

SUPPORTING INFORMATION AND DATA**Appendix S1.** Summary of data used to update giraffe range maps.

Data type	Source	Date(s)	Area surveyed or covered	Description of data
Aerial observations	Great Elephant Census (GEC)	2014 - 2016	Angola, Botswana, Cameroon, Chad, Ethiopia, Kenya, Mozambique, Tanzania, South Sudan, and Zimbabwe	Global Positioning System (GPS) locations of giraffe observations recorded during aerial surveys
	Kenya Wildlife Service Aerial Survey	November 2017	Laikipia, Marsabit, Meru, and Samburu Counties, Kenya	GPS locations of giraffe observations recorded during aerial surveys
Ground observations	Twiga Walinzi	May 2016 – December 2018	Laikipia and Samburu Counties, Kenya	GPS locations of giraffe observations recorded by the Twiga Walinzi research team
	Great Grevy's Rally	January 2018	Laikipia, Isiolo, Marsabit, Meru, and Samburu Counties, Kenya	GPS locations of giraffe observations recorded during the Great Grevy's Rally 2018
	Giraffe Conservation Foundation, Niger	December 2018	Niamey, Niger	GPS locations of giraffe observations recorded during vehicle surveys and GIS shapefile of game reserve where giraffe translocations recently took place
	Uganda Wildlife Authority, GCF and Dartmouth University	2015 - 2019	Uganda	Long-term population monitoring and observation data
	Sam Phillips, Northern Michigan University, and Matthew Becker, Zambian Carnivore Programme	2016 - 2018	Luangwa Valley, Zambia	GPS locations of giraffe observations

D. O'Connor et al. (2019): Supporting Information

Satellite-derived GPS telemetry data	Twiga Walinzi, San Diego Zoo Global, Giraffe Conservation Foundation, Savannah Tracking	June 2017 – December 2018	Lakipia, Isiolo, and Meru Counties, Kenya	Hourly GPS satellite tracking data recorded by solar-powered ossicone units that were affixed to 11 <i>Giraffa reticulata</i> (reticulated giraffe)
Existing data	Michael B. Brown	2018	Kenya, Uganda	Geographic Information Systems (GIS) shapefile of current <i>Giraffa camelopardalis</i> (northern giraffe) in Kenya based on recent translocations, individually based photographic surveys, and GPS telemetry
	Giraffe Conservation Foundation	2016	Namibia, South Africa, Botswana, Zimbabwe, Angola, Zambia, Malawi, Tanzania, Rwanda, Kenya, Uganda, Somalia, Ethiopia, South Sudan, Central African Republic, Democratic Republic of Congo, Chad, Cameroon, Niger	GIS shapefile of the currently recognized distribution map of giraffe across Africa (use as the baseline for this update)
	Kenya Wildlife Service, National Recovery and Action Plan for Giraffe (<i>Giraffa camelopardalis</i>)	November 2018	Kenya	Map of the distribution of giraffe in Kenya as accepted and published by the Kenya Wildlife Service
	Bristol Zoological Society, Giraffe Conservation Foundation	2019	Cameroon	Map of the distribution of giraffe in Cameroon developed by GCF and Bristol Zoological Society
Personal communications and interviews	Ian Craig, Juliet King, and Antony Wandera, Northern Rangelands Trust	October 2018	Kenya	Email communications regarding giraffe distribution in northern Kenya

	Zeke Davidson, Zoological Society of London	October 2018	Kenya	Email communications regarding giraffe distribution in northern Kenya around Lake Turkana
	Julian Fennessy and Arthur Muneza, Giraffe Conservation Foundation	October 2018	Namibia, South Africa, Botswana, Zimbabwe, Angola, Zambia, Malawi, Tanzania, Rwanda, Kenya, Uganda, Somalia, Ethiopia, South Sudan, Central African Republic, Democratic Republic of Congo, Chad, Cameroon, Niger	Communications regarding giraffe distributions, translocations, and areas where populations have been exterminated.
	Paul Elkan	March 2018	Cameroon, Central African Republic, Ethiopia, South Sudan, Uganda	Keyhole Markup Language (KML) file containing polygons of giraffe distribution based on aerial surveys, ground observations, and expert knowledge.

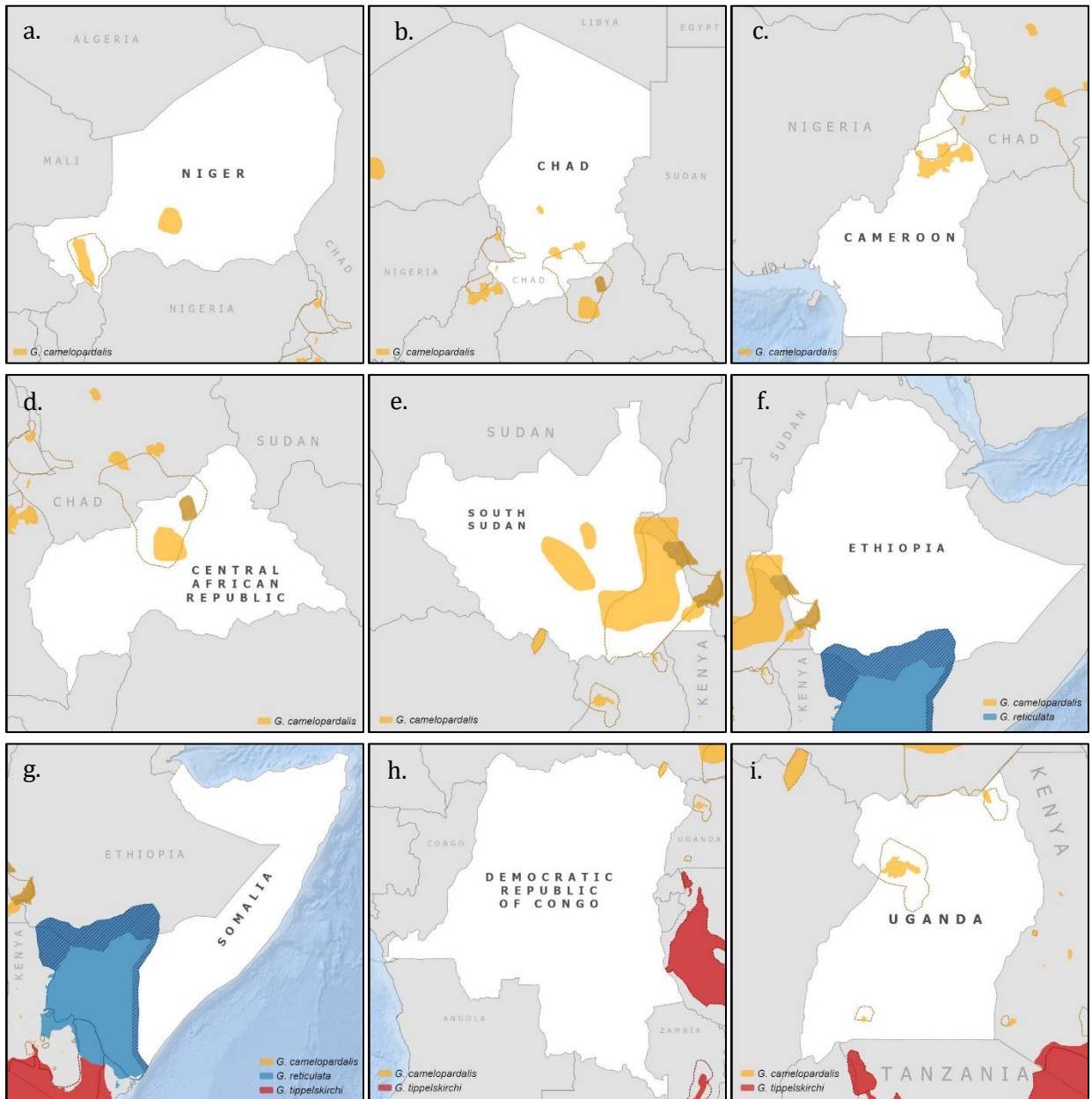
Appendix S2. Full list of government-managed protected area (GMPA) designations.

Designation	
Aire Protégée Nationale	Multiple Use Management Area
Aquatic Reserve	National Faunal Reserve
Area of absolute protection	National Forest Park
Area protected for habitat and species	National Nature Reserve
Biological and Ecological Interest Site	National Park
Biological Reserve	National Park (proposed)
Bird Reserve	National Reserve
Chimpanzee Sanctuary	National Sanctuary
Classified Forest and Community Reserve	Natural Monument
Community Reserve	Natural Park

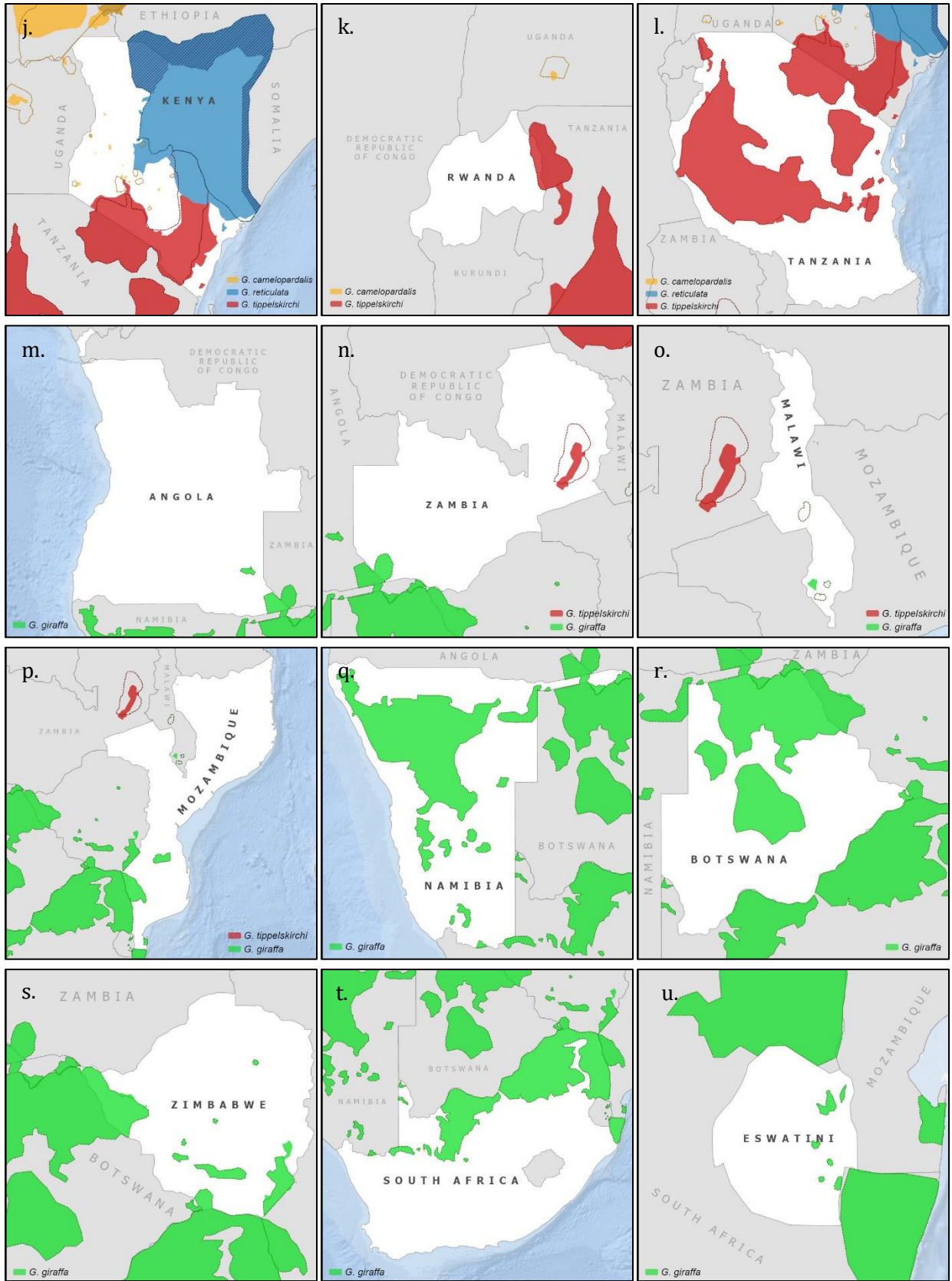
D. O'Connor et al. (2019): Supporting Information

Community Wildlife Management Area	Natural Reserve
Concession	Nature Conservation Reserve
Conservation Area	Nature Monument
Cultural Park	Nature Reserve
Endemic garden	Not Reported
Faunal Reserve	Open area
Faunal Reserve	Partial Faunal Reserve
Fishing Reserve	Partial Natural Reserve
Forest Nature Reserve	Partial Wildlife Reserve
Forest Plantation	Paysage Harmonieux Protégé
Forest Reserve	Permanent Hunting Reserve
Forest Reserve and Game Controlled Area	Presidential Reserve
Forest Wilderness Area	Protected Environment
Game controlled area	Protected Landscape
Game Management Area	Ramsar Site, Wetland of International Importance
Game Reserve	Sanctuary
Game Sanctuary	Scientific Reserve
Game Sanctuary / Non-hunting Forest Reserve	Site of Community Importance (Habitats Directive)
Hunting Area	Special Nature Reserve
Hunting Reserve	Special Protection Area (Birds Directive)
Integral National Reserve	Special Reserve
Islet National Park	Specially Protected Areas of Mediterranean Importance (Barcelona Convention)
Marine National Park	Strict Nature Reserve
Marine National Reserve	Terrestrial protected area
Marine Park	Total Wildlife Reserve
Marine Park Buffer Zone	UNESCO-MAB Biosphere Reserve
Marine Protected Area	Wetland Zone of National Importance
Marine protected landscape	Wildlife Reserve
Mountain Catchment Area	Wildlife Sanctuary
Multiple Sustainable Use Reserve	World Heritage Site (natural or mixed)

Appendix S3. Giraffe distribution by country in sub-Saharan Africa.



D. O'Connor et al. (2019): Supporting Information



Ranges are shown as coloured polygons for *Giraffa camelopardalis*, *Giraffa reticulata*, *Giraffa tippelskirchi*, and *Giraffa giraffa*. The dashed outlines show the previously recognised IUCN ranges. Cross-hatched areas are where giraffe populations are not confirmed, but possibly do occur. In Kenya (m.) the updated range of *Giraffa reticulata* overlaps the previously recognised IUCN range of *Giraffa tippelskirchi*, which no longer extends as far north.

Appendix S4. Specific changes and updates to the geographical distribution of giraffe as a result of this study.

Species	Country	Updates to distribution	Data source
<i>Giraffa camelopardalis</i>	Niger	Limited to the immediate areas to the northeast, east, and southeast of Niamey	Giraffe Conservation Foundation (GCF)
		Population added in Gadabedji Biosphere Reserve	GCF (recent translocation)
	Chad	Limited to Zakouma National Park	GCF
		Population added with the far eastern boundary and just outside of Binder-Léré Faunal Reserve	GCF
		Population added in Siniaka Minia Wildlife Reserve	GCF (recent translocation)
		Population added along the western edge of Lake Fitri	GCF
	Cameroon	Distribution near Bouba Ndjida, Bénoué, and Faro National Parks slightly extended to the south	Great Elephant Census (GEC) observations
		Distribution near Bouba Ndjida, Bénoué, and Faro National Parks reduced in the north	GCF, Bristol Zoological Society
		Population reduced to boundary of Waza National Park	GCF, Bristol Zoological Society

D. O'Connor et al. (2019): Supporting Information

Central African Republic	Distribution reduced to in and around Bamingui-Bangoran Park	Paul Elkan, Wildlife Conservation Society (WCS)
	Distribution reduced to a sector of Manovo-Goundar St Floris and classified as possible	Paul Elkan, WCS
Democratic Republic of the Congo	Limited to small area within Garamba National Park	GCF, African Parks
South Sudan	Slightly extended along the eastern boundary of distribution near Bandingilo National Park	GEC observations
	Revised distribution for confirmed presence in the Boma-Badingilo landscape	Paul Elkan
	Distribution reduced to small area near Loelle (Ilemi triangle), Jonglei southeast of Zeraff, and Shambe Park and surrounding area west of Nile river.	Paul Elkan
Ethiopia	Revised distribution around Omo National Park and Tama Wildlife Reserve and classed as possible	GCF, Paul Elkan
	Distribution revised for Gambella National Park and surrounding area	Paul Elkan
Uganda	Distribution slightly extended into northern Uganda near Kidepo Valley National Park	GEC observations
	Limited to areas throughout northern area of Murchison Falls National Park and in south range extends from close to main road in through the Park about 60km east and not further south into forest	GCF (south population recent translocation)
	Limited to small distribution in Lake Mburo National Park	GCF (recent translocation)
Kenya	Limited to Nasalot National Reserve, Kerio Valley National Park, Ruma National Park, and Lake Nakuru National Park	GCF
	Limited to distribution near Kaiboi	GCF
	Limited distribution near Solai	GCF
	Limited distribution near Lake Elementaita	GCF

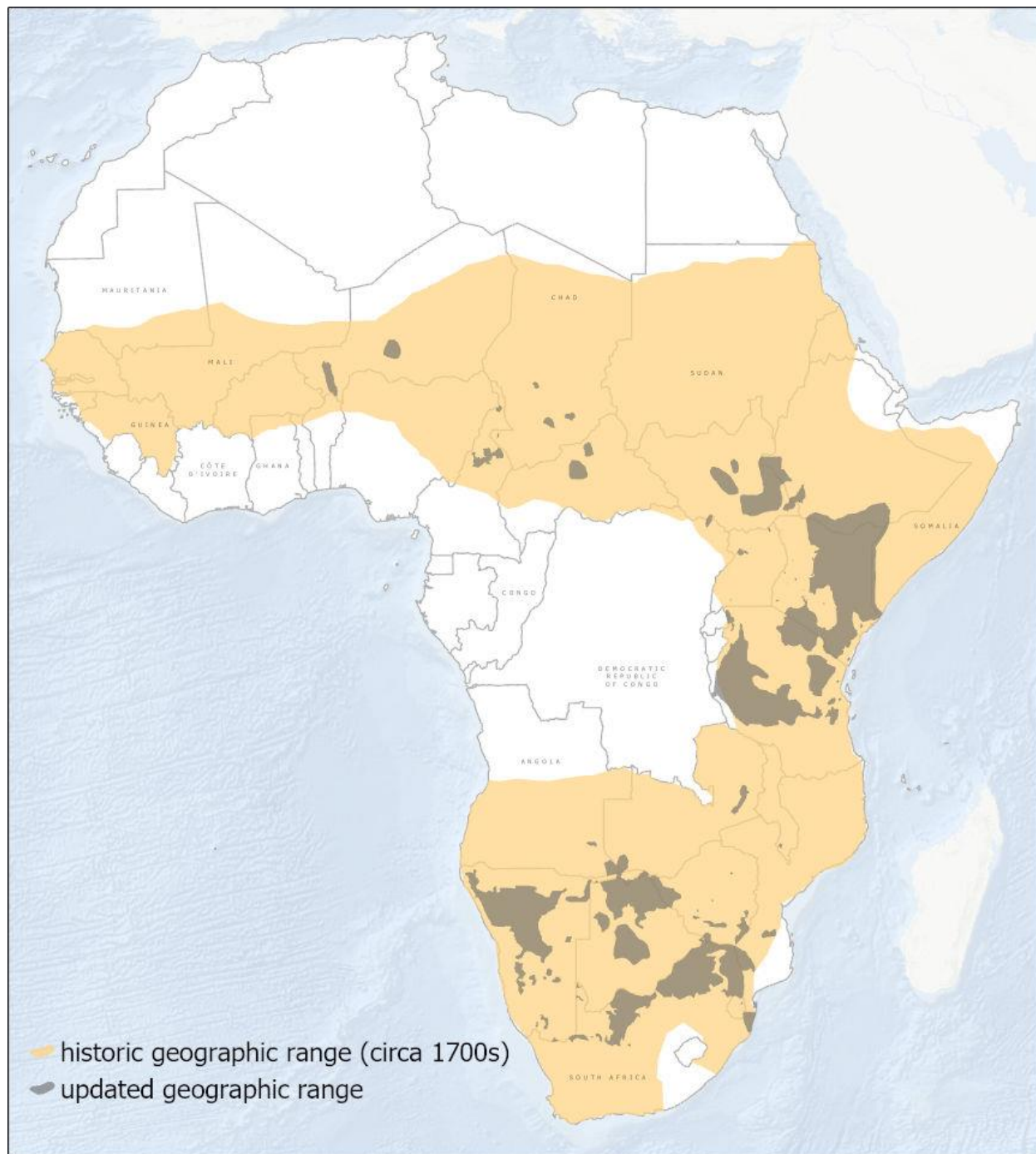
D. O'Connor et al. (2019): Supporting Information

		Limited distribution near Kigio Wildlife Conservancy and Mwea National Reserve	GCF
		Populations near Aberdare National Park no longer present	GCF
		Population near Mwingi National Reserve no longer present	GCF
<i>Giraffa reticulata</i>	Kenya	Distribution extended slightly to the west in Marsabit and Samburu Counties	Great Grevy's Rally (GGR) observations
		Distribution extended southwest into Laikipia County, south into Meru County, and south into Tana River and Kitui Counties	GGR Observations, GEC observations, satellite movement data, Twiga Walinzi observations, Kenya Wildlife Service (KWS) aerial survey observations
		Distribution reduced to the northwest within Lamu County	GCF
		Small population present within Aberdare Country Club	GCF
		Population near Mwingi National Reserve	GCF
<i>Giraffa tippelskirchi</i>	Kenya	Distribution reduced to south of Nairobi National Park and south of Nairobi	GCF and GEC observations
		Distribution reduced near to the south near the Tana River	GCF
		Population in Mombasa no longer present	GCF
	Tanzania	Populations in Burigi Game Reserve reduced to the south	GCF
		Distribution extend slightly to the west towards Kikonko	GEC observations
		Distribution extend slightly to the west towards Mgandu	GEC observations
		Distribution extend slightly to the southeast of Mufundi	GEC observations
		Distribution extended slightly towards the north and the east near Mikumi National Park	GEC observations
		Distribution extended to the west near Pwani	GEC observations

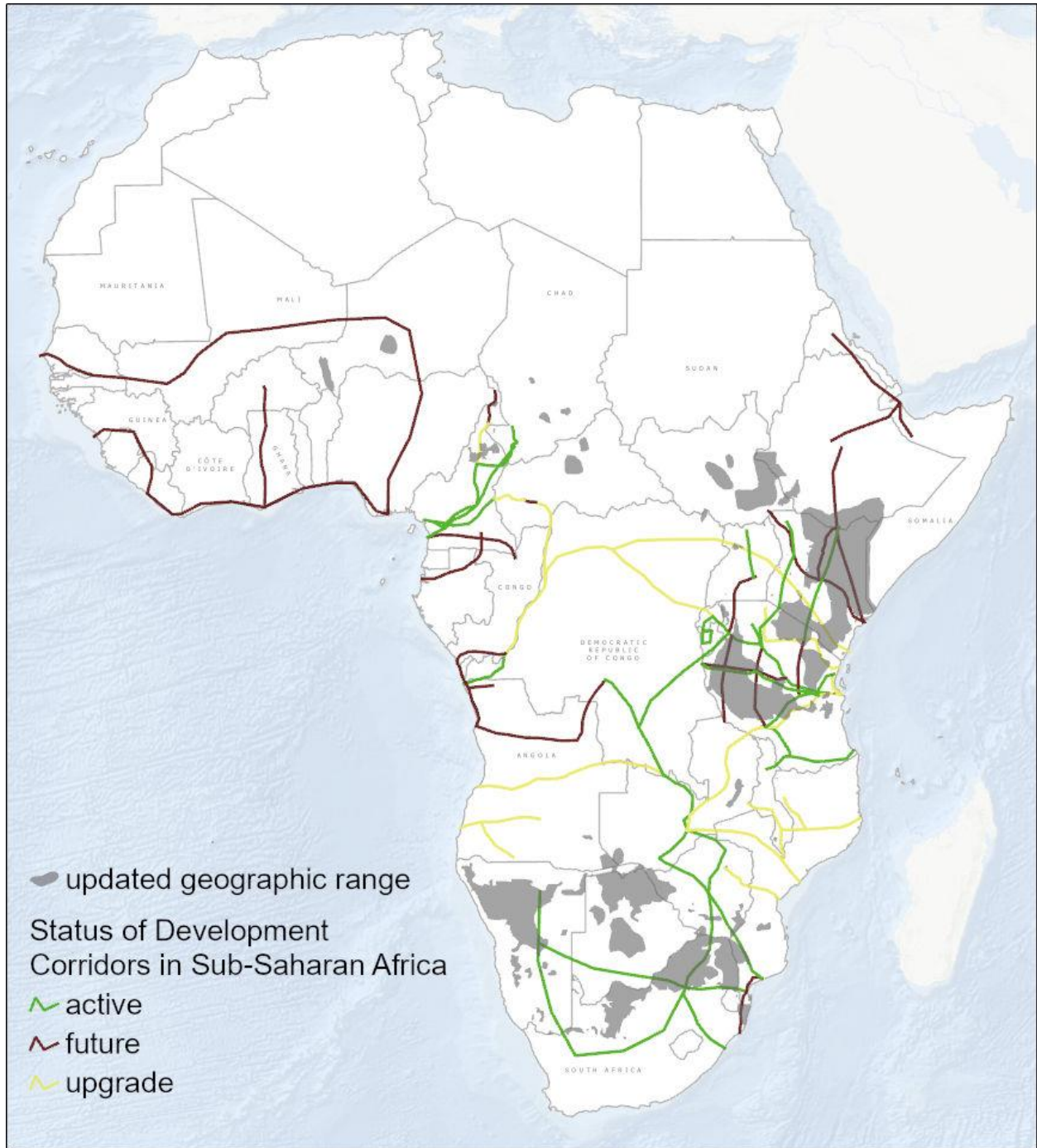
D. O'Connor et al. (2019): Supporting Information

	Zambia	Distribution reduced to the south, east, and west towards the Luangwa River	Sam Phillips and Matthew Becker observations
		Distribution extended to the south to encompass Sandwe Game Management Area	Sam Phillips and Matthew Becker observations
<i>Giraffa giraffa</i>	Malawi	Limited to Nyala Park, Majete National Park, and Game Haven Lodge in Blantyre	GCF
	Zimbabwe	Distribution extended slightly northwest and east along the southeastern border of Zimbabwe	GEC observations

Appendix S5. Updated geographical range of the giraffe, in comparison to the range in the 1700s. The historical range map was compiled and provided by the Giraffe Conservation Foundation.



Appendix S6. Updated geographical range of the giraffe in relation to active and planned future major infrastructure development corridors in sub-Saharan Africa.



D. O'Connor et al. (2019): Supporting Information

The map was provided by Laurance et al. (2015). See Figure 1 in Laurance et al. (2015) for more details of the development corridors (Laurance WF, Sloan S, Weng L, Sayer JA, 2015, Estimating the environmental costs of Africa's massive "development corridors". *Current Biology* 25: 3202–3208.)