

Supplementary Materials: A Meta-Analysis of Human–Wildlife Conflict: South African and Global Perspectives

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Table S1. Description of categories that gauge vulnerability of human-wildlife-conflict species and severity of conflict. A description of how species were categorised for vulnerability and conflict status is provided using guidelines proposed by Gittleman et al. (2001) and Inskip and Zimmermann (2009). These categories identified levels of biodiversity extinction vulnerability with corresponding abbreviations for such classification.

Category	Description	Category	Description
Index of Vulnerability		Conflict Status	
Poorly researched, data deficient (PR)	Animal appears only once in the published literature database	Low-scale conflict (LSC)	Wild animal rarely attacks people, seldom depredates livestock or crops, rarely experiences retaliatory killing
Moderately persecuted (MP)	Animal appears two to four times in the database and may be moderately persecuted	Moderate-scale conflict (MSC)	Wild animal rarely attacks people, or may frequently depredate livestock or crops, or experiences frequent retaliatory killings
Severely persecuted (SP)	Animal appears more than four times in the database and may be severely persecuted	High-scale conflict (HSC)	Wild animal frequently attacks people and/or recurrently depredates livestock or crops, experiences frequent retaliatory killings
Research required (RR) or Future research (FR)	No research has been conducted on this species in published literature	Status unknown (SU)	Anecdotal evidence of conflict is available. No scientific evidence in literature

Table S2. Problem animals that affected commercial farmers, local communities, subsistence farmers and pooled-farmers (subsistence and commercial farmers). Numbers denote the number of cases that appeared in the published literature database.

Commercial Farmers	Local Communities	Subsistence Farmers	Subsistence and Commercial Farmers
Antelopes			
	Kudu (1)	Eland (1)	Musk deer (1)
	Nilgai (1)	Kudu (1)	
	Ungulates non-specific (1)	Nilgai (1)	
		Roan antelope (1)	
		Sitatunga (1)	
Birds			
Birds non-specific (8)	Birds (4)	Raptor (1)	Birds non-specific (1)
Flamingo (1 case)	Raptor (1)		
	Vulture (1)		

Table S2. Cont.

Commercial Farmers	Local Communities	Subsistence Farmers	Subsistence and Commercial Farmers
Carnivores			
African lion (6)	African lion (7)	African civet (2)	African lion (4)
African wild dog (6)	African wild dog (6)	African lion (4)	African wild dog (2)
American black bear (1)	Amur tiger (1)	African wild cat (1)	American black bear (2)
Brown bear (4)	Asiatic black bear (2)	Cheetah (1)	Brown bear (1)
Caracal (4)	Asiatic jackal (2)	Eurasian lynx (1)	Carnivora non-specific (1)
Carnivora non-specific (1)	Brown bear (2)	Genet (1)	Hyaena (1)
Cheetah (8)	Carnivora non-specific (5)	Hyaena (2)	Jaguar (2)
Coyote (1)	Cheetah (1)	Jackal (1)	Leopard (1)
Eurasian lynx (3)	Eurasian lynx (1)	Leopard (5)	Puma (1)
Hyaena (11)	Florida black bear (1)	Serval (1)	Snow leopard (3)
Iberian lynx (1)	Himalayan black bear (2)	Snow leopard (1)	Tiger (2)
Jackal (7)	Hyaena (3)	Tiger (2)	Wolf (1)
Jaguar (2)	Jackal (2)	Wolf (1)	
Leopard (9)	Jaguar (1)		
Puma (5)	Leopard (10)		
Serval (2)	Red fox (1)		
Snow leopard (1)	Serval (1)		
Wolf (11)	Snow leopard (5)		
Wolverine (3)	Sun bear (1)		
	Tiger (13)		
	Wolf (5)		
Mega-herbivores			
Buffalo (1)	Asian elephant (1)	Asian elephant (2)	Elephant (3)
Commercial farmers	Local communities	Subsistence farmers	Subsistence and commercial farmers
Bushpig (2)	One-horned Rhinoceros (1)	Buffalo (2)	
Elephant (9)	Rhinoceros (1)	Elephant (8)	
Porcupine (1)			
Wild boar (1)			
Other mammals/Omnivorous feeders			
Commercial farmers	Local communities	Subsistence farmers	Subsistence and commercial farmers
Feral house mouse (2)	Bushpig (2)	Bushpig (1)	Dhole (1)
	Dhole (3)	Feral domestic pig (1)	Porcupine (1)
	European bison (1)	Honey badger (1)	Wild boar (1)
	European rabbit (1)	Mongoose (1)	
	Porcupine (1)	Porcupine (2)	
	Rodents (3)	Squirrel (1)	
	Warthog (2)	Sulawesi warty pig (1)	
	Wild boar (4)	Warthog (1)	
		Wild boar (2)	
Primates			
Baboon (2)	Baboon (9)	Agile mangabey (1)	Baboon (1)
Chimpanzee (1)	Black and white colobus monkey (1)	Baboon (4)	Chimpanzee (1)
Long-tailed macaque (1)	Black howler monkey (1)	Blue monkey (1)	Primates non-specific (1)
Orangutan (2)	Blue monkey (2)	Buton macaque (1)	Sclater's monkey (1)
Red colobus monkey (1)	Chimpanzee (1)	Chimpanzee (2)	Vervet monkey (1)
Red-tailed monkey (2)	Other Primates (2)	Kipunji forest monkey (1)	
Thomas' leaf monkey (1)	Patas monkey (1)	Red-tailed monkey (1)	
Vervet monkey (1)	Red-tailed monkey (2)	Rhesus macaque (2)	
	Vervet monkey (3)	White-collared monkey (1)	

Table S3. Vulnerability index and conflict status of problem animals that appeared in the human-wildlife conflict literature database. The common name, species name (where available), the International Union for Conservation of Nature status for each animal (as at 2015) and the number of publications in which each animal featured is included. Bold text indicates endangered species that do not appear in the published literature database and hence, their vulnerability index requires assessment and their conflict status is unknown.

Common Name of Problem Animal	Species	IUCN Status	Number of Publications	Vulnerability Index				Conflict Status
				PR	MP	SP	RR/FR	
Antelope								
Eland	<i>Tragelaphus oryx</i>	Least concern	1	X				Low-scale
Hirola	<i>Damaliscus lunatus</i>	Critically endangered	0				X	Status unknown
Kudu	<i>Tragelaphus strepsiceros</i>	Least concern	2		X			Moderate-scale
Musk deer	<i>Moschus leucogaster</i>	Endangered	1	X				Low-scale
Nilgai	<i>Boselaphus tragocamelus</i>	Least concern	2		X			Moderate-scale
Roan	<i>Hippotragus equinus</i>	Least concern	1	X				Low-scale
Sitatunga	<i>Tragelaphus spekii</i>	Least concern	1	X				Low-scale
Birds								
Blackbird	<i>Turdus merula</i>	Least concern	1	X				Low-scale
Crane	Gruidae		2		X			Moderate-scale
Crow	Corvus		1	X				Low-scale
Dove	Columbidae		2		X			Moderate-scale
Flamingo	<i>Phoenicopterus roseus</i>	Least concern	1	X				Low-scale
Goose	Anserinae		2		X			Moderate-scale
Golden eagle	<i>Aquila chrysaetos</i>	Least concern	1	X				Low-scale
Green parrot	Trichoglossus		1	X				Low-scale
Partridge	Perdicinae		1	X				Low-scale
Pigeon	Columbidae		2		X			Moderate-scale
Raptor	Unspecified		2		X			Moderate-scale
Thrush	Turdidae		2		X			Moderate-scale
Vulture	Unspecified		1	X				Low-scale
Weaverbird	Ploceidae	Least concern	1	X				Low-scale

Table S3. Cont.

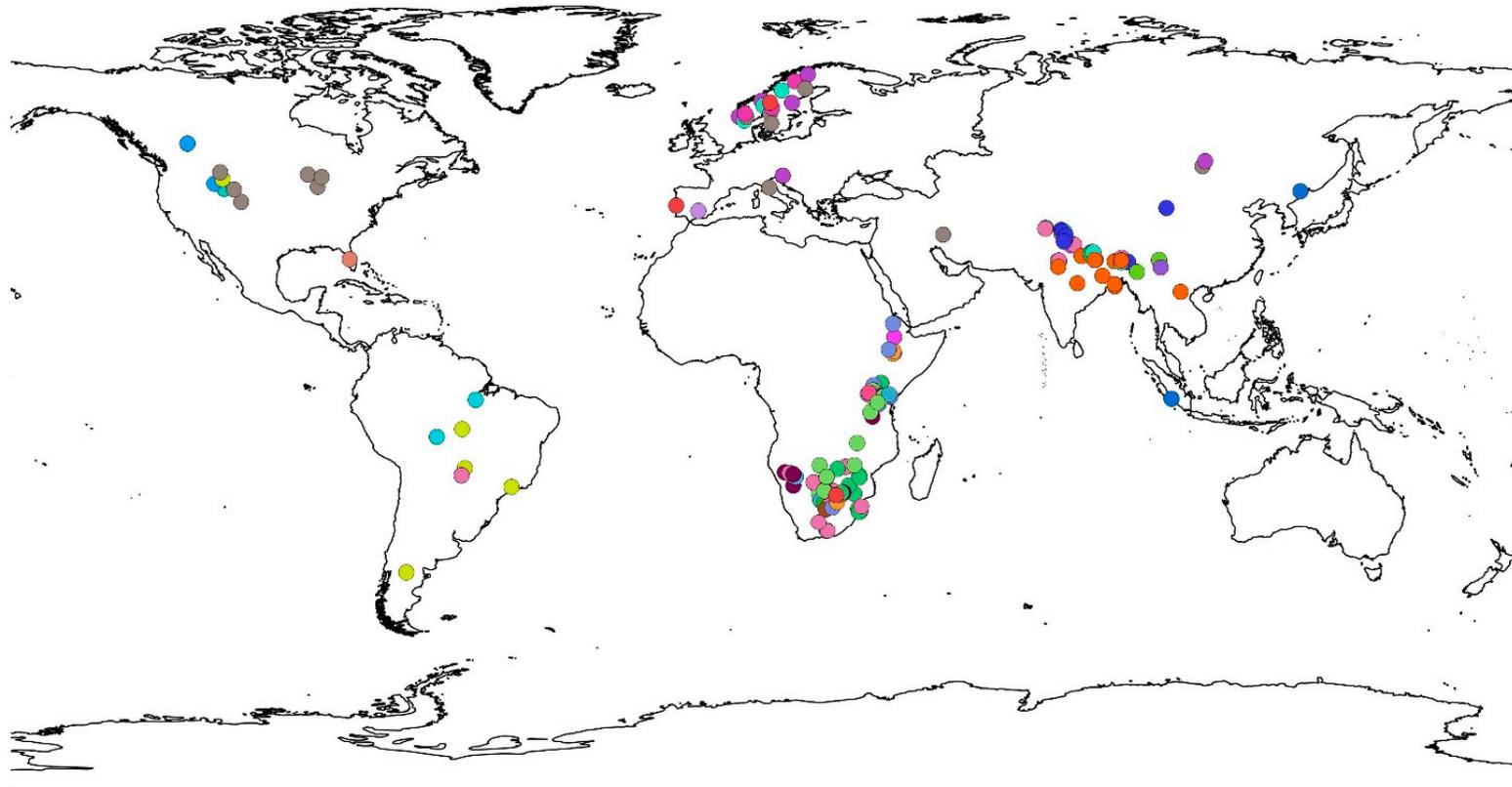
Common Name of Problem Animal	Species	IUCN Status	Number of Publications	Vulnerability Index				Conflict Status
				PR	MP	SP	RR/FR	
Carnivores								
African lion	<i>Panthera leo</i>	Vulnerable	21			X		High-scale
African wild cat	<i>Felis silvestris</i>	Least concern	1	X				Low-scale
African wild dog	<i>Lycaon pictus</i>	Endangered	14			X		High-scale
American black bear	<i>Ursus americanus</i>	Least concern	3		X			Moderate-scale
Amur tiger	<i>Panthera tigris altaica</i>	Endangered	1	X				Low-scale
Amur leopard	<i>Panthera pardus orientalis</i>	Critically endangered	0				X	Status unknown
Asiatic black bear	<i>Ursus thibetanus</i>	Vulnerable	2		X			Moderate-scale
Asiatic jackal	<i>Canis aureus</i>	Least concern	2		X			Moderate-scale
Asiatic wild dog/dhole	<i>Cuon alpinus</i>	Endangered	4		X			Moderate-scale
Black-backed jackal	<i>Canis mesomelas</i>	Least concern	8			X		High-scale
Brown bear	<i>Ursus arctos</i>	Least concern	7			X		High-scale
Brown hyena	<i>Hyaena brunnea</i>	Near threatened	5			X		High-scale
Caracal	<i>Caracal caracal</i>	Least concern	4		X			Moderate-scale
Cheetah	<i>Acinonyx jubatus</i>	Vulnerable	10			X		High-scale
Common jackal	<i>Canis aureus aureus</i>	Least concern	2		X			Moderate-scale
Ethiopian wolf	<i>Canis simensis</i>	Endangered	1	X				Low-scale
Eurasian lynx	<i>Lynx lynx</i>	Least concern	5			X		High-scale
Florida black bear	<i>Ursus americanus floridanus</i>	Least concern	1	X				Low-scale
Gray wolf	<i>Canis lupus</i>	Least concern	18			X		High-scale
Grizzly bear	<i>Ursus arctos</i>	Least concern	2		X			Moderate-scale
Himalayan black bear	<i>Ursus thibetanus</i>	Vulnerable	2		X			Moderate-scale
Iberian lynx	<i>Lynx pardinus</i>	Endangered	1	X				Low-scale
Jaguar	<i>Panthera onca</i>	Near threatened	5			X		High-scale
Leopard	<i>Panthera pardus</i>	Vulnerable	25			X		High-scale
Other Carnivora			5			X		High-scale
Puma	<i>Puma concolor</i>	Least concern	6			X		High-scale
Red fox	<i>Vulpes vulpes</i>	Least concern	1	X				Low-scale
Scandinavian wolverine	<i>Gulo gulo</i>	Least concern	3		X			Moderate-scale
Serval	<i>Leptailurus serval</i>	Least concern	4		X			Moderate-scale
Snow leopard	<i>Panthera uncia</i>	Endangered	10			X		High-scale
Spotted hyena	<i>Crocuta crocuta</i>	Least concern	12			X		High-scale
Sun bear	<i>Helarctos malayanus</i>	Vulnerable	1	X				Low-scale
Tiger	<i>Panthera tigris</i>	Endangered	17			X		High-scale

Table S3. Cont.

Common Name of Problem Animal	Species	IUCN Status	Number of Publications	Vulnerability Index				Conflict Status
				PR	MP	SP	RR/FR	
Mega-herbivores								
African elephant	<i>Loxodonta africana</i>	Vulnerable	31			X		High-scale
Asian elephant	<i>Elephas maximus</i>	Endangered	3		X			Moderate-scale
Cape buffalo	<i>Syncerus caffer</i>	Least concern	3		X			Moderate-scale
Great Indian one-horned rhino	<i>Rhinoceros unicornis</i>	Vulnerable	1	X				Low-scale
Hippopotamus	<i>Hippopotamus amphibius</i>	Vulnerable	1	X				Low-scale
Other mammals								
Aardvark	<i>Orycteropus afer</i>	Least concern	1	X				Low-scale
African civet	<i>Civettictis civetta</i>	Least concern	2		X			Moderate-scale
Bushpig	<i>Potamochoerus larvatus</i>	Least concern	5			X		High-scale
Common genet	<i>Genetta genetta</i>	Least concern	1	X				Low-scale
European Bison	<i>Bison bonasus</i>	Vulnerable	1	X				Low-scale
European rabbit	<i>Oryctolagus cuniculus</i>	Near threatened	1	X				Low-scale
Feral Domestic pig	<i>Sus domesticus</i>	Least concern	1	X				Low-scale
Feral house mouse	<i>Mus musculus</i>	Least concern	2		X			Moderate-scale
Honey badger	<i>Mellivora</i> spp.	Least concern	3		X			Moderate-scale
Mongoose	<i>Herpestes</i> sp.		1	X				Low-scale
Rodents	Rodentia	Least concern	3		X			Moderate-scale
Porcupine	Hystriidae	Least concern	5			X		High-scale
Rice field rat	<i>Rattus argentiventer</i>	Least concern	2		X			Moderate-scale
Squirrel	Sciuridae	Least concern	1	X				Low-scale
Sulawesi warty pig	<i>Sus celebensis</i>	Near threatened	1	X				Low-scale
Warthog	<i>Phacochoerus</i> spp.		4		X			Moderate-scale
Wild boar	<i>Sus scrofa</i>	Least concern	8			X		High-scale

Table S3. Cont.

Common Name of Problem Animal	Species	IUCN Status	Number of Publications	Vulnerability Index				Conflict Status
				PR	MP	SP	RR/FR	
Primates								
Agile mangabey	<i>Cercocebus agilis</i>	Least concern	1	X				Low-scale
Black and white colobus monkey	<i>Colobus</i> sp.	Endangered	1	X				Low-scale
Black howler monkey	<i>Alouatta caraya</i>	Least concern	1	X				Low-scale
Blue monkey	<i>Cercopithecus mitis</i>	Least concern	2		X			Moderate-scale
Boutourlini's blue monkey	<i>Cercopithecus mitis</i> spp. <i>boutourlinii</i>	Vulnerable	1	X				Low-scale
Buton macaque	<i>Macaca</i> sp.	Vulnerable	1	X				Low-scale
Chacma baboon	<i>Papio ursinus</i>	Least concern	2		X			Moderate-scale
Chimpanzee	<i>Pan troglodytes</i>	Endangered	5			X		High-scale
Grey-cheeked manglebe	<i>Lophocebus albigena</i>	Least concern	1	X				Low-scale
Kipunji forest monkey	<i>Rungwecebus kipunji</i>	Critically endangered	1	X				Low-scale
Long-tailed macaque	<i>Macaca fascicularis</i>	Least concern	1	X				Low-scale
Moloney's white-collared monkey	<i>Cercopithecus mitis</i> spp. <i>moloneyi</i>	Least concern	1	X				Low-scale
Moustached guenon	<i>Cercopithecus cephus</i>	Least concern	1	X				Low-scale
Northern muriqui (woolly spider monkey)	<i>Brachyteles hypoxanthus</i>	Critically endangered	0				X	Status unknown
Olive baboon	<i>Papio anubis</i>	Least concern	11			X		High-scale
Orangutan	<i>Pongo</i> spp.	Critically endangered	6			X		High-scale
Patas monkey	<i>Erythrocebus patas</i>	Least concern	1	X				Low-scale
Pig-tailed macaque	<i>Macaca leonina</i>	Vulnerable	1	X				Low-scale
Red colobus monkey	<i>Procolobus</i> sp.		1	X				Low-scale
Red-tailed monkey	<i>Cercopithecus ascanius</i>	Least concern	6			X		High-scale
Rhesus macaque	<i>Macaca mulatta</i>	Least concern	2		X			Moderate-scale
Sclater's monkey	<i>Cercopithecus sclateri</i>	Vulnerable	1	X				Low-scale
Thomas' leaf monkey	<i>Presbytis thomasi</i>	Vulnerable	1	X				Low-scale
Vervet monkey	<i>Chlorocebus pygerythrus</i>	Least concern	5			X		High-scale
Yellow baboon	<i>Papio cynocephalus</i>	Least concern	3		X			Moderate-scale

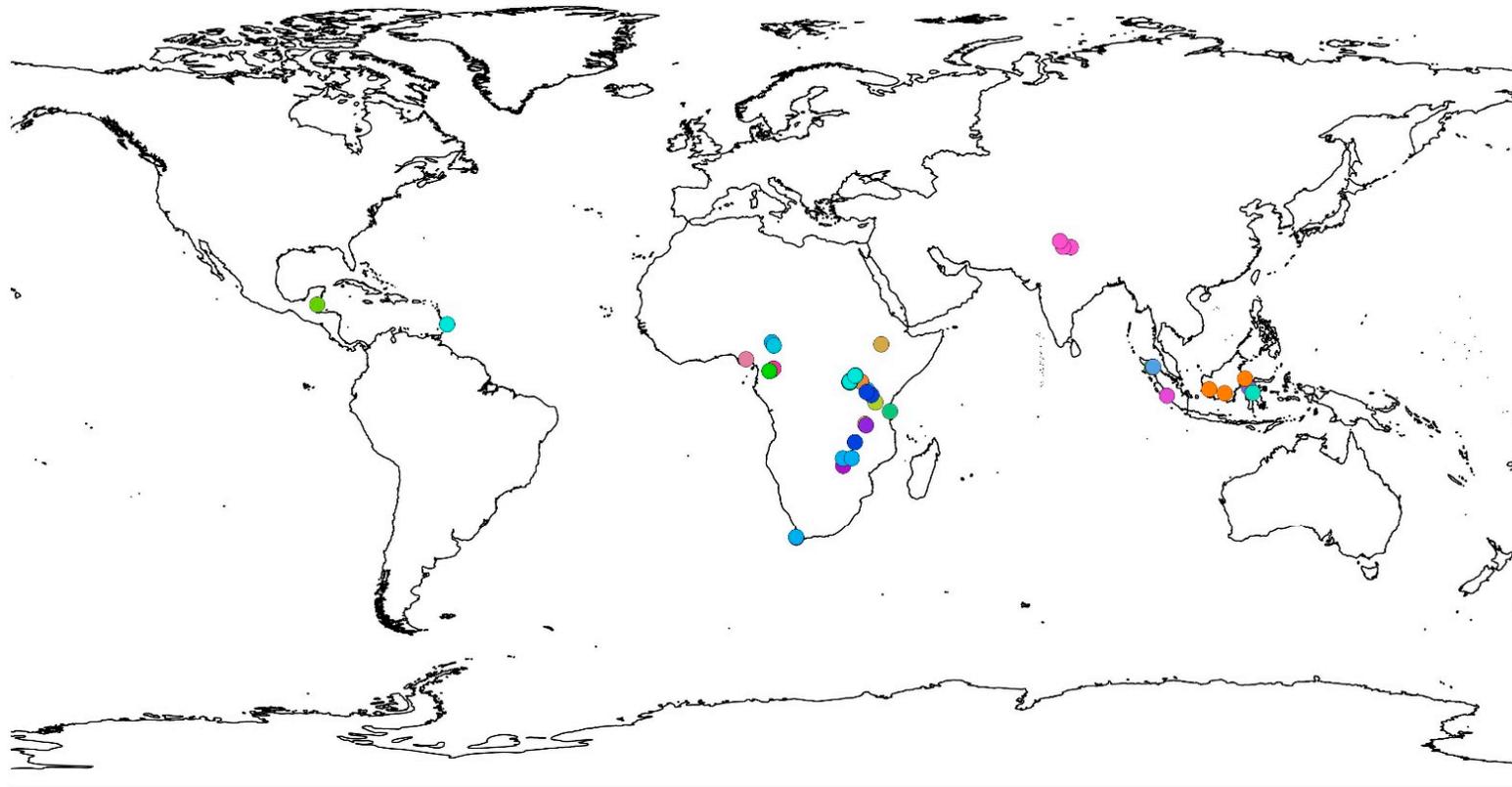


Legend

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|----------------------------|---------------------------|----------------------|------------------------|--------------------------|-----------------|
| Carnivore Species Studied: | ● Asiatic Black Bears | ● Caracal | ● Gray Wolf | ● Mountain Lion | ● Snow Leopard |
| ● African Lion | ● Asiatic Jackal | ● Cheetah | ● Grizzly Bear | ● Order Carnivora | ● Spotted Hyena |
| ● African Wild Cat | ● Asiatic Wild Dog/ Dhole | ● Common Jackal | ● Himalayan Black Bear | ● Puma Puma | ● Sun Bear |
| ● African Wild Dog | ● Black-backed Jackal | ● Ethiopian Wolf | ● Iberian Lynx | ● Red Fox | ● Tiger |
| ● Amur Tiger | ● Brown Bear | ● Eurasian Lynx | ● Jaguar | ● Scandinavian Wolverine | |
| | ● Brown Hyaena | ● Florida Black Bear | ● Leopard | ● Serval | |



Figure S1. A species-level occurrence of published human-carnivore-conflict from 1994–2015. Coloured circles are global positioning system data points that show human-carnivore-conflict study sites by carnivore species.



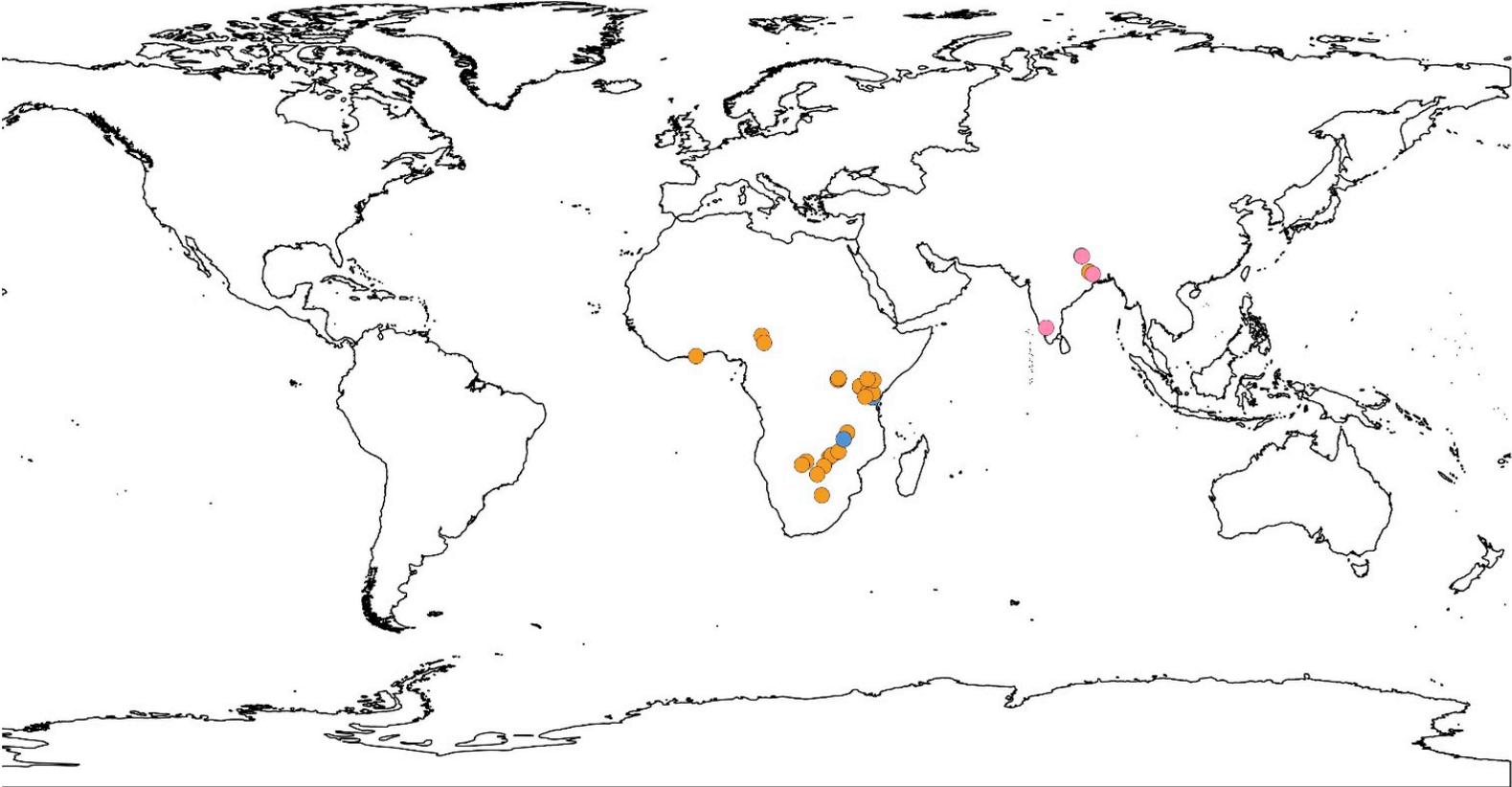
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Primate Species Studied:

- | | | | | |
|--|---|---|---|---|
| ● Agile Mangabey | ● Boutourlini's Blue Monkey | ● Long-tailed Macaque | ● Pig-tailed Macaque | ● Sulawesi Warty Pig |
| ● Black Howler Monkey | ● Buton Macaque | ● Moloney's White-collared Monkey | ● Primates | ● Thomas' Leaf Monkey |
| ● Black and White Colobus Monkey | ● Chacma Baboon | ● Moustached Guenon | ● Red Colobus Monkey | ● Vervet Monkey |
| ● Blue Monkey | ● Chimpanzees | ● Olive Baboon | ● Red-tailed Monkey | ● Yellow Baboon |
| | ● Grey-cheeked Mangebey | ● Orangutan | ● Rhesus Macaque | |
| | ● Kipunji Forest Monkey | ● Patas Monkey | ● Sclater's Monkey | |



Figure S2. A species-level occurrence of published human-primate conflict from 1994–2015. Coloured circles are global positioning system data points that show human-primate-conflict study sites by primate species.



Legend

- Mega-herbivore Species Studied: ● Cape Buffalo
- African Elephant
- Asian Elephant
- Great Indian One Horned Rhino
- Hippopotamus

Figure S3. A species-level occurrence of published human-mega-herbivore conflict from 1994–2015. Coloured circles are global positioning system data points that show human-mega-herbivore-conflict study sites.

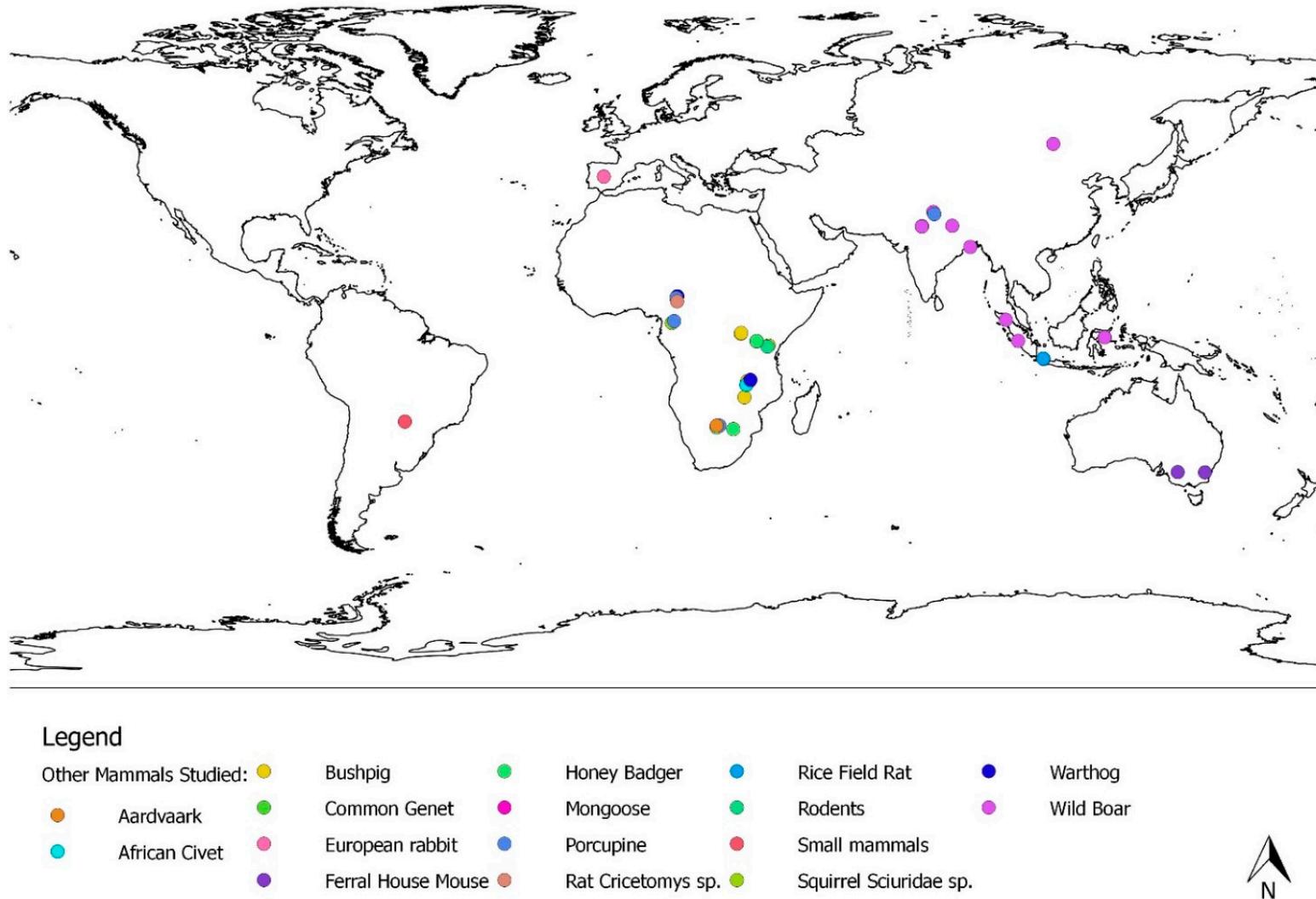


Figure S4. A species-level occurrence of published human and other mammal conflict from 1994–2015. Coloured circles are global positioning system data points that show human-other-mammal-conflict study sites by species.

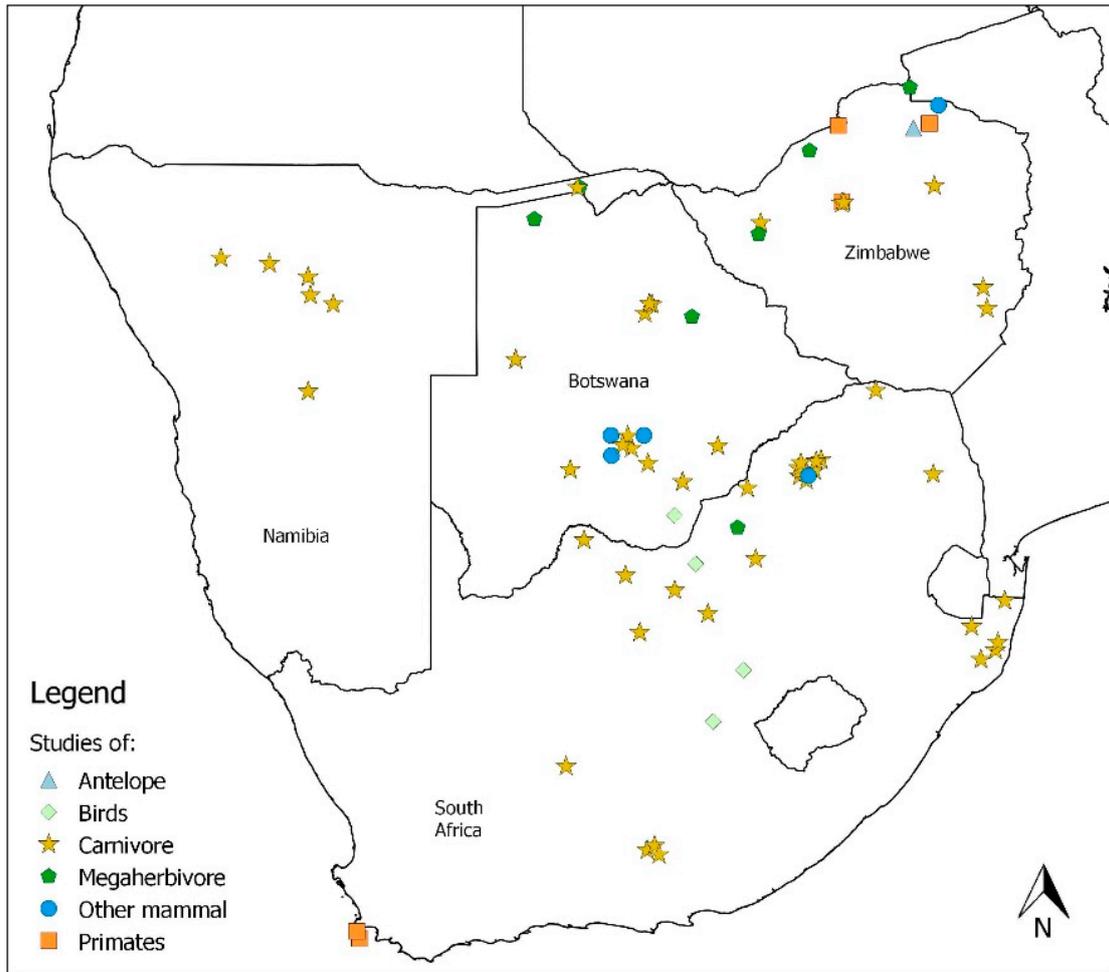


Figure S5. The distribution of publications concerning human-wildlife conflict in Sub-Saharan Africa from 1994 to 2015. Coloured circles are global positioning system data points for wildlife involved in human-wildlife conflict.