

Rothschild's Giraffe (*Giraffa camelopardalis ssp. rothschildi*)

Appendix 1. Rothschild's Giraffe population estimates

In the early 1960s, Dagg (1962) estimated the population of Rothschild's Giraffe in Uganda to be at 1,130 individuals while Rwetsiba (2005) reported that Rothschild's Giraffe population in Uganda numbered approximately 2,500 in the 1960s but had decreased to an estimated 350 individuals.

In 1968, an aerial survey of the Pian-Upe Wildlife Reserve in the Karamoja Region, estimated 899 Rothschild's Giraffe in the reserve (Zwick *et al.* 1998, Lamprey and Michelmore 1996). The population decreased to an estimated 109 Giraffe in 1983 (Eltringham and Malpas 1993). In 1995, an aerial survey estimated the population at only 10 individuals (Lamprey and Michelmore 1996), and a subsequent ground surveys conducted in 1996 recorded a single indirect sighting of the remains of a Giraffe that had been dead for several years. No Giraffe were recorded during an aerial survey of the reserve in the same year (Lamprey and Michelmore 1996). Anecdotal reports suggested that the Giraffe recorded by Lamprey and Michelmore (1996) in 1995 were hunted to extinction (Zwick *et al.* 1998).

In 1967, 157 Giraffe were estimated to occur in the Matheniko Wildlife Reserve (Nampindo *et al.* 2005). By 1983, Giraffe had disappeared from the area (Nampindo *et al.* 2005).

In 1968, 207 Giraffe were estimated to occur in the Bokoro Corridor Wildlife Reserve (Nampindo *et al.* 2005). The population decreased to an estimated 96 individuals in 1983 and only five individuals by 1996 (Lamprey and Michelmore 1996). This was the last time Giraffe were reported in the reserve.

Kidepo Valley National Park, located in the Karamoja sub-region in the extreme north-eastern part of Uganda, formerly supported the country's largest protected Rothschild's Giraffe population (East 1999). In the late 1960s to early 1970s there were an estimated 400 Giraffe in the park (NEMA 2009, Rwetsiba 2006, Nampindo *et al.* 2005). The population decreased to an estimated 160 Giraffe in 1982 (NEMA 2009, Rwetsiba 2006, Rwetsiba and Wanyama 2005) and by 1995, a mere five individuals remained in the park (East 1999). Three Rothschild's Giraffe (one male and two females) were translocated from Kenya's Lake Nakuru National Park to Kidepo Valley National Park in 1997 in an attempt to promote the recovery of the park's Giraffe population (Rwetsiba and Wanyama 2005, East 1999, Lamprey and Michelmore 1996).

In the early 1970s the Rothschild's Giraffe population in the Murchison Falls Conservation Area, consisting of Murchison Falls National Park and the adjacent wildlife reserves of

Bugungu and Karuma in the north-western part of Uganda, was estimated at 150 to 200 individuals (Rwetsiba *et al.* 2012, NEMA 2009, Rwetsiba 2006). Several aerial sample counts of wildlife in the Conservation Area were conducted in the 1990s. The population decreased to an estimated 78 Giraffe in 1991 (Olivier 1991). Sommerlatte and Williamson (1995) estimated the population at 100 individuals, while Lamprey and Michelmore (1996) estimated 153 individuals.

At the same time in Kenya, Rothschild's numbers declined so drastically that only a few hundred individuals remained by the 1960s (Fennessy and Brenneman 2010). The subspecies was effectively saved from extinction by a number of conservation and translocation efforts implemented in the 1970s, which resulted in the establishment of new populations in enclosed, protected areas (Fennessy and Brenneman 2010). While the only remaining naturally occurring viable population of Rothschild's Giraffe occurs in Murchison Falls National Park in Uganda (a smaller population occurs in Uganda's Kidepo National Park but has been supplemented by Giraffe from Kenya), the (sub)species has been re-introduced to six sites in Kenya within their assumed native range, namely Ruma National Park, Mt Elgon National Park, Murgor and Sergoit-Kruger Farms in Iten, Kitale Area Farm and Nasalot Reserve (Fennessy and Brenneman 2010). Six extralimital introductions have also taken place in Kenya (Fennessy and Brenneman 2010).

In 1983, 27 Rothschild's Giraffe were translocated from Soi Ranch in Kenya's Rift Valley to Ruma National Park (Awange *et al.* 2004). The population increased to approximately 40 individuals in 1994 (East 1999) and was estimated to number 69 individuals in 1999 (Awange *et al.* 2004). In the late 1980s, 17 Rothschild's Giraffe were translocated from Soi Ranch to Lake Nakuru National Park (Awange *et al.* 2004). In 1994, a wildlife census estimated the (extralimital) Rothschild's Giraffe population in Lake Nakuru National Park at 153 individuals (Brenneman *et al.* 2009).

Recent population estimates

In 2002, nine Rothschild's Giraffe were estimated to remain in the Kidepo Valley Conservation Area (Rwetsiba and Wanyama 2005). In 2005, the first aerial total count of wildlife in the Conservation Area counted 14 Giraffe, all of which occurred in the southern parts of Kidepo Valley National Park (Rwetsiba and Wanyama 2005).

By the new millennium, Lamprey (2000) estimated Murchison Falls National Park's Giraffe population at 347. In 2002, a total aerial count estimated the population at 229 individuals (Rwetsiba *et al.* 2002). In 2005, sample aerial counts of the Murchison Falls Conservation Area estimated the population at 245 Giraffe, all of which were observed in Murchison Falls National Park, north of the Nile River (Rwetsiba and Wanyama 2005). In 2010, aerial sample counts of the Conservation Area estimated the Giraffe population at 904 individuals (Rwetsiba and Nuwamanya 2010), however, these results are inaccurate as the analysis and extrapolation were for the whole park rather than the north only where the Giraffe inhabit.

According to Rwetsiba (2005) and USAID (2011), Uganda's Rothschild's Giraffe population was estimated at a total of 240 individuals in 2003. The population increased to an estimated 259 Giraffe by 2006 (Rwetsiba 2006).

In 1999 an estimated total of 69 individuals resided in Ruma National Park, while a survey in 2002 estimated the Rothschild's Giraffe population at 75 individuals (Awange *et al.* 2004). The population increased to an estimated 130 Giraffe in 2011 (Muller 2011) but a more recent count estimates the population to be 68 individuals (Muller, pers. obs.).

The Rothschild's Giraffe population in Lake Nakuru National Park declined from 153 individuals in 1995 to 62 individuals in 2002 – a failure in recruitment of offspring into the gene pool (Brenneman *et al.* 2009). The population was estimated at 65 individuals in 2008 (Muller 2011).

Adjacent to Lake Nakuru National Park, the Soysambu Conservancy is home to one of the largest populations of Rothschild's Giraffe in Kenya, and the largest on private land. A 2009 total census counted 63 Rothschild's Giraffe (Soysambu Conservancy 2009), increasing to an estimated 70 individuals in 2010 (Soysambu Conservancy 2010) and 109 individuals in 2015 (Soysambu Conservancy Wildlife Census, 2015).

In 2011, an anthrax outbreak at Mwea National Reserve resulted in the death of 11 Rothschild's Giraffe (Kaitho *et al.* 2013). Before the anthrax outbreak, there were an estimated 44 Rothschild's Giraffe in the reserve (Kaitho *et al.* 2013). The environment was decontaminated by rapidly incinerating all carcasses and 20 of the remaining 33 Giraffe were vaccinated against anthrax and black quarter to prevent further losses (Kaitho *et al.* 2013). Although all the remaining Giraffe were not vaccinated as a result of difficult terrains and dense bushes where they could not be pursued, the number of those that were vaccinated was sufficient to halt the outbreak (Kaitho *et al.* 2013).

In 2011 an estimated population of 32 Rothschild's Giraffe resided in the Kigio Wildlife Conservancy (Muller 2011). Less than 20 Giraffe were further estimated to occur on each of four properties respectively, namely Giraffe Manor, Mt Elgon National Park, Murgor Farm and Sergoit-Kruger Farm (Muller 2011). Kitale Area Farm and Nasalot Reserve each host an additional maximum of 10 Rothschild's Giraffe (Muller 2011).

Current population range and estimates

Seven populations of Rothschild's Giraffe are now recognised as viable: Murchison Falls National Park in Uganda, and Lake Nakuru National Park, Ruma National Park, Mwea Natural Reserve (translocated from Yoder Flower Farm), Giraffe Manor, Kigio Wildlife Conservancy and Soysambu Conservancy in Kenya. The six individual Kenyan herds were derived from a single, endemic population dispersed when the defunct Soi army base, located in far western Kenya north of Lake Victoria, east of Mt. Elgon near Eldoret, was opened for resettlement in the late 1970s.

Kidepo Valley National Park's Rothschild's Giraffe population are reported to have increased. Vehicle-based photographic surveys conducted in July 2015 revealed a total of 25 unique individuals throughout the Park (Bryant, Fennessy and Brown 2015), and ongoing surveys estimate a minimum of 31, and a maximum of 35 individuals (A. Rwetsiba pers. comm.).

In 2012, aerial sample counts of wildlife in the Murchison Falls Conservation Area estimated the Rothschild's Giraffe population at 757 individuals, all of which reside north of the Nile River in the Murchison Falls National Park (Rwetsiba *et al.* 2012). Rwetsiba *et al.* 2012 further reported that the Giraffe in Murchison Falls National Park seem to be increasing steadily. Recent vehicle-based photographic surveys were conducted at 4-month intervals between July 2014 and August 2015 as the first step in a long-term monitoring and research programme of the Murchison Falls populations. Preliminary results from these surveys corroborate the increasing population trends and suggest that the current Rothschild's Giraffe population may exceed 1,200 adults and subadults (M. Brown pers. comm.). Additionally, in July 2015, the Uganda Wildlife Authority (UWA) translocated fifteen Giraffe from Murchison Falls National Park to Lake Mburo National

Park in southwest Uganda, creating a separate population. Also, over a two-year period (2016-17), 37 Giraffe were translocated to the south side of Murchison Falls NP and currently 34 remain (GCF 2018). All these introductions are considered conservation translocations.

Recent photographic capture-recapture studies by GCF and Dartmouth College, USA were conducted at 4-month intervals between July 2014 and July 2015 as the first step in a long-term monitoring and research programme of the Murchison Falls populations (M. Brown pers. comm.). Over the last few years, the numbers have assumed to remain stable, with 902 unique subadult and adult Giraffe identified in 2015. Current estimates of the Giraffe population in Murchison Falls NP are at approximately 1,250 individuals (M. Brown pers. comm.).

Through ongoing photographic capture-recapture studies by GCF and AFEW, Rothschild's Giraffe in Ruma National Park are estimated to have increased from the estimated 68 individuals in 2015 (likely a large undercount) to 340 individuals currently. The Giraffe population in Lake Nakuru National Park has remained stable over recent years and now at <90 individuals (GCF 2018, Z. Muller pers. obs.). The privately owned Soysambu Conservancy's Rothschild's Giraffe population increased to 109 individuals in 2015 and now estimated at 159 (Soysambu Conservancy Wildlife Census, 2015, GCF 2018). In 2011, eight Rothschild's Giraffe were re-introduced into the Baringo area, where they had previously disappeared over 40 years ago. These Giraffe were translocated from the Soysambu Conservancy to the Ruko Community Wildlife Conservancy (The Wildlife Researcher 2012, Soysambu Conservancy 2011) and have since produced two offspring, bringing the total count to ten individuals (GCF 2018, Z. Muller pers. comm.). The Kigio Wildlife Conservancy population declined from 37 Rothschild's Giraffe in 2015 to 34 in 2018, while the estimated 100 individuals in Mwea National Reserve in 2015 now number 56 (GCF 2018, Z. Muller pers. comm.). All other populations are low in number – see Table (NGCS 2013, GCF 2018).

In summary, the latest Rothschild's Giraffe numbers are estimated at approximately 2,098, of which 1,468 are estimated to be mature individuals. In Uganda, there is an estimated 1,333 Giraffe and in Kenya 765 Giraffe.

Table 1. Population estimates – 2015 and 2018

Population	2015	2018	Status	Threats	Natural/Introduced
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Natural					
<i>Uganda</i>					
Murchison Falls NP	1,246	1,250	Stable	Poaching, oil exploration	Natural
Kidepo Valley NP	30-35	34	Stable/Increasing	Poaching	Natural/Supplemented
<i>Kenya</i>					
Ruko Conservancy	10	10	Stable	Habitat minimal	Re-Introduced
TOTAL	1,291	1,292			
Conservation Introductions					
<i>Uganda</i>					
Lake Mburo NP	15	15	Stable	Habitat minimal	Introduced
Murchison Falls NP - south	-	34	Stable	Poaching, oil exploration	Introduced
<i>Kenya</i>					
Ruma NP	68	340	Increasing	Disease vectors, Fire outbreak	Introduced
Lake Nakuru NP	81	<90	Stable	Habitat minimal	Introduced
Soysambu Conservancy	109	159	Increasing	Poaching, habitat loss	Introduced
Kigio Wildlife Conservancy	37	34	Decreasing	Habitat minimal	Introduced
Giraffe Manor	10	12	Stable	Habitat minimal	Introduced (managed)
Mount Elgon NP	8	<10	Decreasing	Poaching, habitat loss and fragmentation	Introduced
Murgor Farm, Iten	<20	<20	Decreasing	Habitat loss and fragmentation	Introduced
Mwea National GR	100	56	Increasing	Habitat minimal	Introduced
Sergoit-Kruger Farm, Iten	<10	16	Decreasing	Habitat loss and fragmentation	Introduced
Kitale area farm	<10	<10	Decreasing	Habitat loss and fragmentation	Introduced
Nasalot National Reserve	<10	<10	Stable	Habitat minimal	Introduced
Tindress		5	Stable	Habitat minimal	Introduced
Rimoi NR		7	Stable	Habitat minimal	Introduced

TOTAL	<478	808
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Source: Marais *et al.* 2013, 2014; Muller 2011; Soysambu Conservancy Wildlife Census 2015; GCF 2018; D. Brown pers. comm.

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