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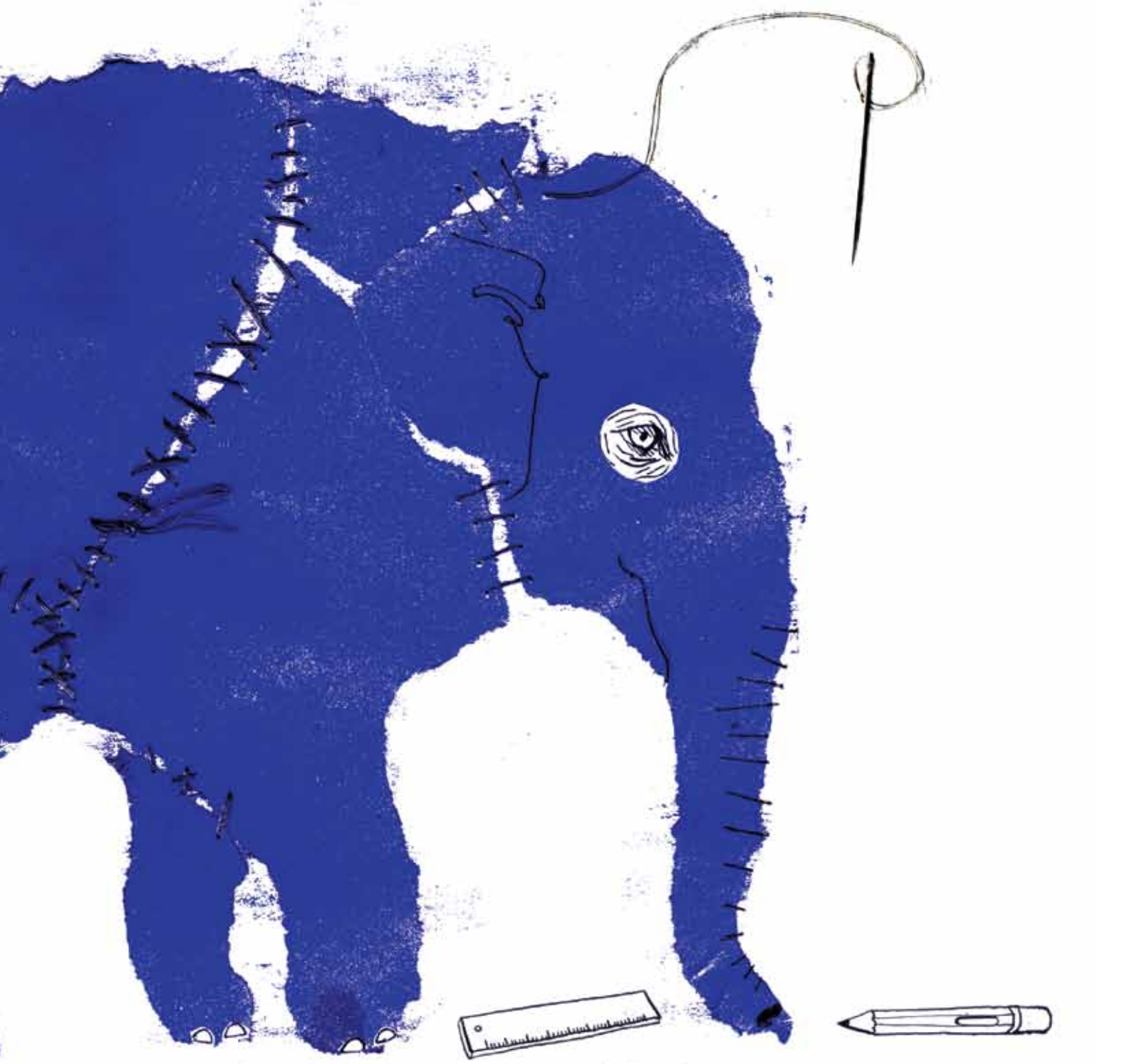
Inside the Elephant Task Force Report



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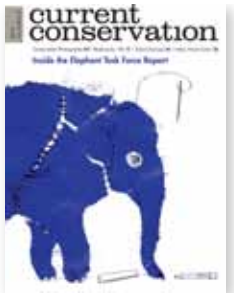
editor's note



Artwork by Pencil Sauce

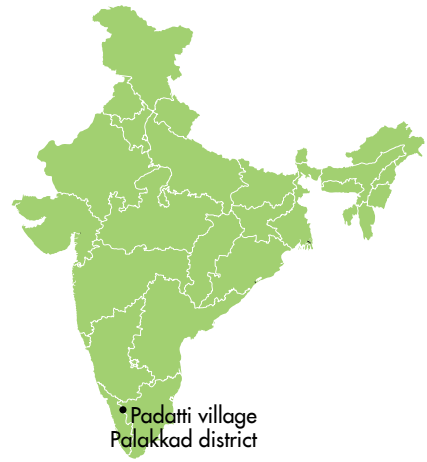
Is protecting biodiversity just the job of the government or do people have a say in what action should be taken? The Elephant Task Force (ETF) constituted by the Ministry of Environment and Forests comprised 12 persons from a variety of disciplines. The ETF compiled information critical to the survival of elephants in India. After inviting input from the public (121 responses), public hearings and field visits, the ETF outlined actions to save the people's animal. Sanjay Gubbi and Divya Gandhi assess the report within these pages.

The second initiative involving broad public participation, Biodiverity 100, is a unique online campaign launched by Guillome Chaperon and George Monbiot in association with the Guardian that calls for suggestions from people across the world regarding what goverments of the world should do to save biodiversity. This unique campaign has already attracted responses from over a hundred people, and in these pages you will see Current Conservation's involvement with the program and contributions from our readers.

Going Organic for Biodiversity

** Richa Malhotra*

Kalyan Varma



There is overwhelming evidence that the use of chemical fertilizers and pesticides contributes to soil contamination, which affects both biodiversity and human health. With increasing knowledge about the harmful effects of chemical use, there is a realization that chemical-free farming practices have to be adopted. An initiative in this direction has been taken by the Kerala State Biodiversity Board (KSBB), which instituted an Organic Farming Policy that came into force in 2010. This policy, which will be implemented by the Kerala State Government, recommends phasing out the use of chemicals and pesticides on food crops by 2015, and on cash crops by 2020.

In a move to demonstrate the practicality of this proposition, the KSBB initiated an experiment in Padetti village, Aremayur Panchayat, Palakkad District in 2008 with the cooperation of 69 farmers. Under this pilot project, farms spread over 400 acres were considered for organic farming. A 100-acre area within this was targeted for organic cultivation after taking into consideration the topography of the land and ensuring that this area was free from pesticide run-off from neighbouring farms. Prior to the start of the project studies were commissioned from various institutions to assess bio-diversity (birds: Thanal, benthic fauna: Cochin University, botany: Guruvayurappan College, insects: Entomology Department, Devagiri College, pesticide content: Salim Ali Centre for Ornithology and Natural History, and socioeconomics: River Research Centre) at the project site. At the time of the project was initiated, the price of paddy grown by conventional methods was Rs 11/kg, and the cost of farming was Rs 8.23/kg of rice.

Since the start of the project, only organic fertilizers and no chemical fertilizers have been used on the 100 acre area. Organic farming experts from Kudumbam, Trichy, trained farmers through all stages of the farming process.

Though the yield of paddy was low in the first two harvests and did not return profits, the third harvest equalled the pre-organic production, and yield in the fourth harvest was higher than that with chemical farming. Paddy is now worth Rs 14/kg and the cost of production has come down to Rs 6.45/kg, resulting in increased profits for the farmers. It was also observed that the biodiversity increased in terms of abundance and diversity. For instance, the Baya weaverbird, which has not been sighted in the farm lands for 40 years, is now a regular along with black drongos, bee-eaters, and king-fishers.

Besides encouraging a chemical-free approach, the KSBB has initiated a Homestead Biodiversity Enhancement Program. The program encourages cultivation of vegetable gardens and fruit trees, water harvesting, use of biogas to reduce fuelwood consumption, and solar power for electricity. A dairy is also proposed, and this program seeks to make the area a sustainable, self-sufficient and eco-friendly unit. The ultimate goal of the joint effort of the KSBB and Kerala State Government– the Organic Kerala Mission–is to expand organic farming to 40,000 acres of land in the state of Kerala.

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What is Conservation

Evaluating the role of visual literacy in the environmental arena.

Photographs by Neil Osborne

Photography?

At the precipice of the contemporary environmental movement is an immediate need for the greater inclusion of strategic visual communication in the form of conservation photography. Conservation photography is simply photography that empowers conservation. It involves the active use of the photographic process and its products, within the parameters of journalistic activity, to achieve concrete conservation outcomes in the context of the bio-cultural landscape.

Conservation photography is not yet widely acknowledged. However, photography has been used as a conservation tool since the early days of landscape photography. William Henry Jackson's 1871 images of Yellowstone influenced legislators to create the first U.S. National Park to protect wilderness. Today, in a society that depends even more heavily on visual communication platforms to send and receive information, conservation photography can be increasingly employed as a conduit for sharing environmental messages with the public at large. Most significantly, conservation photography practice involves placing images in front of influential people whose decisions can elicit tangible conservation action, such as policy-makers, government officials, funders, and corporations.

The ability of an audience to "read" conservation images is crucial to these processes. Similarly, the creation of conservation imagery requires a photographer who can intentionally construct an authenticate visual representation of an environmental issue or concern. The effectiveness of conservation photography is dependent upon the ability of photographers and viewers to thoughtfully create and interpret visuals—in other words, their ability to be visually literate.

Visual literacy is a burgeoning area of study that involves a critical approach to the creation and interpretation of images. Notable contributor to the field, Cyndi Giorgis, defined visual literacy as the ability to construct meaning from visual images. Anne Bamford, recognized internationally for her research in arts education, emerging literacies and visual communication, described visuals as having the capacity to produce and communicate thoughts and images about reality. This visual vocabulary is a powerful tool that conservation photographers use to express their messages. "For scientists and communicators concerned with the natural environment, visual literacy is of paramount importance. If the images are not comprehensible to a lay audience, the message is lost," noted Jean Trumbo in a 2007 article on visual literacy and the environment.

Visual literacy involves understanding the language of representation used to create meaning about the world around us through images. In the same way that a sentence can be broken down into parts, an image can be dissected through syntax and

Top left: Snorkeler swimming with Green sea turtle. Hawaii, USA.

Top right: Green sea turtle resting on plastic bottle while returning to sea after nesting. Tortuguero, Costa Rica.

Bottom: Bag of turtle eggs.

semantics. In a visual literacy whitepaper, Bamford described syntax as the building blocks of an image—elements such as perspective and framing, or balance and tone. Semantics, on the other hand, refers to "the way images relate more broadly to issues in the world to gain meaning." This is addressed in conservation photography by asking such questions as:

- Who commissioned the image (e.g. government/corporation/NGO)?
- Who is the intended viewer (e.g. general public, scientists, policy-makers, government)?
- What environmental or conservation issue(s) is communicated in the image?
- What environmental components are emphasized/omitted?
- Is there a juxtaposition of opposing elements?
- Are there opposing conservation attitudes depicted in the image?
- What are the positive/negative connotations of the image?

"Photographs are objects that channel affect in ways that often seem magical."
– Marita Sturken and Lisa Cartwright, 2008

Conservation imagery is adept at conjuring emotions, portraying the devastating (e.g. an oil-slicked pelican) as well as the stunning (e.g. a verdant rainforest vista). Yet, this emotion is often tied to cultural context.

Roland Barthes used the terms denotative and connotative to describe this concept. Denotative refers to what an image depicts in a literal way, without any inference. Connotative refers to the culturally and emotionally significant meaning of an image—the aspects that resonate with the viewer as described by Marita Sturken and Lisa Cartwright in Practices of Looking. Conservation photography aims to use images as springboards for discussion, and visual literacy skills set the stage for critical thinking. Educator Robert Phillips notes that learning "skills and attitudes for viewing pictures can assist [people] in understanding the form, content and context of visual images, and help them to critically assess the inherent qualities, veracity, and agency of images."

Adopting a visual literacy approach to viewing conservation images, we can analyze photographs such as the image below (man with turtle). We start by identifying the denotative and connotative aspects of the image, and then dissect its syntax and semantics.

To begin, we describe the image denotatively. It depicts a man standing on a beach holding a turtle. Behind him, we see several fish lying on the sand on one side, and a black net on the other. Next, we explore the connotative meaning of the image. What personal experience do we have that influences how we interpret this photograph? Someone with a fishing background, for example, might sympathize with the human subject of this image and admire how proud the man is of his catch. For some, the tropical beach location might be interpreted as exotic. Our personal context shapes the connotations we draw from the image.

"A photograph can't coerce. It won't do the moral work for us, but it can start us on the way."
– Susan Sontag, 1973

Syntax, or the arrangement of visual elements, allows us to examine the intent of the photographer and the conscious choices they made while creating this image. Taken from slightly above the subject, the perspective of the image makes the man look diminutive in stature, as opposed to a lower angle, which would have made him seem large and powerful.

The areas of interest (i.e. the fish, the man, the turtle, and the net) are concentrated in the foreground of the image, while the background consists of a nondescript beach landscape. The colour palette is fairly consistent and muted, except for bold blocks of colour in the man's clothing. His red shorts and blue shirt are a stark contrast to the taupe background. This draws the viewer's eye first to him, and then, more significantly, to the sea turtle he holds in his hands. Framing is used on several levels – the fish and the net on the beach frame the man, while the man's figure and bright clothing frame the turtle.

Finally, we consider semantics to examine the societal context of the image. The man's smile and stance suggest a level of pride associated with the turtle, leaving the viewer to surmise his plans – is the turtle intended for a meal, or for release back into the ocean? We can make inferences about the man based on his clothing – he wears a t-shirt that is splattered with stains, and a pair of shorts with one pocket turned inside out. His unkempt clothing suggests that he has a job involving physical labour, as does his position next to the black net that appears to be used for fishing. The man's attire fits in with his outdoor surroundings.

Captions have an important function in conservation photography, as they fill in gaps and help to answer questions associated with semantics. In this particular picture, the man is a Trinidadian fisherman, photographed with a juvenile green sea turtle caught in his fishing net right before he released the turtle back into the ocean. The photograph was commissioned by a sea turtle conservation NGO, intended to be seen by members of the general public in order to draw attention to the plight of sea turtles as by-catch in the fishing industry.

Quantifying the effectiveness of conservation photography is largely uncharted territory. In the following case study, we provide examples of outcomes resulting from the combined efforts of a biologist and a conservation photographer. Sea turtle populations are in decline worldwide, due to a number of causes including fishing practices, pollution, and ocean health. In an ongoing project to save these ancient reptiles, focused on specific populations, visual assets are being created for use in research, advocacy, and outreach, communicating the threats faced by sea turtles to the layperson and encouaging people to participate in conservation efforts locally. Partners onboard this international initiative include the California Academy of Sciences, and the International Union for Conservation of Nature Marine Turtle Specialist Group, among numerous conservation organizations. Grants and donations via The Ocean Foundation have brought the following outcomes to fruition:

- ***Print publications:*** photography used in magazines that reached a total circulation audience of over 1.5 million people to date, in both academic and mainstream audiences
- ***Presentations:*** photography used in worldwide presentations to audiences from 25 to 12,000 people
- ***Portfolio review:*** Mexican government officials are currently reviewing research findings on by-catch accompanied by documentary photographs
- ***Funding:*** increased donations, thanks in part to the impact and reach of conservation photographs

The conservation photographer's task is to disseminate images strategically, in order to promote their conservation agenda. Visually literate audiences have the skills to interpret these messages and by extension, the potential to make a difference through their actions. Therefore, a convergence is required between visual literacy competencies and conservation photography works.

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** Neil Ever Osborne is a conservation photographer, an educator, and a consultant specializing in strategic visual communication platforms. He is an associate member of the International League of Conservation Photographers (iLCP).*
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Below left: Green sea turtle stuck in fishing net. Anambas Islands, Indonesia.

Below right: Sea turtle eggs for sale at the local fish market. Anambas Islands, Indonesia.

Biodiversity 100

In a unique online campaign, George Monbiot and Guillome Chaperon invited public opinion to compile a list of 100 tasks for world governments to undertake in order to tackle the biodiversity crisis. This list was submitted to the Convention on Biological Diversity meeting in Nagoya, Japan in October 2010, and is growing even after this event. Current Conservation is a liaison for Biodiversity 100 within India, and these are some responses compiled by us.

Pencilsauce

What is the campaign about?

Despite pledges by the G20 countries to stem the loss of biodiversity, their achievements have amounted to little. In many cases, what is lacking is the political commitment to act.

With your help, the Biodiversity 100 campaign, hosted by the Guardian, is compiling a list of actions for governments to take. Recommended actions must:

1. Make a major contribution to safeguard a particular endangered species or area;
2. Be politically costly to implement or strongly opposed by some interest;
3. Be strongly and widely supported by scientific evidence.

Listed below are excerpts from actions suggested by several students, biologists and scientists in India. To read the complete action with accompanying material, log on to our website: http://www.currentconservation.org

Revive environmental flows by restoring natural river flow regimes

** Nachiket Kelkar (rainmaker.nsk@gmail.com)*

This is an action that will require, in some cases, flow maintenance by dams and barrages, and an immediate halt to upcoming link projects, irrigation canals, and dams to sustain dry-season flows and maintain regularity in flood pulses as per natural dynamics. Highly important for endangered species such as Ganges river dolphins, gharials and aquatic birds. Most important for fishes, as these destructive developments will directly affect fisheries and sustenance of millions of dependent human populations.

Dam deconstruction or downscaling, and regularizing water let-off regimes might be politically very sensitive, as well as strongly opposed by technocrats, industrial, and commercial interests, particularly power plants, hydel projects and water works authorities. Overall the dominant belief of the government has been that river interlinking will solve the nation's water security issues, particularly in semi-arid land

Scientific evidence flies in the face of these engi for modifying river systems. Impacts of Fara been well-documented by SANDRP, New Delhi. The In Gandhi Canal meant to bring in irrigation to the arid regi of Rajasthan was found to be a failure in terms of investm costs and actual returns as water never could reach where was expected to, leading to dry canals and dug-up waste along the canals. Dams in the Pune region, lead to severe shortages in Solapur and southern districts. IWMI reported lower flows than minimum for Godavari, Krishna and other peninsular eastflowing rivers. Dams on the Brahmaputra are bound to cause severe destruction and in general be loss-making because of their incapacity against the mighty river (Kalpavriksh). Tributaries of the Ganga, namely Gandak and Chambal are under severe threat from dams and barrages, which have led to potentially isolated populations of gharials, river dolphins, etc. River dolphins might have become extinct in the upper reaches of the Gandak barrage in Nepal, due to isolation. Commercial fisheries in the lower Ganga region have been severely hit by the Farrakka and Damodar valley projects.

Reduce local hunting along the Western Ghats

** Devcharan Jathanna (devcharan@gmail.com)*

Local hunting is an under-appreciated and underestimated threat to diversity, affecting mostly medium and large-sized mammals. Unlike commercial hunting, the species targeted include a diverse range (e.g. in the Western Ghats, palm civets, mongooses, giant and flying squirrels, Indian porcupine, Indian pangolin, black-naped hare, wild pig, muntjac, Indian chevrotain, etc.). One of the reasons this is unappreciated is, of course, that most of the species are low profile and some are relatively common. Another reason is that local hunting is usually low-intensity, but the fact that it is sustained, widespread, and practiced by many or most house-holds in forest or forest-fringe settlements adds up to an enormous offtake. Local hunting has caused some species to be absent from large areas of otherwise prime habitat, with patchy distributions elsewhere, at extremely low densities over large landscapes. This, in turn, also deeply affects the conserv-ation of charismatic large carnivore species, whose densities have been shown to be primarily determined by prey densities.

However, reduction of hunting will require a sensitive and nuanced approach, given that it is a culturally acceptable practice in most areas. This should include a drive to sensitise local communities (who often don't perceive species declines because there is no benchmark to compare) and forest department field staff, supplemented by enforcement drives (anti-poaching activities usually exclude non-charismatic species).

Reviving our rivers

*Tarun Nair (tarunnair1982@gmail.com)

1) Secure the National Chambal Sanctuary, and prevent all extractive activities (sand and stone mining, fishing, and water extraction).
2) Decommission existing irrigation projects (in phases), discontinue further construction and reject all proposed water impoundment and extraction projects.
3) Abandon all plans for River-linking.

The Chambal is one of the last remaining rivers in the greater Gangetic Drainage Basin which has retained significant conservation values. The Chambal contains the largest contiguous and most viable breeding populations of the critically endangered gharial and red-crowned roofed turtle. However, this sanctuary suffers from hydrological modifications due to dams and from the diversion of river water for irrigation, and from activities like sand-mining; fishing, and persistent livestock and human presence.

The 7 major, 12 medium and 134 minor irrigation projects operating in the Chambal river basin, have greatly reduced river flow, and erratic water releases, in the past, have inundated several nesting sites. These notwithstanding, 52 irrigation projects are under construction and 376 projects have been planned in the basin. This will only further impoverish the river and adversely impact the aquatic wildlife of the Chambal river.

Plans to link India's rivers are unreasonable, and must be abandoned. And we must remember that water, as a resource, may be renewable, but rivers as living entities are not.

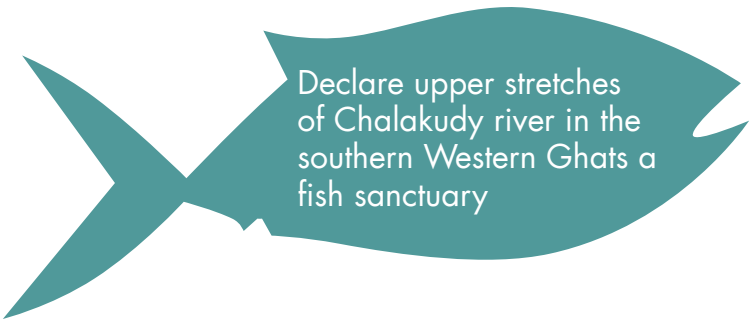
Which wild species will benefit from your action?
Species: gharial, Gangetic dolphin, narrow-headed giant soft-shelled turtle, Indian red-crowned roofed turtle, three-striped roofed turtle, Indian skimmer, black-bellied tern, Sarus craneWhich interest groups or lobbies oppose this action?
1) The political and administrative class who are largely insensitive and feign ignorance towards ecological concerns, and more often than not, have big stakes in large projects.
2) Sand / stone mining and construction industry.
3) Fish and turtle poachers / contractors.
4) The section of population (mostly urban) receiving most benefits from the dams and water extraction.

Upstream and downstream effects of dams are well-known, stemming from inundation, flow manipulation, and fragmentation. Inundation destroys terrestrial ecosystems and also eliminates turbulent reaches, disfavouring lotic biota. It can cause anoxia, greenhouse gas emission, sedimentation, and an upsurge of nutrient release in new reservoirs. Flow manipulation hinders channel development, drains floodplain wetlands, reduces floodplain productivity, decreases dynamism of deltas, and may cause extensive modification of aquatic communities. Dams obstruct the dispersal and migration of organisms, and these and other effects have been directly linked to loss of populations and entire species of freshwater fish. Dam removal to restore rivers are the way ahead, and should be seriously considered.

Conservation of sloth bear (Melursus ursinus)

*Manisha Tomar (manishatomar3@gmail.com)

Conservation action recommended for this species are:
A habitat improvement program to ensure restoration of degraded parts of the forest and reduction of disturbance through regular surveliance of forest staff. There should be provision of resources for the local community to reduce extraction from the forest, and fodder and fuel wood plots can be developed within the village environs and the common lands of the villages along the park boundary. There needs to be an increase in awareness and education on the significance of the sloth bear in maintaining the balance of the ecosystem and the benefits obtain from conserving this species and its habitat. A long term ecological study covering all season and forest types in KWLS is of high importance and necessity. Regular monitoring of the indirect and direct evidences along few permanent transects in all the forest types in different season would help in understanding the habitat use and population of sloth bear.



*Latha Anantha *(rrckerala@gmail.com)*

Western Ghats is recognized as one of the eight hottest Biodiversity Hotspots in the world. The rivers in this fragile ecosystem are under severe stress due to deforestation of upper catchments, dams and diversion of water to other basins, sand mining, and pollution from agro and industrial chemicals. The fish diversity and habitats in these rivers are the first to be affected. Out of the 339 fish species found in the Western Ghats rivers, 231 are endemic. Chalakudy river with numerous waterfalls, rapids, and different altitudinal ranges and forest types, holds the maximum fish diversity with 104 fish species in a 144 km small river. The river Cauvery originating from the Western Ghats, though eight times the length of Chalakudy river holds just 146 fish species. Five species 'new to science' were discovered for the first time from this river. The flow in Chalakudy River is already reduced and fragmented due to six dams including diversion of 35 % water to another river basin. A seventh large dam (Athirappilly Hydro-Electric Project) is proposed in the river, and this is bound to create larger daily flow fluctuations, which will severely affect fish habitats and breeding. The Government of India and the Kerala Government have the powers to take necessary steps to declare the upper reaches of the Chalakudy river a Fish Sanctuary. This will be the first attempt of its kind in to protect the aquatic biodiversity in any river in India. The declaration of a fish sanctuary will also ensure the overall protection of the river system from further degradation and interventions.

Chalakudy river is recognized as one of the highest fish diversity rivers (fish diversity index 1.79 - 3.9) in India. Latest estimates reveal that 12 species are critically endangered and 22 species are vulnerable as per IUCN standards. Detailed studies carried out by CUSAT reveals that two species are restricted to the new dam site.

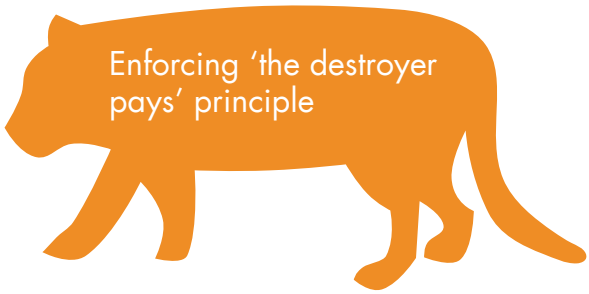
*M.O. Anand *(moanand@ncf-india.org)*

Because of the high levels of biodiversity recorded within them, semi-natural and agricultural production landscapes are today viewed as important allies of formal protected areas in the battle against the ongoing biodiversity crisis. These landscapes may be suitable as breeding and foraging grounds for a number of native wild species, while serving as dispersal corridors for several others. The importance of these landscapes is only likely to increase as time progresses, given the highly limited extent of formal protected areas (around 12% of the earth's surface, largely concentrated on mountain tops and in the higher latitudes) and the ever-increasing resource demands of a growing human population.

Across the tropics, it is not uncommon to find remnant natural habitats such as forest fragments, strips of riparian vegetation, and swampy fallows embedded within production landscapes. Scientific evidence suggests that these very natural remnants are not only the hotspots of biodiversity within production landscapes, but also serve as important source populations, and 'stepping-stones' responsible, to a large extent, for high biodiversity observed at the landscape level. Conseq-uently, these remnants are also important sources of several ecosystem services – important at scales ranging from local to global. For instance, forest fragments in a coffee-growing landscape in Costa Rica have been found to be economically very valuable by supporting populations of pollinating bees that are important for coffee production. In spite of their overall importance, these remnant habitats, most often occurring on community- or privately-owned land, face the constant threat of clearing for agricultural expansion some-times even the expansion of so called 'biodiversity-friendly' agriculture.

There is therefore a pressing need for stronger conservation support for natural habitats occurring within production landscapes. Given that change in these landscapes are driven

largely by economics, financial incentives for forest set-asides and payments for ecosystem services are likely to be important.



*__Damodaran__ *(damodaran@iimb.ernet.in)*

In the context of the Strategic Plan for 2020 on biodiversity conservation formulated and discussed by COP 10 at Aichi Nagoya, it is important to emphasize a new principle of 'destroyer pays'. The ' destroyer pays' principle should focus on corporate undertakings that have destroyed biodiversity through irreversible land use and/or have created collateral ecosystem damage through their production activities. Extractive industries or amenity providing industries have to pay special royalties (in proportion to sales revenues) to local communities that have been affected by biodiversity loss due to their activities. These revenues should be channelized for biodiversity enhancing activities, including regeneration of endemic species in sites that are suitable for the purpose in and around the activity zones. Also no new projects involving irreversible land use should be permitted in natural areas rich in species endemicity.

*__Aarthi Sridhar__ *(aarthi77@gmail.com)*

The conservation of endangered marine species by a conventional protection approach has led to deepening conflicts and a deterioration of the condition of traditional fisherfolk in many parts of the globe, thanks to unrealistic fishing restrictions and harassment by enforcement officials. The process of the conservation of marine resources must involve the fishing community. And this cannot be effected only by the State without the central involvement of the communities in question.

Marine biodiversity conservation needs to adopt a more transparent and inclusive politics for conservation. The rights of millions of traditional fishing communities over coastal common spaces cannot be denied by governments. At all stages of coastal planning, decision-making and implementation of laws, coastal fishing communities must play a key role. Governments across the world follow a more participatory process in the declaration of Marine Protected Areas.

At the same time, rampant coastal development needs to be regulated so that development is rational, environmental impacts are minimal, and benefits reach marginal coastal communities and other sections of society. The rapid establishment and expansion of ports, exploration for oil, and other coastal industries can have devastating impacts on livelihoods and biodiversity. Similarly, commercial fishing must be regulated to minimise impacts on artisanal communities and on endangered species.

Governments need to invest in a wide range of educational programmes that address the needs of urban and rural settings. The fishing communities of the world are bearers of tremendous knowledge about their ecosystems and resources. Fisheries education needs to incorporate special courses that highlight the value, role, and knowledge of fisherfolk in coastal and marine management.

In summary, we call for a nationwide community oriented campaign for the conservation of our coasts and oceans, with careful regulation of activities that have detrimental effects on marine biodiversity and livelihoods, and management actions for the conservation of endangered species and habitats.

*__Narayan Sharma__ *(narayansharma77@yahoo.co.uk)*

The upper Brahmaputra valley in northeastern India harbours one of the last remaining tropical lowland evergreen rainforests in the world. These forests contain the highly endangered western hoolock gibbon (*Hoolock hoolock*), critically endangered tree species (*Vatica lanceaefolia*), and globally endangered

white-winged wood duck (*Cairina scutulata*). Recently, seven cat species were recorded from Jeypore-upper Dehing forest, the only site worldwide to support such diversity of sympatric cat species. These forests are important for preserving the regional biodiversity and also for supporting local communities who depend on these forests for their livelihood.

However, these forests are threatened by continuous expansion of the tea estates, human settlements, oil exploration, and other developmental activities. Many of these forests, in fact, exist as isolated patches situated in the sea of human-modified landscape and few of them were completely encroached without a trace of forest. Recently, a plan to build a four-lane highway through the upper Dehing forest was mooted. Had this project come through, it would have threatened the survival of several species besides further fragmenting an already fragmented landscape.

Linking communities and research in the Western Ghats

** K.M. Jayahari (jayashari@winrockindia.org)*

There should be initiatives to link communities and conservation oriented research activities, in Western Ghats, where empirical research outputs are used to create conservation awareness and the communities are treated as an ecosystem component with due attention paid to their livelihood and other issues. Community issues pertaining to resource sharing with other ecosystem components should be considered as the problem to be addressed through research at par with other 'conventional' conservation issues. Amidst the large body of commendable empirical scientific research in ecology in the southern Western Ghats, remarkable failure in bidirectional linking of these research activities with the human component of the ecosystem – information to people for awareness generation and information from the people for research prioritization can be observed. The gap exists due to the inability to translate the empirical research outputs to ecosystem management programs and identifying the community requirements for designing research projects. This would apply particularly to situations where animals are used in traditional practices (eg. Vayanattu Kulavan Theyyam in North Kerala) and human-wildlife conflict situations, where the lack of awareness and non-involement of local people has aggravated conservation problems.

Incorporation of local people (tribal/ traditional peoples) into the management of protected areas

***Kalpana Das** (kkalpana1988@gmail.com)*

India is a country that holds rich cultural and biological diversity. When we look into the broad spectrum of biodiversity we cannot neglect the human dimension. The solution to many conservation problems is to involve the local peoples in efforts and this can be done in many ways. People can be employed as local guides. They can also contribute as patrol guards to check against poaching or illegal felling of timber. Most importantly, local knowledge of flora and fauna can be used to create management plans incorporating traditional methods and customs of protection.

If you would like to contribute to the Biodiversity 100 Campaign, follow the instructions on the Guardian Biodiversity 100 Campaign website, and submit your recommendations online. Make sure that you send us a copy of your action (editor@currentconservation.org), and we will publish them in the following issues.

For details, log on to: http://www.guardian.co.uk/environment/series/biodiversity-100 http://www.currentconservation.org/biodiversity100

Biodiversity 100 attracted a lot of comments, many of which applied to India as well as other countries. Of these, the ones presented by the campaign to the Convention on Biological Diversity meet in Nagoya, Japan are summarised below. These were also sent in an open letter to the Environment Minister, Shri Jairam Ramesh.

1. Stop forest destruction to protect the lion-tailed macaque

2. Ban shark "finning" at sea

Excerpts of some of the other actions recommended for countries including India:

• Enforcement measures to reduce trawl related mortality over the years haven't neither been effectively implemented nor have the demands of the fisher folk involved in the process been sought in bringing out an effective plan. An interdisciplinary approach towards turtle conservation as well as alternate solutions for the fisher folk to compensate their losses is required to effectively control the issue.

• Ban or severely restrict international trawling.

• Ban all whaling. Without exception.

• Legislate against [unsterilised] ballast water discharge and encourage alternatives.

• Create well-policed wildlife migration corridors in areas at risk from climate disruption and/or human expansion.

• Make organic food production compulsory; ban production of environmental toxins; declare the release of toxins into the environment an international crime.

• Consume less. Legislate against product disposability and waste encouragement; find ways to promote longevity in products. These should be criminal acts of eco vandalism. Zero waste.

• Create national laws (and subsequent treaties) that radically reduce the size and power of multinational corporations. Mega-corps are the primary drivers of unsustainable consumption, eco-social havoc, sabotage of environmental treaties, governmental corruption, widening inequality and endless wars.

• Support sound, scientifically-based habitat restoration programs.

• Global corporate social responsibility treaty agreed between major countries placing a common legal framework on how their companies may conduct operations in global South/ countries with less established or less consistently strong legal institutions, so as to give due accord to human rights, biodiversity, etc.

• Ban the use of all chemical cleaning products.

• Introduce a carbon tax; ideally a single rate global tax, applied at source, but a coalition of the willing would be fine, as long as imports were levied, and the proceeds applied to sustainability/biodiversity measures

• Control movement of invasive weeds and pests between bioregions and continents, especially through humans trading and transporting species

• Encourage companies' boards to adopt 'net positive impact' policies (like that of Rio Tinto) and help governments introduce 'no net loss/ net positive impact' requirements into environmental impact assessment and planning regulations. This would mean all developers design new projects (eg mines, energy installations, roads, housing, agriculture) to avoid and minimise harm to biodiversity, undertake restoration work and then (and this is the new bit!) address the residual loss through biodiversity offsets that measurably demonstrate a net positive impact.

• Stop the production of plastic bottles for water and other drinks or tax very high to dissuade people from buying.

• Actively encourage smaller families by making contraceptives available to all. The only real menace to endangered species is the menace of human demands on space and commodities.

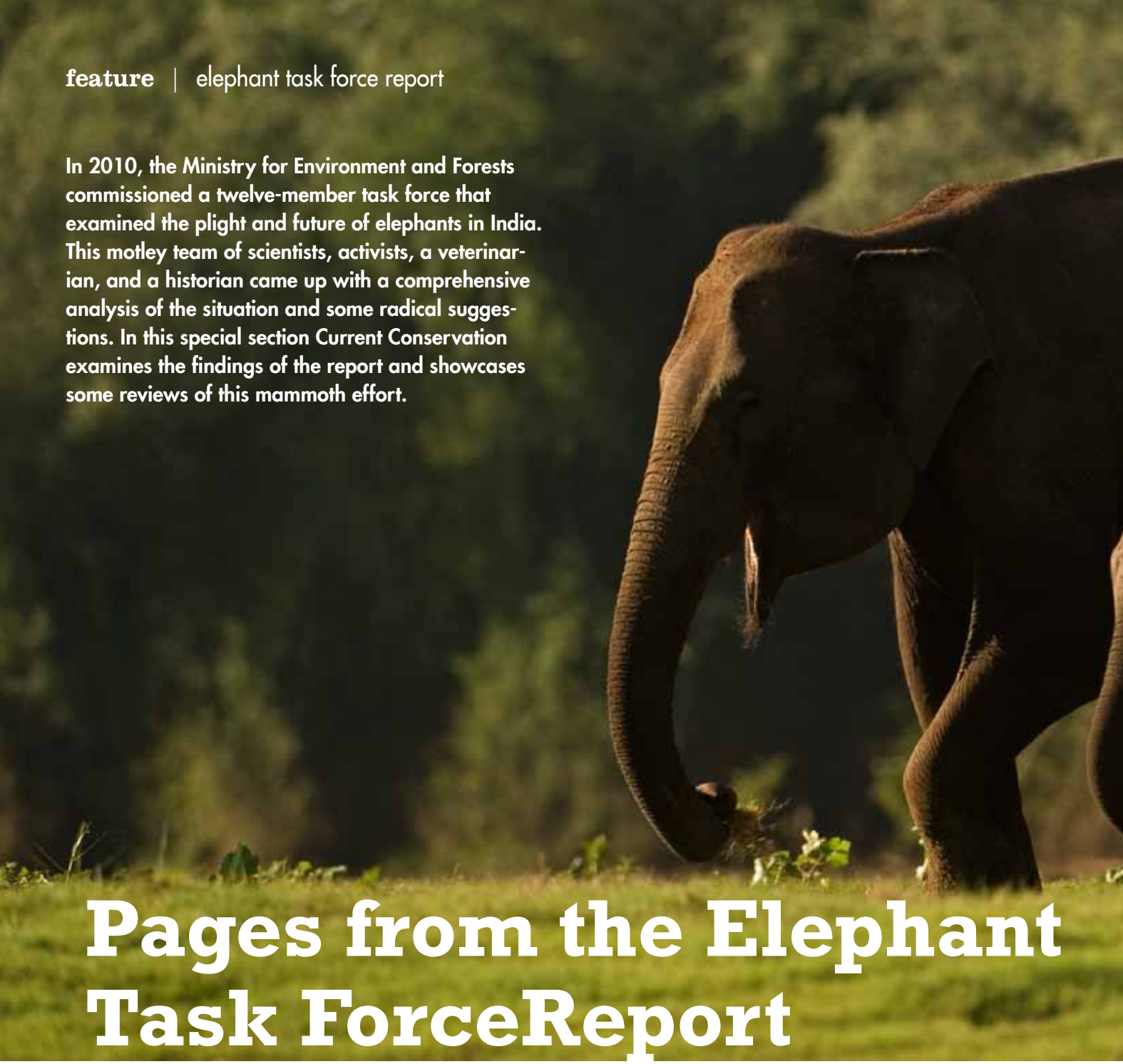
• Ban windfarms. The wind turbines are naturally placed in high wind areas, which also attract high numbers of birds.

• Research funds should go into finding natural solutions to protecting food crops rather than into genetic engineering. Surely "organic farming" needs to be developed.

• Pass a law to create international integrated habitat networks.

• An immediate cessation of the logging of old-growth forests worldwide, and the creation of old-growth reserves that are permanently spared any sort of felling operations

• Apply ecological impact tax to everything —until every human recognises and is impacted by our inherent myopic rapaciousness then the biosphere is at dire risk.



In 2010, the Ministry for Environment and Forests commissioned a twelve-member task force that examined the plight and future of elephants in India. This motley team of scientists, activists, a veterinarian, and a historian came up with a comprehensive analysis of the situation and some radical suggestions. In this special section Current Conservation examines the findings of the report and showcases some reviews of this mammoth effort.

Pages from the Elephant Task ForceReport

Excerpt from the report

Securing the challenge of conserving elephants in the wild and of ensuring humane care in captivity is symbolic of the wider dilemma of living in harmony with nature in India. No animal better symbolises our cultures and few have such major presence across diverse ecosystems as this flagship species. But there is more to securing the future of the elephant than knowledge of its biology.

The ecological and behavioural characteristics of elephants in the wild are the necessary starting point but the challenge of conservation begins within our broader social milieu. As our country's economic base expands, the challenges for in situ conservation in general and of large vertebrates in particular will be more, not less intense. But the challenge is both societal and scientific.

An India with elephants living securely in the wild, and in humane conditions if in captivity, is still within reach. Such a goal, if attained, not in full measure but very substantially, can have wider resonances. It is also of importance beyond our borders. Possibly as many as six of every ten wild Asian elephants live in India.

As for its future, there are grounds for both hope and concern. The most recent estimate of the wild population of elephants

in India is over 26,000 elephants. While population estimates may be revised as more rigorous techniques are developed, what they do show is that the elephant does not confront crises of the sort the tiger has faced in the recent past. Its visibility and presence across diverse ecosystems is probably greater than that of the magnificent big cat.

India is also to home to 3500 captive elephants, with ancient traditions of captive care. Even as science unlocks secrets of their lives in the wild, new knowledge informs us about their complex social relationships. Forest reservation helps halt agricultural expansion. Protected Areas provide refuges.

Sustained measures have brought the levels of poaching for ivory under control. The respect, tolerance, and fellow feeling accorded to these huge animals by most people have helped their survival. But there is no need for complacence. Poaching of male elephants for tusks has declined but there are well researched populations showing that the after-effects are all too real, with the males being too few and sex ratios heavily skewed towards females. Large developmental and infrastructural projects, when not planned or located with adequate care, are fragmenting habitat, while other local pressures degrade them. Elephants cannot survive simply

through strict protection of a few parks and sanctuaries. A sole focus exclusively on Protected Areas, vital as they are, is inadequate for the long-term conservation of this keystone species. Habitats outside reserves may often be crucial, especially if they are corridors or links between large tracts of habitat.

Yet, we cannot overlook how economic, social, and cultural demands will take priority outside the boundaries of parks and sanctuaries. Any interventions in such areas have to proceed on a different set of premises involving local stakeholders. Participation and incentives, planning, and conflict management, not merely exclusion, will be critical. Even more so, securing elephants and their habitats and containing conflict with people has the potential to give conservation in India a new direction. It is no mean task and the odds are immense.

But we can succeed. Indeed we must: failure is too high a price to pay. Success requires that policies be better informed with sound science. Landscapes vital to viable populations of elephants have to remain intact. Careful land use planning can minimize the irretrievable loss of fragmenting of habitat.

Gajah and Prajah

The survival of the elephant depends even more on taking its cause to the people. Gajah (the elephant) and Prajah (the people) have to go together. Losing sight of either dimension will harm both.

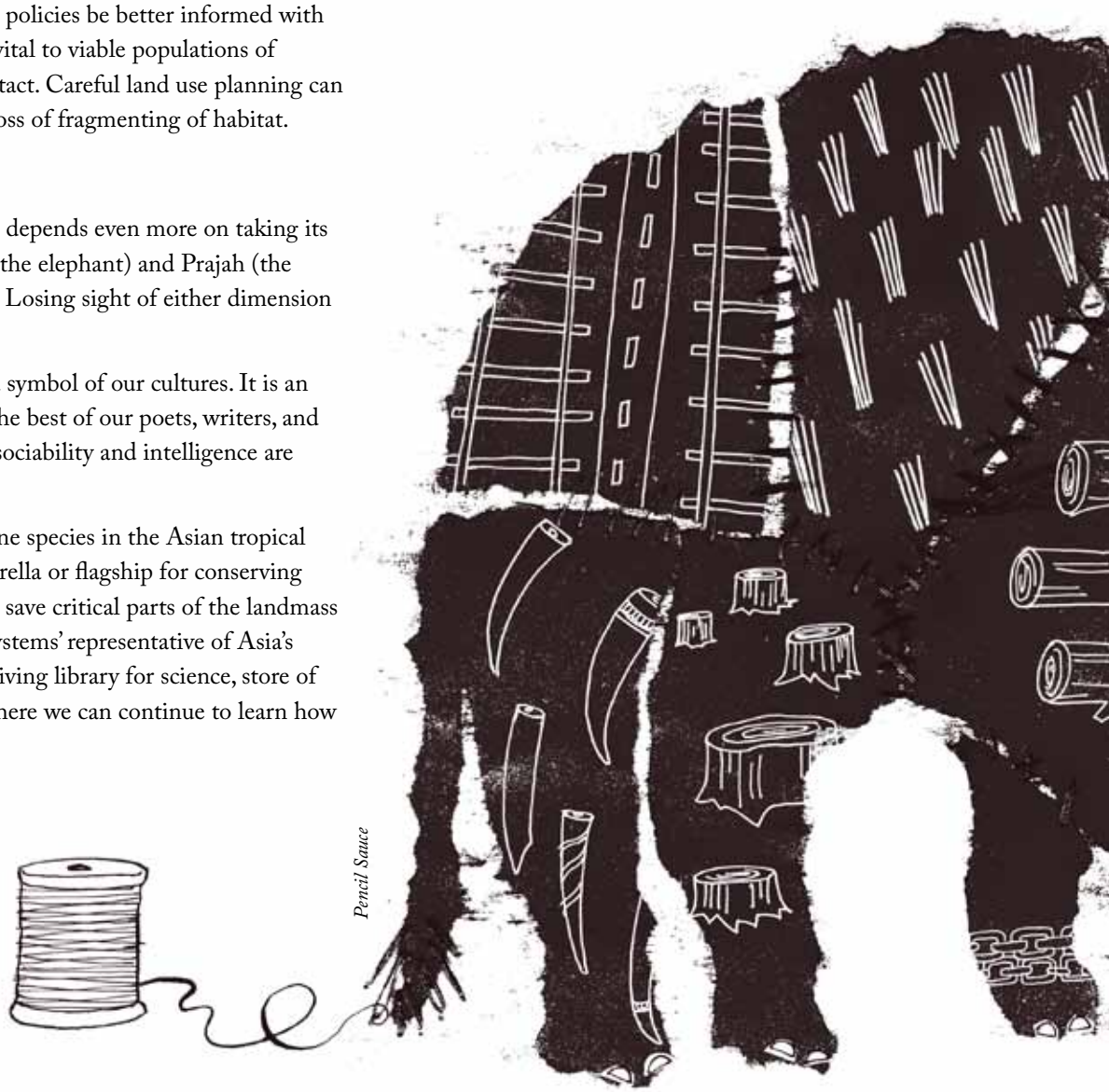
The elephant is more than a symbol of our cultures. It is an animal that has fascinated the best of our poets, writers, and singers across the ages. Its sociability and intelligence are proverbial.

Elephas maximus is a keystone species in the Asian tropical forests. It can act as an umbrella or flagship for conserving biodiversity. Gajah can help save critical parts of the landmass that will be functional ecosystems' representative of Asia's biomes, and also serve as a living library for science, store of genetic wealth, and place where we can continue to learn how nature works.

But elephants and people are often in conflict. Asia's largest vertebrate, requires living space, food, and water, and the search for these often conflicts with human aspirations and needs.

Wild populations can only survive if the landscapes they live in remain intact. This was not as much an issue in the past centuries but demographic growth, the expansion of agriculture, and the growth of industry and infrastructure have fragmented habitats.

Human-elephant conflict is also a matter calling for serious attention and action. Every year, over four hundred people lose their lives to elephants, and these are mostly cultivators or labourers. In turn, more than half of the hundred elephants killed each year are in defense of crops.

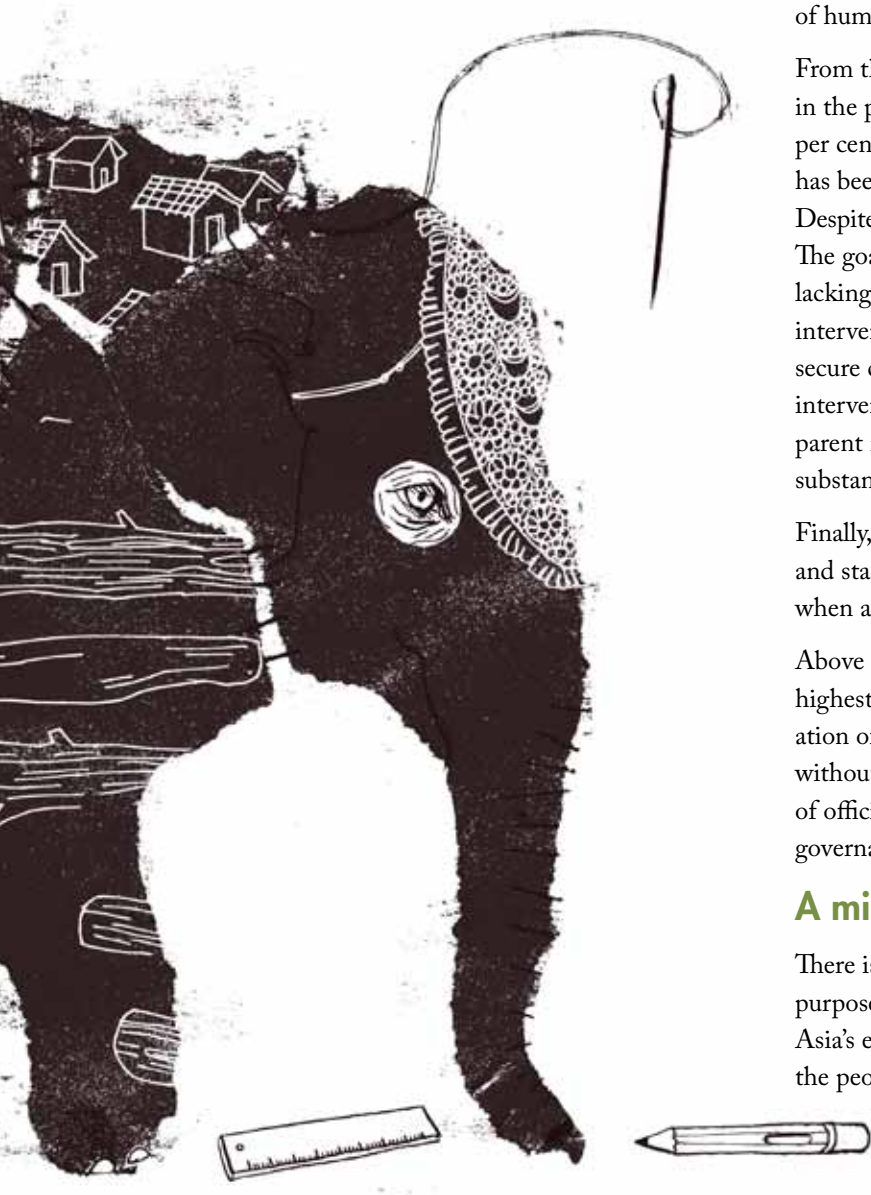


Pencil Sauce

The stress, suffering, and loss are all too real. It is tragic, for elephants as well as humans are both victims in the conflict. Both are victims of victims. Crop compensation and ex-gratia, payment for the loss of human life (in a very small way) are important facets of elephant conservation in India. But the issue requires a much more sustained and knowledge-based programs that alleviates distress, but also addresses underlying factors that exacerbate the conflict. The best of our country's skills in science and humane governance have to be brought to bear on this issue.

A future for Gajah

The future of wild elephants rests centrally on how best India secures their habitats. Population and habitat management have to take account of sound ecological principles. But the tactics can vary. The local texture of the land use, society, and culture vary greatly across India's elephant habitats. The ecological and social diversity is easy to take note of, but difficult to appreciate in coming up with a response. Elephants in India are distributed across four large regions, each with several sub-populations from small herds in isolated forest patches to several thousand elephants within large interconnected landscapes.



The complex contours of the elephant conservation scenario were recognised by a previous Task Force two decades ago and built into the founding principles of Project Elephant in 1992. Since then, Project Elephant has had significant achievements. The 65,000 sq km in the 32 existing and proposed Elephant Reserves include Protected Areas and forests as well as zones of human use and habitation.

From the outset, the objective was to consolidate preservation in the parks and sanctuaries. But since these form less than 30 per cent of the Elephant Reserves, it is land-use planning that has been the major challenge in the rest of the landscapes. Despite significant achievements, there have been shortcomings. The goals were spelt out but the means to get there were lacking, not merely in a financial sense. Coordinated interventions for land-use planning outside Protected Areas or secure corridors required a far wider range of instruments of intervention. Further, the mitigation of conflict in a transparent manner and science-based planning of reserves needed substantial strengthening.

Finally, Project Elephant's efforts to improve the welfare, status, and standards of captive elephants and their care-givers even when assisted by active civil society groups needed more focus.

Above all, the efforts lacked sharp focus and attention at the highest level of government. The fragmentation and degradation of habitat is a serious issue and cannot be addressed without major overhaul both of administrative machinery and of official policies. Timely action can avert crises, and effective governance make people partners in protection.

A mission renewed

There is, to put it simply, a need for a renewed sense of purpose. India can and should take the lead in protecting Asia's elephants. In doing so, it needs to take Gajah back to the people.

01 **Be humane to captive elephants**	01. Phase out elephants in commercial captivity	01. Monitor and enforce welfare standards for 3,500 captive elephants. Better service conditions for mahouts 02. Establish state-of-the-art lifetime care centres	
02 **Upgrage research & monitoring systems**		01. Establish National Elephant Baselines and estimation protocols by Consortium for Elephant Research and Estimation anchored by NECA 02. Promote long term dedicated research through Elephant Reserve Research Stations	01. Establish open-air forest labe in elephant landscapes adjecent to PAs. Identify institutions of excellence to run them
03 **Secure elephant landscapes**	01. Rationalise boundaries of Elephant reserves. Let-go human dominated landscapes 02. Declare as Slow-go areas through the rest of Elephant Reserve and prioritised corridors 03. Consolidate No-go areas in these reserves as Protected Area network or critical wildlife habitat or other conservation zones. 04. Declare immediate priority of select elephant landscapes and Elephant Reserves		
04 **Take Gajah to the people**	01. Declare the elephant a national heritage animal	01. Initiate Haathi mere Saathi awareness programme	01. Start regional Gajah centres

Kalyani Ganapathy

Far more than any wild animal, it is a species that children and adults alike are familiar with. But this goodwill has hardly been harnessed with a wider message of conservation and awareness of animal sensibilities, or of our lore and cultures. The elephant needs pride of place in our national life, and it also needs to be restored not just in its beleagured habitats but in the hearts and minds of our people.

The Elephant Task Force has made several specific recommendations. These extend over different facets of governance and research, the securing of landscapes, and mitigation of conflict, anti-poaching and ivory trade measures, and compassionate and humane care for captive animals.

But to secure the future for Gajah, the key is in our perceptions as much as in policies and programmes. Declaring it the National Heritage Animal will recognize its dual identity as a symbol of ecology and of culture. Taking Gajah back to the people through a host of outreach programmes, most of all in and around its habitats, will bring on board children and

	Government Initiative	NGO-Govt Initiative	NGO Initiative
05 **Stop poaching**	01. Fill frontline vacancies with motivated local youth. Upgrade service conditions 02. Boost intelligence gathering and anti-wildlife crime technologies 03. Shut out Indian and International ivory markets		
06 **Establish better governance model**	01. Form National Elephant Conservation Authority (NECA) 02. Amend Wildlife Protection Act to close loopholes 03. Encourage direct recruitment at top levels		
07 **Take global lead in elephant conservation**	01. Establish Asian Elephant Forum for trans-boundary co-operation	01. Host first International Elephant Congress with conclaves in Science and Management culminating in a government led summit for elephant 50:50 vision charter 02. Encourage cooperation with Elephant Scholar Exchange Programme	
08 **Conflict mitigation**	01. Establish high conflict zone mitigation task forces to develop and oversee protocols 02. Make relief packages adequate, innovative and speedy 03. No culling captures/ transactions in dire situations. Moratorium on elephant proof trenches and fences till standards in place		

young people who will share their lives with this remarkable animal in the 21st century. Finally, India ought to take the global lead in elephant conservation, with an International Elephant Congress and broader cooperation with Asian neighbours. Any such efforts at the popular or global level will eventually be tested on the ground. The task force is convinced that India can give Gajah a secure future. An India without elephants is unacceptable. But an India with elephants requires sustainable approaches that work on the ground.

The best of our science and our democratic institutions have to mesh together and solve real life problems and crises. A future for Gajah depends on how solidly we can rise to the challenge of the hour.

* *Rangarajan M, Desai A, Sukumar R, Easa PS, Menon V, Vincent S, Ganguly S, Talkudar K, Singh B, Mudappa D, Chowdhary S & Prasad AN. 2010. Gajah: Securing the future for elephants in India. The report of the Elephant Task Force, Ministry of Environment and Forests.*

Divya Mudappa

Captive elephants waiting for food at Dubare Elephant Camp

The Curious Case of the Captive Elephant

The Elephant Task Force proposes to eventually 'phase out' the use of elephants in commercial captivity through a massive tightening of law. Not surprisingly, owners are far from happy, and the State Forest Departments in a quandary.

The captive Asian elephant is something of a legal oxymoron. Few other wild animals, Schedule I species at that, are in such extensive commercial use. Some 3,500 elephants in India, mostly captured from the wild, have been trained by human ingenuity to ferry tourists, 'bless' the devout, parade in festivals and log timber in forest camps.

Not least because of the oddity of their position, this large section of elephants has slipped through the cracks in the Wildlife Protection Act (WLPA). Whether it is ownership, trade, upkeep, or its use, the captive elephant is exempted from almost every provision the WLPA extends to wildlife.

Unlike all other forms of wildlife, elephants can be 'owned' privately while the WLPA specifies that all wildlife is property of the Government. The only specific reference to captive elephants places them in the same category as bullocks, horses, camels and other domesticated animals, or "vehicles" despite their very specific ecological needs. The fact, however, that these lacunae in the law have for so long remained unaddressed is indicative of an important cultural reality in India (and several Asian countries): the elephant has, over the

centuries, become an integral part of well-entrenched traditional or religious practices and more importantly, a source of livelihood for thousands of mahouts and kavadis.

There are no precise figures for the number of captive elephants India has. But of the estimated 3,500 elephants, half are in northeast India, and another 900 in southern India. Northern and eastern India are thought to have between 200 and 300 each, while western India has some 80.

Indeed, the dilemma that these creatures pose and the sheer numbers they represent—they account for approximately 10 per cent of all elephants in India—make them impossible to ignore. It was only inevitable, therefore, that the first major report on the status and future of elephants in India, 'Gajah,' written by scientists, academics, and activists comprising the 12-member Elephant Task Force, should dedicate an entire chapter to the captive elephant. The report, submitted in August 2010 to the Ministry of Environment and Forests, recommended among other things that the elephant be declared a "heritage animal."

The report bases itself on the premise—one held by field biologists, scientists and scholars of elephant behaviour—that elephants have unusual social complexity, significant cognitive abilities, that they are "self-aware individuals, possessing distinct histories, personalities and interests, and that they are capable of physical and mental suffering."

Beginning here, the Task Force recommends a string of modifications to the WLPA in an attempt to bring within its umbrella the curious case of the captive elephant. The eventual goal, it adds, must be "the complete phasing out of elephants from commercial captivity." This somewhat controversial proposition is appended with an acknowledgment however, that "the elephant is integral to cultures, religions and livelihoods in many parts of India [that] have a long tradition of elephant keeping and handling." The chapter then sets itself the more immediate target of "improving their condition in captivity" by clamping down on their capture, taming, sale, transfer, and ownership.

The elephants used for logging operations in government forest camps are comparatively in better shape, owing perhaps to their proximity to their natural habitat. But the biggest chunk of captive elephants are in commercial captivity predominantly in temples, circuses, tour operations or used to beg for alms, and the condition of many of them is debatable. And studies have shown that the worst off are temple elephants, an estimated 1,200 of them—being farthest removed from their natural ecological needs. Tethered for days on end, their rearing is often unscientific and their nutritional status poor. This group of elephants is also prone to a variety of ailments from anaemia to foot-sores and tuberculosis. Every now and again there are unsettling reports of temple elephants going 'beserk,' breaking loose and even killing people while on a rampage.

The use of elephants in circuses has also caught the attention of the Task Force that has called for its ban. "This category of privately owned elephants should follow the precedent of phasing out as per the 1991 ban of the five categories of wild animals (lion, tiger, leopard, bears and monkeys) in circuses." It also recommends the prohibition of elephants in weddings, unregulated tourism, public functions, begging, and other forms of entertainment.

Pencil Sauce

Divya Mudappa

Elephants bathing at Dubare Elephant Camp

If the Task Force has its way, no one but the government would 'own' an elephant. The Task Force recommends that the word 'ownership' be replaced with 'guardianship'. Individual State Forest Departments will take over ownership and also establish 'Captive Elephant Lifetime Care Centres' to take care of animals abandoned, confiscated, or captured.

Guardians, whether individuals or agencies, should also be given a 'guardianship certificate' or 'passports' with photographs and complete details of the elephants, which will be micro-chipped "in order to ensure that the elephants enter into a central and state system of monitoring." If implemented, these and other legal interventions such as the ban on new acquisitions of wild-caught elephants for commercial use, their sale, and ownership could indeed serve to realize the eventual goal of the Task Force, i.e, the phasing out of captive elephants in commercial use.

The proposal has, not surprisingly, met with opposition from owners and temple authorities. October 4, the 'National Elephant Day' was observed as a 'black day' in Thrissur: the Guruvayur temple here has one of the largest collection of elephants at around 70. The Kerala State Elephant Owners' Federation and the Kerala State Pooram-Perunnal Festival Coordination Committee said the Task Force had failed to consider "the state's cultural and religious traditions" and that the Thrissur Pooram that draws in thousands of tourists, will be unimaginable without the caparisoned procession.

And if owners were allowed only a guardianship of their elephants, they argued, the government must take up the responsibility of maintaining elephants. An elephant costs an annual Rs. 3 lakh to maintain and Rs 1.5 lakh to cremate, owners pointed out. The Kerala Forest Department chose not to "antagonise large communities" by enforcing legislation such as this. The department endorsed a "transparent way" of selling, gifting and donating elephants. It also admitted that it cannot take up the ownership of the 800 elephants in the State, the department added.

In another incident a couple of months earlier, in August, the Tamil Nadu forest department kicked up dust when it asked temple authorities to stop using elephants to "bless" Hindu pilgrims. The animals had begun to contract tuberculosis (and possibly even transmit it) from the 500 devotees that touched their trunks everyday. Four elephants had recently died of the disease. Hindu groups however said the ban went "against religious sentiment".

Scientific studies do establish the practice as a health hazard for elephants and humans. According to a study sponsored by the Bangalore-based non-government organization Asian Nature and Conservation Foundation, one in four temple elephants in the southern states has tuberculosis, a 'zoonotic' disease that can be transmitted between humans and animals. The prevalence of the disease was as high as 24 per cent among other privately owned elephants (such as circus elephants and those used for collecting alms), while elephants with the forest department fared much better, with a much smaller 11 per cent testing positive for the bacteria.

Be this as it may, at least two key problems are bound to arise if the Task Force's recommendations became a reality. One, what would happen to the 5,000 mahouts and kavadis, the primary caretakers of the captive elephant, who would be inevitably "phased out" too? And two, how will the State Forest Departments, with the meager money, space, and personnel at their disposal take on the ownership of hundreds of these beasts that are now in private custody, or bring under their wing every rogue elephant captured in a human-animal conflict situation?

The report does not suggest a long-term vision for mahouts or alternative livelihood options. It does however acknowledge the mahout as the custodian of traditional knowledge about elephant behavior, as the single most important point of contact with the elephant, as someone who is paid a pittance by the elephant owner and as deserving "better employee status" with specific laws to their aid. The Task Force recommends that mahouts in forest camps be recruited at the cadre of forest guards and entitled to hardship allowance, accident insurance, and "bonus for well-kept and healthy elephants." As for mahouts in private employment, their salaries should be at par with the forest department grades, it adds.

As the privately owned elephants are phased out, an already stretched Forest Department will find its responsibilities bloat. As owners of all the State's captive elephants and the caretakers of the pachyderms captured or seized, the department is likely to find itself in a logistical conundrum, one that the Task Force offers few solutions to.

The Task Force does point to the abysmal lack of wildlife vets and paltry infrastructure that leaves elephants largely devoid of professional care. For instance, Karnataka's Forest Department, which has some 120 elephants in its camps, has no more than three wildlife vets at its disposal. Many of these elephants are captured "rogue" elephants with pellet wounds that need specialized help, the forest department often laments. The report recommends that "Wildlife Veterinary Wings be set up within the state forest department with full promotional opportunities, incentives, and facilities for the veterinarians with options of permanent absorptions."

It also recommended a host of other interventions besides additions, deletions, and amendments to the WLPA. These include the setting up of Captive Elephant Welfare Committees to assist the State Forest Departments monitor the condition of captive elephants.

To begin with, the Task Force suggests a census of the captive elephant—the first ever exercise of its kind if it is carried out. But with livelihoods and businesses at stake and the current capacity of the State Forest Departments, it is anybody's guess when or how these beasts will be brought under the ambitious umbrella of measures conceived for them.

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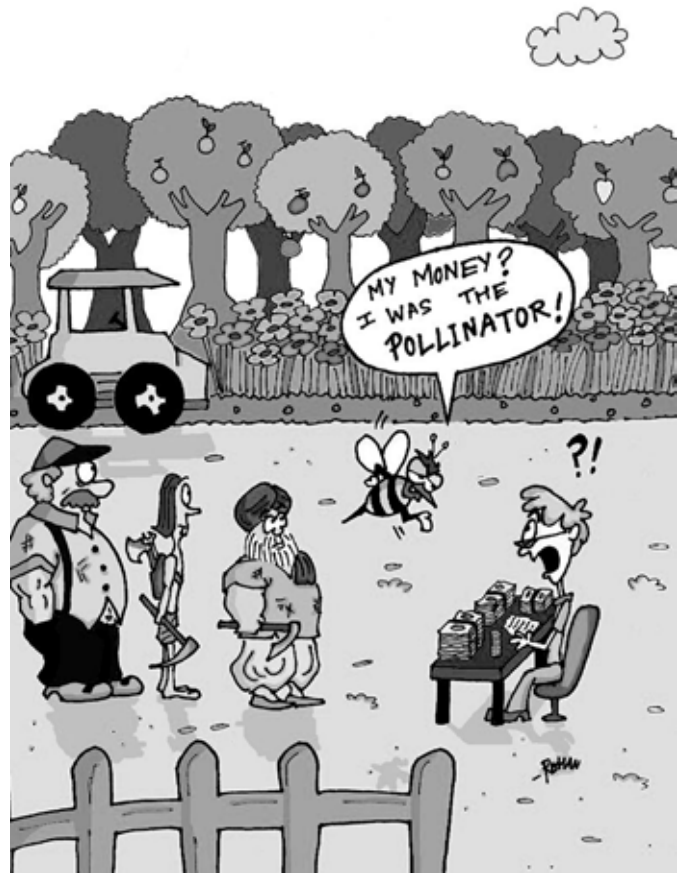

Rohan Chakravarty

Sanjay Gubbi

The Elephant Task Force Report advocates transparency in all aspects of elephant conservation and calls for an administrative overhaul both at the union and state levels. As admirable as this effort is, do some of the recommendations need rethinking?

Making Way for the Jumbo Challenge

Prior to the software buzz, a bejewelled Maharaja on an elephant was an important brand icon for India. This acted as an important symbol for promoting the tourism industry. But in recent times 'brand elephant' has suffered a loss of reputation, at least in some parts of rural India where farmers suffer crop loss or injury/death of near and dear ones. Though some of us strongly advocate the preservation of elephants, certain sections of society, especially those who live in close proximity to this megaherbivore, do not share our sentiments about these difficult neighbours.

At the other end of the spectrum infrastructure project proponents (though crucial for the country's economic growth) have knowingly or unknowingly ensured fragmentation and degradation of elephant habitats at a scale and pace that is monstrous. Hence, today, saving a large wildlife species such as the elephant has become the ultimate test of society's willingness to conserve wildlife.

India hosts the largest Asian elephant population and with an estimated 26,000 elephants it is home to half the world's population. These pachyderms are spread over a geographical area of about 110,000 sq km, sixty percent of which is declared as 32 Elephant Reserves (ER).

A different concept than the conventional Protected Areas (PAs), ERs consist of a mixture of land categories. PAs (30%), Reserved Forests (40%) and private lands (30%) form the land tenure of ERs. Securing this landscape in pursuit of saving a flagship species is a challenging and daunting task, particularly as degrees of protection and land ownership vary within ERs. Combined with it is the ever expanding economy and crushing human numbers competing for space, sometimes

with elephants. This is perhaps true for all large vertebrates that demand specialised food habits and/or range over wide areas. However, due its ability to inflict human fatalities, the conservation of elephants is a mammoth task compared to the conservation of any of the other species.

The increased tension due to human-elephant conflict and rampant retaliatory killing of elephants prompted the central Government to set up the Elephant Task Force (ETF) along the lines of the Tiger Task Force that was set up earlier in the wake of the tiger crisis looming over the nation. The important assignment of ETF was to bring in long-term, pragmatic solutions for elephant conservation.

Interestingly, the task force was headed by a wildlife historian and political analyst, which is an indication of the issues related to elephant conservation that encompasses the broader social milieu. Other members of the task force comprised elephant biologists, conservation and animal welfare activists, and a veterinarian. The report was developed based on country-wide consultations with a wide array of people including people affected by elephants, elected representatives, officials of forest departments, wildlife biologists, conservation and welfare activists, mahouts, veterinarians, temple committees, and elephant owners, attempting a democratic process.

'Gajah: Securing the future for elephants in India', was recently submitted to the Government sans the intense media glare that the Tiger Task Force attracted. The report advocates transparency in all aspects of elephant conservation, and it is admirable that the report itself was immediately made accessible to the public on the Ministry of Environment and Forests' website.

The ETF has focussed on a wide range of issues such as the elephant's spread in the country, governance, habitat loss, protection and habitat management, captive elephants, human-elephant conflict, elephant research, and outreach.

Elephants and governance

Few Government-appointed committees have been critical about the way the public institution functions. Calling for an administrative overhaul both at the union and state level, ETF notes that there is lack of focus and attention at the highest level of the Government. ETF comments that though Project Elephant was set up in 1992 it has been "unable to take up leadership in elephant conservation". A statutory body similar to the National Tiger Conservation Authority is proposed. This new body, National Elephant Conservation Authority (NECA) would require amendments in the Wild Life Protection Act 1972 (WLPA), to give it teeth under the law. A budget of Rs 600 crore (US $129 million) has been proposed under the 12th five-year plan for NECA. In a progressive idea, ETF recommends lateral recruitment of non-governmental personnel with requisite skills to be appointed in the NECA at the regional levels.

To improve governance in management, Operational Reserve Level Management Advisory Committees comprising of elected representatives (MLAs, Zilla Panchayat, Gram Panchayat and Gram Sabha members), local conservationists, officers of railways, veterinary, and other departments, which would hold public hearings, are to be setup.

An important feature that's missing in our PA management is objective, ecological, and administrative assessment of performance. Independent evaluation of the ERs with performance indicators to measure progress is recommended to bring in transparency.

Defragmenting elephant habitats

Recently there have been increased debates about the role of PAs in wildlife conservation. However, with crisis looming over some habitat specialist species it is becoming clearer that PAs act as core sites for source populations. Re-emphasising this, ETF calls PAs indispensable for elephant survival and has suggested that PAs be expanded to include critical habitats and corridors or else be declared as Community or Conservation Reserves as found fit.

Expanding or declaring new PAs, however small they are, is a herculean task in the current socio-political situation. Opposing interests, whether legitimate or not, are too many. Hence declaring elephant corridors, as part of the PAs that as suggested by the ETF would be a challenging job to accomplish.

The world over and in India elephants have experienced massive contractions of their geographical range due to modifications of their habitats and landscapes. This collapse of range needs to be halted if wide-ranging species have to be saved, and saved with minimum conflict with humans. Larger external pressures have pushed elephants into fragmented habitats and this needs larger habitat management processes.

To reduce further fragmentation of elephant habitats it is recommended that entire ERs are declared as Ecologically Sensitive Areas under the Environment Protection Act. The

Elephant landscapes		Area of landscape	Population 2005
1	*East Central Landscape*	*17092.3*	*1978*
2	*Kameng - Sonitpur Landscape*	*3312*	*612+*
3	*Eastern South Bank Landscape*	*2894.5*	*424*
4	*Kaziranga - Karbi - Anglong - Intanki Landscape*	*6212*	*2245*
5	*North Bengal - Greater Manas Landscape*	*3578*	*1008*
6	*Meghalaya Landscape*	*3831*	*1430*
7	*Brahmagiri - Nilgiri - Eastern Ghat Landscape*	*15320*	*8572*
8	*Anamalai - Nelliampathy - High Range Landscape*	*5185*	*1430*
9	*Periyar - Agasthyamalai Landscape*	*4991*	*1738*
10	*North - Western Landscape*	*6149*	*1510+*

Kalyani Ganapathy

EFT suggests that infrastructure development like mining within ERs be checked or permitted under strict ecological safety standards, and urges continuance of local livelihood activities subject to existing norms. To check diverting wildlife habitats without species specific criteria, a new approach termed as Elephant-Specific EIA (Environmental Impact Assessment) is suggested for permitting developmental projects within ERs. The ETF has also recognised the long pending issue of quality and rigor of EIAs and licensing consultants conducting EIAs.

Civil society has identified 88 critical elephant corridors across the country based on various ecological and social parameters. ETF has ranked the importance of these corridors and a Rs 200 crore (US$ 43 million) budget for corridor securement is proposed under NECA. Apart from this it is also suggested to use Compensatory Afforestation Fund Management and Planning Authority (CAMPA) for habitat consolidation and in particular for purchasing corridors. The corridors have been divided into two categories based on ecological priority and feasibility.

The report calls for rationalisation of ER boundaries based on ecological principles rather than the current ad-hoc boundaries. With this background the ETF has identified 10 elephant landscapes for prioritising suggested activities.

There are few cases where forest land encroachment, especially for developmental activities or commercial plantations, has been dealt with seriously in the country. This soft approach on a serious issue has bolstered forest encroachers. On a positive note ETF has suggested amendment of WLPA so that a minimum fine of Rs 10 lakh and imprisonment of not less than two years be imposed on encroachers in ERs.

On the issue of linear fragmentations such as railway tracks, roads, and high tension power lines, several suggestions including regulating night traffic passing through elephant corridors and bringing railway projects under the purview of EIA have been advised.

Other serious concerns

Another critical issue addressed is the way elephant habitats are managed in the name of 'habitat improvement'. The report has set guidelines on management of surface water, forest road construction, and soil and moisture conservation activities in elephant habitats. This is an effort to inculcate scientific management of habitats and also prevent 'leakage' of conservation funds.

Applying the precautionary principle on the important international issue, opening of ivory trade finds no support in the report as it states that "no rationale, whether ecological, economic and ethical can justify international ivory trade." Expressing unstinted support for wildlife conservation, the report states "in India species do not always have to pay to survive." This should answer questions of culling, trophy hunting, and other similar conservation paradigms. Issues that are perhaps ubiquitous to most tropical countries such as improving enforcement effectiveness and staff recruitment at lower levels also find place in the report.

Education and outreach

Broaching the domain of conservation education, which is focussed more on urbanites, the report has emphasised enormously on conservation education and outreach for communities living in and around elephant habitats. In a bid to take elephants to people, based on ETF's suggestion elephant has been declared as a national heritage animal. Hosting the first International Elephant Congress, Elephant Range Exchange Programme, United Nations Day of the Elephants and setting up of the Asian Elephant Forum are other suggestions.

On the flip side

Certain recommendations made by ETF need some rethinking. It has gone with the old model of recommending MPs to represent in national level committees. Representation of MLAs from high conflict areas in the national level committees is important. The political dynamics of MLAs and MPs are different. Rural communities have an influential political voice but have better access to MLAs rather than MPs. MPs do not rely directly on individual voters to regain political constituencies like MLAs, but operate through other elected representatives and local leaders.

It should be mandatory that there is no financial link between the agency applying for permits and EIA consultants. This issue has been the crux in the bias shown in most EIA reports. It would have been ideal if this gap was identified in the report.

Another serious concern in the report's recommendations is about independent evaluation of reserve management. Though the suggestion of independent evaluation is highly valid, it missed the point that evaluators cannot be people retired from the forest services. As ex-officials evaluating their own colleagues and juniors, the outcomes might be biased.

Bringing paramilitary forces to improve protection might not be an ideal solution. As the report itself has highlighted, elephant conservation is as much a social, economic and political issue as it is biological. Protection forces need considerable understanding of local issues, familiarity with terrain, people (for information gathering), language, and so on. Alien paramilitary forces might only work in terrorist, insurgency infested areas but not under normal circumstances.

Finally

Overall the ETF has shown a strong will to democratise the way elephant conservation needs to go ahead and also how Government appointed committees can perform. Lastly, the task force projects a positive picture that "India can secure the future of elephants and their forest home". This is unlike several other reports which project a gloomy picture. Hope the recommendations of the task force are implemented by the Government in true spirit.

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Big Conservation and Big Business: Joined at the Hip Pocket

Kalyani Ganapathy

When corporations form alliances with conservation NGOs, are they equal partners? With their enormous political and financial clout, corporations hold all the chips while conservation organizations transform from environmental watch-dogs to corporate public relations machines.

At a time when the British Petroleum (BP) oil spill and the Bhopal gas tragedy are in the headlines, Green, Inc. offers an insight into the murky world that lies at the intersection between Big Business and Big International NGOs (BINGOs). Reports of the appalling treatment of traditional and indigenous peoples at the hands of conservation BINGOs started getting louder during the 2000s. In 2004, Mac Chapin, an anthropologist, wrote a seminal essay 'A Challenge to Conservationists' in World Watch Magazine chronicling the cynical alliance between conservation BINGOs and Big Business against local people across Latin America's extensive forests.

As money for conservation became harder and harder to find through the 1990s, the BINGOs increasingly banked on a lucrative source of revenue - the corporate sector. In return for the favour, executives from these donor companies sat on the boards and councils of the charitable organisations whose integrity in the conservation of wildlife and ecosystems became increasingly compromised. The NGOs, however, defended their strategy by saying that the alliance provided them with leverage that they did not otherwise possess, and that they were actively advising the companies on best environmental practices for the benefit of ecosystems. But when large extractive industries decimated forests in search of oil and minerals, these BINGOs were accused of mutely watching, or even providing validation for the companies' activities. Instead of supporting the struggle the local people were waging against this destruction, the conservation organisations denounced the indigenous peoples who had been living in these forests for centuries, blaming them for the loss of biodiversity. BINGOS lobbied for their removal and on occasion even labeled their desperate attempts at saving their forest homes as terrorism.

As Chapin points out, conservation NGOs staffed primarily by biologists were more conversant with saving natural resources and had no expertise in handling people issues. This is where Green, Inc., is enlightening. A former journalist who worked for a time at Conservation International, she is in a unique position to narrate this story. At the heart of her book is the question: Are conservation NGOs and large

corporations equal partners in such alliances? With their enormous political and financial clout, corporations hold all the chips while conservation organisations transform from environmental watchdogs to corporate PR machines.

In the developing world, where these multi-billion dollar conservation organisations fund local groups, they use their considerable clout to overrule indigenous struggles against forces that are detrimental to conservation. For example, regional conservation groups had been pressurising Tata Steel and Larsen & Toubro to move the Dhamra port from its current ecologically sensitive location on India's east coast. However, with the arrival of IUCN as official consultants to the project, local opposition was steamrolled and 'reputation insurance' was provided to the port promoters. The international NGO's advice will at best prevent some turtle mortality whereas the activities of the port threaten the entire nesting habitat of sea turtles in Gahirmatha as well as the nearby mangrove forests of Bhitarkanika, jeopardising the last remaining stronghold of the saltwater crocodile in India, and future generations of countless life forms and the habitats as we know them today.

In October 2002, the then-CEO of Dow Chemicals (the company that bought Union Carbide), Michael Parker, was addressing 500 guests at a $75-a-plate event in Houston, Texas. The occasion: He was receiving an award for 'Dow's contributions to the environment' from the Nature Conservancy (TNC)! TNC could not have been unaware that two feisty survivors of the world's worst industrial disaster in Bhopal, Rashida Bee and Champi Devi Shukla sat in a hunger strike outside the Dow Chemicals' annual shareholder meeting in Michigan and similar protests outside the UN building in New York earlier that year.

As these BINGOs became bigger with large infusions of corporate donations, it took more and more money to sustain them. At the same time, another drain on conservation money was the huge incomes the CEOs of these large charities earned, which were nearly comparable to their corporate counterparts. The do-good organisations also began to resemble their corporate donors in other ways: MacDonald chronicles the various charges of impropriety against these leaders, such as giving themselves large bonuses, paying for personal expenses, interest-free loans, and so on by dipping into the organisations' kitty. Few donors investigate how their money is used and are often content with the glossy reports that conservation NGOs produce. Both Chapin & MacDonald argue that NGOs function largely without any regulatory oversight, while even corporations are answerable to their stakeholders.

A couple of months ago, Joe Stephens of the Washington Post revealed that BP gave $ 2 million in donations to Conservation International (CI) and $ 10 million to the TNC plus land assets over the years. BP was represented on CI's Board as well as on TNC's International Leadership Council. Yet neither of these two leading conservation organisations could help the British energy conglomerate's refinery in Texas from being branded as 'the most polluting plant in the United States'. Nor does the partnership appear to have inculcated responsible stewardship of the environment as reports of cutting financial corners, and inadequate precautions emanate after the oil spill in the Gulf of Mexico. Instead, soon after news of the oil spill broke, TNC distanced itself from BP while CI was analysing its 'reputational risk'. The question then arises, if these environmental NGOs are so quick to cut and run during a calamity when their advice is most needed, what real goals did they achieve during the partnership?

During the recent Copenhagen summit to address climate change a columist for The Independent, Johann Hari, accused BINGOs of siding with oil and petroleum businesses and the governments of the First World to scuttle any effort to set targets such as capping the rate of increase of temperature, and safe level of carbon dioxide in the atmosphere.

Is collaborating with Big Business a deal with the devil or a pragmatic alliance for conservation? Evidence that they change their destructive practices on the advice of conservation organisations is hard to find. In mid-July 2010, on the eve of releasing the UN report 'The Economics of Ecosystems and Biodiversity (TEEB) for Business,' of which he is the Study Leader, Pavan Sukhdev told The Guardian that businesses are "soulless corporations" and called on society to hold them accountable. Reading Green, Inc. is a good first step for any citizen willing to take up such an initiative. While the book focuses on American organisations, much is lost between the cup of donations and the lip of effective conservation action in India too. With large sums of money being spent, it is time someone investigated how much work is actually being done.

Christine MacDonald. 2008. Green, Inc. An environmental insider reveals how a good cause has gone bad. The Lyons Press.

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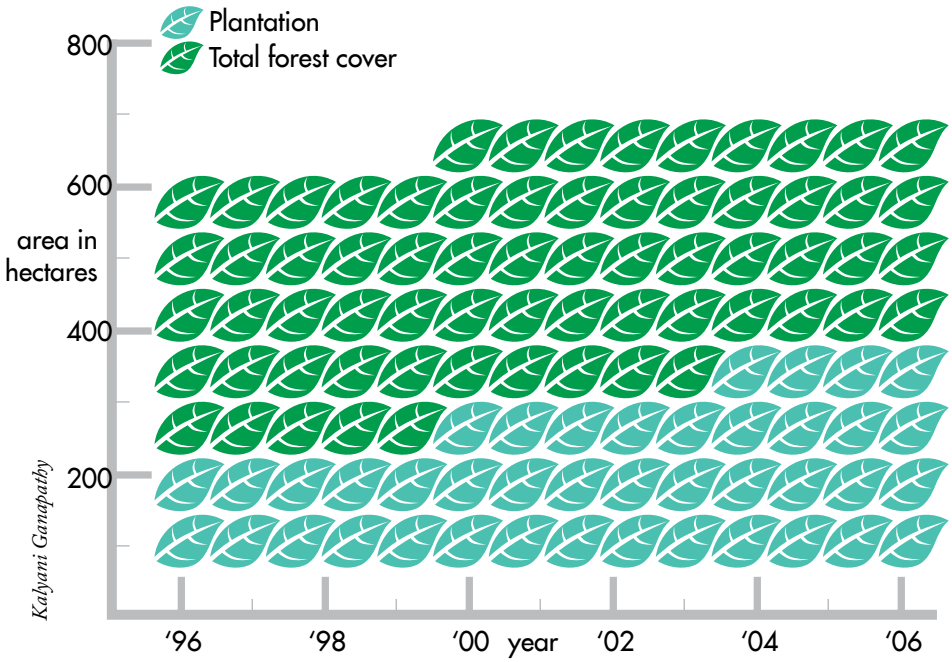

India's increasing forest cover: cause for celebration?

** Hari Sridhar*

India might look green from the sky, but that is not necessarily good for biodiversity on the ground

In 2009, the Forest Survey of India (FSI) announced that India's forest cover had increased by over 5% in the last decade. A recent paper in Conservation Letters suggests that this might not be great news after all. Jean-Philippe Puryavaud, Priya Davidar, and William Laurance—biologists who have worked in the tropics for many years, show that the increase in India's forest cover has come about entirely through the expansion of plantations of exotic vegetation. Since 1992, state-sponsored afforestation programs of fast-growing exotic species such as *Eualpytus* and *Acacia* have expanded rapidly in the country, mainly to meet ever-increasing demands for timber and fuel wood. At the same time, however, native forest cover has reduced at a high rate of roughly 2.4% per year. This is extremely worrying because these newly created 'forests' of exotic trees, are of little use in conserving native biodiversity.

The authors strongly believe that the main reason for the decline in native forests is fuel-wood collection by India's huge rural population; urgent attention, therefore, needs to be paid to find and make other forms of energy such as natural gas, biogas and electricity accessible to them. The authors also urge the FSI and policy-makers to make better use of the technology available to monitor the fate of native and plantation forests separately. Failure to do so, they feel, will lead to a very misleading picture of the fate of India's forests.

Puyravaud J, Davidar P & Laurance WF. 2010. Cryptic destruction of India's native forests. Conservation Letters 3: 390–394.

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Forced to adulthood by global warming

** Sandhya Sekar*

Climate-change is a reality, and conservation efforts must adapt to deal with it

Life on earth hangs on a highly delicate balance of many factors, one of the most critical being temperature. Any change in the surrounding temperature can have a drastic impact on the life history strategies of most organisms. In the past few decades there have been records of global warming, and the various consequences that follow, usually as precocious natural phenomenon. Though anthropogenic activities have often been thought of as a major contributor to global warming, there have been very few studies that demonstrate it as 'the' causal factor.

Of the few, there is one study by Kearney et al. (Biology Letters, March 2010), which reported anthropogenic warming as the cause for early emergence of the annual common brown butterfly *Heteronympha merope* in Melbourne, Australia. The team gathered inform- ation on the emergence dates of the butterfly from 1941 to 2005, from museum records and privately collected data, and calculated the average emer- gence date for every ten years. They also observed the effect of temperature on the life

cycle of the butterflies, from egg to adult stage in the laboratory. Historical weather record of the region from 1947 to 2007 was used to model the physiological response of the butterflies to temper-ature. Further, climate change models of the region were also made.

It was found that butterfly instars respond to increasing temperature, and 5th instars never survived at or beyond 25°C. The predicted earlier emergence by 1.5 day per decade due to increasing temperature in the region almost coincided with the observed 1.4 day earlier emergence each decade for the past 65 years. They also found that "the observed regional warming trend is consistent with the modelled climate response in this region to increasing greenhouse gases and other anthropogenic climate forcing".

This study showed anthropogenic warming as a clear cause for phenological shift in a butterfly.

Kearney MR, Briscoe NJ, Karoly DJ, Porter WB, Norgate M and Sunnucks P. 2010. Early emergence in a butterfly causally linked to anthropogenic warming. Biology Letters 6:674-677.

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Top right: Typical community of extremely rich spring fens occuring in the Rhodope mountains, Bulgaria

Mired by progress

**Joyshree Chanam*

Michal Hajek

Bulgarian mires face an uncertain future in the face of economic development

Biodiversity and ecosystems continue to shrink irreversibly giving way to economic progress, even as policies to save them are being discussed all over the world. One such case is that of the mires (wetlands of peat and calcareous tufa) in Bulgaria.

A comprehensive study carried out by Michal Hajek and his team found that mires in Bulgaria are of unique ecological importance. The mires are highly diverse, representing the entire pH/calcium gradient, and also differ in historical age. Therefore they act as refugia for various endemic and rare species of flora and fauna, and are priceless natural archives. But unlike other mires in arctic and boreal zones, which still remain quite unharmed, these (in south Europe) have been either drained for agriculture and urbanisation, or been submerged. The study shows that 43% of mire plants (some of which are extremely rare)are threatened, and that some of the rarest mollusc communities are found in only a few threatened sites.

The European Union has instituted a policy called Natura 2000 that makes it compulsory for all member nations to protect biodiversity-rich areas.Bulgaria when it joined the Union in 2007 needed to create its own Natura 2000 network. This, however, seems to have come a little too late. In the race for current economic progress, Bulgaria has already lost a major portion of its rare mires, at an accelerated rate after joining the E.U., but also earlier in the 1950s during the communist period. There is a huge lag between the making of policies and their realisation. Public awareness needs to be raised quickly to help slow down the disappearance of such irreplaceable natural treasures.

Hajek M, Hajkova P, Apostolova I, Horsak M, Rozbrojova Z, Sopotlieva D & Velev N. 2010. The insecure future of Bulgarian refugial mires: economic progress versus Natura 2000. Oryx, 44, 539–546.

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42 bastions to provide solution to tiger crisis

** Sandhya Sekar*

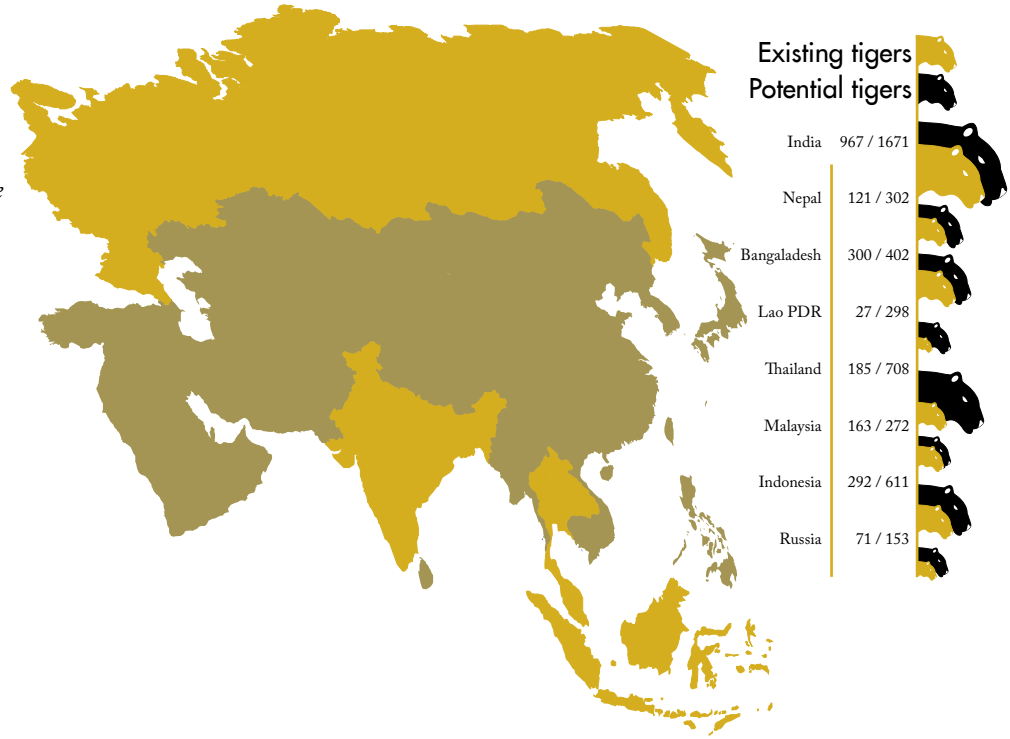
Directing tiger conservation efforts into specific 'source sites' across Asia might be key to prevent extinction

The numbers of tigers in the wild are at a historic low, with only 3500 left, of which only 1000 are breeding females. These tigers today occupy only about 6% of their historical range of about 1.5 million sq. km spread over 13 tiger range states. The principal reason for their decline has been over-hunting, compounded by habitat loss, fragmentation, and inadequate protection in some areas. A team of 21 experts, principally from the Wildlife Conservation Society, who were part of the Global Tiger Initiative (GTI) launched in 2008, present a conservation plan for the leaders of the tiger states in The Tiger Summit, held in Russia in November 2010.

The team has identified country wise 'source sites' for tiger populations, defined as sites that have tigers in enough numbers to replenish the population in the surrounding landscape. There are 42 such sites housing almost 70% of the remnant wild tigers. The costs of protecting these sites, including increased law enforcement monitoring, and where appropriate, community engagement, informant networks, and trade monitoring is estimated at US$930/sq. km/year, which is well within the range of costs of effective protected areas in general. More than half of these funds are already being committed by range-state governments, international donors, and NGOs.

India—with 18 tiger source sites currently housing 967 tigers (potential population size of 1671 tigers), and more importantly, enough funds for intensive protection- is extremely important for the continued existence of tigers. A combination of effective protection of source sites and a landscape level management plan has potential to bring the tiger back from the brink of extinction.

Walston J et al. 2010. Bringing the Tiger Back from the Brink-The Six Percent Solution. PLoS Biology 8: e1000485.



Carry-on meat

** V Sneha*

Illegal bushmeat in airplane baggage feeds luxury market in Paris

The emergence of a luxury market for African bushmeat in Europe was brought to light recently by Anne-Lise Chaber and her colleagues of the Zoological Society of London. With the help of customs inspectors at the Roissy-Charles de Gaulle airport in Paris, they conducted the first systematic survey of illegal imports of meat and fish carried by passengers arriving from sub-Saharan Africa. Large quant-ities of fish and meat were found in iceboxes and other carry-on luggage of passengers from West and Central Africa. Focusing on bushmeat, they found eleven species sourced from three countries, almost all of which are listed

Pallavi Baasri & Kalyani Ganapathy

under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The main drivers identified to facilitate the import of illegal meat in Europe are the lack of initiative shown by customs officers to seize such products as well as to penalize passengers carrying illegal meat. Most passengers claim to either be unaware of regulations on importing meat or produce a veterinary certificate for the animal products which is of no legal value in Europe. As the demand for bushmeat grows among customers in Paris, the rewards derived by these ignorant passengers from Africa for transporting the meat also increase.

Chaber and colleagues recommend that passengers be made aware of regulations related to importing meat illegally and the associated risk of prosecution, as carried out in the United Kingdom by a targeted publicity campaign. Bushmeat trade regulations can be better implemented by training customs officers to distinguish key taxa and by providing them with incentives to safely process and store seizures as evidence. They advocate a large scale study, covering all possible supply routes, to further understand this organized trade and develop strategies to reduce this flow of illegal meat, especially bushmeat.

Chaber A, Allebone-Webb S, Lignereux Y, Cunningham AA & Rowcliffe JM. 2010. The scale of illegal meat import-ation from Africa to Europe via Paris. Conservation Letters 3: 317-321.

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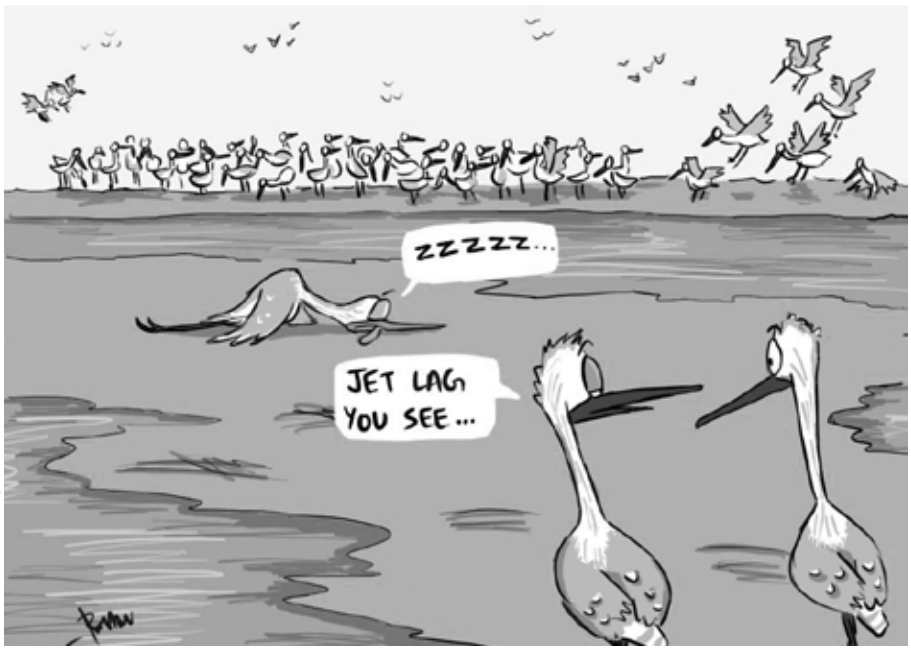

Rohan Chakravarty

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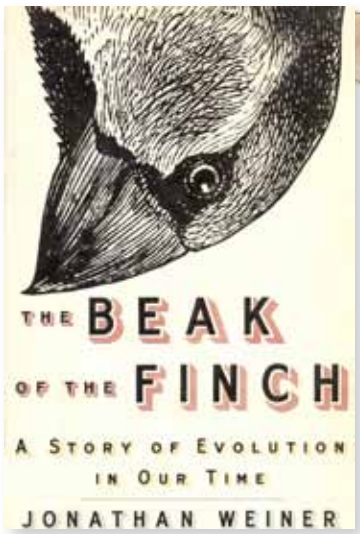
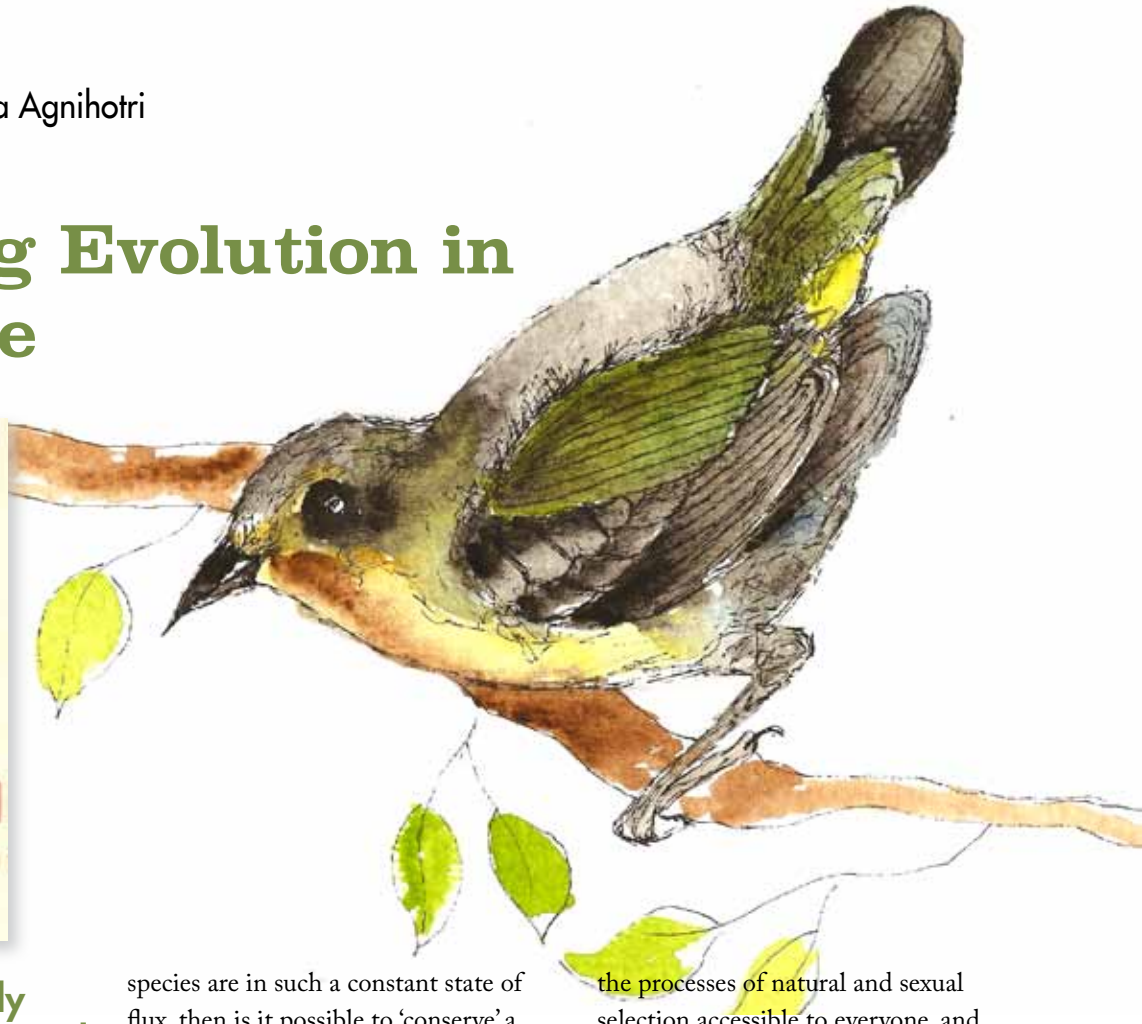
Capturing Evolution in Real Time





Evolution is continually happening around us, and is in some cases even driven by us, writes Jonathan Weiner.

Jonathan Weiner's book `The Beak of the Finch´ takes the reader on an exciting and illuminating journey on the search for `evolution in real time´. The journey begins and ends on the Galapagos Islands, where Princeton's famous husband and wife team of biologists, Peter and Rosemary Grant, have been studying Darwin's finches for more than twenty years. The Grants and their students have been marking and following hundreds of these finches in their pioneering study that demonstrates the processes of natural selection and evolution.

One of the interesting findings from the Grants' study is that the boundaries between species are constantly being built and rebuilt, and are seldom constant. Weiner also raises the question that if species are in such a constant state of flux, then is it possible to 'conserve' a species? The author stresses on the need to redefine what it is that we want to conserve in a particular species, or else be unpleasantly surprised by the results.

Species are adapting and evolving at this very moment, and the author puts together a number of examples that demonstrate how humans have been the cause for the hybridisation or extinction of many species plants and animals. We are also accelerating the evolution of many other species. Across the globe, there is an ongoing arms race between pest and farmer, bacteria and pharmacologist, and pest and bacteria seem to be winning. In Africa, pressures of poaching are pushing the elephant to lose its tusks. Sport fishing, where people are allowed to keep only the larger fish, is selecting for smaller and smaller fish.

Jonathan Weiner's skills in using metaphor and his lucid style of writing make it a compelling read. The book makes the processes of natural and sexual selection accessible to everyone, and also explains other concepts central to ecology and evolutionary biology. This book won the Pulitzer Prize for General Non-fiction in 1995, as well as the Los Angeles Times Book Prize for Science.

This book leaves us feeling that the world around us is suddenly more alive and vibrant, and we realise that we are affected by the same inexorable forces as even the tiniest single-celled organism. To quote one of my favourite lines from the book, "All is flux, everything flows."

Jonathan Weiner. 1994. The Beak of the Finch: A Story of Evolution in Our Time. Knopf.

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