

Conservation news

Reintroduction of captive-bred Philippine crocodiles

The endemic Philippine crocodile *Crocodylus mindorensis* is categorized as Critically Endangered on the IUCN Red List. Previously widely distributed throughout the Philippines, this freshwater crocodile now only survives in south-western Mindanao and northern Luzon. The total Philippine crocodile population in the wild was estimated at < 100 mature individuals in 1998. A captive breeding programme, the Palawan Wildlife Rescue and Conservation Centre, was established by the Philippine government in 1987. However, doubts about the availability of suitable habitat and the ability of captive-bred crocodiles to adapt to wild conditions, and concerns about negative community attitudes towards crocodiles, prevented the reintroduction of captive-bred Philippine crocodiles into the wild.

In 1999 we found a remnant Philippine crocodile population in the municipality of San Mariano, in Isabela Province in northern Luzon. Researchers and students of Isabela State University, in partnership with the Institute of Environmental Sciences of Leiden University, initiated a conservation project with funding from the Conservation Leadership Programme: the Crocodile Rehabilitation, Observance and Conservation Project. The Project became the Mabuwaya Foundation in 2003. An intensive communication, education and public awareness campaign informed rural communities of the plight of the Philippine crocodile. Most people in San Mariano now know that the crocodile is protected by law and support the conservation of the species in the wild. Village and municipal governments declared three crocodile sanctuaries in San Mariano. These are protected by community members, who receive a small incentive. This community-based approach is effective and no crocodiles have been killed in San Mariano since 2007.

To reinforce the wild population in San Mariano a nest protection and headstarting programme was initiated. Wild born hatchlings are raised for 14 months in captivity and then released into the wild. The first results show that survival rates are high and that released crocodiles have no adaptation problems. The wild crocodile population in San Mariano has increased from 12 individuals in 2000 to 65 non-hatchling crocodiles in 2009.

These experiences resulted in renewed interest in reintroducing Philippine crocodiles into the wild. At a national forum on crocodiles in January 2007 we proposed a reintroduction of Philippine crocodiles into Dicitian Lake in the municipality of Divilacan in Isabela Province. This Lake used to have a small population of Philippine crocodiles but they became extinct in 2006, probably due to accidental catches in fishing nets. The 14 ha artificial lake is in the

Northern Sierra Madre Natural Park. The Rufford Maurice Laing Foundation supported a project to reintroduce crocodiles there, starting in August 2008.

Following community consultations the Dicitian village council declared the Lake a Philippine crocodile sanctuary, where human extraction activities are not allowed, a move followed by the municipality of Divilacan. The Protected Area Management Board of the Park and the regional office of the Department of Environment and Natural Resources endorsed a request to the Protected Areas and Wildlife Bureau in Manila to reintroduce 50 subadult crocodiles into the Lake. The captive-bred crocodiles (37 females and 13 males) were selected by Palawan Wildlife Rescue and Conservation Centre and transported to Dicitian Lake, where they were released by community members and government officials on 31 July 2009.

This release is a turning point in Philippine crocodile conservation as it breaks with the assumption that local communities will not accept the reintroduction of crocodiles. Monitoring results will be used to refine reintroduction strategies for the species, with the aim of reintroducing Philippine crocodiles elsewhere in the species' historical range. Both the recovery of the species in San Mariano and the re-establishment of a population in Divilacan are the result of actively involving communities in crocodile conservation.

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Human–elephant conflict mitigation: sharing lessons and experiences from across East Africa

Human–elephant conflict, in particular damage by elephants to crops, is a large and growing problem across East Africa. Increasing human and elephant populations, changing patterns of land-use and land tenure, democratization and the growing penetration of the media are all contributing to this trend. Wildlife authorities, originally geared up to focus primarily on the problem of poaching, rampant between the 1970s and early 1990s, are struggling to cope with human–elephant conflict. Due to its complexity,

human–elephant conflict requires a cross-sectoral and multi-disciplinary approach, which is a challenge for all organizations concerned.

A regional workshop on human–elephant conflict mitigation across East Africa was held at the Mpala Research Centre in Laikipia, Kenya, from 31 August to 1 September 2009. It was organized by the University of Cambridge Darwin Initiative project Building Capacity to Alleviate Human–Elephant Conflict in North Kenya (<http://www.geog.cam.ac.uk/research/projects/heccapacity/>) and the Kenya Wildlife Service. The meeting was held directly prior to, and was designed to inform, a 3-day workshop to develop Kenya's national elephant conservation strategy. The meeting was funded by the UK Darwin Initiative (Grant 15/040), the Centre for Training and Integrated Research for Arid and Semi-arid Lands Development, and the Kenya Wildlife Service.

The meeting brought together senior management personnel from wildlife authorities in East Africa and experts from a range of conservation NGOs to share lessons and experiences on human–elephant conflict mitigation with a view to informing future practice. Thirty-four people attended the meeting including senior government representatives from Uganda, Tanzania, Mozambique, Sudan and Kenya. Representatives from non-governmental research and conservation organizations included WWF, the Wildlife Conservation Society, Save the Elephants, The Ol Pejeta Conservancy, the IUCN Elephant Specialist Group, the Symbiosis Trust and the University of Cambridge.

The meeting discussed the trends in human–elephant conflict across the region and their underlying determinants in time and space, and the difficulty in allocating scarce resources to address human–elephant conflict when it occurs across such a wide area and is so unpredictable. Participants reviewed a range of conventional human–elephant conflict mitigation tools including the use of electrified fences, lethal control and translocation. They identified the need to develop a decentralized, community-based approach, and discussed a range of novel crop raiding mitigation tools and approaches, including simple farm-based deterrents (chilli-grease fences, noise makers, communal guarding, beehives and others), the use of mobile phones in crop-raiding mitigation, and non-lethal management of fence breaking elephants (GPS/GSM collars and de-tusking trials).

At the end of the meeting participants made country presentations with a view to helping to address future human–elephant conflict. Themes emerging from these presentations included:

- The biggest human–elephant conflict problems in East Africa are (in order of significance): crop-raiding, loss of human lives, damage to property and the threat to day-to-day human livelihood activities.
- These problems are caused by loss of elephant habitat from human encroachment, an increasing human

population, climate change, incompatible land use practices, lack of awareness, inadequate incentives, and the mismatch between those who benefit and those who incur costs from wildlife conservation.

- The best way to prevent human–elephant conflict is through clearly defined land-use and wildlife policies and the harmonization of such policies across different sectors (such as wildlife, agriculture, forestry and water) that do not currently communicate with one another effectively and are therefore unwittingly implementing activities that are in conflict.
- Human–elephant conflict can also be prevented by greater involvement of communities in conservation and the fostering of the idea of 'ownership' of elephants among such communities through the provision of direct benefits.
- Human population growth is a major contributor to the encroachment of cultivation into elephant habitat, and improved family planning services and livelihoods are important to support smaller family sizes.
- Where human–elephant conflict already occurs an integrated approach is needed, with local communities involved in the design, implementation and management of the interventions applied.
- More resources are required to support and strengthen the capacity of small-scale farmers to deter crop-raiding elephants.
- Some participants also felt that elephant corridors need to be secured and elephant populations need to be managed in relation to their carrying capacity.
- More information is required to help address human–elephant conflict across East Africa.
- Elephant dispersal areas, corridors and human–elephant conflict hot spots need to be identified.
- Participants felt they needed to have a better understanding of which mitigation strategies work under which circumstances and how communities can be encouraged to take ownership of human–elephant conflict mitigation.

The meeting ended with a pledge by the Tanzanian delegation to hold a follow-on meeting in Tanzania.

Note: Darwin project working papers on electric fences and mobile phones in elephant conflict management, and on elephant-compatible livelihoods, are available for free download from: <http://www.geog.cam.ac.uk/research/projects/heccapacity/>

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The Economics of Ecosystems and Biodiversity

The value of ecosystems and biodiversity in providing regulating services (e.g. climate moderation), supporting services

(e.g. soil formation), provisions (e.g. food and medicines) and cultural value (e.g. recreational and aesthetic services) is hard to quantify in monetary or other tangible terms but a start is being made by a study called The Economics of Ecosystems and Biodiversity—TEEB for short. The study is being led by Pavan Sukhdev, a senior banker from Deutsche Bank, and is supported by UNEP, the European Commission, the German Federal Ministry for the Environment and the UK Department for Environment, Food and Rural Affairs.

In an interim report focusing on forests, published in May 2008, the TEEB group showed that significant global and local economic losses and human welfare impacts were attributable to degradation of ecosystems and loss of biodiversity. Phase 2 of the study, due to be published next year at the 10th Conference of the Parties of the Convention on Biological Diversity, in Nagoya, Japan, will provide a more complete package including: a policy toolkit, covering regulatory frameworks, accounting systems, methods of payment for ecosystem services and access and benefit sharing case studies and guidelines; information on how to quantify, mitigate or offset corporate impacts on ecosystems and biodiversity for enterprises; and information on the value of ecosystems and biodiversity, including examples of how to reduce impacts on wild nature.

A number of organizations and individuals are contributing to the consultation process associated with this study, and early drafts suggest that the authors will make the case that the cost of inaction far outweighs the investment needed, and that action now is both sensible and appropriate. The different chapters will cover the policy and regulatory challenges, measuring what we manage, solutions, instruments and measures, and recommendations for the

way forward. A feature of the text will be a liberal dose of case studies. In short, what this study will attempt to do is not only to make the case for valuing natural capital but also to suggest practical ways in which this has already been done, and can be done in the future.

The authors will also argue that we now have a unique opportunity to rethink the way that we value and manage ecosystems and biodiversity. One hopes that by the time the study is published, the financial sector will not have quietly forgotten about the global crisis they have triggered. Clearly, also, the outcomes of the December 2009 UN Climate Change Conference in Copenhagen, which will relate to both carbon and biodiversity, will have a major impact on the TEEB thesis, and presumably the timing of the study's release later in 2010 takes this into account.

This promises to be a ground-breaking piece of work with real, practical value. More details are available at <http://www.teebweb.info>

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