

as peer-to-peer learning between reserves. The capacity-building programme in China has provided support to 35 nature reserves, helping them to deliver improved conservation action for more than 25 threatened tree species.

To complement the work carried out through projects the Global Trees Campaign has launched a series of technical guidance briefs promoting best practice for tree conservation. Each brief covers a different core skill for tree conservation and has been tailored to meet the needs of non-specialists (people with some experience in conservation but with limited knowledge and experience in botany, forestry or horticulture). The first series of nine briefs is available at www.globaltrees.org/resources/practical-guidance and contains guidance on carrying out tree surveys, botanical identification, monitoring, nursery management, seed collection, seed processing and storage, germination and seedling growth, germination experiments, and tree planting.

Briefs will be translated into a number of languages during 2014–2015, making them accessible to as wide an audience as possible. Because these briefs represent an introduction to tree conservation techniques, links to sources of further guidance are included. Users are encouraged to adapt the guidance to local circumstances and to approach local experts or the Global Trees Campaign for additional advice. Feedback on the briefs is welcomed (please address to david.gill@fauna-flora.org).

DAVID GILL, GEORGINA MAGIN and ROBIN LOVERIDGE *Global Trees Campaign, Fauna & Flora International, Cambridge, UK*
E-mail david.gill@fauna-flora.org

New evidence of wild Amur tigers and leopards breeding in China

On 15 November 2013 CCTV news reported that pug-marks of a wild adult female Amur tiger *Panthera tigris altaica* and three kittens had been found in the Hunchun forest department of Jilin Province in north-east China. The front pad widths of the adult were 9.0–9.3 cm and those of the kittens were 6.0–6.2 cm. Experts have examined the details of the pug-marks and tracks and have confirmed the presence of a female and kittens. From the size of the pug-marks it is estimated the kittens were 4–5 months old. It is particularly notable that this record was outside Hunchun Nature Reserve, > 20 km away from the Sino–Russian border. In recent years camera-traps have recorded adult Amur tigers in this area and local people have reported sightings of Amur tiger pug-marks and/or loss of livestock.

Historically, the Endangered Amur tiger was distributed across most of the forested montane areas of north-east China. It has been argued that this subspecies originated in China (The World's Cat (1976), 1–14) and this has been partially confirmed by a genetic study (PLoS Biology (2004),

2(12), e442). It is estimated that in the mid 20th century there were 150 Amur tigers in China and 30–40 in Russia. However, until now, it was presumed that the c. 20 extant Amur tigers in China were migrants from the Russian far east and that it was unlikely any were resident breeding females.

There is also new evidence of the Critically Endangered Amur leopard *Panthera pardus orientalis* in this area. In October 2013 CCTV news reported a video recording of a female Amur leopard and two kittens walking past a video trap in the Jilin Wangqing Nature Reserve. Based on the kittens' body size it is estimated they were < 5 months old and thus still lactating. As the area of Wangqing Nature Reserve is > 600 km² it is most likely that this family is part of a resident population rather than being migrant. Russian wildlife biologists reported that only c. 50 extant Amur leopards were known in the Russian far east in 2012. Only 7–12 were believed to be present in China in 2000, although this estimate was derived from data collected during a survey for the Amur tiger.

Given these recent sightings and sign observations we believe the future outlook for these two subspecies in China is improving. In 2011 WWF–China initiated a prey recovery project in north-east China and introduced SMART technology (Integrative Zoology (2010), 5, 363–377) for patrolling. These measures will ensure improved habitat conditions and more effective protection for both species. The Feline Research Center of the Chinese State Forestry Administration has initiated camera-trap monitoring for both species, DNA analysis of faecal samples, and a new pug-mark identification technique in collaboration with Wildtrack. The Chinese State Forestry Administration is now consulting with experts to develop a Chinese Big Cat Conservation Action Plan to ensure the continued protection of the Amur tiger and leopard in China.

GUANGSHUN JIANG Jinzhe Qi *Feline Research Center of Chinese State Forestry Administration, Northeast Forestry University, Harbin, China. E-mail jgshun@126.com*

Indexing for Life: improved genetic data resources for conservation

In setting conservation priorities for a taxon a range of factors need to be considered, including threatened status, endemism, rarity, charisma, function in ecosystem and genetic diversity. When trying to determine which strategy will conserve the greatest extent of independent evolutionary life, phylogenetic distance methods can be used as they reveal the genetic uniqueness of a taxon. The evolutionary distinctiveness measure, for example, can be calculated for groups of taxa, of different Eukaryotic kingdoms, based on the length of each branch of a phylogenetic tree. By combining evolutionary distinctiveness (ED) with the

extinction risk Globally Endangered (GE), Evolutionarily Distinct and Globally Endangered (EDGE) scores can be computed for designing conservation strategies (see www.edgeofexistence.org).

The availability of genetic data resources linked to a large and reliable repository of taxonomy is therefore essential for phylogenetically informed conservation strategies. During 2010–2013 the EU Indexing for Life (i4Life) project (www.i4life.eu), coordinated at the University of Reading, UK, established a virtual research community to enable six partners to engage in a programme to enumerate the extent of life. The partners were the Global Biodiversity Information Facility, the European Molecular Biology Laboratory–European Bioinformatics Institute, IUCN, LifeWatch, the Encyclopedia of Life, and the Barcode of Life programme.

The project built on the common need of these partners to access high-quality taxonomic data in the partnership's databases, and was a European e-Infrastructure project, co-funded by the European Commission's Seventh Framework Programme for Research and Technological Development. For each of the partners i4Life designed and implemented the necessary tools, as well as significantly enhancing the *Catalogue of Life* (www.catalogueoflife.org).

The i4Life project also established a set of tools and standards for data sharing and cooperation among major biodiversity programmes. Tools developed included a download service, a cross-mapper for comparing different taxonomies and a piping tool that accepts taxa centrally and then 'pipes' them out to c. 130 global species checklists for processing (<http://www.i4life.eu/i4lifewebsite/col-piping-tools/>). These tools facilitated the cross-referencing of the partners' taxon names with the taxonomically edited *Catalogue of Life* list, and a gap analysis of taxonomic coverage among the partners to identify taxa missing from the *Catalogue of Life*, and helped complete the taxon lists in the partners' taxonomic data.

The i4Life project is a major achievement in biodiversity informatics as it ensures a higher quality of taxonomic data in the databases of the project's partners and facilitates the usability of genetic data resources essential for conducting phylogenetically informed conservation strategies such as EDGE. In this regard the European Molecular Biology Laboratory–European Bioinformatics Institute European Nucleotide Archive has recently developed a marker portal from which phylogenetic marker sequences can be downloaded (www.ebi.ac.uk/ena/data/warehouse/search).

STÉPHANE RIVIÈRE *Department of Geography, University of Cambridge, Cambridge, UK, on behalf of the i4Life Consortium*
E-mail i4life@reading.ac.uk

i4LIFE CONSORTIUM *School of Biological Sciences, University of Reading, Reading, UK*

New tourism concessions in National Parks to benefit community conservancies in Namibia

Although the long-term survival of protected areas is widely believed to depend on them benefiting local communities, it is unusual for communities to be given major tourism opportunities in national parks. The recent allocation of tourism concessions to community conservancies in Namibia has passed with little comment and should be recognized more widely as a major milestone in Namibia's support for community-based conservation.

The development of the Caprivi Nature Park provided the first impetus towards community benefits from protected-area tourism in Namibia. At independence in 1990 local people (about 6,000 of whom lived in the Park) agreed that it should be upgraded to the Bwabwata National Park only if they were to be the primary beneficiaries. The Palmwag, Etendeka and Hobatere concession areas in Kunene Region had also been designated for conservation by traditional authorities shortly before independence and, after communal conservancies were established under the Nature Conservation Ordinance Amendment of 1996, it was agreed that benefits should go to adjoining conservancies, although government retained responsibility for management.

A draft policy on concessions in state protected areas was developed by the Ministry of Environment and Tourism during 2004–2005 and approved in 2007. This recognized that one of the main reasons for giving out tourism concessions was to share benefits with park residents and neighbouring communities. Three concessions had already been allocated in Bwabwata before the policy was approved: a hunting concession with 50% of the income going to park residents, and two camp-sites.

The first tourism concessions under this policy were awarded between 2008 and 2010, including two sites in the Hobatere concession area (one with traversing rights in Etosha National Park), one in Etendeka, one in Bwabwata National Park and one in Khaudum National Park. Tourism operations in these concessions were to be managed by private-sector partners (existing operators in two cases and new operators in the others). Typically 75% of the income from the operators goes to the conservancies holding the head concession contract, with the other 25% going to the Namibian government.

Unfortunately these were awarded as Namibian tourism was suffering from the global economic crisis and so the private-sector partners failed to develop three of the sites and another was delayed because of gold exploration next to the lodge site. Only Etendeka remained a viable prospect, and even there the development of a new lodge was considered too high a risk, and so the existing facility was upgraded with funding from the African Safari Lodge Foundation and Millennium Challenge Account–Namibia. Development of the other sites is now underway, thanks in