

**- Black-footed Cat Working Group -**  
**Report on surveying and catching Black-footed cats (*Felis nigripes*)**  
**on Nuwejaarsfontein Farm / Benfontein Nature Reserve 4-20th July 2010**

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**Introduction:**



The Black-footed Cat Working Group (BFCWG) aims to conserve this rare cat species by furthering awareness, conducting multidisciplinary research on the species' biology. The BFCWG owns a research vehicle (Toyota Hilux), for which the required insurance, running and maintenance costs are administered by the McGregor Museum. The vehicle is used solely for black-footed cat related work. The specialized equipment required for our research is stored at the McGregor Museum, Kimberley. This winter trip we worked again in two study areas, from 4–8<sup>th</sup> July and again 11–15<sup>th</sup> July on Nuwejaarsfontein Farm, south of De Aar, and from 8–11<sup>th</sup> July and 15–18<sup>th</sup> on Benfontein Nature Reserve near Kimberley.

**Study Areas and Project Aims**

**1 - Benfontein Nature Reserve:**

A nature reserve owned by De Beers Consolidated Mines, located 10 km SE of Kimberley on the border of the Northern Cape and Free State Provinces in central South Africa. The majority of the 11,400 ha, which consists of arid plant communities has been the subject of the first, and so far only, in-depth field study on the black-footed cat by A. Sliwa in the 1990s (1992–1998; Sliwa 2004, 2006). Benfontein NR receives average annual rainfalls of 450 mm.

**2- Nuwejaarsfontein Farm:**

Situated 24 km south of De Aar in the Northern Cape Province, this sheep and game farm is owned by Sterrie Marais. The BFCWG visited the farm for the first time in February 2009. The 13,000 ha farm receives an average of 300 mm rain annually, and the Karoo plant communities are fenced into 300–400 ha camps both sides of the secondary road parallel to and between the R348 and N10.

**3- Project Aims:** 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 black-footed cats (hereafter termed “bfc”) for biological sampling, and radio-collaring for subsequent observation, several methods were employed to survey areas previously known to hold black-footed cats. From November 2005, annual capture operations were conducted on Benfontein NR until the present visit. Six reports are available on these periods by the authors and on the website [www.black-footed-cat.wild-cat.org](http://www.black-footed-cat.wild-cat.org).

**Methods:**

(A) **Spot-lamp searching:** For 8 nights on Nuwejaarsfontein and 6 nights on Benfontein, a 4x4 vehicle (Landrover V8 or 2.4 litre Diesel Toyota Hilux Double cab) drove a route of 20–80 km in length along dirt roads at a speed of 20–30 km/h whilst looking for the characteristic bright eye shine of cats. Two people stood on the open back of the vehicle operating two spotlights (1 million candle power / Lightforce® 240 mm).

(B) **Catching via searching and pursuit:** Once bfc's were located by their eye-shine in the spotlights, their species identity was swiftly confirmed using 10x42 binoculars. If positively identified, they were pursued quickly by vehicle for a short distance of between 100–600m until the cat squatted low on the ground in front of the stopped vehicle. One or two people with fish landing nets then netted the cats. On other occasions, the cats would find a den system dug by aardvark, ground squirrels or springhares, and were either captured by exposing them after digging, or were lost by the capture team when escaping deeper into the den system. All accessible cats were subsequently

anesthetized with an intramuscular injection of ketamine, medetomidine, midazolam, and butorphanol, and covered with a blanket to shield them from lights and sounds. After transporting them back to the research house, all animals were given complete physical examinations, had biological samples collected for disease and genetic studies, morphometric measurements obtained, and radio-collars fitted. The anaesthetic drugs were antagonized with intramuscular atipamezole and naltrexone, and the cats then placed in a small plastic crate for recovery. All black-footed cats were released back into a den close to their capture locations. A blanket was used to cover the den entrance, keeping them inside until they were fit to leave on their own account. There were no complications associated with these procedures, and all cats were confirmed alive and well on subsequent nights using telemetry and visual verification.

**(C) Digging:** This method was not employed this year as all cats were captured following ground pursuits. It was neither necessary to employ this method on cats with still-functioning radio-collars as three of the cats collared during the November 2009 trip were located through their working radio-collars. The females' (Thea, Ilse, Judy) collar batteries are still due to last 10 months, and thus didn't need to be replaced. The fate of the 2 male cats is given in detail in the results section below.

**(D) Live-trapping:** We did not employ this method during the present trip.

**The capture via vehicles were conducted and staffed by:**

Ms. Beryl Wilson, zoologist, McGregor Museum, South Africa ([berylwa@museumsnc.co.za](mailto:berylwa@museumsnc.co.za))

Dr. Alexander Sliwa, behavioural ecologist and zoo curator, Cologne (Kölner) Zoo, Germany ([sliwa@koelnerzoo.de](mailto:sliwa@koelnerzoo.de))

Dr. Arne Lawrenz, zoo veterinarian, Wuppertal Zoo, Germany ([a.lawrenz@zoo-wuppertal.de](mailto:a.lawrenz@zoo-wuppertal.de))

Mr. Sterrie Marais, farm owner of Nuwejaarsfontein and Taaibosfontein, De Aar ([info@karooexperience.co.za](mailto:info@karooexperience.co.za))

Mr. Pieter Marais, farm manager of Nuwejaarsfontein and Taaibosfontein, De Aar.

Mrs. Chriszanne Burger, nature conservation student, Paardeberg

Mr. Max Seigal, biology student, Boulder, Colorado, USA ([maxseigal@yahoo.com](mailto:maxseigal@yahoo.com))

**Results:**

**Trapping:** the team did not conduct any trapping during this trip

**Spot-lamp searching:**

**Nuwejaarsfontein-** We only saw two different black-footed cats on three occasions during the 8 nights of searching, of which we caught the one un-collared female on the first attempt. The other two observations were of the collared female "Ilse". Thus we saw black-footed cats, on average, every third night (33% sighting success rate).

During these night drives, we observed other carnivore species such as aardwolves (*Proteles cristatus*), black-backed jackal (*Canis mesomelas*), several groups of bat-eared foxes (*Otocyon megalotis*), Cape foxes (*Vulpes chama*), aardvark (*Orycteropus after*), as well as porcupines (*Hystrix africae australis*), and both Cape eagle owl (*Bubo capensis*) and spotted eagle owl (*Bubo africanus*). In contrast to February 2009, as during November 2009, we did not see any African wildcats (*Felis silvestris lybica*) during our night searches.

**Benfontein-** We saw four black-footed cat individuals during six nights of searching. Twice we saw the female "Thea" with her functioning collar, and radio-tracked her first on the following nights to avoid pursuing in the event on spotting her visually. Thus we saw black-footed cats unaided by telemetry almost every night (66% sighting success rate). The entire area was part of the previous ecological study of Alex Sliwa from 1992–1998, and the same that we searched during previous capture trips. During these night drives, we observed other carnivores including aardwolves, different individuals of black-

backed jackals (up to 5 per night), Cape fox, and several small groups of bat-eared foxes. During this trip we did not sight any caracal (*Caracal caracal*). Other nocturnal mammals sighted included aardvark and porcupines.

#### **Catching via searching and pursuit:**

**Nuwejaarsfontein-** We caught the single un-collared black-footed cats sighted, thus our capture “success” was one out of one attempt (100%). This newly collared older adult female “Bora” lives north and adjacent to the female “Ilse” who is still resident in the same range and across the road from the younger collared female “Judy”. Latter has moved from her former range (2009) further north and into more rocky terrain (Fig. 1). We only sighted cats twice in 8 nights of spotting (25% sighting frequency/night), the second cat being the collared “Ilse” whom we did not pursue after identifying her by her radio signal.

**Benfontein-** Out of the three sightings of un-collared cats we pursued and captured all three new black-footed cats, thus our capture “success” was 100%. We saw the collared female “Thea” twice without checking her signal beforehand. Thus our sighting frequency here was 5 cats in 6 nights (83% sighting frequency/night).

**Fate of black-footed cats collared in 2009:** One of the previous year’s cats on Nuwejaarsfontein was found dead (male “Berg”) in an advanced state of decay, within his home range (pers. comm. P. Marais) in January 2010. No cause of death could be determined.

The other male is “Okko” who has been captured as an adult by the BFCWG for the first time in November 2006 on Benfontein. In May 2007, we radio-collared him; his collar has been replaced in February 2009. In April 2010, we decided to replace his conventional VHF collar by a GPS GSM collar by Sirtrack® kindly sponsored by Dr. Rob Crawford of the Department of Environment and Tourism (DEAT) in Cape Town. Unfortunately, we were not able to properly test this collar to validate the acquisition of satellites for locations later downloaded via the ARGOS satellites. His collar was only going to transmit GPS locations for 3 months. However, since the VHF component of the collar failed to function, his GPS collar is still transmitting to this date (December 2010 – 9 months!) providing us with regular updates of his movements. Most of the GPS locations are of lower signal quality, thus the analysis of the data will have to be carefully planned and cleaned from outliers; however, the amount of regularly downloaded data provides us with spectacular results for this adult male on Benfontein.

#### **Locating the radio-collared cats:**

**Nuwejaarsfontein and Benfontein-** Subsequent to their respective capture we attempted to acquire location fixes of all radio-marked cats in their dens during daylight each day, and then additional fixes during the course of the nights. Altogether 168 such fixes were obtained for the three cats on Nuwejaarsfontein (Map 1) and the four cats on Benfontein (Map 2) between 4–18<sup>th</sup> July, while searching several times for male “Okko” VHF signal from Koppies on Benfontein. The short duration of the field trip allowed only for the collection of a limited number of fixes, and thus to arrive at incomplete estimated ranges (Table 1). We were fortunate to receive help in acquiring additional fixes for the 4 cats on Benfontein NR through Max Seigal. He gathered 68 fixes for Thea, 53 for Paris, 56 for Vito and 53 for Erica, arriving at a total of 230 fixes between July and August (Table 1).

We foresee that through further work by Sterrie and Pieter Marais and by Beryl Wilson and Chriszanne Burger following the joint trip, additional location fixes will provide a clearer picture of the home ranges of individual black-footed cats.

**Behavioural Observations of black-footed cats:** Only two cats (“Ilse” and “Thea”) have been followed for several nights in 2009. During the course of this field trip, we tried to improve on the habituation of both cats that provided us with beautiful observations of their hunting, spray-marking and other behaviours. The other cats (Bora, Vito and Paris, and Erica) also significantly improved in habituation, but the period was too short to observe them for more than a minute continuously on a sighting.

**Media:** During our stay at Nuewjaarsfontein/Taaiboschpoort, a cameraman/producer, Charl Rohland of SABA 2 visited us, who portrayed our work and the role of Sterrie Marais in hosting and sponsoring the BFCWG.

### **Discussion and Conclusions:**

Valuable data on censusing and catching black-footed cats have been collected again on this short trip of the BFCWG on Benfontein NR, where the species was intensively studied between 1992–1998. We captured 3 new cats during only 6 nights of spotting there. The spotting frequency was even higher than during the previous field trips (see progress reports 2005- November 2009 – downloadable as PDF-files on [www.black-footed-cat.wild-cat.org](http://www.black-footed-cat.wild-cat.org)). We captured unmarked females in addition to those during our November 2009 trip, one a young adult female close to the collared female “Thea”, and another fully adult female in the south, as well as a subadult male, again close to “Thea” on Benfontein. This is encouraging for the black-footed cat population there.

The sighting frequencies between the two study areas during this trip were dissimilar with 5 sightings of cats on Benfontein in 6 nights (83% chance/night) versus 2 sightings of black-footed cats in 8 nights (25% chance/night) on Nuwejaarsfontein. We assume that the chance of detection was similar between the two sites as both have open habitats with good visibility. During several nights on Nuwejaarsfontein, we even went out with two vehicles to increase our chances of detecting more cats by covering a larger area in the same part of the night. We have no good explanation for this difference as there were no changes in management on Nuwejaarsfontein since our last trip.

As in previous years on Benfontein, we recorded several black-backed jackals, while with certainty only one on Nuwejaarsfontein. High numbers of both black-backed jackal and caracal may negatively affect black-footed cat densities on Benfontein and may force them to alter their ranging behaviour (see report 2007). We now have quite different conditions in this regard between the two study sites. Strangely, during this trip we again did not record African wildcats at Nuwejaarsfontein, in contrast to the 3 different individuals seen in February 2009, which may well benefit the black-footed cats through diminishing competition with this larger felid.

Due to the short time period we spent on Benfontein we are not able to make a reasonable judgement of the population. However, with 5 radio-marked cats on Benfontein and probably more in areas not so intensively covered, the population seems to be increasing again from the levels recorded in the past 5 years. The hypothesis put forward in the 2009 report, that high jackal and caracal populations act selectively via predation on the smaller, slower, less experienced and thus more vulnerable *F. nigripes* kittens and female cats than on adult males seems not to be proven entirely right with the subadult male “Vito” captured during this trip. We have unfortunately no records on the fate of two kittens of “Thea”, which we detected after her capture in November 2009.

The brevity of the time spent does only partially allow us to compare estimated range sizes to those of the past years. The range size (11.1 km<sup>2</sup> 100% Minimum Convex Polygon, N= 44 location fixes) estimated for female “Ilse” on Nuwejaarsfontein during this trip is comparable to the average annual ranges of 10 km<sup>2</sup> for female black-footed cats on Benfontein in the 1990s (Sliwa 2004). This also corresponds with the observation that during this trip no dependant kittens were observed with mothers during this winter, as we recorded during the November 2009 trip. Then female ranges are smaller than usual, as when suckling kittens female range size is significantly reduced (Molteno, Sliwa & Richardson, 1998). Unfortunately, we have no large adult male fitted with a VHF-collar any more. Adult male “Okko” with his GPS-collar seems to move around over a very large area, however these movements will have to be analysed carefully for comparison. The sub-adult male “Vito” showed a monthly range (Table 1, Range 8.7.-4.8.10) similar to those of the adjacent females “Thea” and “Paris”, which corresponds to previous findings (Sliwa, 2004). Female “Erica’s” monthly range in the long grass to the south of Benfontein NR is unusually small.

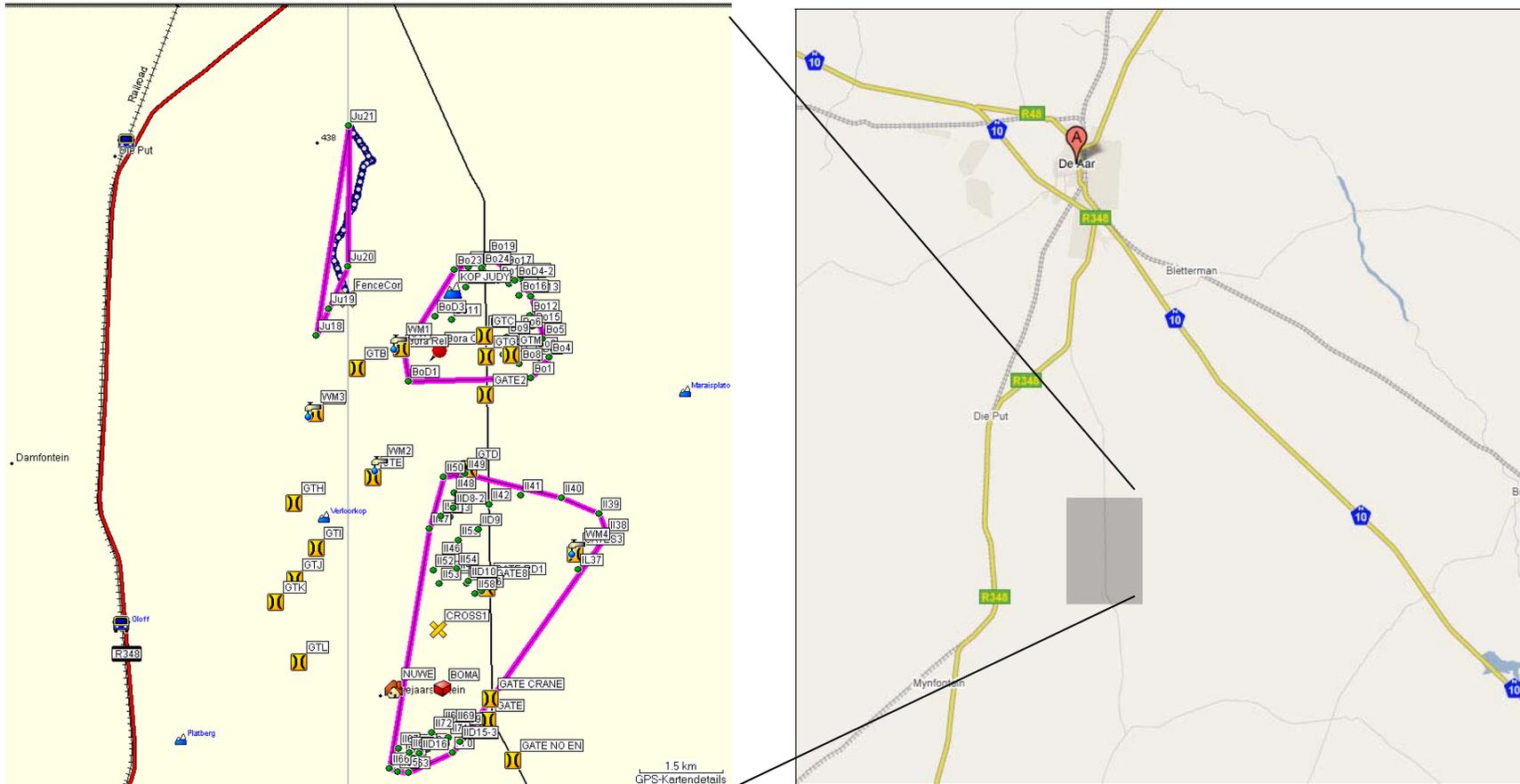
Altogether, the trip was very successful, with the overall capture rate similar to the capture successes obtained during previous field trips. We continued with our decision to radio-collar any captured cat that was large enough (> 1 kg) in order to get repeated biological samples during future trips and allowing for the comparison of home ranges to the sizes estimated by Sliwa (2004). Beryl Wilson, Sterrie Marais and Pieter Marais will be able to collect more location fixes on a regular basis for each of the five radio-collared cats.

We will return to Benfontein NR and Nuwejaarsfontein Farm for further capturing and sampling of wild black-footed cats in February 2011.

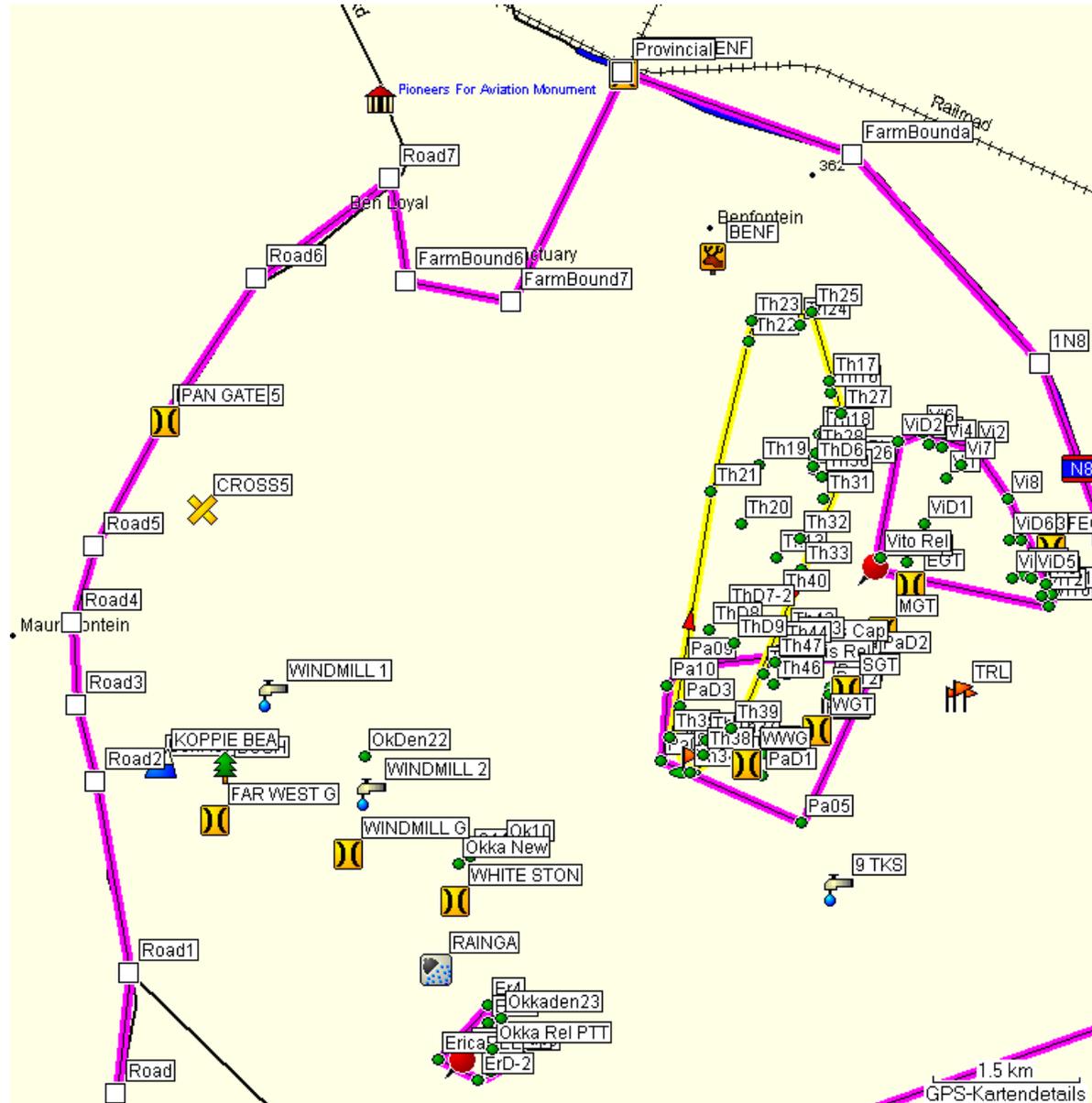
**Acknowledgements:** We thank Sterrie Marais, his wife Ilse and son Pieter for their holistic support of this capture trip to Nuwejaarsfontein. Not only did Sterrie and Pieter drive and man spot lamps on their excellent Land Rover field vehicle, as well as a Toyota Landcruiser every night, they also helped with the capture and processing of the cat. In addition, they covered all the running costs of the vehicles, provided the use of the spot lamps and much needed coffee breaks in the middle of the veld in the late hours of the night. We are especially indebted for their provision of our tranquil, beautiful and comfortable lodging at Taaibospoort entirely for free, again! We consider this the most significant South African sponsor contribution to the success of the black-footed cat project! Likewise, we thank De Beers Consolidated Mines for permission to work on Benfontein NR and to use the research house for accommodation and lab facilities. Ecology Division of De Beers gave us permission for the sampling, and supported us in employing the pursuit and live-trapping method. Funds for fieldwork came from Cologne Zoo (dedicated donation by Mr. and Mrs. Stock), Tierarztpraxis Dr. Lore Marholdt, Leverkusen, Germany, Zoo-Verein Wuppertal e.V. (friends of the zoo), Wuppertal Zoo, Parc-des Félines, Paris, France; Ebeltoft Zoo (Ree Park), Denmark. The International Society of Endangered Cats (ISEC) Canada Branch, gave generous funds for radio-collars and vehicle running costs. We sincerely thank our respective employers for supporting us and granting us leave of absence from our busy work schedules to carry out this field work.

### References:

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Map 1. GPS map of Nuwejaarsfontein Farm, with minimum convex polygons of female “Ilse” (11.1 km<sup>2</sup> =100% MCP in magenta joining green dots), female “Judy” (0.7 km<sup>2</sup>, 100%MCP), and female “Bora” (4.1 km<sup>2</sup>, 100% MCP) collected during the field period 4–15 July 10. Land marks, windmills and gates, and capture location (red beacons) of “Bora” are also shown. The researcher track taken to find “Judy” on the neighbouring farm by foot is in dark blue. There was no overlap between any pair of these 3 females during our tracking period.



Map 2. GPS map of Benfontein Farm, with minimum convex polygons (100% MCP) encompassing the locations of the 4 radio-collared cats collected during the field period. Female “Thea”= 4.6 km<sup>2</sup> in yellow, female “Paris”= 2.5 km<sup>2</sup>, male “Vito”= 4.6 km<sup>2</sup>, and female “Erica”= 0.3 km<sup>2</sup> in the south. There was some overlap between Thea and Paris. Land marks, gates and capture location (red beacon) of the black-footed cats.



Fig.1. Searching for female “Judy” in rocky terrain on foot (A. Lawrenz)



Fig. 2. Female “Ilse” with collar (A.Sliwa)



Fig 3. Frozen landscape at dawn on Nuwejaarsfontein (A.Sliwa)



Fig 4. Capture team in mid-winter, Nuwejaarsfontein (Charl .Rohland)



Fig 5. “Ilse” jumping from rocks after ambushing prey (A. Sliwa)



Fig. 6. Covering the release den of “Bora” during early morning frost (A. Lawrenz)



Fig. 7. Alex in heavy winter gear (A. Lawrenz)



Fig. 8. Waiting for the anaesthesia to take effect on “Vito” (A. Sliwa)



Fig. 9. Injecting fluid to aid recovery (A. Sliwa)



Fig 10. “Vito” in the weighing bag (A. Sliwa)



Fig. 11. Commuting between Kimberley and De Aar (A. Sliwa)



Fig. 12. Beryl sitting for the interview with Agri TV (A. Sliwa)



Fig. 13. Alex showing Max Seigal how to find a cat in her den (A. Lawrenz)

Table 1: Body measurements, range size and remarks on 7 black-footed cats on Nuwejaarsfontein and Benfontein, July 2010.

Date	6.7.10	9.7.10	10.7.10	15.7.10	<i>not captured</i>	<i>not captured</i>	<i>not captured</i>
Name (also on Map)	<b>Bora</b>	<b>Vito</b>	<b>Paris</b>	<b>Erica</b>	<b>Thea</b>	<b>Ilse</b>	<b>Judy</b>
No. captured	Cat 1 10	Cat 2 10	Cat 3 10	Cat 4 10	Cat 09	Cat 09	Cat 09
Sex	F	M	F	F	F	F	F
Age	adult	subadult	adult	adult	adult	adult	adult
Microchip #.	TRV 00-06CB9-29C	TRV 00-06896-B28	TRV 00-06CAA-4FF	TVN 00-06CAD-797			
<b>Mass (kg)</b>	1.20	1.19	1.35	1.20			
<b>Ear (cm)</b>	4.40	4.75	4.80	4.60			
<b>Shoulder (cm)</b>	22.00	23.00	22.00	23.00			
<b>Total Length (cm)</b>	53.50	55.00	55.00	56.00			
<b>Hind foot (cm)</b>	7.9	8.70	8.80	8.80			
<b>Front foot (cm)</b>	1.90	2.10	1.80	1.80			
<b>Tail (cm)</b>	16.00	16.00	16.00	14.50			
<b>Neck (cm)</b>	11.50	13.00	12.00	11.00			
<b>Canine UR (cm)</b>	0.80	0.90	0.89	0.79			
<b>Canine LR (cm)</b>	0.75	0.85	0.78	0.70			
<b>Canine UL (cm)</b>	0.83	0.90	0.84	0.83			
<b>Canine LL (cm)</b>	0.72	0.85	0.72	0.70			
<b>Testes (cm)</b>	/	R 1.1 x 1.1; L 1.1 x 1.1	/	/			
<b>No. fixes (8.-18.7.10)</b>	31	21	17	9	42	44	4
<b>Range (100%) (8.-18.7.10)</b>	4.1 km <sup>2</sup>	2.0 km <sup>2</sup>	2.5 km <sup>2</sup>	0.3 km <sup>2</sup>	4.6 km <sup>2</sup>	11.1 km <sup>2</sup>	0.7 km <sup>2</sup>
<b>No. fixes (18.7-4.8.10)</b>		56	53	53	68		
<b>Range (100%) (18.7.-4.8.10)</b>		4.4 km <sup>2</sup>	5.6 km <sup>2</sup>	2.7 km <sup>2</sup>	5.2 km <sup>2</sup>		
<b>No. fixes (8.7.-4.8.10)</b>		77	70	62	108		
<b>Range (100%) (8.7.-4.8.10)</b>		4.7 km <sup>2</sup>	6.4 km <sup>2</sup>	2.7 km <sup>2</sup>	6.6 km <sup>2</sup>		
<b>REMARKS</b>							
<b>Bora Cat 1 10</b>	Adult female, not captured before, good condition, has bred before, used nipples, <b>Nuwejaarsfontein, radio-collared</b>						
<b>Vito Cat 2 10</b>	Subadult male, good condition, permanent teeth, black nose becoming red, <b>Benfontein, radio-collared,</b>						
<b>Paris Cat 3 10</b>	Adult female, very good condition, few ectoparasites, large size, unused nipples, ~ 1.5 years old, on <b>Benfontein, radio-collared</b>						
<b>Erica Cat 4 10</b>	Adult female, good condition, used nipples- had kittens, captured on <b>Benfontein, radio-collared</b>						
<b>Thea</b>	Collared in November 2009, has shifted her range, but still on <b>Benfontein</b>						
<b>Ilse</b>	Collared in November 2009, much more relaxed, <b>Nuwejaarsfontein</b>						
<b>Judy</b>	Collared in November 2009, has shifted her range further north to a neighbouring farm to <b>Nuwejaarsfontein</b>						
<b>Okko</b>	Adult male, VHF collar exchanged to PTT GPS/GSM collar in April 2010, thus only data download once a week, <b>Benfontein</b>						