

Conservation news

Where to now? An uncertain future for Jamaica's largest endemic vertebrate

More than 20 years after the endemic Jamaican iguana *Cyclura collei* was removed from the list of extinct Caribbean iguanas, its fate is again tenuous. Since its rediscovery in 1990, conservation efforts have reversed the species' extinction trajectory. However, it remains a Critically Endangered species. Surviving in just a few square kilometres of the Hellshire Hills in Jamaica, initial estimates suggested as few as 50 adults remained. The remnant population clung to the rugged limestone cliffs in Jamaica's dry forest interior, which provided some level of protection from hunting and exotic predators. Because of high rates of predation, juvenile recruitment was essentially non-existent. Population viability models in 1993 concluded that the remnant, ageing population was doomed unless innovative conservation interventions could be implemented.

Since 1991 two communal nesting sites have been monitored and a subset of hatchlings collected annually and transferred to the Hope Zoo in Kingston. The zoo provides hatchlings a headstart on survival by rearing them to a size at which they are considered safe from exotic predators before they are returned to the wild. A small number (24) have been transferred to U.S. zoos as a hedge against extinction in the wild.

The first headstarted iguanas were released in 1996 and a total of 226 have now been repatriated, with recaptures indicating relatively high survivorship. In 1997 a programme to trap exotic predators, focused on the mongoose, was initiated within the core iguana area. Since then the predator control programme has expanded to include all exotic predators (cats, dogs, feral pigs), using more than 300 traps over a four-fold larger target area. All evidence suggests the iguana population is increasing. Census results from the monitored communal nest sites indicated a six-fold increase in the number of nesting females and hatchlings during 1991–2013.

Although these results are encouraging, the future survival of the Jamaican iguana has become increasingly tenuous. For decades their interior dry limestone forest habitat has been under siege from illegal tree cutting for charcoal production. Expansion of local urban centres, increasing unemployment and dwindling resources have intensified this pressure. Notably, since 2011 chainsaws can be heard from the iguana project's most remote field station, indicating a new level of encroachment into the core iguana conservation area. Campaigning and advocacy

to stop this illegal habitat destruction have gone largely unheeded by authorities, and the lack of adequate enforcement has been at least partly responsible for threats against university researchers and students working in the area.

The Hellshire Hills are included in the Portland Bight Protected Area (PBPA), which was designated in 1999 because of the area's importance as a repository of endemic biodiversity. Unfortunately, the PBPA, and the Hellshire Hills in particular, are protected only on paper. Legislation for the protection and management of natural resources in Jamaica is sufficient; genuine political and on-the-ground support, however, is not. Consequently, environmentally damaging development activities, even in government-declared protected areas, continue to counter conservation efforts.

Protection of the remaining primary dry forest in the Hellshire Hills (arguably the best and most extensive in the Caribbean) has been adequately outlined in management plans; however, strategies for education, alternative livelihoods, and sustainable development, particularly eco-friendly tourism, have been cursory and uninspiring. Rather, opportunistic and often poorly conceived plans that disregard the protected area mandate have been proposed, including hotels, resorts and casinos.

In August 2013 the Jamaican government announced that 'very serious consideration' had been given to a proposal from foreign investors to develop a massive transshipment port and industrial hub in the PBPA (on the Goat Islands). This controversial development would end a long-standing plan for a biodiversity reserve on the Goat Islands, destroy economically valuable fish sanctuaries, and disrupt natural storm protection. In addition, a large port development would probably involve habitat destruction in the nearby Hellshire Hills on the mainland, threatening the last remaining iguanas.

Local government agencies and conservation partners have agreed that reintroducing Jamaican iguanas to the Goat Islands is critical for their long-term survival, as the mainland population will always be vulnerable to predation by exotic mammals. The eradication of the mongoose and other exotic species from the Goat Islands is an achievable prerequisite to reintroduction of the iguana.

As a poor developing nation that still contains important habitats for global biodiversity, Jamaica is poised to set an example of how the development vs biodiversity conservation conflict plays out. The proposed development of the Goat Islands will provide a test of the government's commitment to biodiversity conservation

and the environmental conventions to which it is a signatory.

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Conservation and reintroduction of the Vulnerable plant *Apterosperma oblata* in China

Apterosperma oblata H. T. Chang, of the monotypic genus *Apterosperma* in the family Theaceae, is a Vulnerable plant endemic to China. Historically the species occurred in Guangdong and Guangxi Provinces in southern China. Our field surveys indicate that the only remaining, small population is in the Ehuangzhang Natural Reserve in Yangchun County, Guangdong Province. The species, which has been recorded as the second most threatened plant in China, is facing a high risk of extinction and is protected nationally. Supported by the National Science Foundation of China, the Plant Science Institute of Yunnan University has been studying the biology and ecology of the species, and its artificial propagation, since 2005.

Although the species is rare it has a high level of genetic diversity and variation, as determined by amplified fragment length polymorphism molecular markers. The breeding system of *A. oblata* is xenogamy and there is low natural regeneration in the wild because the seeds are recalcitrant and sensitive to dehydration.

In October 2010 we collected seeds from the natural population and propagated them in a greenhouse at Yunnan University. Approximately 700 seedlings of c. 8 cm height had grown successfully after 10 months. In July 2013 seedlings of 20–25 cm height were transplanted to the original collection site and to a site with similar characteristics in Jinghong in Yunnan Province. Our studies, especially of artificial propagation of seedlings, will provide a basis for the design of conservation and reintroduction strategies for *A. oblata*, and the Plant Science Institute of Yunnan University is now studying the physiological ecology and adaptation of the transplanted seedlings.

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What is the true cost of the world's most expensive coffee?

Civet coffee (also known as Kopi Luwak in Indonesia) is produced using coffee berries that have been eaten and then partially digested by civets. It is claimed that the digestive system of civets ferments and alters the chemical structure of the beans, resulting in a smoother, less bitter flavour that is highly prized in certain circles.

With an estimated annual production of < 127 kg (although this is widely considered to be a gross underestimate) and a price tag of up to USD 200–400 per kg, it is known as the rarest, most expensive coffee. It is widely available in international markets (including Europe, USA and Asian countries such as Japan, Taiwan and South Korea).

Indonesia is the main producer of this luxury product but other countries, such as East Timor, the Philippines, Thailand, Vietnam and Ethiopia, also produce it. With an apparent growth in international consumer demand some producers have turned to caged production methods to increase yields. These include both casual cottage industry initiatives operated by rural communities and large-scale coffee estate initiatives.

The potential threat posed by civet farming to both the welfare and conservation of wild populations received media attention in September 2013 following an undercover investigation conducted by the BBC in Indonesia. The World Society for the Protection of Animals (WSPA) verified the footage, revealing that at least two species (the palm civet *Paradoxurus hermaphroditus* and the binturong *Arctictis binturong*) are currently utilized and are typically kept in inadequate conditions that result in high levels of morbidity and mortality. It is estimated that thousands of wild civets are being poached from the wild every year to maintain these farms. The binturong is of particular concern as it is categorized as Vulnerable on the IUCN Red List and is already fully protected by Indonesian law. Although the palm civet is a more widespread species, the local impact of the unregulated removal on populations is unknown.

In contrast, traditional production methods for civet coffee do not pose a threat to the welfare and conservation of civets as these methods do not involve the removal of civets from their natural habitats. Rather, workers are employed to collect excreted coffee beans directly from plantations and forests. This process could result in a mutually beneficial co-existence, allowing people to profit from an animal whose presence might otherwise be considered a nuisance because of its consumption of coffee berries on plantations. From a consumer perspective, civet coffee collected by this traditional method is considered to produce a higher quality product.