- Black-footed Cat Working Group -
Report on surveying and monitoring Black-footed cats (*Felis nigripes*) on Benfontein Nature Reserve and in Namibia in 2019

Alexander Sliwa, Beryl Wilson, Michelle Rodgers, Javed Anver, Michelle Schroeder, Martina Küsters & Morgan Hauptfleisch

Introduction:

The Black-footed Cat Working Group (BFCWG) aims to conserve this rare cat species by furthering awareness and conducting multidisciplinary research on the species' biology. The BFCWG owns a research vehicle (formerly a Toyota Hilux, now a Ford Ranger) for which the insurance, running and maintenance costs were administered by the McGregor Museum, Kimberley, South Africa until the establishment of the NPC in 2019. The specialised equipment required for our research is also stored at the McGregor Museum. This year we didn't make a joint trip to exchange and capture new individual cats in the current long-term study area, Benfontein Nature Reserve (BFN), near Kimberley. The remaining radio-collared cats continued to be monitored with different intensity by field technicians and Alex Sliwa, the project leader. With the goal of establishing a new study area outside of South Africa, the project leader travelled to southern Namibia (21-28 January 2019) with the BFCWG member, Martina Küsters, and Morgan Hauptfleisch, where they surveyed several areas for the presence of black-footed cats. A full and extensive report on Namibia is available from the first author via email and at https://www.koelnerzoo.de/images/pdf/Zeitschriften/Black-footed-Cat-Survey-Namibia-January-2019.pdf. In order to facilitate further exploration of potential BFC populations and future monitoring of cats in Namibia, a vehicle sponsorship was received from Auas Motors in Windhoek. The vehicle is administered through the Namibia University of Science and Technology's Biodiversity Research Centre.

Background and Study Areas

Background: This project is part of a multidisciplinary effort to study the distribution, ecology, health, and reproduction of *F. nigripes* over an extended period. With the aim of repeatedly capturing BFCs for biological sampling and radio-collaring for subsequent observation. Several methods, like camera trapping, den monitoring, focal animal surveys, were employed to survey areas, previously known to hold BFCs. From November 2005, annual capture operations were conducted on BFN, and between 2009-2018 two additional properties 200 km southeast close to the town of De Aar served as study sites, before research ended on these properties in November 2018. Sixteen reports are available detailing previous fieldwork for download as PDF on the website www.black-footed-cat.wild-cat.org.

1 - Benfontein Nature Reserve (BFN):

A private nature reserve owned by De Beers Consolidated Mines, located 10 km southeast of Kimberley on the border of the Northern Cape and Free State Provinces in central South Africa. The majority of the 11 400 ha consists of arid plant communities receiving an average annual precipitation of 450 mm. BFN has been the subject of the first field study on the black-footed cat by Sliwa in the 1990s (1992-1998) (Sliwa 2004, 2006, Sliwa *et al.* 2010), and continues to be an important site for long-term monitoring.

2 – Potential new study areas in Namibia:

Gondwana Canyon Park (3 nights surveyed): Is a protected private conservation area in the South of Namibia extending over 126 000 ha and receives an average of 100 mm of rain annually. The landscape encompasses a mix of habitats, ranging from mountain veld, gravel plains, some Kalahari and also Karoo

vegetation types. It is home to an amazing variety of wildlife, including large predators like leopard (*Panthera pardus*) and cheetah (*Acinonyx jubatus*). We spotlighted for a total of 302 km over 3 nights.
Grünau 1-2: Private farmland comprising 51 000 ha of Dwarf Shrub Savannah in Nama Karoo habitat receiving 125 mm of rain annually and is thus lightly stocked with sheep (*Ovis aries*). We surveyed the property of Kobus and Margaret van der Merwe for two nights over a distance of 92 km along roads with spot lamps. A well-maintained grid of sand roads traverses the property allowing adequate survey coverage. The steep and emergent koppie "Kirchberg" would provide ideal conditions to acquire an initial radio signal of future radio-collared BFCs.

Methods:

Spot-lamp searching: This method has only been applied in 2019 while surveying Namibia for a total of 8 nights (3 nights in "Kalahari-type", 3 nights in "mixed dwarf shrubland – Karoo-type" in the surrounds of the Fish River Canyon, and 2 nights in "Karoo-type" habitat on the farm near Grünau). A 4x4 vehicle (2.4 litre Diesel Nissan Hardbody or 4 litre Toyota Landcruiser) was used to drive a survey route of 37-117 km along dirt roads at a speed of 20–40 km/h whilst looking for the characteristic bright eye-shine of cats. A minimum of two people (3 maximum this trip) stood on the open back of the vehicle operating two spotlights (1 million candle power / Lightforce® SL240 mm).

No cats were captured this year in either site since BFN collars did not need replacing and Namibia site visits were exploratory to discern species presence.

The survey vehicles in Namibia were staffed in January 2019 by:
Dr. Alex Sliwa, behavioural ecologist and zoo curator, Cologne (Kölner) Zoo, Germany (sliwa@koelnerzoo.de)
Ms. Martina Küsters, field researcher BFCWG, Swakopmund, Namibia (kusters.m@hotmail.com)
Dr. Morgan Hauptfleisch, Associate Professor Namibian University of Technology (NUST), Windhoek, Namibia (mhauptfleisch@nust.na)
Ms. Stephanie de Lange, Park Warden, Gondwana Kalahari Anib PArk
Mr. MJ Gerbers, farm manager of Kameelboom, Namibia
Mr. Mathias Tsameya, Warden, Gondwana Canyon Park

Results:

Survey Namibia: a total of 4 sightings of BFCs occurred during the 8 days of surveying.

1. The single sighting of a juvenile or subadult BFC in Gondwana Canyon Park on 24.1.19 occurred on gravel plain close to the Grenspos Mountain (Fig. 9-11.). This individual could be well-documented using pictures taken over several minutes before being left by the survey team. The fact that this was a juvenile attests to the occurrence of reproduction by the species on this property and/ or dispersal into the area from other areas.
2. Another 3 sightings occurred over two nights (27.1.19 and 28.1.19) on the property of Grünau with two fleeting but unequivocal sightings on the first night, one documented by pictures, while the third sighting on 28.1.19 was very extended and allowed for the taking of many good photographs of the subadult BFC (Fig. 14).
3. Between November 2019 and January 2020 Morgan Hauptfleisch and students from the NUST Biodiversity Research Centre explored possible additional BFC localities. These were Farm Onverwacht (Dordabis district), Okonjima Nature Reserve (Otjiwarongo district), Farm Scheidthof (Witvlei district) and Etosha Heights Private Reserve. There was one photographed sighting at Onverwacht of an adult female on 18.11.19 (Fig.14). No BFCs were observed on the other properties. All carnivore sightings were recorded. These data will be used to determine whether BFCs show any sympatry or competitive exclusion with other carnivores. Black-footed Cat occupancy data will be used to understand habitat selection and inform species distribution modelling.

Monitoring radio-collared cats on BFN*:* The three field technicians and Alex Sliwa concentrated on spotting radio-collared (Map 1 & 2) and some un-collared BFCs (Map 3) on BFN at night when the old field vehicle, the Toyota Hi-Lux, was still in operation until mid-August. Michelle Rodgers worked during three periods until late March 2019 before she had to return to her native Namibia due to her South African visa expiring. Javed Anver, an Indian field technician, payed two visits to BFN in April and late May before he could start full time in July, leaving his Goegap Nature Reserve post for good. In June/July Michelle Schroeder, an American wildlife biologist, initially volunteered on the project and later was contracted to assist with the monitoring work on the remaining 5 cats by then.

A number of un-collared BFCs were seen throughout the year at night, showing that BFN supports sufficient BFCs for continuing our study there (Map 3).

Fate of black-footed cats in 2019 on BFN (radio-collared in November 2018):
Female "Zonke": The collar of female "Zonke" (skull sign in Map 1) was found on the ground by Michelle Rodgers with no obvious signs of being chewed on 15.1.19. She could have died naturally, or was predated upon, and then her body and head separated leaving no trace of her.
Female "Ufisa": Michelle Rodgers found her collar without a body on 13.3.19. Small bodies disintegrate quickly in the summer heat and during a possible scavenging process and since cats were not monitored for 6 weeks during breaks between field technician presence on BFN, this is not unusual to happen.
Female "Leia": We captured her in November 2016, thus monitored her for 3 full years. With a 6.3 km² HR in 2019 she maintained, again, an on average remarkably small home range in typical "Karoo-type" habitat in 2019. When last captured in November 2018 she was in poor condition without signs of pregnancy or kittens. She was found freshly predated, though in good condition, on 11.11.19 (Map 1, Tab1).
Male "Basa": An older adult male; captured in November 2018; stayed mostly in the southwestern part of BFN, but also moved across the southern border. He did return occasionally until he was seen for the last time on 31.3.19, after which contact was lost. Since he could not be followed while on the bordering farms and the fact that he was monitored only for 4 months renders the estimated size of his home range not characterized well – thus certainly an underestimate (Map 1; Tab1).
Male "Inkosi": Likewise an older adult male, collared November 2018. He must have been ill for an extended period, due to his scruffy fur and relatively sedentary nocturnal activity, and stayed within unusually close proximity to human habitation. He still hunted successfully proven by a dead scrub hare (*Lepus saxatilis*) that lay at the entrance of his daytime burrow in early November. He maintained a below average home range of 18.8 km² in 2019, although removing a single waypoint diminished this to only 13.3 km² (Map 1; Tab1). After remaining in the same daytime burrow for 3 days near a water trough he was found dead on 18.11.19, badly emaciated at only 1.35 kg, a full kilogram less than his capture weight. The necropsy confirmed high external and internal parasites (lung worms), apparent organ failure with enlarged grey coloured kidneys. His teeth were worn and discoloured. The primary cause of death was assessed as pneumonia, but surprisingly no immediate signs of amyloidosis.

Cats currently alive:
Male "Hamba": A young adult male. He has habituated very well and is still staying in the north-western part of BFN, having a small home range that overlapped remarkably with that of "Inkosi". In September, a fire occurred in the eastern part of BFN with high winds and dry veld conditions that resulted in a rapid burn at low intensity, but affected part of his home range. He went missing for a week until he was found to the far western side of his range. In November, he made an excursion to a neighbouring cattle farm requiring the crossing of the N8, which has been recorded by previously monitored BFCs. Despite not having attained full adult size, Hamba was observed breeding in July 2019 and frequently scent marks his expanding territory.

Male "Phusa": A young adult male that exhibits special behaviours in several respects. He often rests in a small wetland dominated by rushes *Juncus* sp. and riddled with aardvark burrows. While he seems in good health, hunting successfully, scent marking and even having contact with un-collared and collared female BFCs, the association with water is worrying because this may suggest early onset of kidney disease. His annual home range is, like that of "Hamba", less than average-sized for a fully adult male, at only 15.9 km².

Female "Kasi": An adult female, always on the move, restless and often shy. She had two kittens less than a week old in late October (Fig. 20), which did not survive past early November 2019. Maybe due to her choosing shallow and wide-open aardvark (*Orycteropus afer*) burrows that are easy to access by predators. She was seen in early January 2020 in proximity of male "Phusa" and an un-collared larger male, maybe a sign of her impending oestrus.

Locating the radio-collared Cats

BFN: The field technicians and project leader Alex Sliwa acquired location fixes (waypoints) of the radio-collared cats in their dens during daylight, particularly when the field vehicle was broken during late August to November 2019, when they used a specifically purchased bicycle (Fig. 6). Despite the difficulties, we achieved sufficient numbers of waypoints to determine home ranges for 2019, aside from cats that were lost or died prematurely (Tab 1). The BFCWG was able to finance the tracking of all the cats by Michelle Rodgers, Javed Anver and Michelle Schroeder on BFN, with assistance from the McGregor Museum using a Toyota Hilux Legend driven by Heidi Fölscher on occasion at night. Overall 1 053 waypoints were collected up until 31 December 2019. Home range size estimates incorporating all collected waypoints for all the individual cats tracked in 2019 and are provided in Tab 1 and Map 1 & 2.

Behavioural Observations of Black-footed Cats

A total of 8 cats were monitored in 2019 with varying intensity. All were well-habituated through the field technicians and provided valuable insights into the killing of various prey. A new prey species was recorded, the Common Quail (*Coturnix coturnix*). Additional information on spray-marking, courting during the mating seasons and the birth of kittens, and sadly also recent death of the study animals. These excellent data sets will allow meaningful comparison of annual home range sizes between years and between study areas in future analyses.

Reproduction: Of the four females tracked in 2019 we have confirmed reproduction in the two adult females. The two subadult, small females "Zonke" and "Ufisa" disappeared, probably died, in the first quarter of 2019.

"Kasi": In late October 2019, Javed observed two barely week-old kittens in the entrance of a shallow aardvark den (Fig. 20). She must have given birth in mid-October. However, the kittens were not recorded again after early November, thus didn't survive.

"Leia": A single ±3-week old kitten was seen near her resting den in a hollow termite mound in early November by Javed Anver and then later recorded on the night of 11 November via camera trap (Fig. 21), aged at about 5 weeks old, born in mid-October. Sadly, the mother was predated that very night, so the kitten likely starved due to having lost its mother. The last known den and surrounding area were searched in attempt to find the kitten but was unsuccessful.

Camera Trapping: The field technicians deployed digital camera traps (mostly Bushnell Trophy Cam HD Nature View with close focus lens, Browning Strike Force Pro XD) to acquire regular pictorial material of all the monitored cats and to check for the presence of kittens (Sliwa *et al*. 2018) at their subterranean dens (Figs. 21 & 22).

Outreach and social media coverage of BFCs and the BFCWG: throughout 2019 several members of the BFCWG have spread information on the species, through interviews and presentations about our joint research. Scientific tourists and interested laypersons were provided the opportunity to join on tracking

sessions of the radio-collared BFCs. We continue to have our almost annual field capture trip followed on social media by ISEC Canada (International Society for Endangered Cats) as part of their long-term crowd sourcing project for the smaller wild cats.

Also, from November 2018, Beryl Wilson and Alex Sliwa regularly update the Facebook Page, formerly "Save the Black-footed Cat!" now "Black-footed Cat Working Group" https://www.facebook.com/groups/black.footed.cat/ with publicly visible posts. These are shared from the public Instagram page "blackfootedcat.life" https://www.instagram.com/blackfootedcat.life/ administered by Alex Sliwa with posts every 4 days using pictures of black-footed cats taken over the past decades with a few sentences of informative text.

Non-Profit Company (NPC): Beryl Wilson and Alex Sliwa had a meeting with Brian Loudon (professional accountant) about the final stages of establishing the bank account of the NPC in August 2019. The dedicated bank account for all future funds is now at our disposition, which facilitated the purchase of equipment (a new vehicle!) and making payments for the project by generous funds from Omaha Zoo received in 2019.

New Vehicle: In November Beryl Wilson purchased a second-hand Ford Ranger (Fig. 7), twin cab, as a new field vehicle. The past months it has been adapted to fit our field work needs: dual battery system, rubberized roof, fittings for spotlamps and railings to hold on to – all of them costly, so we used a good deal of extra funds for these necessary steps.

Publications, conference papers, presentations by BFCWG group members on *Felis nigripes*:
Sliwa, A., Wilson, B., Küsters, Küsters, M, Lawrenz, A., Herrick, J., Eggers, B. van Herden, M., Kennerknecht, S. & Rodgers, M. (2019): Report on surveying, catching and monitoring Black-footed cats (*Felis nigripes*) on Benfontein Nature Reserve, Nuwejaarsfontein and Taaiboschpoort Farms in 2018. 16 pp.

Küsters, M. 2019. Black-footed cats in Namibia. 18 October 2019, Okaukuejo, Etosha National Park. Presentation to Dartmouth College student group visiting the Etosha Ecological Institute.

Küsters, M. 2019. Conservation and distribution of black-footed cats in Namibia. Etosha 112 Symposium, 6 June 2019, Mokuti Lodge, Namibia. Presentation at symposium.

Discussion and Conclusions:

Valuable data on censusing and monitoring black-footed cats has been collected again by the BFCWG in 2019. We have only concentrated on the long-term study area BFN with 8 radio-collared cats, as well as searching for new promising areas in the south of Namibia in 2019.

The jackal density on BFN seemed continuously high with on average one sighting every night when spotting in August 2019. The field technicians sighted an African wildcat in the south of BFN. Despite the presence of meso-predators, having predated with certainty one of our lactating female bfcs, and competing other smaller felids, the sighting frequencies of un-collared cats confirms that there is a good population of BFCs of both sexes, probably both resident and transient on BFN.

Promising is that we had two records of reproduction in the two adult female cats monitored in October/November 2019, although sadly none of these kittens survived. However, the technicians did detect 3 kittens from an un-collared female in Hamba's area in November.

On BFN, we now have only three out of eight cats caught in November 2018 that are alive and actively being monitored. It is difficult to assign absolute mortality for these adults in 2019, although two cats (25% mortality) certainly died, due to predation and age/infection/infestation related and a further two young females highly likely predated, coming to 50% total mortality. The fifth cat, the adult male "Basa" went missing, likely because he moved further south, however he may have also died.

It must again be stated that similarities and differences in percentages from previous years (2018 – 50% mortality on BFN) shift quickly with such relatively small numbers of cats monitored via telemetry. The death of our long-term monitored female "Leia" was sad and unexpected as she had a dependant kitten in her stable and fairly small home range in 2019 (Map 1, Tab 1). We monitored her for 36 months, with minimal shifts in her home range. She was killed by either a caracal (*Caracal caracal*) or jackals (*Canis mesomelas*), but examination of state of the body, associated wounds and bite marks during the necropsy by Beryl Wilson suggest the former. Necropsies will remain crucial to provide a measure of the frequency and prevalence of AA-Amyloidosis, when a body is found reasonably fresh in the current and future study areas, not only on BFN where it had been reported before (Terio *et al.* 2008; Zimmermann *et al.* 2011). So far we could not relate amyloidosis as a cause of death for the 4 cats, although the older male "Inkosi" may have been affected by the condition. So, in general the year 2019 has been a hard one with high BFC mortality.

Fortunately, the three field technicians and the project leader were able to collect 1 053 waypoints for all the cats combined in 2019 (Maps 1 & 2; Table 1), despite the difficulties in schedules, frequent vehicle breakdowns and the final permanent damage of our old field vehicle.

Looking at home range (HR) size on BFN in the year 2019, it is apparent that the two young adult and adult males, didn't frequent similarly large home ranges as published so far (Sliwa 2004) and what we have recorded on BFN in the past years, as well in our second long-term study area close to De Aar (Sliwa *et al.* 2018, 2019). The HRs of the two young adult males of 15 – 16 km² (100% MCP) are slightly below average for fully adult males. "Inkosi's" range with 13.3 km² after removing the one outlier waypoint is strongly less than the 20.7 km² for adult males published, probably due to his failing health. The HR of the two adult females are likewise smaller than average with 6.3 km² and 7.4 km² instead of the average 10 km² (Sliwa 2004).

The BFCWG is happy that we were able to enlist the work of currently two field technicians, both with their own future research plans on BFN and further afield.

The BFCWG will return to BFN for capturing and sampling of wild black-footed cats in March 2020, because the batteries of the currently fitted radio-collars should be operational for a minimum of 18 months, thus at least until May 2020. Also, around this time we will attempt to catch BFCs in our prospective new study areas in southern Namibia.

Acknowledgements: We thank De Beers Consolidated Mines and the Diamond Route for permission to work on Benfontein NR. Landowners and farm managers that border Benfontein, are thanked for their continued support and permission to enter the properties to check on cats. Heidi Fölscher and the McGregor Museum for assisting in the field during a period when the project had no field vehicle. Funds for fieldwork came from Cologne (Kölner) Zoo; Zoo-Verein Wuppertal e. V. (friends of Wuppertal Zoo); Ch. Ritzen, K. Stellmacher, T. Mennig (Felis felix Katzenpsychologie), A. Brüggemann & Koch Gang; - all Germany; Zoological Association of America (ZAA), Punta Gorda FL, USA; Omaha's Henry Doorly Zoo & Aquarium, Omaha, NE, USA; San Diego Zoo Global, CA, USA; The Living Desert, Palm Desert CA, USA; Denver Zoological Foundation, CO, USA; Big Cat Rescue, FL, USA; The International Society of Endangered Cats (ISEC), Canada, provided funds and again reported directly to their sponsors when we were in the field and through all the filed technicians' bi-monthly reportsWe sincerely thank

our respective employers for supporting us and granting us leave from our busy work schedules to carry out this field work.

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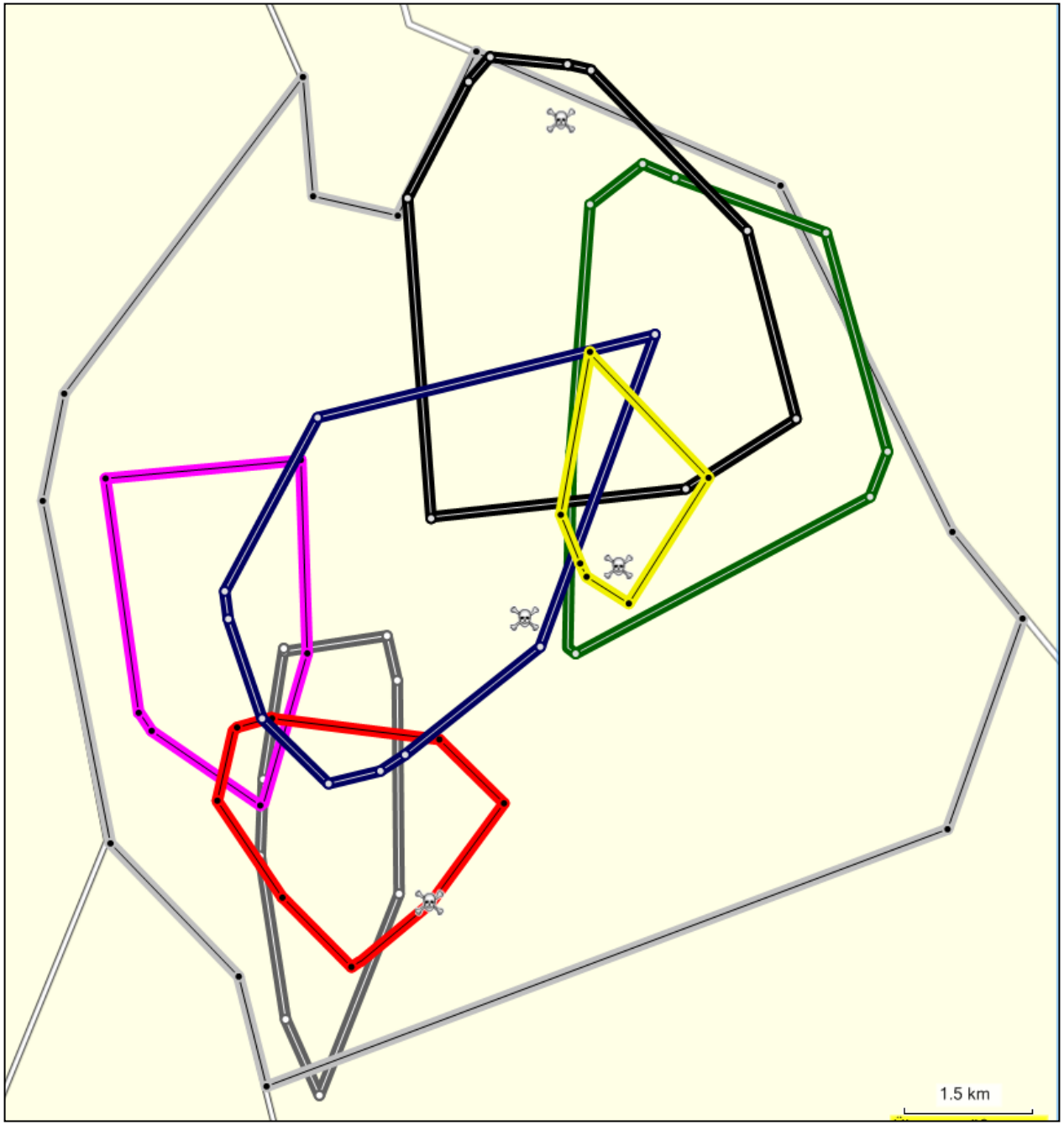
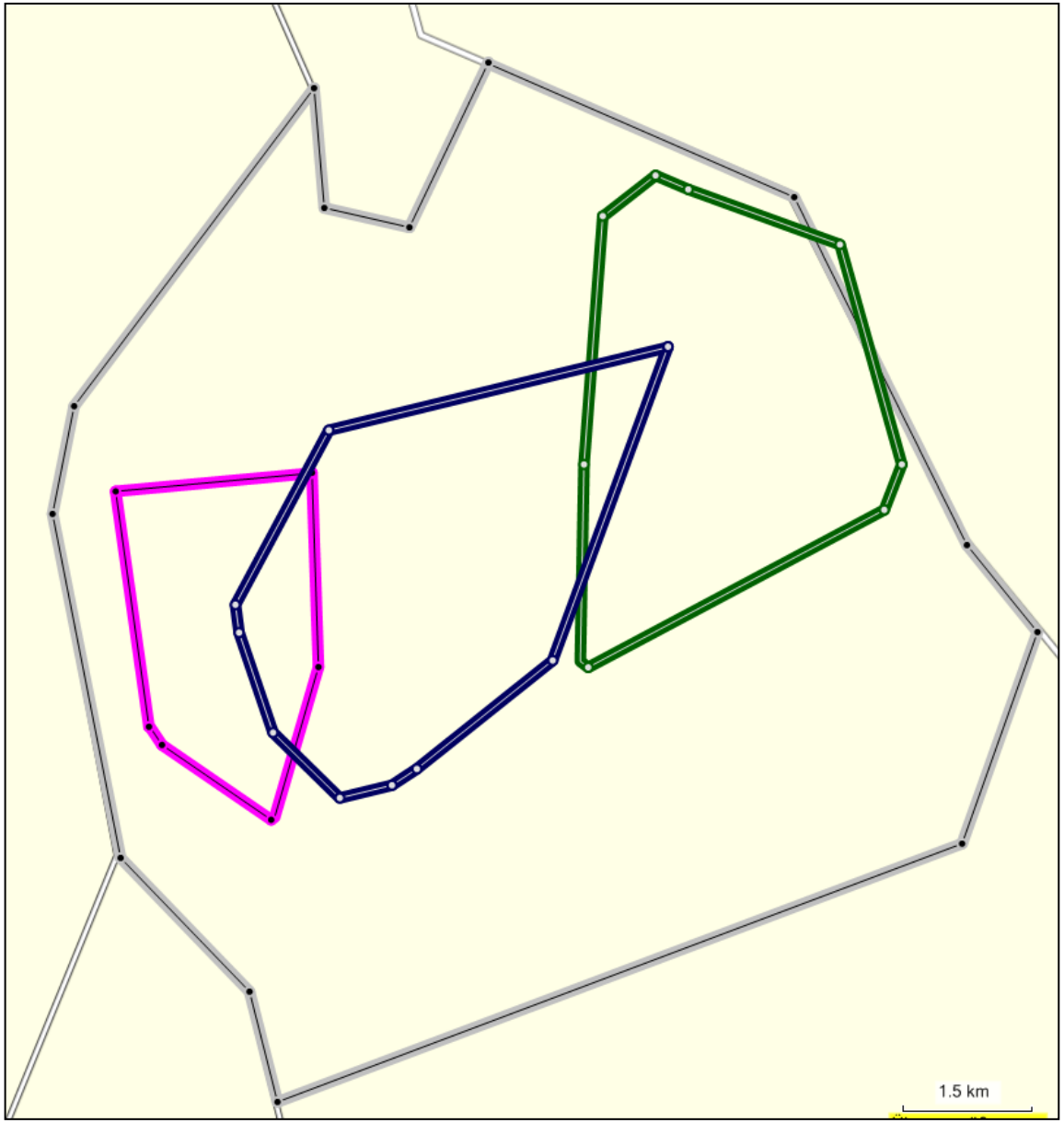


Map 1: Map of Benfontein (BFN; boundary = light grey polygon) with ranges of all BFCs in 2019, minimum convex polygons (100% MCP) encompassing the locations (*n* =) of 8 radio-collared black-footed cats monitored between January – December 2019.

Based on 1053 waypoints.

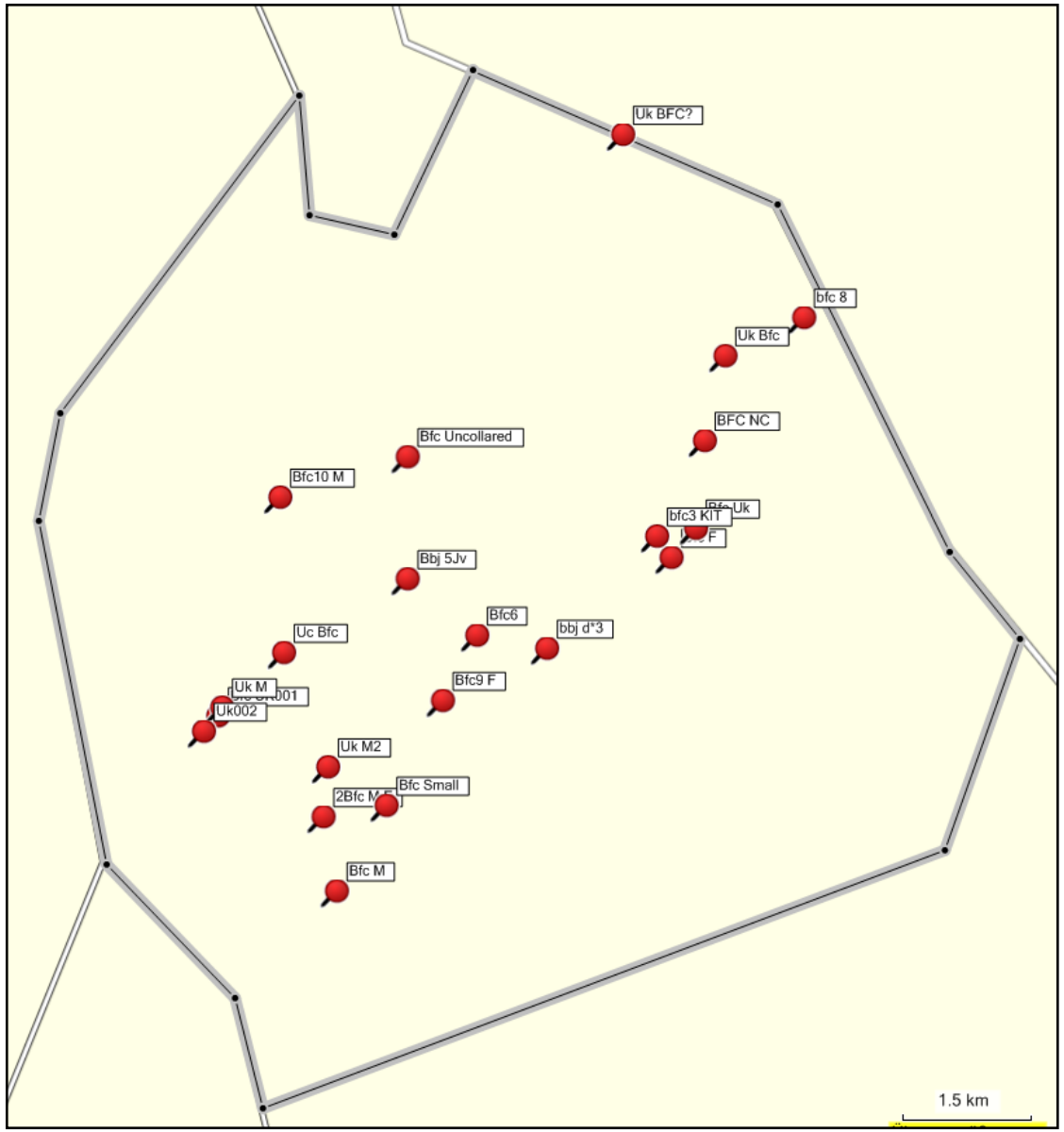
Individuals:
- Female "Kasi" magenta polygon, (7.4 km²; *n* = 241) in "Pan Veld"-habitat type. She is alive and well.
- Female "Leia" red polygon, (6.3 km ²; *n* = 147), remarkably small range. On 11.11.19 found dead, freshly killed by a predator (skull sign on polygon edge). **DEAD**
- Female "Ufisa" yellow polygon, (2.9 km²; n = 29) in central eastern part of BFN. Found her collar on 13.3.19 (skull sign). **DEAD**
- Female "Zonke" – no polygon since only found her collar on 15.1.29 (skull sign close to edge of blue polygon). **DEAD**
- Male "Basa" dark grey polygon (6.7 km², *n* = 53). Often crossed to southern adjacent farms. Was last seen alive on 31.3.19, **LOST** contact
- Male "Inkosi" black polygon (18.8 km², *n* = 129), **DEAD** on 18.11.19.
- Male "Phusa" blue polygon (15.9 km², *n* = 220).
- Male "Hamba" green polygon (15.3 km², *n* = 233).



Map 2: GPS map of Benfontein NR (BFN; boundary = grey polygon), with minimum convex polygons (100% MCP) encompassing the locations of the 3 radio-collared black-footed cats currently alive and monitored (February 2020).

Based on total of 694 waypoints recorded combined:

- Female "Kasi" magenta polygon, (7.4 km²; *n* = 241) in "Pan Veld"-habitat type.
- Male "Phusa" blue polygon (15.9 km², *n* = 220).
- Male "Hamba" green polygon (15.3 km², *n* = 233).



Map 3: GPS map of Benfontein NR (BFN; boundary = grey polygon), with locations of the 21 un-collared black-footed cat sightings throughout 2019.

Based on 21 waypoints recorded

Particularly in December 2019 there were many sightings. Of special note was a female with 3 kittens “bfc3 KIT”.

August 2019: Benfontein Nature Reserve (BFN)

Fig. 1: Self-release in August on BFN, Alex Sliwa, Michelle Schroeder, Beryl Wilson, and Javed Anver

Fig. 2: Javed searching for "Basa", still with the old field vehicle (A.Sliwa).

Fig. 3: Going for the highest hills for signals (A. Sliwa).

Fig. 4: Nothing stopping Beryl ☺. (A. Sliwa).

Fig. 5: Setting a camera trap at a daytime refuge (A. Sliwa).

Fig. 6: The interim field vehicle – finding the cats in their dens during daytime via bicycle – environmentally friendly (M. Schroeder)

Fig. 7: The new field vehicle – a Ford Ranger 2.6 l (J. Anver).

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Fig. 8. Spotting on Anib Gondwana Kalahari (self-release)

Fig. 9: Grenspos Mountain, Gondwana Canyon Conservancy. On the gravel plain at its foot we recorded the first BFC (A.Sliwa)

Fig. 10. Subadult Black-footed Cat "hiding" on a gravel plain, location as detailed in Fig. 9 (A.Sliwa)

Fig. 11: Mathias Tsameya holding the spot on the BFC (A. Sliwa).

Fig. 12: Surveyors on Kirchberg Koppie, Grünau (self-release)

Fig. 13: 3rd BFC, probably a subadult male, on Grünau Farm. (A. Sliwa).

Fig. 14: Black-footed Cat sighting on farm Onverwacht on 18.11.19, ~120 km from Windhoek (M. Hauptfleisch)

Black-footed Cats tracked and observed in August 2019 on BFN

Fig. 15: “Inkosi” in August 2019 (A. Sliwa).

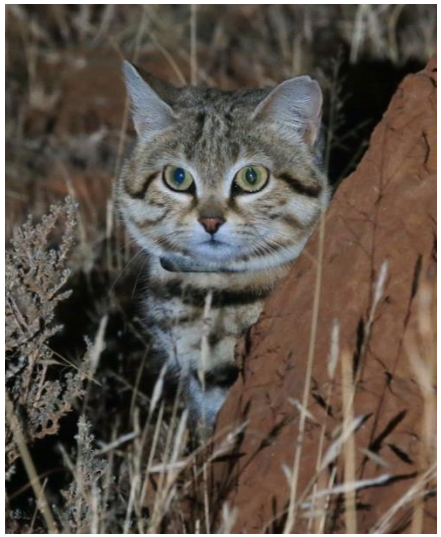

Fig. 16: “Hamba” (A. Sliwa).

Fig. 17: “Kazi” (A. Sliwa).

Fig. 18: Un-collared young male (A. Sliwa).

Fig. 19: “Leia” watching prey (A. Sliwa).

Fig.20: “Phusa”amongst *Psilocaulon* herbage (A. Sliwa).

Fig.21: “Phusa” pushing through long grass (A. Sliwa).

Fig. 22: Un-collared large male courting the female “Leia” (A. Sliwa).

Black-footed Cats – camera trap pictures and reproduction records in October/November 2019

Fig. 15: "Inkosi" on 25.10.19 (BFCWG).

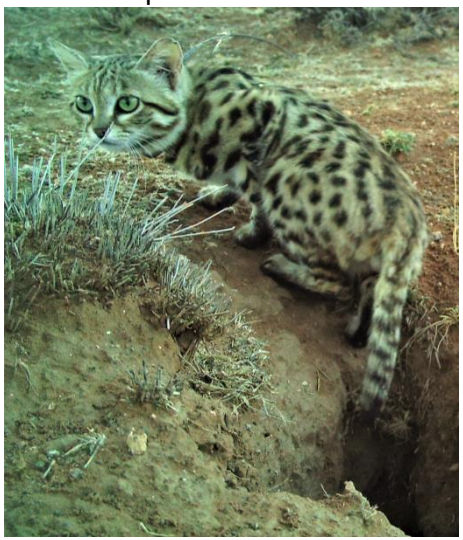

Fig. 16: "Hamba" emerges at dusk (BFCWG).

Fig. 17: Kasi" about to leave for the night (BFCWG).

Fig. 18: "Kazi" emerging on a winter afternoon-soaking up the last sunrays of the day (BFCWG).

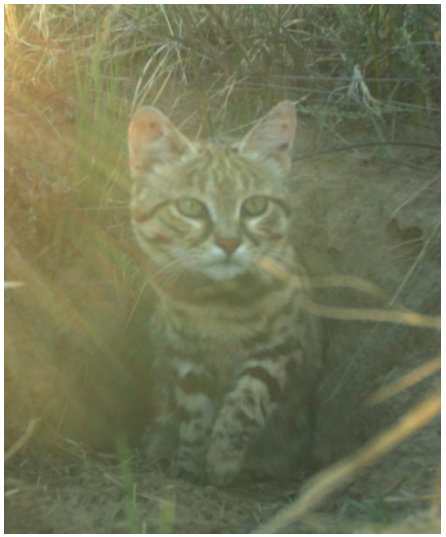

Fig. 19: "Phusa" with last rays of sun in December 2019 (BFCWG).

Fig.20: "Kasi's" kittens, ~ a week old in late October 2019 (J. Anver).

Fig.21: "Leia" moving her ~5 week old kitten – she was killed that night (BFCWG).

Fig. 22: Un-collared female with 2 of 3 kittens (BFCWG)

Table. 1: Range size and remarks on 8 black-footed cats on Benfontein in 2019. Shaded columns – individual either lost to follow up or confirmed dead.

Capture Date (10/11-2018)	30.10.18	31.10.18	31.10.18	1.11.18	3.11.18	7.11.18	7.11.18	8.11.18
Name (also on Map)	**Hamba**	**Leia**	**Inkosi**	**Kasi**	**Basa**	**Phusa**	**Ufisa**	**Zonke**
Sex	M	F	M	F	M	M	F	F
Age (judged by teeth)	SubAdult	Adult	Adult	Adult	Adult	Adult	SubAd	Adult
Mass (kg)- captured in 2018	1.37	1.02	2,18	1.23	2.33	1.21	1.00	1.02
No. fixes collected in 2019	233	147	129	241	53	220	29	1
Range (100MCP) 2019 in km² (range excluding outlier)	15.3	6.3	18.8 (13.3)	7.4	6.7	15.9 (11.8)	2.9	/

Total fixes collected in 2019, n = 1053

Remarks:

1) Hamba (Cat 1 18): Turned into adult in the course of 2019. Pale background colour. Small average home range size. Made a move due to veld fire, but returned subsequently.
2) Leia (Cat 2 18): Adult we tracked for 3 years. She had a single kitten when she was killed by a predator on 11.11.19. **DEAD.**
3) Inkosi (Cat 3 18): Old adult male; smallish home range, staying often close to BFN staff housing. Died 18.11.19 emaciated with pneumonia and massive lung worm (parasite) infestation in his daytime den. **DEAD.**
4) Kasi (Cat 4 18): Adult female; hunts enthusiastically, but relatively shy.
5) Basa (Cat 5 18): Large adult male - older; caught in the south of BFN; often crossed to farms to the south, last seen 31.3.19. before disappearing for good, despite extensive searching of the surroundings. Incomplete home range size estimation. **Lost to Followup.**
6) Phusa (Cat 7 18): Turned into adult in the course of 2019; captured at pan fringe, pale ground colour, brown stripes and spots on flanks – "*nigripes*-type". Often uses unusual resting places. Has habituated well. Comparable and thus below average home range size as similar-aged "Hamba".
7) Ufisa (Cat 8 18): Subdadult female (± 18 months); habituated well in first 3 months of following her. Collar found unopened after 6 weeks of absence of field technician, thus presumed **DEAD**, as body was not found**.**
8) Zonke (Cat 9 18): BFN - adult female; caught in central part; small and lean, used nipples, but not recent. Only monitored in November 2018; found unopened collar on 15.1.19. presumed **DEAD**.