in the world. Solutions are sought that will drive real, tangible change towards five Earthshots—simple but ambitious goals: Protect and restore nature, Clean our air, Revive our oceans, Build a waste-free world, and Fix our climate.

Five GBP 1 million prizes will be awarded each year for the next 10 years (2021–2030) supporting 50 solutions to the world's most significant environmental problems. The prize money is designed to enable the wider scaling and global uptake of the Earthshot solutions identified.

Ideas for potential solutions are actively being sought from around the world by a wide ranging group of nominating organizations, including Fauna & Flora International, of which Prince William recently became patron. Fauna & Flora International and other nominating organizations are inviting concepts describing potential Earthshot solutions from any interested parties. They are seeking game-changing initiatives that could be scaled to help tackle one or more of these environmental crises, and could—in time—be applied across the globe. Potential Earthshots are formally submitted by nominating organizations, with prizes being awarded by a panel of 13 distinguished international figures. Ideas can be submitted to nominating organizations at any time, but the closing date for prizes in any year will be the end of January.

Fauna & Flora International is particularly keen to identify potential nominations for the Protect and restore nature and Revive our oceans Earthshots. We are seeking to identify ideas that provide a step change in addressing these key matters—ideas with evidence of their potential but a need for an injection of support to deliver real and measurable benefits for people and planet. These ideas can come from individuals, organizations, academia, governments, the private sector or consortia.

For more information or to submit an idea or concept for an Earthshot contact earthshot@fauna-flora.org. For more information about the Earthshot Prize visit earthshot.org.

*Abigail Entwistle and Jack Murphy Fauna & Flora International, Cambridge, UK*
*E-mail abigail.entwistle@fauna-flora.org*



## African forest and savannah elephants treated as separate species

The African Elephant Specialist Group (AfESG) of IUCN will now treat African elephants as two species: the forest elephant *Loxodonta cyclotis* and the savannah elephant *Loxodonta africana*. This will be reflected in IUCN's Red List assessment update for African elephants, and in the next iteration of the African Elephant Status Report, both to be published in 2021. This concurs with Wilson & Reader (*Mammal Species of the World*, 2005), the primary IUCN reference on mammalian taxonomy, Wittemyer (in *Handbook of the Mammals of the World*, 2011), and Tassy & Shoshani (in *Mammals of Africa*, 2013).

The 2019 AfESG members' meeting considered morphological, genetic, reproductive, ecological and behavioural evidence, and a commissioned study by Kim & Wasser (iucn.org/sites/dev/files/content/documents/2019-03-15-final-taxanomy_report-african-elephant-sg.pdf) that specifically assessed extent and distribution of genetic hybridization. Hybrid individuals occur infrequently, at a few locations. The only exception is the hybrid hotspot along the border between The Democratic Republic of the Congo and Uganda, thought to be a consequence of human pressure having pushed individual elephants into the range of the other species.

Species-specific national and regional assessments of population status and trends are needed. In separating the two species, the AfESG highlights three consequences. Firstly, *L. cyclotis* is listed in CITES Appendices under *L. africana* (cites.org/sites/default/files/document/E-Res-12-11-R18.pdf). This could (1) be maintained; (2) changed to *Loxodonta* spp., as is the case for monk seals (*Monachus* spp.), under Appendix I or II (depending on range state), which would allow inclusion of hybrid elephants and unclassified populations; or (3) a Party could request an updated reference in CITES nomenclature to recognize both species. Under CITES rules, if *L. africana* were split into *L. africana* and *L. cyclotis*, all *L. cyclotis* would remain on Appendix I (as only some populations of *L. africana* are currently on Appendix II, with specific annotations). An appropriate approach should be identified for the regional and continental treatment of other African elephant issues, such as cross-border movements.

Secondly, the Red List assessments provide species-specific lists of range states, based on the best current information. However, legislative nomenclature varies by country. The two-species listing will support harmonization of nomenclature in national legislation, and focus attention on the differing management and conservation issues faced by the two species. Thirdly, there may be uncertainty as to whether one or both species occur in a country. The two-species listing will encourage the genetic investigation of hitherto taxonomically undefined populations, to examine the importance and dynamics of hybridization. The AfESG has established a taxonomy task force to develop supporting documentation for the economic, political, and conservation implications of the two-species listing of the African elephant. It will further recommend support for range states in addressing the implications identified.

*John Hart (orcid.org/0000-0002-5800-0156) AfESG Taxonomy Task Force Convenor, Frankfurt Zoological Society, TL2 Project, Kinshasa, The Democratic Republic of the Congo*

*Oryx*, 2021, 55(2), 169–172 © The Author(s), 2021. Published by Cambridge University Press on behalf of Fauna & Flora International doi:10.1017/S0030605320001386

*Kathleen Gobush (orcid.org/0000-0003-3407-2419) AfESG Red List Lead, Center for Conservation Biology, University of Washington, Seattle, USA*

*Fiona Maisels (orcid.org/0000-0002-0778-0615) Wildlife Conservation Society, New York, USA, and Faculty of Natural Sciences, University of Stirling, Stirling, UK*

*Sam Wasser (orcid.org/0000-0002-2678-1904) Center for Conservation Biology, University of Washington, Seattle, USA*

*Benson Okita-Ouma (orcid.org/0000-0001-7184-7303) AfESG Co-Chair, Save the Elephants, Nairobi, Kenya*

*Rob Slotow (orcid.org/0000-0001-9469-1508) AfESG Co-Chair, University of KwaZulu-Natal, Pietermaritzburg, South Africa. E-mail slotow@ukzn.ac.za*



## Drones for conservation: new techniques to monitor muriquis

The northern muriqui *Brachyteles hypoxanthus* and southern muriqui *Brachyteles arachnoides* are Critically Endangered primates endemic to the Atlantic Forest of south-east Brazil (Ferraz et al., 2019, *The IUCN Red List of Threatened Species*, e.T2994A17927482; Talebi et al., 2019, *The IUCN Red List of Threatened Species*, e.T2993A17927228). In 2017, we developed a novel drone, which we named Dronequi, an S900 hexacopter from DJI equipped with a GoPro Hero4 4K camera and a thermal camera (Flir Vue Pro 336 13mm). During 2018–2019, we flew more than 100 hours in various areas, recording *B. hypoxanthus* on at least five separate occasions. At Parque Estadual Serra do Brigadeiro, Minas Gerais, we counted at least 22 individuals in just 8 minutes of flight, c. 7% of the population estimated during > 1,700 hours of fieldwork over a 2-year period.

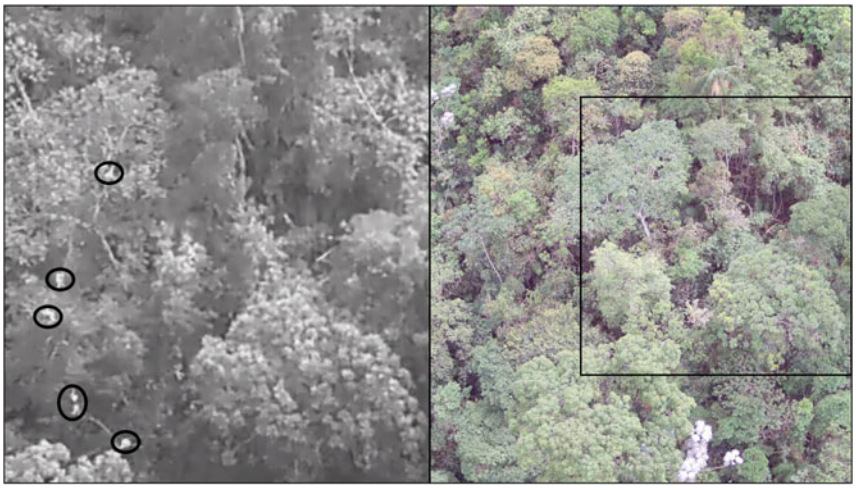
More recently we acquired a DJI Matrice 200, which we named Dronequi 2.0, equipped with a DJI Zenmuse XT2 that combines a 4K visual camera and a Flir Tau 2 thermal sensor. With this we surveyed a total of five sites in January, February, August and November 2020, identifying one previously unconfirmed *B. arachnoides* population, one new group, and two other groups already known at sites previously studied by other researchers, in São Paulo, and rediscovering a population of 15 individuals at Peçanha in Minas Gerais. Thus, in 2020 at least five groups of muriquis were detected by drone, with up to 80 individuals counted, in some cases identified to age and sex classes. This was possible because the hybrid camera recorded thermal and colour images simultaneously. An intelligent algorithm, named Murilabs, developed by Storm Group, analyses thermal impressions captured by the drones to identify primate species. This software currently focuses on *Brachyteles* spp. but could be developed for other primate species.

We have also recorded groups of black capuchin monkeys *Sapajus nigritus* with sufficient resolution to count individuals. For both capuchin monkeys and muriquis, we can sometimes see infants carried on females' backs, even in large tracts of dense forest. Despite the high cost of thermal cameras for drones, they are efficient and improve surveying and monitoring success for large-bodied Neotropical primates and could potentially be used to detect smaller understorey species in more sparse or riparian vegetation.

Financial support was provided by Boticário Group Foundation for Nature Protection and Vale S.A.

*Fabiano Rodrigues de Melo (orcid.org/0000-0001-9958-2036) Departamento de Engenharia Florestal, Universidade Federal de Viçosa, Viçosa, Minas Gerais, Brazil*
*E-mail frmelo@ufv.br*





Southern muriquis *Brachyteles arachnoides* in Pindamonhangaba, São Paulo, recorded by Dronequi 2.0 in November 2020. The black circles on the left-hand image show five muriquis that could only be detected with the infra-red camera. In the visible light image on the right they are not visible. The black rectangle on the right-hand image is the area seen by the thermal camera. (Photos: F.R. de Melo)