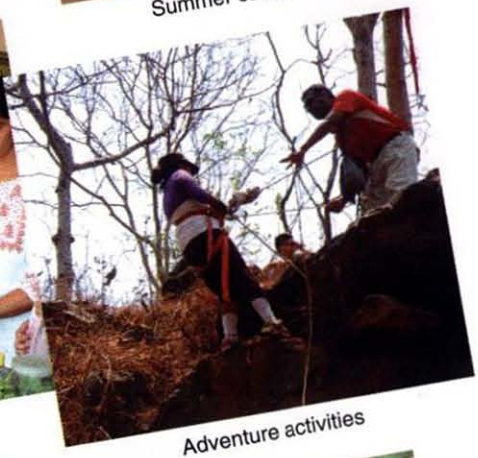


Brunch with birds

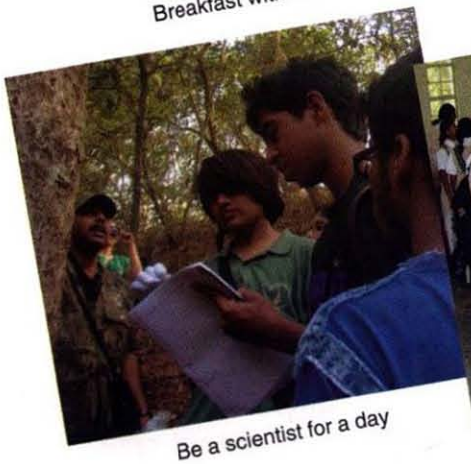
Summer camp for children



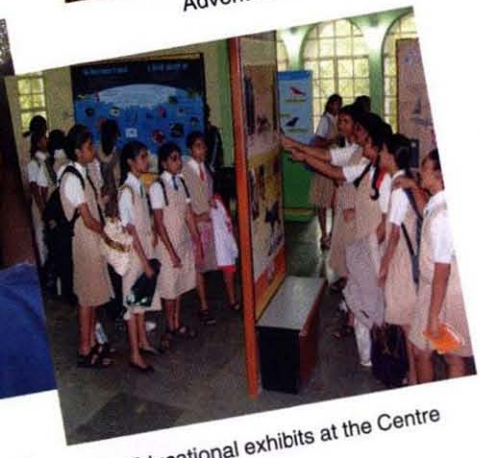
Breakfast with butterflies



Adventure activities



Be a scientist for a day



Educational exhibits at the Centre

been developed and conducted for children, youth and families.

One of the star attractions at CEC-Mumbai are the Special Events that are conducted annually. It all began with the innovative programme in 2004 – Breakfast with Butterflies – a concept borrowed from New York's Bronx Zoo. It was customised for the Indian scenario, and was first held in India. With a butterfly species diversity of 150 species the venue was perfect for the event.

Our CECs are able to sustain themselves, despite the economic slowdown, because of continuous innovation and value added programmes that are offered with full integrity and authenticity. In fact, the awareness of values of biodiversity have resulted in some of our members setting up specific groups to voice their resentment against activities that are detrimental to the environment. The Save Rani Bagh team is one such group.

CEC-Delhi

CEC-Delhi, a joint venture by the Government of NCT Delhi and BNHS, has since 2005 been reaching out to nature enthusiasts from Delhi and the neighbouring states through a number of programmes from the Asola Bhatti Wildlife Sanctuary. The Centre provides every visitor with a chance to gain first hand experience in the field. The guided tours through the forest help capture every participant's attention to everything from small organisms to large animals and plants. These trails open the eyes of a casual visitor to an otherwise unnoticed world around. The carefully planned Display Room and Interpretation Centre at Asola makes a trip to the Centre complete.

The Interpretation Centre offers the nature enthusiast a space to spend happy

CEC-Delhi also caters to Residents Welfare Associations, Corporate groups, E-groups and other NGOs through outreach programmes like nature exploration walks, workshops, slide and movie shows, and seminars.

Nineteen panels introduce visitors to the CEC, its vision and mission; India's tradition of conservation; amazing wildlife of India; threatened species; and a glimpse into the biodiversity of Delhi and its environs. The panels also detail the diverse flora and fauna of Asola Bhatti Wildlife Sanctuary.

hours in the most educative way. Interactive bilingual displays give a thorough introduction to the concept of conservation. Movies and slide shows are shown to give a better understanding of the amazing biodiversity of the country and the need to conserve it.

Recently CEC-Delhi activities have spread to the surrounding areas into Delhi's gardens and other forested areas. The weekly nature walks have gained great popularity. In future, we are also planning to conduct nature camps in collaboration with the Forest Department.

Both the BNHS CECs are well-equipped with infrastructure for dissemination of educational programmes to educational institutions, corporates, professionals and housing societies. The Centres offer a choice of programmes based on the 5E principle – Engage, Explore, Explain, Extend and Evaluate. Every programme is laid on a solid foundation of natural history coupled with topical environmental concerns delivered by trained and passionate educators and volunteers.

Volunteering for natural history activities was not a popular concept in India; CECs changed the way volunteers are trained, engaged and cared for. Since 2004, we have been conducting regular training programmes and training new hands to support our activities. Till now around 180 professionals have been trained.

To broaden its outreach, BNHS today also offers distance learning courses such as Leadership Course in Biodiversity Conservation, Basic Ornithology, Field Botany, and Basic Course in Entomology, the country's first such course to be offered online.

Being part of an education endeavour, the primary role of our CECs is to impart nature education. We are, however, also promoting environment-friendly practices, providing a platform for advocacy and liaison with decision-makers, and providing consultancy and training in conservation education (Aichi Target T1, 19). That our efforts arouse people's interest in conservation and get them to incorporate nature conservation into their way of life is our ultimate aim. ■

About 45,000 visitors have participated in various activities conducted at the CEC, Delhi since its inception. The Centre reaches out to over 100,000 people to create awareness of environmental issues every year through exhibitions at popular events like Dilli Utsav, Eco-club meets, exhibitions at Dilli Haat and exhibitions at various schools across the capital.

Nature workshops for school children

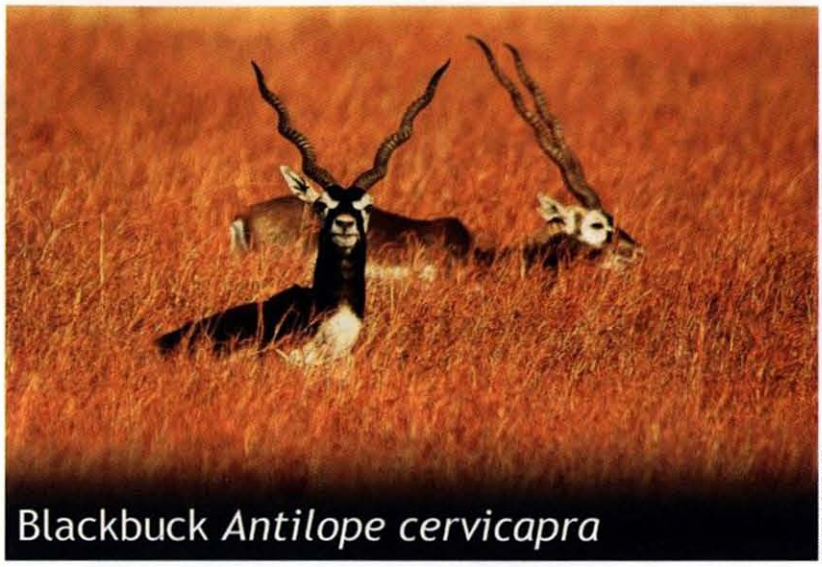
Interpretation Centre

Family programmes

Painting competition

Eco Club exhibition was visited by Mrs. Sheila Dixit

Earthwatch - local volunteers



Blackbuck *Antilope cervicapra*

YUVRAJ GURJAR

The Blackbuck is almost endemic to India, with a reintroduced population in Pakistan and a small herd surviving in Nepal. During studies on the Great Indian Bustard and dry grasslands, records of all Blackbuck sightings were maintained and in 1991, a detailed paper on Blackbuck distribution was published by the BNHS. Although many behavioural and ecological studies have been conducted on the Blackbuck, its all-India status was not known till then.

Blackbuck is listed under Schedule I of the Indian Wildlife (Protection) Act, 1972, and thanks to protection by the Forest Department and local communities, its numbers have increased in many areas. As it is an inhabitant of short-grass plains, it is generally not found in many protected areas. Tal Chhapar Wildlife Sanctuary in Rajasthan and Velavadar National Park in Gujarat have been established mainly for Blackbuck protection, and both have thriving populations. The BNHS was the pioneer in highlighting the problems of Blackbuck protection in Point Calimere Sanctuary in the 1960s through reports and papers. About 700 Blackbuck are found in this Sanctuary – the southern-most record of this animal – which is mainly found in north, north-west and central India.

The Blackbuck is the sole representative in India of the genus *Antilope*. Its striking colour and its beautiful spiralled long horns give it an elegance hardly equalled by any antelope. This exclusively Indian animal, perhaps the most beautiful of its kind, is a well-known feature of folklore, culture and religious scriptures. ■

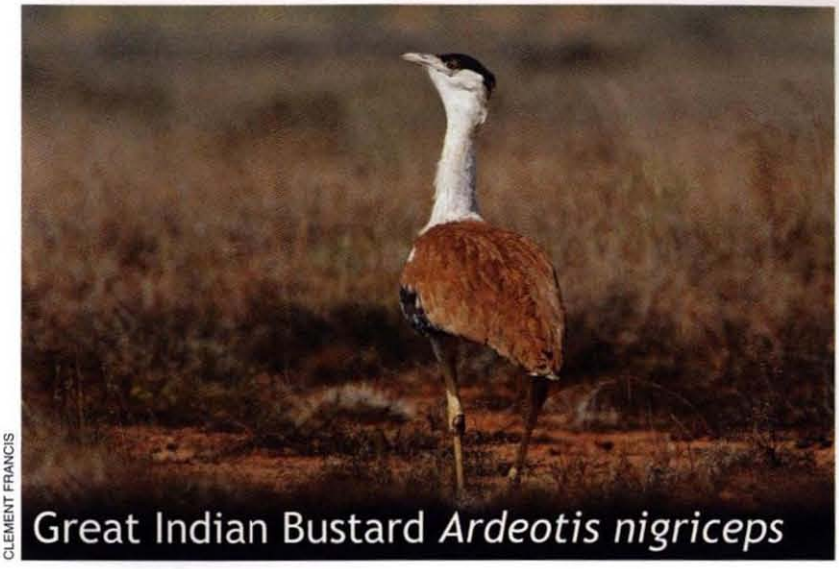
Chousingha *Tetracerus quadricornis*

KOUSTUBH SHARMA

The Four-horned Antelope is a monotypic species and mainly endemic to India, with a small population in Nepal. It is the only wild animal with four horns, hence this name. With its unique four horns, it is taxonomically important. This dainty, 16-20 kg small antelope is found in thorny and dry deciduous forest in broken stretches of country with easy access to water. Practically nothing was known about its ecology and behaviour before BNHS studies in Panna National Park, Madhya Pradesh, from 2003 to 2006 by Koustubh Sharma. Though widely distributed, it is not common and has always been known as a shy and elusive animal. It is highly dependent on flowers, fruits, pods and fresh leaves, hence its distribution changes with the seasonal availability of food. It is a solitary animal or lives in small family groups. The males are highly territorial and maintain middens and scent marks to deter other males. It evades detection from predators by hiding and freezing, but sprints fast when chased. It is listed as Vulnerable in the IUCN Red List due to its low density, and shrinkage and fragmentation of its preferred habitat. The female gives birth to one, sometimes two fawns.

Habitat comprising a forest with high diversity, moderately high grasses and understorey, low disturbance and good availability of water is crucial for the survival of this species. From foraging requirements to avoiding predators, the Chousingha is extremely sensitive to habitat alterations, and is often amongst the first to be affected by these. ■

One of the longest studies of any species by BNHS is on the Great Indian Bustard (GIB). Initial study in the early 1980s was funded by US Fish and Wildlife Service that resulted in remarkable insights into the behaviour, ecology, distribution and status of this magnificent bird of Indian short grass plains and deserts. Later, studies continued under the Grassland Ecology Project and other projects. Site-specific recommendations were given to protect the GIB and its habitat, but unfortunately no action was taken by the Government, as a result of which GIB is now listed as Critically Endangered by BirdLife International and IUCN. As the GIB lives in low density in a large landscape, more or less totally occupied by man and livestock, it is not easy to protect this species. Recently, the BNHS with the help of WWF-I, MoEF, state governments, and many experts prepared a GIB Recovery Plan. The implementation of this plan will help the save this bird and also achieve Aichi Target 12. The total population is estimated to be less than 300 individuals, scattered in six states (Rajasthan, Gujarat, Madhya Pradesh, Maharashtra, Andhra Pradesh and Karnataka). The largest population of about 150 birds is found in the Thar Desert of Rajasthan. As the birds move to the Pakistan Thar, they come under acute hunting pressure and international cooperation is required to save the GIB. Since GIBs inhabit a largely human impacted landscape, a captive breeding programme is urgently required to save it from extinction. ■



CLEMENT FRANCIS

Great Indian Bustard *Ardeotis nigriceps*

Even before joining as Director in May 1997, Dr. Asad R. Rahmani had highlighted the decline of *Gyps* species of vultures, based on newspaper reports and discussion with experts. Scientific evidence of vulture decline was provided by comparative studies conducted by Dr. Vibhu Prakash of BNHS at Keoladeo National Park, Rajasthan, and later, from surveys all over India. Initially, a virus was blamed for the steep decline, but in 2003 studies conducted in Pakistan by Lindsay Oaks and his team identified the culprit – a non-steroidal anti-inflammatory drug, diclofenac sodium, given to livestock was responsible for killing vultures in South Asia. In the Vulture Species Recovery Programme, developed by BNHS, RSPB, MoEF, IVRI, state governments and other organisations, a complete ban on veterinary use of diclofenac and conservation breeding were the two major steps. In May 2006, the Government of India banned veterinary use of diclofenac, thanks to advocacy by BNHS and RSPB. However, villagers started using diclofenac meant for humans for cattle. To achieve effective implementation of a total ban on diclofenac is a major challenge. The BNHS-RSPB conservation breeding programme is doing well at three sites (Pinjore, Haryana; Buxa, West Bengal; and Rani, Assam) and more than 50 vultures have been bred till now. Restoring vulture populations in the wild is a major challenge and an important achievement of Aichi Target 12.

The BNHS Vulture Programme is a good example of how various conservation bodies can come together and work with governments to save a species. ■

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Gyps Vultures

Houbara Bustard *Chlamydotis undulata*

YOGENDRA SHAH

Houbara is the most widespread of the bustards of the world, being found in nearly 50 countries as three subspecies, which are sometimes considered as full species. The taxon that comes to India during winter is called the Macqueen's Bustard *Chlamydotis macqueeni*. Wherever it occurs, it is extensively hunted, mainly for sport falconry and food. In Arab countries, falconry pressure is extremely intensive, and rich Arab falconers spread out to hunt this bustard in Pakistan, north Africa and even in Central Asia. In India, it is relatively safe as Arab falconers are not allowed to hunt it. Many captive breeding programmes are going on in the Middle East and N. Africa mainly to augment the population for hunting purposes.

During surveys in the Thar Desert in 1990s and 2000s, information on the status of the Houbara Bustard was collated by a team of BNHS scientists. The bird is found in winter in the Thar Desert, with stray birds reported even from Baran district in Rajasthan. In Gujarat, it is mainly found in Kutch and Surendranagar districts, with stray birds in the Saurashtra region. The birds found in India mainly originate from Central Asia, Mongolia and Outer Mongolia. Destruction of grasslands, spread of monoculture and GM crops, infrastructure development, windmills and power lines are the main threats in Gujarat, while in Rajasthan hunting is still a major threat, along with other factors mentioned for Gujarat. It is relatively safe in the Desert National Park, and in the large field firing range of the Indian Army. ■

Chinkara *Gazella bennettii*

ASAD R. RAHMANI

The Indian Gazelle or Chinkara is thinly and widely distributed in north, north-west and central India in drier biotopes. It is best seen in the Thar Desert of Rajasthan and Gujarat, but it also lives in dry deciduous and tropical thorn forests, particularly in broken and uneven country. A countrywide field and literature survey was conducted by BNHS in the 1980s, and detailed survey of the Thar Desert in Rajasthan was conducted from 1992 to 1994, and since then, surveys were repeated in the early 2000s. Survey results were published in the form of research papers and as chapters in books.

Chinkara is considered sacred by the Vishnoi community in Rajasthan who protect it fiercely, hence a high density is encountered in areas where this community is dominant. Chinkara is also present in more than 100 protected areas, at variable densities, in 11 states of India. Although its population has drastically declined in the Thar Desert, and in some protected areas due to dense growth of vegetation, it is not in immediate danger of extinction. It is listed under Schedule I of the Indian Wildlife (Protection) Act, 1972.

A shy animal, the Chinkara avoids human habitation. It can go without water for long periods and can get sufficient fluids from plants and dew. Although most individuals are seen alone, they can sometimes be spotted in groups of up to four animals. The males are territorial and hold territories of about 200 km. ■

After the pioneering studies of R.S. Dharmakumarsinhji in the 1950s, the BNHS started scientific studies on this semi-endemic bustard of India in the mid-1980s by conducting extensive status surveys and ecological studies in selected sites. The late Dr. Ravi Sankaran obtained his doctoral degree on the species, studying its ecology and behaviour based largely in the Sailana grasslands of Madhya Pradesh. For breeding, the Lesser Florican is totally dependent on grasslands that come up during the monsoon, particularly in north-west India. It arrives with the monsoon and departs once it is over. During the non-breeding season, it can be found anywhere in north, central and south India. Its post-monsoon movement has not been studied, which needs to be urgently addressed with the help of satellite tracking, considering its long distance migration and movements.

ASAD R. RAHMANI

Lesser Florican *Sypheotides indica*

The BNHS was able to map the major breeding areas of the Lesser Florican, and some grasslands were given protection by the Forest Department. As the bird moves and breeds in a large area, sometimes in agricultural fields, it is important to involve locals in its protection.

The Lesser Florican is listed in Schedule I of the Indian Wildlife (Protection) Act, 1972, and considered Endangered by BirdLife International/IUCN. Protection and proper management of seasonal grasslands, control on hunting and use of pesticides are urgently required to save the species. BNHS and WWF have helped the MoEF to prepare a Lesser Florican Recovery Plan, which needs to be implemented urgently. ■

The Nilgiri Laughingthrush, also called Rufous-breasted or Black-chinned Laughingthrush is endemic to the Nilgiris in the Western Ghats with very restricted and severely fragmented range. It is considered Endangered by BirdLife International and IUCN. Recent studies by BNHS reveal that it is generally found above 1,900 msl in shola forest with dense undergrowth and moist, shady lower storey vegetation of evergreen and semi-evergreen type, especially in wooded ravines and forest edges. Total world population is estimated to be between 1,800 and 2,000 in about 1,800 ha in scattered forest patches. A study by Ashfaq Ahmed Zarri of the BNHS found a high percentage of infertile eggs, indicating the impact of heavy use of pesticides by agriculturists and tea planters. Gradual encroachment on the shola habitat by plantation owners and villagers by burning and thinning of shola edges is a common practice near human settlements. Mukurthi National Park, an IBA, and some protected shola forests are the sites of hope for the long-term survival of this endangered species. BNHS has given specific recommendations in a recent book, THREATENED BIRDS OF INDIA, by Dr. Asad R. Rahmani. ■

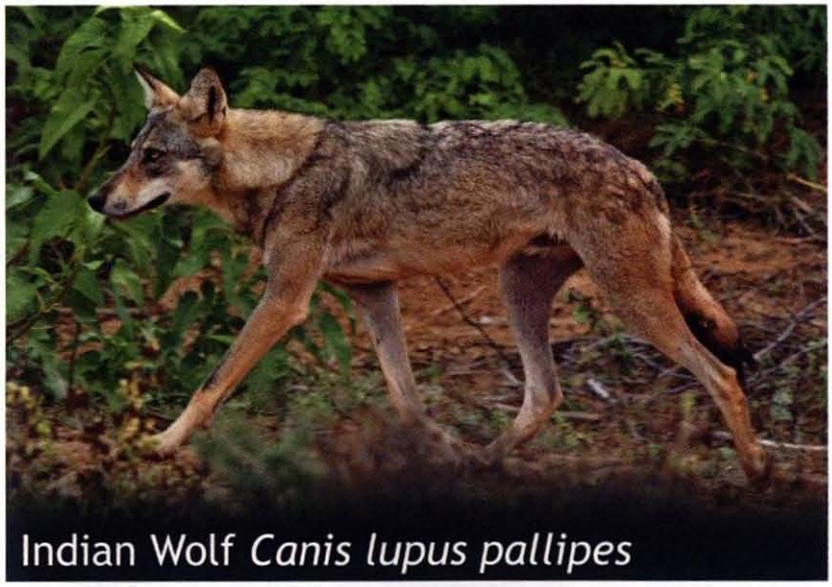
SANDEEP DAS

Nilgiri Laughingthrush *Garrulax cachinnans*

J.D. MARCUS KNIGHT

Hill stream fishes of Western Ghats

The Western Ghats are a region of high diversity and endemicity of fish fauna, primarily due to their latitudinal and altitudinal gradient variations. Fish communities of the torrential hill streams are highly specialised and sensitive to changes in their habitats, largely caused by anthropogenic activities. This has resulted in some of the more specialised species being threatened by extinction. Considering these factors, the BNHS carried out a study to assess the status, distribution, habitat preference and threats facing the hill stream fishes of the Western Ghats in Kerala. The project was undertaken by Dr. C.R. Ajithkumar and two research fellows C.R. Biju and K. Raju Thomas During the study, a total of 39 of the 44 rivers of Kerala were surveyed, and a total of 115 freshwater species belonging to 58 genera of 27 families and 10 orders were recorded. Thirty-five of the recorded species are endemic to the Western Ghats and 11 to Kerala. Twenty-nine of the species fall under the Critically Endangered and Endangered category of the IUCN Red List. Fifteen species recorded by earlier workers were not recorded during the study. Nine exotic species were recorded, some of which have become common in the rivers of Kerala. The identified conservation issues of hill stream fishes and their habitats were the imapct of dams, diversion of water for irrigation, fisheries, sand mining, aquaculture and exotic fish introductions, and pollution among others. Conservation recommendations were made for key sites. ■



DHARMENDRA KHANDAL

Indian Wolf *Canis lupus pallipes*

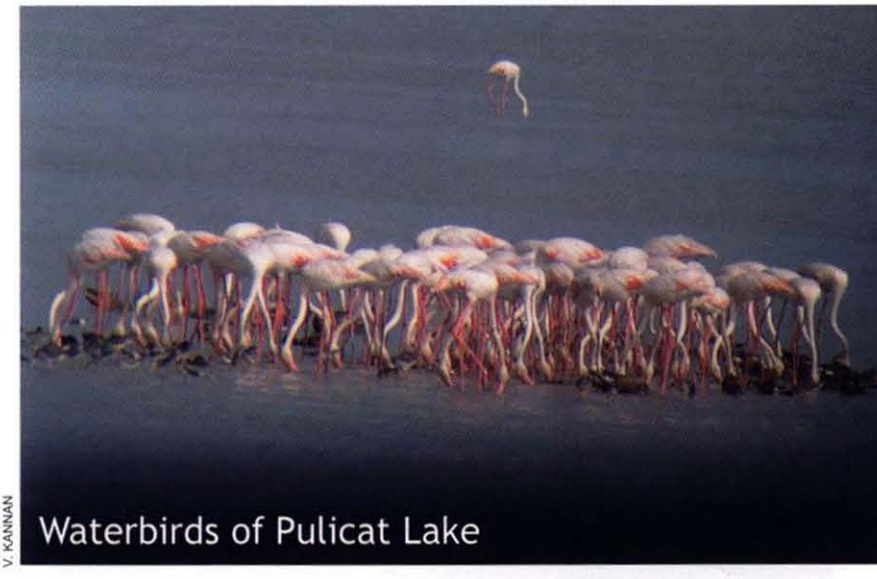
Ecological studies on the Indian Wolf *Canis lupus pallipes* were conducted in Solapur, Maharashtra, under the BNHS Grassland Ecology Project from June 1991 to September 1994 by Satish Kumar. Intensive study was done in the Great Indian Bustard Sanctuary, Nannaj. Three wolf packs, namely Nannaj, Gangewadi and Mohol packs, were studied for movement pattern, predation, habitat use, breeding biology, status and distribution. The packs were located 20-25 km apart from the core area of their home range. We reported 53-85 individuals in Solapur district and identified 11 packs of 2 to 12 individuals. The rendezvous sites were located in scrubland with 20-30% vegetation cover and the first rendezvous site was located closest (0.13 km) to the natal den. Predation by wolves on its major prey Blackbuck *Antilope cervicapra* was significantly higher than on livestock during the non-breeding period when wolf pups were more than six months old, whereas predation was higher on livestock during the denning period till pups attained six months of age. The dens were located in cropland, as well as protected grassland and plantation patches. Breeding wolves excavated two to five dens simultaneously during the breeding season and shifted pups among them for safety.

In the Thar desert, wolves are known to shelter from the heat in burrows dug in the sand dunes. Elsewhere, there is more shade and they remain above ground, lying up in fields, or patches of scrub and thorn forest. ■

M. RAMESH BABU

Elephants of the southern Eastern Ghats

Studies on the Asian Elephant *Elephas maximus* in the southern Eastern Ghats were carried out under three projects by Dr. Ranjit Manakadan. Under these projects, studies were undertaken to assess the population, distribution, habitat, human-elephant conflict and conservation issues of elephants in Koundinya Wildlife Sanctuary and Sri Venkateswara Wildlife Sanctuary-National Park of Andhra Pradesh, the Hosur and Dharmapuri Reserve Forests of Tamil Nadu, and the Biligiri Rangaswamy Temple Wildlife Sanctuary, Cauvery Wildlife Sanctuary and Kollegal Territorial Forest Division of Karnataka. With these studies, the situation of the elephants and their habitats in these sites have got well-documented, providing a better picture of the long-term conservation potential for elephants in these areas. Additionally, the findings have helped us understand the causes and consequences of elephant dispersal, offering insights into why elephants disperse and their impacts on the areas intervening on the dispersal routes and in colonized sites, which will be of help to wildlife managers to better manage problems associated with dispersal and colonization by elephants. Problems facing the elephants of the Eastern Ghats are a number of human related pressures and disturbances. ■



V. KANNAN

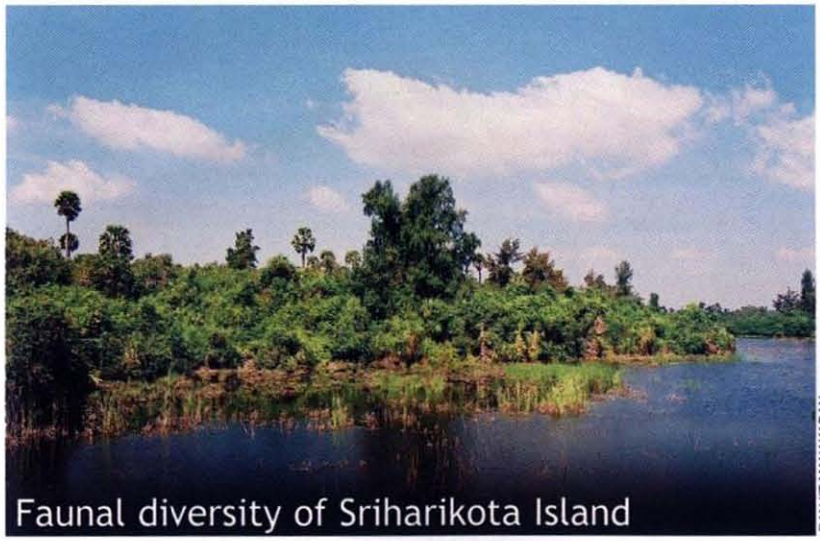
Waterbirds of Pulicat Lake

Pulicat Lake, the second largest brackish-water lagoon in India, is renowned as a refuge for waterbirds in southern India. Till this study, most of the information on the waterbirds of Pulicat Lake was based on studies and records from the central part of the lake. This project documented the distribution, species composition, abundance and conservation of waterbirds in the whole lake. A total of 113 waterbird species were recorded in Pulicat Lake, including in the adjoining wetlands. The northern areas of Pulicat Lake were significantly lower in species richness and abundance of waterbirds than the central and southern areas, mainly since water is available there only for a short period during the N.E. monsoon. The central area attracts birds during the N.E. monsoon, and till mid-February for the Sullurpet-Sriharikota stretch (till it dries up), and throughout the year for areas further south that remain wet. The southern lagoon areas, which have water throughout the year, are 'bird poor' and support only swimming birds (cormorants, gulls, etc.) or aerial feeders (terns and wetland raptors), the other species being able to forage only at the margin. Pulicat Lake and its adjoining wetlands and heronries face numerous problems such as overfishing, pollution, siltation, decrease in freshwater inflow, encroachment, poaching, electrocution of birds by power lines, loss of nesting trees, and growing urbanisation. Many of these problems are complex, some extend beyond its confines, e.g., the inflow of water and silt from rivers, and those associated with the livelihood of local communities. Recommendations have been made to alleviate or tackle these problems. ■

Spot-billed Pelican *Pelecanus philippensis*

V. KANNAN

The Spot-billed Pelican, formerly common across much of Asia, in hundreds of thousands, is one of the most threatened pelican species of the world. To assess its current population and identify the conservation issues facing the species, a three-year study was undertaken in southern India. Under the project, intensive studies were carried out on the species in Pulicat Lake (foraging ground) and Nelapattu (breeding site) in the bordering states of Andhra Pradesh and Tamil Nadu, and surveys and short study trips were carried out in their foraging and breeding sites in the states of Andhra Pradesh, Tamil Nadu, Karnataka and Kerala by V. Kannan. The findings revealed that the population of the Spot-billed Pelican in the four southern states ranged around 2,850 to 3,700 birds, significantly higher than earlier estimates. However, the Pelican was facing a multitude of pressures, such as conflict with fishermen, pollution, destruction of wetlands, proliferation of weeds, loss of nesting trees, disturbances to breeding sites, fatalities from power lines and poaching. The future of nesting colonies in protected areas appeared safe, but since breeding success depends on food supplies, it will only be assured if their foraging grounds are safe. Breeding colonies and wetlands not under government protection are likely to disappear with the decline in community support and increasing human demands on land and natural resources. A directory of the important foraging and nesting sites in southern India was an outcome of the project. ■



Faunal diversity of Sriharikota Island

RANJIT MANAKADAN

Documentation of biodiversity is one of the first necessary steps in the conservation of species and wildlife habitats. On the initiative of the Indian Space Research Organisation (ISRO), the BNHS undertook a project to document the faunal diversity of Sriharikota Island with reference to the mammal, bird, reptile, amphibian, fish and butterfly fauna. The island was found to have good populations of the Rusty Spotted Cat *Felis rubiginosa* and Slender Loris *Loris tardigradus*, which makes it an important site for the conservation of these two species. An important discovery was three nesting colonies of waterbirds, making Sriharikota an important breeding site for colonial waterbirds. The seashore on the east of the island serves as a seasonal nesting site for marine turtles. The aquatic habitats of Sriharikota support a diversity of fish species, comprising freshwater, estuarine and marine forms. Sriharikota has one of the last remaining, largest and best-preserved tracts of coastal Tropical Dry Evergreen Forest in India, and considering the increasing loss or deterioration of wildlife habitats, even in wildlife sanctuaries, due to the growing human population and resulting pressures on the natural resources, Sriharikota could in future be one of the few safe biodiversity refuges in India. ■

This study was initiated by Dr. S. Balachandran to document the migration of waterfowl in Asian flyways to assess the hypothesis that H5N1 or Avian Influenza virus is transmitted via wild birds. The migratory linkage between Indian wintering grounds and Qinghai Lake in China, where a major H5N1 outbreak in wild birds occurred in 2005, was studied. Nothing much was known on what effect the epidemic was having on wild bird populations until the BNHS study.

S. BALACHANDRAN

Pathogenic Avian Influenza

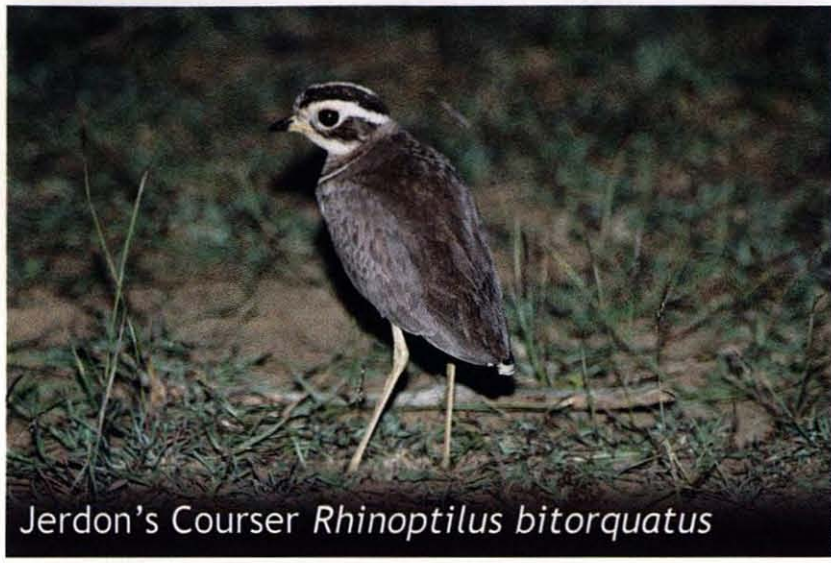
A total of 80 high-risk migratory ducks and geese of eight species, namely Bar-headed Goose *Anser indicus* (25), Brahminy Shelduck *Tadorna ferruginea* (4), Gadwall *Anas strepera* (8), Eurasian Wigeon *Anas penelope* (10), Northern Shoveller *Anas clypeata* (10), Northern Pintail *Anas acuta* (10), Common Teal *Anas crecca* (6), and Garganey *Anas querquedula* (7) were fitted with satellite transmitters by experts from BNHS, United States Geological Survey, Food and Agriculture Organisation, Wetlands International, and Bangor University, at Chilika Lake and Koonthankulam (near Kanyakumari). 750 samples (tracheal and cloacal swabs) from 47 species, and 165 blood samples of 27 species, were collected and tested at the High Security Animal Disease Laboratory, Bhopal, for H5N1 virus and found to be negative.

Preliminary ecological assessments were made in 17 sites from seven states where the PTT fitted birds had moved. The northward movement of PTT fitted Bar-headed Geese from Koonthankulam and Chilika Lake proved that they migrated from China and Mongolia. Bar-headed Geese movement through HPAI outbreak areas of West Bengal was also proved by this study. ■

An ecological study funded by Wildlife Conservation Society, New York was conducted by Dr. Gopinathan Maheswaran on the Hispid Hare *Caprolagus hispidus* at Jaldapara Wildlife Sanctuary, West Bengal. A shy and reclusive species, it is found in the tall grassland habitats of Jaldapara Wildlife Sanctuary in northern West Bengal, apart from Dudhwa Tiger Reserve and Manas National Park in India. Direct sighting is difficult due to its habit of living among grasses that are over 3 m tall. Hence, the population in Jaldapara was assessed indirectly by enumerating pellet density. Tall grassland patches along the Torsa river, dominated by *Saccharum spontaneum* grass, had the least as well as the greatest pellet density. Occurrence of different size class pellets varied significantly within transects, reflecting the presence of different individuals living in different localities. The mean length of the pellets also fluctuated. The density of Hispid Hare in Jaldapara was 1/0.115 sq.km. The short vegetation, ground cover and tall vegetation together determined the occurrence of this endangered species in Jaldapara WLS. The main aim of this study was to make recommendations for habitat management for Hispid Hare and other related species in India and Nepal. ■

G. MAHESWARAN

Hispid Hare *Caprolagus hispidus*



Jerdon's Courser *Rhinoptilus bitorquatus*

SIMON COOK

The Jerdon's Courser *Rhinoptilus bitorquatus* is a small, nocturnal, cursorial bird endemic to Andhra Pradesh. First described by T.C. Jerdon in 1848, it was periodically recorded till 1900. Efforts in the early 1930s and mid to late 1970s to locate it failed, leading to the belief that it was extinct. In 1986, this bird was rediscovered in Cuddapah district, Andhra Pradesh by a BNHS scientist, Dr. Bharat Bhushan. The rediscovery site was declared as the Sri Lankamaleswara Wildlife Sanctuary. Very little information is available on the distribution, ecology, population size, and habitat requirements of the Jerdon's Courser. Classified as Critically Endangered by the IUCN, it inhabits open patches within scrub-forest interspersed with patches of bare ground, in undulating, rocky foothills. Research initiated in 2001 by Panchapakesan Jeganathan of BNHS in collaboration with Andhra Pradesh Forest Department, and other international organisations such as RSPB, UK, resulted in the discovery of three new sites within the Sri Lankamaleswara Wildlife Sanctuary, and the species' call was recorded and identified for the first time. Based on a decade long study on this bird and its habitat, a species recovery plan was prepared and published by the Government of India. Protecting the scrub-forest habitat is the only way to save this elusive bird from extinction. A collective effort of locals, governments and scientists can probably help resolve this matter. ■

Satpuda Landscape Tiger Programme

ANIL DAHULE

With the increasing anthropogenic pressures on the Earth's natural resources, its ecosystems and habitats, species extinctions are rising at an alarming rate, destroying biodiversity and habitats. The tiger has become a symbolic barometer of the decline of biodiversity globally. At the national level, there are concerns about the survival of the tiger in view of severe human-tiger conflict.

A major activity of the Satpuda Landscape Tiger Programme (SLTP) is the Mobile Environmental Education Unit (MEEU), funded by Born Free Foundation, UK, Wildlife Conservation Research Unit, Oxford University and Tata Steel Limited, and coordinated by Sanjay Karkare.

Since its inception in 2005, MEEU has worked at the grassroots level to awaken the potential in the minds of school children and communities living adjacent to tiger reserves. MEEU has delivered outreach education to more than 50,000 school children, sensitized over 700 youths and informed women regarding prodigal use of natural resources. Operating on the fringes of three tiger reserves in central India, MEEU works towards influencing the perceptions of local communities towards biodiversity. MEEU also repairs biogas units installed by the Forest Department on the fringes of tiger reserves. This helps to reduce fuel wood collection from the forest.

The modularity, flexibility, and portability of the unit makes it universally applicable wherever biodiversity is under threat. ■

The Forest Owlet *Heteroglaux blewitti* was considered extinct for 113 years, till its rediscovery in 1997 in Maharashtra. Subsequently, two studies taken up by BNHS revealed information about its status, distribution and ecology. The last study on its status was carried out in 2006 and the results were published in peer-reviewed journals and shared with decision makers. Subsequent surveys revealed a good number of Forest Owlet in Melghat Tiger Reserve in Maharashtra.

A reassessment survey of the status was conducted at selected sites in Maharashtra and Madhya Pradesh from December 2010 to July 2011 by Girish Jathar and Dharmaraj Patil, BNHS Associates. In Maharashtra, a pair was observed in Toranmal Reserve Forest, and six individuals were observed in Khaknar, Burhanpur district of Madhya Pradesh.

GIRISH A. JATHAR

Forest Owlet *Heteroglaux blewitti*

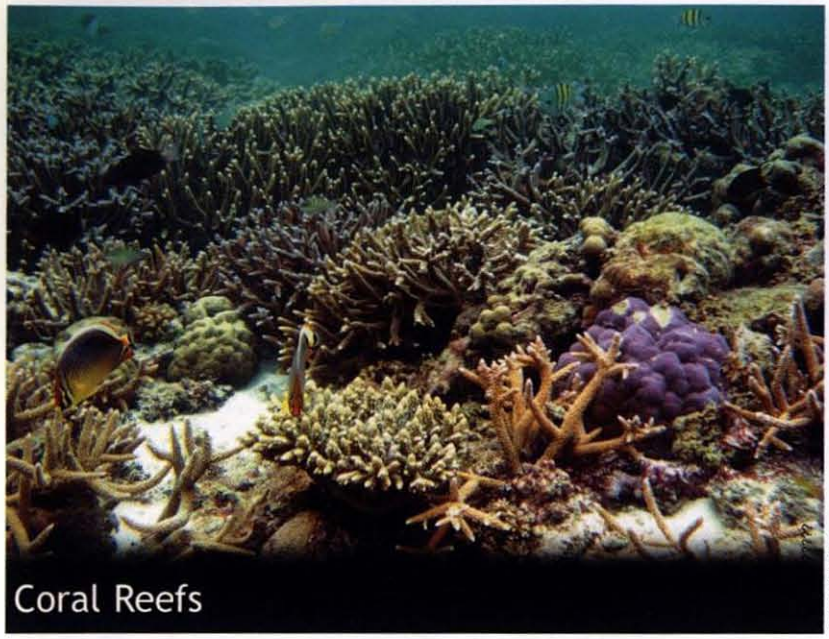
Toranmal and Taloda in Maharashtra are the most vulnerable sites, whereas West Kalibhit in Khandwa district, Madhya Pradesh, is relatively safe. This decline is due to anthropogenic pressures: the local communities are mainly dependent on the forest for their survival. Habitat protection, through community involvement, implementation of law, provision of alternative livelihoods, restoration of ecosystem, minimal use of pesticides and rodenticides, education and awareness are the conservation strategies for the species' future. ■

The Kondana Soft-furred Rat *Millardia kondana* was discovered in 1975 from Sinhgad, Maharashtra. Kondana is a small plateau *c.* 1 sq. km, situated at 1,280 msl in the northern Western Ghats. The species was classified as Critically Endangered by IUCN in 2008.

Under a BNHS project funded by Mohamed bin Zayed Species Conservation Fund 2011, live-trapping was carried from November 2011 to May 2012 by Sameer Bajaru to study the population density and microhabitat preference of *M. kondana*. In 1,538 trap nights, 32 individuals were trapped in an area *of c.* 2 ha; 10 individuals were recaptured in successive sessions. All individuals were trapped in natural vegetation areas surrounding human habitation. They were also trapped at Rajgad and Torna fort located less than 20 km from Sinhgad, in the Bhuleshwar range. These were first records of the species outside its type locality. The burrows are long with multiple openings and small piles of soil deposited outside. Burrows were clumped and scattered, and mostly found around thickets of *Lapidagathis cuspidata*, agave, grass and other forbs. Anthropogenic factors, forest fire, increasing tourism and conversion of natural habitat to other land use appear to be the major threats for the species. Plans for an awareness programme for conservation of the species with active participation of the various stakeholders is currently under progress. ■

SAMEER BAJARU

Kondana Soft-furred Rat *Millardia kondana*



Coral Reefs

DEEPAK APTE

Often called rainforests of the sea, coral reefs are among the most diverse ecosystems on earth. They occupy less than 0.1% of the world's ocean surface, yet they harbour over 25% of all marine species. Plant life such as sea grass, sea weed, algae and phytoplankton form an important component of reef ecosystems. Coral reefs are among the most valuable ecosystems on earth. According to one estimate, they provide humans with living resources (such as fish) and services (tourism returns, coastal protection) worth about $375 billion a year.

Many types of disturbance are changing the face of coral reefs. These include hurricanes, coral bleaching, disease, predators, overfishing, destructive fishing, nutrient loading, sedimentation, hyper- and hypothermic stress, various pollutants, harvesting of reef invertebrates, coral mining, trampling by tourists, and devastation caused by ship anchors and groundings. Many of the cited anthropogenic factors can be reduced by the implementation of scientific management programmes.

Since 2004, on the initiative of Deepak Apte, BNHS has been working in Lakshadweep Islands, Gulf of Kutch and coastal Konkan for the conservation of this highly threatened ecosystem. Project Giant Clam in Lakshadweep, Save Poshitora in Gulf of Kutch, and ecologically sensitive areas in coastal Konkan are part of our coral reef conservation programme. ■

Project Giant Clam

DEEPAK APTE

The majestic Giant Clams are found exclusively in tropical reefs. These bivalves grow over a metre and are the largest living molluscs, known to live over 80 years. They cultivate zooxanthellae (unicellular algae) in their enormous mantle and are simultaneous hermaphrodites. Four species of giant clams are known from India, with the possibility of one more to be recognised. Three of these are protected in India under Schedule I of the Wildlife (Protection) Act, 1972. They are listed in CITES Appendix II and IUCN Red List.

Since 2004, BNHS is working in Lakshadweep towards the conservation of Giant Clams in collaboration with LEAD International, supported by Darwin Initiative and Whitley Fund for Nature through Shears' Foundation. The aim was to establish Agatti Conservation Reserve. The Marine Protected Area (MPA) at Agatti would restore bait fish population in the lagoon, which is fundamental to pole-and-line tuna fishery, the backbone of Lakshadweep's cash economy. After three years of community consultations, in 2008, the Agatti Panchayat agreed to the establishment of the Agatti Conservation Reserve. Since then, the proposal is under consideration by the Lakshadweep administration.

In 2010, Government of India requested BNHS to develop a species recovery plan for the Giant Clam *Tridacna maxima*. The plan was submitted to MoEF, and is under consideration. ■

As part of its 125th year celebrations, BNHS established the Sanmar-Nahar Bird Migration Study Centre at Point Calimere on February 22, 2009. BNHS has been conducting bird migration studies in India since the late 1950s, but had no permanent training centre for migration studies. This is the first centre of its kind, dedicated for ornithological studies and training in India. The centre has been named after its two major donors, Chemplast Sanmar Limited and Mr. Uhamraj Nahar (Nahar Finance, Secunderabad). Significant donations were also received from Mrs. Boers, Retd Dutch Embassy Staff (stationed at Thiruvannamalai), Citibank, Mumbai Branch, Madras Cements (P) Limited, Ion Exchange, and TVS Fastners, Chennai.

BNHS PHOTO LIBRARY

Bird Migration Study Centre

The major objectives of the centre are:

- Undertake bird migration and related research extensively through a network of researchers (professionals and amateurs) in different parts of India.
- Impart training to amateur birdwatchers, researchers and wildlife officials on techniques of bird migration, bird population and behaviour studies.
- Monitor flyway population of waterbirds of India migrating to India through annual, integrated bird population counts.
- Study the precise migratory routes of bird species across the world using satellite telemetry and geolocators.
- Address global issues like avian influenza and other disease outbreaks. ■

Funded by the Sálim Ali Nature Conservation Fund, BNHS and Pirojsha Godrej Foundation Fund for Field Work and Project Formulation Fund, Dr. V. Shubhalaxmi initiated ecological studies on moths in the northern Western Ghats in 1993. The initial focus was on indicator species such as hawkmoths (Family Sphingidae) and emperor moths (Saturniidae) of Sanjay Gandhi National Park (SGNP), Mumbai. The study documented three saturnids and 32 sphingids. Of these, 12 sphingids were range extensions for northern Western Ghats, six were rare species and two were endemic. Ten new larval foodplants for Emperor moths and 33 for Hawkmoths were recorded. In 2006, a Hawkmoth form, *Sataspes tagalica* f. *hauxwellii* new to India was discovered from SGNP.

V. SHUBHALAXMI

Moth Studies

In 2004, eight sites in northern Western Ghats were studied. The study documented 418 moth species from 28 families. Of these, 11 species from five families were new records for India, 130 species from 16 families were range extensions, and 25 species from six families were endemic to India.

In 2011, a brief study was carried out in Arunachal Pradesh in search of a new moth *Elcysma* sp. in Talle Wildlife Sanctuary, Lower Subansiri district. The moth was not sighted, but 368 moth species from 20 families were recorded for the first time. Of these, 36 species were endemic to India, 95 species were range extensions and 42 species were new records for India. ■

Conservation of Wild Buffalo (*Bubalus bubalis arnee*) in Central India

P.M. LAD

The forest of Chattisgarh at the borders of Maharashtra and Andhra Pradesh supports the last population of the central Indian Wild Buffalo. BNHS initiated a programme to confirm its presence in the border areas of these three states, mapping the habitats and their continuity and enlisting habitat-wise conservation issues.

Intensive surveys by Rushikesh Chavan, spread over three years, resulted in establishing the presence of the last remaining populations in the Kopela-Kolamarka forest. The surveys also revealed that the buffaloes migrate locally from Chattisgarh to Maharashtra. A detailed study of the threats and recommended conservation measures were mapped out for the Wild Buffalo.

As a result of the survey, Kopela-Kolamarka was recognised as an important biodiversity area; efforts are on to declare it as a Wild Buffalo sanctuary. The Chattisgarh government formed a task force for conservation of Wild Buffalo. BNHS was a member of the Task Force and gave recommendations, especially on the captive breeding programme envisaged for the species.

Currently, there are only two known populations in Udanti and Indravati Wildlife Sanctuaries. Hopefully, Pamed still has five to eight individuals left. In all, the central Indian population could be less than 50. ■

All India Coordinated Project on Taxonomy of Mollusca: Gujarat

BHAVIK PATEL

Mollusca, the largest marine phylum, comprising about 23% of all known marine organisms, are soft-bodied animals which have developed the capacity to build their own 'house' or shell. The shell helps to classify molluscs, but some molluscs have vastly reduced shells inside the body, or the shell may be absent.

Taxonomy and conservation go hand-in-hand where taxonomy plays an important role in any conservation action. Along the west coast of India the molluscan diversity is poorly documented. To fill the lacuna existing in information on marine mollusca, the Ministry of Environment and Forests under the All India Co-ordinated Project on Taxonomy initiated a data inventory study in 2004. BNHS has been given the task of documenting molluscan fauna of Gujarat on the west coast of India. During the survey by Deepak Apte and Bhavik Patel, the entire coastal stretch of Gujarat was covered.

Intertidal habitats were carefully searched to prepare the inventory, which consisted of Bivalves (31 families, 154 species), Gastropods (60 families, 311 species), and Opisthobranchs (24 families, 60 species). These included new records of families and species to Gujarat and some to India (Gastropods - 33 families, 61 species, and Opisthobranchs - 14 families, 27 species). ■

Artisanal fishing for octopus from reefs is an important subsistence activity for the inhabitants of Lakshadweep Island. The major part of the catch is for self-consumption and local sale, and thus, the true impact of this fishery remains undocumented. BNHS undertook a two-year study under Project Giant Clam, collecting baseline information regarding the techniques used, primary fishing areas, hunting intensity, economic importance of resources and a scientific quantification of the fishery catch based on socio-economic data collected from interviews. The study was confined to two islands – Kavaratti and Agatti.

ADITI NAIR

Octopus fishery in Lakshadweep

Researchers Deepak Apte and Aditi Nair confirmed the presence of only one species of octopus (*Octopus cyanea*) in the lagoons of Kavaratti and Agatti, compared to three previously described. Catch Per Unit Effort (CPUE) of 0.5 and 2.9 for Kavaratti and Agatti, respectively, indicated that octopus hunting is not as intensive on these islands, as probably elsewhere. An increase in the artisanal fishery annual yield from 11-22 tonnes/yr in 1985 to 1,102 tonnes/yr in 2010 is indicative of an increase in reef extraction over the years. With sun-dried meat sale to other islanders at Rs. 100-150/kg, artisanal fishery yields Rs. 110 million per annum.

After observing the destructive methods of octopus hunting and unregulated harvesting, we are now developing management measures, such as scientific collection, computation of size and catch limits, seasonal closure, and multiple use areas for sustainable harvesting of octopus. ■

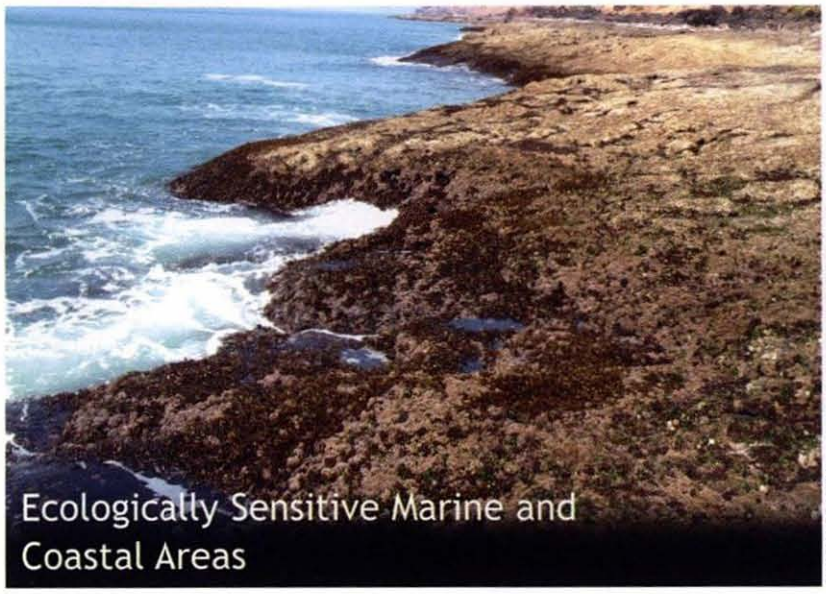
On November 21, 1970, Kitti Thonglongya while examining bats in the BNHS Collection found a specimen collected by A.F. Hutton on June 11, 1948, from the High Wavy Mountains in Madurai district, Tamil Nadu, identified as the Greater Short-nosed Fruit Bat *Cynopterus sphinx,* one of the commonest bats of the Indian subcontinent. However, it had unusual characters, and on further examination, it was described as a new genus and a new species, *Latidens salimalii* Thonglongya, 1972, based on its broad cheek teeth, with the species name in honour of Dr. Sálim Ali.

BNHS PHOTO LIBRARY

Sálim Ali's Fruit Bat *Latidens salimalii*

The species was only known by its holotype until 1992. In 1993, Harrison Zoological Museum (HZM), UK, in collaboration with the BNHS explored High Wavy Mountains for rediscovering Sálim Ali's Fruit Bat. Despite intensive mist netting efforts, from March 9-13, 1993, they failed to find it. A second attempt was made from April 6-8, 1993, during which six specimens of the species were collected by Mr. Manoj Muni, Scientist-in-charge of the Mammals section of the BNHS and Ms Nikky M. Thomas, HZM, at Yeni Kodai Cave situated in Kardama Coffee Estate, Meghamalai, Tamil Nadu.

IUCN in 2004 classified Sálim Ali's Fruit Bat as Endangered, considering its small area of occurrence in combination with a continuous decline in extent and quality of its habitat. ■



SWAPNA PRABHU

Ecologically Sensitive Marine and Coastal Areas

The Konkan coast of Maharashtra faces significant threats from coal-fired and nuclear power projects, and mining. These developments will ravage one of Maharashtra's most valuable coastal areas. Several rivers and rivulets, which make the Western Ghats foothills agriculturally productive, are also at stake. The monsoon runoff to the adjoining sea is vital for enriching the coastline, and coastal fisheries. At least 15 proposed coal-fired power projects equalling 25 GW are planned on a strip of coastal land 200 km long, representing a 200% increase in coal-fired power for Maharashtra, which already has the largest total installed capacity of 11 GW, or 13% of the national capacity.

The cost and benefits of the proposed projects need to look at not just the 10 sq. km impact area of each project, but on their cumulative impact. It is evident from the impact maps that not a single square kilometre will be unaffected in the 200 km stretch from Dabhol to Sindhudurg.

BNHS has undertaken a comprehensive impact assessment of these developments. The project will be implemented in various phases; the report for Phase 1 of the series of assessments identified 10 rocky shores in Ratnagiri and Rajapur districts as ecologically sensitive areas (ESA). All the ESAs identified lie within a 10 km radius impact area of proposed and operational power plants. ■

SWAPNA PRABHU

Biodiversity Assessment of Flora in Konkan region

The coastal region of Maharashtra, popularly known as Konkan, is characterised by various land forms from gently undulating low plateaus, and cliffs, in the west to very steep slopes, ridges and high hills towards the east. Owing to such terrain this coastal strip holds various habitats and significant biodiversity across these habitats. However, a sudden outbreak of developmental activities has been witnessed recently with a number of industries mushrooming along the coastline. There are more than 20 major power plants proposed within 500 km of the coastline. Land use patterns are rapidly changing, with urbanisation, industria-lisation, orchard development, mining and quarrying. Consequently, the natural habitats, flora and fauna of this region are being threatened.

Deepak Apte and his team have undertaken a strategic year-long Bio-diversity Assessment Study of the Konkan area, which will cover terrestrial and marine habitats with appropriate methodologies. Marine life, plants, insects, amphibians, reptiles, fish, birds and mammals are being evaluated systematically. The area surveyed so far is highly heterogeneous, with a mosaic of agricultural fields, small close forest patches, open scrubs, flat rocky outcrops with highly seasonal biota, streams and large tracts of mangroves. Thus, detailed documentation of characteristics of these habitats, their unique diversity, seasonality, endemic and threatened biota, type of threats are the major objectives of this project. The study also aims to identify ecologically sensitive areas, corridors, and special habitats that deserve special concern in order to protect their unique diversity. ■

Molecular data and its use in taxonomy

DEEPAK APTE

Mollusca, an important marine phylum, comprises about 23% of all the named marine organisms, yet the phylogeny of molluscs has been controversial, since morphological identification and classification has not been addressed adequately. There is taxonomic confusion even within well-studied taxa. DNA barcoding is considered an additional tool for taxonomy and has been proposed to facilitate species identification.

BNHS is involved in the DNA barcoding of molluscs from the Indian subcontinent since the last two years. We have used cytochrome oxidase subunit 1 (COI) DNA barcodes. We also use the mitochondrial 16S rRNA gene and Histone 3 gene as additional markers. Rahul Salunkhe has observed distinctive cytochrome oxidase barcode for all the morphologically distinct species sampled so far.

Literature survey indicates that molluscs from the Indian region are poorly represented in molecular databases like Genebank and BOLD. Our study will add new sequences to the existing data for molluscs of the world and will help to identify many more species in future.

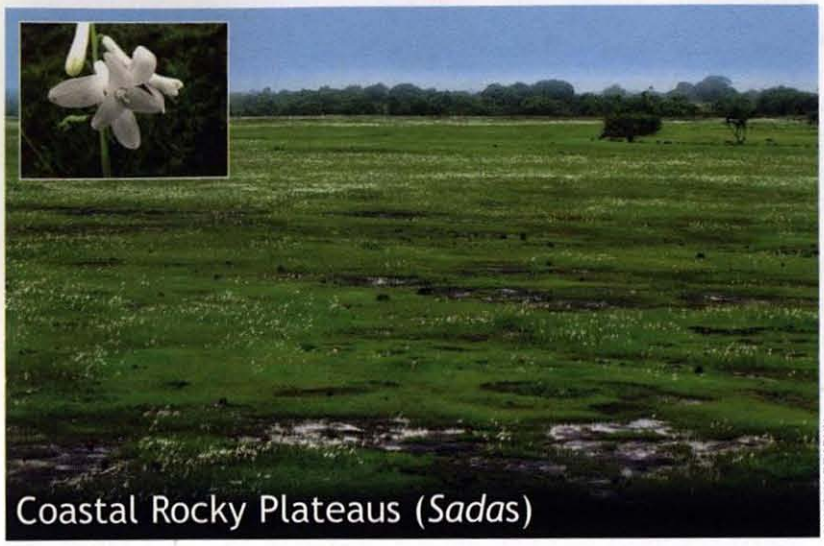
Phylogenetic analysis using various bioinformatics tools, supported by conventional morphological techniques, suggested the posibility of two novel species of *Cratena* in specimens collected from India. Molecular techniques can enhance our understanding about marine diversity and help in exploring the hidden diversity in the Indian Ocean when combined with conventional techniques and good bioinformatics tools. ■

Mangroves

NISHIGANDHA PEDNEKAR

Mangroves are salt tolerant coastal ecosystems found mainly in tropical and sub-tropical intertidal regions. There are two main regions of mangroves – the eastern hemisphere which includes east Africa, Asia, including India, and the western hemisphere which includes the Americas and western Africa. The eastern hemisphere is hypothesized to be the original home of mangroves, and these are called Old World mangroves. The western hemisphere mangroves are called New World mangroves. Globally, there are 60 true mangrove species in 27 genera and 20 families. In India, there are 34 true mangrove species. Bhitarkanika in Odisha (Orissa) has 31 species, the Sundarbans 27, and the Andaman & Nicobar Islands have 24 species.

Deepak Apte and Manan Shukla of BNHS have been working on Mangrove Restoration and Conservation Education since 2007, with funding from ONGC. An area of 100 ha was planted with mangroves in Gandhar region of Bharuch district, Gujarat, to protect the shoreline against erosion, which also damages oil wells. Presently, the plantation area is well-developed, and attracts faunal diversity. This project was possible only due to the involvement of the coastal community. A conservation education unit works to spread awareness among the coastal community. The Education Unit visits rural and urban schools, colleges, institutions, and ground staff of the Forest Department. In its second phase, Project Mangrove will cover *c.* 180 ha with mangroves. ■



Coastal Rocky Plateaus (*Sadas*)

SWAPNA PRABHU

The microclimatic conditions on Coastal Rocky plateaus are extreme and distinct from the surrounding habitats. Consequently, the communities that dwell on coastal rock outcrops across the world experience a wide array of adverse environmental conditions, such as very high and low temperatures, fluctuating humidity, flooding, drought, harsh wind, salinity and lack of nutrients. As a result, these communities evolved in favour of habitat specialist plants, which can cope with these extreme conditions and even flourish. The plants include ephemerals, which complete their life cycle rapidly within the four favourable monsoon months, or geophytes, which survive the dry period with the help of their underground bulbs, rhizomes and tubers. Many of these species show adaptive strategies like carnivory, desiccation tolerance, succulence (high water content), etc. In spite of these peculiarities, rocky plateaus harbour lush biodiversity due to the microhabitat diversity. Combinations of factors such as absence or presence or depth of the soil layer, duration of water availability, and surface characteristics give rise to these micro-habitats. The short-lived rock pools, puddles formed in shallow depressions, streams, rock surfaces with or without thin films of soil and water, crevices and furrows in-between two rock surfaces, cliffs and pockets of woody vegetation wherever a thick enough soil layer is available, are some of the distinct features.

The biological uniqueness of rocky plateaus is further highlighted by the greater degree of endemism among its fauna and flora, which can be attributed to the geomorphological distinction and early isolation of communities.

Recently, most of the coastal rock outcrops along the Konkan coast are experiencing heavy biotic pressures. Lack or scarcity of woody species make rocky plateaus appear barren or 'wastelands' during the eight month long dry season covering winter and summer. Unrecognised as special habitats, they are facing rapid conversion for settlements, paddy fields, orchards, quarries, grazing fields, windmill farms and industrialisation. Lack of awareness about their role as special habitats and the consequent absence of basic understanding regarding their ecology are the main hindrance in bringing them under a recognised protected area network. Dr. Swapna Prabhu has recently undertaken an in-depth study of plant communities on these coastal rocky plateaus along with a detailed documentation of various disturbances, which will be an important step towards their conservation.

This ecologically interesting habitat is ideal to study insects as it has some threatened and endemic species. Rahul Khot is studying the insects diversity in this habitat. More than 60 species of insects from coastal rocky outcrops have been identified.

Amphibian diversity of Phansad WLS

PSEUDOPHILAUTUS CF. *AMBOLI* / UNMESH KATWATE

Amphibians

A study conducted in 2011 at Phansad Wildlife Sanctuary by Unmesh Katwate has yielded a broad picture of the amphibian species diversity, species assemblage in logged and unlogged forests, habitat specificity, anthropogenic effects on species diversity, and current threat status and recommended conservation measures. About 50% of the diversity recorded is endemic to the Western Ghats, and several species were first records for the region. In our current study we have recorded 24 species, most of them being endemic and habitat-specific. ■

Reptilian diversity of coastal plateau

HEMIDACTYLUS ALBOFASCIATUS / UNMESH KATWATE

Reptilian diversity of coastal plateaus of Konkan is relatively less studied in the ecological context. Many species inhabiting these plateaus are well-adapted to varying climatic stress. A year-long study was undertaken by Unmesh Katwate on some plateaus in Ratnagiri district in Maharashtra to study reptilian diversity estimation, qualitative and quantitative studies of species assemblages, distribution patterns and habitat specificity. A total of 38 species was recorded. Among these, some are found to be endemic and habitat specific.

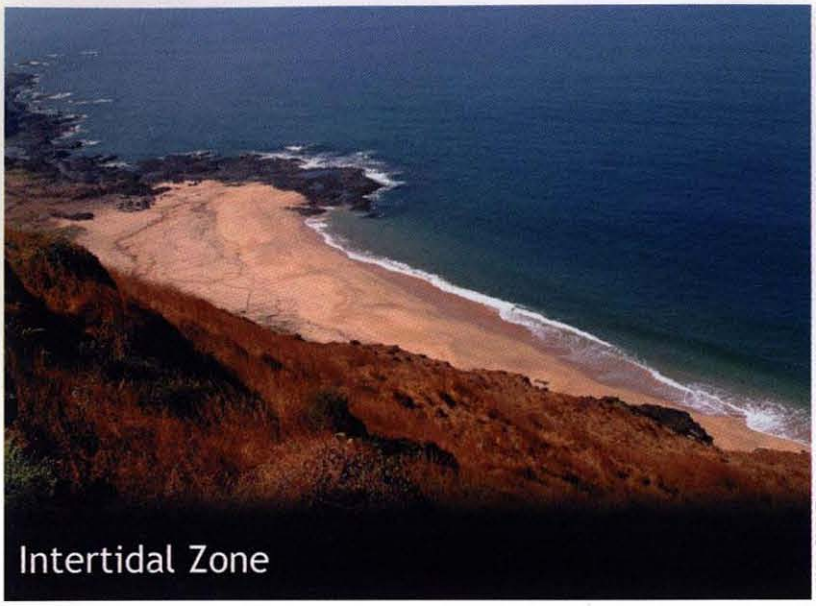
White-striped Viper Gecko *Hemidactylus albofasciatus* is an endemic gecko of the Western Ghats, restricted to lateritic plateaus of Ratnagiri and Sindhudurg districts. This species has not yet been evaluated for IUCN Red List criteria even though it has a narrow range of occurrence. Population estimation, relative impact of anthropogenic stresses on density of this endemic gecko, sex ratio and seasonal variability in density were studied in detail. Habitat preference and some behavioural observations on feeding, courtship and breeding were also made. The population study of this small gecko will contribute greatly to Indian herpetology. ■

Freshwater fishes of northern Western Ghats

UNMESH KATWATE

Rivers and wetlands of Konkan region are least studied biomes for diversity, endemism, pattern of distribution, ecology and taxonomy of freshwater fish. Six major rivers were assessed systematically in this study which added 18 new records. Exotic fish species were found to be a major threat for endemic fauna of this region. Nine exotic fish species were collected from various study areas that constitute about 13% of the total fish fauna. Recent records of Amazonian Piranha and Pacu from some rivers of Raigad district indicate the impact of growing aquaculture and aquarium industries.

Taxonomic uncertainties in some widely distributed and Least Concern species like *Puntius amphibius*, *Dawkinsia filamentosa*, *Devario aequipinnatus*, *Indoreonectes evezardi*, *Channa gachua*, *Garra mullya* may comprise more than a single species having restricted range of distribution. Molecular taxonomic investigation of *Puntius amphibius* actually shows that this complex comprises more than one species with some new records of *Puntius* sp. previously considered to have a restricted range of distribution in southern Western Ghats. Further south, in Konkan at Kajali and Gad River basins in Ratnagiri and Sindhudurg district, endemism and uniqueness in species is high. Unmesh Katwate recorded many range extensions in a year-long study. Our recently reported new population of threatened and endemic catfish *Horabagrus brachysoma* extends the distribution of the species by about 180 km in the northern parts of the Western Ghats. We have confirmed the identity of the species using molecular methods. We also studied the natural history of *H. brachysoma*, which would help in making informed conservation recommendations for this threatened and endemic catfish of the Western Ghats. Details of sexual dimorphism and behavioural observations on *H. brachysoma* are discussed for the first time by this study. ■



Intertidal Zone

VISHAL BHAVE

Most of the area on our planet is covered with oceans and seas. In this vast realm is an interface between the sea and land, the intertidal or littoral zone – commonly known as the foreshore and seashore. This zone is formed between high water level (demarcation towards land) and low water level (demarcation towards sea), i.e. the area between tide marks. This habitat, covered with water during high tide, and exposed to air at low tide, is a unique marine ecosystem. The intertidal habitat includes beaches, rocky shores, coastal wetlands, mangroves, sea grass beds and estuaries.

The biota living in these habitats need to develop special abilities to survive in this challenging environment. The main challenges include desiccation, waves and other physical forces, and variation in chemical features (such as salinity, temperature and pH). These challenges are the effect of the tidal movements where animals/plants need to undergo almost six-hour cycles of alternating dry and wet periods.

India has a large coastline and so is our intertidal area. BNHS is working on the intertidal habitat along the coast of Maharashtra (*c.* 720 km). The study aims to map the on-going and proposed coastal project and identify vulnerable areas. Preliminary assessment of rocky shores along Rajapur and Ratnagiri talukas has been done. The shores here are most vulnerable to coastal development, pollution as well as exploitation by a large number of coastal communities for food and recreation.

Hydroid

VISHAL BHAVE

Phylum Cnidaria includes class Hydrozoa, which is best known for their stinging property. Hydrozoans are commonly called as hydroids. Hydroids are of various forms, like pelagic (Medusae-Free floating) to benthic (Polypoid-Attached to Substrate). These solitary or colonial animals feed on planktons. Hydroids are mostly marine although some freshwater species are also known. There are around 3,500 nominal species of hydroids present worldwide. They play a vital role in the intertidal faunal associations. Very few eminent scientists have worked on hydroids from India, but the study remains restricted to the southern coast of India.

Pooja Nagale of BNHS is currently studying the Hydroids of the Ratnagiri coast and some parts of the Gujarat coast. We have recorded a few range extensions; study to identify the Hydroids and their relationship with associated organisms is ongoing. ■

Opisthobranchs are beautifully coloured shell-less molluscs that include sea slugs, sea butterflies and sea hares. These soft-bodied animals are globally distributed and are found exclusively in marine intertidal reefs and rockpools. Cerata-bearing nudibranchs mostly feed on hydroids and bryozoans, collecting and using stinging cells from their cnidarian predators for self defence. Coral feeding slugs can take up zooxanthellae while sap-sucking saccoglossans can take chloroplasts into their body and utilise them for metabolism. Opisthobranchs are hermaphrodites, where reproduction takes place by reciprocal sperm transmission. Egg ribbons of these colourful animals are beautiful and sometimes help in identifying a species.

VISHAL BHAVE

Ophisthobranchs

In India, opisthobranch study began in the 18th century, but the work done was discrete and patchy. Under the guidence of Deepak Apte, BNHS research scientists Vishal Bhave, Amruta Prasade and Bhavik Patel are studying Opisthobranchs on India for past 5 years at Lakshadweep, Gujarat, Ratnagiri, and Andaman & Nicobar Islands coasts under the All India Co-ordinated Project on Taxonomy (AICOPTAX) and Opisthobranch Fauna of India. BNHS has recorded over 100 range extensions, taking the opisthobranch species count of India to 325. ■

Phylum Platyhelminthes, commonly known as flatworms, comprises a variety of parasitic and free-living species. Polyclads are a free-living and exclusively marine, hermaphroditic component of this phylum.

In the marine environment, flatworms are commonly seen dwelling specifically within littoral limits of rocky shores, coral reefs and mangroves, and a few are recorded from great depths of the ocean. Polyclads are found associated with sponges, molluscs, algae, with a few examples known to feed on barnacles, bivalves and ascidians (sea-squirts). Predatory species of this group destroy economically important bivalves, such as oysters and mussels, therefore they are considered as a major pest in the aquaculture industry globally. Nowadays, polyclads are considered as models in the field of neurobiology, evolutionary biology and stem cell research due to their most primitive brain and excellent ability of regeneration.

RESHMA PITALE

Polyclad Flatworms

Of the *c.* 900 species known worldwide, only 30 species are listed from Indian waters. Geomorphic variability is known to occur on the western and eastern coast of India. The gradients in habitat structure in turn host diverse faunal and floral assemblages. Coral reefs and lagoons of the Lakshadweep, and Andaman and Nicobar Islands are ideal habitats for these creatures. A recent study by Reshma Pitale aims to examine the diversity and habitat specificity of polyclads. A preliminary survey from Lakshadweep, Gujarat, and the Konkan coast of Maharashtra has had notable results. This study, besides detailing anatomy, will also barcode DNA to determine the taxonomic status. ■

Satellite tracking of migratory Ducks and Geese at Pong Dam

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The objective of this project by Dr. S. Balachandran is to determine the breeding origin, migratory routes and stopover sites of select long distance migratory ducks and geese wintering in Pong Wetland, Himachal Pradesh, through satellite tracking, and to establish the link of Pong with other wetlands along the Central Asian Flyway, to recognise its global importance.

Captured birds were fitted with BNHS metal rings and the biometrics of birds recorded. Geese were marked with colour-coded neck collars. A total of 189 individuals of 21 species were ringed, of which 108 Bar-headed Goose *Anser indicus* and six Greylag Goose *Anser anser* were fitted with neck collars. This is the first large scale colour marking in a wintering ground. Bar-headed Goose (5), Brahminy Shelduck *Tadorna ferruginea* (4), Northern Shoveller *Anas clypeata* (2), Northern Pintail *Anas acuta* (2), and Eurasian Wigeon (2) were fitted with satellite transmitters and their migratory movements are being tracked. The movement patterns of three Bar-headed Geese and Brahminy Shelduck from Pong Dam were entirely different from individuals of the same species tracked from south and eastern India. A Brahminy Shelduck from Pong, marked during March 2010, was tracked moving to its Chinese breeding ground, and again the subsequent winter, to the same breeding ground. ■

Satellite tracking of Brahminy Shelduck and Flamingos

A.S. BISHNOI

This project is being conducted by Dr. S. Balachandran to recognise the migratory routes and stopover sites of Brahminy Shelduck *Tadorna ferruginea* frequenting Loktak Lake, Manipur – a Ramsar Site – and to understand the lake use pattern, congregation sites, and daily movement pattern within the lake. Imparting training to the Manipur Forest Department officials on bird identification, bird migration, wetland ecology, and management is the second objective of the project. Three Brahminy Shelducks were fitted with transmitters during November 2011.

Two capacity strengthening programmes on bird identification, bird migration, satellite tracking of wild birds and wetland management were organised for forest officials and NGOs at Imphal, Manipur.

The ongoing project on Greater Flamingo *Phoenicopterus roseus* migration aims to i) investigate the spring migration routes and staging areas, ii) recognise the geographical origins, iii) investigate the duration of stay at staging areas, and iv) undertake preliminary ecological assessment in wetlands where satellite transmitter tagged birds stage during their northward migration. Four solar powered Platform Transmitter Terminals (PTT) were fitted on three Greater Flamingos between December 2011 and March 2012 (two each at Kanyakumari and Point Calimere).

The migration data collected for both the species is interesting and educating. ■

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Guardians of a National Heritage

Rahul Khot

Zoological collections are an important tool for the study of faunal biodiversity. Taxonomically identified and well preserved specimens with complete data such as date, species name, locality, and other data provide valuable past information on a species. A collection is also a tool for molecular studies from feathers and tissues of the specimens. Natural history collections are the foundation of the science of systematics. Researchers in all fields of biology require taxonomically identified specimens.

The Bombay Natural History Society (BNHS) is the guardian of one of the finest natural history collections in Asia. Recognised as a National Heritage, the BNHS Collection includes rare, endangered and extinct species of mammals, birds, reptiles, amphibians and insects. This collection provides data on the biodiversity of the Indian subcontinent, and also of Myanmar and Sri Lanka. Hornbill House, the BNHS's headquarters in Mumbai, was built to house the Collection.

Notable Scientific Surveys

The extensive mammal collection is a result of the BNHS Mammal Survey of India from 1911 to 1923. This survey was carried out in most of the biogeographic regions of India.

Most of the bird specimens were collected during special surveys. The Vernay Survey of the Eastern Ghats in April 1929 was a pioneering effort. Subsequent additions were from the surveys carried out by Dr. Sálim Ali. About 20 major surveys in different localities, including Iraq, Hyderabad state, Travancore and Cochin states, Mysore state, Central India, Gujarat, Orissa, Berar, Sikkim, Bhutan, Goa, Arunachal Pradesh, and Andaman and Nicobar Islands were carried out by Dr. Sálim Ali.

BENEFICIARIES

- Researchers from universities, and institutes such as Wildlife Institute of India, Zoological Survey of India, Sálim Ali Centre for Ornithology and Natural History, and Zoo Outreach Organisation.
- Scientists and taxonomists of international organisations such as Smithsonian Institution, Washington DC; Field Museum, Chicago; British Museum of Natural History, U.K.; Harrison Zoological Museum, U.K.; and other SAARC countries.
- Wildlife Customs officials, state Forest Departments and Ministry of Defence for identification of bird strike remnants.

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HIGHLIGHTS

- BNHS is the only non-governmental organisation in India, which has such a comprehensive collection of South Asian biodiversity.
- The Collection represents a gene pool and reference on living and extinct fauna of the Indian subcontinent.
- Several books on birds, mammals, reptiles, amphibians, and insects have been published using the collection as source material.
- School children, college students and researchers avail of the facilities at various levels and gain benefit from this valuable natural wealth.

VARAD GIRI

A ground dwelling gecko, *Geckoelia albofasciatus*

VARAD GIRI

Gegeneophis danieli, one of the endemic caecilian species of the Western Ghats

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Butterfly Collection of the BNHS

New species described in recent years by the Collection team

TOAD

Xanthophryne tigerinus 2009

FROGS

Nyctibatrachus minimus (Miniature Night Frog) 2007

Nyctibatrachus vrijeuni (VUB Night Frog) 2011

Nyctibatrachus shiradi (Shiradi Night Frog) 2011

Nyctibatrachus poocha (Meowing Night Frog) 2011

Nyctibatrachus pillaii (Pillai's Night Frog) 2011

Nyctibatrachus periyar (Periyar Night Frog) 2011

Nyctibatrachus jog (Jog's Night Frog) 2011

Nyctibatrachus indraneili (Indraneil's Night Frog) 2011

Nyctibatrachus grandis (Wyanad Night Frog) 2011

Nyctibatrachus gavi (Gavi Night Frog) 2011

Nyctibatrachus danieli (Daniel's Night Frog) 2011

Nyctibatrachus acanthodermis (Spinular Night Frog) 2011

CAECILIANS

Gegeneophis danieli 2003

Indotyphlus maharashtraensis 2004

Gegeneophis pareshi Paresh's Gegeneophis 2011

GECKOS

Hemidactylus aaronbaueri 2008

Hemidactylus imbricatus 2008

Hemidactylus sataraensis 2008

Cnemaspis kolhapurensis 2009

Hemidactylus gujaratensis 2009

Hemidactylus graniticolus 2011

The Collection Department is constantly collecting, collating and disseminating data through projects, scientific papers, popular articles and campaigns. The findings of projects are shared with stakeholders and agencies like MoEF and IUCN.

A number of new species and subspecies of birds and mammals have been described by individuals associated with the Society or on the basis of specimens present in the Collection, Humayun Abdulali and Robert Charles Wroughton to name just two. Many well-known scientists have been associated with the Collection Department like Sir Norman Boyd Kinnear, Robert Charles Wroughton, Charles McCann, S.H. Prater, and J.C. Daniel. ■

Published on September, 18, 2012, by Mrs. Sumaira Abdulali for Bombay Natural History Society, Hornbill House, Dr. Sálim Ali Chowk, Shaheed Bhagat Singh Road, Mumbai 400 001, Maharashtra, India.

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