carefully check whether or not animals (or their parts) declared as captive-bred have indeed been bred under controlled conditions.

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Photographic database informs management of conflict tigers

The increasing interface between people and wildlife contributes to human–wildlife conflict in many conservation landscapes. In India animals suspected to be involved in conflict are often captured and translocated to different locations or zoological parks. A key concern in the capture of so-called problem animals has been the identification of individuals involved in conflict. The Wildlife Conservation Society (WCS) India Program, in collaboration with research partners, has aided government officials in this matter through its research on tigers in the Malenad Tiger Landscape, south-west India. As part of a research programme initiated in 1991, WCS India has formulated a protocol for individual identification of tigers, based on their stripe patterns. Using pattern-matching software that aids quick and reliable identification of tigers from photographs (Hiby et al., 2009, *Biology Letters*, 5, 383–386), a photographic database has been developed, with > 750 individually identified tigers from 16 protected areas totalling > 38,000 km^2, and elsewhere, in India. Ancillary information on home ranges, activity patterns and sociobiology of conflict-tigers provides a unique opportunity for informed management of the species. This long-term, ongoing study is funded by the Department of Science and Technology and the Department of Biotechnology of the Government of India, Vision Group on Science & Technology of the Government of Karnataka, and the Wildlife Conservation Society, New York.

Two recent cases of human–tiger conflict in the Malenad Tiger Landscape exemplify the utility of this database and long-term monitoring for conflict mitigation. One incident, on 27 December 2013, involved the loss of human life in Bandipur National Park, and the other, on 1–2 January 2014, involved the killing of cattle in a village adjoining Nagarahole National Park. In the latter incident a dead cow was used as bait to capture the tiger involved. In the incident in Bandipur photographs from camera traps set up in the area of conflict were matched to individuals in the database. One individual was identified in nine of the 15 photographs obtained and, as the location of conflict was well beyond its home range, it was identified as the conflict individual and was subsequently captured. The tigers from both incidents have been transferred to a nearby zoo. The Forest Department debated relocation of the individuals but this was not pursued.

Both of the tigers involved in these incidents had been photographed previously multiple times. The tiger in Bandipur had been photographed over the last 5 years and was probably an old individual past its prime. The tiger in Nagarahole was 2–3 years old and had only been photographed in the previous year. The distances between the locations of previous photographs and the location of conflict were 4–8 km for the tiger in Bandipur and 35 km for the tiger in Nagarahole. The observation of the Nagarahole individual with another male in two photographs suggests that this individual was dispersing from its natal home range to establish a breeding territory.

Nagarahole and Bandipur National Parks have high tiger densities (10–15 tigers per 100 km^2) with c. 20% of the population lost annually to mortality and emigration. It is likely that the Nagarahole individual was emigrating from the reserve. The infrequency of dispersal events, particularly in human-dominated landscapes such as the Malenad Tiger Landscape, suggests that the removal of the Nagarahole tiger, a potential long-distance disperser, may have detrimental effects on the long-term population viability of tigers in this landscape. In contrast, the removal of the Bandipur tiger will probably have negligible effects on the population, although any relocation into an existing tiger population would be likely to cause further conflict (Athreya et al., 2011, *Conservation Biology*, 25, 133–141). Mitigation of conflict is frequently ad hoc, with management authorities pressurized into quick but often ineffective action. In these two contrasting examples, alternative actions could have had very different consequences. In areas where data on the age, reproductive status and ranging patterns of conflict animals are available, this information should be used to direct conflict mitigation strategies such that they are maximally effective whilst inflicting least harm on species viability.

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First village successfully resettled from Dandeli-Anshi Tiger Reserve

Much debate on the conservation of species such as the tiger has centred around the need for inviolate spaces devoid of human presence. A conservation strategy that emerges from this is the resettlement of villages from within the core zones of tiger conservation areas. The resettlement of such villages not only frees up space for dedicated tiger conservation but provides the resettled people with better access to amenities and serves to mitigate human–wildlife conflict (Karanth, 2007, *Biological Conservation*, 139, 315–324). Although

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voluntary resettlement is sanctioned within demarcated Tiger Reserves in India, actual implementation is often delayed for various reasons. The Wildlife Conservation Society (WCS) India Program and its partners, with help from WCS, New York, have participated in encouraging the implementation of relocation activities in Dandeli-Anshi Tiger Reserve, in the state of Karnataka, south-west India. Since its demarcation as a Tiger Reserve in 2007, $>$ 600 families resident within the reserve have expressed interest in resettlement. However, various hurdles have prevented the Government of Karnataka from facilitating this.

WCS India has catalysed and provided strategic support for the implementation of the relocation programme, focusing on a remote settlement, Naiphed, within the Reserve. These efforts culminated in May 2014, with the village now relocated outside the protected area. The relocation followed models developed through previous involvement of WCS India in the resettlement of c. 1,000 families elsewhere in the Malenad–Mysore landscape, which spans the states of Karnataka, Kerala and Tamil Nadu. Naiphed comprised three families and was formerly located c. 10 km from amenities such as public transport, medical facilities and schools, and was without electricity. The village suffered repeated incidents of crop raiding by recovering wildlife populations, and the infertile land produced only low yields of rice and *Areca catechu*. The resettled families now have access to fertile agricultural land and amenities. Following the norms laid down by the Government of Karnataka, WCS provided each family with appropriate financial compensation to facilitate adaptation to their new home.

As a result of the resettlement all land formerly occupied by the village has been relinquished to the Government of Karnataka. Regeneration of native vegetation will follow, turning the abandoned village into habitat for tigers, their prey and other fauna. The Malenad–Mysore Tiger Landscape, which comprises multiple protected areas, is one of the most promising conservation landscapes for the long-term conservation of the tiger. Included in this landscape is the Nagarahole–Bandipur complex of contiguous forests, which has a tiger density of 10–15 individuals per 100 km^2.

Following the successful resettlement of the families from Naiphed, the government has initiated resettlement of an additional 30 families from within the Reserve. Preliminary procedures have been initiated, with some financial compensation provided to the families while subsequent steps are undertaken for fair resettlement. It is expected that the remaining families that have expressed interest in being resettled will soon follow. Resettlement programmes, when conducted in a manner that benefits villagers otherwise separated from essential services, can serve as a valuable conservation tool to hasten recovery of threatened species, alleviate threats to biodiversity and foster a positive attitude towards wildlife conservation through human–wildlife conflict mitigation.

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Conservation and reintroduction of *Firmiana danxiaensis*, a rare tree species endemic to southern China

Firmiana danxiaensis H. H. Hsue & H. S. Kiu, a tree species belonging to the Family Sterculiaceae, was discovered and named in 1987. It was listed as a Second Class Protected Key Wild Plant of China in 1999 and in the Conservation Programme for Wild Plants with Extremely Small Populations in China in 2012. It occurs only on Danxia Mountain, a natural World Heritage site in Renhua County, Guangdong Province, southern China, in an area of 168 km^2. In 1987, $<$ 100 wild individuals were known. Our investigations in 2014, however, have indicated that the population is c. 10,000 wild individuals. However, the species is threatened as it is a valuable economic species (it is an excellent garden ornamental tree and its trunk is suitable for use in piano construction).

This rare species has low genetic diversity and low population differentiation as a result of its restricted range and the strong selective pressure exerted by the soils of Danxia Mountain, which have a low soil fertility and strong acidity. In October 2011 we collected seeds from the natural population and propagated them at the nursery in Danxia Park. About 300 seedlings had grown to c. 73 cm tall after 18 months. In May 2014, to examine the feasibility of augmenting the natural population of this tree, 45 seedlings were transplanted to the original collection site. Thirty seedlings were also transplanted to the South China Botanical Garden in Guangzhou City (c. 260 km south) and Tianxin Natural Reserve (c. 200 km west) in Lianzhou City. To date, the transplanted seedlings have grown well. Our studies on artificial propagation, reintroduction, and the ecophysiology of this tree will provide a basis for the design of an integrated species conservation plan, including in situ and ex situ conservation, and reintroduction.

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