David Fernández¹, Andrea Dempsey², Gráinne McCabe³, and W. Scott McGraw⁴

¹ University of West of England, Bristol, UK; ² West African Primate Conservation Action, Accra, Ghana

³ Bristol Zoological Society, Bristol, UK; ⁴ The Ohio State University, Columbus, USA

June 2019 was a good month for "mangadrills", the primate clade comprised of species within Cercocebus (also known as white-eyelid mangabeys) and Mandrillus (Cronin & Sarich 1976; Groves 1978; Dutrillaux et al. 1980; Stanyon et al. 1988; Disotell 1994; Fleagle & McGraw 1999; McGraw 2017). A workshop hosted by the Wildlife Division of the Forestry Commission of Ghana and West African Primate Conservation Action (WAPCA), and organised by Andrea Dempsey (WAPCA), Dr. David Fernández (University of the West of England) and Dr. Gráinne McCabe (Bristol Zoological Society), brought together a number of species and range country experts in Accra, Ghana, from June 17 - 19, 2019. The purpose of the gathering was to finalise the forthcoming Cercocebus-Mandrillus Conservation Action Plan (Figure 1).

Mangadrills include nine species of African monkeys: seven within Cercocebus and two within Mandrillus, including two drill subspecies (Butynski et al. 2013). Together, they represent some of the least studied and hence least known of the Old World Primates. Although they have a wide range across Africa, extending from the Upper Guinean Forests of Senegal in the west to the Tana River Delta in Kenya, they are also some of the most threatened taxa. In 2008, the while golden-bellied mangabey was considered Data Deficient by the IUCN Red List (Hart et al. 2008), while four other Cercocebus and both Mandrillus species were placed in either the Endangered (Sanje mangabey: Ehardt et al. 2008; Tana River mangabey: Butynski et al. 2008; white-naped mangabey: Oates et al. 2008a; drill: Oates & Butynski 2008a) or Vulnerable (red-capped mangabey: Oates et al. 2008b; mandrill: Oates & Butynski 2008b) category. Given the limited knowledge and threatened conservation status of most of these species, there is urgent need for a collaborative, regional-wide

approach to catalyse and facilitate efforts to ensure the protection of mangadrills and their habitats.

Prior to the workshop, species experts were asked to collate current information on their species' distribution, density, population trends and threats, and to recommend evidence-based conservation actions needed to ensure their long-term survival. During the three days in Accra, we worked collectively to review this information and identify overarching threats and conservation actions, highlight priority areas for conservation across the species' range, and determine the best strategy to ensure success in both the short and long term. From our discussions it became clear that there were many threats that affected all taxa. As such, we identified a number of priority conservation actions that should be implemented wherever these animals occur and noted that such action items would benefit not only mangadrills, but their habitats and other threatened fauna in tropical Africa.

The overarching actions fall into three categories. First, there is a need to increase stakeholder engagement in range countries across all levels of society. As such, we aim to: a) encourage mentoring and capacity building for conservation and research among range country nationals; b) support education of women and family planning; c) increase conservation education among local communities living on forest boundaries and urban dwellers; and d) promote effective sustainable livelihoods for communities living alongside mangadrill populations.

Second, we need to reduce our existing knowledge gap on mangadrills. In particular, we feel it imperative to: (a) conduct surveys in order to establish reliable distribution and population density profiles; and (b) carry out more comprehensive genetic studies to better clarify the taxonomic and evolutionary relationships between populations. Such efforts would enhance our understanding of these animals and provide a muchneeded research presence in areas where illegal activities are often uncontrolled.

Habitat destruction is, of course, a common threat across the range of most Cercocebus and Mandrillus species and it was agreed that, whenever possible, habitat restoration should be prioritised.

Finally, given the obscurity of *Cercocebus* and Mandrillus among the general public, particularly among range country inhabitants, it is a priority to raise the profile of these animals.

In addition to proposing priority conservation actions that apply to all taxa, we also identified key priority areas for each mangadrill species. These are regarded as species strongholds because they consist of suitable habitat, supporting viable populations, and include sites such as Taï National Park in Côte d'Ivoire, Lopé National Park in Gabon, and the Udzungwa Mountains National Park in Tanzania. Species have a good chance of surviving at these sites provided protection measures there continue. Other priority sites highlighted include sites that are not currently well protected but are regarded as critical to conservation efforts due to their geographic location or taxonomic uniqueness. Some of these sites are Korup National Park in Cameroon, Monte Alén National Park in Equatorial Guinea, and the Tana River Delta in Kenya. The action plan will include a series of site-specific management recommendations to inform government officials, local and international research organisations and conservationists.

So, what's next? Species experts have returned to their respective work places full of ideas and deadlines. We aim to launch the Mangadrill Conservation Action Plan in mid-2020. A lot to accomplish in the coming months. So, stay tuned!

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Figure 1. Mangadrill Conservation Action Plan workshop participants with Mr Joseph Oppong (third from the right, front row), Public Relations Manager for the Wildlife Division of the Forestry Commission of Ghana.

REFERENCES

Cronin, J.E. & V.M. Sarich. 1976. Molecular evidence for dual origin of mangabeys among Old World monkeys. Nature 260: 700-702.

Butynski, T.M., T. Struhsaker, J. Kingdon & Y. de Jong. 2008. Cercocebus galeritus. The IUCN Red List of Threatened Species 2008.

Butynski, T.M., J. Kingdon & J. Kalina (eds.). 2013. Mammals of Africa. Volume II: Primates. Bloomsbury Publishing, London, United Kingdom, 556 pp.

Disotell, T.R. 1994. Generic-level relationships of the Papionini (Cercopithecoidea). American Journal of Physical Anthropology 94: 47-57.

Dutrillaux, B., J. Couturier & G. Chauvier. 1980. Chromosomal evolution of 19 species or sub species of Cercopithecinae. Annales de Génétique 23: 133-143.

Ehardt, C., T.M. Butynski & T. Struhsaker. 2008. Cercocebus sanjei. The IUCN Red List of Threatened Species 2008

Fleagle, J.G. & W.S. McGraw. 1999. Skeletal and dental morphology supports diphyletic origin of baboons and mandrills. Proceedings of the National Academy of Sciences 96: 1157-1161.

Groves, C.P. 1978. Phylogenetic and population systematics of the mangabeys (Primates: Cercopithecoidea). Primates 19: 1-34.

Hart, J., T.M. Butynski & Y. de Jong. 2008. Cercocebus chrysogaster. The IUCN Red List of Threatened Species

McGraw, W.S. 2017. Mangabeys (Cercocebus and Lophocebus). In The International Encyclopedia of Primatology, A. Fuentes (ed.). Wiley and Sons, New

Oates, J.F. & T.M. Butynski. 2008a. Mandrillus leucophaeus. The IUCN Red List of Threatened Species 2008.

Oates, J.F. & T.M. Butynski. 2008b. Mandrillus sphinx. The IUCN Red List of Threatened Species 2008.

Oates, J.F., S. Gippoliti & C.P. Groves. 2008a. Cercocebus atys ssp. lunulatus. The IUCN Red List of Threatened Species 2008

Oates, J.F., S. Gippoliti & C.P. Groves. 2008b. Cercocebus torquatus. The IUCN Red List of Threatened Species

Stanyon, R., C. Fantini, A. Camerio-Ciani, B. Chiarelli & G. Ardito. 1988. Banded karyotypes of 20 Papionini species reveal no necessary correlation with speciation. American Journal of Primatology 16: 3-17.