



2018 Annual Progress Report

Reporting Period

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By

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I. Executive Summary

This year we saw the culmination of a huge undertaking with the publication of the most complete book on cheetahs. *Cheetahs: Biology and Conservation* was published by Elsevier in November as part of the series *Biodiversity of the World*. The book that I co-edited with Lorraine Boast and Anne Schmidt-Küntzel brings together over 150 of the world's leading experts in all aspects relevant to cheetah, from its history, evolution and genetics, to threats, challenges, captivity, conservation strategies and solutions.

On the cheetah re-wilding front, we continue to learn from our research. In March, we released a 3-male coalition into the Erindi Private Game Reserve, and although one of them failed to succeed, the other two are doing very well. We were also excited to see a third generation of one of our re-wilded cheetahs, Jacomina, as one of her daughters, Savanna, gave birth to two cubs in November at Erindi.

Our work in the Eastern Communal Area of the Greater Waterberg Conservancy continues to provide important insights into human-wildlife conflict. We have collected important data that will allow us to design programmes to help farmers reduce losses to predators, and thus reduce their systematic killing.

A new scat detection dog, Levi, arrived at CCF in July. Levi came with his trainer, Quentin DeJager from Paramount K9 in South Africa. Our Livestock Guarding Dog staff was quite busy caring for 58 puppies throughout the year. Many of these puppies are already learning to protect livestock on Namibian farms, including CCF's Model Farm, where over 400 goats and sheep continue to play an important role in demonstrating the importance of an integrated approach to livestock farming. CCF's Dancing Goat Creamery products, made of milk from our dairy goat herd, yielded a robust 64% this year. Bushblok production continued at our factory in Otjiwarongo, and we expect to move it to CCF's Biomass Technology Demonstration Centre upon completion in 2018.

Eco-tourism is a growing industry in Namibia, and the number of day and overnight visitors to CCF continues to grow. In June, we proudly inaugurated CCF's new lodge, Cheetah View, which offers five bedrooms for the mid-priced tourist. In just six months, nearly 1,000 bed nights were booked at the Lodge. Similarly, the number of Namibian and international students and youth participating in education programmes at our Centre continues to grow, having exceeded 2,000 this year.

2017 was a difficult year for our Illegal Wildlife Trade team, as nine cheetah cubs confiscated in Somaliland sadly succumbed to a suspected virus, despite all efforts. Sadly, this is not unusual with cheetahs taken from the wild at a very young age. Three more cheetahs, one of which suffers of Metabolic Bone Disease as the result of poor nutrition, are under our care in the capital, Hargeisa. We continue to work with national and international partners to find solutions to the trafficking of cheetahs in the Horn of Africa region.

The ability to fund our programmes is always a priority, and my tours are an important element of our fundraising efforts. This year my Spring and Fall tours allowed me to reach more than 4,000 people in the US thanks to the efforts of our CCF USA staff and volunteer chapters. I also had the honour to join CCF's International Royal Patron, HRH Princess Michael of Kent, for an event in the UK. The Princess had visited us in Namibia earlier in the year to learn more about our work.

As we close 2017, everyone at CCF is busy, especially with the organisation of the Pathways Africa conference and training, which we will be hosting in Namibia in partnership with Colorado State University, the Large Carnivore Management Association of Namibia (LCMAN) and the Namibian Nature Foundation (NNF). We look forward to welcoming over 200 scientists and practitioners at this major international conference on the Human Dimensions in Wildlife Management.

"I personally believe that the cheetah can be saved and conserved even in the face of its skirmishes with extinction in its past," wrote our Chairman Emeritus, Dr Stephen O'Brien on the foreword of our

new book, *Cheetahs*. Like Steve, I believe that the amazing cheetah, having overcome so many challenges through its thousands of years of existence, must not be lost to future generations, or more importantly, to the habitats it occupies. This is why the work of CCF is so important. Seeing a cheetah in the wild is a breath-taking sight, but more importantly, the role it plays in its eco-system is one that cannot be replaced by any other animal. Thank you for joining us in this fight; a fight for the survival of Africa's most endangered big cat.

A handwritten signature in black ink that reads "Laurie Marker". The signature is written in a cursive, flowing style.

Laurie Marker, DPhil.
Founder and Executive Director

II. Organisational Structure

The Cheetah Conservation Fund (CCF) is an international organisation with registered not-for-profit organisations in Namibia, the United States, Canada, the United Kingdom, Australia and the newly formed CCF Italy. A new CCF foundation is being incorporated in China. In addition, CCF has Memoranda of Understanding with partner fundraising organisations in the Netherlands, France, and Germany.

CCF's International Research and Education Centre in Namibia is the primary base for all of CCF's global activities. In 1991 CCF became a Namibian Voluntary Trust and in 2002 was registered as a not-for-profit Namibian Section 21 Company. CCF's Namibian Board of Directors is comprised of leaders in the local community, businesses, and agricultural sectors. Additionally, there is an International Scientific Board of Advisors that assists in planning and advising on research projects. CCF's Executive Director, Dr Laurie Marker, is assisted in the management and operations of CCF by a core professional staff aided by short-term volunteers and students who assist with daily operations and data collection.

The CCF Centre includes the farms Elandsvreugde, Osonanga, Boskop (Khayam's Kopje), Cheetah View, Bellebenno, Janhelpman, and Bynadaar, totalling 46,000 hectares. CCF's Centre is located in prime cheetah habitat and a wildlife-friendly area, with many neighbouring farmers who believe in conservation ethics. This ensures a large prey population, which is important for the cheetah population and serves to provide a model for farmers to demonstrate that they can live harmoniously with cheetahs.

CCF is an active member of the Waterberg Conservancy, which encompasses over 175,000 hectares of private farmland surrounding the Waterberg Plateau Park: a national game park dedicated to rare and endangered species. The conservancy's farmers cooperatively manage the land's wildlife for long-term sustainability that in turn provides habitat and prey base for the cheetah. CCF also sits on the Steering Committee of the Greater Waterberg Landscape, an area comprising 16,000 km², or close to 2 million hectares, around the Plateau and in Hereroland.

III. Research

During 2018, the Cheetah Conservation Fund continued working towards achieving its research objectives and strengthening collaborative efforts. Research continued in overall health and genetics, ecological surveying, cheetah releases, and ecosystem research.

A. Population Dynamics

As of December 2018, the number of CCF's resident captive cheetahs has decreased to 33 (22M, 11F), compared to 37 (22M, 15F) at the end of 2017.

Throughout 2018, there were 10 releases, two deaths, no transfers, and eight additions from the wild.

Releases:

- Zin (AJU 1666) - age 2.5, on 18 March 2018, onto private land.
- Merlin (AJU 1654) - age 2.5, on 3 September 2019, onto private land.
- 4 females (AJU 1667, 1669, 1670, 1671) - age 3, on 10 August, into a private game reserve.
- 4 males (AJU 1668, 1664, 1665) - age 8.5, on 10 August, into a private game reserve.

Deaths:

- Roo (AJU 1768), age 2 years, killed by a baboon on 9 January 2018.
- Solo (AJU 1233) age 18.5 years, euthanised due to renal failure and old age on 23 Aug 2018.

Additions:

- Sasha (AJU 1773), estimated age 7/8months, rescued on 18 January 2018.
- Dominic (AJU1776) estimated 10 days old, confiscated on 13 April 2018.
- Wild Boy (AJU 1778), estimated age 4 years, confiscated on 29 May 2018.
- Scop and Tyto (AJU 1779, AJU1780), estimated age 8 months on 20 June 2018, wild caught.
- Loki (AJU 1784), estimated age 4 months on 9 Aug 2018, wild caught.
- Thor and Hella (AJU 1785, 1786) estimated age 4 months on 15 Aug 2018, wild caught.

Eight cheetahs were added in 2018. Six wild caught, one confiscated and one rescued. On 18 January 2018 a young female estimated to be around six months old, was rescued from a private farm after they had found her orphaned on their land. CCF were called and after assessing her young age and health, decided to bring her to our rescue centre as she was too young to be returned immediately. On 13 April 2018, a veterinary clinic called CCF concerned about a 10 day old cub that needed critical care. CCF brought the orphan to our centre and had no other option but to hand raise the cub. On 29 May 2018, an adult male estimated to be around four years old was confiscated from a private lodge after holding him there illegally. He was brought to our rehabilitation centre and

released into a private game reserve around three months later. On the 20 June 2018, CCF had reports of two young cubs estimated to be around eight months old, trapped on farmland and had no other option but to remove them and bring them to our rehabilitation centre. On 8 August 2018 CCF were called about three young cubs estimated to be around four months old that had become separated from their mother. Unfortunately attempts to find the mother and reunite them were unsuccessful so the cubs were to be brought to CCF. The first of the three cubs sustained an injury whilst in holding and was rushed to CCF for emergency care on 9 August 2018. The cub was semi paralysed with no fractures and was given critical care until he regained his ability to walk. The other two cubs were brought to CCF on 15 August 2018 both in good health. All three were reunited after the injury had healed.

B. Medical Examinations

In 2018 CCF performed a total of 53 medical examinations on 29 individuals (19M, 10F). Four of the individuals (3M, 1F) received examinations both with and without anaesthesia, resulting in 41 examinations under anaesthesia on 27 individuals (17M, 10F;) and 12 examinations without anaesthesia on six individuals (5M, 1F; Table 2). Of the 41 examinations requiring anaesthesia, 15 were health related, seven were for dental procedures, 10 were released cheetah examinations and nine were wild cheetah examinations.

Nineteen (12M, 7F) of the 29 individuals were captive, and two (1M, 1F) were of wild origin but have to remain in captivity due to their young age and extent of human contact, leading to a total of 21 (13M, 8F) captive individuals receiving a medical examination between 1 January and 31 December 2018. Six (5M, 1F) were of wild origin and were or will be released back into the wild as soon as their age and condition allow. One individual (1M) was a released cheetah that needed a collar replacement and one wild female needed a collar change as well. Seven (3M, 4F) of the captive individuals were moved to Erindi to be released back into the wild.

1. Examinations Under Anaesthesia

Each cheetah that is evaluated under anaesthesia by CCF, both captive and wild, is assessed for general health and fitness. The examinations follow standard protocols for health assessment and sample collection. Male examinations include semen collection; the semen is analysed and sperm stored in the Genome Resource Bank (GRB). In 2018 CCF performed a total of 41 examinations under anaesthesia on 27 individuals (17M, 10F; Table 1).

Table 1: Summary of exams performed on wild and captive cheetahs in 2018. The exam type is indicated; exam types include: 'predator' (wild animal on initial arrival to CCF); entry (arrival of a captive cheetah from another facility or a wild cheetah remaining at CCF after examination); annual (routine health check); EEJ (an electroejaculation procedure was performed); dental; and medical (treatment of any injury or illness, medical procedures not including dentistry & oral surgery).

AJU	Sex	Date of Exam	Exam Type						Detail
			Predator	Entry	Routine	EEJ	Dental	Medical	
1548	M	14-Jan-18						X	Abscess on face, treated
1773	F	28-Jan-18		X				X	Entry examination, laparotomy

1664	M	25-Feb-18			X	X			Health check, semen collection + collaring prior to release
1665	M	25-Feb-18			X	X			Health check, semen collection + collaring prior to release
1668	M	25-Feb-18			X	X			Health check, semen collection + collaring prior to release
1647	M	28-Feb-18				X		X	Semen collection + castration
1666	F	28-Feb-18			X				Health check + collaring prior to release
1664	M	8-Mar-18					X		Root canal treatment
1233	F	26-Mar-18						X	Enucleation
1665	M	7-Apr-18		X					Re-captured from wild for re-release
1668	M	9-Apr-18		X					Re-captured from wild for re-release
1664	M	10-May-18		X					Health check after being caught in trap cage
1665	M	10-May-18		X					Health check after being caught in trap cage
1668	M	10-May-18		X					Health check after being caught in trap cage
1778	M	29-May-18	X	X		X			Wild cheetah exam + semen collection
1779	M	25-Jun-18	X	X				X	Wild cheetah exam, wound on left front foot
1780	M	25-Jun-18	X	X					Wild cheetah exam
1548	M	1-Jul-18					X		Dental, root canals & extractions
1581	M	1-Jul-18					X		Dental, root canals & extractions
1474	F	2-Jul-18			X		X		Health check + dental, only minor issues
1532	M	2-Jul-18			X		X		Health check + dental, only minor issues
1549	M	2-Jul-18			X		X		Health check + dental, only minor issues
1665	M	8-Aug-18			X	X			Health check + semen collection prior to release
1667	F	8-Aug-18			X				Health check + collaring prior to release
1668	M	8-Aug-18			X	X			Health check, semen collection prior to release
1670	F	8-Aug-18			X				Health check + collaring prior to release
1778	M	8-Aug-18			X	X			Health check, semen collection prior to release
1671	F	9-Aug-18			X				Health check + collaring prior to release
1783	M	9-Aug-18						X	Hind leg paralysis, x-rays at Northern Vet Clinic
1669	F	10-Aug-18			X				Health check + collaring prior to release
1785	F	20-Aug-18	X	X					Wild cheetah exam
1786	M	20-Aug-18	X	X					Wild cheetah exam
1654	M	24-Aug-18			X	X			Health check, semen collection + collaring prior to release
1515	M	5-Sep-18						X	Anorexia, abscess under his chin, icterus, serious infection
1565	M	5-Sep-18						X	Anorexia, possible pancreatitis

1627	M	1-Oct-18			X				Collar replacement at EPGR
1515	M	3-Oct-18					X	X	Anorexia, extraction of bad tooth
1648	F	13-Oct-18			X				Collar replacement at EPGR
1665	M	14-Oct-18			X				Collar replacement at EPGR
1668	M	14-Oct-18			X				Collar replacement at EPGR
1778	M	14-Oct-18			X				Relocated back to EPGR after escaping EPGR

2. Examinations without anaesthesia

Most of the captive cheetahs at CCF have been trained to go into a squeeze cage, which allows the veterinary team to do a basic visual exam and blood collection without anaesthesia. Sometimes CCF receives small cubs for which an examination under anaesthesia is neither required nor desirable. Depending on the individual and the type of medical problem some of the animals are examined and treated without anaesthesia.

In 2018 CCF performed 12 examinations without anaesthesia on six (5M, 1F) individuals. One individual (1M) was of wild origin but will remain in captivity due to his young age (Table 2).

Table 2: Summary of examinations performed without anaesthesia on captive cheetahs between 1 January 2018 and 31 December 2018. The exam type is indicated; exam types include: predator (wild animal on initial arrival to CCF); entry (arrival of a captive cheetah from another facility or a wild cheetah remaining at CCF after examination); routine (routine health check); and medical (treatment of any injury or illness).

AJU	Sex	Date of Exam	Exam Type				Detail
			Predator	Entry	Routine	Medical	
1233	F	29-Jan-18				X	Corneal ulcer, blood collection, daily treatments + follow up checks
1233	F	26-Mar-18				X	Blood collection
1549	M	11-May-18				X	Corneal ulcer, daily treatment + follow up checks
1776	M	2-Jun-18		X	X		Entry examination & blood collection without anaesthesia
1233	F	7-Jun-18				X	Blood collection
1776	M	18-Jun-18			X		Health check & blood collection without anaesthesia
1548	M	27-Sep-18				X	Follow up blood collection
1515	M	12-Oct-18				X	Follow up blood collection
1548	M	18-Oct-18				X	Follow up blood collection
1583	M	25-Oct-18				X	Snake bite under his chin, treatment + blood collection
1515	M	4-Nov-18				X	Follow up blood collection
1515	M	3-Dec-18				X	Follow up blood collection

3. Health-Related Medical Examinations: Captive Cheetahs

In 2018, CCF performed a total of 15 health related medical examinations or procedures requiring anaesthesia (other than dental procedures, released cheetah examinations, and wild cheetah

examinations) and 12 medical examinations without anaesthesia on 17 individual cheetahs (9M, 8F). Details of on-site procedures are provided hereafter in order of ascending AJU numbers. No off-site procedures were performed.

Resident female AJU 1233 (Solo) had a non-healing ulcer on the cornea of her left eye, which caused blepharospasm (squinting) and lacrimation (tearing), indicating pain. Due to her age (18 years) and the fact that she had already lost vision in the affected eye due to cataract, it was decided to do an enucleation (removal of the eye) on 26 March 2018 after two months of unsuccessful treatment with different eye drops. She received subcutaneous fluids on a daily basis from five days before the procedure and was still receiving fluids every third day to support her kidneys. She received long-term antibiotics and painkillers (opioids). Her initial recovery was difficult, but she bounced back after four days and was stable as confirmed by follow up blood values on 7 June 2018. In the first week of September 2018 she was not eating eagerly and would only take very small amounts of food. At this point she was getting fluids every day and even twice a day was attempted, but she continued to go downhill, and on 7 September 2018 she collapsed and it was decided to euthanize her.

Resident male AJU 1515 was anaesthetised on 5 September 2018 to assess his loss of appetite and a large swelling under his chin. The swelling turned out to be a very large abscess possibly caused by a bad tooth. The abscess was drained and flushed. However his mucous membranes were very icteric, indicating a very serious infection, and it was decided to reverse the anaesthesia and start an antibiotic course to treat the infection prior to treating the bad tooth. A premolar was removed on 3 October 2018, when his appetite declined again. His blood results from September showed elevated renal values, which went down again in October, suggesting temporary acute renal damage. Unfortunately follow up tests on 12 October, 4 November, and 3 December 2018 are consistent with chronic kidney disease (CKD). He was thus put on daily subcutaneous fluids, phosphate binders and ACE-inhibitors. He was also put back on antibiotics as his blood values and kidney condition suggested a bladder infection.

Resident male AJU 1548 (N'dunge) was noted to have a swelling under the left eye. This turned out to be an abscess, which burst open after three days. On 14 January 2018 the abscess was flushed and cleaned under anaesthesia and he was given long acting antibiotics. Some of his teeth required a root canal treatment as well as further dentistry care. Therefore he was put on the list for the veterinary dentistry specialist who visited in July 2018. He recovered well after his dental. In September it was noted that his body and coat condition were not at their best. No abnormalities were detected from the blood collected on 27 September 2018, therefore a treatment for chronic gastritis was initiated. More extensive tests looking at less common endocrinological diseases were performed on 18 October 2018 and also came back normal. Given the initial improvement observed with the first gastritis treatment, a longer and more extensive course of treatment for chronic gastritis was started. This increased his appetite enormously, but he still did not entirely get back into shape. The chronic gastritis could have caused permanent damage to his stomach which could potentially be impairing his digestion. The next step would be to do a gastroscopy to either confirm or exclude some of the possible causes.

Resident male AJU 1549 (Shunga) was squinting his left eye on 11 May 2018. A corneal ulcer was diagnosed and immediate treatment started. The aspect of the ulcer differed from ulcers caused by trauma and therefore treatment against herpes was started as well. Fortunately, he was very good at receiving eye drops in the crush cage. The eye healed well.

Resident male AJU 1565 (Phoenix) showed acute anorexia and an examination on 5 September 2018 suggested pancreatitis, which was confirmed by blood results. He was started on treatment with fluids, anti-nausea medication, and pain medication. As usual with pancreatitis, he had ups and downs but after a long period of daily treatments he has now fully recovered.

Resident male 1583 (Phil) refused to eat on 25 October 2018. His lower jaw was swollen and a wound was found under his chin, which was most likely caused by a snake bite, likely a puff adder. He received antibiotics and anti-inflammatories and the wound was disinfected. Blood was collected and sent to the lab to check whether the snake venom had affected any of the organs. The results were

within normal limits and after daily cleaning of the wound and follow up treatments with antibiotics and anti-inflammatories he fully recovered.

Resident male AJU 1647 (Romeo) was surgically castrated as contraceptive method of choice due to his age (11 years) on 28 February 2018. Sperm collection was attempted, but he had not resumed sperm collection since the last contraceptive implant in March 2017. His testes were frozen viably.

Resident male AJU 1654 (Merlin) received a health check, sperm collection, and was collared on 24 August 2018 prior to release on CCF land.

Temporary resident males AJU 1664, 1665, and 1668 (Kamin, Cyclone, and Elwood respectively) received a health check, sperm collection, and were collared on 25 February 2018, before release. Kamin had lost the tip of his right bottom canine and the root was exposed, so the release was delayed and a dental procedure scheduled.

Temporary resident female AJU 1666 (Zin) received a health check and was collared on 25 February 2018 prior to release.

On 8 August 2018 temporary resident females AJU 1667 (Susan) and AJU 1670 (Georgia) received a health check and were collared prior to release at Erindi Private Game Reserve (EPGR).

Resident female AJU 1671 (Tatjana) received a health check and was collared on 9 August 2018 prior to release at EPGR.

Resident female AJU 1669 (Daenerys) received a health check and was collared at on 10 August 2018 prior to release at EPGR.

Resident female AJU 1773 (Sasha) arrived at CCF after being kept by a farmer for over two months. An examination was done on 28 January 2018 and a hard mass was felt in her abdomen. It was suspected she had a foreign body in her stomach and it was decided to do an explorative laparotomy. The remains of a rubber ball were found in her stomach, and those had caused a large ulcer to form in the stomach lining. The pieces were surgically removed and thereafter, Sasha received stomach protectants, antibiotics, and anti-nausea medication. She recovered well. Sasha will have to remain in captivity due to her age at being orphaned and the amount of human contact received before being handed over to CCF

Resident male AJU 1776 (Dominic) was handed over to CCF by a woman who had been taking care of him for seven days after having received the cub from farm workers. His health is being monitored continuously and blood was collected on 2 June 2018 and 18 June 2018 for the genetics laboratory and biochemistry analysis. The orphaned cub only received medical examinations without anaesthesia. He will need to remain in captivity due to being orphaned at a very young age (less than a week).

4. Dental Procedures on CCF's Wild and Captive Cheetahs

In 2018, seven dental procedures were performed on seven individuals (6M, 1F). For time sensitive specialist dentistry treatments a local dentist in Otjiwarongo was contacted or, for the non-urgent cases, a visiting veterinary dentistry specialist visited CCF in July 2018.

Temporary resident male AJU 1664 (Kamin) had broken off the tip of his right lower canine, which was treated with a root canal treatment on 8 March 2018.

Resident males AJU 1548 (Ndunge) and AJU 1581 (Mischief) were treated by Veterinary Dentistry specialist Dr. José Ruiz on 1 July 2018. Both needed extensive work done including several root canals and extractions and were therefore under anaesthesia for several hours. AJU 1548 had started

to lose weight in the past week and did not eat very well, he had very bad teeth quite a few premolars and a canine had to be extracted. AJU 1581 had root canals on all four canines and some premolars were extracted. They recovered very well from the procedures.

Resident males AJU 1532 (Little C) and AJU 1549 (Shunga) and female AJU 1474 (Harry) were treated by Veterinary Dentistry specialist Dr. José Ruiz on 2 July 2018. These individuals have been very healthy and therefore did not have any work ups for several years. It was decided to do a work up on them while Dr. Ruiz was at CCF since the status of their teeth was unknown. They all turned out to have very good dentition still and very little work needed to be done. AJU 1532 had a root canal done on one of his premolars, AJU 1549 had root canals done on both his upper canines, and AJU 1474 had an extraction of an incisor.

Resident male AJU 1515 (Fossey) had a premolar removed on 3 October 2018.

5. Released Cheetah Examinations

In 2018, 10 examinations were conducted by CCF on four released cheetahs.

Released males AJU 1664, 1665, and 1668 (Kamin, Cyclone, and Elwood) were caught (1664 was lured to the camp, while 1665 and 1668 were darted) between 7 and 9 April 2018 to be reunited as they had become separated about a week prior. They were re-released the following week. A health check with sperm collection was performed on AJU 1664, AJU 1665, and AJU 1668 on 10 May 2018 after the males were caught in a trap cage by a neighbouring farmer and re-captured by CCF on 9 May 2018. On 8 August 2018 a health check and sperm collection were done on AJU 1665 and AJU 1668 before they were all transported to EPGR. On 14 October 2018 AJU 1665 and AJU 1668 were darted at EPGR for a collar change, since their collars were set to automatically drop off 6 months after placement.

On 1 October 2018 released male AJU 1627 (Alcatraz) was darted by CCF at EPGR for a collar change.

6. Wild Cheetah Examinations

In 2018, CCF performed nine wild cheetah examinations on seven cheetahs (5M, 2F).

On 13 October 2018 wild female AJU 1648 (Savanna) was darted by CCF to change her collar. The anaesthesia was kept as short and smooth as possible, while her three cubs waited for her.

On 29 May 2018 a work up was performed on a wild male cheetah, AJU 1778. He was kept in a very small enclosure by the farmer for a minimum of six weeks and was covered in faeces and louse flies. He otherwise looked healthy and would stay at CCF until a suitable release site had been found. On 8 August 2018 a health check, sperm collection, and collar placement were done prior to release at EPGR. On 14 October 2018 the GPS signal of his collar indicated he escaped the reserve and the CCF team went to dart him in order to do a health check and transport him back into the reserve.

On 25 June 2018 a work up was performed on two wild male cheetahs, AJU 1779 and AJU 1780. AJU 1779 had an open fracture of a metacarpal, digit 4, on the left front foot. The wound was flushed and cleaned thoroughly and a long-term antibiotic (Convenia) was given. Since it was an open fracture (and therefore infected) nothing more could be done at that moment in time. He is walking well because the other metacarpals are able to support his weight, so he most likely does

not need any further treatment of the fracture and he is expected to heal uneventfully. Both males were estimated to be nine months old.

On 9 August 2018 a male cheetah AJU 1783 (Loki) was picked up from a lodge. He had been captured two days prior and had sustained capture injuries leading to a paralysis of his hind legs. After a lot of care and patience he started to regain feeling and use of his legs. On 20 August 2018, AJU 1783's siblings, female AJU 1785 (Hella) and male AJU 1786 (Thor) received an initial work up after they were transferred to CCF from the lodge. They appeared to be healthy, but two days later they started vomiting and had watery diarrhoea, which resolved in a couple of days with supportive treatment (subcutaneous fluids and anti-nausea medication). All three siblings were put together as soon as the injuries of AJU 1783 allowed. The sibling group was four months old when they were captured.

7. Deaths, Euthanasia, and Necropsies

In 2018 CCF performed three necropsies. No necropsy was performed on AJU 1666 (Zin) as the body was not released by the farmer who shot her. At each necropsy, samples are taken for histopathology assessment and genetic research and skin and bones are preserved unless this is not possible due to missing parts or extremely advanced state of decomposition. A set of necropsy samples was sent to long-term collaborator Dr Karen Terio for histopathological diagnostics.

One male on loan, AJU 1461 (d'Artagnan), died on 23 September 2017. He had displayed neurological symptoms of increasing severity for several months that started with apparent loss of hearing and losing connection with his coalition mates. Later on he developed ataxia and moments of staggering. Symptoms usually resolved within 10 minutes after feeding, which indicated a possible problem with his glucose metabolism. During the last two days he was not able to get up and started to get epileptic. His remains were transported to CCF on 7 April 2018 and a necropsy was performed the following day. The most noteworthy finding was a nodular black neoplasia with an irregular surface (3x2x1.5 cm in size), located in the pancreas, which is consistent with an insulinoma.

Released male AJU 1607 (Dexter) was found dead late afternoon on 29 March 2018 in EPGR. His remains were picked up on 30 March 2018 and a necropsy was performed on 31 March 2018. He had a puncture wound on his right elbow and the right side of his thorax and the sternum area was severely bruised. He had haemorrhages in his pericardium and inside his thorax on the right side. The injury most likely occurred while he was attempting to make a kill, most likely a warthog.

Temporary resident male AJU 1768 (Ruu) was found dead in the enclosure on the morning of 9 January 2018. He had a puncture wound on the right side of his head, on the occipital area, and on the cranium. He also had puncture wounds on the left and right shoulder, small punctures on the dorsal side of the neck, and punctures around the spinal column and hindquarters. His neck was dislocated. He had been recently introduced with the other three releasable males and while it's not entirely clear, it's expected that a baboon is responsible for his death.

Resident female AJU 1233 (Solo) was euthanized on 7 September 2018 at the advanced age of 18 years and seven months. She had been diagnosed with chronic kidney disease almost a year before but her condition was stable on supportive treatment ever since. Prior to euthanasia she had anorexia for three days and was very lethargic and dehydrated despite the increase of subcutaneous fluids administered, which is indicative of poor kidney function. The necropsy performed the next day showed reduced muscle mass and fat stores. The kidneys were very pale, small in size and had a very firm consistency. All findings were consistent with renal failure.

Released male AJU 1654 (Merlin) was found dead on a neighbouring farm of CCF after an inactivity signal was received from the collar on 24 July 2018. He was found under a bush and had wounds in the shoulder/spinal area. Necropsy revealed puncture wounds on either side of the spine, with fractured vertebra, bone splinters and spinal cord damage just caudal to the shoulder blades (T4-T5).

Due to the very localized but extreme and severe damage associated with the two puncture wounds, the most likely cause of death is a gunshot.

Released male AJU 1627 (Alcatraz) was found dead in EPGR on 25 October 2018. He was found approximately 20 meters from his kill in a pool of fresh blood. He was then kept in a low temperature EPGR fridge for about a week before he was transported to the CCF for necropsy. Alcatraz had a very good body condition score and about 4.5 kg of meat in his stomach. He had an old wound under his chin which may have been infected. There were two puncture wounds on his right shoulder, about 4 fingers apart. There was a puncture wound in dorsal neck area (C4/5), a puncture wound on the left shoulder (caudal) and a puncture wound on the cranial side of the left quadriceps. The scapula was fractured and fragmented under the puncture wounds on the right shoulder and the brachial plexus had been destroyed. Everything indicates he was killed by lions. He most likely bled to death although he could have been initially paralyzed due to the damage to the spinal cord in the neck area (spinal shock).

8. Non-cheetah Carnivore Examinations and Necropsies

African Wild Dogs

In 2018, three examinations under sedation and 61 examinations without anaesthesia were performed by CCF on 17 African painted dogs. Since there is very little known about the efficacy of vaccinations in African painted dogs, blood was collected on a regular basis in a squeeze cage (Table 3).

On 25 August 2018 an attempt was made to introduce LPI 10 – 18 to the older two males LPI 1 and LPI 2 and one female LPI 7. The introduction to the males went very well but unfortunately the female attacked the puppies and they all required medical attention to clean the puncture wounds. Two animals, LPI 15 and LPI 18 had wounds sutured under local anaesthesia with lignocaine.

On 25 October 2018, LPI 18 was examined because she was limping on her right front leg. Radiographs taken at Northern Veterinary Clinic showed the leg was broken close to the shoulder joint. Surgery was done on 29 October 2018 by Dr Minty Soni from Rhino Park Veterinary Clinic. Due to the fracture already being fibrotic, a pin was placed to stabilize the fracture. The wound required regular cleaning and later on debriding as some stitches came off after two weeks. The fracture healed very well, but the pin had to be removed by Dr. Ulf Tubbesing from Rhino Park Veterinary Clinic on 11 December 2018 as the pin moved and the tip was obstructing the elbow joint.

Table 3: Blood collections done on resident African painted dogs in 2018

Individual	Date	Individual	Date
LPI01	14-Mar-2018	LPI14	25-Aug-2018
LPI02	14-Mar-2018	LPI15	25-Aug-2018
LPI03	14-Mar-2018	LPI16	25-Aug-2018
LPI04	14-Mar-2018	LPI17	25-Aug-2018
LPI06	14-Mar-2018	LPI18	25-Aug-2018
LPI07	14-Mar-2018	LPI03	2-Oct-2018
LPI08	14-Mar-2018	LPI04	2-Oct-2018
LPI09	14-Mar-2018	LPI06	2-Oct-2018
LPI01	13-Jun-2018	LPI07	2-Oct-2018
LPI02	13-Jun-2018	LPI08	2-Oct-2018
LPI03	13-Jun-2018	LPI09	2-Oct-2018
LPI04	13-Jun-2018	LPI10	28-Nov-2018
LPI06	13-Jun-2018	LPI11	28-Nov-2018
LPI07	13-Jun-2018	LPI12	28-Nov-2018

LPI08	13-Jun-2018
LPI09	13-Jun-2018
LPI10	31-Jul-2018
LPI11	31-Jul-2018
LPI12	31-Jul-2018
LPI13	31-Jul-2018
LPI14	31-Jul-2018
LPI15	31-Jul-2018
LPI16	31-Jul-2018
LPI17	31-Jul-2018
LPI18	31-Jul-2018
LPI10	25-Aug-2018
LPI11	25-Aug-2018
LPI12	25-Aug-2018
LPI13	25-Aug-2018

LPI13	28-Nov-2018
LPI14	28-Nov-2018
LPI15	28-Nov-2018
LPI16	28-Nov-2018
LPI17	28-Nov-2018
LPI18	30-Nov-2018
LPI18	17-Dec-2018
LPI10	19-Dec-2018
LPI11	19-Dec-2018
LPI12	19-Dec-2018
LPI13	19-Dec-2018
LPI14	19-Dec-2018
LPI15	19-Dec-2018
LPI16	19-Dec-2018
LPI17	19-Dec-2018

Other non-cheetah carnivores

In 2018, two exams and three necropsies were performed by CCF on non-cheetah carnivores.

On 16 January 2018 and on 16 May 2018 CCF performed a basic necropsy on two genets that were hit by a car. Gastrointestinal samples were collected for CCF's research database.

On 27 June 2018 CCF performed a basic necropsy on a genet that was killed by a dog. Gastrointestinal samples were collected for CCF's research database.

On 13 November 2018 CCF performed an examination on a leopard in collaboration with the Ministry of Environment and Tourism. The leopard was confiscated from a farmer on that day and released in Mangetti National Park. Hair and blood samples were collected for CCF's research database.

On 13 November 2018 CCF performed an examination on a brown hyena (HBR 0012) , which was confiscated from a farmer on that day and subsequently brought to CCF for release on CCF land. The animal was kept in a capture cage with a very damaged bottom for over a month and the animal had severe damage to its footpads. It was decided to keep the animal in an enclosure for about a month to give him the chance to recover and also to reduce the re-homing instinct. On 19 December 2018 another work up was done and a collar was placed prior to release.

C. Health and Reproduction

1. Genome Resource Bank

Since 2002 CCF has been collecting, evaluating, and freezing cheetah sperm. In 2018, collections were performed on 13 cheetahs, which produced 10 samples for the GRB. Currently, CCF is performing an inventory of all sperm samples and will have figures to report during the mid-year 2019.

CCF continues to bank sperm, serum, plasma, white and red blood cells, hair, and skin samples on all cheetahs worked up. Additionally, an increasingly extensive scat sample collection from wild cheetahs in Namibia and neighbouring countries is kept at CCF. All samples are part of CCF's Genome Resource Bank (GRB). Since 1991, blood and tissue samples have been obtained from over

900 individual cheetahs. These samples are used for over-all health and genetic purposes, with backups stored at both CCF Namibia and the Smithsonian Institution in the USA. With the creation of CCF's genetics laboratory, most samples are now held at CCF. Currently CCF holds the world's largest wild cheetah database of biological material, which also creates the need to curate all the samples and the development of database management systems.

D. Conservation Genetics

1. Life Technologies Conservation Genetics Laboratory

The Life Technologies Conservation Genetics Laboratory (formerly known as the Applied Biosystems Genetic Conservation Laboratory) was set up in 2008/2009 by Dr Anne Schmidt-Küntzel for CCF, thanks to the generous support of Life Technologies Inc. (formerly Applied Biosystems, today Thermo Fisher Scientific) and the Ohrstrom Foundation. Since then, the most important addition to the CCF genetics laboratory has been the donation and installation of a refurbished 4-capillary genetic analyser in July 2014 by Thermo Fisher Scientific. The new instrument has greatly increased the capacity of the laboratory. In 2015 the genetics laboratory moved to the new Visitor Centre. This laboratory was designed with forensic laboratory standards and is larger in order to host visiting scientists and university interns.

The laboratory's main aim is to contribute to the on-going research and conservation of cheetahs by working together with the ecology and biomedical departments in CCF's cross-disciplinary mode of operation. The CCF Scat Detection Dog programme is part of this approach and was put into place to provide the necessary samples to the various genetics projects. The main genetics projects are related to cheetah population structure, census, relatedness, and assignment of individual ID to non-invasive samples such as scat. Projects related to other species are performed with outside funding and are currently limited to collaborative projects.

William Versfeld, one of the few Namibians holding an MSc in genetics, left CCF at the end of his 2-year contract in December 2018. Natalie Giesen, who was Laboratory Manager in 2013/2014, returned to CCF from November 2017 to March 2018 to assist with ongoing projects until the Manager position was filled. Dr Nina Sausgruber joined the laboratory as Laboratory Manager in June 2018. Monika Nanghama and Hafeni Hamalwa, who both started as interns in the laboratory in the first half of 2017, stayed on in 2018. Monika accepted a position as Laboratory Assistant in January 2018 and Hafeni started his MSc at the University of Namibia. Julia Zumbroich (MSc) started as Laboratory Technician, and plans to conduct her PhD research at CCF.

Throughout 2018, the laboratory hosted two (one Namibian, and one international) interns and two Namibian students. All were provided hands-on experience with conservation genetics and taught best laboratory practices. Helena Ihuhwa holding a BSc in Microbiology from UNAM joined the laboratory in July for a six-month internship with the aim to specialise in genetics. The genetics laboratory also hosted 1 international research intern, Armaghan Nasim, a veterinary student from Virginia-Maryland Regional College of Veterinary Medicine, who joined the laboratory for her six weeks clinical research rotation (27 May-6 July 2018) to continue the work on babesia, a blood-borne protozoal parasite transmitted by ticks.

CCF's genetics laboratory is an official placement for 4th year undergraduate students of the University of Namibia (UNAM) since 2017, and of Namibia University of Science and Technology (NUST) since 2018. Absalom from NUST joined the laboratory from 17 September – 26 October 2018 as part of his Work Integrated Learning (WIL), and Julia Kanyanda from UNAM joined the laboratory from 19 November – 14 December 2018. Both students received credit for their internship.

Furthermore, the laboratory hosted three collaborators; Abigail Guerier from the Ongava Research Centre visited the laboratory at the beginning of the year to process new samples from their rhino population; Dr Caitlin O'Conner from Stanford University sent two of her students; Katie Lawlor (11

July - 5 August 2018) and Mireille Vargas (18 August – 19 September 2018) to be trained in genetic laboratory work and initiate a project to test the relatedness of elephants in Etosha National Park.

In September the Genetics Department in collaboration with the Ecology Department, hosted the 3rd workshop for UNAM students from the Katima Mulilo campus (9 – 15 September 2018). The workshop included hands on experience of camera trapping, kill identification (human wildlife conflict), and the preparations of genotyping individuals. The students were further provided with lectures on how to apply the knowledge gained.

Genetics Projects

- Cheetah genotypes of known individuals (blood/tissue samples): As part of CCF's on-going research in the genetics laboratory, DNA is extracted for all individuals for which blood and tissue samples are available. Extracted DNA samples are assessed for quality via gel electrophoresis and genotypes obtained for 15 microsatellite markers. In 2018, 16 new cheetah samples were added to the sample collection. We are thankful to the farmers who have invited our genetics and scat dog team to attend their farmers meetings in 2018, have allowed them on their land for surveys, and have taken the time to assist us with our study by collecting samples on our behalf.
- Cheetah genotypes of unknown individuals (scat samples) using non-invasive techniques: Since the identity of a cheetah is unknown from non-invasive samples, the first step is to obtain a genetic ID to assign an individual ID. Over a thousand samples have been collected over the years. Many of these scat samples were collected by the CCF ecology team or with the help of CCF's scat detection dogs Finn, Isha, and Tiger, and now Levi and Ole. Other samples were obtained from collaborators from other conservation organisations, taxidermists and the farming community. In 2018, 27 suspected cheetah scat samples were added to the sample collection. Between July 2008 and October 2013, over 950 scat samples were collected from a coalition of two wild cheetah males ('The Wild Boys': Hifi (AJU 1543), and Sam (AJU 1542)) around the CCF Centre, in a daily effort. While the two wild males have died since (AJU 1542 in August 2010, AJU 1543 in October 2013), the sample collection represents an invaluable resource for long-term monitoring of physiological parameters in two wild cheetahs. The parasite levels were assessed and recorded on a regular basis at the time of collection. The aim of the study is to identify samples for every 3-5 days throughout the entire five-year period and conduct hair analysis to determine the wild males' diet over time. Hormone work to determine stress and testosterone levels will be performed when funding is secured. To date 320 samples have been finalized, of which 289 were successfully assigned to AJU1542, 1543, or another wild individual and 11 as other carnivores (Figure 1).

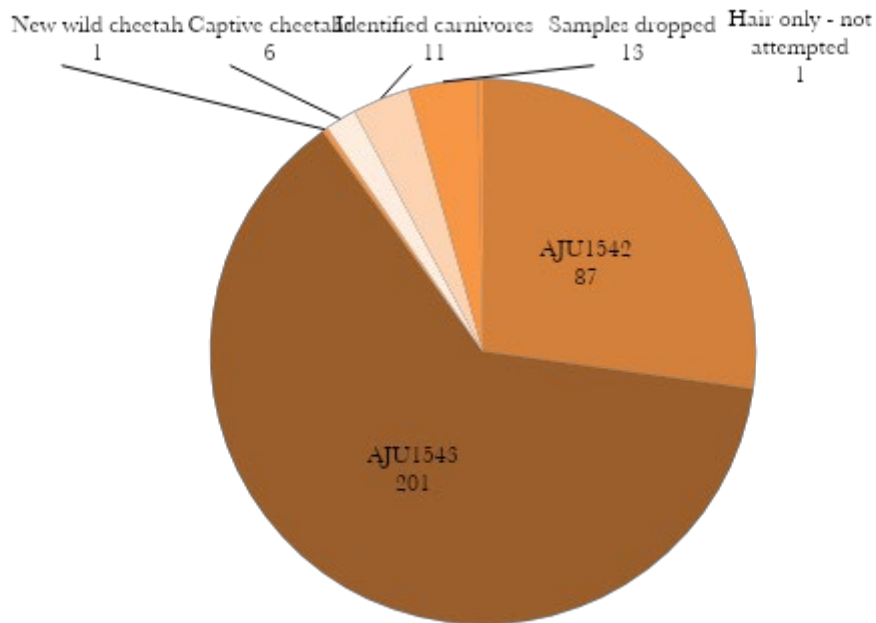


Figure 1: Genetic identification of 'Wild Boy' samples.

All other suspected cheetah samples are analysed so that unique individuals can later be included in population studies. Over 300 samples collected between 2008 and 2016 are currently being processed to obtain their genetic profile. Of those, 197 could be assigned an individual ID as cheetah (corresponding to less than 20 individuals), 54 could be assigned to other carnivore species using a barcode sequencing approach, and 62 are expected to be completed in the first half of 2019 (Figure 2).

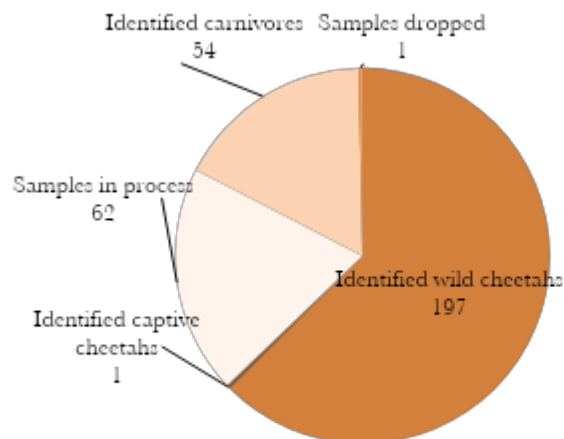


Figure 2: Genetic identification in process, for other suspected cheetah scat samples.

The data from scat samples collected at camera trap stations from CCF's camera trap surveys between 2008 - 2014 is part of Lucia Mhuulu's MSc research thesis, which she defended in June 2015. For this study the genetic ID was combined with the visual ID from the camera traps, to pair a physical appearance to the genetic genotype without handling the animal. No sample could be found during the 2018 camera trap survey.

- Verification of the accuracy of the scat detection dogs: The species of scat samples found by the dogs and suspected to be cheetah is routinely verified using molecular markers.
- Illegal trade: The species content of samples from illegal trade was assessed using molecular markers specifically designed to identify carnivore species in samples of poor quality. Polymerase Chain Reaction (PCR) products were taken to the United States by Dr Schmidt-Küntzel to do next generation sequencing in a collaborator's laboratory. The obtained results will be made public when possible.
- Babesia: A trial study was conducted to determine the percentage of affected cheetahs that are currently at CCF and compare those to the results obtained from microscopic evaluation of blood smears from other captive cheetahs. We also developed a diagnostic test to be used for further screening of the samples. The initial testing was assigned to Shalette Dingle, a visiting Cornell veterinary student in 2013. Since then, a more sensitive test was also tested with promising results. Cornell veterinary student intern, Natasja Lavin read the blood slides corresponding to the genetic samples. Armaghan Nasim assessed whether the diagnostic test allowed detection of babesia in ticks collected from babesia-positive and negative cheetahs. She also collected samples to allow us to determine the effect of storing ticks in methylated spirits for 14 days, 24 days, 34 days, 3 months, 6 months and 12 months. Results of this study will be obtained in 2019.
- Release study: Sixty-six release and pre-release scat samples were extracted and assigned to an individual cheetah. These samples were sent to the Smithsonian Institution in the USA to be analysed for faecal hormone levels. Results of the hormone work are pending.
- Carnivore species ID and diet: In 2014, visiting student intern Alicia Walsh from University of New Hampshire (USA) extracted DNA from 50 carnivore scat samples and verified the species they belong to using a mitochondrial marker. She also identified what the animals ate by using a variety of approaches including hair, bone, exoskeleton, and vegetation analysis. She published the project in the university's Inquiry journal. A preliminary analysis of the diet composition was performed by ecology research assistant Samara Moreira.

Current Collaborative Genetics Projects

- Oxalate nephrosis: A collaboration was started in March 2012 with Dr Karen Terio from the University of Illinois (USA) and Dr Emily Lane from the National Zoological Gardens of South Africa for a study on oxalate nephrosis. Primers for one candidate gene were designed by Dr Schmidt-Küntzel and optimised at the CCF genetics laboratory in 2014. Diseased individuals were tested in the laboratory of the South African collaborators. In the first half of 2015 a second gene was investigated. The South African team came to visit CCF as part of the collaboration, and two students from each institution visited the other one as part of the grant. To date no candidate mutation was found. Results will be published in 2019.
- Illegal trade: The collaboration with cheetah holding facilities and veterinary clinics in the United Arab Emirates (UAE) was initiated during a trip in June of 2013 and renewed in February of 2014. The aim is to begin developing a genetic database of cheetahs held in that area. Sperm and genetic samples were collected on males in 2014. The genetic samples are currently being analysed.
- Carnivore ID: Carnivore hair samples obtained from rubbing stations and hair snares in southern Namibia were analysed at the genetics laboratory to identify species. This work was done in collaboration with the Brown Hyena Project in Lüderitz and will be part of Sarah Edward's PhD. The genetic analysis was finalised in 2014, and the PhD successfully defended in October 2015. A publication is expected in 2019.
- Caracal ID: DNA from Caracal hair and tissue samples, collected from killer traps in South Africa, were extracted and genotyped at the genetics laboratory to assess relatedness. This study is a

collaboration with Kristine Teichman, a student from British Columbia University (Canada) and will be part of her PhD. Most samples were processed and should be finalised in 2019.

- Rhinoceros: A pedigree for white rhinoceros (*Ceratotherium simum*), performed by visiting researcher and Master's student Abigail Guerier, from Ongava Wildlife Reserve's Research Centre, was finalised and published in 2012 as part of Abigail's MSc. In the beginning of 2013 she started a genetics project on Ongava's resident population of black rhinoceros (*Diceros bicornis*) at the CCF genetics laboratory. The project is on-going and more samples are added as they are collected by the Ongava research team. From 22 January - 15 February, Abigail visited the laboratory to process new rhinoceros samples as part of an ongoing collaboration.
- Kenyan cheetahs: Brian Solomon, an MSc student from Kenyatta University in Nairobi, visited the laboratory as part of a collaboration between CCF, Action for Cheetahs in Kenya, and the Kenyan Wildlife Services. He spent ten weeks (28 August to 6 November 2017) processing scat and tissue DNA samples of Kenyan cheetahs to genotype individuals. For his MSc he will examine cheetah relatedness in the Maasai Mara. Hafeni Hamalwa has continued the laboratory work to complete the full genotypes of the 137 samples and is pursuing his MSc degree on the mitochondrial genome in the Kenyan cheetah.
- Termites: In May 2015 and February 2016, a research team from the University of Florida worked with CCF to do a pilot study on termites. The initial tests were successful. Additional markers will be developed.
- Brown Hyena Project: As part of collaboration with Dr Ingrid Wiesel from the Brown Hyena Project in Lüderitz, we received a set of paste marks of brown hyenas (*Hyaena brunnea*) in August 2016, which allowed us to optimise protocols to successfully extract DNA. Additional samples were sent since and 59 samples were genotyped with published markers. However, additional markers are needed, and will be developed in 2019.
- Herpetology Project: As part of collaboration with Paul Kornacker from the Museum König in Germany on lizard species identification on samples from the NamibRand region of Namibia, 81 samples were extracted and species identity was determined for half of the species. A new primer was ordered, which did amplify some of the remaining species.
- Mushara Elephant Project: As part of a collaboration with Dr Caitlin O'Conner, the genetics laboratory has received 223 elephant scat samples of which 107 were identified as priority samples. To date 75 samples have been extracted and partial genotypes obtained for 12 markers.

2. Scat Detection Dogs

CCF's scat detection dog unit was put in place to increase the number of cheetah scat samples found in the field. As part of our conservation efforts, CCF actively looks for scat samples, as the CCF genetics laboratory can extract DNA from these and gather valuable information on the animal's gender, individual, and species. The test phase of the programme started with the arrival of Border Collie, Finn, in February 2009. Working with scat detection dogs on cheetahs is quite challenging, and we calculated a 22 km distance covered for each sample found along a road (data presented in the 'black gold' chapter of "Cheetahs: Biology and Conservation" published in January 2018).

The programme has continuously grown over the years, and in May 2018 dog handler Tim Hofmann and his dog Ole, a 6-year old male Weimaraner joined Quentin de Jaeger and the CCF dogs. Tim is joining the team as Scat Dog Researcher. He visited CCF last year for his Master's Thesis on factors influencing the detection success of scat dogs. Ole was used as a tracker dog in several research projects before coming to CCF. He quickly adapted to the new environment and got trained up for his job as scat detection dog in his first months at CCF. Now we have two fully operational teams which will allow us to increase our search effort in the upcoming year.

CCF also received four Belgian Malinois puppies donated from the Otjiwarongo Neighbourhood Watch. We gave two of them to our collaborators at Ongava Game Reserve to help their work in the protection of endangered wildlife. The other two, Enyakwa (Enya) and Gamena (Mena), stayed at CCF and are currently trained to be the next generation of scat detection dogs. Enyakwa and Gamena were named by donors via a Facebook contest, whom we would like to thank for their generous support. Enya is very active and has the typical temperament of a Malinois. She is progressing very well and her indications are “explosive” (when she finds target scat, she sits immediately and is very self-confident). Also, her high enthusiasm and toy drive make her a promising candidate for scat detection. We are very optimistic that she will be a great contribution to our program in the future. Mena is a bit more reserved and progressing at a slower pace. But since dogs, like humans, change a lot while growing up, we are giving her more time and are keeping her in training at the moment.

The two teams (Levi/Quentin and Ole/Tim) have started to extend their work from CCF land to other farms in the surrounding area, and will increase that effort in the future (Figure 3). This year only one cheetah scat was found on CCF land which is a strong indicator for a reduction in cheetah numbers in our area. Our ecologist’s camera trap data unfortunately support these findings. Visiting farms that are in the surrounding of CCF’s research station retained 80 carnivore and five potential cheetah scat samples. Our dogs walked a total of 76.3 km to find the five cheetah samples, however four of the five samples were derived from only one site. The dogs thus walked 38.2 km per site with cheetah scat.



Figure 3: Example transect from a farm visit, blue line handler movement and red line dog movement, green points indicate scat samples.

Tim and Ole visited a farm in the Omaheke region (Figure 4), in the east of Namibia, as farmers reported regular sightings of cheetah. This trip obtained 23 potential cheetah scat samples that are currently being analysed in our genetics laboratory. All of the samples were found very close to “play trees”. Ole walked 35.9 km during several search sessions and scat was found on eight different play trees, which were found thanks to the knowledge and assistance of the farmer. The higher number of

scat samples found in this area is consistent with current cheetah research, which shows that this region is hosting a considerably higher number of cheetahs.

The team was accompanied by intern Justin Moya (Figure 4). He joined us on our daily searches and learned about dog training, kennel maintenance, data management, and the theory of working dogs. We will keep up that working routine in the future to build up local capacity and introduce more people to our work with the dogs and to hopefully identify an assistant dog handler to join our team.





Figure 4: Scat detection team, Tim Hoffman and Ole, joined by intern Justin Muyoba.

Quentin and Levi joined a 3-year research project involving long-term CCF collaborator Dr Ezequiel Fabiano (who obtained his MSc and PhD with CCF and is now a lecturer at the University of Namibia) and CIBIO (Centro de Investigação em Biodiversidade e Recursos Genéticos). As part of this project, our detection team went to Angola from 10 - 30 June 2018 to collect scat samples in local national parks. Our dog team searched more than 7 km per day and found a total of 71 scat samples from a range of carnivores, including leopard, caracal, and African wild dog. However, no cheetah sample was found. The samples will contribute to research of three graduate students. The data collected from scat samples and camera traps will be combined to analyse the predator and prey population sizes and how they are integrated.

The dogs were also imprinted on additional species (African wild dog, caracal, and leopard) to allow them to be successful in their searches on a more regular basis, which boosts their motivation and gives a better return on investment to CCF. In order to have a better understanding of their search routine and to closely monitor their training success, the scat dog team implemented assessment transects. Here we deploy samples in a fixed area and have our dogs to find them. The samples are always placed in the field by the handler not working the dog, which ensures that handler and dog do not know the sample position, which we call “double blind” testing. This will be done on a monthly basis and we are looking forward to draw conclusions about factors influencing their work, such as environmental conditions, sample distance to the dog, and the transect line.

E. Large Carnivore Research and Ecology

1. Go Green Project – Carnivore Landscape Distribution and Abundance

A project to determine the density and human-carnivore conflict areas for cheetah (*Acinonyx jubatus*) and other key large carnivores across the Greater Waterberg Landscape (GWL) was initiated on 1 September 2015. The project focuses on CCF's farm, re-settled farms, freehold farms and communal conservancies across the GWL, which consists of five conservancies; Waterberg, Okamatapati, Ozonahi, Otjituuo and African Wild Dog (Figure 5). This project is due for completion in March 2019.

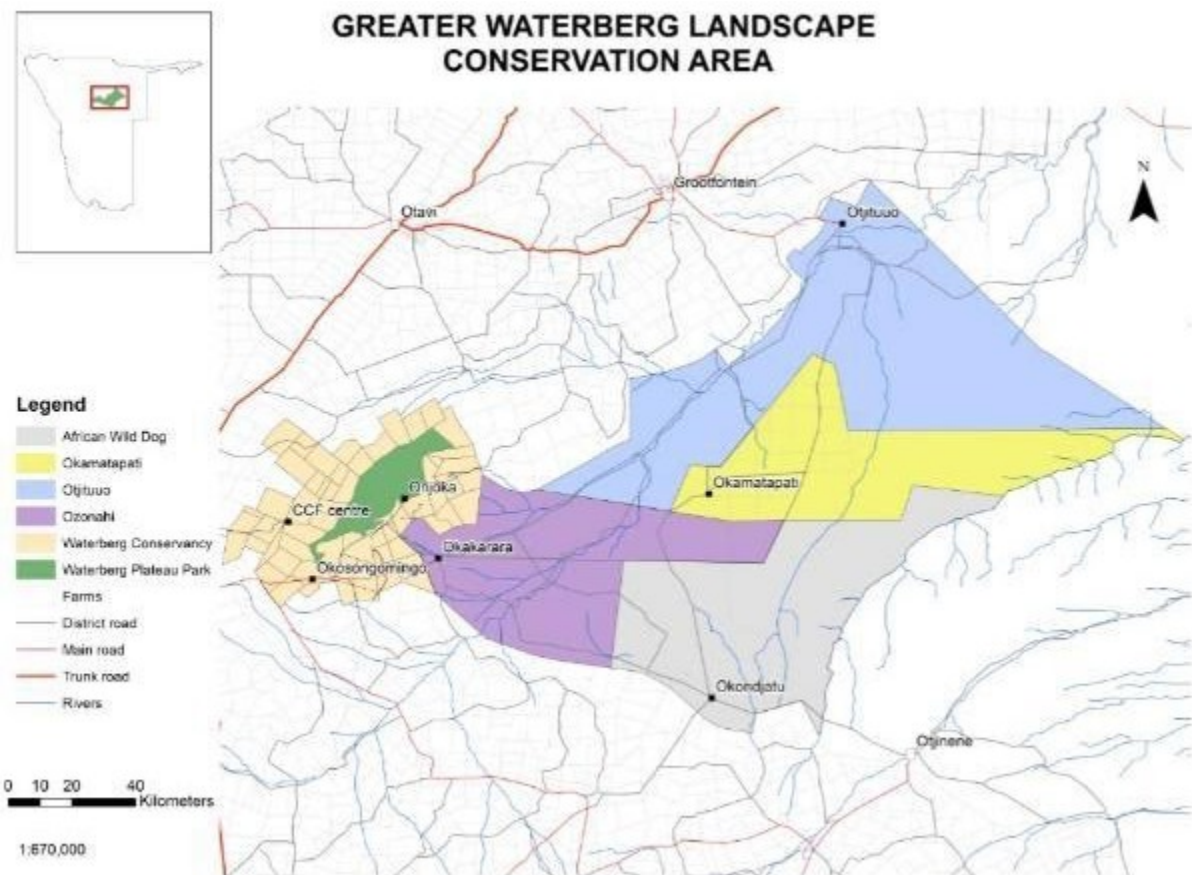


Figure 5: Location of the GWL and the five individual conservancies; the Waterberg (commercial), Otjituuo, African Wild Dog, Okamatapati, and Ozonahi (communal) conservancies.

The current distribution and densities of key carnivore species including the African wild dog and cheetah across the GWL is unknown. However, previous studies have shown that high level of retaliatory killing of carnivores due to livestock loss is occurring across the GWL. This project therefore aims to use remote camera traps to determine large carnivore presence and densities across the GWL. The main goal is to determine if land use affects large carnivore densities and occupancy.

Phase 1: Freehold Farmland

The first phase of this project was conducted on freehold farmland (2,111 km²), which was divided into four survey areas (Figure 6). Camera traps were deployed for 30 nights on a 4x4km grid, with each survey area being sampled during the wet and dry season. All survey areas were completed and below are some results obtained from this study. CCF is currently working on this data with the aim of publishing later in the year. Additionally, CCF also conducted farmer questionnaires to better understand land use, wildlife presence and carnivore conflict across the GWL.

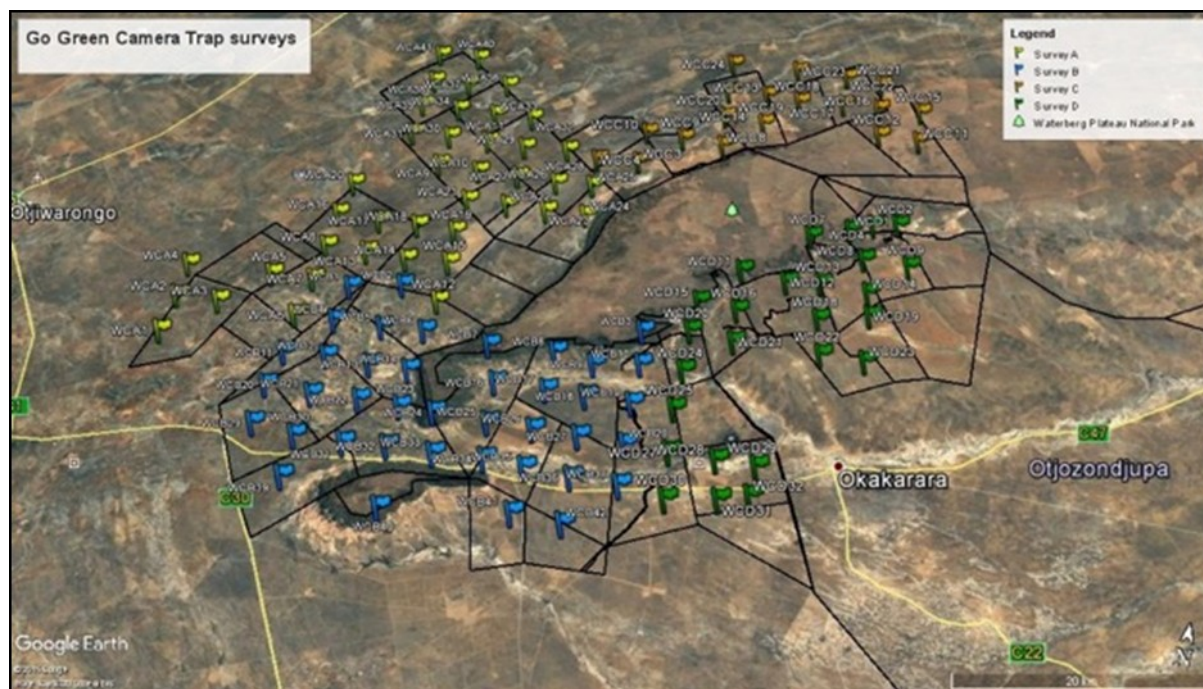


Figure 6: Camera trapping sites in the freehold farms of the Greater Waterberg Landscape showing the 4 survey areas.

Camera trapping

While this report focuses only on carnivores, similar information can be extracted for each species caught on camera. Table 4 shows the number of pictures taken for each carnivore species during each survey as well as the total number of species seen. Overall, a total of 14 species were detected in the study, with black-backed jackal (*Canis mesomelas*) and brown hyena (*Hyaena brunnea*) making up the highest number of camera trap pictures (Table 5).

Table 4: Number of carnivore pictures taken and number of species detected during camera trap surveys.

Survey area	Dry season	Wet Season
A (634 km ²)	2,309 (13 species)	2,860 (13 species)
B (730 km ²)	2,592 (12 species)	1,389 (11 species)
C (308 km ²)	1,179 (12 species)	371 (10 species)
D (439 km ²)	1,532 (13 species)	861 (11 species)
Total Pictures	13,093	

Table 5: Total number of pictures taken for each carnivore species.

Species	Dry season	Wet season
---------	------------	------------

<i>Aardwolf</i>	169	45
<i>African Wild Cat</i>	339	369
<i>Banded Mongoose</i>	240	100
<i>Bat-eared Fox</i>	337	407
<i>Black-backed Jackal</i>	3,408	1,995
<i>Brown Hyena</i>	1,547	784
<i>Cape Fox</i>	61	9
<i>Caracal</i>	333	133
<i>Cheetah</i>	11	9
<i>Genet</i>	565	475
<i>Leopard</i>	249	475
<i>Serval</i>	14	3
<i>Slender Mongoose</i>	94	168
<i>Striped Polecat</i>	104	84

We defined independent capture events when pictures of the same species at a given site were taken at least 30 minutes apart from each other. Using these independent events, we mapped carnivore frequency of occurrence across the survey area (Figure 7). At least one carnivore species was captured at virtually every site (overall only three sites had no carnivore captured) but not necessarily during both seasons. The maximum number of species recorded at a given site during a given season was eight (Figure 7).

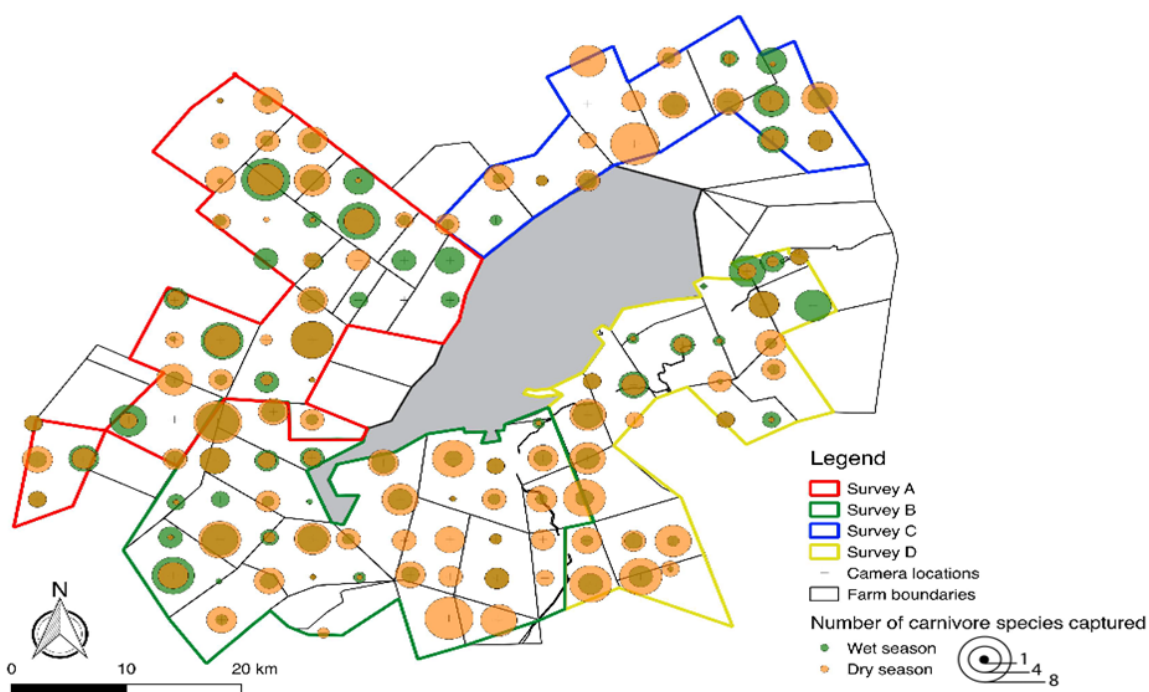


Figure 7: Number of carnivore species captured on camera during the wet (green) and dry (orange) season survey.

Farmer Questionnaires

The majority of farmers (53%) own livestock-only farms, five farmers own combination livestock-game farms, and four own game-only farms. Numbers of cattle ranged from 0–1,300, goats from 0–500,

and sheep from 0-100. The highest number of livestock and game losses occurred due to predators ($n=307$), followed by poaching ($n=133$), poisonous plants ($n=22$), and disease ($n=22$). The majority of farmers (74%) reported having a predator problem. Farmers mostly reported leopards in predation events ($n=19$), followed by cheetahs ($n=6$), brown hyenas ($n=5$), caracals ($n=3$), and jackal ($n=2$). Leopards took the highest reported numbers of game (impala and springbok) and livestock ($n=316$) particularly calves, followed by caracal ($n=75$), targeting exclusively small stock such as sheep and goats (Figure 8).

In terms of mitigation methods, the majority of farmers (65%) kraal their livestock. Of the farmers that kraal their livestock, all farmers kraal their cattle at night, while 72% of the farmers also kraal their livestock during the day. Only 35% of farmers reported using a herder, while 29% use a livestock-guarding dog. Black-backed jackals were the predators most frequently sighted by respondents, with all questioned ($n=18$) reported seeing them daily. Leopards, although implicated in the most livestock losses and attacks, were equally reported ($n=5$) to be seen once a month and every six months due to the elusiveness of this species. The majority of farmers (72%) reported that leopards were on the increase.

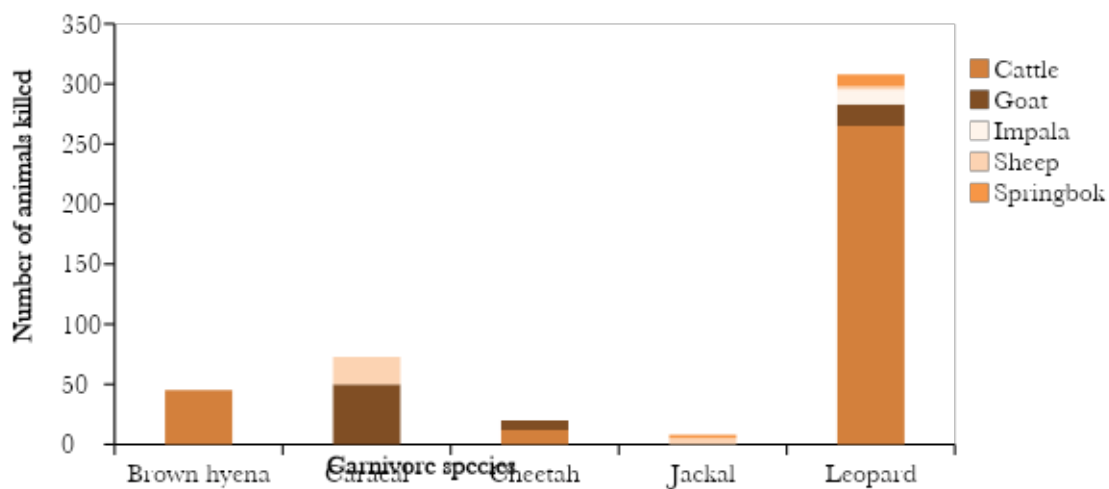


Figure 8: Number of livestock lost to predator species and predator preference of livestock and game on freehold farms in the GWL.

Phase 2: Communal Conservancies

The second phase of this project was conducted in the Okakarara District (E 17.5019, S 20.0215) which covers 18,951 km² and is situated to the east of the Waterberg Plateau National Park (Figure 5). This area, also known as the Okakarara Eastern Communal Conservancies, consists of four conservancies, namely: Otjituuo, Okamatapati, African Wild Dog and Ozonahi. This landscape is dominated by cattle farming and borders freehold farmland as well as other conservancies.

Camera Trapping

The study area was divided into three survey areas with 35 grid cells each (Figure 9). Each grid cell was 8x8km with a single camera trap randomly selected per grid cell (although accessibility and likelihood of capturing wildlife was important in the placement). This resulted in a total of 35 camera trap sites per survey area and 105 sites overall. This area was sampled both during the wet season and dry season. Camera trap deployment commenced in January 2018 and currently only one block remains to be sampled for the wet season.

Figure 9: Camera trap design (8x8km) in the communal conservancies which was divided into three survey areas, with one camera trap placed within each grid cell.

Preliminary Results

Camera trap photos revealed the following:

In total, 15 different carnivore species were captured on camera traps during the survey period (Table 3). Thirteen species were recorded in both survey areas 1 and 2, while 12 species were recorded in survey area 3. Camera traps captured only a few photographs of large carnivore species i.e. African wild dog ($n=5$), cheetah ($n=1$), leopard ($n=4$) and spotted hyena ($n=1$; Figure 10). In contrast, smaller carnivores such as black-backed jackal and caracal were regularly captured on camera traps. The R package, *CamTrapR*, will be used to extract and analyse the data once all the data are collected in February/March 2019.

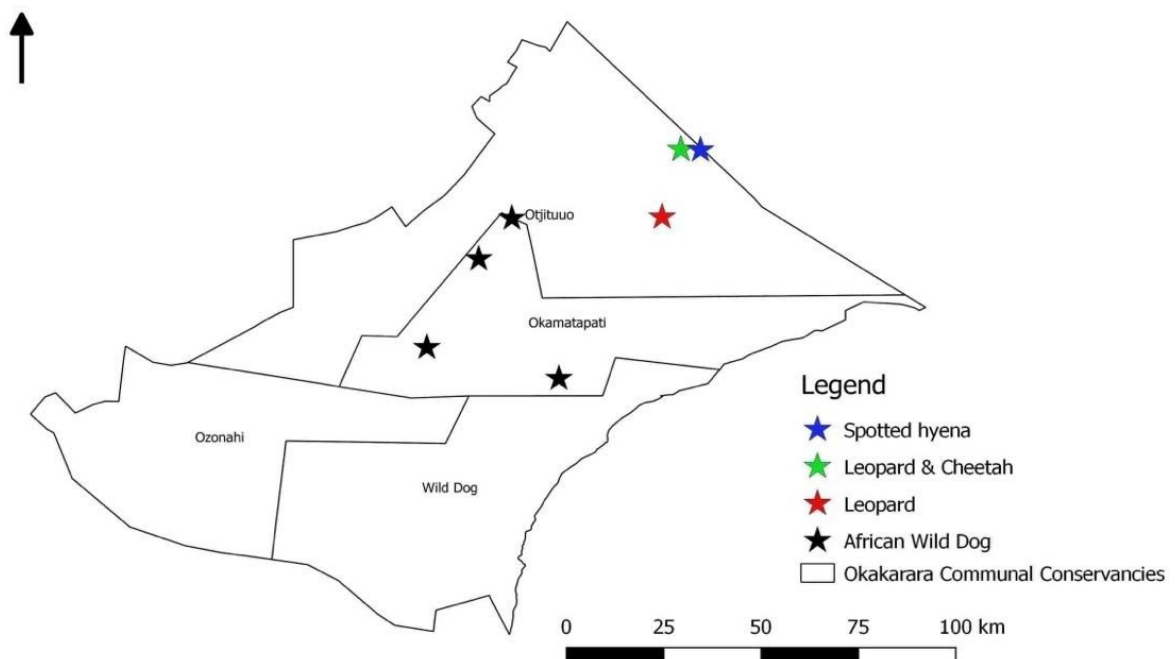


Figure 10: Camera trap photos of large carnivores in the communal conservancies.

Table 6: Preliminary species list for the camera trapping study in the eastern communal conservancies of the Okakarara District.

Species	Scientific Name	Survey Area 1	Survey Area 2	Survey Area 3
Aardwolf	<i>Proteles cristata</i>	●	●	●
African Wild cat	<i>Felis sylvestris</i>	●	●	●
African wild dog	<i>Lycaon pictus</i>	●	●	●
Banded mongoose	<i>Mungos mungo</i>		●	
Bat-eared fox	<i>Otocyon megalotis</i>	●	●	●
Black-backed jackal	<i>Canis mesomelas</i>	●	●	●
Brown hyena	<i>Hyane brunnea</i>	●	●	●

Cape fox	<i>Vulpes chama</i>		•	•
Caracal	<i>Caracal Caracal</i>	•	•	•
Cheetah	<i>Acinonyx jubatus</i>	•		
Leopard	<i>Panthera Pardus</i>	•		
Slender mongoose	<i>Galerella sanguinea</i>	•	•	•
Small-spotted genet	<i>Genetta genetta</i>	•	•	•
Striped polecat	<i>Ictonyx striatus</i>	•	•	•
Yellow mongoose	<i>Cynictis penicillata</i>	•	•	•
Total Species		13	13	12

CCF's research and engagement with communities has helped us gain a better understanding of the current state of wildlife in the communal conservancies. Thus far, it is evident that:

- 1) Large herbivores are mostly absent, except for elephant (*Loxodonta africana*) that occasionally move through the area from Bushmanland and free-hold farmland, and buffalo (*Syncerus caffer*) that move down from the Waterberg Plateau National Park on occasion;
- 2) Medium-sized herbivores such as kudu (*Tragelaphus strepsiceros*) and gemsbok (*Oryx gazella*) are present in extremely low numbers;
- 3) Small-sized herbivores such as duiker (*Sylvicapra grimmia*) and steenbok (*Raphicerus campestris*) are present and relatively well-distributed;
- 4) Large carnivores such as African wild dog (*Lycan pictus*), leopard (*Panthera pardus*) and cheetah (*Acinonyx jubatus*) are present, but scarce; while brown hyena (*Hyaena brunnea*) are relatively well distributed, and;
- 5) Small carnivores such as black-backed jackal (*Canis mesomelas*) and caracal (*Caracal caracal*) are abundant and widely distributed.

These results provide a good indication of the current state of wildlife presence within the eastern communal conservancies of the Okakarara District. Based on the data that CCF has collected, it appears as though the wildlife (both carnivores and their prey) on freehold farmland is abundant, while wildlife on communal land is scarce (Figure 11). It is important that the communal conservancies increase their wildlife numbers by stopping illegal hunting. If the conservancies increase wildlife numbers, it could create a potential eco-tourism/cultural market in the area.



Figure 11: Camera trap photos of some of the carnivore species captured during the survey in the communal conservancies.

Farmer Questionnaires

Along with the Go Green project camera trap deployment, meetings were held in each area in which camera traps were put up. The objective of the interviews (Figure 12) was to collect data and understand livelihoods, human wildlife conflict (HWC) and presence of wildlife based on local knowledge.

With open conversations the following issues of interest were raised:

- 1) African wild dog conflict was a very pressing topic. Community members openly admit that they do not and will not tolerate wild dogs.
- 2) MET does not respond to HWC calls
- 3) Very little known about HACCIS and how it works
- 4) Most farmers use gin traps and don't report predator mortalities to MET
- 5) Livestock theft is a broad issue
- 6) Reports of neighbouring game farms chasing wildlife into their farms
- 7) No water points for wildlife, thus competing with livestock (most water points are situated inside kraals)

Farmers do not know much about conservancies, the structure or how it works. The community have very little understanding of the GWL and how it fits into the broader scheme of transboundary conservation and livestock management. However, all farmers agree that wildlife is a benefit and are open to jointly managing wildlife and feel that more wildlife in the area would benefit the area and

their livelihoods. The community acknowledge that browsing herbivorous species are important to combat some of the bush encroachment compared to grazing species that would compete with their cattle.



Figure 12: Initial consultations with head of households to explain the project objectives (left) and discussing livestock management (right).

One of the biggest issues when asked about NGO support in capacity building is that training is not sufficient. The communities need constant follow up and technical assistance. It was also clear that in order to change mindsets, a few selected and willing farmers need to be engaged with and commit to some different farming practices in order to be examples to other community members, for full community buy in. Different incentives need to be investigated, as well as management styles of the conservancy committee versus the traditional approach to communal conservancies. The model needs to be adapted to suit the area.

African Wild Dogs

African wild dogs (*Lycaon pictus*) are critically endangered. In Namibia, wild dogs are only found in the north-east, and the country-wide population is estimated at 250-350 individuals (Hanssen, pers. comm.). In Okakarara, wild dogs are severely persecuted. Adults are actively hunted and shot, while dens are destroyed and burnt, especially if pups are present. The wild dogs in this area likely provide an important link in Namibia's remaining wild dog population. However, little is known about these individuals and conserving them should be a priority.

African wild dogs are highly social and live in packs of up to 20 individuals. Given their social structure, wild dogs require a high prey intake to feed all individuals within the pack. Wild dogs typically prey on medium-sized antelope species such as kudu, nyala and impala. However, if given the opportunity, wild dogs will prey on livestock, especially calves. Our preliminary camera trap results indicate that the abundance of natural, medium-sized antelope species is extremely low in areas wild dogs are persecuted. The lack of natural prey is therefore causing the wild dogs to predate on cattle, resulting in high conflict with farmers (Figure 13).



Figure 13: A three month-old calf killed by a pack of African wild dogs about 500m from Omaundjiro village in Otjituuo Conservancy (Block 1). Calf skin recovered after the wild dog attack (left) and kill site (right).

Based on a combination of camera traps and local knowledge, we were able to identify areas of African wild dog activity (Figure 14). Camera traps captured a total of five wild dog photos during the study period thus far (Figure 15). These camera trap photos, along with scat samples and local knowledge, provide some of the only data on these wild dogs in the area. To be able to conserve these packs, we must first gain a better understanding on their pack sizes, denning locations, movement, behaviour and diet. This study has provided vital information on the presence of wild dogs in the area, potentially the most persecuted population of wild dogs in Namibia.

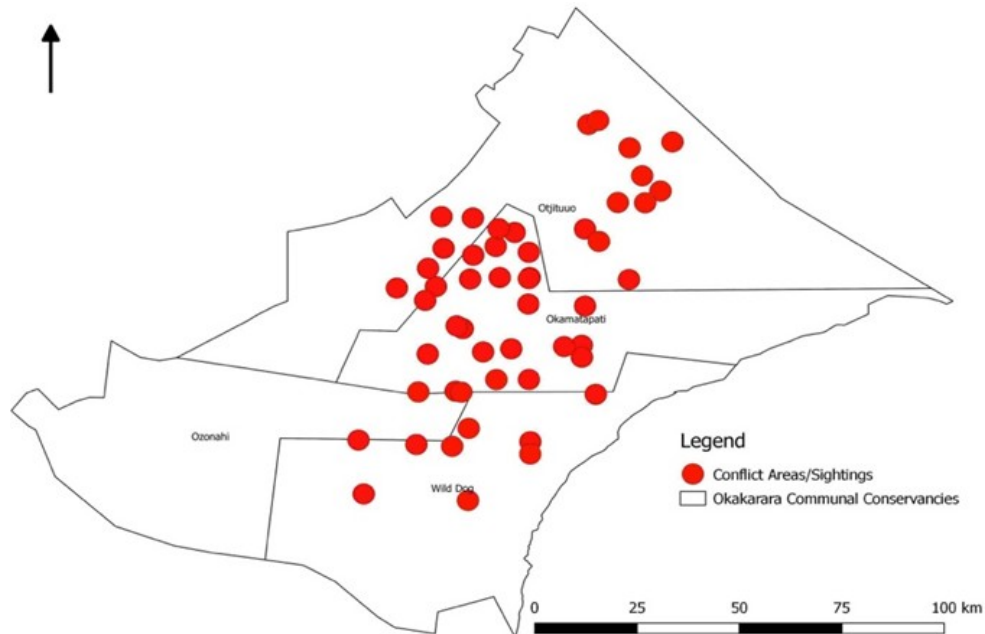


Figure 14: Confirmed locations of African wild dogs in the Okakarara District communal conservancies.



Figure 15: African wild dogs captured on camera traps during the study period in the eastern communal conservancies of the Okakarara District.

2. Pilot projects: E-Shepherd collars and Foxlights

E-Shepherd Collars

As a way to enhance farmer training and reduce human-wildlife conflict (HWC) in Namibia's Eastern Communal Conservancies, CCF started a pilot project in January 2018 with E-Shepherd collars. The project aims to test if these collars placed around the neck of a goat, sheep, or calf would help deter predators from hunting livestock (Figure 16). The collars are designed to trigger lights and emit a high-pitched noise when the animal with the collar is running, in an effort to deter the predator that is chasing them. E-Shepherd collars are a relatively inexpensive method (N\$1359 per unit) to prevent livestock losses to predators in the field, and are sourced locally (South Africa).



Figure 16: Goat in the centre with an E-Shepherd collar around its neck.

The specific objectives of the project are to:

- Test how well E-Shepherd collars work to prevent livestock losses to predators compared to 'controls'
- Test habituation (if predators get used to collars) over time, by looking if predator and livestock conflict increases over time from deployment – 1 year
- See if the collars have an effect on farmer tolerance levels (as measured by a Likert-style questionnaire) for predators, and if those tolerance levels change over time – 1 year.
- See how well E-Shepherd collars work for communal vs commercial farmers in three different study sites (Eastern Communal Area - Otjituuo, Okamatapati, African Wild Dog Conservancies), Waterberg Conservancy and Kavango West.

Between January and May 2018, CCF deployed E-Shepherd collars in three different phases mainly on communal farms in Otjituuo, Okamatapati and Wild Dog Conservancies. Collars were also deployed on commercial farms in Kavango West, and one in the Waterberg Conservancy (Figure 17).

- Phase 1 was deployed beginning 23 January in Otjituuo Conservancy;
- Phase 2 was deployed beginning 30 April in the Waterberg Conservancy (commercial operations on private land), Okamatapati and African Wild Dog Conservancies.;
- Phase 3 deployment in Kavango West and Okamatapati Conservancy was done between 14 May and 18 May.

Additionally, 'controls' (i.e. farmers with similar farming conditions but without collars) for Phase 1 were identified during February 2018, and for Phase 2 and 3 these were identified during July 2018.

Phase 1 will be concluded in January 2019, and Phase 2 and 3 in May 2019.

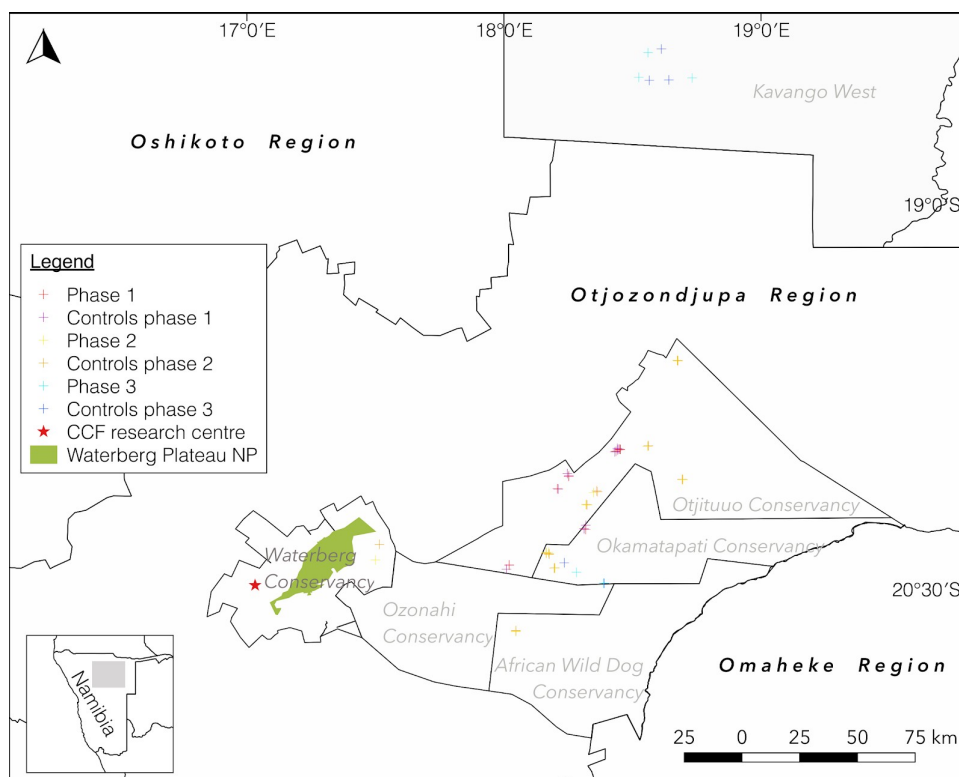


Figure 17: E-Shepherd placements and controls sites.

Sixty-nine small stock collars and eighteen calf collars were placed with 20 farmers in total, the majority located in the Eastern Communal Conservancies. The rest of the farmers were located in Kavango West and in a commercial farm in the Waterberg Conservancy (Table 7 and Table 8).

Table 7: Numbers of E-Shepherd collars deployed by location and collar type (Phase 1, Phase 2, Phase 3). Fifty-three individual farmers were recipients of the E-Shepherd project.

Livestock Type	Region		
	Kavango West	Eastern Communal Conservancies	Waterberg Conservancy
Calf	7	7	4
Small stock	7	62	0
Regional Total	14	69	4

Table 8: Number of E-Shepherd collars by farm type (Phase 1, 2, 3).

Communal	Semi-Commercial	Commercial
70	8	9

In addition to the deployment of collars, 5 workshops were conducted between April, May and August 2018, with a total of 122 participants (99 men and 23 women). The purpose of these workshops was to train farmers on integrated livestock and predator management, as well as introducing both the 'E-Shepherd' and 'Foxlights' pilot projects (Figure 18).



Figure 18: Participants during two workshops in Okamatapati and Otjituuo Conservancies.

CCF has done regular follow-up questionnaires (every 2 months) with all farmers including the controls. The follow-ups have been done both through physical visits and phone calls. The main objective of these is to see how many livestock they have lost since the last visit, if their farming conditions have changed (e.g. they have gotten a herder and/or guarding dog, etc.), and to assess how their tolerance towards predators evolves.

Preliminary results

Data is still being collected at the time of writing, with Phase 1 of the study period near conclusion. All data will be analysed together once Phase 2 and 3 are completed in May 2019. Follow-ups have so far revealed the following:

- (1) From January to December 2018, a total of 615 animals were lost to predators for both groups of farmers (E-Shepherd: $n=250$; Controls: $n=365$), which shows that even though the group with collars have had less losses overall, the collars are not entirely predator-proof.
- (2) Overall, farmers are mostly losing goats (adults 54%, kids 9%) to predators, followed by sheep (adults 25%, lambs 2%), and calves (8%).
- (3) Predators that are affecting these farmers the most are black-backed jackals (*Canis mesomelas*), responsible for 43% of overall losses, and caracals (*Caracal caracal*), responsible for 19% of losses. Both carnivore species seem to have a preference for smallstock (sheep and goats). Larger predators like cheetah (*Acinonyx jubatus*), leopard (*Panthera pardus*), wild dogs (*Lycaon pictus*), and brown hyenas (*Hyaena brunnea*) are also affecting these farmers but at lower frequency (5%, 2%, 3%, and 4% respectively; Figure 20).

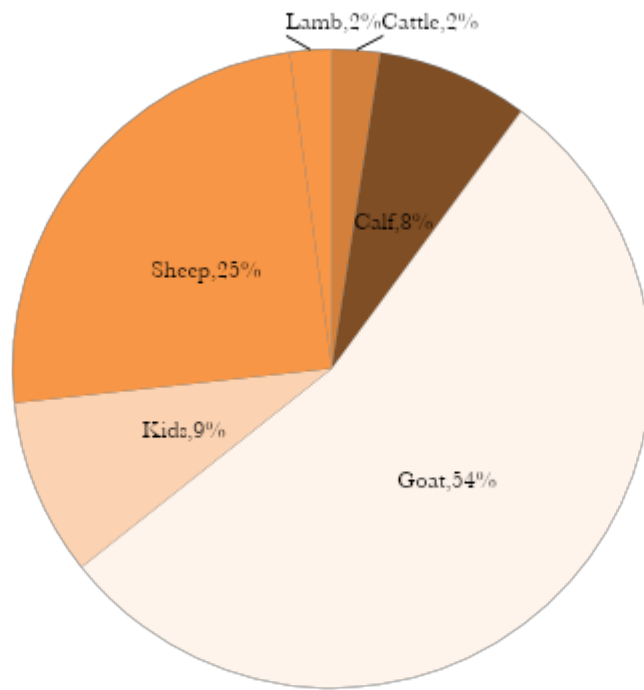


Figure 19: Reported livestock losses per type.

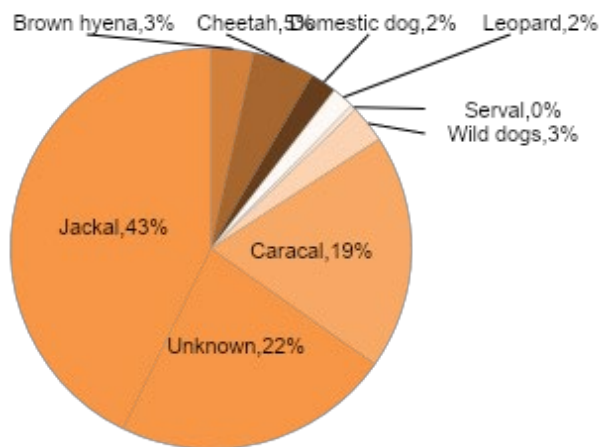


Figure 20: Reported predators responsible for livestock losses by farmers.

- (4) From the losses reported it is evident that a significant proportion of the losses attributed to predators, farmers were not able to identify the predator responsible for the attack (Unknown 22%; Figure 5), which could potentially bias the results of the collar's effectiveness.
- (5) From the questionnaires with farmers and from looking at predators responsible for the losses it seems that depending on the hunting technique of the predator (ambush vs. chase)

and farming conditions, the collars could be more or less effective in preventing livestock losses to predators.

- (6) From the livestock losses, it seems that the effectiveness of the E-Shepherd collars also depend on livestock breed. If they are of a flocking nature it is more likely that they will stay together even if left out in the veld to graze, thus allowing the collars to cover the entire herd at a ratio of 1 to 10.
- (7) Individuals who have received E-Shepherds may have higher tolerance scores than their controls. Even if treatments and controls have both lost no livestock during the same period, pointing to a potential psychological effect of having the deterrent itself.
- (8) Livestock losses suggest that for E-Shepherd collars to work best, effective and good livestock management is still essential to reduce losses in the long term.

Foxlights

The Foxlight (Figure 21) is a predator deterrent with a computerised flashing light. It gives the impression of someone patrolling during hours of darkness and therefore help to prevent livestock losses at night inside the kraal. Similar techniques have been used against lions in Kenya, jaguars and pumas in South America and black-backed jackals in South Africa.



Figure 21: Foxlight in the kraal.

CCF conducts a total of five workshops with a two-fold purpose; train farmers in 'Integrative Livestock and Predator Management', and identifying suitable candidates to receive the Foxlights. Due to the fact that farmers in the Eastern Communal areas have very different kraaling techniques and livestock management practices and live in close settlements, it was not possible to find two individuals with similar characteristics to compare livestock losses with and without the Foxlights, thus the project is going to have a before/after approach – livestock losses will be compared within the same individual for a year (before and after having received the Foxlights). To minimise confounding factors, candidates to test the lights fulfil the following conditions:

- 1) *Are losing, or have lost livestock in the kraal in the last six months,*
- 2) *Losses take place during the night, and*
- 3) *Farmers do not have a guarding dog that sleeps in the kraal.*

For losses that take place close to the kraal (i.e. within 15m) during the night, the Foxlights could also help deter predators. Thus, candidates that reported losses within 15m of the kraal were also suitable candidates.

After identifying suitable candidates, CCF deployed these lights on ten farms (Table 9) in two Eastern Communal Conservancies (Otjituuu and Okamatapati), Namibia (Figure 22). This area is communal land dominated by livestock farming. Farmers suffer severe livestock losses to predators both inside and outside of their kraals. CCF is working alongside farmers to find solutions for this ongoing human-wildlife conflict.

The specific aim of this project is to determine whether Foxlights are an effective method to prevent livestock losses inside the kraal and be a potential solution to reduce human-wildlife conflict in these conservancies.

Table 9: Details of farmers with Foxlights.

<i>Name</i>	<i>Village</i>	<i>Conservancy</i>
<i>Ndike Narukuiami</i>	<i>Okamututjindo</i>	<i>Otjituuu</i>
<i>Puume Urirapi</i>	<i>Okamututjindo</i>	<i>Otjituuu</i>
<i>Hitjivirue Uatanaua</i>	<i>Okamututjindo</i>	<i>Otjituuu</i>
<i>Kapenauame Katjiveri</i>	<i>Okamututjindo</i>	<i>Otjituuu</i>
<i>Clive Majuoka</i>	<i>Otjivamaatenga</i>	<i>Okamatapati</i>
<i>Dokies Tjirimuje</i>	<i>Mooiplaas</i>	<i>Okamatapati</i>
<i>Jackson Kandinhgua</i>	<i>Ombekeremiba</i>	<i>Okamatapati</i>
<i>Paporo Ratoveri*</i>	<i>Okaperongo</i>	<i>Okamatapati</i>
<i>Dije Tjirare</i>	<i>Ongambi</i>	<i>Okamatapati</i>
<i>Ebenhard Karita</i>	<i>Okamatapati</i>	<i>Okamatapati</i>

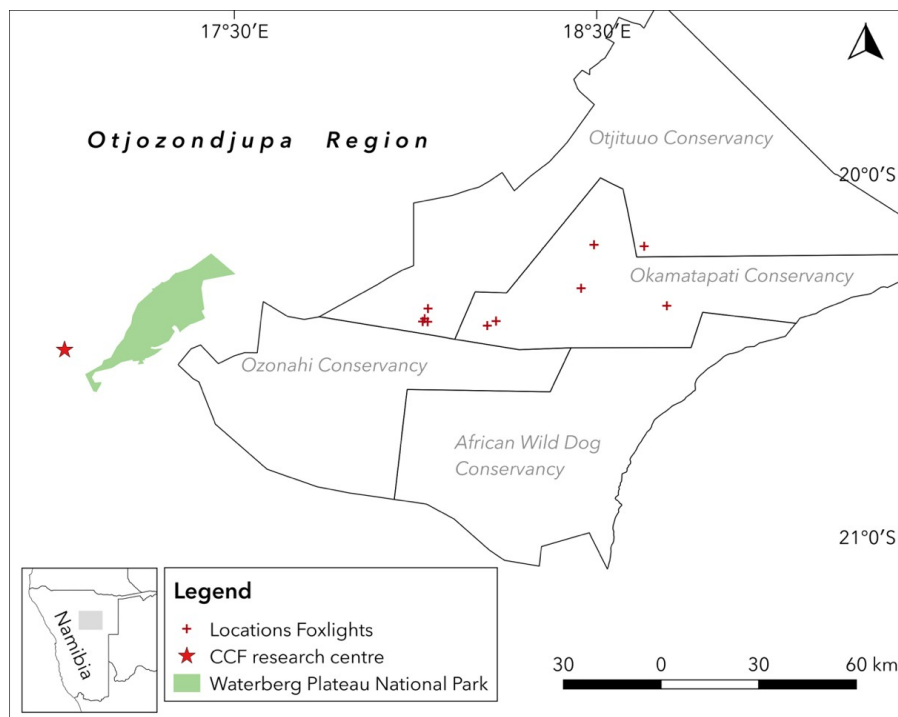


Figure 22: Locations of Foxlight deployment.

CCF ecologists Willem Briers-Louw and Stijn Verschuere deployed four lights per farmer (Figure 23) - i.e. four lights on each side of the kraal, in order to ensure coverage from all sides. Earlier findings in Kenya showed that lions still attack kraals that are partially illuminated from the side without lights. Foxlights were deployed only in kraals with small-stock. In the case where farmers kept sheep and

goats in separate kraals, Foxlights were deployed on the kraal where livestock were killed inside the kraal.



Figure 23: Ecologists Stijn Verschueren and Willem Briers-Louw showing and explaining to farmers how the Foxlights work.

Questionnaires were conducted to evaluate the livestock management practices and to take note of predator problems and livestock losses before the Foxlights deployment. Follow-up questionnaires will be done by telephone every four months to check if there were any more livestock losses inside the kraal at night after the installation of the Foxlights and to make sure that the lights are still operational. After one year a final questionnaire and evaluation of the effectiveness of the Foxlights in the Eastern Communal Conservancies will be done. If the lights show to be an effective measure in reducing livestock losses and there is a growing interest from the local people, there is potential to scale-up the project. As the batteries of the Foxlights will only last for up to three years, CCF will try to find a more sustainable long-term solution, or ensure that they can maintain the Foxlights functioning in the long term. In Kenya, a car battery powered by a solar panel has been used to power a series of LED flashlight bulbs. To equip one livestock kraal, an investment of approximately US\$250.00 is required, compared to the investment of US\$237.00 (price for 4 Foxlights).

Summary of questionnaires

Living conditions

All recipients of the Foxlights are communal farmers. Additionally, the number of people who live in each household varies between 3 - 14, averaging 6 people per household. The majority of participants come from settlements with more than 10, with an average of 9 households per settlement (Figure 24).



Figure 24: Number of people and household at each site of Foxlight deployment.

Livestock information

Livestock numbers reported by farmers show that the two major livestock types preferred are cattle (38%) and sheep (32%; Figure 25).

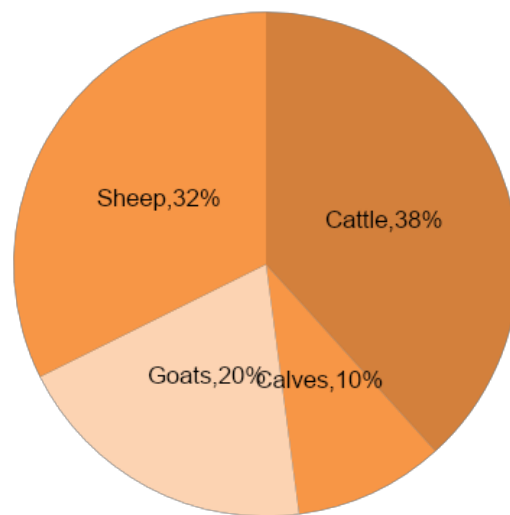


Figure 25: Livestock numbers reported by recipients of Foxlights.

Reported livestock breeds indicate a majority of sheep and cattle breeds are mixed. Moreover, there is a greater variation of breeds with sheep (4 different types). All farmers (n=7) who own goats report they are the Boer breed (Figure 26).

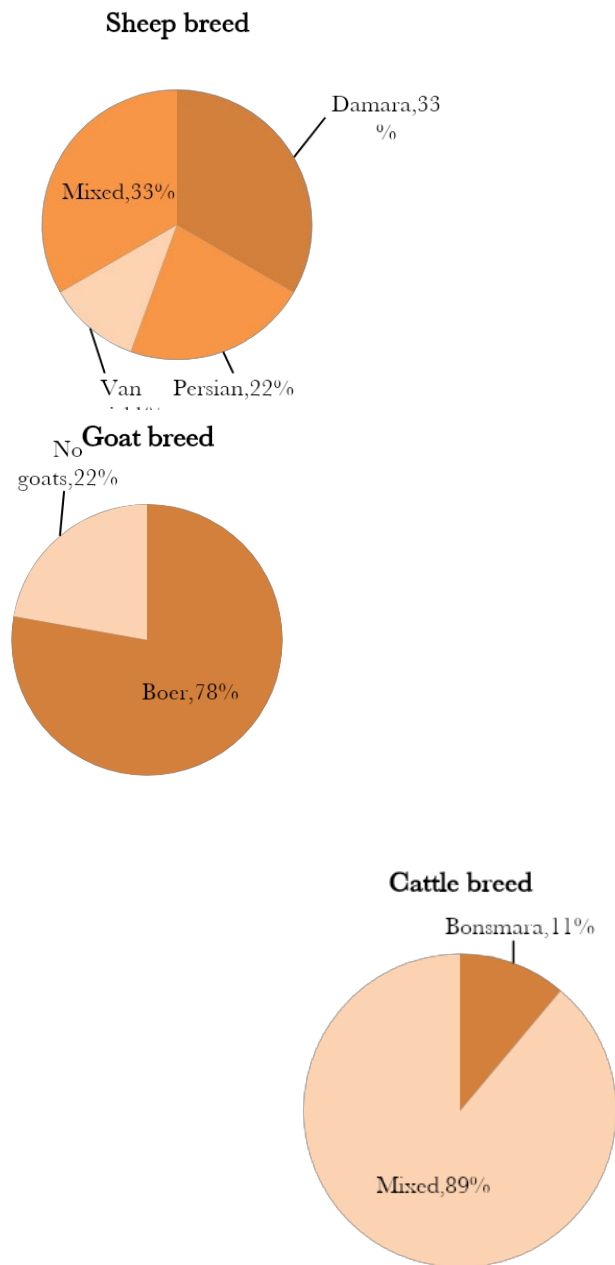


Figure 26: Breed of livestock owned by recipients of Foxlights.

Infrastructure and livestock management information

All farmers reported to have had losses inside their kraal during the candidate selection workshops, and we were interested in getting more information on how many kraals they own and their conditions. Having this information will allow us to understand what other factors may influence livestock losses inside the kraals due to predator losses. In addition, we also asked more specific questions on their livestock management practices, specifically related to the kraaling of their livestock.

Regarding their management conditions, 78% of the farmers (n=7) reported to keep cattle and small stock in separate kraals, while the rest (n=2) keep them in the same kraal. Moreover, only 11% (n=1)

reported to kraal all livestock at night. Twenty-five percent (n=2) of farmers kraal half of their livestock during the night, while 75% (n=6) kraal two-thirds of theirs. The main reason for this is because these farmers let their cattle roam in the veld (bush) overnight.

The number of kraals owned by farmers vary from one to four. All farmers have fences that are 1 - 2 meters high. Sizes of the kraals range from 8x12 meters to 35x35 meters. Kraals are predominantly built with wire (chain-link/barbed) (78%, n=7), however there are some that mix this material with bush (Acacia; 11%, n=1) or sheets (metal/wood; 11%, n=1). Due to the use of this material, for 78% of farmers (n=7) livestock is visible from outside the kraal, while for 22% (n=2) livestock is partially visible.

Preventive methods against livestock depredation

Farmers were asked about other preventive methods they use to avoid losing livestock to predators, and time of the day they use them. Figure 27 shows a summary of the methods they use. The main method used by the majority of participants is a guarding dog, mainly used only during the day but some also use it at night. Some use other methods like herding, scarecrows, and E-Shepherd collars (included in the 'Others' category).

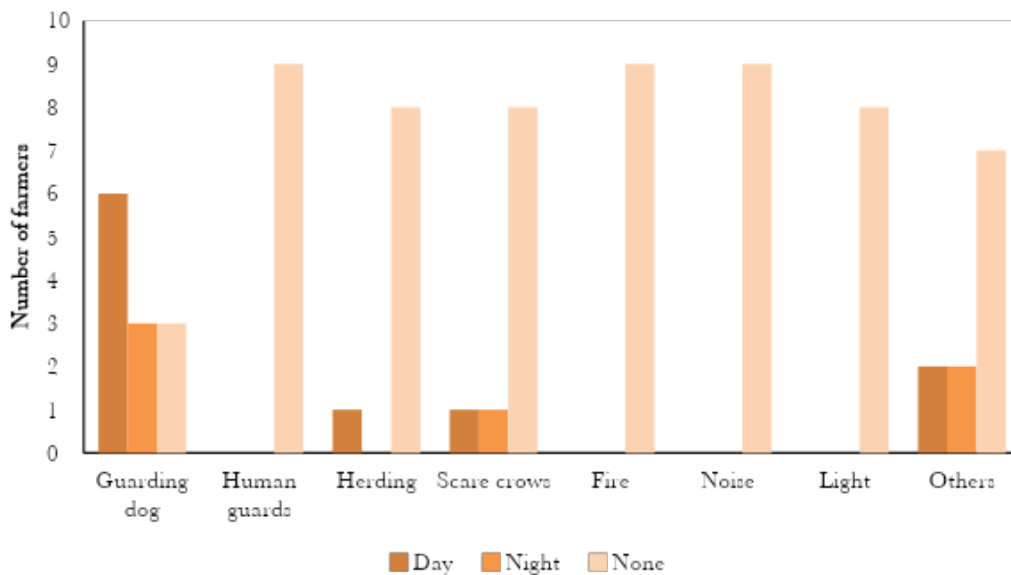


Figure 27: Summary of preventive methods used by participant farmers.

Livestock losses

To measure the effectiveness of the Foxlights we are taking a 'before/after' approach on livestock losses, thus farmers reported all the livestock losses they have experienced over the last year. After a year with the Foxlights they will report their losses so we can determine if the lights are effectively deterring predators, specifically within the kraal. In total, the 9 farmers lost 121 animals during 2018. The main livestock that farmers are losing is sheep – adults 31% (n=38), lambs 24% (n=29), followed by goats – adults 21% (n=25), kids 9% (n=11), and calves 15% (n=18; Figure 28).

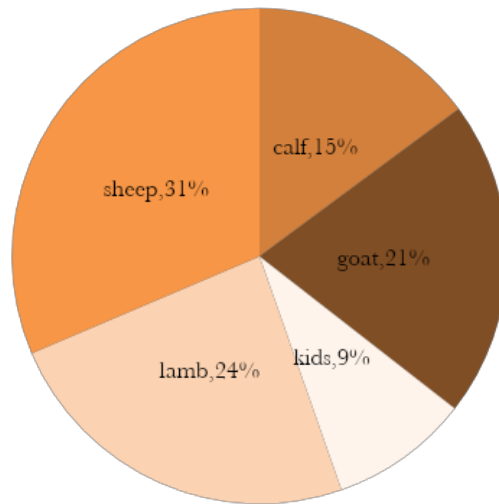


Figure 28: Total livestock losses for 2018.

The main predators affecting farmers are African wild dogs (*Lycaon pictus*), responsible for 45% of their losses, followed by blacked-back jackals (*Canis mesomelas*) responsible for 36% of the overall losses. Jackals have a preference for smallstock (goats and sheep), while wild dogs have a preference for calves and sheep. Larger cats like leopard (*Panthera pardus*) and cheetah (*Acinonyx jubatus*) seem to be less of a problem in general (with only 3% and 1% respectively). Additionally, 8% of the losses were reported to be due to domestic dogs or an unknown predator (Figure 29).

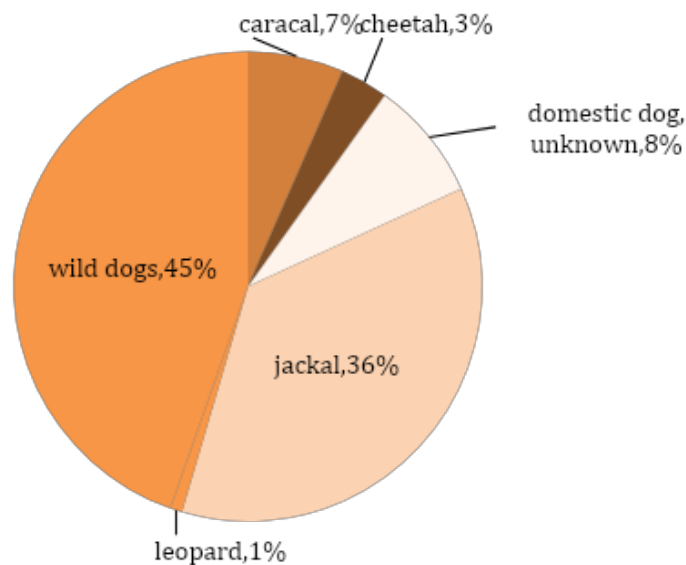


Figure 29: Predators responsible for livestock losses.

According to the time farmers reported their losses, it seems that predators will be more likely to shift their prey preference to livestock once the resources become scarcer during the cold and hot dry seasons.

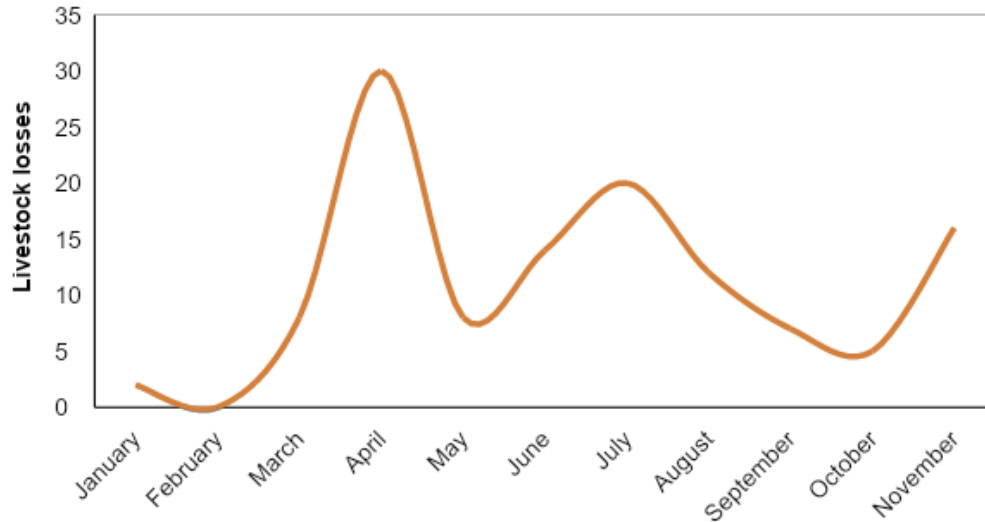


Figure 30: Total livestock losses throughout the year (2018).

For all losses reported, 56% happened more than 15 meters from the kraal, while the rest happened equally inside and within 15 meters of the kraal Figure 31. However, this can be explained due to the fact that all farmers reported to keep their cattle outside in the veld overnight, which is when most of the losses of cattle (calves) happened (Figure 32). Similarly, for losses of sheep further away from the kraal, it coincides for when they are left out to graze in the bush (morning; Figure 32).

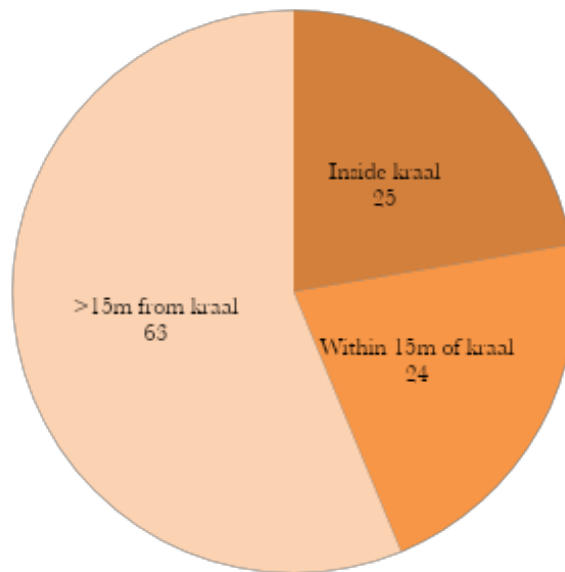


Figure 31: Location reported for losses.

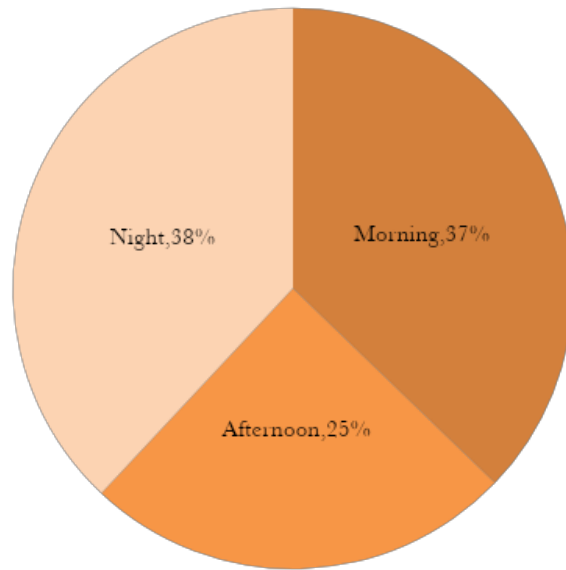


Figure 32: Time of day for reported losses.

Lastly, all farmers except one stated to have reported the attack to an authority. From these, 41% (n=9) reported only to the Conservancy, 36% (n=8) to the Ministry of Environment and Tourism, and 18% (n=4) to both (Figure 33).

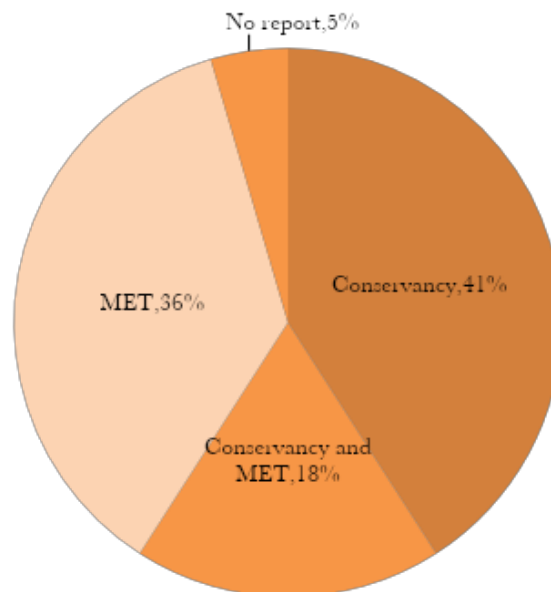


Figure 33: Reported predator attacks.

3. Cheetah Releases and Monitoring

Dexter and Alcatraz (AJU1607 & AJU1627)

CCF released a coalition of three male cheetahs, known as the 'Inmates' on 5 March 2017 at Erindi Private Game Reserve. From the time of release, the males did quite well on their own making regular kills and only requiring occasional supplementation. Unfortunately, one of the coalition mates, Donner (AJU1616), was found dead in June 2017. The necropsy performed indicated that a leopard had killed him. However, despite the loss of one member the other two males, Dexter and Alcatraz (Figure 34) continued to perform exceptionally on their own in Erindi.

The two males established a solid and stable home range in the south-western region of Erindi, where one of CCF's other coalitions (Chester and Obi-Wan) used to patrol. The males made regular kills and provided Erindi visitors many incredible sightings. Sadly, on 29 March 2018 Dexter was found dead after his GPS collar had indicated no movement for over six hours. After performing a necropsy, the cause of death was determined to be internal thoracic haemorrhage and while it is difficult to say what caused this, the most likely case is that Dexter was kicked by a prey animal while hunting. At the same time, Alcatraz was also injured. A team from CCF immediately travelled to Erindi to assess his condition and to determine if any veterinary care was necessary. Fortunately, Alcatraz had sustained only minor injuries and CCF's veterinarian only needed to dart him with a dose of antibiotics.

Despite the loss of his last remaining coalition mate, Alcatraz continued to do well on his own in Erindi. Sadly, however, Alcatraz was killed by a coalition of two male lions on 25 October 2018 while he was resting after having finished eating a kill he had made that morning.

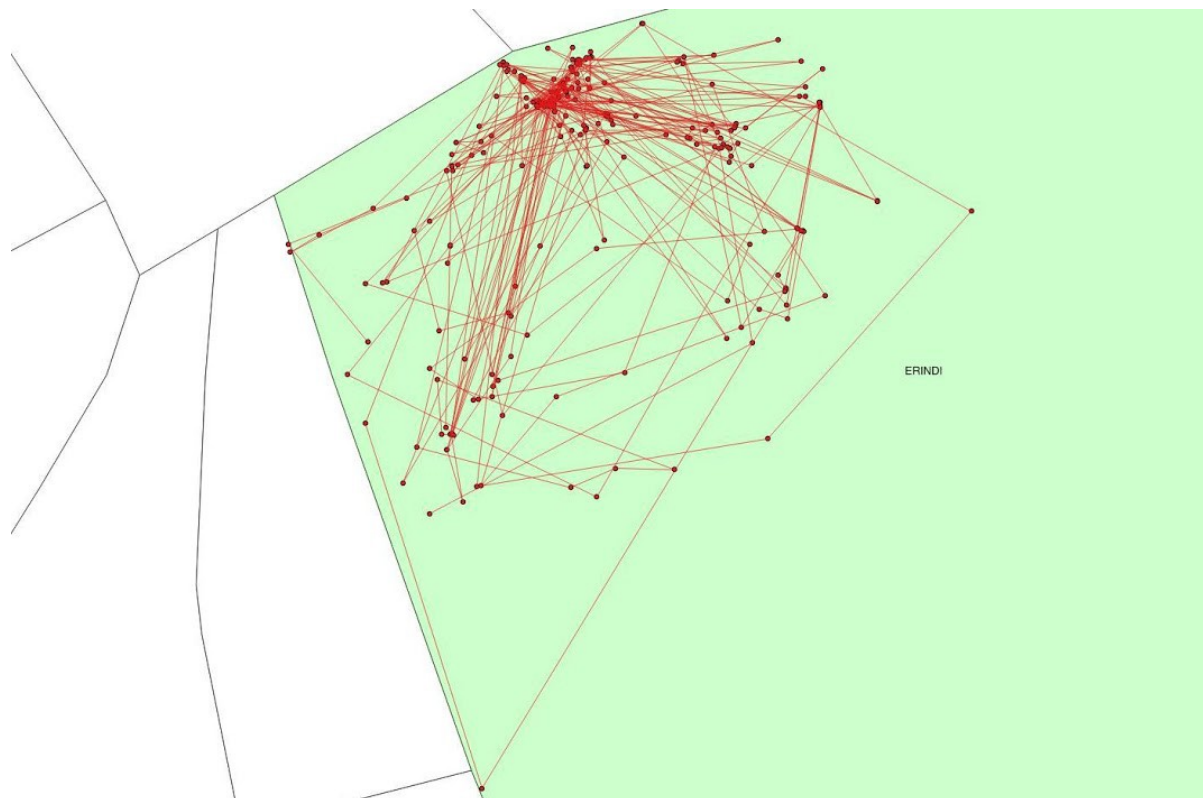


Figure 34: GPS collar data from Alcatraz from 2018 truncated to one point per day.

Savanna and Shandy (AJU1648 & AJU1649)

In November of 2017, Savanna gave birth to another litter of cubs, which see sadly lost sometime in January of 2018. However, on 5 May 2018 Savanna gave birth to yet another litter of four cubs. Savanna still has three of her original four cubs and on 27 June 2018 she took them out of the nest for the first time and started taking them to kills, their first taste of meat occurred on 29 June 2018.

Savanna has had the most success with this current litter compared to all her past litters. Raising cubs to adulthood is a very difficult task for a mother cheetah, particularly in an area with lions, leopards, and spotted hyenas. Despite this, at the end of 2018 Savanna (Figure 35 & Figure 36) and all three cubs were thriving in Erindi. Savanna makes regular kills and the cubs are growing stronger every day. 2019 will bring many learning opportunities for the three cubs, including opportunities to participate in hunts with their mother. CCF and Erindi will continue to monitor the small family closely.

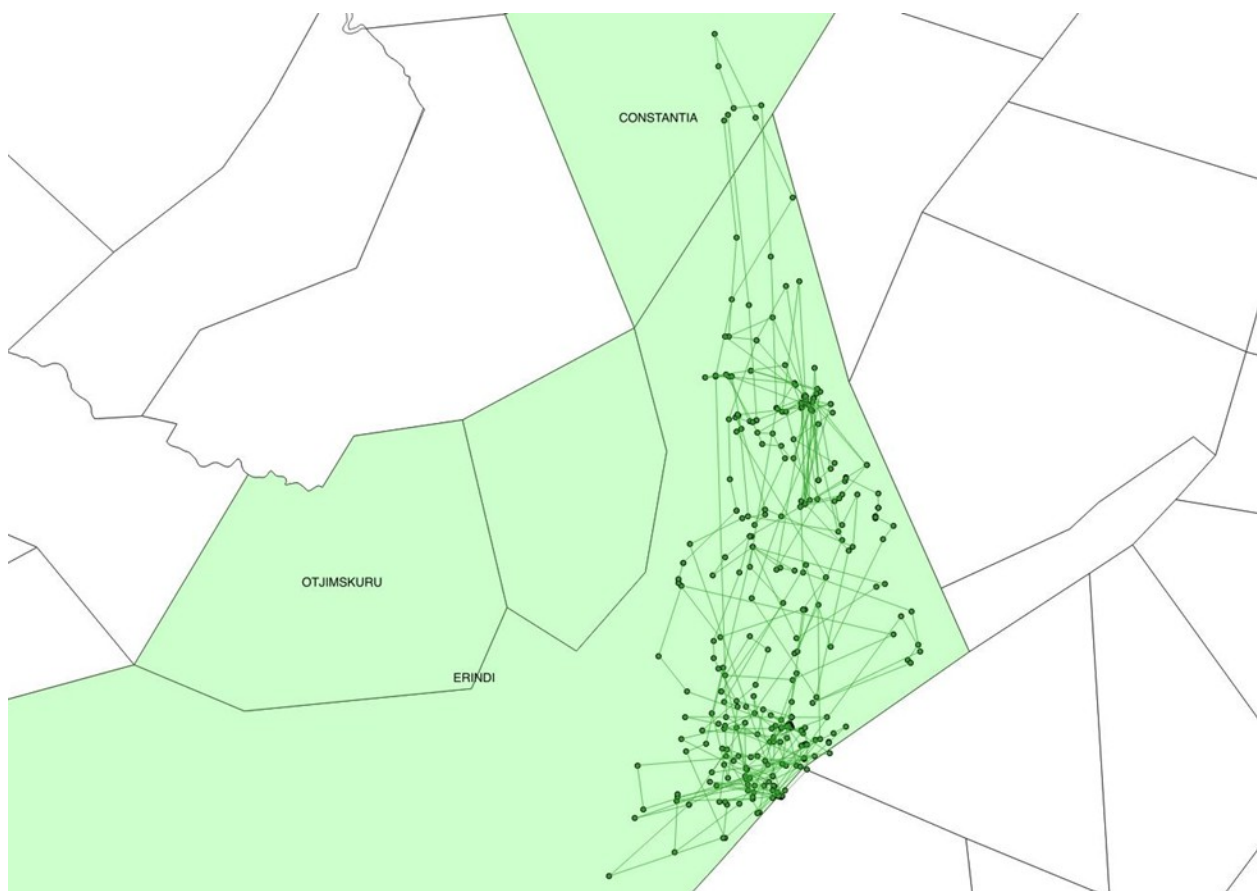


Figure 35: GPS collar data from Savanna from 2018 truncated to one point per day.

Unfortunately, Shandy's collar failed on 16 October 2016 and has yet to be replaced as of December 2018. While Shandy's precise movements are currently unknown, Erindi staff still sees her on occasion and report she's doing very well. CCF will attempt to re-collar her should an opportunity present itself.

Obi-Wan (AJU1561)

Obi Wan has been doing very well since his coalition mate Chester died in November 2016. He is making successful kills every few days and is in good condition considering his age of 11 years.

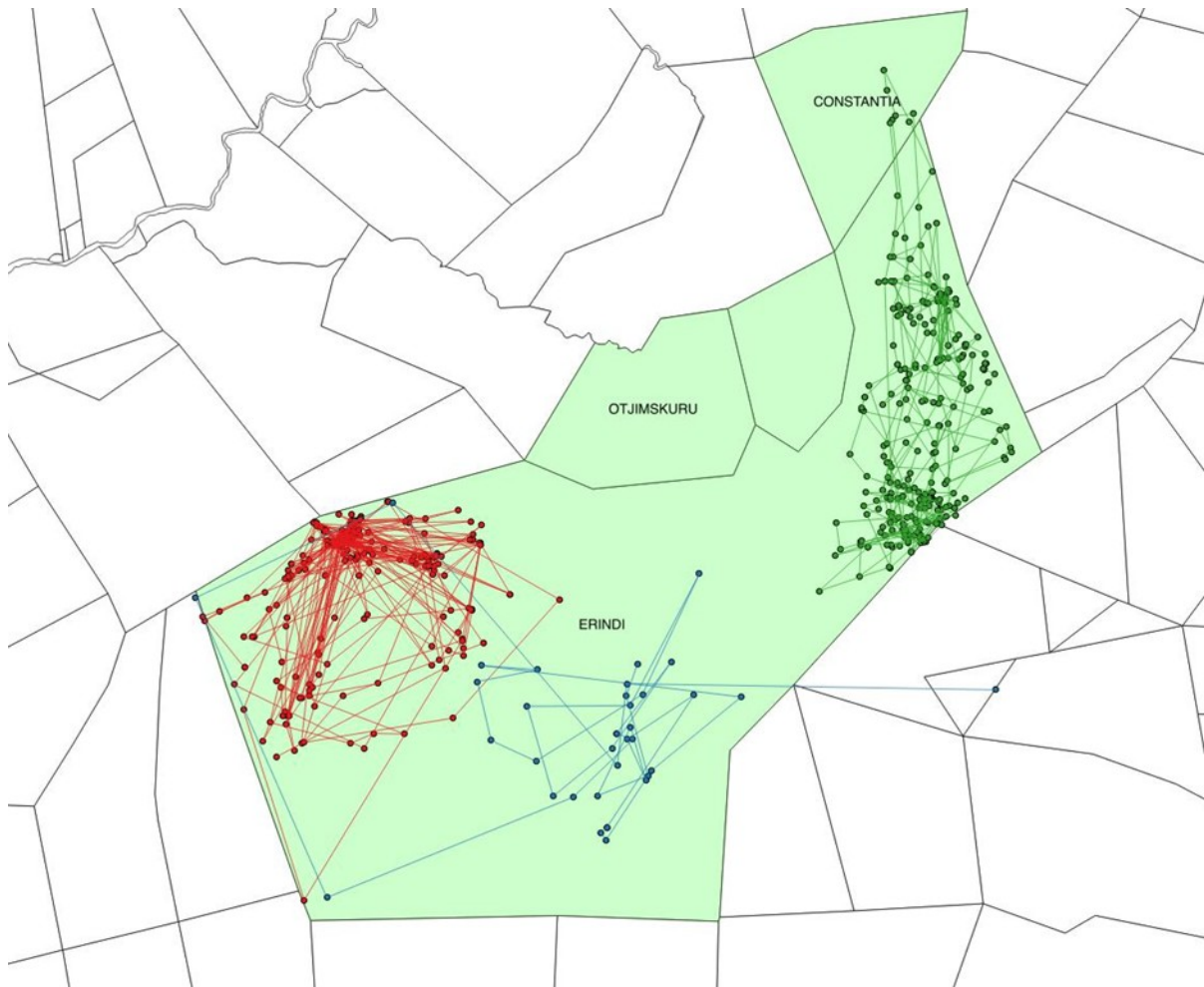


Figure 36: GPS collar data from all cheetahs with GPS collars in Erindi during 2018. All data truncated to one point per day. Alcatraz in red, Miers in blue, and Savanna in green.

Eli (AJU1732)

As Eli's collar was scheduled to drop-off early in 2018, CCF made a plan with B2Gold (where he had been spending the majority of his time) to set traps to try and recapture him. Traps were set in the middle of March 2018, but unfortunately CCF was not successful in recapturing Eli. Eli's movement (Figure 37) data indicated that he was indeed in the area of the traps but it seems he was avoiding them. CCF will continue to work with B2Gold to try and trap this cheetah so that a new GPS collar can be placed. GPS data from the collar indicates that it dropped off on 11 April 2018, but upon collection of the collar CCF found that it had actually fallen off due to a failed connection in the collar rather than by the activation of the timed-release drop-off.

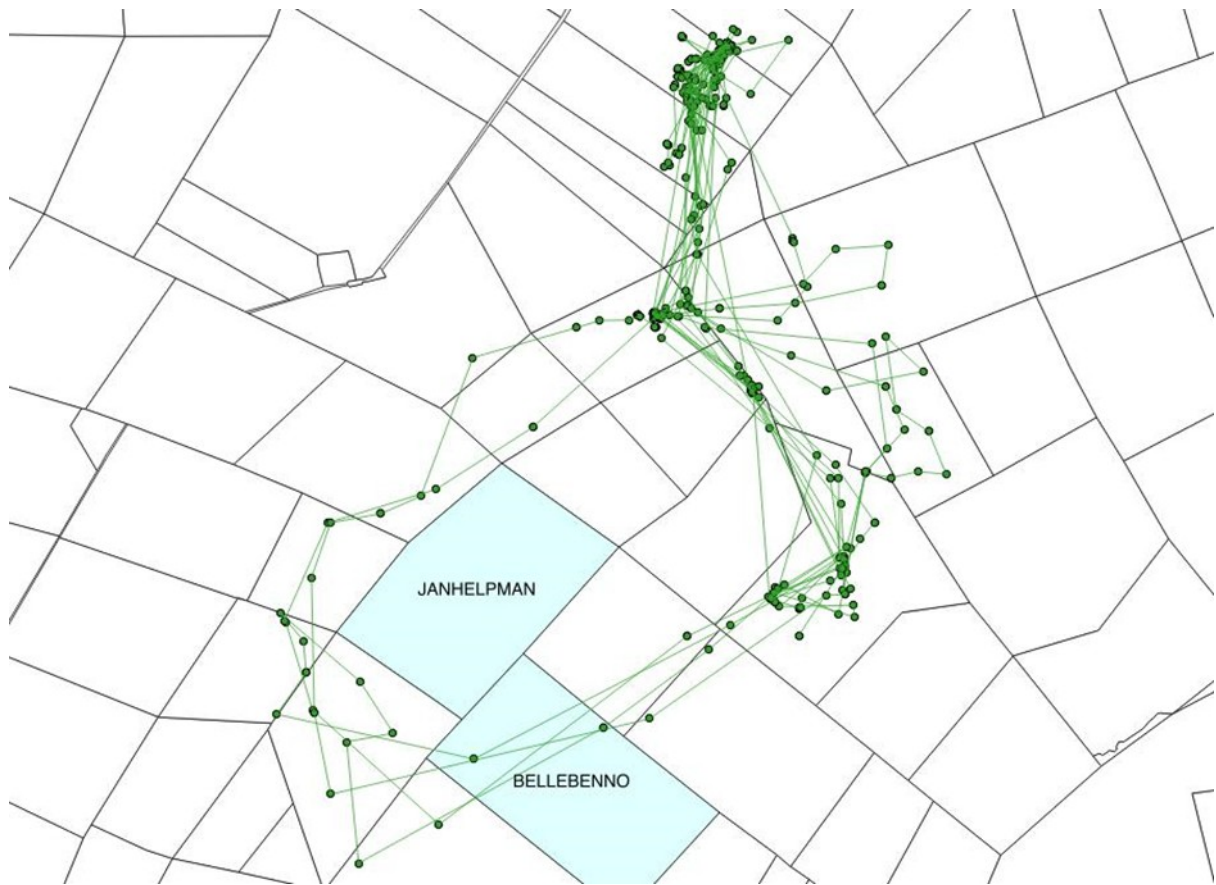


Figure 37: GPS collar data from Eli from January 2018 to 11 April 2018 when his collar dropped off.

Zinzi's Cubs and Elwood (AJU1664, AJU1665, AJU1666, & AJU1668)

In the very early morning of 12 August 2016, one of CCF's rehabilitated and released cheetahs, Zinzi (AJU1619), was killed by a leopard. At the time, this cheetah had three 11month old cubs (two males, Kamin-AJU1664 and Cyclone-AJU1665 and one female, Zin-AJU166) accompanying her. Unfortunately at this age, the cubs would not have been able to survive on their own without their mother and therefore CCF's monitoring had to capture all three cubs for care in CCF's rehabilitation facility until they were old enough for release.

In July 2016 on a farm nearby CCF, the game farmer shot a female cheetah and captured her five cubs in a cage trap. The farmer contacted CCF who then went to collect the five cubs. Of the five only one was male (AJU1668), all others were female. A few months after their arrival to CCF, the male cub was joined with the two male cubs from Zinzi's litter, and the one female from Zinzi's litter was joined with the four females from this litter.

CCF made the decision in March 2018 to release the coalition of three males and Zin onto CCF property straight from their enclosure (Figure 38). On 7 March 2018, Zin was reunited with her brothers and Elwood and then on 18 March 2018 the group of four were released.

After release, Zin separated from the three males after the first day and never returned to the Leopard Pen enclosure. The three males remained in the area of Leopard Pen for the first week post-release and then began exploring deeper into CCF's reserve. Zin made her first kill 10 days after release and then began making regular kills every few days after the first (Figure 39). The males

struggled to make successful kills and required supplementation for the first few weeks of their release.

Unfortunately, about one week after their release the three males got separated from one another for some unknown reason. CCF's monitoring team decided to give them time to try and find one another on their own, however after about two weeks of separation the decision was made to capture each male and artificially reunite them back in Leopard Pen. During their period of separation, only Cyclone was successful in making a kill. Kamin wandered into Leopard Pen on his own, so the team was able to simply close him in. Cyclone and Elwood had to be darted. After about a week back together in Leopard Pen, the males were re-released. The males remained together and GPS data indicates that they were successful in making kills, however another few weeks after this release two of the males were captured in cage traps on a neighbouring farm. After receiving permission from the farm, CCF's team collected the two captured males and captured the third and returned them yet again to Leopard Pen.

Following this event, CCF made the decision to release the males into Erindi Private Game Reserve instead of back onto CCF property. In August 2018, these three males were transferred to a holding boma within Erindi to start their soft release holding period. As of the end of 2018, the males were still in the holding boma and plans are underway for their eventual re-release into the reserve in January 2019.

Tragically, a game farmer north of CCF shot Zin on 16 May 2018 when she was seen chasing springbok. This cheetah was immediately independent from the time of her release as she never required any supplementation from CCF's monitoring team and began making regular kills very soon after release. Had she not been shot, Zin would have likely gone on to breed and raise cubs of her own in the area she was born in. This tragic loss further reiterates the importance of CCF's continued outreach and education programming.

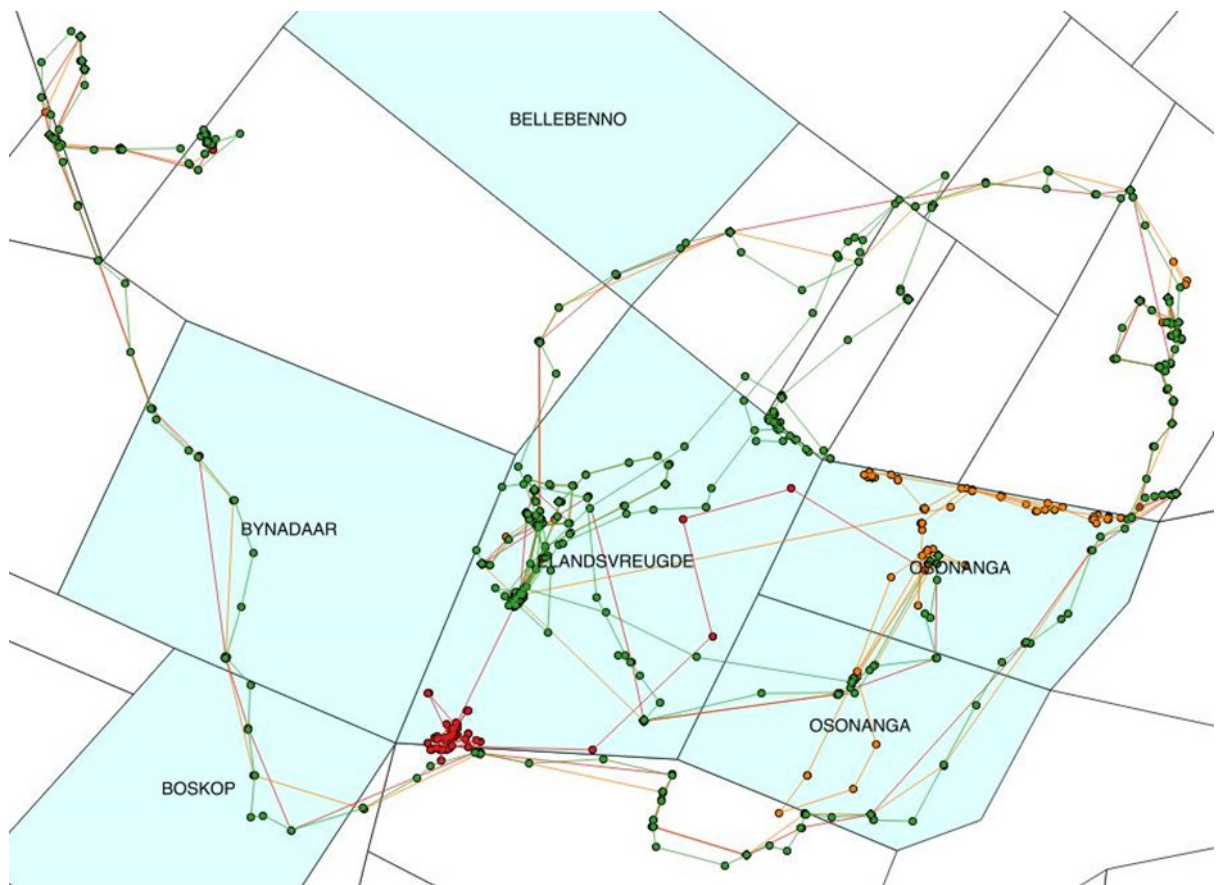


Figure 38: GPS collar data from the three males during their release in the first half of 2018.

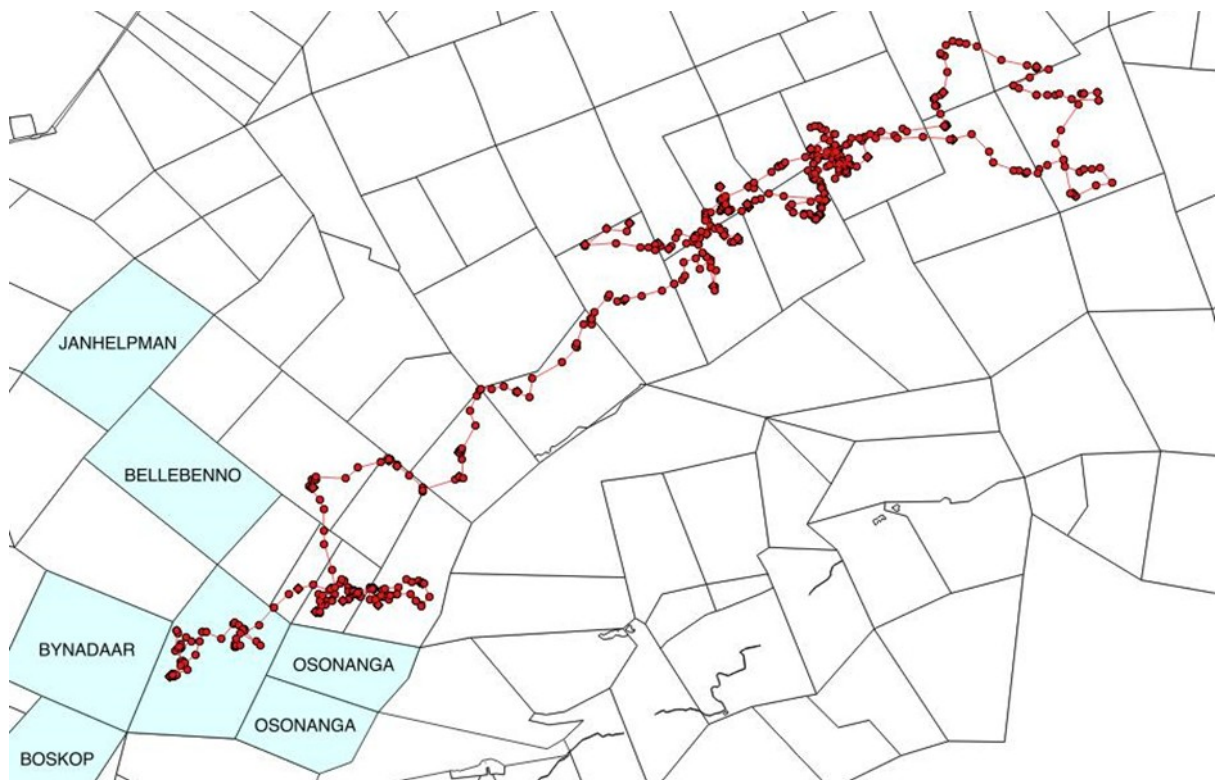


Figure 39: GPS collar data from Zin during her release in the first half of 2018.

Merlin (AJU1654)

In February of 2016, CCF responded to a farmer's call regarding a single male cheetah ('Merlin' AJU1654) that he had captured just outside of his house. The cheetah was killing the farmer's goats and the farmer had actually watched this occur from his house. When CCF's team arrived, they discovered that the cheetah had a shattered wrist joint, which explains why he was killing goats. The cheetah was transferred back to CCF for rehabilitation with the hope that he would eventually heal well enough to return to the wild.

On 3 September 2018, CCF released Merlin from his enclosure at CCF headquarters after deciding that he had recovered well enough to be released. Merlin remained relatively close to CCF property (Figure 40), moving slightly south. Despite his time in captivity, Merlin never habituated to humans and therefore was not trackable, but CCF's monitoring team kept track of his activity through his GPS collar. GPS data indicated that Merlin was making regular kills, finding water, and avoiding human activity; all signs indicating that he had not lost his independence during his two-year rehabilitation period.

Unfortunately, Merlin was shot by a neighbouring game farmer on 17 October 2018 for unknown reasons.

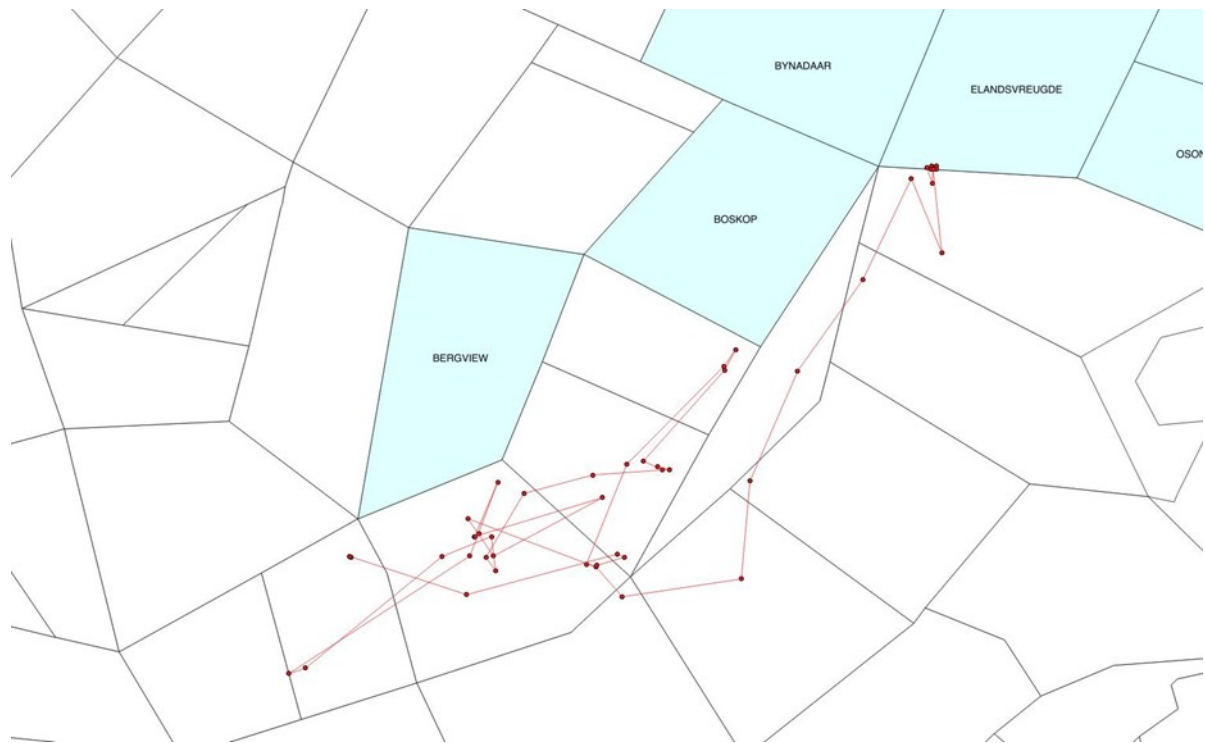


Figure 40: GPS Collar data from Merlin during his release in the last half of 2018, truncated to one point per day.

Miers (AJU1778)

In May of 2018, CCF collected a single adult male cheetah on a farm south of Otjiwarongo. The farmer informed CCF's team that the cheetah had been captured only a couple of weeks previous, however based on the conditions of the enclosure they had him in and based upon the behaviour of the cheetah CCF suspects that this male had been in captivity for a few months at least. The cheetah was moved into a transfer box and driven to CCF.

After a brief period of rehabilitation and care from CCF, Miers made a very quick and full recovery, and the decision was made to release Miers in Erindi Private Game Reserve. Miers was transferred to Erindi to start his soft-release holding period in August 2018 and was released into the reserve on 26 September 2018. Miers performed exceedingly well post-release (Figure 41), but this was expected as he was an adult cheetah when he was first captured. Miers only required supplemental food a single time before making his first kill. After his first kill, Miers began making very regular kills as necessary and no longer needed support from CCF's monitoring team.

On 13 October 2018, Miers escaped Erindi onto a neighbouring farm east of the reserve. Luckily, CCF's veterinarian was on site with the monitoring team and so the team travelled to his location, darted him, and returned him to the reserve without incident. Unfortunately, Miers escaped yet again on 4 November 2018 and appears to have escaped through the same exact spot as the previous occasion. Erindi checked the fence and indeed found a large hole through which Miers was escaping. The decision was made to place Miers back inside his holding boma, to provide time for the fence to be fully fixed. Unfortunately, Erindi was unable to fix the fence before the end of 2018, so Miers will be released into the reserve yet again sometime in early January after the fence has been repaired.

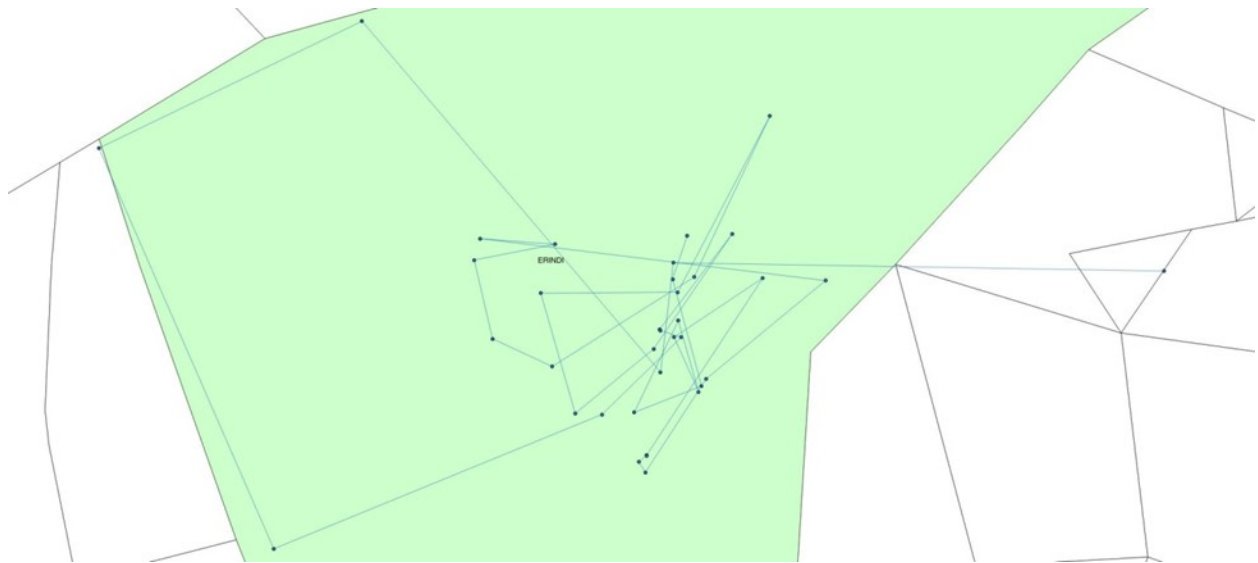


Figure 41: GPS Collar data from Miers during his release in the last half of 2018, truncated to one point per day.

F. Ecosystem Research

As over 80% of Namibia's game inhabits farmland, assessment of the Namibian ecosystem for long-term habitat viability for the cheetah and its prey is a part of CCF's primary on-going research.

1. Weather Monitoring

CCF staff continued collecting rainfall data on CCF farms, and daily high and low temperature readings at the CCF Centre throughout 2018 (Figure 42 & Figure 43). Between January and December 2018, CCF received a total of 175.84 mm. The first drops in the summer fell on 21 September 2018 (<1mm) and the first significant rain event was on 30 December, receiving an average of 34mm throughout CCF land, and as high as 67mm in the areas closer to the Waterberg. During the wet season 2017-2018 (September – April), CCF received 234.64 mm of rain, which is lower than the median (384mm) rainfall for the last 10 years.

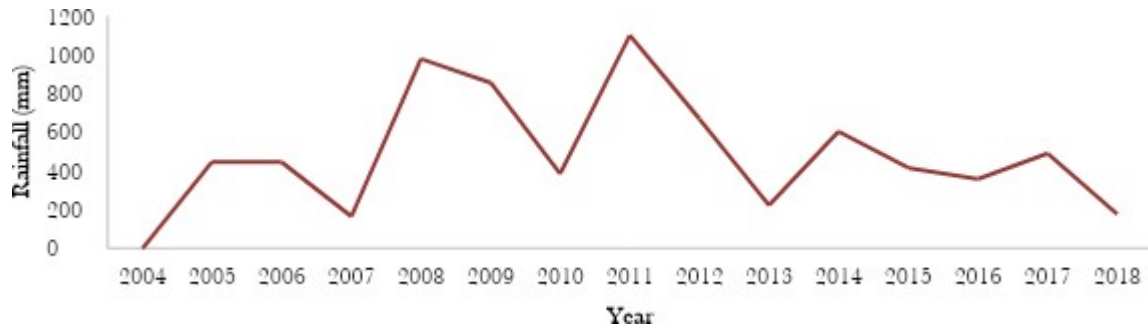


Figure 42: Annual rainfall from 2004 to 2018. Each rainy season comprises the precipitations occurring between October of one year and July of the following year.

The lowest temperature in 2018 was recorded on 8 June, 3 and 19 July (7°C), and the highest temperature was recorded on 18 and 28 November (36°C). In comparison to 2017, the monthly maximum temperatures are similar, except for lower temperatures between July and August during 2018. The monthly minimum temperatures are substantially higher for the beginning of 2018 compared to last year (Figure 43).

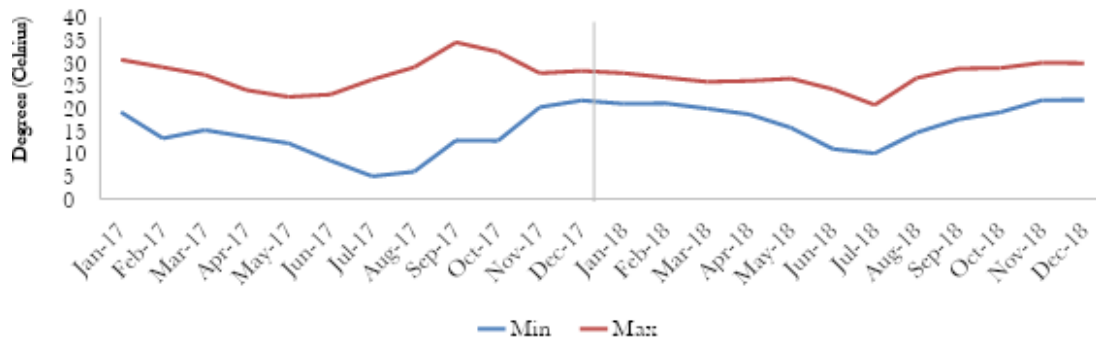


Figure 43: Monthly average minimum and maximum temperatures (°C) from January to December 2017 and 2018.

2. Game Monitoring

CCF's long-term wildlife monitoring programme continues with the assistance of volunteers and student interns. The research conducted on CCF farms is designed to understand patterns and trends of game density, movements, demographics, and habitat utilisation. The monthly monitoring involves visual road counts, categorising vegetation types, densities, and distributions. This information is correlated with data collected on rainfall and temperature.

Big Field Game Counts

CCF's Big Field, also known as 'The Little Serengeti', is an old uncultivated field of 14.9 km². The field, one of the largest open, uncultivated areas in the north central farmlands, attracts a high number of free-ranging game. This area provides an ideal case study to monitor ecological successional trends. Apart from containing high prey densities for cheetahs and leopards, this area contains the most game, so monitoring trends and understanding the dynamics of how the game utilises the field provides important information for future management strategies and is very helpful for tourism in the long term. For this reason, CCF has been conducting monthly counts since 2004.

The field habitat has changed over the years and continues to show a high density of Bitter bush (*Pechuel-loeschea leubuitziae*), which has triggered a change in species density on the field.

During this reporting period, a total of 36 replicate counts (3 routes sampled daily for 3 days) were conducted on the Big Field, resulting in a sampling effort covering 296.64 km. There are three routes on the field: Chewbaaka Road (6.34 km), Midfield Road (5.38 km), and Osonanga Road (4.76 km, Figure 44). The total distance travelled by three teams is 16.48km per day and 49.44km per month.

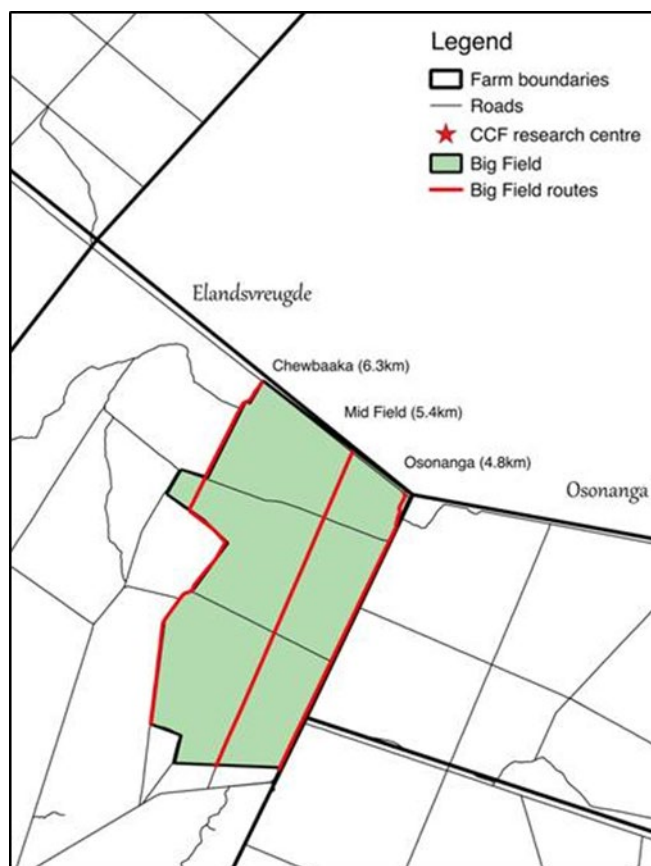


Figure 44: Map of CCF land and location of the Big Field showing the three transects driven monthly for game counts.

All data from these surveys were entered into the main database and preliminary results on trends were produced. Density estimates for the most common species (representing more than 10% of sightings) are reported in (Table 10). Densities were estimated using Distance 7.2 Software.

The current period was compared to the same period in 2017, showing an increase in springbok and red hartebeest, and a decrease in oryx and warthog (Table 10, Figure 45). All other species are compared in Figure 46, this shows a significant increase in eland and giraffe.

Table 10: Density estimates (individual/km²with 95% confidence interval) of the most common species seen on Big Field in 2017 and 2018.

Species	2017			2018		
	Mean	Lower CI	Upper CI	Mean	Lower CI	Upper CI
Warthog <i>(Phacochoerus africanus)</i>	6.22	5.07	7.62	3.15	1.33	7.62

Springbok <i>(Antidorcas marsupialis)</i>	0.16	0.11	0.22	0.72	0.14	3.77
Red hartebeest <i>(Alcelaphus buselaphus caama)</i>	0.1	0.07	0.14	0.32	0.08	1.71
Oryx <i>(Oryx gazella)</i>	0.37	0.30	0.45	1.10	0.43	3.07
Eland <i>(Taurotragus oryx)</i>				0.28	0.05	5.31
Kudu <i>(Tragelaphus strepsiceros)</i>				0.56	0.12	2.98

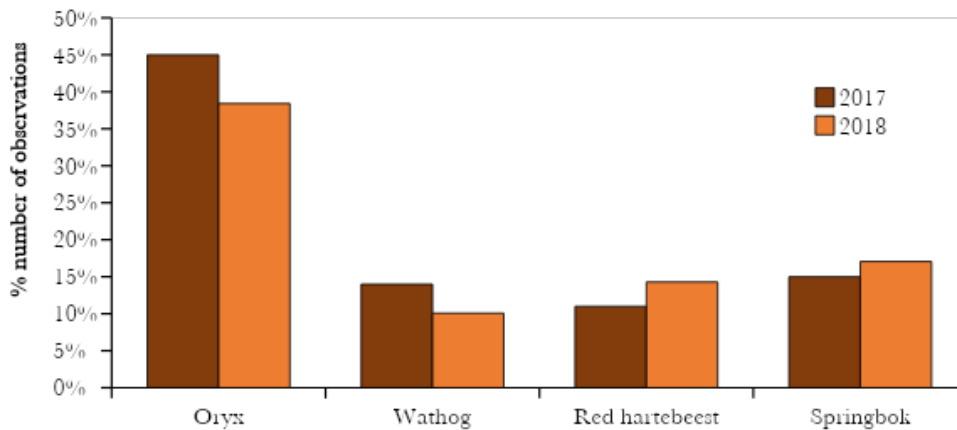


Figure 45: Number of sightings for the most common species during the Big Field counts in 2017 and 2018.

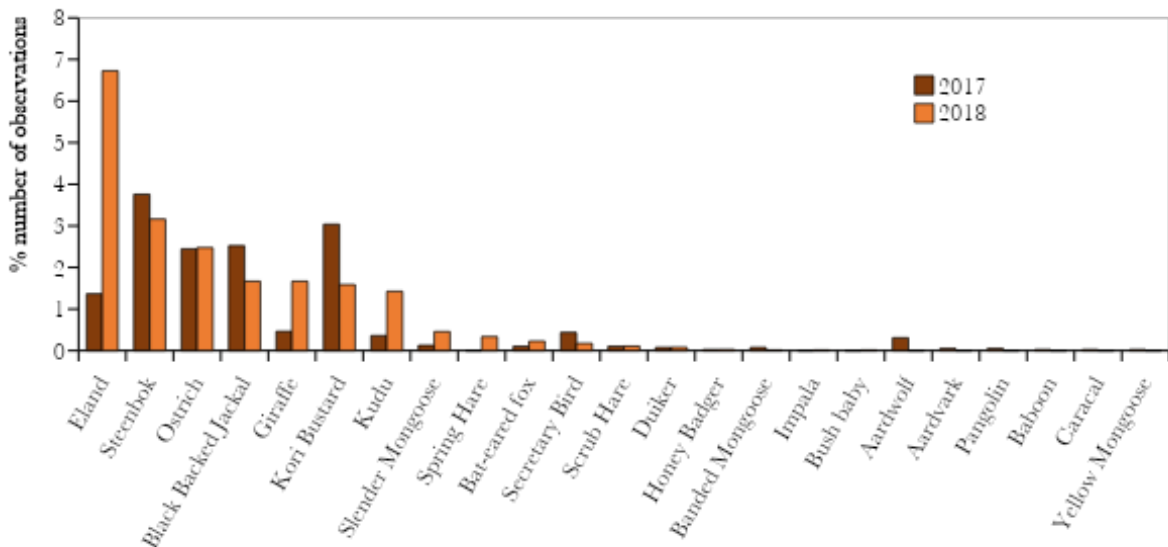


Figure 46: Distribution of species seen during the Big Field game counts in 2017 and 2018.

Night counts - Circuit B

The night count (also known as Circuit B) was also driven on once a month (7pm – 10pm in winter, and 8pm – 11pm in summer) using spotlights on both sides of the vehicle (Figure 47). The night count focuses on nocturnal species. Therefore, while all species seen were recorded, we report here

only the nocturnal species. The most frequently sighted species during the night count were black-backed jackal and scrub hair (Figure 48).

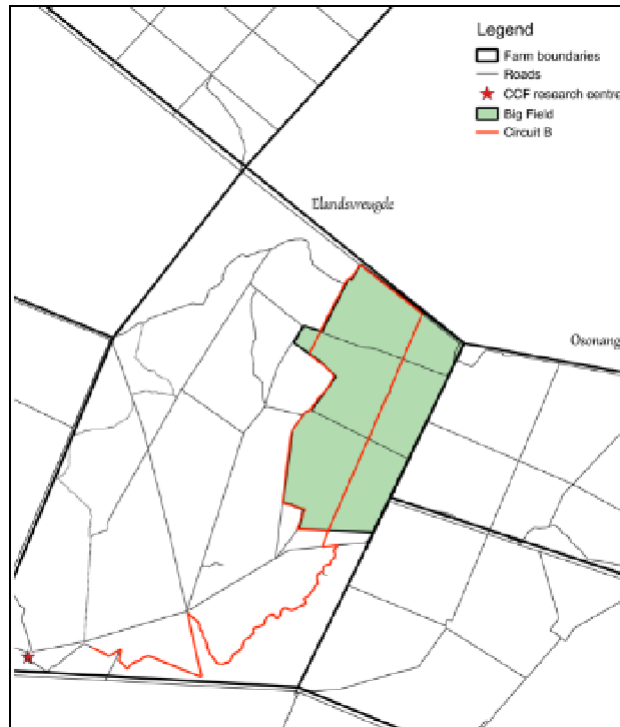


Figure 47: Location of Circuit B on farm Elandsvreugde.

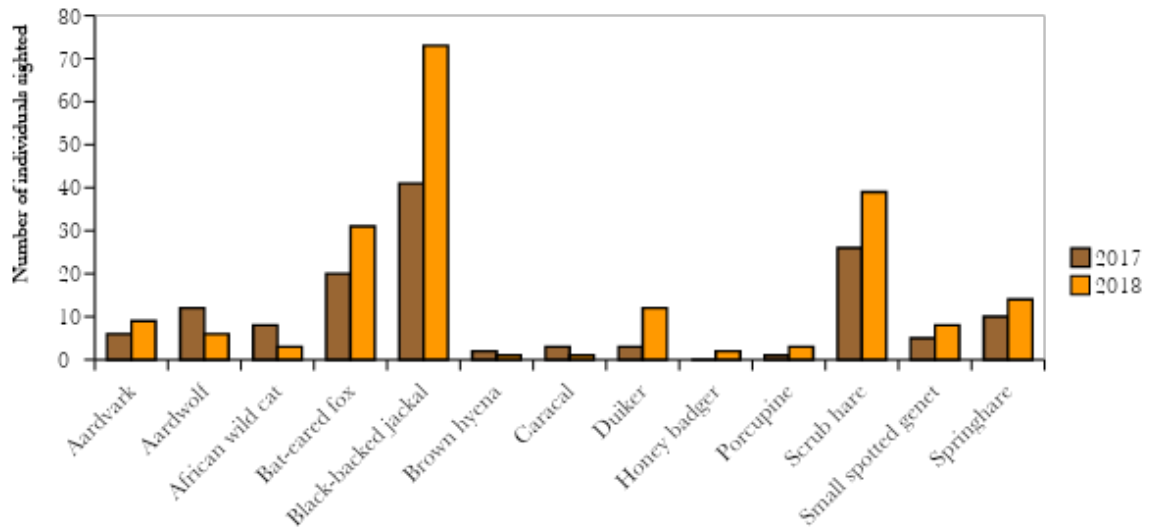


Figure 48: Sightings of nocturnal species during night counts in 2017 and 2018.

Bellebenno 12-hour Waterhole Counts

To assist in developing a management plan for the 4,000-ha game-fenced Bellebenno camp, CCF started 12-hour waterhole counts in 2008. These counts are conducted at four waterholes every

second month from 6am to 6pm by CCF interns and staff members. Species, group size, sex, and age classes are recorded. For each animal/group visiting the waterhole, we also record if they drink and/or make use of salt blocks.

In 2018, waterhole counts were conducted on six different occasions (bi-monthly). A total of 3,100 animals were counted involving 18 different species. Here we show the most common species recorded during the waterhole counts in Figure 49, and their densities.

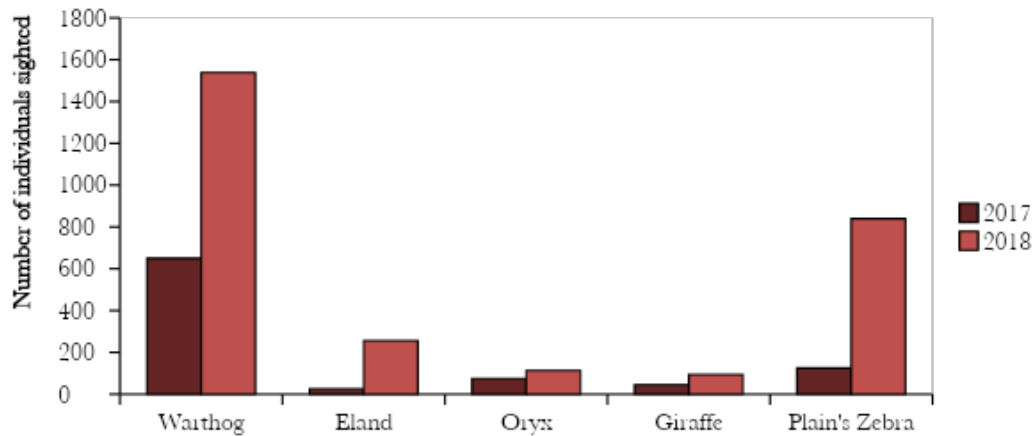


Figure 49: Frequently sighted species during the Bellebenno waterhole count.

Annual waterhole counts

The annual 12h waterhole counts took place on 16 July 2018. A total of 16 waterholes (Figure 50) were surveyed this year by teams of 2 observers comprised of CCF volunteers/interns/staff and Earth Expedition members.

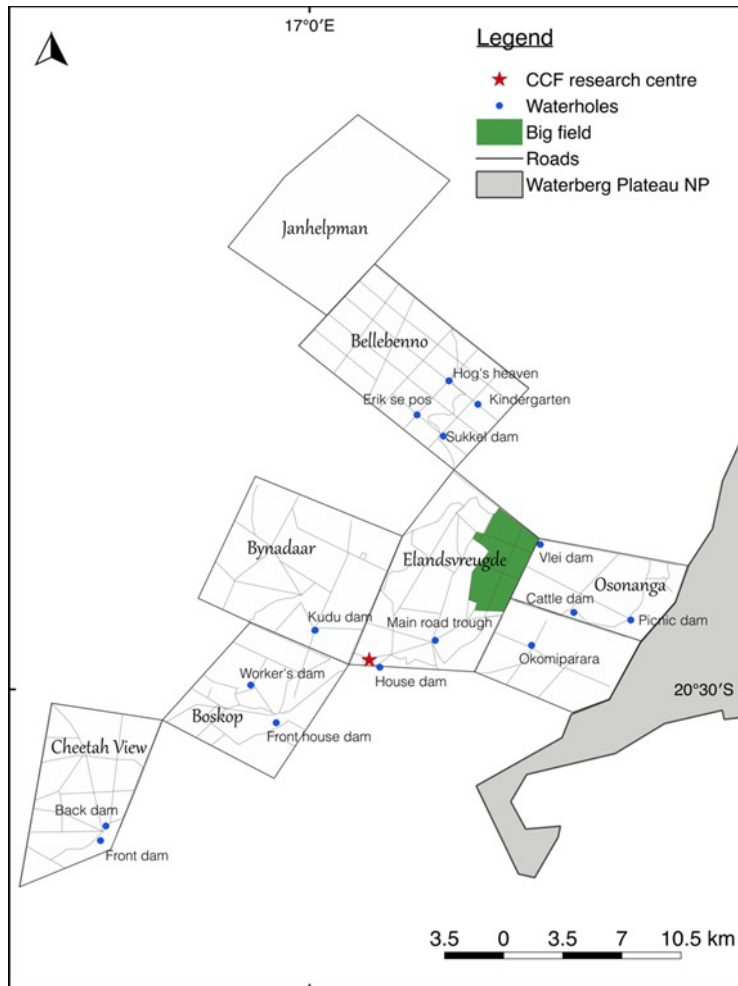


Figure 50: Location of waterholes surveyed during the annual 12-hour.

Density estimates for the most common species are shown in Figure 51 and compared with the estimates in 2016 and 2017. An overall trend is observed where wildlife numbers start to increase again after a drop in 2017.

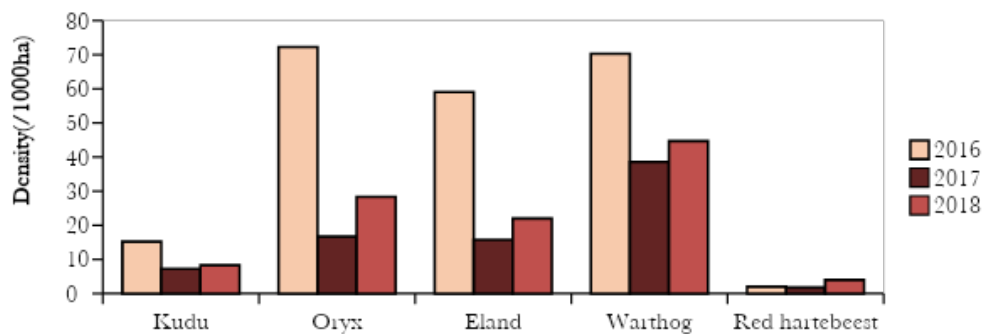


Figure 51: Most frequently sighted herbivore species during the 12 hour annual waterhole counts in 2016, 2017 and 2018.

Seasonal Count across CCF farms

Starting in July 2017, CCF began conducting seasonal, rather than only annual, strip counts across all CCF farms. These seasonal counts follow transects used in the past for annual counts with added routes to cover Osonanga, Janhelpman and the non-game fenced section of Bellebenno (Figure 52). They are repeated twice (one morning and one afternoon count) for each season (wet, early and late dry). The nine transects cover a total of ~175 km (350 km including the repetitions). We estimated densities for the most commonly seen species following the same methods as for Big Field counts.

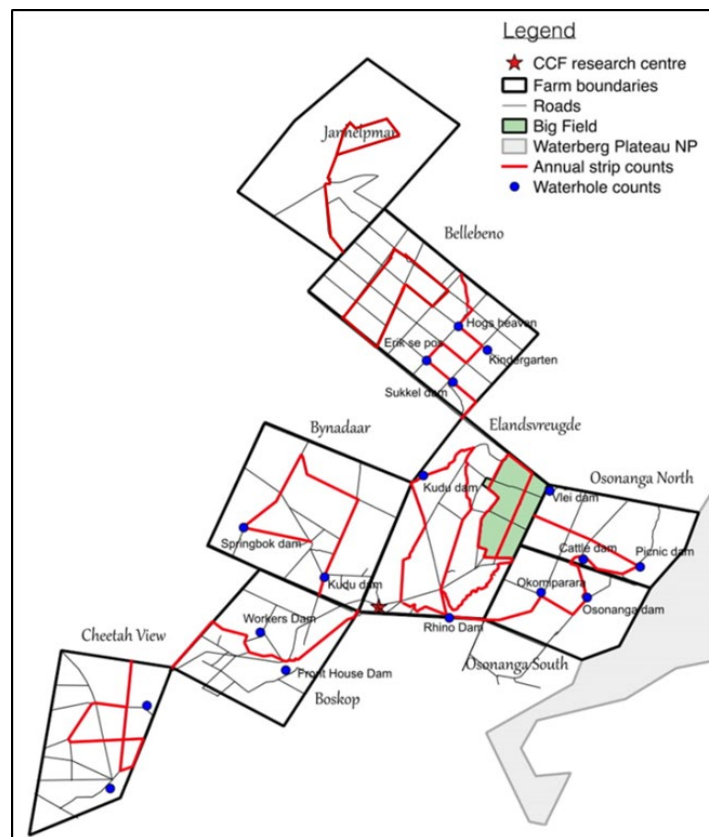


Figure 52: Map of seasonal strip count transects on CCF land.

Based on the density estimates (Table 11), warthog and steenbok are the most abundant species on CCF land, followed by oryx, kudu and plains zebra. However, plains zebra are only found in the game fenced portion of Bellebenno and parts of Boskop and thus their densities are based on only these two farms. Red hartebeest and springbok have relatively low densities as they are largely restricted to Elandsvregde and sightings are infrequent.

Table 11: Density estimates of main species counted during seasonal strip counts, by season.

Species	Density estimate (individual/km ²)		
	Wet (March)	Early Dry (July)	Late Dry (October)
Duiker (<i>Sylvicapra grimmia</i>)	0.3 (0-3.4)	0.06 (0-0.5)	0.3 (0-3.1)
Eland (<i>Taurotragus oryx</i>)	0.9 (0.2-4.9)	1.8 (0.3-9.8)	1.3 (0.3-8.3)

Giraffe (<i>Giraffa camelopardalis</i>)	1.2 (0.3-6.0)	0.8 (0.1-4.5)	1.0 (0.2-4.7)
Kudu (<i>Tragelaphus strepsiceros</i>)	1.5 (0.1-21.5)	2.1 (0.3-16.7)	3.6 (0.5-26.0)
Oryx (<i>Oryx gazella</i>)	2.5 (0.6-11.7)	1.7 (0.3-10.2)	1.4 (0.3-6.8)
Red hartebeest (<i>Alcelaphus buselaphus caama</i>)	0.3 (0.0-2.6)	0.1 (0-1.0)	0.0 (0.0-0.1)
Springbok (<i>Antidorcas marsupialis</i>)	0.1 (0-1.1)	0.2 (0-0.8)	0.1 (0.1-0.5)
Steenbok (<i>Raphicerus campestris</i>)	4.7 (1.0-23.3)	8.9 (1.4-70.4)	9.2 (2.0-43.5)
Warthog (<i>Phacochoerus africanus</i>)	10.2 (2.0-53.5)	4.9 (0.9-28.4)	6.4 (1.4-29.1)
Plains zebra (<i>Equus quagga</i>)	2.9 (0.65-13.0)	1.7 (0.3-9.8)	1.7 (0.4-7.3)

3. Bush Encroachment and Biodiversity

Bush encroachment is an environmental problem threatening Namibia's rangeland productivity, food security, and biodiversity conservation nationwide. However, it also has potential for a renewable source of alternative energy, especially in rural areas, and may alleviate electricity shortages projected to affect Namibia in the near future.

Research continued around CCF's Bushblok project in the first half of 2018. During this reporting period, the bioassay surveys done in 2017 using Moringa and Barley to determine seedling growth using soil samples from three different habitats (previously thinned sites) in order to determine the impacts of harvesting was published in the Namibia journal of Environment. The journal paper titled "The influence of debushing in Namibia's thornbush Savanna on overall soil fertility measured through bioassays" (Available at <http://www.nje.org.na/index.php/nje/article/view/volume1-zimmermann1>).

CCF, the University of Hamburg in Germany, and UNAM entered into an agreement to study the impacts of bush encroachment and bush clearing on soil and vegetation characteristics, and on the savannah water budget. This project is part of the Southern African Science Service Centre for Climate Change and Adaptive Land Management (SASSCAL). The project has three sites in Namibia and includes CCF's farms. In November 2014, data collection equipment consisting of rain gauges and soil moisture meters, as well as remote digital data transmitters were installed in previously harvested sites and current bush-encroached sites on CCF farms Cheetah View and Boskop. Both UNAM and Hamburg partners continued with field research during this reporting period, with the involvement of their graduate students and faculty members.

In 2016, CCF's Ecologist and Forest Steward, Matti Nghikembua, conducted a soil survey to study the nutrient and mineral compositions (chemical and physical properties) between harvested and non-harvested bush encroached habitat in order to understand long-term natural regeneration and recovery of the soils and restored vegetation. A total of 15 harvested and non-harvested sites each were identified with different harvest ages for chronological sequence analysis. Researchers collected 648 samples at various depths of the top soils to characterise the physical and chemical properties of soils from harvested and non-harvested sites by chemical analysis: Nitrogen (N), Phosphorus (P) and Potassium (K); percent organic matter, organic Carbon; Exchangeable cations (Calcium, Magnesium, Potassium, Sodium), cation exchange capacity (CEC); Soil PH; and Physical properties (sand, silt and clay fractions). Samples were submitted to a laboratory for data extraction. The results will be utilised as a baseline for further ecological research and monitoring of harvested sites. The findings have applications to bush harvesting operations in both commercial and communal farmlands. The research will also provide necessary reference information to the public and for farmland management.

In 2017, as part of Matti Nghikembua's PhD research, a camera trap survey was conducted between harvested and non-harvested sites, spanning over three commercial farms owned by CCF. Twenty-six

camera trap stations were operated and replicated once per study area, yielding a total of 1,092 trap nights and 10,483 correctly identified images. The aim of the survey is to examine impacts associated with reversing bush encroachment and identify whether bush thinning enhances wildlife diversity, richness and habitat use. Results will be published as soon as they are available.

4. Cheetah/Leopard camera trap study

Cheetahs are known to frequent scent-marking posts ('play trees') for territorial marking and social interactions. Olfactory communication plays a vital role in conspecific interactions as it allows for communication in the absence of the sender.

CCF has conducted camera trap surveys at such scent-marking sites on their property since 2005 to estimate cheetah and leopard densities. Assessing trends in abundance and density is crucial to inform conservation and management strategies. The most recent camera trap study at play trees was done in 2014. In October 2018, a follow-up study was set up using similar methodologies. Camera traps were placed at 22 sites and camera traps were checked on a weekly basis. Camera traps were operational for three months. Almost all sites are frequently being visited by leopards and preliminary results show at least 25 identified individuals on CCF property. Cheetahs were not recorded at the same frequency as leopards and were only captured during the last week of the study, with 3 individuals identified. Some examples of the individuals captured are shown in Figure 53 and Figure 54).

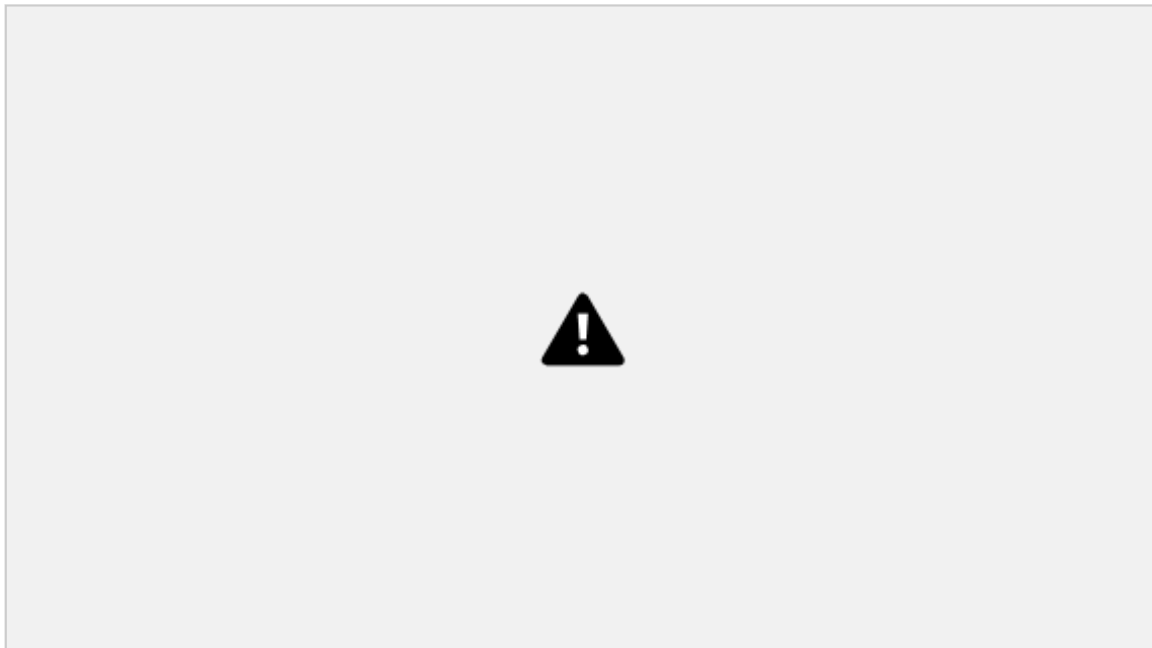


Figure 53: A few camera trap photos of leopards at play trees.

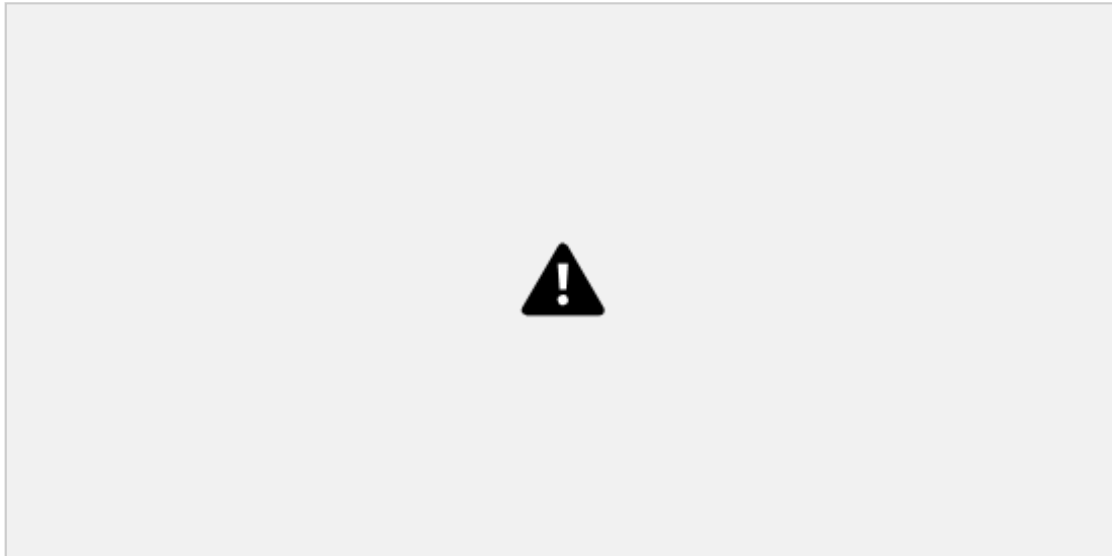


Figure 54: A few camera trap photos of cheetahs at play trees.

5. Giraffe Identification

Since 2003, CCF has been recording and identifying Giraffes. 119 individual giraffes have been identified on CCF's land in the past years using camera traps, waterhole counts and opportunistic photos taken by CCF staff and visitors. Out of 119 Giraffes, 89 were seen and recorded alive in 2018 so far, 56 males, 31 females and 3 unknown. Six more new calves have been observed in the reserve this year but they are yet to be identified and recorded according to age, ID, and sex (Table 12).

Table 12: Total number and percentage of individuals of each sex.

	Number of individuals (%)
<i>Males</i>	<i>56 (58)</i>
<i>Females</i>	<i>31 (32.6)</i>
<i>Unknown</i>	<i>9 (9.4)</i>
<i>Total</i>	<i>95</i>

Calves are individuals estimated to have been born in 2018, sub-adults are individuals between the estimated ages of two and four, and adults are individuals estimated five years or older. In Figure 55, adults have the highest number observed compared to sub-adults and calves.

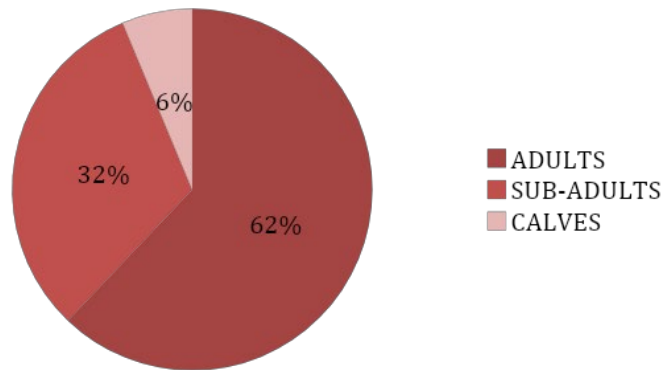


Figure 55: Percentages of giraffes per age group observed in 2018.

During 2018, 53 individuals have been observed in Bellebenno, 32 in the Reserve including the six new calves, and 10 individuals who have been observed in both locations (categorized as “Overlap”, Table 13). Overall, the largest numbers of Giraffes have been observed in Bellebenno with 53 individuals compared to the Reserve. It is possible that since Bellebenno is a game-fenced farm, it is much easier to capture and identify new individuals whereas the Reserve is an open system that does not restrict giraffe movements in and out. Bellebenno’s mostly-closed system could result in an acceleration of population growth that could reach carrying capacity much sooner than if it were an open system like the Reserve, and there may be more movement of adult animals from Bellebenno out into the Reserve. Further population modelling will need to be done to determine when that is most likely to occur.

Table 13: Total number and percentages of individual giraffes observed in 2018. Individuals observed in both Bellebenno and the Reserve are categorized under “Overlap”.

<i>Location</i>	<i>Number of individuals (%)</i>
<i>Bellebenno</i>	<i>53 (56)</i>
<i>Reserve</i>	<i>32 (34)</i>
<i>Overlap</i>	<i>10 (10)</i>
<i>Total</i>	<i>95</i>

There are currently 95 confirmed individual giraffes on CCF land. Of these individuals, 59 are adults, 30 sub-adults and 6 calves. This population was estimated using the number of individuals observed between 2015 and 2018 to account for individuals who may be present but not captured in photographs or those that may not have been observed. There were two individuals who had not been photographed/observed since 2015 but were re-photographed in late 2017, thus it is likely that there are other individuals who are present but have not been documented in the last couple of years

Within the current population, there are twelve individuals who were first identified in 2003. The oldest individuals from 2003 are at least 19 years old, and the youngest from 2003 are now 15 years old. The majority of individuals were first observed in 2010 (n=20), and the youngest individuals from that year are now adults (eight years old). The 14 individuals from 2013, the majority of whom were calves born that year have also reached adulthood (five years old). In 2018 six new calves were observed in the reserve during game drives and game counts (Figure 56).

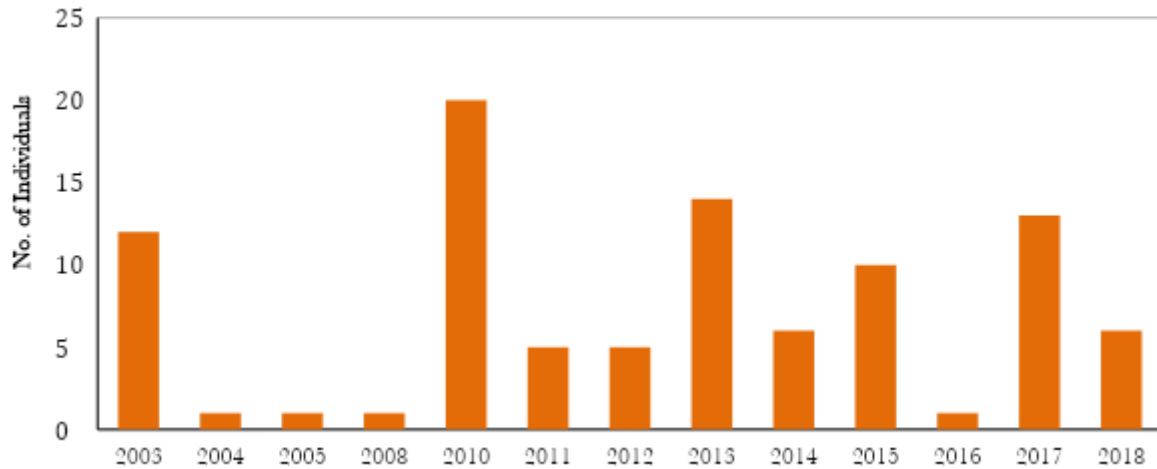


Figure 56: Years in which individuals were first observed.

6. Visiting Researchers

Termite Research: Paul Bardunias, Nicola Carey and Daniel Calovi

Paul Bardunias a visiting research scientist, along with Nicola Carey and Daniel Calovi, visited and conducted research at CCF from 17 April - May 2018. This joint team from Harvard's Wyss Institute and the State University of New York- Environmental Science and Forestry investigated the role of humidity in governing the mound construction process in the *Macrotermes* species. Their findings challenge long-held beliefs about the manner in which social insects build structures.

Bird Research: David Millican and Dr. Mark Stanback

The CCF ecology department is continuing its collaboration with David Millican, PhD candidate from Virginia Polytechnic Institute and State University. David returned in July 2018 for his third field season to continue his research describing the community of cavity-nesting birds in central Namibia. Unlike his two previous field seasons, David began his surveys in early August, instead of in December. Nest box data has given preliminary indications that cavity-nesters in Namibia exhibit temporal resource partitioning of nest cavities. To enable documenting this behavior, David returned at the beginning of the potential breeding season to describe cavity use and avifaunal communities during this period.

David is also continuing his collaboration with Dr. Mark Stanback of Davidson College on the breeding biology of *Tockus* hornbills. Their research continues to explore the physiological characteristics of the unique hornbill breeding system, as well as the developmental characteristics of nestlings.

Dr. Stanback visited in December 2018 to check on the installed hornbill nest boxes.

Soil Research: Jona Luther-Mosebach

Jona Luther-Mosebach visited in November to check on the four soil monitoring stations he installed at CCF. The objective of this project is to investigate soil water balance in bush dominated and cleared areas. Two stations are installed on an open patch and one under a tree, one in the cleared area, two in a bush encroached area on an open patch, and one under a canopy. Comparison of the results can hopefully answer how bush encroachment and debushing influence the soil water balance.

Small stock scientist: Dr. Terry Gipson

In August, CCF in collaboration with Dr. Terry Gipson, goat specialist from Langston University, USA, hosted dairy goat seminars. Students from the University of Namibia's Neudamm Campus (Department of Animal Science and Agricultural Economics), and local farmers attended the seminar. The seminars focused on dairy goat production and general small stock husbandry. The seminar brought together about 50 students and 6 goat farmers.

G. Scientific Publications and Papers

1. Books

Marker, L., Boast, L. and Schmidt-Küntzel (Eds.). (2018). *Biodiversity of the World: Cheetahs: Conservation from Genes to Landscape*. Elsevier. San Diego, CA.

2. Book Chapters

Marker, L., Grisham, J. and Brewer, B. (2018). A brief history of cheetah conservation. In L. Marker, L.K. Boast & A. Schmidt-Küntzel (Eds.), *Biodiversity of the World: Cheetahs: Biology and Conservation* (pp. 3 – 14). San Diego: Elsevier.

Pang, B., Van Valkenburgh, B., Kitchell, K.F. Jr., Dickman, A. and Marker, L. (2018). History of the cheetah-human relationship. In L. Marker, L.K. Boast & A. Schmidt-Küntzel (Eds.), *Biodiversity of the World: Cheetahs: Biology and Conservation* (pp. 17 - 23). San Diego: Elsevier.

Marker, L., Cristescu, B., Morrison, T., Flyman, M.V., Horgan, J., Sogbohossou, E.A., Bissett, C., Van der Merwe, V., de Matos Machado, I.B., Fabiano, E., Van der Meer, E., Aschenborn, O., Melzheimer, J., Young-Overton, K., Farhadinia, M., Wykstra, M., Chege, M., Samna, A., Amir, O.G., Mohanun, A., Paulos, O.D., Nhabanga, A.R., M'soka, J.L.J., Belbachir, F., Ashenafi, Z.T. and Nghikembua, M.T.(2018). Cheetah range wide status and distribution. In L. Marker, L.K. Boast & A. Schmidt-Küntzel (Eds.), *Biodiversity of the World: Cheetahs: Biology and Conservation* (pp. 34 – 51). San Diego: Elsevier.

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- Jeo, R.M., Schmidt-Küntzel, A., Ballou, J.D., Sanjayan, M. (2018). Drivers of habitat loss and fragmentation: implications for the design of landscape linkages for cheetahs. In L. Marker, L.K. Boast & A. Schmidt-Küntzel (Eds.), *Biodiversity of the World: Cheetahs: Biology and Conservation* (pp. 137 – 147). San Diego: Elsevier.
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Marker, L., Boast, L.K. and Schmidt-Küntzel, A. (2018). What does the future hold? In. L. Marker, L.K. Boast & A. Schmidt-Küntzel (Eds.), *Biodiversity of the World: Cheetahs: Biology and Conservation* (pp. 549 – 556). San Diego: Elsevier.

3. Papers

Stanback, M., Millican, D., Visser, P. and Marker, L. (2018). The simultaneous moult of female hornbills is not triggered by the darkness of their nest cavity. *Ostrich*, 1-3.

4. Submitted Papers

Schmidt-Küntzel, A., Stoneburg, D., Mujaj, S.A., Barley, S.J. and Marker, L. The common causes of cheetah (*Acinonyx jubatus*) death in captivity – A 30-year retrospective study from 1980 to 2009. Submitted to *Zoo Biology*.

5. Papers in Preparation

Khwaja, H., Schmidt-Küntzel, A., Crosier, A. and Marker, L. Analysis of ovarian activity in group-housed captive female cheetahs (*Acinonyx jubatus*) using vaginal cytology (in prep).

Marker, L., Walker, E. H., Richmond-Coggan, L. Nghikembua, M. and Schmidt-Küntzel, A. The release of captive-raised cheetahs in Namibia: management implications and lessons learned (in prep).

Fabiano, E. C., Sutherland, C., Fuller, A., Nghikembua, M., Eizirik, E. and Marker, L. Trends in cheetah *Acinonyx jubatus* abundance and density in the Waterberg Conservancy, north-central Namibia (in prep).

Fabiano, E. C., Schmidt-Küntzel, A., Bonnato, S., Marker, L., Eizirik, E. The historical demography of the Namibian cheetah population (in prep).

Nghipunya, E. N., Fabiano, E. C., Nghikembua, M. T. and Marker, L. Leopard behavioural activity displayed at the cheetah scent marking post (in prep).

IV. Conservation

Whether perceived or real, livestock loss to cheetahs is an economic and emotional issue as farmers' livelihoods depend on the economic success of their livestock and wild game industries. While many Namibian farmers are very respectful of nature and tolerate a certain level of loss, some resort to lethal predator control rather than alleviating their problems in a non-lethal manner through appropriate livestock and predator management. By addressing livestock-predator conflict through a conservation management strategy that benefits both humans and cheetahs, CCF is ensuring the long-term species' survival on Namibian farms and has raised greater awareness of better farm practices.

A. Livestock Guarding Dog Programme

1. Programme Overview

CCF's Livestock Guarding Dog Programme (LGD) continues to be one of the most successful conservation projects to assist farmers with predator conflict in Namibia. To date, CCF has placed 623 (317M, 306F) Livestock Guarding Dogs with farmers throughout Namibia and other parts of Africa. As of December 2018, there were 203 (93M, 110F) dogs alive in the programme (Table 14), of which 174 (77M, 97F) are working dogs, 5 (3M, 2F) are puppies in training at CCF, and 24 (13M, 11F) are retired or housed as pets.

Table 14: Dogs alive as of 31 December 2018. The dogs in South Africa and one female in Tanzania are now pet dogs.

Location	M	F	Total
Commercial	28	32	60
Commercial (CCF Working)	4	14	18
Commercial (CCF Puppies)	3	2	5
Communal	23	32	55
Emerging Commercial	12	7	19
Resettled	8	9	17
South Africa	1	1	2
Kenya	0	0	0
Tanzania	1	2	3
Total Working	80	99	179
Retired/Pet (breeding)	13	11	24
Total dogs alive:	93	110	203

CCF began a collaboration with the Ruaha Carnivore Project (RCP) in Tanzania in 2013, which is working to mitigate human-carnivore conflict in the Ruaha area. A large part of this conflict is driven by attacks on livestock, so CCF has provided RCP with a total of 10 (5M, 5F) puppies throughout the years to protect livestock of Maasai and Barabaig farmers. Although the program has been quite successful, only two (1M, 1F) dogs are still working and one female had to be placed as a pet due to an eye issue that affected her working skills.

CCF has also donated numerous puppies over the years to Cheetah Outreach, another facility which works to save the wild cheetah in South Africa, to help form their own livestock guarding dog programme. Since the trial programme was so successful in 2005, they also began breeding and

providing Anatolian shepherds to South African farmers after the CCF model. The programme is key in helping farmers protect their livestock and thus save more cheetahs.

Currently, there are 13 (3M, 10F) intact dogs in CCF's breeding programme (Table 15), of which 8 (2M, 6F) reside at CCF as working dogs, four (1M, 3F) work on commercial farms, and one female is in South Africa. Dusty (SB# 751) was given intact to Timm Miller, a breeder in the south of Namibia who has worked with CCF for years, helping to provide guarding dogs to his local area. Five dogs were removed from Table 15 in 2018.

- Wagter (SB# 324), a breeding male on a commercial farm, passed away in January 2018 due to old age.
- Uhtaya (SB#277), a pet dog in South Africa, is presumed dead as we have not heard from the owner in years and the dog is almost 14 years old.
- Aleya (SB# 424) was sterilized on 28 November 2018 due to old age.
- Karibib (SB# 524) was sterilized on 30 November 2018 due to old age.
- Kiri (SB# 451) was sterilized after complications with her last puppy being delivered on 18 November 2018. This was meant to be her last litter due to old age as well.

Table 15: Intact livestock guarding dogs as of 31 December 2018.

SB#	Dog Name	Born	Sex	Working/Pet	Farm Type	Country
405	<i>Pandora</i>	8/5/2010	F	<i>Pet</i>	<i>N/A</i>	<i>South Africa</i>
431	<i>Firat</i>	8/31/2010	M	<i>Working (CCF)</i>	<i>Commercial</i>	<i>Namibia</i>
456	<i>Kaspaas</i>	2/1/2012	M	<i>Working</i>	<i>Commercial</i>	<i>Namibia</i>
487	<i>Lady</i>	2/17/2013	F	<i>Working</i>	<i>Commercial</i>	<i>Namibia</i>
490	<i>Taya</i>	2/17/2013	F	<i>Working (CCF)</i>	<i>Commercial</i>	<i>Namibia</i>
498	<i>!Us</i>	4/2/2013	F	<i>Working</i>	<i>Commercial</i>	<i>Namibia</i>
507	<i>Repet</i>	4/11/2013	F	<i>Working (CCF)</i>	<i>Communal</i>	<i>Namibia</i>
535	<i>Lady</i>	9/10/2012	F	<i>Working (CCF)</i>	<i>Commercial</i>	<i>Namibia</i>
628	<i>Susie</i>	11/11/2015	F	<i>Working (CCF)</i>	<i>Commercial</i>	<i>Namibia</i>
660	<i>Bolt</i>	5/20/2016	M	<i>Working (CCF)</i>	<i>Commercial</i>	<i>Namibia</i>
709	<i>April</i>	8/1/2017	F	<i>Working (CCF)</i>	<i>Commercial</i>	<i>Namibia</i>
718	<i>Tika</i>	8/8/2017	F	<i>Working (CCF)</i>	<i>Commercial</i>	<i>Namibia</i>
751	<i>Dusty</i>	8/10/2018	F	<i>Working</i>	<i>Commercial</i>	<i>Namibia</i>

The LGD programme is a crucial part in CCF's mission to conserve the wild cheetah and its continuing success is due to the efforts of dedicated CCF staff. Gebhardt Nikanor has worked on placing dogs with farmers for over 10 years. Paige Seitz arrived in December 2013 to manage the programme.

2. Breeding and Puppy Placements

Since the programme's inception, 80 litters have been born at CCF for a total of 665 (322M, 328F, 15U) puppies. From January to December 2018, a total of 32 (16M, 16F) puppies were born to five of CCF's breeding females (Table 16). Of the 32 puppies born, 5 (3M, 2F) will not be placed until end of January 2019. A total of 32 (15M, 17F) puppies were placed in 2018, including 5 (2M, 3F) puppies born in November 2017.

Table 16: Puppies born and type of placement as of 31 December 2018 (K = Commercial Farm; C = Communal Farm; EC = Emerging Commercial Farm; R = Re-settled Farm; P/B = Pet/Breeder; D = Dead; NP = Not Placed; IP = Intact Puppies).

Sire/Dam	660/628		660/498		660/490		660/507		660/535		660/451		Totals	
	15Nov'17		24Apr'18		27Apr'18		30Jul'18		10Aug'18		17Nov'18			
Sex:	M	F	M	F	M	F	M	F	M	F	M	F	M	F
K	2	1	3	2	2	1	1	4	0	0	9	1	0	0
C	0	1	2	0	0	1	0	1	0	0	3	5	0	0
EC	0	0	1	0	1	0	0	0	1	0	3	0	0	0
R	0	1	0	0	0	0	0	1	0	0	0	2	0	0
P/B	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NP	0	0	0	0	0	0	0	0	0	3	2	3	2	0
Total	2	3	6	3	2	2	2	6	3	2	18	1	9	0
IP	0	0	0	0	0	0	0	0	3	2	3	2	0	0

- Susie (SB# 628) was bred with our Kangal male, Bolt (SB# 660), for the first time in September 2017. She gave birth to five (2M, 3F) puppies on 15 November 2017. All puppies survived and were healthy. All puppies were placed in February 2018. Three (2M, 1F) puppies were placed on commercial farms. One female was placed on a communal farm and one female was placed on a resettled farm.
- Nusi (SB# 498) was bred with our Kangal male, Bolt (SB# 660), for the first time in February 2018. She gave birth to 10 (6M, 4F) puppies on 24 April 2018. All puppies survived and were healthy. All puppies were placed in July 2018. Five (3M, 2F) puppies were placed on commercial farms. One male was placed on an emerging commercial farm. Four (2M, 2F) puppies were placed on communal farms.
- Taya (SB# 490) was bred with our Kangal male, Bolt (SB# 660), for the first time in February 2018. She gave birth to 5 (3M, 2F) puppies on 27 April 2018. All puppies survived and were healthy. All puppies were placed in July 2018. Four (2M, 2F) puppies were placed on commercial farms. One male was placed on an emerging commercial farm.
- Repet (SB# 507) was bred with our Kangal male, Bolt (SB#660), for the second time in May 2018. She gave birth to 4 (2M, 2F) puppies on 30 July 2018. All puppies survived and were healthy. All puppies were placed in October 2018. Two (1M, 1F) puppies were placed on commercial farms while the other two (1M, 1F) puppies were placed on communal farms.

- Lady (SB#535) was bred with our Kangal male, Bolt (SB#660), for the second time in May 2018. She gave birth to 8 (2M, 6F) puppies on 10 August 2018. All puppies survived and were healthy. All puppies were placed in October 2018. Five (1M, 4F) puppies were placed on commercial farms. One male was placed on an emerging commercial farm. One female was placed on a communal farm. One female was placed on a resettled farm.
- Kiri (SB#451) was bred with our Kangal male, Bolt (SB#660), for the first time in September 2018. She gave birth to 5 (3M, 2F) puppies on 17 November 2018. All puppies survived and were healthy, however, Kiri had to undergo a C-section to remove her last puppy due to delivery complications. During the surgery she was sterilized.

CCF delivers each puppy to their new farm to ensure the farmer and workers are properly trained on the correct methods of raising a livestock guarding dog and to make sure the puppy settles in to their new farm. Each farmer receives packets of information covering the care and training of their livestock guarding dog as well as an Integrated Livestock and Predator Management book to assist with predator-friendly management.

3. Follow-up on Prior Placements and Health Survey

Before any dog is placed on a farm in Namibia, CCF conducts a pre-approval farm visit to ensure that the farm has the facilities and capabilities to ensure the health and wellbeing of the dog, and that it can provide the right conditions for the dog to succeed as a livestock guarding dog. After a puppy is placed, CCF performs follow-up visits at three, six, and 12 months of age, and then yearly, to ensure the health and success of each dog. When dogs are found to be unhealthy or not doing their job, they are removed from that specific farm, evaluated, and placed on another farm if deemed appropriate or placed as pets if they are no longer able to work as livestock guarding dogs due to health or behavioural problems.

In 2018, CCF staff visited 188 (94M, 94F) dogs, this number includes dogs counted multiple times because they have been visited several times throughout the year to complete their required 3-month, 6-month, and 1-year visits or follow-up visits. Of the 188 dogs, 47 (22M, 25F) received their one-year of age visit. The dogs were vaccinated against rabies and other canine diseases, had an overall health check, and were evaluated on their working success. The following are some outcomes and findings from the visits:

Dog Deaths

- Wagter (SB# 492), a working dog on an emerging commercial farm, died from disease in September 2017. CCF was not informed until calling to schedule a farm visit in January 2018.
- Chaka (SB# 700), a working dog on a resettled farm, died in December 2017 from unknown causes. CCF was only informed in 2018 when calling to schedule a farm visit.
- Wagter (SB#324), a working dog on a commercial farm, died from old age in January 2018.
- Tjevera (SB# 338), a working dog on a communal farm, was hit by a car and died from the injuries on 2 January 2018.
- Spot (SB# 506), a working dog on an emerging commercial farm, died from possible tongue cancer in December 2017. CCF was only informed when calling to schedule a farm visit in April 2018.
- Zuki (SB#384), a working dog on an emerging commercial farm, died from old age in December 2017. CCF was only informed in October 2018 when contacting the farmer for a visit.

- Tiger (SB# 587), a pet dog, died in December 2017 from injuries from a possible dog fight. The dog had gone missing and when the farmer reported her lost, another farmer had been keeping her. When returned she was malnourished and died a few days later.
- Susie (SB# 617), a working dog on a communal farm was hit and killed by a car on 9 January 2018. The farmer was always very satisfied with her work. One time there was a goat who was sick so Susie took the rest of the herd back to the kraal and then went back to sit with the goat until the next day when she heard the workers yelling for her and started barking.
- Witvoet (SB# 694), a working dog on an emerging commercial farm, died from a snake bite on 11 March 2018.
- Maria (SB# 417), a working dog on a resettled farm, was found dead in the veld from unknown causes on 20 March 2018.
- Rock (SB#590), a working dog on a commercial farm, died from a snake bite on 1 April 2018. The farmer is interested in a new dog.
- Cheetah (SB# 695), a working dog on a communal farm, is suspected to be dead by the farmer as she never returned to the kraal on 5 April 2018. The farmer and workers searched most of the property and could not find the dog.
- SB# 698, a working dog on a communal farm, was hit and killed by a car on 27 April 2018. This farmer is black listed as we tried contacting him numerous times for payment and he did not respond and then did not inform us of the death of his dog until we went for a visit to the farm and the workers informed CCF.
- Diesel (SB# 479), a working dog on an emerging commercial farm, died from a snake bite on 20 May 2018.
- Ester (SB# 433), a working dog on a commercial farm, died from a snake bite on 25 May 2018. The farmer is very upset by this as she really loved the dog. She is interested in a new working dog for her farm.
- Security (SB# 667), a working dog on a communal farm, died from a snake bite on 1 June 2018. The farmer was very happy with the success of using this mitigation tool and is interested in another dog.
- Andoline (SB# 639), a working dog on an emerging commercial farm died on 1 June 2018 from a snake bite.
- Rex (SB# 322), a working dog on a commercial farm, died from old age on 8 July 2018.
- Tesa (SB# 697), a working dog on a communal farm died on 10 August 2018 from a snake bite.
- Amos (SB#285), a retired CCF working and breeding dog, was euthanized on 19 August 2018 due to declining health. He suddenly became ill and despite all efforts was not improving in condition.
- Dolly (SB# 449), a pet dog, was euthanized on 7 September 2018 due to squamous cell carcinoma (SCC). See section on Dog Health for more information.
- Wagter (SB# 654), a working dog on a resettled farm was shot by a neighbouring farmer on 10 September 2018.

- Samuel (SB#729), a working dog on a commercial farm died from an injury from an adult female goat. She died on the way to the vet on 13 September 2018. The farmer received a new puppy as he did everything right for the dog.
- Spots (SB#413), a CCF working dog, died on 30 September 2018 from a presumed heart attack. He ran to follow the herd and fell over passing instantly. This was an unfortunate event as Spots was a very big star in promoting CCF's guarding dog program and a beloved animal at CCF, but we are happy he passed doing what he loved.
- Tiger (SB#411), a working dog on a commercial farm, died on 31 December 2018 from a snake bite. The farmer is interested in a new working dog.

Rehomed dogs

A few incidents have occurred this year with guarding dogs killing and eating livestock, mainly sheep. We believe the most logical explanation for this is due to workers teaching the dogs to hunt. These situations can happen here and there as workers see an opportunity. The dog then develops a need to complete this taught behaviour and it can influence their working skills. Most dogs are placed as pets to prevent any further issues.

- Dog (SB# 675), was brought to CCF on 6 November 2017 due to malnourishment at her farm. On 1 January 2018 she was re-homed to CCF's herder, Armas Shanika's commercial farm as a working dog. Her name has been changed to Bokkie and we have been told she works very well and follows the herd all day every day.
- Penomundu (SB# 607), was removed from her communal farm in November 2017 due to health issues. CCF was going to get her back to good health and return her to the farm. However, the farmer never responded to calls when we tried to schedule a drop off time so we re-evaluated her with CCF's herd and re-homed her to a commercial farm on 20 February 2018 as a working dog. After almost 2 months the farmer called to inform CCF that he doesn't believe she will work well at his farm as she has bonded to the herder and will only follow the herd if he goes as well. CCF replaced her with a puppy and brought her back to be re-evaluated on 11 July 2018. After re-evaluation, we believe due to only having one working eye (due to an interaction with a spitting cobra at her first farm), Penomundu is more suited for pet life. She was re-homed as a pet dog on 12 September 2018.
- Pohamba (SB# 616) was returned to CCF from her commercial farm in November 2017 as the farmer said she was no longer following the herd. She was in quite good condition so did not require much weight gain or health assistance. She was re-evaluated with CCF's herd and said to work very well. She was re-homed to a commercial farm on 29 January 2018. Unfortunately, she did not settle in well at her new farm and was returned to CCF on 8 March 2018 as she was said to be roaming far from the herd. She was re-evaluated again with CCF's herd and our herder was unsure as to why she was returned as she works excellent. The only thought is that it is very hot in the area where she was placed and the workers said she was suffering a bit from the heat. However, on 17 April 2018, she was re-homed to a new farm as a working dog and is said to be working well.
- Tex (SB# 603), a working dog on a communal farm, was confiscated due to malnourishment on 3 January 2018. He was visited previously at the end of 2017 and was found in poor condition so the farmer was given a warning and told to improve his weight or Tex would be removed. Upon the visit in January 2018, his condition had worsen so he was removed from the farm. After gaining weight at CCF, Tex was re-evaluated with the herd and worked very well. He was re-homed to a commercial farm on 23 February 2018. The farmer was very happy with his working skills and personality that he asked for another re-homed dog (SB# 595) for his second herd on a different farm.

- Zombie (SB# 662), a working dog on an emerging commercial farm, was returned to CCF on 27 January 2018 as the farmer said the dog was not following the herd and was seen killing and eating a steenbok. Upon arrival at CCF the dog was quite skinny and due to the possibility of hunting it was determined he would have to be placed as a pet dog. He was re-homed on 16 March 2018 to the family of one of CCF's construction workers. The family wanted a large dog for security and despite Zombie's lovable and goofy personality he is quite intimidating. We are told he has fit in very well with the other dogs and the children and has even provided some barking at suspicious things.
- Tasha (SB# 676), a working dog from a commercial farm, was returned to CCF on 5 March 2018 as the farmer was selling his livestock and no longer needed her assistance. Tasha was in good condition and always worked well so was re-homed very quickly after being evaluated with CCF's herd. On 23 March 2018 she went to a resettled farm. She was checked on in May and had lost a bit of weight. It was discussed with the farmer about increasing her portions and CCF will visit again in July. Otherwise she has bonded well to the goats and works well with the older Anatolian she will replace one day when the older dog must retire. Unfortunately, Tasha was returned to CCF on 28 November 2018 due to chasing warthogs. She also began getting confused between which herd to guard as on a resettled farm there can be numerous herds in an area. Upon arrival, Tasha, was a bit underweight, but otherwise in good condition. She was quickly re-evaluated with CCF's herd and worked well. She will soon be re-homed to a commercial farm. Placing her on this type of farm should help prevent any confusion with other herds as most commercial farms are fenced.
- Leila (SB# 595), a working dog on a commercial farm, was returned to CCF on 21 March 2018 as the farmer was selling his livestock and could not keep her as a pet dog. Leila was in decent condition, but needed time to gain weight and get healthy as she had tick bite fever. When to full health again, she was re-evaluated with CCF's herd and worked excellent. She was re-homed to a commercial farm on 1 May 2018. She went to the same owner as SB# 603, but at a different farm. She was checked on in May and has adjusted well to her new herd and is in good condition.
- Bravo (SB# 653), a working dog on a commercial farm, was returned to CCF on 7 December 2017 due to killing livestock as previous workers had taught her to hunt. She was re-homed as a pet dog on 16 April 2018.
- Thousand (SB#474), a working dog on a communal farm, was confiscated on 19 April 2018 as his condition has decreased greatly although the farmer was told to improve the condition on the previous visit. After regaining his health he was re-evaluated with the herd and worked very well. He was re-homed to a communal farm on 5 June 2018. Thousand is doing well at his new farm and working daily with his livestock.
- Stella (SB#704), a working dog on a communal farm was returned to CCF on 23 March 2018 as the farmer said she was not working properly. Upon pick up the dog was malnourished. This farmer will no longer be able to receive a dog from CCF. She was brought back to CCF to regain her health and then re-evaluated with CCF's herd. She was found to work find and was re-homed to a communal farm on 4 May 2018. In July 2018 the farmer asked to return Stella as she wasn't staying with the herd and was returning home to eat chickens. When Stella returned she was quite skinny which could indicate why she was eating chickens. After gaining appropriate weight she was re-evaluated with the herd and then re-homed to a commercial farm on 6 September 2018. Stella adjusted well to this farm and is said to be working well and not even paying attention to the owners chickens.
- Office (SB# 593), or now known as Pota, was re-homed to an emerging commercial farm in 2017 and adjusted very well. Unfortunately over the last few months in 2018 he bonded to a neighbouring group of people that pass by the farm daily and began leaving his herd to stay with them and their herd. The farmer asked to return him as he leaves his farm daily. The farmer will receive a puppy in July, but has been informed to talk to the neighbours about not bonding with the new dog. The farmer is very cooperative so we believe the puppy should do fine. Upon

collection the dog was in decent condition, but did have a hematoma, a swelling of clotted blood in the tissue, in his ear. Pota gained weight and his ear healed completely and then was re-evaluated with CCF's herd and was working well. He was then re-homed to a commercial farm in July 2018. Unfortunately, Pota kept escaping the kraal to join the workers. After this issue, it was determined to re-home Pota as a pet dog as he seemed to enjoy human company very much. He was re-homed as a pet dog on 15 September 2018 and is said to be doing well.

- Ruby (SB# 532), a working dog on a communal farm, was returned on 17 Jun 2018 by the farmer as she had developed issues with her tongue. We believed she was a possible case of squamous cell carcinoma. The farmer didn't want her to suffer and felt CCF could provide better care for her. She has been struggling eating for a few months and we had been keeping in contact with the farmer and assisting in his needs. Upon arrival at CCF she was not in terrible condition, but had lost body condition and needed to gain weight due to struggling with eating. She was started on pain medication for her tongue issues and we are working on finding a suitable treatment to try on her tongue to help her. It was decided by CCF to keep Ruby due to her condition. She escorted CCF's dairy goats on a daily basis to provide them with protection while out grazing. Unfortunately, on 26 November 2018, she had to be euthanized due to her condition worsening. For more information see section, Dog Health.
- Wagter (SB# 630), a pet dog, was found wondering the streets of the Tsumeb area. Luckily a nice woman retrieved him and brought him to the SPCA when another person found him and got his microchipped read and contacted CCF. CCF collected the dog and has kept him at the centre until he was re-homed as a pet dog on 29 June 2018.
- Whitey (SB#692), a working dog on a communal farm, was returned to CCF on 14 August 2018 after being seen eating lambs from his herd. Upon arrival Whitey was in good condition so we are not sure why he began eating the lambs as sometimes this can happen when the dog is underweight and looking for food. Due to this issue he was re-homed as a pet dog on 29 August 2018. Whitey has adjusted well to his new home and has numerous dog friends to play with.
- Wagter (SB# 526), a working dog from a communal farm, was returned to CCF on 30 August 2018 due to increasing issues with his tongue. He was started on pain regiment. He began to gain weight and energy, but unfortunately on 5 November 2018 he had to be euthanized as his condition suddenly worsen and a large tumour had developed on his tongue. For more information see section, Dog Health.
- Nellie (SB# 706), a working dog from a commercial farm, was returned to CCF on 9 September 2018 due to killing and eating sheep. When Nellie arrived at CCF she was in good condition, but extremely nervous. Due to her nervousness and other issue we decided it was best for her to be placed as a pet dog. She will stay at CCF until a home is found for her.
- Lady (SB# 741), a working dog on a commercial farm, was returned as she was said to be playing too rough with the lambs of her herd. Upon arrival at CCF, Lady, was in good condition, but she is young and all puppies go through a playful stage. Sometimes this playful stage is a bit rough for the small stock as the puppy is strong than them, but there are numerous tricks to reducing this behaviour. Lady has been re-evaluated with CCF's herd and is working very well and not playing rough with the small stock anymore. She will soon be re-homed to a new farm to work.
- Rambo (SB# 687), a working dog on a commercial farm, was returned to CCF on 7 November 2018 due to killing and eating lambs. Upon arrival, Rambo was underweight and had a large infestation of ticks. He was treated and is slowly gaining weight. He will stay at CCF until he is healthy and then a plan will be made for placement.
- Olbeia (SB# 722), a working dog on a commercial farm, was returned on 27 November 2018 due to killing and eating the sheep of his herd. We are unsure of the cause of this issue, but upon arrival at CCF he was in perfect condition. He was very soon re-homed as a pet dog on 15 December 2018.

- Wagter (SB#721), a working dog on a commercial farm, was returned on 29 November 2018 due to killing and eating calves. This incident most likely occurred due to not being properly introduced to the cattle on the farm – the dog will then see the cattle as an intruder and work to keep it away from its herd. Upon arrival, Wagter was underweight and needed to be dewormed due to a case of hookworm. This may be an indication as to why she ate the calves. She began quickly gaining weight and will soon be re-evaluated with CCF's herd to possibly be placed on a farm that has no cattle present as she loves to work and be around goats and sheep.
- Taia (SB# 740), a working dog on a commercial farm, was returned on 13 December 2018 due to roaming at night. Despite the farmers efforts she and the other working dog would escape the kraal and roam. Upon arrival, Taia was in good condition. She is currently being re-evaluated with CCF's herd and then will be re-homed to a new farm to work. Most times bad behaviours like this can be stopped if the dog is moved to a new location.

Other than routine vaccinations, CCF provides de-worming tablets, veterinary supplies for minor injuries, and topical anti-parasitic agents that are available from donations. The medical supplies ensure that the dogs' health is a priority. Dog food is offered for purchase at a discounted rate to the farmers to encourage that a correct diet is followed consistently. The dogs' working success has been correlated with good care from the owner. Many farmers are part-time and thus their attention is divided between their farm and other business activities, however, this is not a problem if they have good herders who assist with livestock and dog care. It is important that the owners are in touch with the developmental phases of their dogs so that problems can be dealt with immediately as they occur, preventing bad habits from developing and the dog failing as a result.

4. Dog Health

All CCF's Anatolian shepherd and Kangal dogs, as well as the scat-detection dogs, are enrolled in a preventative medicine programme. Every month, a broad-spectrum anti-parasite product for endo-parasites is administered. The product utilised is rotated continually to help prevent development of resistance. Every four weeks an ecto-parasite prevention product is applied topically to prevent fleas, ticks, and mites. Each dog receives vaccinations annually against canine distemper virus, canine parvovirus, adenovirus, parainfluenza virus, and rabies virus. Each month every dog is weighed to make sure they are at a healthy body weight.

Squamous Cell Carcinoma (SCC)

Each dog that comes in to CCF with SCC begins treatment. Each dog first receives a biopsy of the tongue which is taken to confirm the damage is caused by SCC. While under sedation, a prednisolone injection will be inserted into the tongue along the lines of damage. The prednisolone will help decrease inflammation and reduce pain, but only lasts for one month. Monthly biopsies and injections will be completed to continue pain treatment and see if there is any cellular change. All dogs will be fed a soaked pelleted diet to ease eating. The condition of the dog and tongue will be monitored from month to month. CCF is working on finding a suitable chemotherapy drug to help treat any confirmed SCC cases.

- Spots (SB#413), a working dog at CCF's farm began having trouble eating in September 2017. A biopsy confirmed that the damage to the tongue is cancer. He was originally started on Metacam, but that seemed to have no effect on his pain. He was then started on prednisolone tablets. We began observing that he was losing weight and body condition. The prednisolone was stopped and he was started on Metacam again, but that didn't seem to make much difference to his condition. He was sedated for a biopsy and received a prednisolone injection in his tongue. Unfortunately, this confirmed the odd side effects were from the prednisolone as he began to lose body condition again. Once the drug had worn off his condition returned. Due to his age, Spots was no longer sedated for biopsies or treatment. Unfortunately, Spots suddenly passed away on 30 September 2018 from unknown causes. Cause of death could not be determined from the necropsy, but it is believed to have possibly been a heart attack.

- Dolly (SB#449), a pet dog at CCF's herder's farm, has had tongue issues for numerous years. She was removed from her previous farm to help monitor the condition. A biopsy confirmed her tongue was affected with cancer. She has undergone 3 treatments for her tongue. Not much improvement on the tongue itself had been seen besides reduced inflammation, but her coat condition and overall body condition had improved and she began eating with less pain. Unfortunately, during her 4th treatment she had to be euthanized as it was found her gums on her lower jaw started to slough. A necropsy was completed and samples will be sent to the USA for analysis.

- Ranger (SB#623), a working dog on a communal farm was experiencing trouble eating in January 2018 and was losing body condition and weight. The farmer contacted CCF asking for assistance. CCF brought the dog in and evaluated his tongue. His case is quite severe as the tongue is very inflamed and painful. He has undergone 7 treatments. Two of the biopsies from his first and second treatment have been analysed and confirmed SCC and shows the cancer has worsened. However, his inflammation has been reduced and he is eating much better and is almost at ideal condition again. No more biopsy results received.

- Diesel (SB#479), a working dog on an emerging commercial farm, was brought in to CCF in March 2018 due to large ulcerations seen on his tongue from farm visit photos. When Diesel arrived to CCF the ulcerated areas had fallen off leaving a hole on the side of his tongue. Diesel received 2 treatments with the same results – no real improvement besides reduced inflammation and improved eating ability. Biopsies confirmed SCC was present on his tongue. Unfortunately, Diesel was killed by a snake in May 2018. A necropsy was completed confirming the bite was from a puff adder. No samples or blood work could be taken from the necropsy as the samples would not be viable.

- Ruby (SB#532), a working dog on a communal farm has been experiencing eating issues for the last few months. CCF had been communicating with the farmer about this issue. The farmer asked CCF to return the dog in June 2018 as he felt we could better provide for her. She was started on Metacam tablets to reduce pain although her case is quite severe as a portion of the front of her tongue is missing. She was not started on the prednisolone treatment as we wanted to wait for the chemotherapy drug since both products cannot interact together, however, she will continue on the Metacam. She will permanently be on a soaked pelleted diet and had reached ideal condition again. Unfortunately, Ruby had to be euthanized on 26 November 2018 due to her condition worsening. Her tongue began becoming more painful and affecting her eating. No biopsy results received yet. A necropsy was completed and samples will be sent to the USA for analysis.

- Cheetah (SB#567), a working dog on a communal farm, began having issues eating and only eating from one side of her mouth a few months before May 2018. The owner contacted us asking for assistance as she was losing body condition and weight. Metacam was delivered to the farm to help her with the pain and we informed the farmer to start her on a soaked pelleted diet. He informed us the medicine was helping, however upon receiving a picture of her tongue, we found a piece is missing on the right side. Cheetah was brought in to CCF for her first treatment on 25 August 2018 and has now undergone 3 treatments in total. No improvement has been seen on her tongue besides reduced inflammation and pain control, however, due to the very good care given by her owner, her condition is ideal and she seems fit and happy. No biopsy results received yet.

- Wagter (SB# 526), a working dog from a communal farm, was returned to CCF on 30 August 2018 due to increasing issues with his tongue. He had started excessively drooling and having some trouble eating a few months before which CCF assumed was due to his tongue possibly being affected with squamous cell carcinoma. CCF had been in contact with the farmer on this issue previously and was monitoring the dog. When Wagter arrived at CCF we could see his

tongue was affecting his condition quite a lot and decided to keep him at CCF permanently to try and improve his health. No biopsy results have been received. He was started on pain medication and he began to gain weight and energy, but unfortunately on 5 November 2018 he had to be euthanized as his condition suddenly worsen and a large tumour had developed on his tongue. A necropsy was completed and samples will be sent to the USA for analysis.

B. CCF Model Farm

CCF's farm provides the opportunity to practice and experiment with optimal methods of livestock and non-lethal farm management practices, especially acting as a showcase model of success. The cattle, goat, and sheep herds at CCF continue to increase and selected herds have been used during various Farmer Training programmes. Table 17 provides an overview of CCF's livestock.

Table 17: CCF livestock from January to December 2018.

	Stock Start	Born	Purchased	Sold	Died	Slaughtered / CCF use	Stolen	Stock End
Cattle	408	190	0	229	4	3	0	362
Boer Goats	165	34	0	81	8	0	0	110
Damara Sheep	142	62	0	56	5	0	0	143
Dairy Goats	155	74	0	34	13	0	0	182
Donkeys	4	13	314	0	22	285	0	24
Horses	6	4	20	0	4	14	0	12

CCF's Farm Manager, Johan Britz; Large Stock Assistant Manager, Bessie Simon; Small Stock Manager, Tyapa Toivo; Small Stock Herder, Armas Shanika, and the animal health team carry out proper management to maintain the general health and welfare of the animals.

During this period, CCF farm staff continued to work on fence repairs and basic farm maintenance. Work also continues on firebreaks, road maintenance, provision of water as well as weed control and eradication of alien species.

1. Cattle

CCF cattle are managed in a 100% predator-friendly environment. A cow-calf system is in place and weaners are sold before one year of age based on market conditions. Factors such as severe bush encroachment continue to be a challenge.

Normal management is done in coordination with nature, therefore mating seasons differ yearly but generally it is from January to the end of April. This period has been extended since CCF only owns three bulls instead of the usual 12 to 15 bulls. However, when necessary, CCF utilises six to eight bulls that are on loan. Pregnancy determination is normally done in July or August. Dehorning and castration are done as needed during the calving season.

By end of December 2018, CCF had 362 cattle compared to 408 at the end of 2017. Total cattle production for 2018 included 190 calves born (100M, 90F), and 229 sold (16 cows, 78 female calves

and 119 male calves, 16 steers; Table 17). Cheetah Conservation Fund also rents grazing land to two farmers for their cattle (approximately 700 herd total), thus providing an extra income.

Vaccination Programme

CCF firmly believes in farming with animals adapted to the Namibian climate with a strong natural resistance to most diseases. As such, unnecessary vaccinations are avoided to minimise costs and reduce stress on the animals. Compulsory brucellosis and anthrax vaccinations are administered and other vaccinations are done purely as needed. Periodical internal and external parasite control is also in place.

Other

Since cattle falls under the Fanmeat scheme of Namibia, CCF must ensure compliance with the European Union (EU) and the Fanmeat scheme. Fanmeat stands for Farm Assured Namibian Meat, which is a standard for meat production, specifically for cattle, that involves the traceability, animal health and welfare, record keeping, and animal movement in Namibia. The CCF cattle recordkeeping and data have passed inspection every year, and our cattle operation is mentioned by the Directorate of Veterinary Services as an excellent standard when it comes to the fulfilment of these requirements. Good results were also obtained during the annual weaner auctions.

2. Small Stock

Goats and sheep are an essential part of CCF's LSGD programme as the puppies must be raised amongst the goats and sheep in order for them to form a close bond with the livestock. As part of CCF's Model Farm, dogs and small stock are used during farmer-training programmes as a method to raise livestock around predators without using lethal methods to prevent predation.

In addition to the 14 Anatolian shepherd and Kangal dogs mentioned in the previous section, as of December 2018 the kraal contains 182 (7M, 137F, 38 wethers) dairy goats, 110 (0M, 91F, 19 wethers) Boer goats, and 143 (5M, 95F, 43 wethers) Damara sheep.

Boer Goats

Out of the 25 Boer goats that were bred between March and April 2018, 21 females gave birth between in August 2018 to a total of 34 kids (Table 18).

Table 18: Boer goat births from 1 January 2018 to 31 December 2018.

<i>Studbook #</i>	<i>Sex</i>	<i>DOB</i>	<i>Dam</i>	<i>Sire</i>	<i>Dead/Alive</i>
585	cM	1/08/2018	8-12	584	Alive
586	cM	1/08/2018	8-12	584	Alive
587	F	01-Aug-18	11-14	584	Alive
588	cM	01-Aug-18	11-14	584	Alive
589	cM	02-Aug-18	7-14	584	Alive
590	cM	02-Aug-18	7-14	584	Alive
591	cM	03-Aug-18	27-15	584	Alive
592	cM	03-Aug-18	27-15	584	Alive
593	cM	03-Aug-18	51-15	584	Alive
594	F	03-Aug-18	51-15	584	Still born

595	<i>cM</i>	<i>04-Aug-18</i>	<i>14-14</i>	<i>584</i>	<i>Alive</i>
596	<i>F</i>	<i>04-Aug-18</i>	<i>14-14</i>	<i>584</i>	<i>Alive</i>
597	<i>cM</i>	<i>04-Aug-18</i>	<i>31-14</i>	<i>584</i>	<i>Alive</i>
598	<i>F</i>	<i>04-Aug-18</i>	<i>31-14</i>	<i>584</i>	<i>Alive</i>
599	<i>cM</i>	<i>05-Aug-18</i>	<i>57-15</i>	<i>584</i>	<i>Alive</i>
600	<i>F</i>	<i>05-Aug-18</i>	<i>57-15</i>	<i>584</i>	<i>Alive</i>
601	<i>cM</i>	<i>05-Aug-18</i>	<i>13-14</i>	<i>584</i>	<i>Alive</i>
602	<i>F</i>	<i>05-Aug-18</i>	<i>13-14</i>	<i>584</i>	<i>Alive</i>
603	<i>cM</i>	<i>06-Aug-18</i>	<i>52-11</i>	<i>584</i>	<i>Alive</i>
604	<i>F</i>	<i>06-Aug-18</i>	<i>52-11</i>	<i>584</i>	<i>Alive</i>
605	<i>F</i>	<i>07-Aug-18</i>	<i>4-12</i>	<i>584</i>	<i>Alive</i>
606	<i>cM</i>	<i>07-Aug-18</i>	<i>41-11</i>	<i>584</i>	<i>Alive</i>
607	<i>cM</i>	<i>07-Aug-18</i>	<i>16-14</i>	<i>584</i>	<i>Alive</i>
608	<i>cM</i>	<i>07-Aug-18</i>	<i>16-14</i>	<i>584</i>	<i>Alive</i>
609	<i>F</i>	<i>08-Aug-18</i>	<i>74-15</i>	<i>584</i>	<i>Alive</i>
610	<i>cM</i>	<i>08-Aug-18</i>	<i>74-15</i>	<i>584</i>	<i>Alive</i>
611	<i>cM</i>	<i>09-Aug-18</i>	<i>33-15</i>	<i>584</i>	<i>Alive</i>
612	<i>cM</i>	<i>09-Aug-18</i>	<i>33-15</i>	<i>584</i>	<i>Alive</i>
613	<i>F</i>	<i>09-Aug-18</i>	<i>82-15</i>	<i>584</i>	<i>Alive</i>
614	<i>F</i>	<i>09-Aug-18</i>	<i>14-12</i>	<i>584</i>	<i>Alive</i>
615	<i>cM</i>	<i>10-Aug-18</i>	<i>10-14</i>	<i>584</i>	<i>Alive</i>
616	<i>cM</i>	<i>10-Aug-18</i>	<i>11-16</i>	<i>584</i>	<i>Alive</i>
617	<i>F</i>	<i>10-Aug-18</i>	<i>35-15</i>	<i>584</i>	<i>Alive</i>
618	<i>cM</i>	<i>10-Aug-18</i>	<i>65-15</i>	<i>584</i>	<i>Alive</i>

In 2018, eight Boer goats died due to causes listed in Table 19.

Table 19: Boer goat deaths from 1 January 2018 to 31 December 2018.

<i>Studbook #</i>	<i>Sex</i>	<i>Date of Death</i>	<i>Cause of Death</i>
<i>SB# 602</i>	<i>Femal e</i>	<i>02-Feb-17</i>	<i>Pneumonia</i>
<i>SB# B69</i>	<i>Femal e</i>	<i>15-Oct-18</i>	<i>Old age</i>
<i>SB# 594</i>	<i>Femal e</i>	<i>03-Aug-18</i>	<i>Still born</i>
<i>SB# 603</i>	<i>Male</i>	<i>28-Oct-18</i>	<i>Poisonous plants</i>
<i>SB# 589</i>	<i>Male</i>	<i>08-Nov-18</i>	<i>Poisonous plants</i>
<i>SB# 590</i>	<i>Male</i>	<i>14-Nov-18</i>	<i>Internal parasites</i>
<i>SB# 593</i>	<i>Male</i>	<i>10-Nov-18</i>	<i>Internal parasites</i>
<i>SB# 240</i>	<i>Femal e</i>	<i>29-Nov-18</i>	<i>Ingested Plastics</i>

CCF's Boer goats are managed for meat production and castrated males and old or inferior does are sold at auction. Between January and December 2018, 81 goats (38 Females, 42 Wethers and 1 Male) were sold. No Boer goats were purchased.

CCF's strategy is to keep improving the quality of its Boer herd by bringing in quality bucks and continuing to improve the selection of animals for breeding. This will provide more income from the sales of these goats, as some can be sold as breeding animals versus only meat.

Damara Sheep

The Damara sheep herd stood at 143 (5M, 95F, 43 wethers) at the end of this reporting period, up from 142 at the end of 2018.

Forty-nine ewes were bred between August and September 2017 and lambed between January to February 2018. In order to increase the muscle mass of the Damara sheep, CCF bought a Meat master ram to crossbreed with the Damara sheep. The Meat master ram was bred to 23 ewes between October and November 2017. They gave birth in March 2018. Of the 23 ewes, 16 gave birth to 16 lambs (7M, 9F). In total 62 (29M, 33F) lambs were born in 2018, however one lamb was stillborn and another one died (Table 20).

Table 20: Damara sheep births from January 2018 to December 2018 (cM = castrated male, iM = intact male).

<i>Studbook #</i>	<i>Sex</i>	<i>DOB</i>	<i>Dam</i>	<i>Sire</i>	<i>Dead/Alive</i>
467	F	08-Jan-18	204	263	Alive
468	cM	08-Jan-18	179	263	Alive
469	F	09-Jan-18	248	263	Alive
470	cM	09-Jan-18	206	263	Alive
471	F	10-Jan-18	220	263	Alive
472	F	10-Jan-18	230	263	Alive
473	F	10-Jan-18	220	263	Alive
474	cM	11-Jan-18	214	263	Alive
475	F	12-Jan-18	252	263	Alive
476	F	12-Jan-18	231	263	Alive
478	cM	12-Jan-18	186	263	Alive
479	F	13-Jan-18	209	263	Alive
480	F	13-Jan-18	273	263	Alive
481	F	14-Jan-18	309	263	Alive
482	cM	15-Jan-18	181	263	Alive
483	F	16-Jan-18	314	263	Alive
484	cM	16-Jan-18	244	263	Alive
485	F	17-Jan-18	238	263	Alive
486	F	19-Jan-18	289	263	Alive
488	F	19-Jan-18	317	263	Alive
489	cM	20-Jan-18	211	263	Alive

490	<i>F</i>	<i>21-Jan-18</i>	<i>233</i>	<i>263</i>	<i>Alive</i>
491	<i>F</i>	<i>22-Jan-18</i>	<i>193</i>	<i>263</i>	<i>Alive</i>
492	<i>cM</i>	<i>22-Jan-18</i>	<i>257</i>	<i>263</i>	<i>Alive</i>
493	<i>cM</i>	<i>22-Jan-18</i>	<i>222</i>	<i>263</i>	<i>Alive</i>
494	<i>F</i>	<i>23-Jan-18</i>	<i>212</i>	<i>263</i>	<i>Alive</i>
495	<i>cM</i>	<i>23-Jan-18</i>	<i>315</i>	<i>263</i>	<i>Alive</i>
496	<i>cM</i>	<i>25-Jan-18</i>	<i>302</i>	<i>263</i>	<i>Dead</i>
497	<i>F</i>	<i>26-Jan-18</i>	<i>257</i>	<i>263</i>	<i>Alive</i>
498	<i>cM</i>	<i>28-Jan-18</i>	<i>319</i>	<i>263</i>	<i>Alive</i>
499	<i>F</i>	<i>29-Jan-18</i>	<i>292</i>	<i>263</i>	<i>Alive</i>
500	<i>F</i>	<i>29-Jan-18</i>	<i>284</i>	<i>263</i>	<i>Alive</i>
501	<i>cM</i>	<i>30-Jan-18</i>	<i>263</i>	<i>263</i>	<i>Alive</i>
502	<i>F</i>	<i>30-Jan-18</i>	<i>272</i>	<i>263</i>	<i>Alive</i>
503	<i>F</i>	<i>30-Jan-18</i>	<i>251</i>	<i>263</i>	<i>Alive</i>
504	<i>cM</i>	<i>30-Jan-18</i>	<i>246</i>	<i>263</i>	<i>Alive</i>
505	<i>F</i>	<i>31-Jan-18</i>	<i>208</i>	<i>263</i>	<i>stillborn</i>
506	<i>cM</i>	<i>31-Jan-18</i>	<i>211</i>	<i>263</i>	<i>Alive</i>
507	<i>cM</i>	<i>07-Feb-18</i>	<i>309</i>	<i>263</i>	<i>Alive</i>
508	<i>cM</i>	<i>09-Feb-18</i>	<i>202</i>	<i>263</i>	<i>Alive</i>
509	<i>cM</i>	<i>10-Feb-18</i>	<i>256</i>	<i>263</i>	<i>Alive</i>
510	<i>cM</i>	<i>11-Feb-18</i>	<i>275</i>	<i>263</i>	<i>Alive</i>
511	<i>F</i>	<i>12-Feb-18</i>	<i>307</i>	<i>263</i>	<i>Alive</i>
512	<i>F</i>	<i>13-Feb-18</i>	<i>305</i>	<i>263</i>	<i>Alive</i>
514	<i>cM</i>	<i>13-Feb-18</i>	<i>274</i>	<i>513</i>	<i>Alive</i>
515	<i>F</i>	<i>13-Feb-18</i>	<i>235</i>	<i>513</i>	<i>Alive</i>
516	<i>cM</i>	<i>19-Mar-18</i>	<i>296</i>	<i>513</i>	<i>Alive</i>
517	<i>cM</i>	<i>19-Mar-18</i>	<i>298</i>	<i>513</i>	<i>Alive</i>
518	<i>F</i>	<i>19-Mar-18</i>	<i>270</i>	<i>513</i>	<i>Alive</i>
519	<i>cM</i>	<i>20-Mar-18</i>	<i>242</i>	<i>513</i>	<i>Alive</i>
520	<i>cM</i>	<i>20-Mar-18</i>	<i>254</i>	<i>513</i>	<i>Alive</i>
521	<i>F</i>	<i>20-Mar-18</i>	<i>266</i>	<i>513</i>	<i>Alive</i>
523	<i>cM</i>	<i>20-Mar-18</i>	<i>321</i>	<i>513</i>	<i>Alive</i>
524	<i>F</i>	<i>22-Mar-18</i>	<i>331</i>	<i>513</i>	<i>Alive</i>
525	<i>F</i>	<i>22-Mar-18</i>	<i>340</i>	<i>513</i>	<i>Alive</i>
526	<i>cM</i>	<i>23-Mar-18</i>	<i>337</i>	<i>513</i>	<i>Alive</i>
527	<i>F</i>	<i>24-Mar-18</i>	<i>334</i>	<i>513</i>	<i>Alive</i>
528	<i>cM</i>	<i>24-Mar-18</i>	<i>323</i>	<i>513</i>	<i>Alive</i>
529	<i>cM</i>	<i>24-Mar-18</i>	<i>328</i>	<i>513</i>	<i>Alive</i>
530	<i>F</i>	<i>25-Mar-18</i>	<i>332</i>	<i>513</i>	<i>Alive</i>
531	<i>cM</i>	<i>25-Mar-18</i>	<i>326</i>	<i>513</i>	<i>Alive</i>

532	F	26-Mar-18	330	513	Alive
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In 2018, five sheep died due to causes listed in Table 21.

Table 21: Damara sheep deaths from 1 January 2018 to 31 December 2018.

<i>Studbook #</i>	<i>Sex</i>	<i>Date of Death</i>	<i>Cause of Death</i>
<i>SB# 496</i>	<i>Female</i>	<i>19-Jan-18</i>	<i>Rejected by dam</i>
<i>SB# 252</i>	<i>Female</i>	<i>04-Apr-18</i>	<i>Ingested plastic</i>
<i>SB# 450</i>	<i>Female</i>	<i>03-Aug-18</i>	<i>Poisonous plants</i>
<i>SB# 479</i>	<i>Male</i>	<i>28-Oct-18</i>	<i>Poisonous plants</i>
<i>SB# 498</i>	<i>Male</i>	<i>08-Nov-18</i>	<i>Killed by dog</i>

Dairy Goats

The dairy goat herd increased by 27, from 155 animals on 31 December 2017 to 182 (7M, 130F, 45 wethers) on 31 December 2018.

The dairy goat does are managed in such a way that when half of them are being bred, the other half are lactating to keep a continuous production of milk. Between March and June 2018, 51 does were bred and they gave birth between August and September 2018 (Table 22). Seven more does were bred between late July and September 2018 and are expected to kid between January and February 2019.

Table 22: Breeding and kidding times for 58 dairy does from January to December 2018.

<i>Goat</i>	<i>Jan</i>	<i>Feb</i>	<i>Mar</i>	<i>Apr</i>	<i>May</i>	<i>Jun</i>	<i>Jul</i>	<i>Aug</i>	<i>Sep</i>	<i>Oct</i>	<i>Nov</i>	<i>Dec</i>
<i>Lolita</i>			<i>Bred</i>				<i>Kid</i>					
<i>Marry2</i>			<i>Bred</i>					<i>Kid</i>				
<i>Blanc</i>			<i>Bred</i>					<i>Kid</i>				
<i>Princess Eugene</i>			<i>Bred</i>					<i>Kid</i>				
<i>Tulip</i>			<i>Bred</i>					<i>Kid</i>				
<i>Maggie</i>			<i>Bred</i>					<i>Kid</i>				
<i>Snow</i>			<i>Bred</i>					<i>Kid</i>				
<i>Violet</i>			<i>Bred</i>					<i>Kid</i>				
<i>Marigold</i>			<i>Bred</i>					<i>Kid</i>				
<i>Lizzie</i>			<i>Bred</i>					<i>Kid</i>				
<i>Diamond</i>			<i>Bred</i>					<i>Kid</i>				
<i>Marie-Antoinet</i>			<i>Bred</i>					<i>Kid</i>				
<i>Onyx</i>			<i>Bred</i>					<i>Kid</i>				
<i>Bridget</i>			<i>Bred</i>					<i>Kid</i>				
<i>Olifa</i>			<i>Bred</i>					<i>Kid</i>				

<i>Henrietta</i>			<i>Bred</i>				<i>Kid</i>			
<i>Anne-Bolyn</i>			<i>Bred</i>				<i>Kid</i>			
<i>Onsie</i>			<i>Bred</i>				<i>Kid</i>			
<i>Petrina</i>			<i>Bred</i>				<i>Kid</i>			
<i>Becky</i>			<i>Bred</i>				<i>Kid</i>			
<i>Anise</i>			<i>Bred</i>				<i>Kid</i>			
<i>Nigella</i>			<i>Bred</i>				<i>Kid</i>			
<i>Mhlali</i>			<i>Bred</i>				<i>Kid</i>			
<i>Astrid</i>			<i>Bred</i>			<i>Bred</i>	<i>Kid</i>			
<i>Salt</i>						<i>Bred</i>			<i>Kid</i>	
<i>Diana</i>						<i>Bred</i>			<i>Kid</i>	
<i>Kyla</i>						<i>Bred</i>			<i>Kid</i>	
<i>caitlin</i>						<i>Bred</i>			<i>Kid</i>	
<i>Carolina</i>						<i>Bred</i>			<i>Kid</i>	
<i>Beatrice</i>						<i>Bred</i>			<i>Kid</i>	
<i>Tina2</i>						<i>Bred</i>		<i>Kid</i>		
<i>Josaphine</i>						<i>Bred</i>			<i>Kid</i>	
<i>Ruacana</i>						<i>Bred</i>			<i>Kid</i>	
<i>Safire</i>						<i>Bred</i>				
<i>Emma</i>						<i>Bred</i>			<i>Kid</i>	
<i>Katrina</i>						<i>Bred</i>			<i>Kid</i>	
<i>Trycolym</i>						<i>Bred</i>			<i>Kid</i>	
<i>Rose</i>						<i>Bred</i>			<i>Kid</i>	
<i>Edeewis</i>						<i>Bred</i>				
<i>Princess Saba</i>						<i>Bred</i>			<i>Kid</i>	
<i>Noma</i>						<i>Bred</i>				<i>Kid</i>
<i>Peony</i>						<i>Bred</i>				<i>Kid</i>
<i>Primerose</i>						<i>Bred</i>				<i>Kid</i>
<i>Brenna</i>						<i>Bred</i>				
<i>Whinnie</i>						<i>Bred</i>				<i>Kid</i>
<i>Yarrow</i>						<i>Bred</i>				<i>Kid</i>
<i>Indira</i>						<i>Bred</i>				<i>Kid</i>
<i>Pinotage</i>						<i>Bred</i>				<i>Kid</i>
<i>Pearl</i>						<i>Bred</i>				<i>Kid</i>
<i>Regina</i>						<i>Bred</i>				<i>Kid</i>
<i>Lil-red</i>						<i>Bred</i>				<i>Kid</i>
<i>Mirabat</i>							<i>Bred</i>			
<i>Eve</i>							<i>Bred</i>			
<i>Lavender</i>							<i>Bred</i>			

<i>Daneli</i>								<i>Bred</i>				
<i>Chardon nay</i>								<i>Bred</i>				
<i>Kimberly</i>								<i>Bred</i>				
<i>Zinfandel</i>								<i>Bred</i>				

In 2018, 74 (46M, 28F) dairy kids were born (Table 23).

Table 23: Dairy goat kids from January to December 2018.

<i>Stud#</i>	<i>D.oB</i>	<i>Sex</i>	<i>Dam</i>	<i>Sire</i>
403	26-Mar-18	M	Hannah	Picasso
404	26-Mar-18	F	Hannah	Picasso
405	04-Apr-18	F	Ruby2	Picasso
406	7/31/2018	F	Lolita	Monet
407	7/31/2018	F	Lolita	Monet
408	01-Aug-18	F	An-Bolyne	Picasso
409	02-Aug-18	M	Nigella	Picasso
410	02-Aug-18	M	Nigella	Picasso
411	02-Aug-18	M	Nigella	Picasso
412	03-Aug-18	M	Anise	Monet
413	03-Aug-18	F	Anise	Monet
414	03-Aug-18	M	Snow	Monet
415	04-Aug-18	M	Olifa	Picasso
416	04-Aug-18	M	Marigold	Monet
417	05-Aug-18	F	Marry	Monet
418	05-Aug-18	F	Tulip	Picasso
419	06-Aug-18	M	Bridget	Picasso
420	06-Aug-18	F	Diamond	Picasso
421	07-Aug-18	M	Mary-Antoinett	Picasso
422	07-Aug-18	F	Mary-Antoinett	Picasso
423	07-Aug-18	F	Petrina	Picasso
424	09-Aug-18	M	Wendy	Picasso
425	09-Aug-18	M	Henrietta	Monet
426	08-Aug-18	M	Princess Eugen	Monet
427	08-Aug-18	M	Princess Eugen	Monet
428	08-Aug-18	M	Becky	Monet
429	08-Aug-18	M	Halali	Picasso
430	08-Aug-18	M	Halali	Picasso
431	09-Aug-18	F	Syrah	Monet
432	09-Aug-18	M	Maggie	Monet
433	10-Aug-18	F	Lizzie	Picasso

434	10-Aug-18	F	Lizzie	Picasso
435	10-Aug-18	M	Violet	Picasso
436	09-Aug-18	M	Maggie	Monet
437	11-Aug-18	M	Onsie	Monet
438	08/26/2018	F	Onyx	Picasso
439	10/22/2018	M	Kyla	Monet
440	10/22/2018	M	Kyla	Monet
441	10/25/2018	M	Carolina	Monet
442	10/25/2018	F	Carolina	Monet
443	10/25/2018	M	Salt	Monet
444	10/25/2018	M	Caitlin	Monet
445	10/25/2018	M	Caitlin	Monet
446	10/26/2018	M	Beatrice	Monet
447	10/26/2018	M	Katrina	Monet
448	10/26/2018	F	Katrina	Monet
449	10/26/2018	F	Katrina	Monet
450	10/26/2018	M	Daina	Monet
451	10/26/2018	F	Diana	Monet
452	10/27/2018	M	Emma	Monet
453	10/27/2018	F	Emma	Monet
454	10/27/2018	M	Saba	Monet
455	10/28/2018	F	Princess Adela	Monet
456	10/30/2018	M	Trycolyn	Monet
457	10/30/2018	M	Trycolyn	Monet
458	10/30/2018	M	Josephine	Monet
459	10/30/2018	M	Ruacana	Monet
460	10/31/2018	M	Rose	Monet
461	11-Jan-18	M	Noma	Monet
462	11-Jan-18	F	Noma	Monet
463	11-Jan-18	M	Peony	Monet
464	11-Jan-18	M	Peony	Monet
465	11-Mar-18	M	Yarrow	Monet
466	11-Mar-18	M	Yarrow	Monet
467	11-Jan-18	M	P-rose	Monet
468	11-Jan-18	F	P-rose	Monet
469	11-Apr-18	F	Lil-red	Monet
476	11-Jun-18	F	Whinnie	Monet
470	11-Oct-18	M	pearl	Monet
471	11-Nov-18	M	indra	Monet
472	11-Nov-18	M	indra	Monet
473	11-Nov-18	F	pinotage	Monet

474	11-Nov-18	F	pinotage	Monet
475	11-Dec-18	F	regina	Monet

In 2018, 13 (4M, 9F) dairy goats died to causes listed in Table 24, and 34 (1buck, 33wethers) were sold.

Table 24: Dairy goats that died from January to December 2018.

<i>Studbook #</i>	<i>Sex</i>	<i>Date of Death</i>	<i>Cause of Death</i>
<i>SB# 166</i>	<i>Female</i>	<i>10-Feb-18</i>	<i>Internal parasites</i>
<i>SB# 400</i>	<i>Female</i>	<i>27-Feb-18</i>	<i>Poisonous plants</i>
<i>SB# 65</i>	<i>Female</i>	<i>12-Mar-18</i>	<i>Bloat</i>
<i>SB# 67</i>	<i>Female</i>	<i>02-Apr-18</i>	<i>Bloat</i>
<i>SB# 428</i>	<i>Male</i>	<i>08-Aug-18</i>	<i>Distotia</i>
<i>SB# 436</i>	<i>Male</i>	<i>18-Aug-18</i>	<i>Pneumoia</i>
<i>SB# 391</i>	<i>Male</i>	<i>04-Nov-18</i>	<i>Ingested plastics</i>
<i>SB# 476</i>	<i>Female</i>	<i>07-Nov-18</i>	<i>Unknown</i>
<i>SB# 241</i>	<i>Female</i>	<i>23-Nov-18</i>	<i>Poisonous plants</i>
<i>SB# 463</i>	<i>Male</i>	<i>11/28/2018</i>	<i>Orf</i>
<i>SB# 455</i>	<i>Female</i>	<i>20-Dec-18</i>	<i>Bacterial infection</i>
<i>SB# 272</i>	<i>Female</i>	<i>25-Dec-18</i>	<i>Enterotoxemia</i>
<i>SB# 387</i>	<i>Female</i>	<i>26-Dec-18</i>	<i>Internal parasites</i>

Milk Production

There are several major factors that play a role in the amount of milk given by a specific goat. These factors include; the breed, age of the animal, lactation stage, amount and type of feed, temperature, milking frequency, availability and duration of free ranging, animal health condition, and the type of management practice. Each goat is milked twice a day, although the number of goats milked each month depends on their lactation stage.

In 2018, up to 64 goats were milked every day for a total production of 36,544.6kg of milk. Of this milk, 7,736.8kg was used to raise goat kids and 28,807.8kg was supplied to the creamery (Table 25).

Table 25: Goats milked, amount produced (kilograms), and how much allocated to kids and creamery in 2018.

	<i>Jan</i>	<i>Feb</i>	<i>Mar</i>	<i>Apr</i>	<i>May</i>	<i>Jun</i>	<i>Jul</i>	<i>Aug</i>	<i>Sep</i>	<i>Oct</i>	<i>Nov</i>	<i>Dec</i>
<i>Goats milked</i>	42	42	44	42	42	43	41	64	47	40	63	60
<i>Total Produced</i>	1755.9	2500.6	2546.7	2653.5	2522.3	3162.8	2926.1	3133.3	2926.9	3151.8	4338	4926.7
<i>Used to Raise Kids</i>	330.8	0	0	109.5	139.5	105		819	1733	1180	1465	1855
<i>To Creamery</i>	1425.1	2500.6	2546.7	2544	2382.8	3057.8	2926.1	2314.3	1193.9	1971.8	2873	3071.7

The amount of milk each individual goat produces is monitored on a daily, weekly, monthly and annual basis. This allows us to determine when they are producing the most milk and then compare

the amounts produced to the feed they are given. Table 26 shows amounts of milk production per goat per month.

Table 26: Milk production per goat per month for 2018 (kilograms).

	SB #	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Safire</i>	47	45.8	54.1	58.3	69.4	67.4	74.7	65.1	40.9	0	0	0	0
<i>Addie</i>	176	39.5	54.4	57.6	76.6	56.2	65	68.6	71.1	66.2	75.5	67	66.4
<i>Anise</i>	27 2	0	0	0	0	0	0	0	51.9	100.8	120.2	117.6	93.4
<i>Ann-Bolyn e</i>	30 0	0	0	0	0	0	0	0	44.9	78.5	89.5	79.1	87.6
<i>Astrid</i>	29 3	0	0	0	0	0	0	0	26.5	66.1	76.1	70.4	74.3
<i>Beatrice</i>	178	44.1	73.4	72.2	79.4	77.6	181.3	92.8	71	37.9	0.4	81	83.2
<i>Becky</i>	27 0	0	0	0	0	0	0	0	25.5	61.9	61.6	59.2	49.7
<i>Blossom</i>	15 0	34	45.8	51.1	58	56.7	71.7	68.2	66.7	60.8	68.9	62.1	57.7
<i>Brenna</i>		47.6	61.4	66.7	77	70.7	81.6	84.1	73.1	0	0	0	0
<i>Bridget</i>	27 7	0	0	0	0	0	0	0	36.1	81.7	92.2	82.6	88.9
<i>Caitlin</i>	13 2	48.6	68	75	69.3	69.8	71.7	83	44.4	0	0	87.2	105.8
<i>Caroline</i>	131	37.4	51.7	55.4	57.2	53.6	58.4	58.5	45.3	12.3	0	75.9	87.4
<i>Chardonnay</i>	53	68.6	70.9	63.9	60.3	47.9	46.3	44.9	47.5	0	0	0	0
<i>Chenin</i>	10 0	42.5	54.2	54.7	54.5	50.8	73.7	77	76.8	81.6	100.8	80.5	83.5
<i>Diamond</i>	29 1	0	0	0	0	0	0	0	18.1	74	76.4	68.9	77
<i>Diana</i>	59	0	0	0	0	0	0	0	0	0	0	59.9	63.4
<i>Dolly Parton</i>	65	61	70.5	24.6	0	0	0	0	0	0	0	0	0
<i>Edelweiss</i>	74	31.4	39.2	39.8	44.3	52.7	51.7	71	63.2	0	0	0	0
<i>Emma</i>	24 3	24.8	40	45.5	58.6	58.3	54.3	55.6	35.5	0	0	77.2	90.9
<i>Gretel</i>	67	63.7	76	71.6	0	0	0	0	0	0	0	0	0
<i>Halali</i>	27 9	0	0	0	0	0	0	0	28.1	69.5	82.4	75.9	71.1
<i>Hannah</i>	121	0	0	0	0	0	129.3	0	88.9	85.1	93.8	86	63
<i>Henrietta</i>	29 6	0	0	0	0	0	0	0	26.7	61	72.3	71.4	64.6
<i>Indira</i>	49	38	48.8	45.5	55.1	60.2	75.5	68.6	60.3	18.2		52.9	97.6
<i>Jasmin</i>	44	92.3	130	73.6	82	77.6	87.8	80.1	78.9	84.5	103.9	95.9	101.6
<i>Josaphine</i>	42	27.8	24.1	22	14.3	12.1	4.5	0	0	0	0	61.5	90.2
<i>Katrina</i>	142	31.4	48.1	52.1	57	53.3	62	67.3	45.5	0	0	78.4	82.4

<i>Kimberley</i>	56	53.4	76.2	50.1	14.5	17.9	4.7	92.8	0	0	0	0	0
<i>Kyla</i>	25 3	27.1	46.9	46.9	49.8	43.3	56.5	53.4	29.3	0	0	79.9	94.2
<i>Lady Jane</i>	174	51.7	80.7	83.8	87.2	68	99.1	91.9	61.1	0	0	0	0
<i>Lil Red</i>	13 0	40	48.5	53.2	53.6	51.4	50.6	49.2	45	0	0	46.3	87.4
<i>lizzie</i>	28 9	0	0	0	0	0	0	0	32.4	72.4	94.7	85	93.5
<i>Lolita</i>	26 5	0	0	0	0	0	0	0	42.1	73.7	82.4	74.5	72.5
<i>Maggie</i>	317	0	0	0	0	0	0	0	28.4	67.2	83.3	76.6	75.8
<i>Margaret</i>	72	50.3	65.4	69	76.7	83.6	103. 2	89.6	86.2	99.2	104. 3	89.4	93.4
<i>Marie-Antoinette</i>	30 1	0	0	0	0	0	0	0	30.2	80. 8	80.1	81.6	91.1
<i>Marigold</i>	28 4	0	0	0	0	0	0	0	26.2	60. 2	62.3	49.3	52.4
<i>Marry</i>	29 5	0	0	0	0	0	0	0	32	62.4	70.6	68	62.9
<i>Meriam</i>	24 4	79.7	52.7	52.5	52.1	45.4	54	55.3	57.3	61.3	78.2	68.3	61.8
<i>Mhalali</i>	26 8	0	0	0	0	0	0	0	0.6	62.3	82.5	84.2	148
<i>Monica</i>	25 4	8.6	0	0	0	0	0	0	0	0	0	0	0
<i>Nigella</i>	26 8	0	0	0	0	0	0	0	43.6	74.5	84.5	73.5	0
<i>Nina</i>	19 5	32.2	40.6	39	43.2	51.8	60.7	64.2	64.4	64.6	82.8	76.5	82.6
<i>Noir</i>	50	45.5	56.9	61.9	65.6	61.2	74.9	55.9	39.6	44.2	57.5	54.6	61.1
<i>Noma</i>	39 0	0	0	0	0	0	0	0	0	0	0	44.8	77.1
<i>Olifa</i>	28 0	0	0	0	0	0	0	0	30.5	63.5	73.8	65.3	68
<i>Onsie</i>	24 6	8.9	0	0	0	0	0	0	0	0	0	0	0
<i>Onyx</i>	30 3	0	0	0	0	0	0	0	0	57.9	84	69.8	70.7
<i>Pearl</i>	18 6	30.1	51.3	63.2	73.3	69.9	78.9	74.9	67.6	56.1	36.2	26.7	70.2
<i>Peony</i>	16 3	37.6	49.4	51.3	82.3	71	98	86.6	72	0	0	0	0
<i>Petrina</i>	33 6	0	0	0	0	0	0	0	31.1	61.8	72.5	65.3	76.4
<i>Pinotage</i>	75	55.3	65.3	67	66.7	68.4	70.8	70.6	67	47.2		54.6	125. 4
<i>Poppy</i>	137	46.3	72	70.4	70.9	71.7	92.5	85.9	69.8	77.9	95.8	82.9	87
<i>Primerose</i>	13 8	46.4	68.5	63.3	74.8	77	82.3	76.9	57.8	0	0	71.7	114. 5
<i>Princess Adela</i>	15 2	19.7	35.4	42.1	53.2	43.4	49.1	48.2	43.2	19.3	0	47.3	62.3
<i>Princess Eugene</i>	31 9	0	0	0	0	0	0	0	20.4	50.6	54	43.6	46.2

Princess Saba	107	36.4	51.5	63.6	69.2	69.5	81.1	76.9	58.5	0	0	72.7	97.6
Razzle	241	29	31.7	34.7	40.5	40.1	49.5	52.7	50.5	51.9	60.7	37.3	0
Regina	99	23.2	32.7	31.1	30.5	32.9	38.4	47.3	47	42.5	0	51.6	72.6
Rose	307	0	0	0	0	0	0	0	0	0	0	54.2	83.1

Feed provided to CCF Small Stock

To ensure the health of all our goats and sheep we constantly monitor their food requirements and intake. We currently use four feed products to provide the correct variety of nutrients to our animals. They include: Alfalfa hay; ram, lamb, and ewe pellets; milk goat pellets; and grass hay. Figure 57 shows the amount used for each during this reporting period.

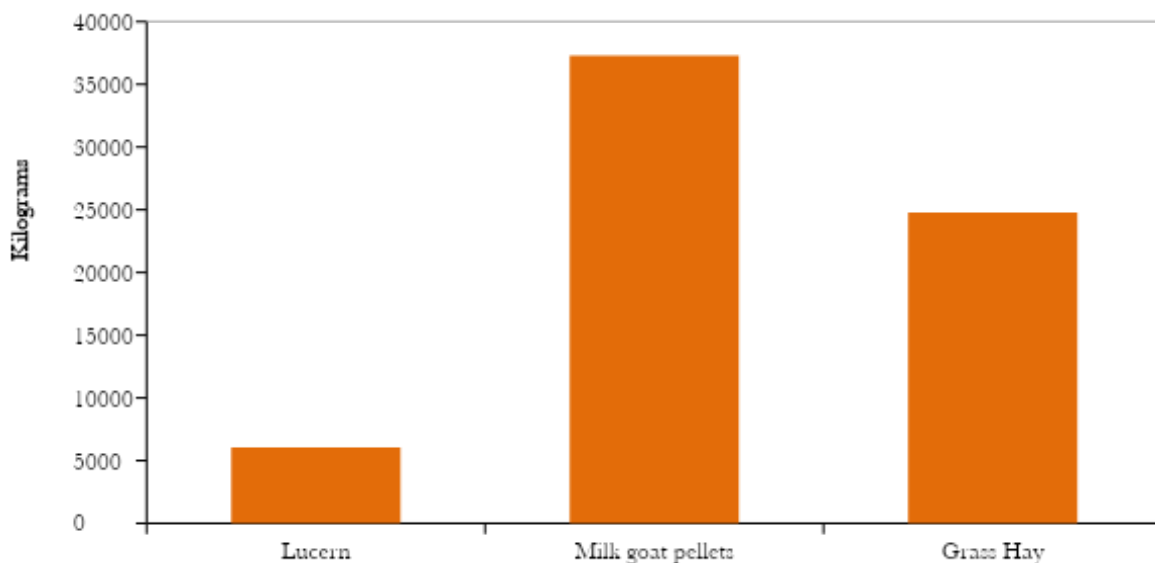


Figure 57: Amount of feed provided to CCF small stock in 2018.

Vaccinations and De-worming

All of CCF's small stock is treated for internal and external parasites on a quarterly basis in January, April, July, and October of each year. The product used for internal parasite treatment rotates between the following four products: Fenbendazole, Ivermectin, Albendazole, and Doramectin. The product used at each treatment is determined by which product was used previously; anthelmvecicintic products are rotated between drug classes in order to help prevent development of resistance among the parasites, which can happen when the same product is used repeatedly. Both before and after each quarterly parasite treatment, a herd-wide Faecal Egg Count (FEC) is performed to determine the internal parasite burden in the animals. This is done by collecting representative faecal samples from various areas in the *kraal*. The pre- and post-treatment testing helps ensure that the treatments reduce the parasite burden in the animals, which helps to ensure efficacy of the products used. For external parasite (tick, fly, and lice) prevention Paracide (Pfizer Animal Health) and Ultra-Boss Pour-On (Schering-Plough Animal Health) are rotated at each quarterly treatment. Vaccines are applied as follows. In addition, this year CCF vaccinated all small stock against Anthrax.

- Glanvac 3 – for the control of caseouslymphadenitits (*Co rynebacterium pseudotuberculosis*) and prevention of enterotoxemia, pulpy kidney disease (*Clostridium perfringens* Type D), and tetanus (*Clostridium tetani*).
 - o Adult female animals are vaccinated one month before giving birth (parturition)
 - o Adult male animals are vaccinated once annually.
 - o Newborns are vaccinated at three and four months of age and then annually thereafter.
- Pasteurella – for the control of Pasteurellahaemolytica respiratory infection ('shipping fever').
 - o All adult animals are vaccinated annually.
 - o Newborns are vaccinated at three and four months of age and then annually thereafter.
- Brucellosis – for the control of *Brucellaovis* and *Brucellamelitensis*, a bacterial infection of the reproductive tract.
 - o This vaccine is given only once and provides life-long immunity; all young animals are vaccinated at four months of age.
- Enzootic Abortion – for the control of Chlamydoghilapsittici, an organism that causes early and late term abortions.
 - o All female animals are vaccinated one month before breeding on an annual basis.
- Rabies – for the prevention of rabies virus which causes fatal encephalitis.
 - o All adult animals are vaccinated yearly.
 - o All newborns are vaccinated at nine months of age and then annually thereafter.

3. Hay Production

In 2018, CCF produced no bales of hay due to poor rainfall.

4. Wild Game Hunted on CCF Property

As part of CCF Model Farm's sustainable wildlife management practices, CCF hunts several wild game species for consumptive purposes, including oryx, kudu, red hartebeest, and warthog. Figure 58 below displays the amount of wild game removed for consumptive use for this reporting period.

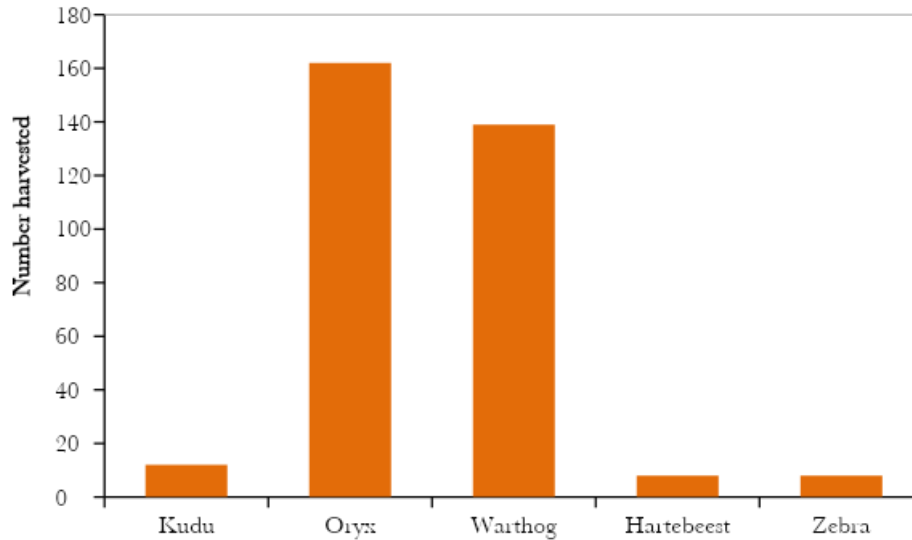


Figure 58: Amount of game utilised by CCF in 2018.

C. Sustainable Economic Programmes Supporting Local Communities

If the world’s fastest cat is to survive in the wild, humans must coexist with it. The following progress has been made on CCF’s activities that seek to assure the economic well-being of people living within the cheetah’s range and provide resources to support CCF’s long-term activity.

1. Certified Wildlife Friendly

CCF is a cofounder of The Wildlife Friendly Enterprise Network (WFEN), which is a ‘global community dedicated to the development and marketing of products that conserve threatened wildlife while contributing to the economic vitality of rural communities’. The WFEN provides the ‘Certified Wildlife Friendly’ trademark (Figure 60) that distinguishes enterprises that meet the highest standards of being wildlife friendly. CCF’s Bushblok and Dancing Goat Creamery are both Certified Wildlife Friendly.



Figure SEQ Figure * ARABIC 59: Certified Wildlife Friendly logo.

2. Bushblok

Operations

Production in 2018 amounted to 367 tonnes. Table 27 shows the monthly block production during this reporting period.

Table 27: Monthly block production January to December 2017.

Month	Amount (tonnes)
January	10
February	15
March	24
April	22
May	30
June	63
July	51
August	19
September	33
October	34
November	50
December	16
Total	367

General Information

The production of carbonised block and wood continued in 2018. Construction work on the Biomass Technology Demonstration Centre (BTDC) at CCF also continued and most of the equipment from town has been moved to the facility at CCF headquarters. The Bushblok factory is now operational at the CCF's BTDC.

Maintenance on the extruders and cut off saws at the Bushblok factory continue to be a challenge.

Dr Bruce Brewer, CCF's General Manager, remained active in groups involved with bush encroachment in Namibia. These included the National Rangeland and Bush Encroachment Forum, which is convened by the Ministry of Agriculture, Water and Forestry, the Namibia Biomass Group (N-BiG), a newly established industry founded through the support of the GIZ Support to De-bushing Programme, and the GIZ/MAWF De-bushing project, which is supported by the German Development Authority. There was much interaction with the GIZ group as a joint marketing company is under consideration.

3. Cheetah Country Initiatives

Dancing Goat Creamery

Background

CCF began producing fresh goat cheese in August 2009 using the milk from six CCF's dairy goats, which came from the award-winning dairy farm Fairview in South Africa.

The herd has grown slowly over the past few years, as it takes approximately one and a half years to get a goat kid into production. At the end of 2018, there were over 182 dairy goats at CCF with up to 75 being milked daily for a daily average of 101.5 kg per day. Milk yields from the dairy goats have steadily increased since the inception of the dairy goat programme. The programme aims to facilitate training and skill development around the production of dairy goat products, thus enabling livelihood diversification, and supplemental income to both CCF and community members.

In early April 2013, CCF opened the Dancing Goat Creamery, where high-quality artisanal fresh goat cheeses, as well as a variety of goat milk ice creams, fudge, and soaps are produced daily by CCF's Creamery Manager Hanlie Visser, and head cheese maker Fransina Simson. The Dancing Goat Creamery is an essential part of CCF's Model Farm, which alongside its celebrated Livestock Guarding Dog Programme, allows CCF to demonstrate how cheetahs and livestock can live together and how local farmers can be successful using non-lethal predator management and alternative income source strategies to protect their livestock and thus their livelihoods.

As with the CCF International Research and Education Centre, the CCF Model Farm and Dancing Goat Creamery are open to the public daily and local farmers are encouraged to visit.

Production

CCF's Dancing Goat Creamery was supplied with a total of 28,807.8 kg of milk, however due to a faulty freezer, only 26,701 kg of the milk from CCF's Model Farm could be used in the creamery. The milk which turned sour and could not be used in the creamery was used in the CCF garden for compositing, and the faulty freezer has since been replaced. Table 28 shows amounts of milk allocated to production of each creamery product.

Table 28: Milk allocation per product from January to December 2018.

<i>Product</i>	<i>Milk Used (kg)</i>
<i>Feta</i>	<i>11,426</i>
<i>Chèvre</i>	<i>7,225</i>
<i>Ricotta</i>	<i>4,585</i>
<i>Mozzarella</i>	<i>950</i>
<i>Fudge</i>	<i>1,942</i>
<i>Ice cream</i>	<i>175</i>
<i>Chevrotin</i>	<i>320</i>
<i>Yogurt</i>	<i>0</i>
<i>Soap</i>	<i>78</i>
<i>Total</i>	<i>26,701</i>

Of this milk, 70% was used to produce two of the Creamery's original cheeses, feta and chèvre.

Table 29 shows the amounts of these varieties produced each month in 2018. In addition, the Creamery produced a total of 179.83 kg of fudge, 230.25 kg of ice cream, 434.21 kg of ricotta and 85.47 kg mozzarella cheeses. The creamery started making a new hard cheese called Chevrotin, for which 320.01 kg of milk was used to produce and develop. All cheese that was made was used on cheese platters in the café or as promotions. This cheese will be included in all tables from 2019.

Table 29: Feta and chèvre monthly production (kilograms) in 2018.

Month	Feta	Chèvre	Total
January	57.80	41.29	99.09

February	73.08	51.95	125.03
March	82.01	56.63	138.64
April	104.37	34.93	139.30
May	81.42	35.84	117.26
June	121.31	66.24	187.55
July	94.40	78.35	172.75
August	86.27	50.78	137.05
September	45.80	31.80	77.59
October	71.67	58.96	130.63
November	151.62	81.81	233.43
December	155.96	119.88	275.84
Total	1,125.71	708.46	1,834.16

Expenses

Creamery expenses such as cheese cultures, packaging, labelling, herbs, labour, gas, and electricity are estimated at N\$9,872.77 for this period, averaging N\$7.65 per kilogram of product. Total milk costs amounted to N\$60.78 at an average of N\$44.73 per kilogram of product. The average amount of milk required to produce a kilogram of cheese is 10.50kg, whereas fudge requires 10.80kg, and ice cream 0.76kg.

Table 30 shows the breakdown of costs for the various creamery products as well as the total cost per kilogram of product.

Table 30: Production costs (N\$) of creamery products from January to December 2018.

Product	Production (kg)	Milk per kg	Total Milk Used (kg)	Total Milk Cost	Total Other Cost	Total Production Cost	Total cost per kg
Feta	1,125.71	10.15	11,426.26	\$62,387.35	\$3,857.55	\$66,244.91	\$58.85
Chèvre	708.45	10.20	7,225.35	\$39,450.42	\$2,427.70	\$41,878.12	\$59.11
Ricotta	434.21	10.56	4,584.83	\$25,033.17	\$1,487.94	\$26,521.12	\$61.08
Fudge	179.83	10.80	1,942.43	\$10,605.67	\$616.22	\$11,221.89	\$62.40
Ice cream	230.25	0.76	174.57	\$953.15	\$789.01	\$1,742.16	\$7.57
Soap	117.15		78.10	\$426.43	\$401.45	\$827.87	
Mozzarella	85.47	11.11	949.70	\$5,185.36	\$292.90	\$5,478.26	\$64.09
Total	2,881.07		26,381.24	\$144,041.55	\$9,872.77	\$153,914.32	

Sales

Total revenue from creamery products in 2018 was N\$334,691.80. Creamery product sales totalled 2,612.67 kg, while 33.5kg were distributed as promotional samples and gifts at events such as agricultural shows, farmer's markets, and tourism fairs, and 55.30kg of products were left in inventory (Table 31).

Table 31: Creamery product sales in 2017. Figures in parenthesis do not indicate profit from products.

Product	Kg	Cost/Kg	Total Cost	Revenue	Profit
Feta	99.8	\$58.85	\$5,872.93	\$13,755	\$7,882.07

Chèvre		16.4	\$59.11	\$969.44	\$2,888.90	\$1,919.46
Ricotta		5.1	\$61.08	\$311.50	\$735	\$423.50
Ice cream		0	\$7.57	\$0.00	\$0.00	\$0.00
Soap		0	\$0.00	\$0.00	\$0.00	\$0.00
Fudge		16.7	\$62.40	\$1,042.15	\$4,110	\$3,067.85
Stores and Lodges		138		\$8,196.02	\$21,488.90	\$13,292.88
Fudge Gift Shop		17.6	\$62.40	\$1,098.32	\$4,554.50	\$3,456.18
Soap Gift Shop		5.1	\$0.00	\$0.00	\$1,680	\$1,680.00
Cheese Gift Shop		10.25	\$60.78	623.02	\$1,551	\$927.98
Ice cream Gift Shop		42.72	\$7.57	\$323.24	\$11,607	\$11,283.76
Total CCF Gift Shop		75.67		\$2,044.58	\$19,392.50	\$17,347.92
Ice Cream Babson		50	\$7.57	\$378.32	\$11,000	\$10,621.68
Soap Babson		0	\$0.00	\$0.00	\$0.00	\$0.00
Cheese Babson		150	\$60.78	\$9,117.41	\$18,000	\$8,882.59
Fudge Babson		51	\$62.40	\$3,182.62	\$7,650	\$4,467.38
Total Babson		251		\$12,678.36	\$36,650	\$23,971.64
Ice Cream Café		119	\$7.57	\$900.40	\$26,180	\$25,279.60
Cheese Café		1859.5	\$60.78	\$113,025.52	\$223,140	\$110,114.48
Total Café		1,978.50		\$113,925.92	\$249,320	\$135,394.10
Cheese Hotspot		128	\$60.78	\$7,779.84	\$7,779.84	\$0.00
Ice Cream Hotspot		8	\$7.57	\$60.56	\$60.56	\$0.00
Total Hotspot		136		\$7,840.40	\$7,840.40	\$0.00
Total CCF		2,441.17	\$0.00	\$136,489.26	\$313,202.90	\$176,713.66
Cheese samples		29.5	\$60.78	\$1,793.09	\$0.00	(\$1,793.09)
Fudge samples		3	\$62.40	\$187.21	\$0.00	(\$187.21)
Ice cream samples		1	\$7.57	\$7.57	\$0.00	(\$7.57)
Promotional samples		33.5		\$1,987.87	\$0.00	(\$1,987.87)
Total All Products		2,612.67	\$0.00	\$146,673.15	\$334,691.80	\$188,018.67

Cheese deliveries were made to approximately 25 different customers, nine of which order on a regular basis. CCF's main customers include Maerua Super Spar, Desert Hill, Fruit and Veg, Theo Spar, and the Frans Indongo Lodge.

The Dancing Goat Creamery also creates a secondary industry for CCF with increased revenues for its eco-tourism business by offering its products for sale to visitors at the Cheetah Gift Shop at retail

price. As shown in Table 31, during this period the Creamery supplied the Gift Shop with 75.7 kg of product (cheese, fudge, and ice cream).

The Creamery also supplies products to the CCF kitchens at Babson House, Cheetah Café, and the Hot Spot. During this period, the CCF kitchens were supplied 2,441.2 kg of ice cream, fudge, cheese, and soap.

At the end of this period, the remaining inventory in CCF's freezers was 55.3 kg of cheese, 4.5 kg fudge, and 9.5 kg of ice cream, as every product made at the Creamery is regularly sold.

Client Development

All the cheese recipes have been perfected to ensure consistent high quality and to ensure client satisfaction. Based on customers' suggestions, the Creamery team worked on the development of a variety of flavours for its existing cheeses. The creamery also developed exciting new fudge flavours including Amarula, rooibos tea and cinnamon.

CCF will continue to place special emphasis on customer satisfaction and quality assurance in an effort to continue its growing sales trend. In addition, CCF will intensify marketing and sales of its new cheese types while continuing to develop new products. Consequently, this growing demand for Creamery products will require increasing milk production.

The Chewbaaka Memorial Garden

CCF's Chewbaaka Memorial Garden continues to produce fresh vegetables for consumption by more than 40 CCF staff and volunteers, as well as visitors to the Cheetah Café and Babson House guests. Namibia imports approximately 80% of its fruits and vegetables, mostly from South Africa, transporting it across long distances and increasing use of fossil fuels and carbon emissions that contribute to climate change. By localising food production, CCF is not only reducing the environmental and social impacts of transporting food, but is also providing fresher, tastier, and more nutritious meals while saving money.

To counteract the heavy clay-sand soil, CCF uses aged manure from its farm animals and a by-product from its Bushblok production: wood dust. These materials are mixed into parent soil to improve fertility and organic matter content. CCF is also creating compost from food scraps, which is an essential ingredient for any organic garden. CCF staff, volunteers, and CCF gardeners, Hendrik Hoeseb, Magdel Ngandi and Julia Bernard, have been trained in proper composting techniques. CCF is consistently harvesting a variety of salads and vegetables including beans, beetroot, carrots, daikon radishes, peas, squash, lettuces, turnips, parsnips, rutabagas, cilantro, chard, endive, mustard, rocket, spinach, radishes, and okra. Figure 60 shows the amounts of vegetables harvested during the reporting period. Spinach, tomatoes and cucumbers were the most harvested during this reporting with 162.5kg, 75.5kg and 69kg respectively.

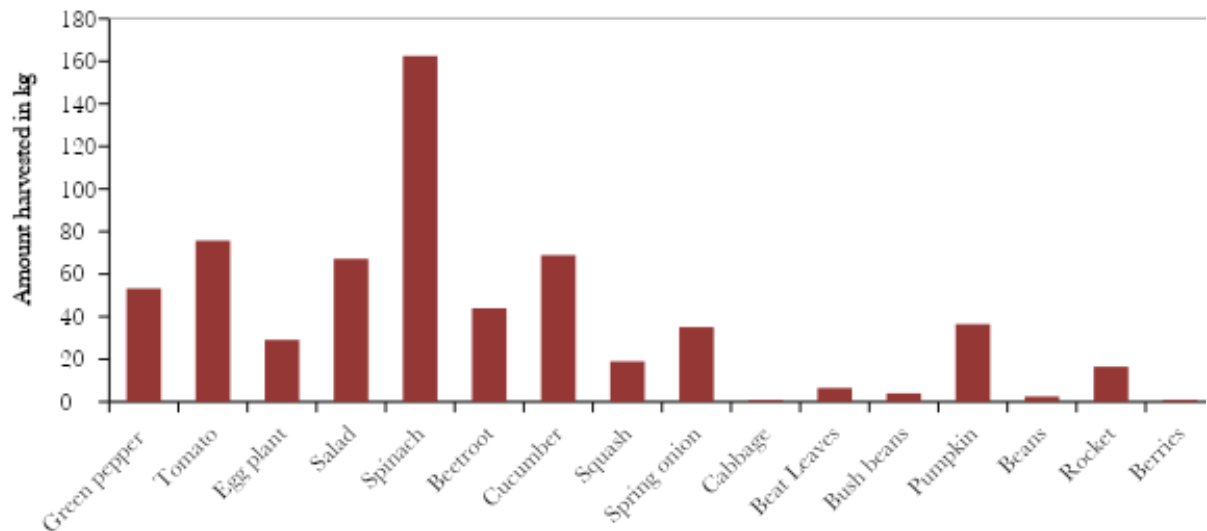


Figure 60: Vegetables and herbs harvested from the Chewbaaka Memorial Garden in 2018.

Since its inception, the garden's harvest has continued to grow. By having diverse plantings in a small space, the garden remains chemical-free because it invites beneficial insects to do the work of managing unwanted insects. Sunflowers and other flowers attract pollinators. The vegetables are therefore healthier for the environment, the growers, and the consumers. Seeds were provided courtesy of Baker Creek Heirloom Seeds, an American company based in Missouri that distributes from California. We have 42 varieties of heirloom vegetable seeds.

Because of a designated gift from CCF USA Trustee Candice Clough in honour of her father, a new greenhouse and pond were installed in May, including electric and water servicing.

The garden is one more step in CCF's sustainability programme, which includes an extensive recycling programme and composting. CCF includes the Chewbaaka Memorial Garden and Sustainable Practices in farmer training programmes as yet another way to promote alternative livelihoods and economic growth in Namibia.

The Apiary

The colony that took over one of CCF's existing colonies continues to do very well at CCF's apiary. A third super (hive extension) has been added and for this super a queen excluder has been added to allocate this super solely to honey.

Another colony that moved into the old tire hive from which the past colony absconded seems to be doing extremely well. Plans are in place to modify the hive to allow supers to be added.

Having bees at CCF is beneficial for many different reasons. Honey harvesting and sales will add to CCF's diverse income and food sustainability. In addition, bees pollinate the crops at CCF's organic garden and increase food production. CCF intends to build up the apiary to teach more aspects of sustainability to visitors and local farmers, and to produce honey for food and added income. Along with CCF's Model Farm, the apiary will help to demonstrate predator-friendly farming techniques, as honeybees are part of an integrated farming system that diversifies income and adds value to the landscape. We are yet to harvest honey from the apiary.

CCF Vineyard

The grapes are doing very well. Grapes were pruned during August 2018 and we expect harvest of January 2019 to be the biggest one yet. Weed and grasses were cleared during November and ploughed back into the ground.

D. Eco-Tourism

Tourism is one of Namibia's fastest growing industries, with a large number of developments emerging in the Otjiwarongo area over the past couple of years. CCF's eco-tourism potential continues to grow, as it has become one of the region's leading travel and tourism destinations, thus boosting the local businesses of Otjiwarongo. In June 2017, CCF opened its new Cheetah View Lodge. CCF strives to provide supporters and guests the best stay and experience at its accommodations and during visits at its Centre.

1. Visitors to CCF

By the end of 2018, CCF had received a total of 13,030 visiting tourists, of which 1,310 (Cheetah View Lodge & Babson) were overnight tourists. This represents a 15.97 % increase from 10,949 in 2017. In terms of income, this period saw a 43.30% increase at N\$8,715,106.00 compared with N\$6,041,842.00 in 2017. In addition to school groups and film crews mentioned separately, CCF hosted many CCF friends, supporters, and collaborators in 2018, many of them on return visits.

Long-time friends and supporters who visited CCF during this period included CCF USA Board member Roswitha Smale, who returned in June 2018.

We hosted Kristen Sarri, who is a CCF intern alumnus of 1993/1994. She visited with her partner at the end of December 2017 through to beginning of January 2018.

In January 2018 we hosted Marcia Sivek, (who was a working guest during her visit) along with her partner Vince Dupperon. Marcia is also involved with our northern California Chapter. During the same month, Allen Feldstein, tour operator and owner of Infinite Safaris and CCF trustee, visited the Cheetah View Lodge. He took part in a number of activities offered at CCF and we received important feedback from him. We are excited to host his guests who have booked a visit with us. Jerry Vaske from the Colorado State University, George and Krista Lyons (booked through Alan Feldstein), Cynthia Perry all visited us after the Pathways Conference in January 2018. At the end of January 2018, we hosted Bo Kjellson and his wife, who are big CCF donors. Gary Hattern, a retired executive, visited us at the end of January, and is looking at the possibility of volunteering as a working guest. Gary is also keen on helping at our USA office.

Matilde Venturi along with Betty von Hoenning O'Carroll from CCF Italy, visited CCF for a site inspection of our new Cheetah View Lodge. Both CCF Italy and Gold Wind Tourism organised the tour which we hosted in November 2018. Retired American Diplomat and avid birder, Peter and Kimberly Kaestner, both CCF friends visited in March 2018.

We hosted Patrick Couzinet and Helen Lebedeff, who stayed at Cheetah View Lodge in April 2018. Patrick and Helen are in charge of the Social Corporate Responsibility for Veolia, and wish to develop a program around biodiversity in Namibia. CCF could be a beneficiary of this program. We also hosted Alan and LaVerne Silverman, and their friends, and they all stayed at Babson House in May 2018.

Eli Bitzer, a South African citizen residing in Namibia as a diplomat attached to the South African High Commission in Windhoek visited in July 2018. She enjoyed taking part in our centre activities and meeting Dr. Laurie Marker. The Pray family from Northern California visited in July 2018. One of their sons who joined them on this trip is in the Peace Corps. They were booked by a good friend of CCF's, Alan Feldstein from Infinite Safaris. They enjoyed being hosted for dinner by Dr. Laurie Marker and Dr. Bruce Brewer at Cheetah View Lodge. Caitlin and Tim O'Connell-Rodwell stayed at

Cheetah View Lodge and visited the Genetics Lab in July 2018 and then joined us at the Annual CCF gala at the Country Club in Windhoek. We also proudly hosted Namibian CCF Board Member Mike Hill and His wife Jerry.

In August 2018, CCF had the pleasure of hosting UK’s Africa Travel Resources Company director Greg Welby, his wife Tracey Welbey and their two. We enjoyed showing them all the different programs at CCF and all the activities their guests would enjoy while booked into one of our accommodations. We also hosted Dr Mark Neeham, a Professor in the Department of Forest Ecosystems and Society, and Director of the Natural Resources, Tourism and Recreation (NATURE) Studies Lab from Oregon State University in August. At the Same time we hosted the Cheetah Tour Group from Sense of Africa, and CCF supporters from New York, Andre Rosario & Ronald Pagano, and Vanessa Dewson from Focus Photography Tours which is a division of Carlson Wagonlit Travel. Vanessa is a Photography Tour Specialist, and is working on a new tour group to bring to CCF in 2019.

2. Visitor and Guest Analysis

As tourists are increasingly becoming seasoned international travellers, they become more discerning and choose those destinations that can provide a more memorable experience and good value for their money. Therefore, CCF strives to ensure that the product offered to the tourism sector is sufficiently attractive.

1. Day Visitors

This reporting period saw a strong growth with an 18.8% increase in visiting tourists at 13,030 compared to 10,949 in 2017 (Figure 61).

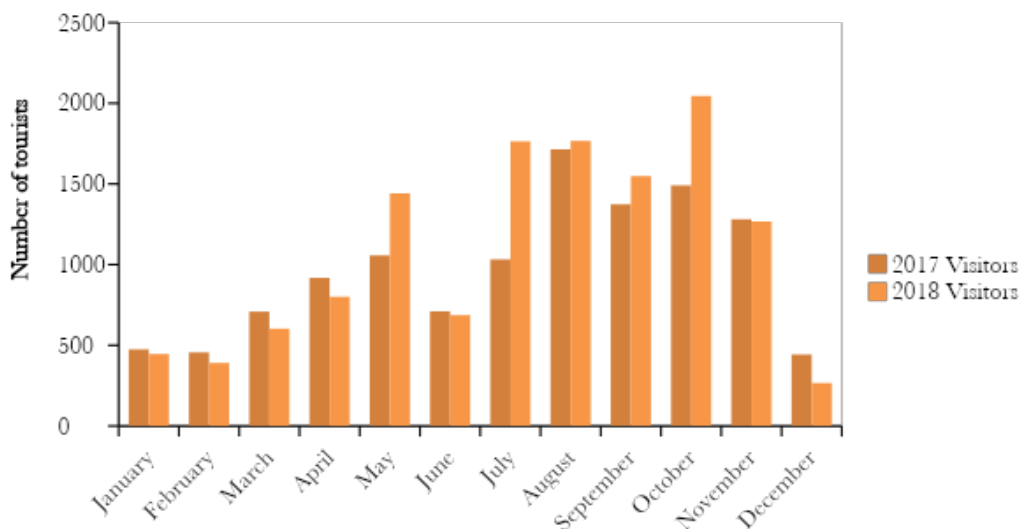


Figure 61: Number of visitors to CCF per month from January to December 2018.

The predominant language spoken by visitors during this period was English (41%), followed by German (27%), and French (21%; Figure 62). In terms of nationalities, the largest proportion of visitors were from the USA, followed by Germany and France (Figure 63).

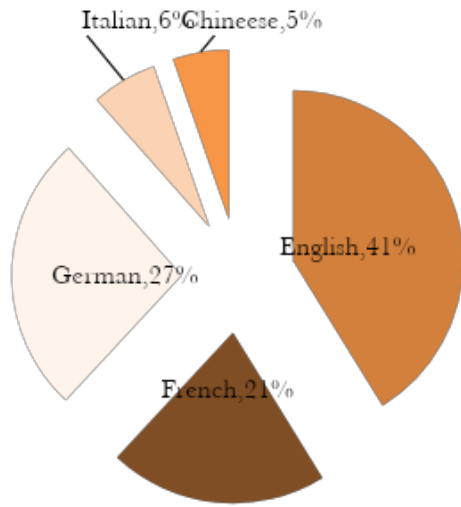


Figure 62: Languages spoken by visitors January to December 2018.

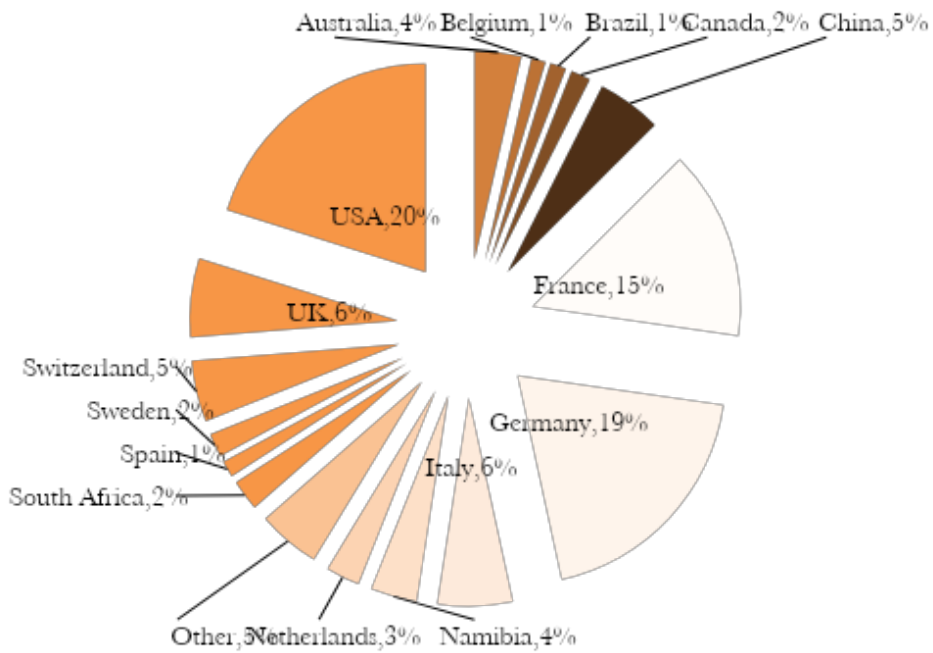


Figure 63: Percentage of visitors per country from January to December 2018.

Most visitors continue to be walk-ins, representing 50% of all sources with 6,483 in 2018 compared to 5,631 in 2017 (Figure 64). The number of visitors booked by CCF's reservation agent, Exclusive Reservations, increased from 4,458 in 2017 to 5,062 in 2018, representing 39% of all CCF bookings.

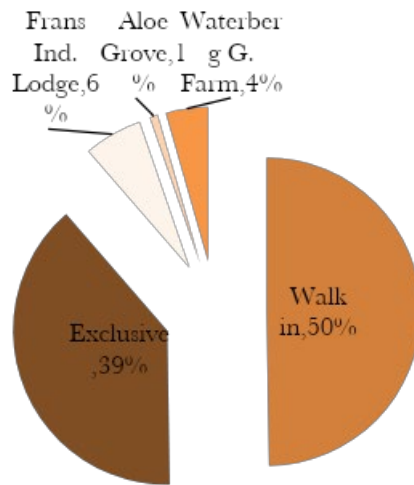


Figure 64: Source of Visitors from January to December 2018.

2. Financial

In terms of tourism revenue, CCF saw an increase of 43.30% during this period, at N\$8,715,106.00 compared to N\$6,041,842.00 in 2017 (Figure 65).

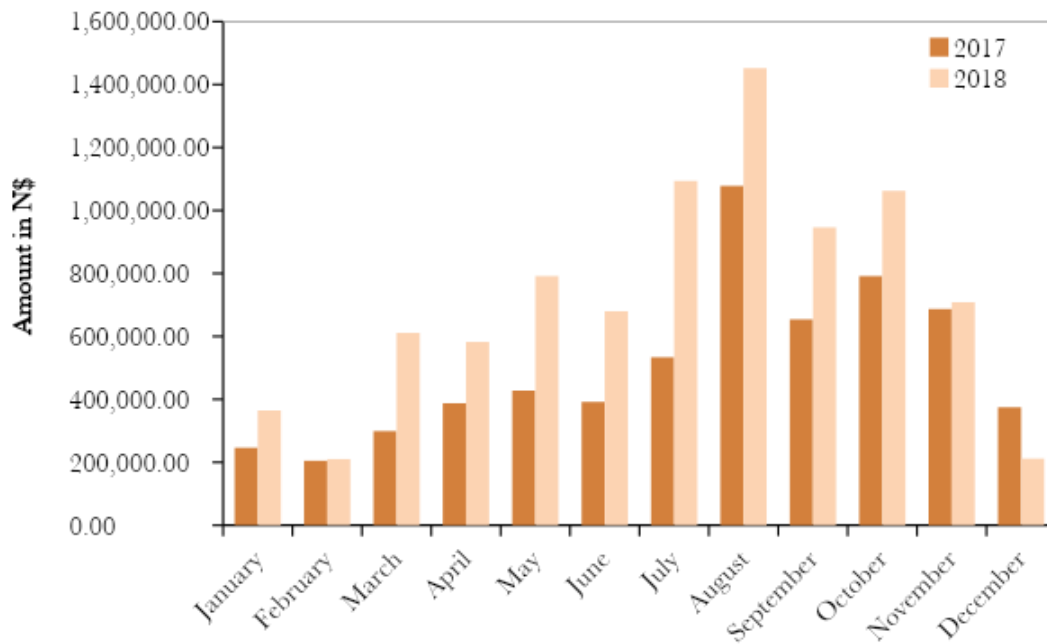


Figure 65: Tourism income (N\$) comparison 2017 versus 2018.

Table 32 provides the monthly breakdown of income per activity and number of visitors, showing that the month with the highest average of expenditure per visitor was June 2018 at N\$1,355.19 and the lowest month was October with N\$519.17 per visitor. The average amount spent by visitors at CCF shows a 24.73% increase in 2018 with N\$688.08 compared to N\$517.90 in 2017. Cheetah Drives (Elands) represented the highest income source during this period, at 32.0 % of total income. Gift Shop revenue showed an 11.50% increase and places Centre Tours as the third highest revenue driver a 13.0% increase relative to 2017.

Table 32: Breakdown of revenue in 2018 based on activity

	32 %	20 %	13 %	7%	13 %	7%	1%	1%	5%	1%	0%	0%	10 0%	0%	0%
Total	\$2,834,430.00	\$1,761,300.00	\$1,140,254.00	\$649,836.00	\$1,182,083.00	\$651,069.00	\$122,117.00	\$104,091.00	\$404,917.00	\$687,150.00	\$5,311.00	\$4,117.00	\$8,965,170.00	13,030.00	\$688,080.00
Dec	\$58,369.00	\$46,325.00	\$4,100.00	\$9,780.00	\$4,012.00	\$2,170.00	\$4,164.00	\$1,530.00	\$1,530.00	\$3,650.00	\$1,023.00	\$-	\$211,819.00	26.00	\$796.31
Nov	\$237,560.00	\$1,807.00	\$1,260.00	\$5,770.00	\$3,252.00	\$5,270.00	\$4,570.00	\$6,120.00	\$2,780.00	\$6,020.00	\$1,480.00	\$-	\$7,096,670.00	1.20	\$559.20
Oct	\$344,220.00	\$232,089.00	\$189,200.00	\$9,491.00	\$6,098.00	\$1,093.00	\$2,710.00	\$1,310.00	\$1,080.00	\$7,480.00	\$1,458.00	\$-	\$1,169,940.00	2.00	\$519.17
Sept	\$268,450.00	\$198,240.00	\$151,840.00	\$9,680.00	\$123,470.00	\$7,470.00	\$6,350.00	\$1,550.00	\$3,650.00	\$6,340.00	\$9,500.00	\$-	\$9,461,100.00	1.50	\$649.78
Aug	\$583,032.00	\$279,511.00	\$128,764.00	\$6,288.00	\$239,902.00	\$8,897.00	\$2,906.00	\$2,060.00	\$2,450.00	\$7,030.00	\$17,500.00	\$8,450.00	\$1,225,580.00	1.70	\$821.88
Jul	\$417,850.00	\$202,290.00	\$124,070.00	\$7,260.00	\$129,920.00	\$8,150.00	\$1,950.00	\$8,300.00	\$1,250.00	\$6,460.00	\$5,810.00	\$1,800.00	\$1,340,050.00	1.70	\$619.84
Jun	\$249,300.00	\$190,380.00	\$85,000.00	\$8,140.00	\$8,970.00	\$5,160.00	\$1,630.00	\$9,880.00	\$11,750.00	\$6,820.00	\$7,480.00	\$-	\$9,314,000.00	68.00	\$135.51
May	\$205,111.00	\$46,670.00	\$142,310.00	\$8,180.00	\$103,900.00	\$5,160.00	\$1,000.00	\$1,300.00	\$2,150.00	\$7,350.00	\$7,500.00	\$-	\$7,902,670.00	1.40	\$547.94
Apr	\$149,580.00	\$88,850.00	\$60,080.00	\$2,840.00	\$209,410.00	\$3,840.00	\$-	\$2,550.00	\$2,550.00	\$5,550.00	\$-	\$-	\$5,825,600.00	80.00	\$727.25
Mar	\$116,600.00	\$70,010.00	\$48,328.00	\$1,960.00	\$7,460.00	\$4,060.00	\$-	\$2,350.00	\$2,470.00	\$4,600.00	\$1,000.00	\$-	\$6,113,397.00	60.00	\$1013.93
Feb	\$73,680.00	\$51,634.00	\$33,240.00	\$1,210.00	\$1,270.00	\$2,100.00	\$1,000.00	\$1,350.00	\$3,350.00	\$3,270.00	\$-	\$-	\$2,10,286,000.00	39.00	\$537.81
Jan	\$169,300.00	\$75,500.00	\$26,630.00	\$3,160.00	\$8,980.00	\$2,240.00	\$4,000.00	\$5,800.00	\$-	\$4,450.00	\$9,000.00	\$-	\$3,65,389,000.00	44.00	\$819.26

Activity	El ands	Gi ft Sh op	Ed Ce ntr e	Ru n	Ac co m	Ca fé	Se re ng eti	Be hi nd The Sc enes	Do na tio ns	Se rvi ce s	Ch ee se	Ex cl usi ve	To tal	#V isit ors	Av g Ex p/ vis itor
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3. Cheetah View Lodge

CCF proudly opened the new Cheetah View Lodge in June 2017. Overnight guest number recording started in June 2017 according to the amount of bed nights (Figure 66). The total number of bed nights during the recording period was 927 for June – December 2017, with a 23.80% increase of 1,148 in 2018, at 550 guests during the same period. The lowest bed nights were recorded in February at 56 and highest in August and October both at 268 bed nights.

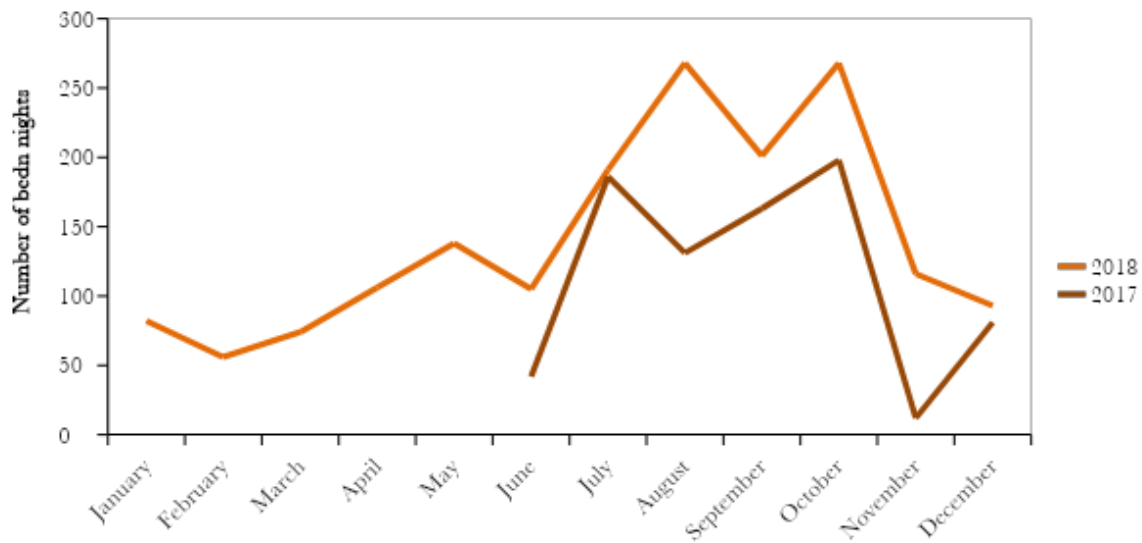


Figure 66: Number of bed nights at Cheetah View Lodge comparing 2017 vs. 2018.

Most visitors were booked by various companies through our reservation office, Exclusive Reservations, representing 61.0 % of all sources (Figure 67) with 76 private bookings through Nights Bridge at 39.0%. The total amount of bookings we received in this period was 631. We currently have 54 reservation companies making bookings through Exclusive Reservations with Namibia Track and Trails still being our most loyal reservation agent making up 34.0% of all our bookings in 2018.

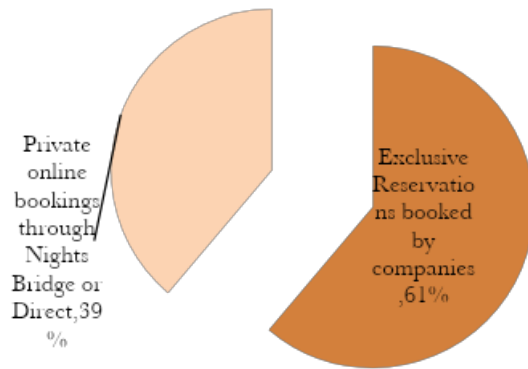


Figure 67: Booking sources for Cheetah View Lodge, 2018.

In terms of nationalities, most guests at Cheetah View Lodge were from Germany (24%), followed by USA (15%) and Italy (10%), France (9%).

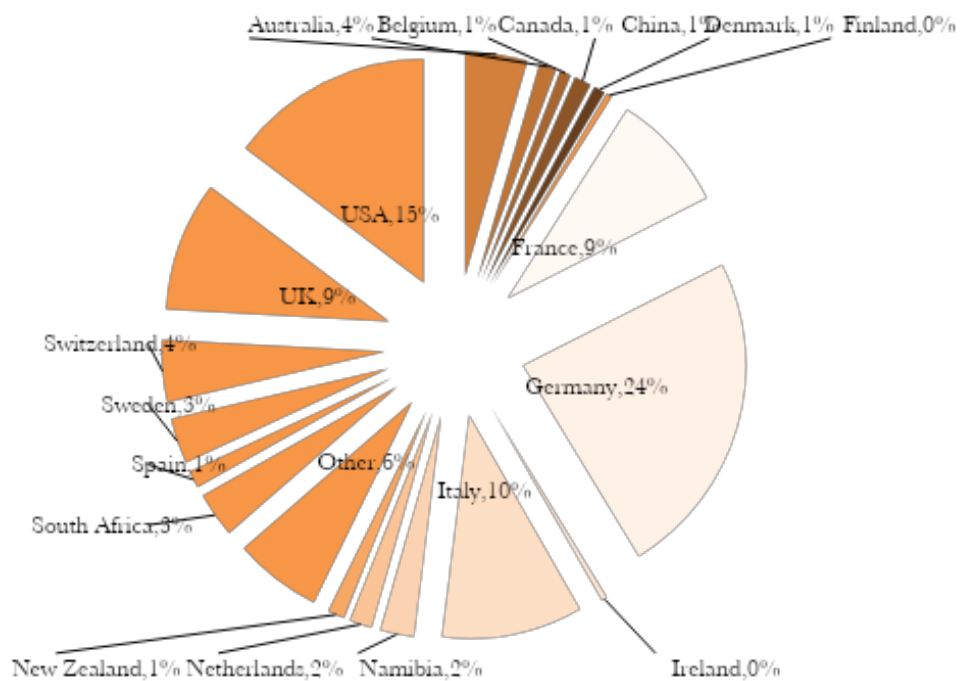


Figure 68: Nationalities of visitors staying at Cheetah View Lodge, January till June 2018.

4. Babson House

Babson House has been open to the public since April 2017, with bookings via Nightsbridge, Track and Trails, and Ultimate Safaris. Overnight guest number recording for Babson House started in April 2017 according to the amount of bed nights (Figure 69). In 2018, the number of overnight guests was 207 bed nights, compared to 204 bed nights during the same period in 2017. The

highest number of overnight guests was in July with a total of 72 bed nights. The lowest number of 2 bed nights occurred in March 2018.

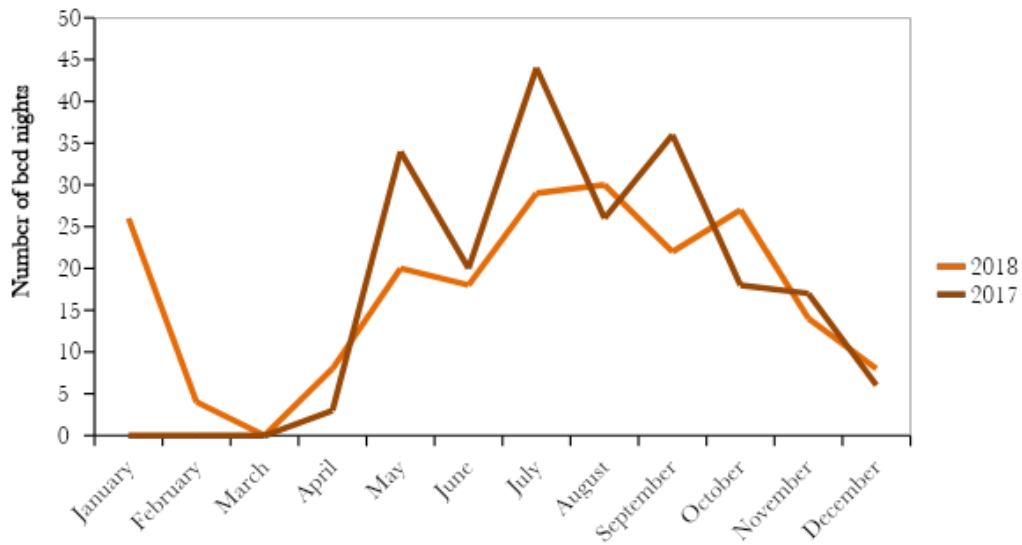


Figure 69: Number of bed nights for Babson House comparing 2017 vs. 2018.

Most of Babson House guests continue to be from private CCF bookings, representing 35% of all sources (Figure 70) and private Exclusive Reservations bookings at 65%. The tour operator with the highest percentage of bookings (8%) was Wilderness Safaris South Africa and Ultimate Safaris.

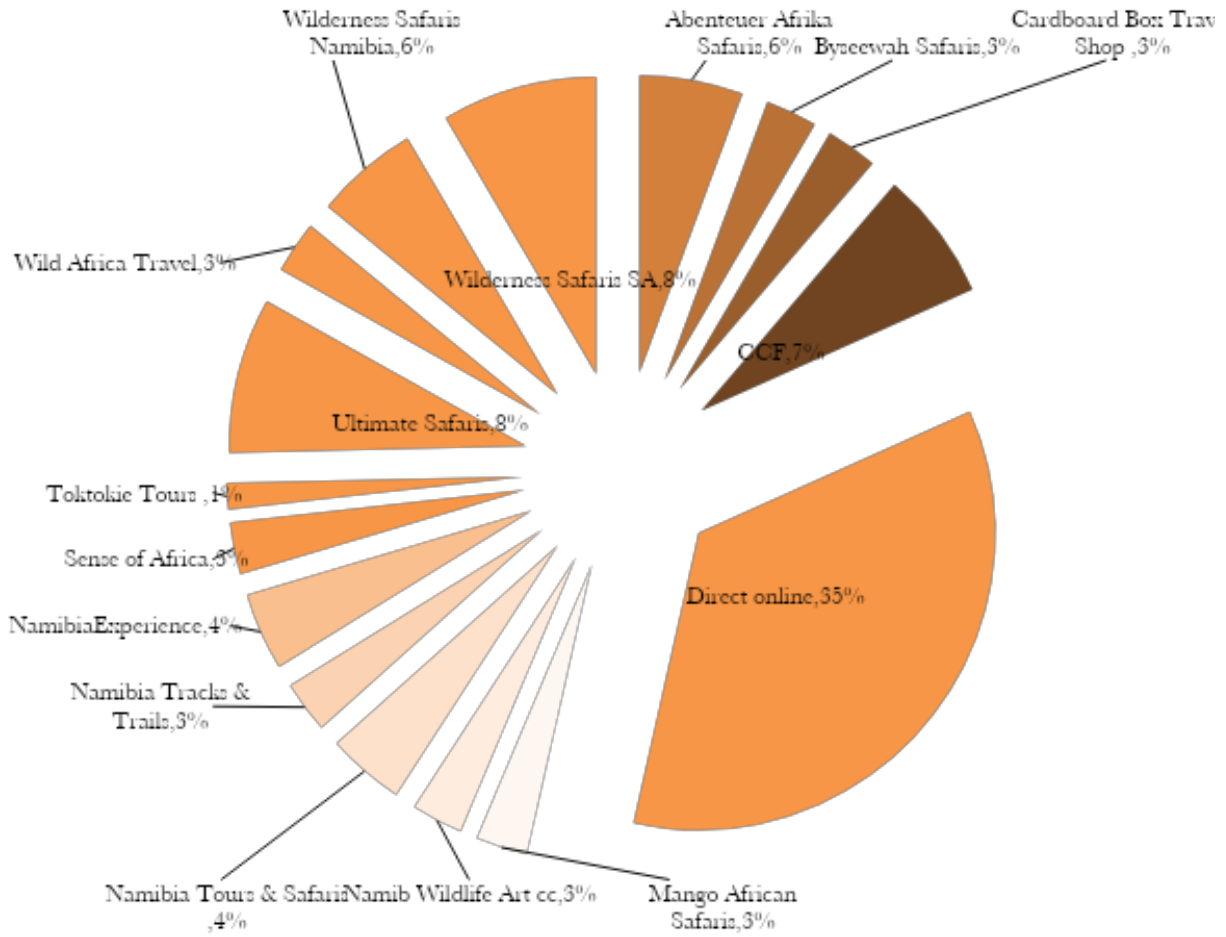


Figure 70: Sources of Babson House bookings, 2018.

Most overnight visitors came from the USA and Canada, followed by France, as shown in Figure 71.

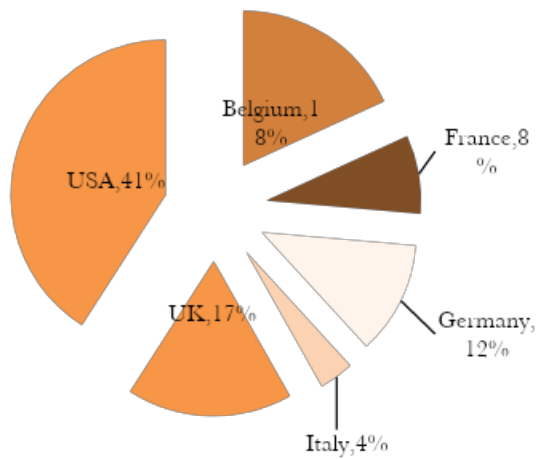


Figure 71: Nationalities of overnight visitors at the Babson. 2018.

3. Food Expenses

The number of people eating at CCF differs every day in accordance with the various guests, working guests, volunteers, and interns arriving and leaving CCF.

Table 33 shows the number of lunches and dinners that were cooked at CCF’s community dining room, the Hot Spot, each month. A total of 34,863 meals were cooked during 2018 for an average of 97 meals per day.

Table 33: Number of meals served at CCF's Hot Spot from January to December 2018.

Meal	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lunch	1,350	1,080	1,170	1,140	1,522	1,549	1,625	1,620	1,596	1,587	1,588	1,599
Dinner	1,352	1,075	1,172	1,145	1,516	1,547	1,628	1,625	1,598	1,586	1,590	1,603
Total	2,702	2,155	2,342	2,285	3,038	3,096	3,253	3,245	3,194	3,173	3,178	3,202
Average/day	90	72	78	76	101	103	108	108	106	106	106	107

Almost half of the meals (50.89%) served at the Hot Spot were for CCF staff members. Volunteers and interns represented 41.25%, while Working Guests (WG), Babson Guests (BG), and other guests represented 7.12% (Figure 72).

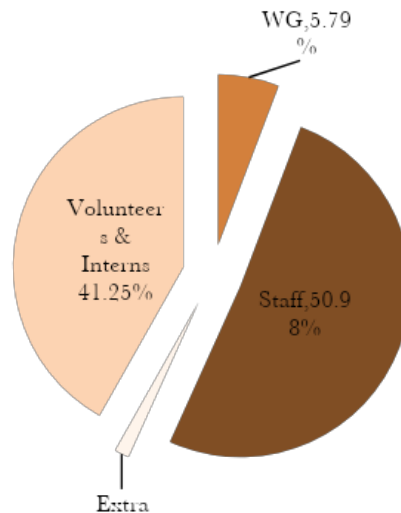


Figure 72: Overall categories of people served at the Hot Spot in 2018.

4. Marketing

For the sixth consecutive year, CCF received a Certificate of Excellence from TripAdvisor in December 2018. This award is given to tourism businesses that consistently receive high ratings from TripAdvisor travellers. Only the top 10% of businesses worldwide on TripAdvisor receive this award. It is our mission to strive for this achievement again in 2019.

Between January and December 2018, CCF had several site inspections from agents from Abenteuer Afrika, Ultimate Safaris, Discover Namibia, Terra Nova, and Namibia Tracks & Tails.

CCF's marketing agent, Exclusive Reservations, continues to support our eco-tourism efforts both with bookings, and its objective of transforming the CCF brand to make it distinctive and different. Exclusive Reservations also promotes CCF by regularly visiting other tour operators in Windhoek at their offices and organising meetings for companies based in Swakopmund. During this period, Exclusive participates in expos based in South Africa, including Africa's largest travel show, INDABA Durban and the World Travel Market in Cape Town. Exclusive also organised an educational visit with some of the Namibian tour operators throughout the year to promote CCF's Cheetah View Lodge and Babson House, and to familiarise the tour operators with CCF's work as an education and research centre. CCF was also represented by the Tourism Manager at the annual Hospitality Association of Namibia AGM and Congress which took place in June in Swakopmund. They also hosted an Hospitality Tourism Trade Forum (HTTF) the next day, where CCF joined together with newly established Activities Namibia at a table talking to Tour operators from Namibia as well as other SADC Countries, spreading the word on CCF and out accommodations. We also attended the Namibia Tourism Expo in July.

Throughout the year, CCF has continued its advertising partnerships with numerous publications and online channels adding a few to the accommodations. This included Brochures Namibia, Where to Stay, Namibia Travel Info, NamibiaTourism.NET and the Namibia Tourism Trade Directory, Explorer Magazine, as well as AA Traveller Magazine.

Attractions that encourage tourism operators to market CCF as a destination continue to be evaluated, as do the information and materials supplied to visitors on departure to encourage them to become engaged and share their experience with their closer and wider networks once they have returned to their homes. CCF staff actively promotes our social media websites (Facebook, Twitter, YouTube, TripAdvisor, and LinkedIn) to all guests visiting CCF. In 2019 we will strive to reach even more Travel Agents and Tour Operators.

5. CCF Cheetah Café

Since the opening of CCF's Dancing Goat Creamery early in 2013, menu items at the Cheetah Café include the very popular CCF Goat Cheese Platter, local platter, and baked feta, as well as fresh muffins, scones, quiches, wraps, a cake of the day, and goat milk ice cream, which is a favourite on hot days. Fudge produced at the Creamery is also offered for sale at the Gift Shop.

After a lightning fire on 16 October 2013 destroyed the CCF Visitor Centre, which housed the Cheetah Café, operated from a small room in the Cheetah Museum building, until the re-opening in June 2017, which is now seeing benefits as Lodge guests can now enjoy a light lunch, snack or coffee at the café between activities at CCF.

Total revenues from the Cheetah Café during this period were N\$584,069.08 up from N\$444,950.00 during the same period in 2017. A la carte sales accounted for 76%, with revenues of N\$413,787.08 (Table 34). However, the popularity of pre-booked lunches with tour groups like African Eagle and Karibu continues to grow. We plan to increase the booked lunches even more in 2018 and promote the different booked lunch menus.

Table 34: Cheetah Café sales from January to December 2018 (N\$).

Month	Pre-Booked	A la Carte	Total
January	\$ -	\$ 22,440.00	\$ 22,440.00
February	\$ 5,980.00	\$ 14,965.00	\$ 20,945.00
March	\$ 18,420.00	\$ 22,205.00	\$ 40,625.00
April	\$ 11,700.00	\$ 26,712.00	\$ 38,412.00
May	\$ 15,860.00	\$ 35,810.00	\$ 51,670.00
June	\$ 6,240.00	\$ 24,260.00	\$ 30,500.00

July	\$ 9,437.00	\$ 66,230.00	\$ 75,667.00
August	\$ 12,025.00	\$ 45,674.08	\$ 57,699.08
September	\$ 29,250.00	\$ 44,612.00	\$ 73,862.00
October	\$ 44,850.00	\$ 57,857.00	\$ 102,707.00
November	\$ 16,520.00	\$ 36,277.00	\$ 52,797.00
December	\$ -	\$ 16,745.00	\$ 16,745.00
Total Sales	\$ 170,282.00	\$ 413,787.08	\$ 584,069.08

E. Association and Conservancy Relationships

1. Large Carnivore Management Association (LCMAN)

CCF is a founding member of LCMAN and Dr Laurie Marker has been the Chair of the organisation for the past three years. LCMAN continues its work as a stakeholder of this group of NGOs, researchers, farmers, and governmental departments and helps guide the conservation and management of large carnivores in the country and facilitates communication among the stakeholders to ensure a coordinated approach. This association also functions as a resource for the Namibian Ministry of Environment and Tourism (MET) to provide expert advice and guidance during policy making procedures.

LCMAN continues to work with farmer organisations such as Namibia Agricultural Union (NAU) and Conservancy Association of Namibia (CANAM) in providing support to the farming community in order to reduce human wildlife conflict. A farmer hotline is available at CCF and an LCMAN email exists to ensure constant communication with farmers or other people when they notice any stray carnivores in or near their farms or when they experience conflict with predators.

LCMAN held meetings on 27 February and 12 June 2018, where various member- organisations gave progress reports on their current projects. LCMAN has been contributing towards the Namibian Carnivore Red Data Book and this was discussed at both meetings. At the last meeting, one of the biggest concerns of the members were the human-wildlife conflict surrounding lions in the north-western part of Namibia as well as the beginning of the denning season for African wild dogs, and the safety of the puppies. To raise more awareness on around these issues and those of large carnivore conservation, members discussed having a joint booth at the Windhoek show in August 2018. Additionally, LCMAN will be contributing information to the IUCN Hyaena's Specialist Group project: Hyaena Distribution Mapping Project 2018 to come up with range maps for spotted hyaena (*Crocuta crocuta*), Striped hyaena (*Hyaena hyaena*), Brown Hyaena (*Hyaena brunnea*), Aardwolf (*Proteles cristata*).

Red Data Assessment

From the Red Data Assessment and National Action Plans Symposium that took place from 8 - 10 November 2017 at B2Gold Otjikoto, species leads and team members were identified and agreed upon among attendants, who will share data among themselves to create historical, past, and current distribution maps and compile species accounts for the Namibian Carnivore Red Data Book. The Red Data Book's purpose is to assess the conservation status of the country's 34 carnivore species. Species leads and team members were identified and agreed upon among attendants of the symposium in 2017, who have shared data among themselves to create historical, past, and current distribution maps and compiled species accounts for the Namibian Carnivore Red Data Book. Cheetah Conservation Fund is co-authoring and/or contributing data for the Cheetah, African Wild Dog, Caracal, and Leopard chapters.

Distribution maps of the 34 species on Namibian carnivores, ranging from nine species of mongoose, two otter species, three species of genet, and a variety of the large and smaller

carnivores will be compiled from expert data and knowledge by Alice Jarvis from JARO Consultancy, who manages the country's web-based Environmental Information service (EIS). The book is in the process of being compiled by the various species' teams, edited by John Pallett, and is expected to be completed by November 2018.

Pathways Africa

The Pathways Africa conference took place in January 2018. It was co-hosted by CCF and Colorado State University (CSU) in partnership with LCMAN and the Namibia Nature Foundation. It took place at the Safari Hotel, Windhoek. Training was held from the 6 - 8 January to improve leadership skills and provide information on how to engage entire communities in conservation efforts. Forty-four early-career conservation practitioners representing 13 different African nationals attended the training, and over 40 trainees from across Africa received scholarships to attend the training and conference from sponsors such as USAID, WWF- EFN, WWF Namibia, First National Bank Namibia, Go Green, Cincinnati zoo, San Diego Zoo Global, CCF and CSU's Human Dimensions and Natural Resources Department, among others. It was our aim to take advantage of the fact that we gather leading thinkers from all over the world on human dimensions of fisheries and wildlife management and do something concrete to help invest in conservation in Africa. By building capacity on the ground for wildlife conservation in Africa, the Pathways conference continues to give back by facilitating the transfer of knowledge and taking our applied focus a step further. Demonstrations of technologies that aid in species monitoring and workshops on mitigating human-wildlife conflict were offered to participants.

The training was followed by the Conference from the 9 - 11 January, this was the second time the Pathways Conference has been held in Africa and it represented a critical effort for wildlife conservation. Participants came from all over the world, gathering 202 scientists (mostly from academia but also from NGO and government agencies) and practitioners (NGO leadership, government wildlife management agency employees, ranchers/pastoralists involved in conservation) from 28 countries, with representation of 12 African countries, making this the largest international Pathways conference to date. The conference started with remarks from the Honorable Pohamba Shifeta, Minister of Environment and Tourism. Additionally, the conference attendees benefited from the deep knowledge and unique perspectives of plenary speakers: John Kasaona, Namibian Conservationist, Maxi Pia Louse, Director of NACSO, and Sem Shikongo, Director of Tourism and Gaming from the Namibian Ministry of Environment and Tourism.

After the conference, five trainees and a small group of conference attendees traveled to CCF for additional post-training. Over three days they learned more about how CCF implements its various programs, including the model farm, the livestock-guarding dog program, the scat detection dog program, and the Bushblok program. They also got to see how CCF cares for its resident cheetahs, how to conduct game counts, and how to correctly identify which predator killed livestock. For the trainees in particular, these skills and knowledge will be important since they are from countries within the cheetah's range.

To help facilitate the connections made during the conference, a WhatsApp group was created for all the trainees and trainers so that everyone could stay connected. Hopes are high that everyone will use this group to share information and to generate ideas for solutions to the challenges that they are facing.

2. The Ministry of Environment and Tourism (MET)

Through CCF's ongoing research and community development in the Greater Waterberg Landscape (GWL) region along with our integrated livestock management conservation training, we've been able to keep tabs on the conflict from predators in the area, as well as the whereabouts of many of the predators. Since 2015, CCF began an intensive camera trap survey to identify predator occupancy in the GWL. The camera trap survey continued in 2018, in the Eastern Communal area of

the Okakarara where cheetah, and other large carnivores, including brown hyena and leopard have been identified with particular interest in the status of the African wild dog (AWD), in the study area.

Human-Wildlife Conflict in Eastern Communal Conservancies in Okakarara District

In late January 2018, CCF staff, ecologist, Willem Briers-Louw and community development officer, Nadja LeRoux, began an extensive camera-trapping survey to identify wildlife occupancy in the Eastern Communal area and to understand the community needs and human wildlife conflict in the areas better through conducting a questionnaire survey. The main conflict in this area is with African wild dogs. CCF's team has spent the majority of the first half of 2018 in this region, delving deeper into the status of this relatively unknown population of AWD. There has been very little done in terms of research on the population due to the large area, difficult terrain and illusiveness of this population.

CCF has established the presence of AWD in the four communal conservancies in the GWL. This part of the GWL is dominated by livestock farming, particularly cattle. According to the local farmers, the conflict with African wild dogs has drastically increased since 2015 and the AWD are denning seasonally.

So far, wild dogs have been captured on camera traps at three different locations; Osakua, Omaundjiro and Otjekongo and denning has occurred in the area, however 2-3 dens are known to have been destroyed and pups and some adult wild dogs killed. Combining photo evidence from camera traps, local knowledge, conflict call-outs and visiting old den sites, CCF is starting to understand how the AWD is still able to persist despite facing immense persecution by farmers.

Our camera trap survey has so far shown that the numbers of larger prey are low, however the smaller prey species (such as steenbok and duiker) are available providing prey for the AWDs in the region to hunt. Some farmers lose cattle to AWD or their cattle are injured by wild dogs, while other farmers only have the AWDs move through their land with no conflict. CCF staff has found that the most vulnerable age for calves to be predated on is from 0 – 6 months, after which from 6 – 18 months the AWDs don't manage to kill calves, but mortally injure them. Adult cattle do not fall prey to the AWD. Indications are that the AWDs will opportunistically hunt and with better livestock management the conflict can be highly reduced.

Due to little support from MET to address the HWC issues with the AWD in the Eastern Communal area, farmers have stated that they have "taken their own action" which is to seek out and destroy dens, when the AWD have puppies and are very vulnerable. Farmers will dig out puppies from the dens, use the live puppies as bait to attract adult dogs and trap and kill adult dogs if they can. This data and incidents have been kept very quiet within the community, as farmers are well aware that it's illegal to kill an AWD, as they are a critically endangered species. CCF has managed to break through this 'secrecy' due to our long-standing relationship with the communities in the region and farmers have been willing to share information and incidents with CCF staff in the field. This has led to CCF being able to investigate and map out AWD dens that have been disturbed in 2017 and 2018, record mortality numbers of puppies and adults, get figures on the estimated pack sizes, and gather tangible data on the status of this population of AWD for the first time. Reports include the following cases of sightings and conflict with the AWD and livestock;

An AWD pack attacked a calf on 14 February 2018 about 500m from a village. Two farm workers heard a calf "screaming" and ran into the bush. When they arrived within 75m of the scene they were afraid as they thought it might be a 'tier' (a leopard). But as they approached from the side, they saw it was a pack of four AWD. The workers managed to see the AWD for about two seconds, but then the AWD saw the workers and ran off. The calf died and according to the farmer it was the second death since December 2017.

On 9 March 2018, CCF staff was on route to the village, Ourarua, when they encountered a community member who had seen AWDs three hours prior. The team investigated from the point where he saw the dogs and could identify five individuals by their tracks. The team then visited

villages around the area to warn the farmers that the AWD had been sighted and encouraged the farmers to practice conflict mitigation methods such as bringing their calves in.

In April 2018 a den was destroyed near Otjikoto in Otjituuo Conservancy. Not much information was provided, except that the workers had managed to kill one adult male in the process. Another den was destroyed on a farm neighbouring Okatembakatjovahone in the African Wild Dog conservancy in May/June 2018. The CCF team was taken by a farm worker to the den site, which had been dug out. Two adults and the pups were killed. CCF staff was unable to recover any carcasses to conduct genetic testing, although scat samples were collected from the den site.

In 2017, CCF was assigned by the Ministry of Environment and Tourism to be the custodians of two separate litters of African wild dog puppies (9 in total of which one died) removed by farmers and handed over to the Ministry. This year again, in June 2018, CCF responded to a call from a farmer in one of the communal conservancies. The farmer had a litter of AWD puppies that had been removed from a den. CCF proceeded to contact the MET to ensure the correct legal procedures were followed. CCF was given the go ahead to take the puppies from the farmer and CCF received another 9 (7M.2F) puppies, estimated at 10 days old. These puppies had been without food for 2 days. They were given immediate medical attention by CCF veterinary team and were provided round the clock care, monitoring body condition and food intake. As of the end of 2018, all these puppies were doing extremely well under the care of CCF's husbandry staff.

CCF's goal is not to be taking AWD pups from their dens, but rather to protect the dens and allow the adults to raise the pups to reach adulthood i.e. a successful den. CCF is doing this by working with the farmers in this region to assist with their livelihoods. Due to CCF's long standing research and expertise in farmer conflict with cheetahs and other predators we hope to assist these farmers by providing on-going education (at the individual farmer, village and conservancy levels) and finding solutions to their conflict.

CCF staff strives to conserve the cheetah and its eco-system and, and since the AWD faces similar problems as that of the cheetah, our work now is also assisting the plight of another endangered carnivore in the GWL communal conservancies. Part of CCF's long term plan to address this critical situation for the AWD, is to engage in a long term study with collaborators including the Ministry of Environment and Tourism (MET), Eriindi Private Reserve, the Cheetah and Wilddog Rangelwide program, the Kwando Carnivore Project, and the Painted Dog Research Trust in Zimbabwe. The study will address the status of the AWDs and bring together stakeholders to develop a National Management Plan for Namibia's AWD.

The aims of this project in the Otjozondjupa and Omaheke Regions will include:

- Conduct genetic analysis on the AWD currently at CCF and other samples provided.
- Identify the number and sizes of wild dog packs.
- Estimating the population sizes of AWD in the study area.
- Identify den sites and determine whether litters were successful or unsuccessful.
- To monitor trends in wild dog ecology over time in a highly persecuted population.
- Investigate social dynamics of wild dogs in a high conflict area, e.g. potential shifts in breeding season, maintaining small pack sizes to avoid detection, etc.
- Identify the causes of mortality, natural versus human-induced deaths.
- Identify pertinent conservation issues such as farmer tolerance to wild dogs and challenges in the local farming practises.

- Investigate potential solutions to reduce human-wild dog conflict.
- Investigate dietary ecology of wild dogs to compare the percentage of natural prey versus livestock preyed on.
- Investigate social dynamics of wild dogs in a high conflict area, e.g. potential shifts in breeding season, maintaining small pack sizes to avoid detection, etc.
- Understand dispersal patterns of wild dogs, e.g. identify potential movement corridors and their relation to populations in KAZA, are they resident in the. GWL or do they disperse into north-east Namibia and western Botswana?
- Better understand disease transmission between wild dogs and domestic dogs.

Omaheke Region Farmer–Predator Coexistence Management Project

In May 2018, CCF initiated a project in the Omaheke Region to bridge the gap between livestock/game farmers and large carnivore conservation in order to promote coexistence, with an emphasis on cheetah and African wild dog, thereby mediating conflict between farmers and large predators on farms.

The objectives of the project are to;

- Determine the dynamics of the human-carnivore conflict occurring on commercial farms.
- Encourage farmer participation in the conservation management of large carnivores on Namibian farmland through collaborative problem solving for human-carnivore conflict.
- Collect samples of predators and other vertebrae species for the Genetics Laboratory.
- Participate in cheetah conservation efforts.
- Assist in educational outreach programmes.

Questionnaire Survey

A questionnaire was designed by Dr L. Marker and Dr H. Winterbach with the aim to collect comparative information to the Farm Surveys from 1991 – 1993 conducted by Dr. Marker in the Omaheke, Khomas, and Otjozundjupa Regions.

The questionnaire was presented at the following meetings:

- District NAU Management
- Gobabis Farmers' Association
- Sonop Farmers' Association
- Summerdown Farmers' Association
- Black Nossob Conservancy Meeting

In addition, Dr Winterbach also attended the Black Nossob Conservancy Meeting, to which she was invited by members of the Steinhausen Farmers' Association. The questionnaire was also presented to individual farmers Dr Winterbach met in the town of Gobabis.

A total of 26 questionnaires were received to date, covering 30 farms (Figure 73). Only one farmer wished to complete the questionnaire anonymously.

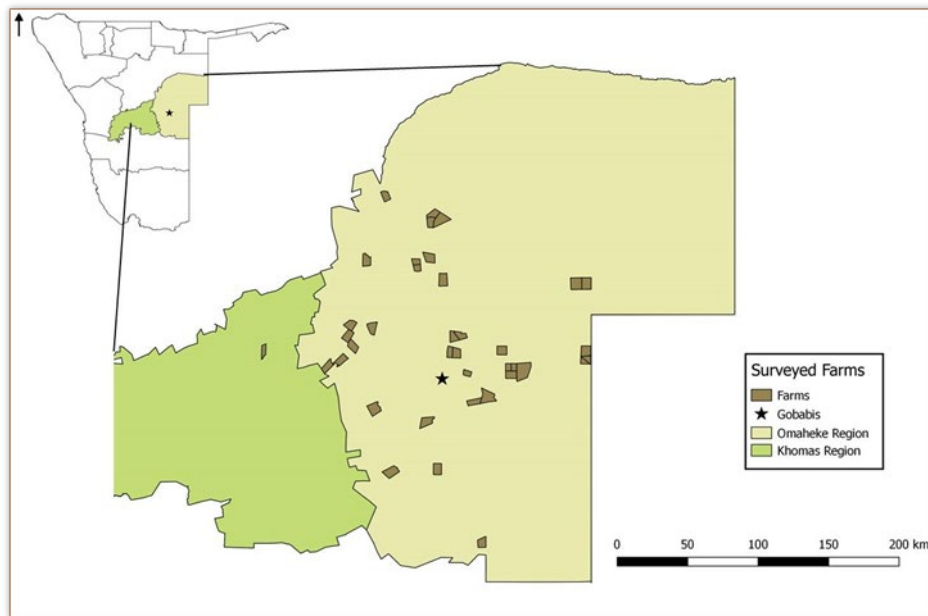


Figure 73: Location of farms covered in the questionnaire survey.

Preliminary Results

Fourteen farmers (56%) reported cheetahs being a problem with cattle farming, while only nine (36%) farmers reported leopard as a problem with regards to cattle (Figure 74). Cheetahs were also seen as the main predator responsible for game species losses, especially of springbok, and calves of large herbivores such as kudu and hartebeest, which negatively affects recruitment in these herbivore species.

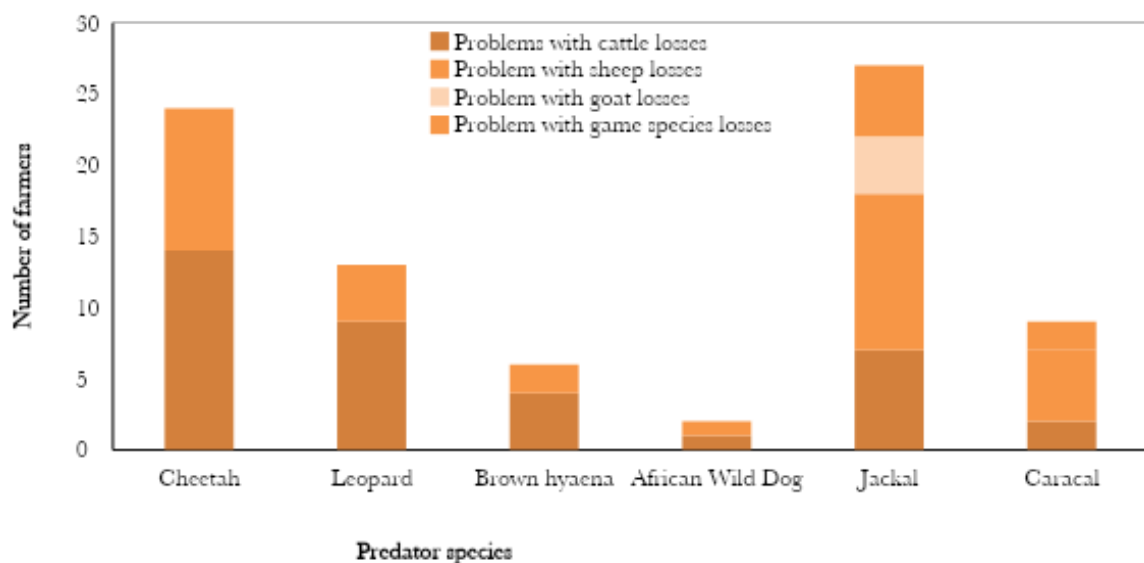


Figure 74: Farmer rating of predator species causing losses of livestock species.

Twenty (80%) farmers considered cheetahs as a problem predator on their farm, with 12 (48%) farmers considering cheetahs as a big problem (Figure 75).

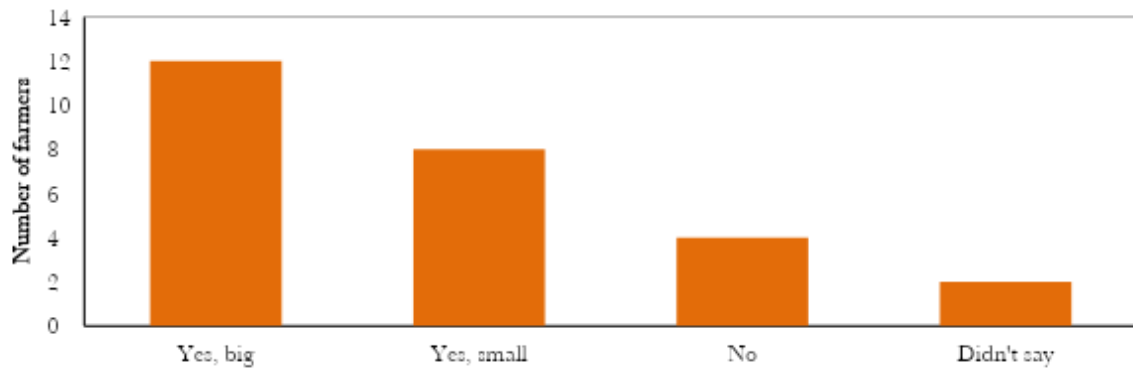


Figure 75: Farmer rating of cheetahs as a problem on their farms.

The most adult cheetahs (33 animals) were seen in groups in 2018, with group sizes ranging from 3-6 animals (Figure 76), while the most lone adults (19 animals) and the most cubs (25 cubs) were seen in 2017.

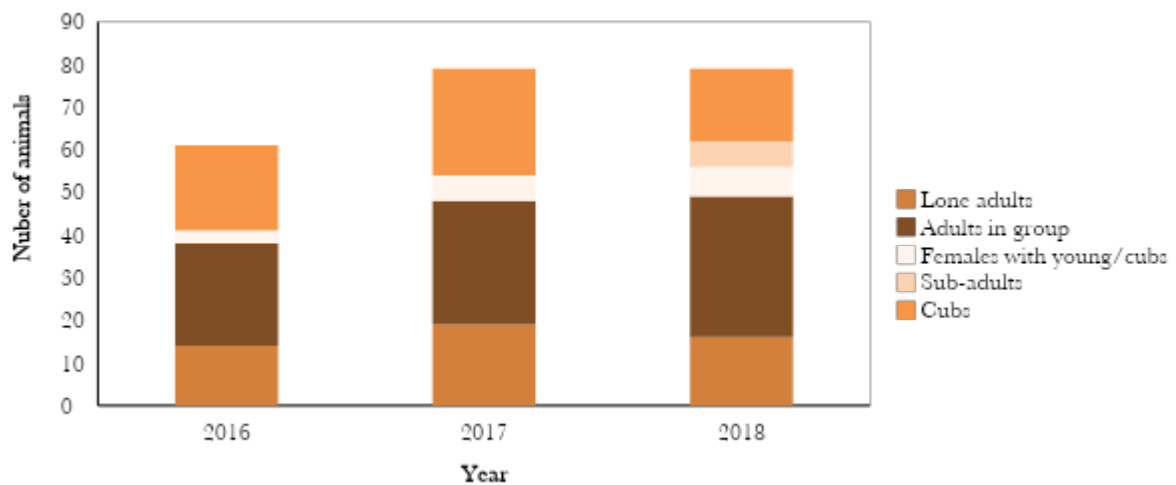


Figure 76: Population structure of cheetah sighted by farmers.

Eight farmers reported seeing groups of 2 to 5 cubs in 2017, while only five farmers reported seeing groups of 2 to 5 cubs in 2018 (Table 35).

Table 35: Number of times different group sizes of cheetahs were sighted by farmers.

Year	Number of farmers	Group sizes of cubs seen		
		1	2 - 3	4 - 5
2016	6	1	3	2
2017	8	1	4	3
2018	5	1	1	3

A total of 70 cheetahs have been removed from farms by the respondents from 2016 to 2018 (Figure 77). However, only four respondents were involved in removing 60 (86%) of these animals. Adult males were removed more often than females, although 25 adult cheetahs were removed with the sex unreported in the questionnaire.

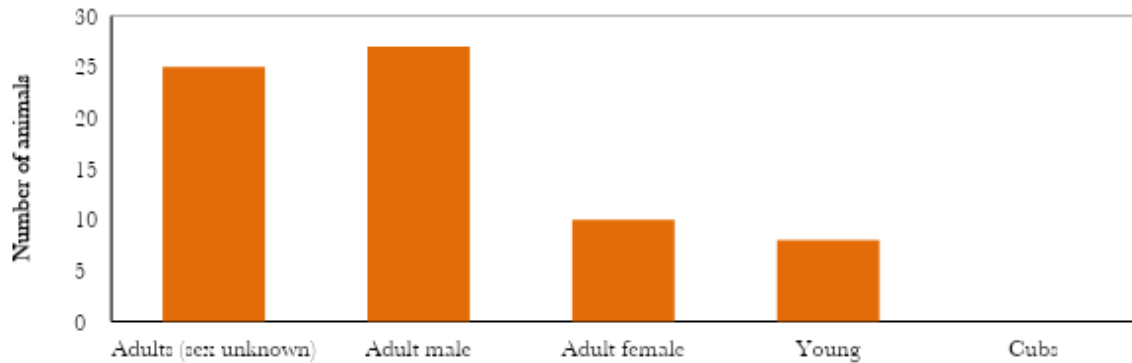


Figure 77: Cheetahs reportedly removed by farmers from 2016 to 2018.

Quick Survey

A Quick Survey was also done at a business auction in Gobabis on 3 November 2018. Cheetahs were the species most removed, with five of the eight respondents having removed cheetahs from their farms from 2016 to 2018 (Figure 78). Of the 24 cheetahs removed, two were utilized for trophy hunting. One respondent was responsible for 13 (54%) of the 24 cheetah removals. Brown hyaena was the second most removed species, with 11 animals having been removed, of which one was hit by a vehicle.

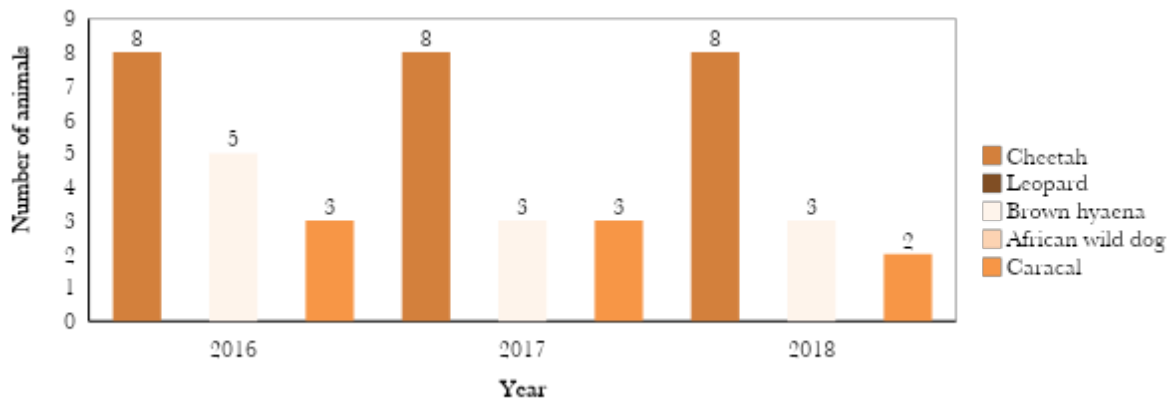


Figure 78: Predator species removed by farmers from 2016 to 2018.

Farmer Engagements

Farmer Associations (FA) and Individual Farmers

CCF staff, Dr. Winterbach and William Versfeld (Genetics Senior Laboratory Technician) attended the Gobabis Farmer Association (FA) meeting, at which both presented. William presented on CCF's request for the collection of genetic samples of predators.

At both Sonop and Summerdown FAs meetings, CCF administered questionnaires, and about 90% of these were filled in by the attendees. Although none of the attendees at the Black Nossob

Conservancy meeting were prepared to fill in the questionnaire, Nadja le Roux and Dr Windterbach were subsequently invited to give a presentation on integrated livestock-wildlife farming and human-carnivore conflict at their Farm Workers' Sports Day on 31 October 2018.

Information obtained in addition to the questionnaire data can be summarised as follows:

1. FA memberships are declining, with fewer farmers thinking it is beneficial to be a member.
2. Cheetah numbers have increased in the region during the past few years, some farmers ascribing this to an increase in game farms in the region.
3. Lethal control of predators, including cheetahs, are commonly used, especially cages and gin traps.
4. Brown hyenas are becoming a major problem predator, killing 1-4 day-old calves. Farmers do not find these kills, but observe the spoor, and are killing Brown hyenas as a preventative measure, using mainly cages and poison. One farmer indicated that he had killed 11 brown hyenas on his farm in 2017, and destroyed the dens.
5. Leopard numbers are increasing in parts of the region where cheetahs were seen in the past but the latter are now rarely observed.
6. Farmers in the region are disillusioned with conservation NGOs and carnivore researchers, which spills over to negative attitudes to conservation efforts. This is due to a number of reasons stated by farmers:
 - A number of farmers have contacted NGOs in the past, but did not receive any help – either enough help, the right kind of help, or timely help.
 - Most farmers say they don't bother anymore, because:
 - there is no response,
 - they are being duped as animals are released a few km from their farm again by the NGO, and
 - they get harassed by government/NGO for their efforts.
 - Farmers receive very little or no feedback from NGOs or researchers visiting their farms.
 - NGOs look good on TV/social media and get benefits from tourism and donor money, while there are no benefits to farmers that have to live with these carnivores and they are made to look bad.

Black Nossob Conservancy

On 31 October 2018, The Black Nossob Conservancy invited CCF to give a presentation at their Farmworkers' sports day. Both Dr. Winterbach and Nadja le Roux, attended where Nadja gave a presentation on livestock management, health and protection against predators.

Cheetah and African wild dog sightings

A farmer reported seeing an adult cheetah on 23 April 2018 on Airlie (Farm #124), and again on Rooigrond (Farm # 144) on 12 July 2018. The farmer reported that during both occasions the cheetahs only travelled through. The farmer further mentioned that cheetahs were regularly sighted on his farm by his family however since the past five years, leopard numbers have increased significantly and cheetah numbers have decreased.

On 12 July 2018, another farmer reported seeing an adult male and female cheetah and one cub on Bitterpan (Farm #170). According to the farmer, at least four cubs were sighted in previous years, but

only one cub was seen in 2018. The cheetahs travelled through and caused no livestock losses while on their farm. The farmer however lost four cattle in 2018 from snakes climbing in water troughs and biting cattle when they drink.

The farmer from Marigold (Farm #136) reported seeing a female cheetah with two cubs (approximately 4 months old) on 11 August 2018, and again on 18 August 2018 he saw a female with three cubs (approximately 8 months old). This farmer has 27 play trees on his farm.

Following up with individual farmers (Fortuna # 439, Ohlshagen # 174), 3 – 4 young adult cheetahs were sighted travelling in the Gobabis District in October – November 2018.

Gobabis Agricultural Show: 19-21 September 2018

The stand at the show was manned by both Dr Winterbach and Nadja le Roux, and they gave a radio interview. Although it was extremely difficult to engage with farmers during the show, the exposure was important and three completed questionnaires were collected.

District Namibia Agricultural Union (NAU) Management Meeting: 13 November 2018

A good relationship has been built with the Secretary of the Gobabis District NAU, Mr Willem Boshof throughout the year. The Gobabis District NAU Management group requested Dr Winterbach and Nadja Le Roux to attend their meeting on 13 November 2018, where I presented an overview of CCF, and cheetah and African wild dog conservation issues.

Information Day at Kaap Agri, Gobabis: 16 November 2018

A CCF information Day was held at Kaap Agri on 16 November 2018. It was attended by CCF staff Dr Winterbach and Nadja le Roux and Levi. NBC produced an insert on CCF's livestock guard dogs program for farmers, to help livestock loss to predators (<https://www.nbc.na/news/cheetah-conservation-introduces-guard-dogs-livestock-farmers.19618>) which was aired on 19 November 2018.

Collaborations

Ministry of Environment and Tourism (MET)

Continual contact is maintained with the Gobabis MET office. They agreed to share their problem animal report data with CCF as soon as it has been entered on their computer. The data should be available in January 2019.

Leibniz Institute for Zoo and Wildlife Research (IZW)

A meeting was held with Rebekka Mueller to discuss collaboration in sample collections of cheetahs. Unfortunately, this has not proven fruitful to date.

Veterinary clinics

The Cattle Country Veterinary Clinic and Gobabis Veterinary Practice both agreed to keep records and collect samples for CCF of human-carnivore conflict cases brought into their clinics.

Biobank

Opportunistic samples collected for the BioBank are summarized in Figure 36.

Table 36: Opportunistic sample collection data sheet.

Date	Species	Status	Blood (# vials)		Tissue		Fecal		Hair	Date sample delivered to CCF	Person receiving sample
			Red Top	Purple Top	Ear	Muscle	Bio Bank	Hair reading			
29-Jun-18	African wil cat	Shot-HWC			1					16-Aug-18	W. Versfeld
11-Jul-18	Cheetah ♀	Legally hunted			1	1				16-Aug-18	W. Versfeld
26-Jul-18	Leopard	Shot-HWC				1			1	16-Aug-18	W. Versfeld
09-Aug-18	Bat-eared fox	Roadkill			1	1			1	16-Aug-18	W. Versfeld
30-Oct-18	Sand snake	Roadkill				1				Gobabis	H. Winterbach
09-Nov-18	Banded mongoose	Roadkill				1			1	Gobabis	H. Winterbach
26-Nov-18	Brown hyaena	Shot-HWC	1	1		1			1	Gobabis	H. Winterbach

Blood and hair samples were also collected from three captive cheetah at Sanddune Lodge, and from cheetah on Farm #136, Marigold.

One Health and Herd Management in local Conservancies: Otjituo, Okamatapati and African Wild Dog.

The objective of this project was to determine what the level of farming is in the conservancies using the CCF Hereroland score card.

The score card was already developed. The survey for the score card focuses on the subjects, facilities, animal health and herd management. To gain trust from the farmers and to monitor what the level of worm infection was, and to determine if worms were a health problem in the Herero land livestock, fecal samples were collected, first from cattle later from goats and sheep.

We also looked at animal health problems the farmers had and tried to solve them. The problems included a variety of abscesses, wounds, diarrhea and coughing, among others.

Gathering more information on the farming and environmental situation in the conservancies, one of the major issues for the farmers was the loss of livestock to predation.

The main contributing factor to livestock predation in the conservancies we visited is the lack of present wildlife herbivores (information camera traps), that is prey for the predators. The lack of wildlife prey leads to predation on livestock. Livestock predation has resulted in low tolerance level among farmers.

The low tolerance level towards the predation could be raised by increasing the production level of the livestock. With a higher production level, the tolerance towards predation on livestock should increase. The increase of production does not mean an increase of amount of animals per hectare, if done correctly.

To increase the production level of livestock three main problems were defined:

- Increase reproduction rates
- Decrease loss from drought
- Decrease loss from predation.

To determine what level of trouble the farmers of the conservancies had with these three subjects, a survey was drawn up with questions on these three subjects. Examples of questions include; what the reproduction rate of the livestock is; how they select the breeding herd; up to what age they keep the breeding animals; what kind of risk management there is for extreme drought; and what the young animal management looks like.

Focusing on reproduction rates is not part of herd management in the conservancies. The average farmer does sell older cows; they do not select their breeding herd; do not sell cows that do not produce until they have not produced a calf in three years. There is a lot that can be improved on reproduction management through education. A reason for low reproduction rates is probably venereal diseases like *Campylobacter* and *Trichomonas*, these have not been monitored.

Drought risk management is not practiced. Some farmers will have two pastures one for the dry season and one for the wet season. But this is not enough to be defined as a rotation grazing system. Only one farmer visited harvests hay during the wet season. Most farmers will sell off the young bulls during the dry season, but this is almost never the desired 30% of the herd. An old cow will also be sold. There is a lot of improvement to be made on this subject through education.

The young animal management or in other words the predation management, shows a variety of management solutions, from going out with the herd at a very young age, up to when they stop going out with the herd, and until the age of one. A common problem is letting the cattle out during the night without a herdsman. This is a cultural way of management which will be difficult to change, even though research shows not more food is consumed during night grazing than during day grazing, and although night grazing is more dangerous for the young, sick and injured and heavily pregnant livestock.

Losses to predation are lower if a livestock guarding dog goes out with the small livestock. The breed of the dog does not make a difference in functioning.

The intensity of predation by jackals or wild dogs is the factor that makes a difference in how well the solutions to the predation problem work. A lot can be gained with a workshop for the farmers where they can discuss possible solutions to their predation problems.

The outcome of the fecal samples is that the infection rate of the cattle is low, probably because part of the year (dry season) the cattle will collect most of their food by browsing. With this feeding method a small number of infectious larvae will be consumed. Next to that especially in the dry season, the worm eggs might dry out before they hatch and can become infectious larvae.

On the other hand, the goats and sheep tend to have a higher infection level. The probable reason for this is that they tend to have a much more crowded kraal and stay in the kraal for a longer time. The goats and sheep will be trying to eat anything they find in the kraal, which brings them more in contact with infected feces and therefore infectious worm larvae. Moving the kraals, cleaning them out and more spacious kraals may be a solution next to more frequent deworming of the small livestock.

In total 40 farms have been scored, score is between 44- 79; 36 farms have written advice, 78 have an outcome of infection level of endoparasites in the fecal sample. Not all the farms had animals in the kraals at the times they were visited. Sometimes samples were taken from small as well as large livestock.

Scored farms/ written advice, sometimes the only people present at the farm were workers who could not speak English or Afrikaans. Sometimes the workers did not have all the information.

3. Communal Conservancy Development

Since January 2018, CCF has been conducting a camera trap study and social survey in the four communal conservancies (Otjituuo, Okamatapati, Ozonahi and African Wild Dog) of the Greater

Waterberg Landscape (GWL). This project conducted aims to: (1) determine the presence of wildlife within the communal conservancies, (2) investigate and address the challenges facing farmers and (3) build capacity in the conservancies to aid management in the area.

However, working in these conservancies has its share of challenges. One of these is the deep, sandy soil which needs to be driven on to navigate through the farmland area, where roads are often not overgrown. The terrain thus puts strain on the fieldwork vehicle, which requires regular mechanical attention to maintain its efficiency and prevent major problems from occurring in the field. The vehicle has already visited a mechanic in Grootfontein (about 60km from the study area) on several occasions, but the vehicle is still going strong and just requires a bit of 'motivation' every now and then to get going.

The team mostly camps on farmland area where there is no running water or ablution facility. Water needs to be collected daily from farmers in 25 litre water containers – the farmers pay a monthly fee for this water which is supplied by NamWater. There is also no electricity. We use an external car battery to charge batteries (for the camera traps) and laptops when necessary. We also make use of a small generator when running fecal samples (collected from cattle to test for presence of worms) under a microscope. These samples need to be run within a day after collection to ensure that the eggs of the worms are still alive within the sample. Food is cooked on the fire every night and water is heated in a pot when we decide to indulge in a warm 'bucket shower' (especially on a cold winter's evening).

Overall, the farmers in the area have been very willing to share information of their farming practices, knowledge of wildlife on their land and their perceptions on the conservancies. The team has also assisted farmers with livestock suffering from injuries or illnesses, which has encouraged a positive, healthy relationship between CCF and the farmers. We also conducted social surveys to investigate some of the challenges which farmers face. One of the most common problems experienced through the landscape is conflict with predators, mainly African wild dog (*Lycaon pictus*) and black-backed jackal (*Canis mesomelas*). Since much of their prey has been depleted due to illegal hunting, these predators often kill livestock. Wild dogs tend to kill calves (aged 3 to 18 months) more regularly than adults, and jackals mostly kill lambs (aged 3 to 18 months). CCF is currently working with farmers suffering major losses to improve livestock management and find a solution to living alongside wildlife, especially predators.

The hope is that these communal conservancies will start identifying the value of wildlife and managing their livestock alongside wildlife. Through education and training, CCF and the Ministry of Environment and Tourism (MET) aim to establish an integrated livestock and wildlife management plan for each of the four conservancies.

F. Global Management Planning/Policy Involvement

CCF assists in international programme development and adapts model programmes developed in Namibia for use in other countries, distributing its materials and information throughout Africa and the rest of the world.

1. International Cheetah Studbook

Dr Laurie Marker is the International Cheetah Studbook Keeper. The International Cheetah Studbook is a voluntary register of all cheetahs in the world held in both zoological and private facilities, and providing information about existing animals by publishing the studbook contents, thus creating the preconditions for selecting breeding animals. The Studbook records captive animals from around the world. It includes wild-caught and captive-born individuals alive in 1980 and after, as well as founders with live offspring since 1980. Each registered animal has a studbook number. Bi-annual questionnaires are sent to all facilities holding cheetah and information is checked through support of the International Species Inventory System (Species360) and personal communications.

The 2018 studbook is currently in preparation. The 2017 studbook was completed and distributed in January 2019 with the assistance of Becky Johnston. In 2017, 252 (120.106.26) new animals were registered, representing births and newly imported wild-caught animals during this period, as well as animals that had been brought into the captive population prior to 1 January 2017, but had not been reported until after the publication of the 2016 Studbook. Captive-born cubs from known breeding facilities totalled 198 (98.84.16) born in 52 litters in 36 facilities in 14 countries. The captive cheetah population on 31 December 2017 was 1,877 (947.918.12) animals in 295 known facilities in 49 countries (Figure 79).

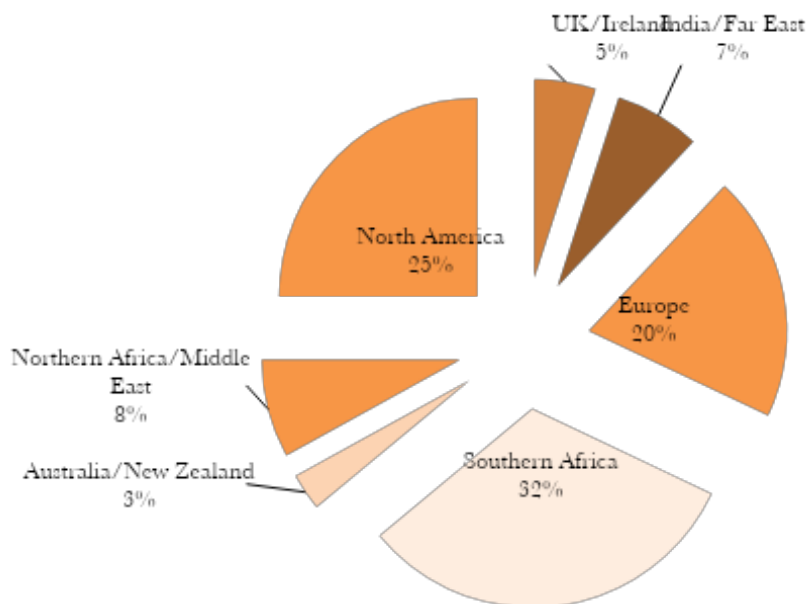


Figure 79: Captive cheetah populations by region, 2017: 1877 (947.918.12).

2. Illegal Wildlife Trafficking (IWT)

Illegal Cheetah Trade Cases

CCF first became actively involved with issues involving the illegal taking of live animals in November 2005, when it arranged for the confiscation of two extremely unhealthy cheetah cubs being held in ropes outside a restaurant in Ethiopia. Since then, CCF's Assistant Director for Strategic Communications and Illegal Wildlife Trade, Patricia Tricorache, has been monitoring illegal cheetah trafficking and organising confiscations through the proper authorities whenever possible. Even though the intrinsic nature of IWT makes it difficult to collect information, CCF has knowledge of over 2,000 cheetahs and/or cheetah parts involved in illegal trade cases gathered between government and direct reports, as well as direct observations and media articles. Although geographically widespread, most of live-animal cases compiled by CCF involve the Arabian Peninsula and the Horn of Africa (HoA), where CCF has a broader network. In terms of cheetah products (skins, bones, etc.), recent information regarding traditional markets indicates that South Africa has the highest incidence.

During 2018, CCF registered 26 cases of illegal cheetah trafficking involving 77 cheetahs (Figure 80); 74 were cubs for the pet trade and three were skins. Of these, 17 deaths were recorded: 14 cubs and three adults (skins).

A total of 25 cheetahs were reported as being alive, while the fate of 25 offered for sale in the Arabian Peninsula and 13 offered for sale in Somaliland is unknown. Eleven cheetahs believed to be alive are under investigation in Somaliland, while 13 cubs were recovered through confiscation.

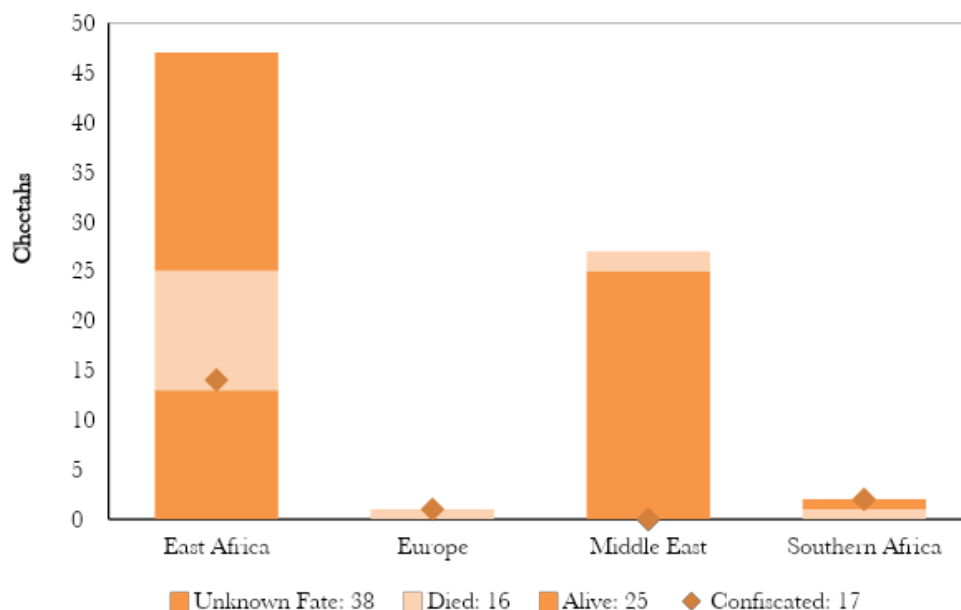


Figure 80: Summary of illegal cheetah trafficking by geographic region from January to December 2018.

CCF makes every attempt to obtain specific information on cases involving illegal cheetah trade to report them to relevant authorities. During this period, CCF and its associates investigated a total of 16 cases involving 43 cheetahs. Five of these resulted in the confiscation of 14 cheetahs. Of these, the confiscation of six cubs in early August resulted in the conviction of two individuals. The conviction followed Somaliland's ratification of its fauna and flora laws in line with international policies a few days earlier. Additionally, CCF has collaborated with various South African NGOs on issues relevant to cheetah parts offered for sale at *muti* or traditional markets across the country.

Confiscated Cubs Update

Since CCF became actively involved in the fight against illegal cheetah trade, we have organised or assisted with the confiscation of 61 cheetahs (23M, 26F, 12UNK; Table 37). Of these, 26 (43%) reached adulthood while 20 (33%) died within three months of confiscation.

Twenty-three cheetahs (11M, 12F) are still alive at the closing of this report. Ten of these, which were confiscated in Somaliland prior to a 2016 government ban on the transfer of confiscated animals to other countries, are housed at the Association DECAN in Djibouti (3M,1F) and the Born Free Foundation Ethiopia (BFFE)'s wildlife rescue centre in Ethiopia (3M,3F). CCF's associates in Somaliland are caring for 13 cheetahs (5M, 8F).

Table 37: Cheetahs confiscated through CCF intervention. November 2005 to December 2018.

Date Reported	Est. Age	Site of Confiscation	Sex	Location								Date of Transfer	Date of Death
				Somaliland		BFF Ethiopia		DECAN Djibouti		Other			
				Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead		
21-Nov-05	12W	Ethiopia	M								1	24-Nov-05	1-Nov-06

21-Nov-05	12W	Ethiopia	M								1	24-Nov-05	30-Jun-06
23-Jun-06	12W	Somaliland	M			1						20-Jun-06	28-Jun-16
2-Jul-08		Kuwait	Unk								1	28-Jul-08	UNK
2-Jul-08		Kuwait	Unk								1	28-Jul-08	UNK
24-Nov-08	8W	Ethiopia	M			1						24-Nov-08	9-May-12
27-Nov-11	8W	Somaliland	Unk		1							N/T	15-Mar-12
2-Dec-11	8W	Somaliland	Unk		1							N/T	11-Feb-12
2-Dec-11	8W	Somaliland	M			1						22-Apr-12	
2-Dec-11	8W	Somaliland	M			1						22-Apr-12	
2-Dec-11	8W	Somaliland	F			1						22-Apr-12	
2-Dec-11	8W	Somaliland	F			1						22-Apr-12	
30-May-12		Somaliland	F		1							N/T	7-Jun-12
30-May-12		Somaliland	Unk		1							N/T	16-Jun-12
30-May-12	10 W	Somaliland	F				1					15-Aug-12	1-Apr-15
3-May-14	6W	Somaliland	Unk		1							N/T	7-Jun-14
3-May-14	6W	Somaliland	Unk		1							N/T	6-Jun-14
3-May-14	6W	Somaliland	M				1					29-Jun-14	8-Jul-14
21-Sep-14	10W	Somaliland	M						1			28-Oct-14	28-Aug-18
21-Sep-14	10W	Somaliland	F						1			28-Oct-14	~Aug-17
21-Sep-14	10W	Somaliland	F						1			28-Oct-14	~Jul-17
30-Sep-14	6W	Somaliland	M		1							N/T	23-Oct-14
30-Sep-14	6W	Somaliland	F						1			28-Oct-14	~Dec-15
30-Sep-14	6W	Somaliland	F						1			28-Oct-14	2-Dec-14
19-Nov-14	8W	Somaliland	M			1						6-Apr-15	
19-Nov-14	8W	Somaliland	F				1					6-Apr-15	5-Mar-16
19-Nov-14	8W	Somaliland	F			1						6-Apr-15	
20-Nov-15	5W	Somaliland	F					1				28-Nov-15	
20-Nov-15	5W	Somaliland	M					1				28-Nov-15	
20-Nov-15	5W	Somaliland	M					1				28-Nov-15	
20-Nov-15	8W	Somaliland	M					1				28-Nov-15	
27-Jun-16	1Y	Somaliland	M	1								3-Jul-16	

18-Apr-17	8W	Somaliland	Unk		1							18-Apr-17	28-Apr-17
18-Apr-17	8W	Somaliland	Unk		1							18-Apr-17	29-Apr-17
18-Apr-17	10W	Somaliland	F		1							18-Apr-17	5-Jun-17
18-Apr-17	10W	Somaliland	F		1							18-Apr-17	8-Jun-17
18-Apr-17	12W	Somaliland	M						1			16-Jun-17	9-Jul-17
18-Apr-17	12W	Somaliland	F		1							18-Apr-17	12-Jun-17
18-Apr-17	10W	Somaliland	Unk		1							18-Apr-17	25-Apr-17
18-Apr-17	10W	Somaliland	Unk		1							18-Apr-17	27-Apr-17
18-Apr-17	10W	Somaliland	Unk		1							18-Apr-17	28-Apr-17
18-Apr-17	1.5Y	Somaliland	M		1							19-Apr-17	23-Apr-17
13-Jun-17	12W	Somaliland	F		1							1-Jul-17	30-May-18
28-Jun-17	5M	Somaliland	F	1								4-Jul-17	
23-Dec-17	3M	Somaliland	M		1							31-Dec-17	3-Jan-18
12-May-18	3M	Somaliland	F	1								12-May-18	
12-May-18	5M	Somaliland	M	1								12-May-18	
4-Aug-18	5M	Somaliland	F	1								4-Aug-18	
4-Aug-18	3M	Somaliland	F	1								4-Aug-18	
4-Aug-18	4M	Somaliland	M	1								4-Aug-18	
4-Aug-18	5M	Somaliland	M?	1								4-Aug-18	
4-Aug-18	5M	Somaliland	M	1								4-Aug-18	
4-Aug-18	5M	Somaliland	F	1								4-Aug-18	
25-Aug-18	3W	Somaliland	F	1								25-Aug-18	
25-Aug-18	3W	Somaliland	F		1							25-Aug-18	1-Sep-18
25-Sep-18	3W	Somaliland	M		1							26-Sep-18	6-Oct-18
25-Sep-18	3W	Somaliland	F		1							26-Sep-18	5-Oct-18
25-Sep-18	3W	Somaliland	F	1								26-Sep-18	
24-Dec-18	8W	Somaliland	F	1								24-Dec-18	

In April 2017, CCF received a grant from our long-term partner, the International Fund for Animal Welfare (IFAW). The funds were designated for the housing and care of cheetahs in Somaliland. However, this funding ran out in March 2018 and to reduce costs, all cheetahs were moved to the same location where other animals confiscated from the trade are also housed. However, following the confiscations of 12 cubs in August and September, a new house was rented in late September to

provide better conditions for all with the support of CCF UK and our German partner, Aktionsgemeinschaft Artenschutz (AGA).

Horn of Africa (HoA) Efforts

Somaliland Cheetah Research

CCF's associate in Somaliland, Dr Paul Evangelista (Colorado State University) published a paper titled, *Integrating indigenous local knowledge and species distribution modeling to detect wildlife in Somaliland*, which sought to predict the distribution of 38 wildlife species Somaliland through local knowledge and predictor models. The paper placed special emphasis on cheetah and African wild ass and concludes that while African wild ass may be extremely rare or extirpated from Somaliland, cheetah may be more widely distributed than previously thought, but in low population densities. This study, along with data on illegal cheetah trade compiled by CCF, demonstrates the need for further research to establish the status of wild cheetah populations in the country.

Somaliland Capacity Building

Wildlife Conservation and Cheetah Care

Sponsored by Colorado State University and the Murulle Foundation, two wildlife officials from the Somaliland MoERD: Ahmed Mohamed and Abdinahir Hussein, joined 44 trainees from 13 African countries in Windhoek for an immersive learning experience designed to enhance their professional skills. The training, held on January 6-8, was followed by the 3-day PATHWAYS Africa Conference, where over 150 scientists and practitioners from around the world explored human dimensions science and its applications in fish and wildlife conservation.

Following PATHWAYS, the two officials were hosted at CCF for post-training especially designed for them, along with a Namibian ecologist and four representatives from ACK (Action for Cheetahs in Kenya). The programme, which included presentations and practicals led by CCF's expert staff, was carefully designed so that the trainees could witness all that they learned during the sessions in Windhoek, as well as many aspects specific to cheetahs and CCF's programs, including cheetah and farm animal care, genetics, ecology, integrated livestock farming and community outreach.

The importance of having participants from Somaliland spend these 12 days at CCF cannot be overstated. These two government officials work in a country that has not been recognised by the international community and where trafficking of cheetah cubs for the illegal pet trade is a major concern. During their stay at CCF, they were able to see first-hand the benefits of approaching conservation in a holistic manner.

Throughout the training, Dr Alistair Bath, an experienced lecturer and facilitator at Memorial University in Newfoundland, Canada, facilitated action-oriented sessions (Figure 81). Dr Bath has deep knowledge in human-wildlife conflict and human dimensions in natural resource management issues. With his facilitating skills, he guided participants through various procedures that allowed them to end the training with a clear pathway on the work that needs to be done in their respective areas of responsibility. The trainees left CCF with specific tasks and deadlines, and Alistair kindly offered to continue guiding them through the process of achieving implementation.



Figure 81: Trainees during a session with Drs. Alistair Bath and Laurie Marker at CCF Namibia.

Wildlife Coordinators Workshop

In May 2018, the CCF Somaliland team held a 3-day MoERD Wildlife Coordinators Workshop with representatives from nine regions (Figure 82). In addition to holding discussions about Somaliland's laws pertaining to wildlife, participants were asked for help with the development of messages aimed to raise awareness about the law among enforcement and wildlife officials. Participants made a commitment to develop specific messages for their respective regions based on the actual issues with which they deal. A booklet with images and descriptions of the most-trafficked species in the region was distributed to all participants (Figure 83).



Figure 82: MoERD Regional Coordinators Workshop. Hargeisa, 6-8 May, 2018.

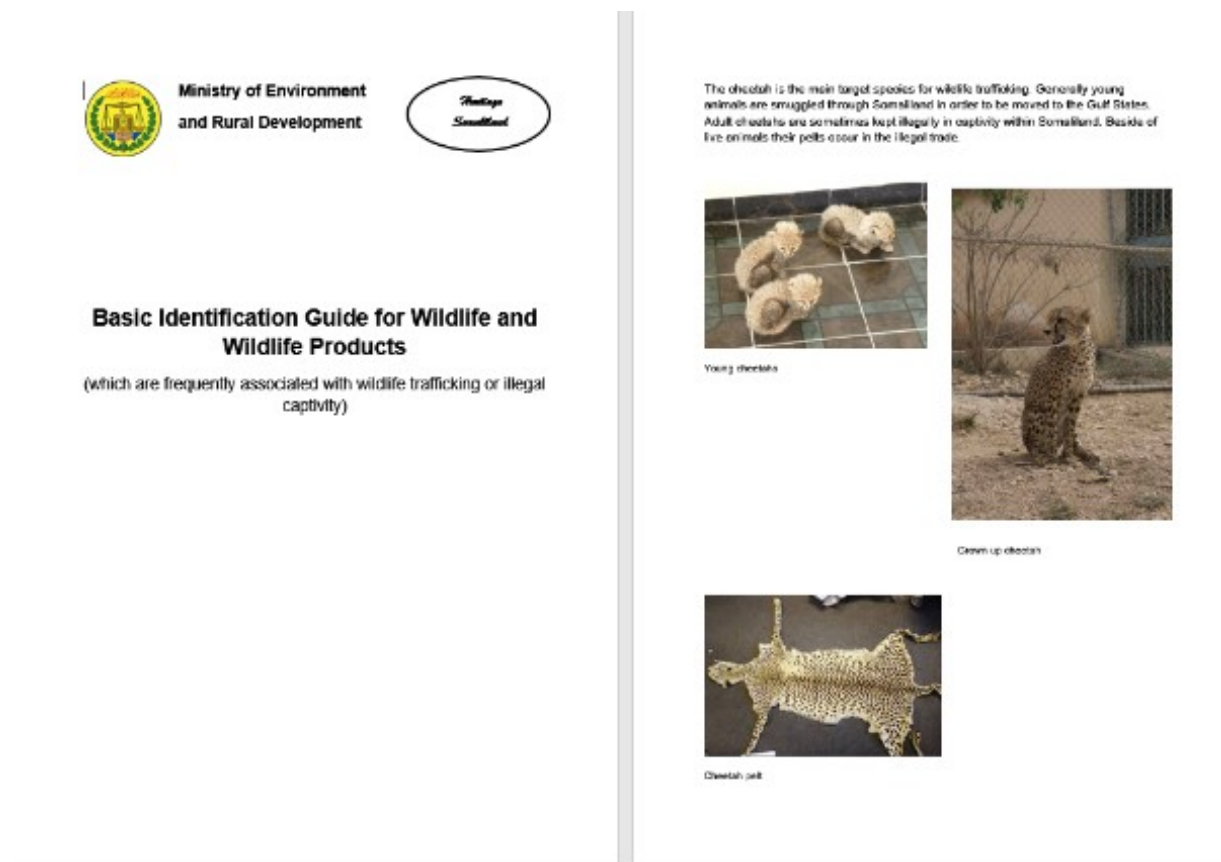


Figure 83: First two pages of the Basic Identification Guide for Wildlife and Wildlife Products, Somaliland.

Veterinary Capacity Building and Volunteer Programme

During Patricia Tricorache's visit to Hargeisa in September, she met with two veterinary medicine professors from USAMV Cluj-Napoca (Romania) and the University of Veterinary and Pharmaceutical Sciences Brno (UVPS, Czech Republic) to discuss a collaboration aimed at building veterinary and wildlife medicine capacity in Somaliland. This partnership, which also includes Vétérinaires Sans Frontières Czech Republic (VSF-cz), University of Hargeisa (UOH) and Heritage Somaliland, began on November 1, 2018. USAMV and UVPS researchers will carry out teaching activities at UOH with the students of the Faculty of Veterinary Medicine (Figure 84), contribute to the setting up of parasitological diagnostic laboratories, and conduct training for teaching and laboratory staff.



Figure 84: First veterinary volunteer, Angela Ionică (USAMV), after a lecture for 5th year veterinary students at University of Hargeisa.

USAMV and VSF-cz also provide specialized volunteer veterinary support for confiscated animals under CCF's care; a programme designed to promote working with wildlife, including basic veterinary care. Additionally, VSF-cz sponsored CCF's cheetah keeper and 5th-year veterinary student, Nujuum Jimi, for a 3-week training at the Al Ma'Wa Wildlife Sanctuary in Jordan. At closing of this report, three veterinarians had volunteered for 1-month periods assisting with animal care and training the CCF Somaliland team.

This partnership brings together the collective knowledge and capabilities of the partner institutions to enable students and volunteers to become immersed in wild animal care.

CCF Visits Somaliland: 28 February-4 March 2018 and 30 August–21 September 2018

Dr Laurie Marker and Patricia Tricorache visited Somaliland in late February to assess the situation regarding cheetah care, and to meet with the Minister of Environment and Rural Development, the Hon. Shukri Ismail, and other Ministry officials. Throughout this visit, the Minister reiterated her Ministry's commitment to end wildlife trafficking. However, she discussed issues facing Somaliland as it struggles with non-recognition by the international community as an independent nation, which makes it difficult for the government to obtain support from most countries. Consequently, NGOs such as CCF and our partners also face tremendous challenges to obtain much-needed funding for capacity building for enforcement and veterinarians, as well as for the care of animals confiscated from the trade.

Every day during this visit, the Minister made time to meet with Dr Marker and Patricia to brainstorm regarding enforcement, awareness and confiscated animals, all of which are part of strategies and agreements developed over the last year to fight illegal wildlife trade. The Minister also agreed to visit the house where two of the cheetah cubs confiscated in July 2017 were located (Figure 85).



Figure 85: (L-R) Patricia Tricorache, Hon. Min. Shukri Ismail, Dr Laurie Marker and Nujum Jimi (cheetah caretaker) during visit to confiscated cubs in Hargeisa.

Cub mortality and disease are always a concern in Somaliland, due to the lack of trained wildlife veterinarians and infrastructure. During this trip, Dr Marker and Patricia met with the Dean and faculty of the Veterinary College of Agriculture, Veterinary and Animal Science at University of Hargeisa to identify areas where immediate cooperation is possible, and those where training or sharing of information are needed. The veterinarians/lecturers all expressed their eagerness to do everything in their power to help when emergencies with animals arise. This includes the use of their laboratory, which offers some basic capabilities that can help with the identification of certain diseases in cheetahs or performing a few procedures.

In an attempt to find alternative options to address cheetah health issues, Dr Marker and Patricia also met with several expats including physicians interested in our work in Somaliland. Human doctors could be of help when cheetah health problems arise, and we hope to count on their support when needed.

One important part of CCF's activities in Somaliland is the development of a rescue centre for confiscated animals. Dr Marker and Patricia visited the site of a rescue centre recently built on land designated by the MoERD with the support of the newly-formed NGO Heritage Somaliland. The centre currently houses about 20 gazelle species endemic to the region. The gazelles had been hoarded illegally by an animal collector. This centre is phase 1 of a longer-term plan to house confiscated cheetahs and other carnivores, once the conditions are ripe, as caring for carnivores entails a larger investment and specialised care and infrastructure.

Other activities during this visit included a TV interview with the Somaliland Sun, a print and online newspaper in English. The interview, which focused on World Wildlife Day and cheetahs, was published on several newspapers and aired on Somaliland national TV. All free time was spent with CCF's Somaliland team to discuss matters such as budget, bio-medical samples in storage, cheetah care and awareness efforts.

Following two confiscations of eight cheetahs in September, including two extremely delicate 6-week-old cubs in late August, Dr Marker returned to Somaliland to assist with cub care, and was then relieved by Patricia Tricorache. In addition to full-time care for the cubs and various meetings with government officials during their visits, a new house was selected and conditioned for the newly-arrived cubs.

Ethiopia: 4 - 8 March 2018

Dr Marker and Patricia travelled from Somaliland to Ethiopia, where they were invited to a World Wildlife Day ceremony hosted by the Ethiopian Wildlife Conservation Authority (EWCA) and representatives from the US Regional Environmental Office for East Africa based at the US Embassy in Ethiopia (Figure 86). At the ceremony, EWCA's Director General, Kumira Waqjira, was presented with various posters produced by the Embassy in collaboration with CCF, in the Somali language. The posters, which feature photos of cheetahs, are intended to raise awareness about illegal cheetah trade in the Ethio-Somali region of Ethiopia.



Figure 86: Cheetah posters' presentation during the World Wildlife Day celebration at the Ethiopian Wildlife Conservation Authority.

The occasion served to meet with Director Kumira, who was recently appointed to this position at EWCA, and with Daniel Pawlos, Director of Wildlife and Their Products. Daniel is a CCF alum who participated in CCF's international training courses on Conservation Biology back in 2008. He facilitated an introduction to EWCA's Director of Wildlife Research and Monitoring, with whom we discussed the CCF's cheetah genetics database and procedures to obtain samples from Ethiopian cheetahs. A cheetah genetics database can be crucial to support enforcement investigations into illegal cheetah trade.

CCF strives to form and maintain partnerships with other NGOs, and during this short visit Dr Marker and Patricia had a very productive meeting with BFFE's Director, Dr. Zelealem Tefera, who was one of the first people to lend their support when CCF organised the confiscation of two cheetah cubs in Ethiopia in 2005. They also had a courtesy meeting with a representative of the newly-established Horn of Africa Wildlife Enforcement Network (HAWEN) and were privileged to be invited to the residence of the Hon. Mary Beth Leonard, US Ambassador to the Africa Union. Ambassador Leonard had met Dr Marker when she was posted in Namibia many years ago. While this was a non-official function, it allowed us to begin a dialogue regarding many issues affecting the African continent and of concern to CCF.

Djibouti: 16-23 March 2018

Patricia Tricorache travelled to Djibouti to continue discussions with HAWEN, as well as with the Intergovernmental Authority on Development (IGAD), which is an eight-country trade bloc in Africa that includes governments from the Horn of Africa. During these meetings, the central topic of discussion was cooperation; with CCF reiterating its commitment to working with the region at all levels to stop illegal wildlife trade.

In Djibouti, Patricia was a guest of DECAN, an organisation dedicated to conservation and currently managing several protected areas in Djibouti. DECAN started in 2003 as a wildlife refuge and today it houses nearly 100 animals (Figure 87). Patricia had an opportunity to meet the cheetahs she helped rescue as small cubs in Somaliland, and hosted a visit by HAWEN representative, Moses Eiru Olinga. During her visit, Patricia processed the cheetahs' registration on the International Cheetah Studbook. She also discussed logistics to obtain bio-genetics samples for the CCF Genetics laboratory.



Figure 87: Moses Eiru Olinga (Horn of Africa Wildlife Enforcement Network) meets confiscated cheetahs at DECAN Refuge, Djibouti.

Horn of Africa: Wildlife Crime Prevention, Peace and Stability – The Hague, 7-8 June 2018.

Patricia represented CCF at an experts' meeting organised by IUCN NL and the Netherlands Ministry of Foreign Affairs, in collaboration with IFAW, as part of the Wildlife Crime Prevention Program in the Horn of Africa. Participants included representatives from governments, NGOs and knowledge institutions.

The 2-day meeting focused on the impact of wildlife crime on security in the HoA and the Great African lakes, and how future wildlife crime prevention programmes could effectively address and combat it via a multi-sectorial approach.

Public Policy

CITES

CCF continued to follow up on CITES-related issues, particularly regarding the development of a Cheetah Trade Resource Kit. CCF, represented by Patricia Tricorache, is a member of an inter-sessional working group formed at the CITES 69th Standing Committee meeting (SC69) held in December 2017. The group's mandate is to:

- (a) review the draft CITES cheetah trade resource kit and the recommendations of the Secretariat as outlined in Decision 17.125;

- (b) formulate comments and recommendations on the finalisation and dissemination of the CITES cheetah trade resource kit for consideration by the Standing Committee at its 70th meeting; and
- (c) provide advice to the Secretariat to support their fulfilment of Decision 17.127.

As funding had not been secured to develop the toolkit, the Secretariat advised the working group to focus its work on item c) concerning fulfilment of Decision 17.127. The Decision states: *The Secretariat shall report to the Standing Committee on progress on all of the recommendations in Standing Committee document SC66 Doc. 32.5, paragraphs 17 and 18, and progress in halting illegal trade in cheetahs.* To accomplish this, CCF helped develop a questionnaire, which was sent as a Notification to the Parties No. 2018/058 on 4 June.

Patricia Tricorache was given the task of logging, analysing and reporting on all received questionnaires. The response from the Parties was poor, and in August, the CITES Secretariat issued a report (E-SC70-43) concluding that illegal cheetah trade remained “limited.” To point out that official data provided on the questionnaires is insufficient to assess the magnitude of the trade, since a large percentage of it is not intercepted by the authorities, CCF began working with the Wildlife Conservation Society, the Zoological Society of London and the Born Free Foundation to draft a document in preparation for the 70th CITES Standing Committee Meeting (SC70) in Sochi, Russia, where the report would be discussed as an agenda item.

Patricia and the three NGOs worked together to garner support from countries affected by cheetah trafficking. As a result, the governments of Ethiopia, Kenya and Yemen agreed to submit an official information document (E-SC70-Inf-44) based on CCF’s years of research, demonstrating that the trade is not limited, and urging CITES to consider it for future decisions and recommendations. The document and discussions in plenary, which were also supported by Botswana and the U.S., emphasised the need for better enforcement, more convictions, better collaboration both regionally and inter-regionally in the affected areas, capacity building, and awareness to reduce demand for cheetahs as pets.

While this document cannot change the original report by the Secretariat, it will help us ensure that the issue doesn’t get lost. CCF is now working in preparation for the 18th Conference of the Parties, or CoP18, that will be held in May 2019.

Illegal Wildlife Trade Conference London 2018 – London, 11-12 October 2018

In London, CCF UK’s head, Jane Galton, represents CCF at a CITES Liaison Group (CLG) that includes government officials, international organisations and NGOs. The CLG group is led by DEFRA (Department for Environment, Food & Rural Affairs), and deals also with the Illegal Wildlife Trade Conference, which was held in October.

This was the first IWT Conference, hosted by the UK government, and attended by dignitaries from over 80 countries, included NGOs. Patricia Tricorache and Jane Galton represented CCF. It was a profoundly moving experience to share space with people occupying the highest posts in many countries, corporations and NGOs, including His Royal Highness the Duke of Cambridge, the Presidents of Botswana, Gabon, Uganda and the Prime Minister of Cambodia, all sharing the same goal, to end wildlife trafficking.

During CCF UK’s participation in CLG meetings, Jane worked to urge DEFRA to include language relevant to trafficking of live animals in the Conference materials. As such, the Conference, also for the first time, was not only about ivory or rhino horn and other wildlife products. The illegal trade in live animals was in the official program, and cheetahs were part of a panel session discussing this trade, emphasising the need for immediate attention, a point that we made also via the CCF pledge:

The CCF pledges to continue fighting the illegal trade in cheetahs, whether as live animals for the pet and tourism industries or as products, both on the supply and demand sides. CCF

will use its extensive research to raise awareness in collaboration with governments, communities and international and non-governmental organisations, by sharing information driving the trade, including the prevalence of live cheetah advertisements on the Internet and social media.

Other Meetings

Dr Laurie Marker and staff take every opportunity to network with government institutions and monitor important issues and government policies that affect the cheetah. The following are some of the meetings on IWT attended by CCF. By attending these meetings, CCF staff can share current information on challenges, obstacles, and programmes that might impact recommendations.

Geographic Information Standards (GIS) to Help Combat Wildlife Trafficking in Africa workshop – Addis Ababa, Ethiopia, 26-28 March 2018

CCF was selected to present a use case on illegal cheetah trade at the regional workshop on Geographic Information Standards to Combat Wildlife Trafficking, organised by the US Department of State as part of the U.S. Strategy to Combat Wildlife Trafficking. The workshop, held in Addis Ababa, Ethiopia, on 26-28 March, was attended by over 80 participants from more than 20 countries, government, INGOs, NGOs and private sector; Figure 88). Its aim was to enhance existing efforts by committed groups and organisations to document, manage, coordinate, analyse and leverage geospatially-enabled information about wildlife trafficking.



Figure 88: Participants of the GIS Workshop in Addis Ababa. May 2018.

The workshop objectives were to:

- (a) develop and promote sustainable and secure use of standards for GIS databases to help combat wildlife trafficking; and

- (b) leverage local expertise to enhance clarity about and establish best practices for data requirements with broad neutrality. Examples of end users include law enforcement and criminal justice authorities.

Participants were encouraged to focus efforts on the two use cases: cheetahs and pangolins, and consider challenges and opportunities for coordinating data, data fidelity, security, and ethics.

Expected outcomes and results include:

- (a) successful development and delivery of a platform-agnostic database template for workshop participants and partners; and
- (b) (b) a “geopledge” whereby workshop participants and partners informally commit to applying an agreed upon data dictionary in order to maximise coordination of geospatially-enabled information in a transboundary context.

CCF has been selected to participate in a volunteer group to help build a broader community of committed participants in a cloud-based GIS environment for discovering, documenting, posting, sharing, and analysing data relevant to combatting wildlife trafficking. Participation will engage directly in a test site of standards to help test, refine, and build the spatial data dictionary and related collaborative tools.

Elsewhere, CCF continues to be approached by, and collaborate with various international conservation and enforcement NGOs researching IWT, and pro-actively approaches government agencies, groups and individuals dedicated to collecting information and training enforcement agencies to fight the trade. Efforts such as these enable CCF to create synergies that may result in successful actions, and to raise awareness to the urgency of addressing the illegal trade of live species as a whole, and not species specific.

CCF also provides support and materials to volunteers and former staff members who are interested in raising awareness about IWT through presentations in their hometowns or workplaces.

Somaliland Beyond Drought: Saving Wildlife and Protecting the Environment – London, UK 3 December 2018

Dr Laurie Marker and Patricia Tricorache took part in a panel discussion at the House of Commons in London on 3 December. The event, Somaliland Beyond Drought: Saving Wildlife and Protecting the Environment, was hosted by Zac Goldsmith MP and the Somaliland’s Mission to the UK and the Commonwealth. This event allowed us to raise awareness about the fact that most cheetah stolen from the wild to be sold as pets are at best, a loss for conservation; at worst, likely to die. Emphasis was made in the effects of wildlife trafficking on communities and their resources, and the importance of proper rangeland management and integrated livestock-wildlife management in arid landscapes.

Cyber-Crime

Throughout this period, CCF continued its research of cheetahs offered for sale on social media in close collaboration with PEGAS (Project to End Great Apes Slavery). Actionable information is shared with relevant authorities. When appropriate and without hindering official investigations, CCF also alerts NGOs working on other endangered species found on the advertisements, e.g. chimpanzees, orangutans, gibbons and clouded leopards. CCF’s ongoing research into online advertisements has reached nearly 450 online accounts and over 1,500 cheetahs offered for sale between January 2012 and December 2018.

CCF’s cyber research has given us an opportunity to meet other concerned stakeholders and opened us doors to speak for the cheetah. On June 5-6, Patricia Tricorache participated in a global

Cyber-Enabled Wildlife Crime workshop co-hosted by INTERPOL and IFAW at the INTERPOL Secretariat in Lyon, France (Figure 89). The importance of this workshop cannot be emphasised enough, as it recognised the need for increased coordination of efforts across public and private sectors to disrupt wildlife cybercrime. Consequently, it included participants spread across all relevant sectors and stakeholders: online technology companies, enforcement agencies, policy makers/politicians, NGOs, and academia. Participants had an opportunity to share insights about what they do, how, and why. They discussed needs, and more importantly, potential opportunities for cross-sector collaboration and best practices. Understanding the obstacles each sector faces when fighting IWT. These obstacles can go from privacy and security concerns, to inadequate national laws and the sheer number of animal and plant species (over 30,000) that are listed in the CITES appendices, many of which are traded illegally through the Internet, while some can be traded legally under specific circumstances.



Figure 89: Participants of the Cyber-Enabled Wildlife Crime Workshop at INTERPOL HQ, June 2018.

At the end of the two days, attendees left with a better understanding and willingness to improve communications and collaboration, a need unanimously identified, along with a more efficient use of available resources, which are limited. The group will continue to work together towards their common goals.

Immediately following the INTERPOL workshop, Patricia took a quick detour to meet up with colleagues from the Horn of Africa (HoA) attending a meeting in The Hague. The HoA is of major concern when it comes to fighting illegal cheetah trade, as many wild cheetahs are taken from Ethiopia and trafficked across Somaliland towards the Arabian Peninsula. Patricia followed up on the establishment of the Horn of Africa Wildlife Enforcement Network, or HAWEN, which will be a key partner in CCF's efforts in that region. HAWEN was established last November with the support of key partners that include IFAW, the IUCN National Chapter of the Netherlands, and the Dutch government.

In September, the Wildlife Justice Commission issued an analysis of CCF's research on cyber-crime, demonstrating that cheetah trade online is prevalent.

Genetics

The CCF team continues to make every effort to collect genetic samples from cheetahs in the UAE and HoA, under the proper CITES permits, for a DNA database that might allow us to identify their geographic origin in support of trafficking investigations. The samples are brought and stored in Namibia. During this period, CCF's associates in Somaliland collected five samples from the cheetahs

confiscated in July 2017 (2), December (1) and May (2). All samples are being held in Somaliland until permits and safe transportation can be organised. In March, CCF began the application process to collect samples from cheetahs in Ethiopia through EWCA.

Social Media

Social media is a tool commonly utilised by wildlife dealers, and their images of animals being offered receive many compliments and “likes” by thousands of people. With this in mind and considering that CCF’s most popular post on its Facebook page in 2015 was relevant to IWT, CCF launched a Facebook page titled, “So you want a pet cheetah?” on 30 December 2015. The page aims to raise awareness on social media about the threat that the illegal pet trade in cheetahs represents to the survival of the species by providing information about the trade, and about actions being taken, hoping to turn public opinion against ownership of cheetah pets and, in particular, to reach those who might own or plan to buy a cheetah.

Between 1 January and 30 December 2018, the page “likes” increased from 1,221 to 1,820 (Figure 90). “Likes” are distributed among 47 countries, with the majority being from the US (33%), followed by the UK (8%) and South Africa (6%). In terms of the page’s main target audiences, i.e., cheetah-range countries or countries relevant to illegal cheetah trade, the page saw an increase during this period, from 23% on 31 December 2017 to 29% on 31 December 2018.

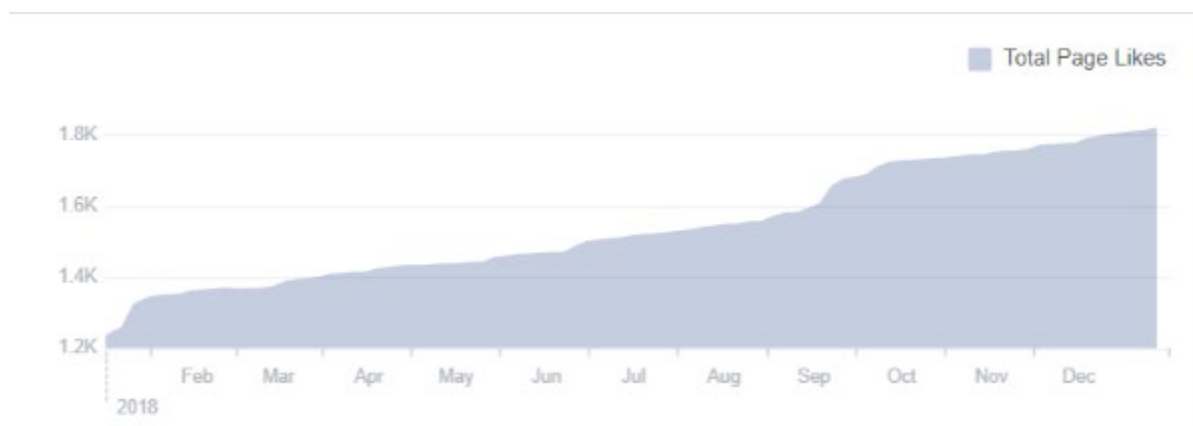


Figure 90: Number of Likes on CCF’s IWT Facebook page, January to December 2018.

During this period, there were 73 posts on CCF’s IWT Facebook page having reached 215,089 organic users. In terms of unique users, i.e., users who engaged in some way by commenting on, liking, sharing, or clicking on particular elements, a total of 40,407 users engaged during this period. The top five most popular posts (Table 38) reached 72,745 organic users and were relevant to updates on cheetahs rescued in Somaliland.

Table 38: Top five posts in terms of total reach (unique users). January-December 2018.

<i>Post Message</i>	<i>Type</i>	<i>Posted</i>	<i>Lifetime Post Total Reach</i>
<i>The small cub confiscated in Somaliland last Saturday is doing well...</i>	<i>Photo</i>	<i>2-Jan-18</i>	<i>7,789</i>
<i>We are sad to communicate that our little New Year’s Eve cub...</i>	<i>Photo</i>	<i>10-Jan-18</i>	<i>37,334</i>
<i>Despite all efforts, one of the two little cubs confiscated on...</i>	<i>Photo</i>	<i>3-Sep-18</i>	<i>8,129</i>
<i>All cheetahs confiscated last month in Somaliland are fighters...</i>	<i>Photo</i>	<i>9-Sep-18</i>	<i>11,403</i>
<i>We have three more confiscated cheetah cubs in Somaliland...</i>	<i>Photo</i>	<i>28-Sep-18</i>	<i>8,090</i>

Media

During this period, CCF issued seven IWT-related press releases (Table 39) and continued to work with various journalists and filmmakers on various projects, resulting in 38 blogs, news articles and TV reports. Illegal cheetah trade was also prominently featured on a ZDF TV (Germany) documentary: Hannes Jaenicke: Im Einsatz für Geparden (In Action for Cheetahs).

A ONE.org blog titled, “Meet the Women Fighting Cheetah Smuggling in Somaliland,” by free-lance journalist Megan Iacobini de Fazio on 19 April, was picked up by four Somaliland media and social media outlets, as well as a Kenyan news outlet. The blog features CCF’s cheetah caretaker, the Minister of Environment and Rural Development, and Patricia Tricorache.

The second half of 2018 was quite active media-wise as a result of the confiscation and conviction involving six cheetahs in Somaliland in Early August, and CCF’s new collaboration with Eastern European universities which yielded four TV reports in Romania.

A blog by Patricia Tricorache, published by the UK Foreign Office in Zimbabwe was featured for several weeks on the homepage of the UK Illegal Wildlife Trade Conference. Additionally, during the Conference, CNN International requested a live interview with CCF. Unfortunately, the interview was cancelled due to a major developing story regarding a Saudi journalist. Table 39 lists all the IWT – related press releases during this reporting period.

Table 39: IWT-related press releases. January -December 2018.

Date	Title
7-Mar-18	Cheetah Conservation Fund leadership travels to the horn of Africa to address wildlife trafficking threat
29-Aug-18	The Cheetah Conservation Fund announces major victory with conviction of two cheetah smugglers in Somaliland
7-Sep-18	Conservationist Dr Laurie Marker Issues Call to End Cheetah Poaching and Cheetah Trafficking While Caring for Sick, Confiscated Cubs in Somaliland
27-Sep-18	Analysis of Cheetah Conservation Fund’s research concludes that trade of cheetahs via social media platforms remains prominent, and it’s not just cheetahs.
28-Sep-18	Somaliland Government Putting Pressure on Cheetah Traffickers; Cheetah Conservation Fund now caring for 14 confiscated cheetahs.
7-Dec-18	Cheetah Conservation Fund discusses illegal trade and other cheetah issues with the Somaliland Minister for Environment and Rural Development at UK House of Commons
18-Dec-18	Cheetah Conservation Fund Announces Multi-Institutional Partnership for Wildlife Medicine and Husbandry in Somaliland

V. Education

Public education and the development of an active grassroots constituency are integral components of CCF's overall cheetah conservation programmes. CCF educates farmers, students, educators, public-policy makers, and the public in general on the value of sustainable practices in conservation, as well as on the importance and value of predators for a healthy ecosystem. Public education and the development of national pride in the cheetah are both critical to its survival, and other natural resources in Namibia.

This reporting period, we welcomed Annetjie Siyaya into our staff, and she has taken over from Nadja Le Roux. Annetjie is the new Research and Education Manager. We also welcomed Elizabeth Pius into our staff. Elizabeth has been an intern at CCF for over year, and was appointed as Research and Education Technician.

The first half of the year presented great opportunities for the Education department to engage and network with different stakeholders in environmental education (EE). CCF's Education department attended the annual NEEN Conference, hosted at the B2Gold Namibia, at the Otjikoto Nature Reserve and EE Centre from 3 – 6 May. The conference brought together environmental educators, teachers, environmental officers, environmental consultants, government ministries, and students – all passionate about environmental education (Figure 91). The four day conference was themed, 'Innovative strategies to develop peaceful co-existence with the endangered wildlife', and Annetjie took the opportunity to share what CCF is doing to promote peaceful co-existence with the cheetah and other predators, through its various conservation and education programmes. Annetjie also introduced and shared the Teacher's Resource Guide with especially teachers, environmental educators, and environmental officers. The conclusion of the conference saw Annetjie being elected as NEEN Regional Network Representative, and Secretary of that committee, a position CCF has carried a few times before.



Figure 91: NEEN 2018 Conference participants, hosted at the B2Gold Otjikoto Nature Reserve EE Centre.

The Education department is always looking at ways it can involve local schools in CCF's education programmes, and the department did not hesitate to accept a request from students from the

Otjiwarongo High School to do their community project with CCF. The eight students volunteered 32 hours (15 – 17 May 2018) of their time towards CCF's mission. They cleaned cheetah, dog and livestock pens, assisted with data entry in the Ecology and Education departments, helped prepare meat for resident cheetah, and brushed and walked livestock guarding dogs. CCF staff helped the students understand the importance of CCF's mission in ensuring the survival of the cheetah in the wild, and how every task they performed contributed to this mission. The Paresis Secondary School also had a similar project with CCF later during the year with 18 students, from 28 – 31 August 2018. This is the beginning of many educational programmes with the two local high schools. Figure 92 shows the students from the two schools pictures with Dr. Marker, staff and interns.



Figure 92: Dr Laurie Marker, staff, interns and students from Otjiwarongo High School (left). CCF staff, interns and students from Paresis Secondary School (right).

Another highlight for the Education department was the National Clean-up Day, which saw CCF winning the National Clean-up Contest, organised by Tourism Supporting Conservation (TOSCO), on 25 May 2018. As part of CCF's educational programmes, for this day, three high schools from Otjiwarongo were invited to take part in the clean-up of the D2440 road, which leads to the dumpsite, and unfortunately this is the same road local and international visitors use to get to CCF. On that day 126 students and three teachers joined CCF staff in picking up litter along that road. This day was set aside by HE the president, Dr Hage Geingob as National Clean-up day with a call to all Namibians to clean up their surroundings and communities. CCF with the help of all students and teachers filled approximately 250 bags with litter, making them the largest group that took part in the clean-up and filling up the most bags on that day, and therefore the winners of the contest (Figure 93). CCF was excited to learn that most of the students, who had volunteered to do community work earlier during the month, showed up to support and contribute to the clean-up.



Figure 93: Students, teachers and CCF staff along with the 250 bags they filled on National Clean-up Day.

In preparation for the Biomass Demonstration Day, hosted by CCF on 20 October 2018, CCF staff and volunteers along with the local municipality of Otjiwarongo once again took to clean the D2440 road on 15 October.

A. Future Conservationists of Africa

At the end of 2018, CCF's Education department engaged 4,763 Namibian students from primary and secondary school levels, as well as 422 teachers in both its outreach and centre-based programmes.

1. Outreach

School outreach started in late January 2018. CCF Senior Environmental Educator, Ignatius Davids visited a total of 26 schools in four regions, reaching a total of 3216 learners and 169 teachers.

The outreach programmes are tailor made for specific audiences and run for approximately 45 minutes covering CCF's research, conservation, and education efforts. Programmes also cover cheetah behaviour, ecology, and its conservation. The presentations and talks go further into different predator ID's, rangeland management, biodiversity as well as HWC mitigation strategies, collaborative management tools to sustainably live with wildlife, and the economic and environmental benefits of having healthy, balanced ecosystems.

2. Centre-based Programmes: Primary to High School

Organised education programmes at CCF as of December 2018 involved 37 Namibian groups totalling 1,547 learners, accompanied by 213 teachers, parents, or volunteers. Of these, nine groups consisting of 209 learners with 38 teachers, participated in overnight programmes at CCF's Camp Lightfoot (Table 40). Additionally, of the total groups visiting the Centre, two groups of 26 learners completed their community projects at CCF as part of the requirements for a class they are taking in school. These groups commuted daily from Otjiwarongo town and are shown with an asterisk in Table 40.

Depending on the length of stay and the group focus, activities included cheetah runs, museum tour, guarding dog and goat kraal talks, predator-kill identification exercises, ecological talks, and game drives.

On 24 November 2018, CCF's Education Department also worked with a group of 40 teachers from the Omaheke and Ohangwena regions. Training on how to use the Teacher's Resource Guide (TRG) was provided to the group from Ohangwena Region, and each teacher was given a TRG. The department will be following up on how the TRG is being implemented by the various teachers in their classrooms in 2019.

Table 40: Namibian schools hosted by CCF from January to December 2018.

Date In	Date Out	Namibian Overnight School Groups School	Students	Adults	Total
23 Jan 18	24 Jan 18	Tsaraxa-Aibes Primary School	20	4	24
06 Apr 18	08 Apr 18	Makalani Primary School	36	7	43
27 Apr 18	29 Apr 18	Eldorado Secondary School	24	3	27
06 Jul 18	08 Jul 18	Karundu Primary School	23	3	26
20 Jul 18	22 Jul 18	Ebenhaeser Primary School	19	6	25
17 Aug 18	18 Aug 18	Monica Geingos Junior Secondary School	20	3	23
28 Aug 18	29 Aug 18	Iilyateko Combined School	20	4	24
02 Nov 18	04 Nov 18	Kayak Trust	30	4	34
27 Nov 18	28 Nov 18	Grootberg Primary School	17	4	21
Total Namibian Overnight School Groups:			209	38	247

Namibian Day Visit School Groups					
Date	School	Students	Adults	Total	
25 Jan 18	Acacia High School	12	3	15	
20 Apr 18	Shining Stars Pre-Primary School	31	4	35	
3 May 18	Emma Hoogenhout Primary School	40	9	49	
14 May 18	*Otjiwarongo Secondary School	10	0	10	
05 May 18	Rundu Senior Primary School	70	6	76	
07 May 18	K.W. Von Marees Combined School	15	4	19	
21 June 18	Rocky Crest High School	16	4	20	
10 Aug 18	Primrose Kindergarten & DCC	120	13	133	
14 Aug 18	Mount View High School	50	5	55	
17 Aug 18	Emono Combined School	14	6	21	
18 Aug 18	Dr Alpo Mbamba Junior Secondary School	120	8	128	
18 Aug 18	Erongosig Primary School	34	5	39	
19 Aug 18	Ndama Combined School	63	9	72	
19 Aug 18	C. Ngatjizeko Primary School	69	9	78	
20 Aug 18	Maarti Arhisaari Primary School	70	7	77	
21 Aug 18	Rudolf Ngondo Primary School	130	8	138	
22 Aug 18	Dr Romanus Kampungu SSS	52	5	57	
22 Aug 18	Otjomuise Primary School	40	5	45	
24 Aug 18	De Duine Secondary School	20	5	25	

28 Aug 18	*Paresis Secondary School	18	0	18
28 Aug 18	Tov House for OVC	17	5	22
30 Aug 18	Andreas Haingura Primary School	75	13	88
30 Aug 18	Ondao Mobile School	58	7	65
03 Sept 18	Torgot Primary School	55	10	65
8 Sept 18	Motsomi Primary School	51	11	62
19 Sept 18	Deutsche Schule Otjiwarongo	18	3	21
03 Nov 18	Queen Sofia Primary School	40	6	46
24 Nov 18	Omuhatutua Primary School	0	20	20
24 Nov 18	Omugwelume Education Circuit	0	20	20
04 Dec 18	Montessori Pre-School	30	5	35
Total Day Visit:		1,338	215	1,553
Total Namibian School Groups:		1,547	253	1,800

3. Ambassador Animals

The Education Department continued to work with some of the kraal animals to serve as Ambassadors for the different school groups that came in. Karibib (a female breeding dog) continued her role as Livestock Guarding Dog Programme ambassador. By allowing the children to meet Karibib and the other animals, the children can have a hands-on experience, touch a dog, and a livestock animal, which in many rural areas are not well taken care of or in which many children are not always taught to take good care of. Interactive experiences have always left a big impact on children, and the three Ambassador animals work together well to represent the farming and livestock management programme as they are comfortable with small children and big groups.

4. Camp Lightfoot

Camp Lightfoot maintenance was a primary focus of the first half of the year. Under the direction of CCF Educator, Ignatius Davids, several of the doors were replaced, all the ceilings were scraped and re-painted, the water tank was cleaned out, a frame for the fire pit was put up and some trees were removed to allow for a clearer walking path. In addition to this, upkeep also included the general cleanliness of the huts and the conditions of surrounding areas, which Ignatius will follow-up on.

Electricity supply at the camp is working at its best after two powerful batteries were bought and installed.

5. Higher Education and In-Service Training

CCF is committed to empowering Namibians to take over the conservation and protection of their wildlife. Toward this goal, for many years CCF has fostered Namibian college students' interest in wildlife conservation. CCF offers in-service training programmes for students from the Namibia University of Science and Technology (NUST), Vocational Training Centres (VTC) and the University Of Namibia (UNAM). The students conduct research projects, with the goal of completing a research paper at the conclusion of their internships. Several former interns have gone on to work at conservation organisations or with MET.

Two Bachelor's students from the NUST conducted and completed their projects at CCF, and three international Master's students collected data at CCF for their projects. One Master's student is currently working on her thesis with data provided by CCF.

In addition to the in-service training students, CCF welcomes groups from Namibia's higher-education institutions to participate in programmes aimed at enriching their skills in various study areas. From January to December 2018, CCF hosted four groups at Camp Light Foot, and two groups visited for a day. A total of 133 Namibian university students accompanied by 25 lecturers participated in various aspects of CCF's work in the areas of Wildlife Management, Environmental Management, and Tourism (Table 41).

Table 41: Namibian higher-education groups visiting CCF in 2018.

Date		Namibian Day Visit Higher Education Groups	Students	Adults	Total	
17 Mar 18		UNAM – Ongongo Campus	13	15	28	
23 Aug 18		UNAM – Ongongo Campus	53	3	56	
Total Namibian Day Visit Higher Education Groups:			66	18	84	
Date In		Date Out	School	Students	Adults	Total
26 Feb 18		02 Mar 18	NUST – SASSCAL	4	0	4
05 Jul 18		06 Jul 18	UST	23	2	25
09 Sept 18		15 Sept 18	UNAM – Katima Mulilo Campus	14	1	15
12 Oct 18		13 Oct 18	NUST	26	4	30
Total Namibian Overnight Higher Education Groups:			67	7	74	
Total Namibian Higher Education Groups:			133	25	158	

B. Other Collaboration with Educational Institutions

During this reporting period, CCF Centre hosted 17 international groups (239 students and 74 teachers/accompanying persons) from international schools and universities participating in educational programmes, including lectures on HWC, cheetah runs, and tours of CCF's Centre. Thirteen of these groups stayed at Camp Lightfoot (Table 42).

Table 42: International groups attending educational programmes at CCF January to December 2018.

Date In	Date Out	International Overnight School Groups	Students	Adults	Total
31 Mar 18	13 Mar 18	Wakefield University (UK)	6	3	9
30 Mar 18	02 Apr 18	Peace Corps (USA)	0	30	30
21 May 18	23 May 18	Grand Valley State University (USA)	13	1	14
10 Jun 18	16 Jun 18	Earth Expedition (USA)	20	2	22
22 Jun 18	23 Jun 18	World Challenge (UK)	16	3	19
24 Jun 18	27 Jun 18	Murdoch University – Veterinary School (Australia)	11	2	13
25 Jun 18	27 Jun 18	Venture Force (UK)	19	2	21
09 Jul 18	17 Jul 18	Earth Expedition (USA)	20	2	22
13 Jul 18	16 Jul 18	National Geography Students Expedition (Various)	18	3	21
13 Aug 18	14 Aug 18	Stanford University (USA)	14	5	5

30 Aug 18	02 Sep 18	TIKA (Turkey)	16	0	16
24 Sep 18	27 Sep 18	The Traveling School (USA)	14	6	20
18 Oct 18	20 Oct 18	Dartmouth College (USA)	16	2	18
Total International Overnight Education Groups:			183	61	241

Date	International Day-Visit Higher Education Groups	Students	Adults	Total
02 April 18	Worcester Polytechnic Institute (USA)	24	2	4
10 May 18	Peace Corps	0	4	4
25 Jun 18	St Margaret's School for Girls (Scotland)	16	4	20
26 Jun 18	Mearns Castle (UK)	16	3	19
Total International Day Visit Education Groups:		56	13	69
Total International Education Groups:		239	74	313

C. Working Guests and International Interns

Working Guests are the backbone of CCF and vital in daily operations. During 2018, CCF hosted 31 working guests (3 returns) from the USA, Canada, Germany, United Kingdom, the Netherlands, France, Australia, and Switzerland. Working Guests play an extremely important role with CCF's student interns, as they bring experience and skills with them and through daily interactions help to share and develop skills in our students. Integrating the Working Guests with student interns allows for sharing of knowledge, life experiences, cultures, and traditions.

In addition to 16 Namibian student interns, CCF welcomed 43 international student interns from the USA, England, France and Australia. The interns were trained in veterinary medicine, zoology, ecology, wildlife science, animal science, environmental studies, international development, and genetics. In addition, there were three MSc students; Hannah Claydon who did her research on surveys with the Bushblok staff, and Isabella McConnell and Aisha Aslam who worked on different projects with the LSGD.

VI. Structural Activities

A. Namibian Facility Developments

1. Existing Structural Projects and New Projects

Mid-year 2018 saw continued investment in the CCF Namibia infrastructure. Improvements include:

- Continued upgrade of the security camera system and Wi-Fi network.
- Installation of road-signs on rock caissons continued throughout the main campus and in the reserve.
- Silos and a chain-conveyor were installed at the Biomass Technology Demonstration Centre.
- An additional 24 batteries were added to the electricity storage system.
- A trenching attachment was received for the skid steer.
- A 9-hectare enclosure and management cages was constructed at the Leopard Pen complex for cheetah or African wild dogs.
- On-going staff training included discussions of general worker safety and chemical use.
- Road and fence maintenance continued throughout the farms.

2. Automotive

Vehicles and tyre repair continue to be an expensive and time-consuming problem at CCF. Table 43 lists CCF's vehicles and their condition at the end of December 2018.

Table 43: CCF's vehicle fleet and each vehicle's status at end of December 2018.

<i>Vehicle</i>	<i>Status</i>
<i>Nissan4x4(3307)</i>	<i>Running</i>
<i>Nissan4x4(4349)</i>	<i>Running</i>
<i>Old Toyota4x4(dogs)</i>	<i>Running</i>
<i>Toyota4x4(feeding)</i>	<i>Running</i>
<i>Quantum Old(2131)</i>	<i>Running</i>
<i>Quantum Nexco(3878)</i>	<i>Running</i>
<i>Old Land Rover, goats</i>	<i>Broken</i>
<i>Green safari cruiser</i>	<i>Broken</i>
<i>GWM</i>	<i>Running</i>
<i>Old land cruiser</i>	<i>Broken</i>

<i>Toyota 4x4 Farm</i>	<i>Running</i>
<i>New Nissan N59470T</i>	<i>Running</i>
<i>New Nissan N44560T</i>	<i>Running</i>
<i>New Nissan N70250T</i>	<i>Running</i>
<i>New Nissan N70320T</i>	<i>Running</i>
<i>Pajero Bruce N11980T</i>	<i>Broken</i>
<i>Toyota Laurie</i>	<i>Running</i>
<i>1997 Tracking Toyota</i>	<i>Running</i>
<i>1987 Toyota ecology</i>	<i>Running</i>
<i>1987 Toyota</i>	<i>Running</i>
<i>Big trekker</i>	<i>Running</i>
<i>Small trekker</i>	<i>Running</i>
<i>Ford game view</i>	<i>Running</i>
<i>Camo bakkie</i>	<i>Running</i>
<i>Bynadaar trekker</i>	<i>Running</i>
<i>New Cruiser, Game view</i>	<i>Running</i>
<i>Camo Land Drover</i>	<i>Running</i>

B. Staffing

1. CCF Namibia Staff

As of 31 December 2018, CCF Namibia employs 44 technical staff as follows. Additionally, CCF employs five cooks, 39 farmhands and domestic workers, and 30 Bushblok project workers.

- Laurie Marker, DPhil – Founder and CEO
- Lora Allen – Cheetah Keeper
- Anne-Marie Bekker – Business Manager
- Vincent Belwoar – Facility Engineer
- Bruce Brewer, PhD - General Manager
- Willem Briers-Louw - Ecologist
- Johan Britz – Farms Manager
- Tanya Britz - CCF Bush Accountant
- Denise Crause – Graphic Artist
- Ignatius Davids – Education and Tourism Officer
- Quentin DeJager – Dog Trainer

- Karin Falk – CCF Accountant
- Josephine Gabriel – Tourism and Education Assistant
- Robin Gieling, DVM – Veterinarian
- Tim Hofmann – Dog Handler
- Job Iyambo – Tour Guide & Cook
- Bianca Jacobs – Tourism Manager
- Ruan Jacobs – Tourism Assistant
- Becky Johnston – Studbook Keeper and Cheetah keeper
- Kristophine Keendjele – Gift Shop Supervisor
- Himee Kuhango – Tour Guide & Tourism Assistant
- Nadja le Roux - Community Relations and Education Manager
- Matti Nghikembua – Forest Steward & Chief Ecologist
- Gebhardt Nikanor – Education and Tourism Officer
- Lauren Pfeiffer– Personal Assistant to the Director
- Nina Sausgruber , PhD – Genetics Lab Manager
- Anne Schmidt-Küntzel, DVM, PhD - Research Geneticist & Asst. Director for Animal Health and Research
- Paige Seitz – Livestock Guarding Dog Manager
- Tryves Shivolo – Tour Guide
- Julia Zumbroich – Genetics Lab Technician
- Bessie Simon – Assistant Farm Manager
- Max Simon – Mechanic
- Heike Stackmann - Volunteer Co-ordinator and Public Relations Officer
- Tyapa Toivo – Small Stock Supervisor
- Carolina Torres - Ecologist
- Hanlie Visser – Hospitality Manager
- Paul Visser – Estate Manager
- Eli Walker – Curator
- Annetjie Siyaya – Research and Education Manager

- Elizabeth Pius – Research and Education Technician
- Stella Emvula – Community Programs Assistant
- Monika Nanghama – Assistant Geneticist
- Dolly – Tourism Assistant
- Beulah Kanguuehi – Tourism Assistant

2. CCF USA Staff

- Justin Birkoff – Donor Relations Coordinator
- Brian Badger – Director of Conservation and Outreach
- Beth Fellenstein - Director of Operations and Finance
- Susan Kaufmann - Constituent Relationship Manager
- Paula Martin – Executive and Development Assistant
- Jj Muehlhausen – Development Manager (Grants and Designated Giving)
- Heather Ravenscroft - Chapter Coordinator
- Dionne Stein – Development Manager (Events and Special Projects)

VII. Organisational activities

A. Fundraising

1. Namibia

Board of Governance

CCF Namibia underwent its annual financial audit in April 2018 by the Namibian auditing firm of Grant Thornton and Neuhaus. CCF Namibia, a section 21 registered not-for-profit, held its Annual General Meeting on 18 June 2018. A regular Board meeting followed immediately.

Fundraising

Annual Gala Dinner

The annual Gala Dinner was again a success with about 230 people in attendance. The Gala event, which is now much-anticipated by Namibian conservation circles, is a celebration of the cheetah and highlights the efforts CCF has made to ensure the survival of the cheetah in the wild for future generations. The evening included a candlelight dinner, conservation awards, bringing together guests from the business, conservation, agriculture and government sectors in Namibia and internationally. The silent auction once again was a huge success with over 100 items donated by local and international businesses, which included artwork, jewellery, Namibian craftwork and tourism 'get-aways' at exclusive Namibian and international tourist venues, including stays at the NamibRand Reserve, the Swakopmund Hotel, and CCF's exclusive Babson House to name a few.

Dr Laurie Marker presented the State of the Cheetah and emphasised the need to conserve Namibia's treasures and to foster an economic system where humans can live within the natural scope of a healthy, intact and bio-diverse landscape. The guest speaker, Dr Greg Rasmussen from Zimbabwe, spoke about the plight of the African Painted Dogs and the conservation issues similar to those faced by the cheetah.

Founding CCF Namibia Board Director Dr. Jock Orford was presented with CCF's 2018 Cheetah Conservationist of the Year award for his dedication to the Namibian environment and community conservation.

The 2018 Cheetah Conservation Fund Sponsorship Recognition Award was given to the Safari Court Hotel for their support of the Pathways conference.

The 2018 Cheetah Conservation Farmer of the Year Award was presented

The wide range of auction items, and ticket and wine sales brought in over CCF's research, conservation and education programmes.

Grants

There were no significant locally-awarded grants during the first half of 2018.

2. International

CCF USA

Board Governance

During 2018, the USA Board of Directors and Trustees had three meetings via teleconference: 23 February, 22 June and 14 December. One board meeting was held on 3 - 4 October at The Living Desert. Seven resolutions were passed during these meetings. At each board meeting there was a quarterly resolution to recognize restricted and designated funds (Resolutions 1075, 1076, 1080 and 1081). At the October Board meeting, the bylaws were amended and an investment committee was formed. Resolution 1077 was passed to adopt the amended and restated bylaws and resolution 1078 was passed to establish a charter for the investment committee. Resolution 1079 was passed to amend resolutions 1070, 1064, 1062 and 1061. This was necessary to define the committees of the board as advisory committees or committees of the board.

Elizabeth Marquart and James Dougherty were elected to the Board of Directors in 2018. Adina Savin, Drew Willison, and Kathleen LaMattina were elected to the Board of Trustees in 2018.

CCF USA underwent its annual 2017 audit with the field portion conducted on site in the Alexandria, Virginia offices on 14 - 15 May 2018. The audit was conducted by Michaud Accavallo Woodbridge & Cusano, LLC.

Operations

The office at 200 Daingerfield Rd. Suite 200, Alexandria, VA 22314 continues to be a great space for collaborative work. Situated two blocks from the King Street Metro, we continue to attract college interns. Two interns worked regularly at the office during the spring, and two volunteers have worked regularly this summer.

Staff continues to utilize the central Database System, Raisers Edge by Blackbaud. Donor wealth screening and map filtering has allowed CCF to better analyse donor potential and schedule meetings with staff and board members.

At the end of April, Reid Nelson, Donor Relations Assistant, resigned from his position. This position has not been filled. In June of 2018, Angelina Mertens resigned as part time

Donor Relations

Coordinator in Northern California. Justin Birkoff has been hired as a full time donor relations coordinator for the west coast. All other staff has been retained.

Six areas of focus were defined for the year: Moves Management, Founder's Circle, Designated Giving, Recurring Gifts, Communications, and Event/Special Projects. Additionally, goals were developed around previous areas of success.

Campaigns

The CCF's Annual Fund Campaign includes four direct mail appeals: the Spring Appeal, the Chewbaaka Memorial Challenge, the Fall Appeal, and the Year-End Challenge. Each direct mail appeal includes several mailing components to targeted audiences during the time period of the appeal and supported with e-mail solicitations. In addition to these major campaigns, several smaller, independent e-blast efforts are incorporated throughout the year, as well as two printed newsletters,

two electronic newsletters, and two electronic 'Notes from the Field'.

Appeals

Email Campaign Series: A total of 241 targeted emails were sent between 1 January 2018 and 31 December 2018 to 1,261,383 subscribers. The entire email campaign raised

Spring Appeal: An initial mailing to 10,626 USA subscribers was sent on 21 March 2018 that included high, medium, low and non-donors.

Chewbaaka Wild Cheetah Challenge: An initial mailing to 13,605 subscribers was sent on 1 July 2018 and a second effort was sent on 10 August 2018, both included high, medium and low donors.

Fall Appeal: An initial mailing to 13,471 subscribers was sent on 5 October 2018 to high, medium and low donors.

Year End Challenge: An initial mailing to 14,097 subscribers was sent on 14 November 2018 and a second effort was sent on 12 December 2018, both included high, medium and low donors.

Year-End Donation Mailing: A comparison of donors that gave during year-end 2017 and 2018 is included in Table 44.

Cheetah Sponsorships

Bi-annual updates on 32 of CCF's resident cheetahs as well as CCF's releasable cheetahs and Livestock Guard Dogs were scheduled and sent out in early July. Many of our appeals and Facebook posts promote cheetah sponsorships. Any revenue received during 1 July to 31 August was matched due to the Chewbaaka Wild Cheetah Challenge.

Newsletters and e-Blasts

Two 'Cheetah Strides' newsletters were mailed in 2018. Issue no. 15 was mailed on 1 March 2018 to 11,466 people in the USA. Issue no. 16 was mailed on 14 September 2018 to 11,903 people in the USA.

Dr Laurie Marker's 'Notes from the Field'

Alternatively, with 'Cheetah Strides', CCF sent out six 'Notes from the Field' e-letters worldwide. The first e-letter was sent on 5 February 2018 to 30,746 people; the second e-letter was sent on 5 April 2018 to 30,796 subscribers; the third e-letter was sent on 6 June 2018 to 30,910 subscribers;

the fourth e-letter was sent on 5 August 2018 to 18,703 subscribers; the fifth e-letter was sent on 5 October 2018 to 17,917 subscribers and the sixth e-letter was sent on 4 December 2018 to 22,085 subscribers. The number of subscribers in the mailing lists has fallen due to the new General Data Protection Regulation (GDPR) rules for the European Union (EU) that requires consent given from the constituent that are in the database that allows CCF permission to send communications to them.

Chapter Events

Supplementing Dr Marker's visits to the US, regional chapters have been encouraged to support events. This includes events and speaking tours under Brian Badger. These are events that support CCF in communities. In 2018 some of these events were supported with 2 targeted e-blasts sent to 1,874 people and have also been posted to Facebook.

Ninety-two targeted e-blasts were sent out to invite partners to events with Dr. Marker during her USA Spring Tour and USA Fall Tour that were sent to 165,163 subscribers.

Thirty-two targeted e-blasts were sent out for miscellaneous informational topics that were sent to 408,928 subscribers.

Management of Constituent Information

CCF continues to track more information on each constituent record in our donor database system, Raiser's Edge. All email blasts, mailing campaigns, and phone calling campaigns are tracked through Raiser's Edge. Each individual record shows the communications sent and the responses received from that constituent. All web donations, events registration and Email marketing are processed and managed now through Blackbaud's Online Express (OEX) that fully integrates with the Raiser's Edge. The creation of our online auctions remains hosted through Bidding for Good.

Grants and Proposals

CCF has expanded the focus on grants and strategic ask to increase designated giving and support the vital programmes that CCF manages. This year, CCF partnered with Colorado State University to host the 2018 Pathways Africa Conference where they hosted more than 200 participants from 28 countries for training. Participants returned home equipped with new techniques and strategies to mitigate human/wildlife conflict.

During 2018, The Ohrstrom Foundation provided support to continue the Future Farmers of Africa and Future Conservationists of Africa education programs throughout the Greater Waterberg Landscape to provide agriculture training programmes to farmers and conservation education courses to school students and educators. More knowledge accounts for better results.

The Ad Astra Foundation and Kirkpatrick Foundation partnered together this year to fund an international information exchange. Dr. Terry Gipson from the University of Langston in Oklahoma City traveled to Namibia where he and CCF Small Livestock Manager, Toivo Tyapa presented dairy goat production training to area farmers. Mr. Tyapa then traveled to Oklahoma where he worked with Dr. Gipson to learn more about artificial insemination for goats so that he can teach new techniques to farmers in Namibia.

The Foundation Human Rabies Eradication Education (FHREE) is a new supporter for CCF's holistic approach to saving cheetahs. In 2018, they provided funding to start a rabies prevention awareness

campaign and are providing continued support for One Health mobile clinic project that will begin in 2019.

Fundraising Tour with Dr Laurie Marker

Dr. Marker's North American tour for spring 2018 was seven weeks in duration as she travelled to 12 states and 27 cities to fundraise for the endangered cheetah. The spring tour began 10 March in New York City and lasted until 25 April in Northern California. Dr. Marker participated in over 26 events to fundraise for the plight of the cheetah. She also had the pleasure of selling her first scientific cheetah book, *Cheetahs: Biology and Conservation - Biodiversity of the world*.

Below is a highlighted summary of the USA spring tour 2018 found on Table 47 with a list of cheetah fundraisers, lectures, conferences, zoo visits, and special events supported by the CCF USA Chapters and CCF Board members.

Table 48: 2018 Spring Tour events, attendance and revenue

CCF Event	Host	Attendance	Date
CCF Denver Dinner	Carol McTavish	75	13-Mar-18
Cheetah Night at Hallam Lake – Aspen	Aspen ACES	100	14-Mar-18
CCF New Jersey	Taufield Family	22	11-Mar-18
Cheetah Party San Francisco	CCF Chair Susan Janin	65	17-Mar-18
Venus De Fido Cheetah event in Palm Springs	CCF Director Marisa Katnic and Jordan Sack	65	21-Mar-18
Earth X Patron Party Dallas, TX	EJF Philanthropies	125	22-Mar-18
CCF St. Louis Zoo Brown Bag lecture	St. Louis Zoo	75	26-Mar-18
Seven Gables Inn-CCF St. Louis fundraiser	Kathy Snowden & Paul Zemitzsch	55	26-Mar-18
Seabrook Island Nat. History Group lecture South Carolina	Norman Powers & SINHG	85	27-Mar-18
Hidden Hollow Farm fundraiser, Warrenton, VA	CCF Chapter	75	29-Mar-18
CCF Whale Watching and fundraiser, Monterey, CA	Dr. Nancy Black & CCF Chapter	75	31-Mar-18
CCF Private Dinner- San Francisco, CA	CCF Trustee Manjul Dixit	20	3-Apr-18
San Francisco Ladies Club Luncheon	CCF Trustee Patricia Klitgaard	12	4-Apr-18
Happy Hollow Zoo Lecture	Happy Hollow Zoo	75	6-Apr-18
Brentwood Meetah Cheetah fundraiser~ Los Angeles, CA	Donna Mills & CCF Director Sara Nichols	125	8-Apr-18
Sundowner Buffet in Los Angeles	CCF Trustee Adina Savin	22	9-Apr-18
Tom Ham's Lighthouse dinner & fundraiser	Chris & Emily Liebenberg	24	12-Apr-18
Seattle Dinner	CCF Chapter	12	14-Apr-18

Seattle Structure Cellar Winery fundraiser	Gary Rygmyr	50	15-Apr-18
Oregon Zoo Brown Bag lecture	Oregon Zoo	45	17-Apr-18
Sentential Portland CCF Chapter gathering	CCF Oregon Chapter	35	17-Apr-18
WCN Expo Northern California	WCN	50	21-Apr-18
Earth X Earth Day Lecture	Earth X	500	21-Apr-18
Help a Cheetah - Stoval/Steele party	Hanna Steele & Goldbys	50	25-Apr-18
General	CCF Donors	3	1-May-18
Explorers Club Dinner	NYC Explorers Club	1	10-Mar-18
Grand Total	26	1,841	

Dr. Marker's North American tour for fall 2018 was six weeks in duration as she travelled to 12 states and 25 cities to fundraise for the endangered cheetah. The fall tour began 23 September in Seattle and lasted until 31 October in Northern California. Dr. Marker participated in over 24 events to fundraise for the plight of the cheetah. She also had the pleasure of selling her first scientific cheetah book, *Cheetahs: Biology and Conservation - Biodiversity* of the world as well as her newest cheetah book called *Cheetahs: A Celebration of Speed and Elegance*.

Below is a highlighted summary of the USA fall tour 2018 found on Table 44 with a list of cheetah fundraisers, lectures, conferences, zoo visits, and special events supported by the CCF USA Chapters and CCF Board members.

In summary for 2018, Dr. Marker travelled to 24 states and 52 cities over a total of 13 weeks collectively for the spring and fall fundraising tours. The mission of CCF was delivered to over 3,617 interested cheetah supporters and participants throughout the tours of 2018.

Table 44: 2018 Fall Tour events, attendance and revenue

CCF Event	Host	Attendanc	Date
Association Zoo & Aquariums CCF Booth	Seattle Zoo	250	
CCF Meet the Authors at AZA	CCF at Structure Cellar Winery Seattle	55	24-Sep-18
Explorers Club PBS Premier-Born to Explore	CCF & Explorers Club	110	27-Sep-18
Big Cat Big Party in Portland	CCF Oregon Chapter in Portland	125	
CCF Annual Board meeting in Palm Desert	CCF and Living Desert Zoo	35	4-Oct-18
Meetah a Cheetah at the Living Desert Zoo	CCF SO CA Chapter & Living Desert	75	4-Oct-18
CCF Santa Barbara Brown Bag Talk	Santa Barbara Zoo	25	8-Oct-18
CCF Santa Barbara Harbor Dutch Dinner	CCF	22	8-Oct-18
Thacher School Lecture in Ojai, CA	Thacher School	45	9-Oct-18
Safari West lecture in Santa Rosa, CA			
WCN Expo in San Francisco – lecture & CCF booth	WCN Expo	150	13-Oct-18
CCF Private Dinner-Woodside, CA	CCF NO CA and Ann Olstad	50	14-Oct-18
CCF Private Dinner – Los Altos, CA	CCF Trustee Manjul Dixit	12	16-Oct-18
Meetah Cheetah Fundraiser-Columbus Zoo	Columbus Zoo	225	18-Oct-18
Meetah Cheetah Fundraiser at OKC Zoo	CCF Trustee Vicki Gourley & OKC Zoo	85	19-Oct-18
CCF Cheetah Party in Dallas, TX	Trammell Crow	75	24-Oct-18
Cheetah Week at the Dallas Zoo & Lecture at University of Dallas	Dallas Zoo	100	25-Oct-18
Meetah a Cheetah at the Conrad, Indianapolis	CCF Chapter Anne Burke	45	26-Oct-18
Cheetah Showcase at the Wakefield School, VA	CCF & Wakefield School	45	28-Oct-18
Private party at Locust Hill with a cheetah.	CCF & Magdalen Bryant & Crane Family	40	28-Oct-18
DC Gala- Meetah Cheetah at the Hyatt Regency, Crystal City	CCF DC Chapter	150	29-Oct-18
Special Tour Donation	EJF Philanthropies	2	Oct-18
CCF General Tour Donations	CCF	25	31-Oct-18
Grand Total	23	1,816	

USA CCF Chapter Support 2018

CCF Chapters from New York, Denver, and the Southern California and Northern California areas participated in cultivation and fundraising events outside of the CCF USA spring. Below is a list of the extra efforts made on behalf of the CCF USA Chapters for 2018.

CCF New York Chapter 2018

- On 24 June - Great Hollow Preserve, Fairfield, CT – Lecture was given to the public about CCF. Ten people were in attendance.
- 5 October - Duchess Day School, Millbrook, NY – The Chapter gave a presentation about CCF to private school student K-12 to about 80 students plus faculty.
- 12 October - Vassar Temple, Poughkeepsie, NY – CCF gave a presentation about CCF to the temple attendees. Twenty-five people attended.
- 10 November - Meet an ambassador cheetah, Westport, CT - Held a fundraising with a nice VIP party at Bub's home with the ambassador cheetah from Columbus Zoo. This was followed by a general admission at Earthplace. Richard Wiese and Brian Badger were present - New people in the audience - 27 attending.
- 11 November - Meet an ambassador cheetah, Poughkeepsie, NY - fundraising - VIP and general admission at Locust Grove with Brian Badger and the cheetah from Columbus Zoo – 66 people attended.
- 25 November - HVArtMarket, Poughkeepsie, NY - Art and craft fair – CCF was present with a booth and beer tasting - 2,400 people attended.

CCF Denver Chapter 2018

- 2 July - The Katie Adamson Fund, Katie's Night Event- Dionne Stein, speaker for Cheetah Conservation Fund and Tristin Smith (15 years old) sang her song on behalf of CCF called "Hope." Arts & Crafts merchandise and more than 350 people were in attendance.
- 29 August - Wildlife Protection Solutions - #zeroextinction Event- Denver Group Gathering. Meet new volunteers, The Running Wild team and many who are excited about CCF's great work. More than 100 were in attendance.
- 7 - 9 September - World Premier, Eye of Survival - A Conservation play that highlighted CCF Arts & Crafts, Education, with over 300 in attendance.
- 4 - 8 October - The National Rocky Mountain AAZK Conference - Hilton Denver City Center. Zookeepers from around the world showed interest in CCF talks for their zoo's. Many new volunteer inquiries. Amanda Westerlund CCF Alumni presented "My Time at the Cheetah Conservation Fund". Eight CCF volunteers with the Denver Chapter supported the Arts & Crafts merchandise table. A great educational event with over 350 daily exposures.
- 28 December 2018 - Mountain Key Retail - The Colorado Chapter ended the year with a new Arts & Crafts retail location in a rural farming community at Mountain Key Pharmacy in Florissant Colorado, 20,000 exposures projected annually with 15,000 travellers who pass through daily. This will welcome many new friends to CCF with the CCF Arts & Crafts programme.

CCF Northern California Chapter 2018

- 14 July - Champagne and Cheetahs Celebration - San Francisco, CA. Hosted by CCF Board Chair, Susan Janin, 10 volunteers, one staff member and 73 guests – Suzi Eszterhas presented.
- 11 August - Oakland Zoo's Lion Appreciation Day. Three volunteers and one staff member were at the CCF Education table.
- 18 September - Chapter Dinner with Laurie hosted by Manjul and Nisha Dixit - dinner and drinks for the Northern California chapter before the kick off the fall tour - 18 dinner guests were in attendance.
- 26 November - Google Gives Week – Steve Pucci and a staff member hosted an education table. Through Google Gives week (11 donors) and Steve Pucci and Cathy Del Masso's match..
- 2 December- Art of Saving the Cheetah, Santa Cruz, CA – Chapter Event planned and hosted by Marcia Sivek and Josanne Virene generated personalized cheetah paintings for all 30 participants.

CCF Southern California Chapter 2018

- 7 September - Safari Night at The Living Desert Zoo & Gardens. CCF partnered with Action for Cheetahs with a display booth while guests visited the zoo for an evening of entertainment.
- 4 December - Celebrating International Cheetah Day at California Pizza Kitchen's in both Fashion Valley and on El Paseo a percentage of a patron's lunch or dinner benefitted CCF.

International Affiliates' Support 2018

CCF Australia

2018 has been a year when most members of the Board of CCF Australia have taken a back seat to non-CCF commitments in work and private life. In 2018 two more enthusiastic volunteers joined the team. During this reporting period a total of eleven cubs were born to two mothers - one a King Cheetah - across two open range zoos (Dubbo and Monarto). This has kept us all very excited and was a major topic of CCF Australia's newsletter.

Communications with CCF Headquarters in Namibia have improved since Dr. Marker's new personal assistant, Lauren Pfeiffer, joined CCF in February. Lauren comes from South Australia and is well known to Monarto Zoo staff. She has been a regular fixture at our monthly teleconferences, and her contribution has been invaluable.

Small donations have continued to come in steadily, but activities have suffered due to Board members low level of availability. However, ZOOSSA has again been CCF Australia's major contributor.

For 2019, CCF Australia hopes to come up with new ideas to generate more activities and interest in the plight of the wild cheetah.

Events

April 2018: Teresia Robitschko, Dr. Marker's former personal assistant, visited Sydney in April, and presented a very popular talk to students from Queenswood high school. Our strong partnership with ZOOSSA benefits both organisations, and CCF Australia has benefited greatly from their financial support.

CCF Canada

Events

- In financial terms, Cheetah Conservation Fund Canada had our best year since its Board was established by in 2013. CCF Canada supported the four programmes to which Canada has committed (Cheetah Care, Livestock Guarding Dogs, Future Farmers of Africa and Education of Young Learners).
- In addition, Cheetah Conservation Fund Canada's fundraising efforts included contribution from two major donors in Vancouver, Canada, sufficient to fully fund the construction of one of CCF Namibia's newstudent dorms.
- In 2018, Cheetah Conservation Fund Canada was able to gain a funding toehold with five family foundations andthree corporate foundations.
- Cheetah Conservation Fund Canada has partnered with a number of supporters this past year, hosting awareness and fundraising events on key days for biodiversity, including International Cheetah Day as well as a photography and wildlife tour, led by Canadian Vanessa Dewson, which included three days at CCF Namibia.
- Cheetah Conservation Fund Canada had a small increase in the number of donors, and a growing number of monthly donors. CCF Canada has strengthened the level of financial commitment from many of these donors. The value of positive experience by CCF Canada's supporters with CCF and word-of-mouth endorsements have been key in broadening our reach in Canada. Social media has enabled CCF Canada to share stories, engage people and provide information to bridge knowledge gaps about cheetah, people and the ecosystems they share.

CCF UK

Areas of focus for 2018

- Hiring and developing Head of Fundraising
- Increasing awareness of CCF UK through website, media, social media and events
- Raising funds.

Head of Fundraising

CCF UK's goal is to be a sustainable organisation: to raise sufficient funds to cover staff expenses, send increasing funds to Namibia and reduce reliance on volunteers. Part of this strategy was to hire a Head of Fundraising, Faith Griffiths, who started in mid-February. Faith has produced fundraising materials for global use (signed off) and programme templates. She is establishing a promising pipeline for corporate brand partnerships and major donors and building an IG programme for 2019.

Increasing awareness

- Website - Visits were between 500-700/month, a drop compared to last year. This was due to a spike in May 2017 which significantly increased totals for that year.
- PR - Front page splash in BBC Wildlife Magazine, (circulation 32,000), and 'A Day in the Life of a Cheetah Conservationist' first person piece in Stylist magazine, featuring Dr. Laurie Marker, with online circulation of 1 million unique monthly visitors. Major interview and photoshoot with Laurie will be appearing in the Telegraph Magazine (circ. 500,000) 1Q 2019 as well as a BBC2 Documentary in 2Q 2019: Big Cat Surgeries featuring CCF.
- Social Media - Increased Facebook output, including testing Facebook Ads with specially developed video content, as well as weekly SM schedule. Followers grew 64% from 1,221 to 2,000 in 2018. We also continued to develop our 'Cheetah Champion' and 'Young Ambassador' blogs, which created engagement on social media, improved our SEO and drew visitors to our site. Twitter: CCF UK and CCF Global is managed by Tony Cadman, CCF UK Volunteer. Followers increased 20% to 825 in the UK and now 18,700 followers globally. Instagram increased 154% from 183 to 446.
We are working with the Digital, Marketing and PR Department, Southampton University to build our digital presence in 2019.
- Database - Subscriber database is 3,180. There were 5 campaigns in 2018: March (Cheetah Tails newsletter), April (Big Cat Festival invite), May (Stay in touch GDPR activity), September (cheetah cub appeal and Illegal Wildlife Trafficking (IWT)) and December (Photograph auction). We are analyzing open rates and subscriber engagement with the plan in 2019 to better segment our existing subscriber list and send more targeted communications. We will also explore linking SM accounts to the newsletter campaigns to further drive engagement and increase reach and donations.

Meetings in conservation/wildlife

- CITES Liaison Group - Jane attended one meeting in Bristol and one by phone in preparation for the IWT Conference in October continually pressing home the need to include live trade in the conference.
- Population Sustainability Network - Jane attended a meeting with Chester Zoo and Oxford University Wildlife Research Unit with Professor David McDonald to gauge interest in collaborating on a PSN project with CCF. Not successful.
- United for Wildlife - We continue to provide content throughout the year
- Tusk Trust - Tusk Trust is one of the best-known conservation charities in the UK with Prince William, as Royal Patron. Awarded a grant in December 2018 for Future Farmers of Africa and a mobile vet clinic in the Greater Waterberg Landscape.
- ZSL and IWT Conference - Jane and Tony attended the ZSL Evidence in Action conference on 9 October. Jane and Patricia Tricorache attended the IWT London Conference 11 - 12 October – useful contacts including Panthera.
- House of Commons Committee Meeting - Somaliland Beyond Drought: Saving Wildlife and Protecting the Environment hosted by well-known advocate of environmental issues, MP Zac Goldsmith 3 December. Laurie, Patricia, Tony and Faith attended the event with the Somaliland Minister for Environment and Rural Development and other dignitaries. Resulted in stronger ties with Somaliland government, Head of Mission in the UK and the Aspinall Foundation; various meetings and events planned in 2019.

Grants

- Tusk Trust, CCG Trust, Marjorie Cootes Charitable Trust and The WalkerTrust.

Events

- CCF UK stand at Bradt Publishers Big Cat Festival at the Royal Geographical Society in May attended by conservationists, wildlife photographers, CCF Royal Patron, Princess Michael of Kent, CCF UK Patrons Jonathan and Angie Scott, and Dr Laurie Marker.
- Information Stand at Big Cat Sanctuary in July.
- CCF UK was selected as Charity of the Year for a Lifestyle group and this partnership will be launched in 2019.

UK Board and Team

- CCF UK's board met in April, July and December. Peter Jarman took over as Chair in July from Co-Chairs Jane Galton and Maggie Du Pree.
- CCF UK welcomed four new members with a mix of much needed skills (video, social media, conservation and marketing). There remains a strong core of 10 people with a floating group of another 11 volunteers.

CCF Italy

Events

- CCF Italy took a Conservation Trip from 28 October to 7 November to Namibia, including 2 days and 2 nights staying at CCF's Eco-Lodge with our CCF Italy members: Marina Mastropietro, CCF Italia Treasurer, Matilde Venturi Vice President, Betty von Hoenning O'Carroll, Raffaella Giavazzi, Marco Ciuti, doc vet Maurizio Ritorto, Monica Mazzola and William Rogora..

- CCF Italy sold mugs for Christmas from Persia.
- CCF Italy had two new junior members join: Sara Gepard from Denmark, and Arianna Bono from Turin Italy.
- CCF Italy's 2019 calendars sold out with 150 bags sold.
- CCF was featured on TV, National Channel Canale 5, on 4 December.
- GM Venice sold CCF members bags at a 20% discount.

B. PR, Marketing, and Media

1. Social Media

CCF Facebook

Currently, CCF staff manages three Facebook pages, one for CCF @ccfcheetah, one for Dr Laurie Marker @drlauriemarker and one to raise awareness about cheetah trafficking @CCFKeepCheetahsWild (see section IV.F.2). Staff also co-manages a page dedicated to CCF's stuffed purring cheetahs that is filled with fan photos and user content shared to the page.

As of 31 December, CCF's Facebook page has 249,569 followers. During this period Facebook followers peaked at 249,862 on April 9th, declining with an upward trend occurring slowly for the remainder of the year.

@CCFCheetah Facebook Post Reach Analysis

Impressions are the number of times a post from a Facebook Page is displayed, whether the post is clicked or not. People may see multiple impressions of the same post. For example, someone might see a Page update in News Feed once, and then a second time if their friend shares it.

The three posts with the highest number of impressions for this time-period were as follows:

- 9 November 2018 – *"Campaigners are calling for urgent cross- border action to halt the illegal trafficking of cheetah cubs..."* - A post about cheetah smuggling with a shared article from Mail & Guardian tagged. The post received 995 Reactions, Comments and Shares including: 419 likes, 24 loves, 10 wow, 452 sad, and 580 angry. The post reached 29,117 people with 252 Shares and was commented on 24 times.
- 4 December 2018 – *"Learn about cheetahs today on #IntlCheetahDay..."* - A large graphic of cheetah facts in vertical format. The post received 487 Reactions, Comments and Shares including: 675 likes, 206 loves, 5 haha, 7 wow, 1 sad. The post reached 22,751 people with 302 shares.
- 14 December 2018 – *"Need a gift?!"* - Sponsorship gifts for the holidays featuring Dominic - The post received 841 Reactions, Comments and Shares including: 1,373 likes, 505 loves, 1 haha, 14 wow, 13 sad and 1 angry. The post reached 19,188 people with 192 Shares and was commented on 12 times.

@CCFCheetah Facebook Donations

In 2018 CCF's application for official charity status was accepted for the @CCFCheetah Facebook page. On Giving Tuesday in 2017, 28 November 2017, Facebook announced they would no longer charge 5.75% fee associated with donations to nonprofits using their platform. The application and review process was begun. The request for approval was finalized on 9 January 2018 and @CCFCheetah was granted access to donation collections using Facebook.

CCF staff can now add donate buttons directly to posts and frame effects to raise money without the donor having to leave the platform. Supporters can quickly create their own fundraising pages to solicit support from their Facebook friends. The donated funds are processed by Network for Good, a payment processor and fundraising tool that CCF has used for several years, for donors who give through their workplace.

- During this reporting period CCF's Facebook supporters have created 164 fundraising pages.

@Chewbaaka's CheetahFriends Facebook Fan Page

CCF's purring cheetah sales initiative fan page Chewbaaka's Cheetah Friends. The initiative was developed by CCF's Southern California chapter leadership and co-managed by CCF USA staff. Updates are posted to the page showing the CCF purring cheetah and his travels. This aims to promote the purchase of purring cheetahs for participation. Facebook users can like the fan page and share photos of their own CCF purring cheetahs.

As of 31 December 2018, Chewbaaka's Cheetah Friends fan page has 836 followers.

The post with the highest number of impressions for this period was a photo shared on 25 March from The San Diego Zoo Safari Park, with the zoo tagged in the post. The post received 91 Reactions, Comments and Shares including: 65 likes and 15 loves. The post reached 1,177 people with 9 Shares and was commented on 2 times.

@DrLaurieMarker Facebook Fan Page

Dr Laurie Marker's Facebook page is primarily photos of Dr Marker with visitors and focuses on sharing the work of CCF from Dr Marker's perspective.

As of 30 December 2018, Dr Laurie Marker's Facebook page has 4,286 followers, up from 3,910 on 1 January 2018.

LinkedIn

LinkedIn is a social network focusing on professional development. CCF has two LinkedIn pages that are monitored by CCF staff: Dr Laurie Marker's personal LinkedIn account and the Cheetah Conservation Fund account.

Laurie Marker - LinkedIn

Dr Marker's personal LinkedIn account has limited analysis capabilities as it is a free account. Analytical tools require purchasing a monthly or yearly business or premium plan. As of 31 December 2018, Dr Marker has over 5,851 connections (members that are in her network).

Dr Marker is a member of 45 discussion groups. These discussion groups are useful in pursuing professional opportunities and enrichment.

Cheetah Conservation Fund - LinkedIn

Cheetah Conservation Fund's LinkedIn account has Analytics enabled. CCF staff monitors the Analytics for this account. In general, academic papers, job postings and scientific announcements perform best on this platform.

As of 31 December 2018, CCF's LinkedIn page has ~1,559 followers, up from ~1,300 in December 2017.

Twitter

@CCFCheetah is CCF's Twitter feed. CCF Twitter is volunteer managed with guidance from CCF staff. CCFCheetah currently has 18.7k followers. CCF staff shares relevant content as re-tweets from select individuals and groups of the 823 organisations and individuals followed by @CCFCheetah.

CCF's Top Tweet from this reporting period was about CCF's ambassador cheetah Solo's passing. The tweet has 32,119 impressions and 1,531 media engagements including: 157 retweets and 431 likes.

Instagram

Instagram is a social media site for photo/image sharing. Posted photos utilise hashtags to be collected into groups and searchable within the site. As of 31 December 2018, CCF's Instagram has 23k followers.

During this reporting period, the most popular post on CCF's Instagram page is a shared post from abcnews about a cheetah that jumped into the back of a tourism truck. This post has 44,103 views, 3,455 likes and 164 comments.

Pinterest

Pinterest is a social media site where users can collect online content from anywhere on the internet and curate "walls" on which they display this content. Pinterest is used by teachers to collect lesson plans from each other, and by people interested in cooking, DIY (Do it yourself) and crafting. As of 31 December 2018, CCF's Pinterest page has an average of 723 monthly viewers. This is a 310.50%

increase from the previous reporting period. CCF's pins have an average of 37 daily impressions and 24 daily viewers.

DeviantArt.com

DeviantArt.com is the platform where artists can participate in groups with other like-minded artists. The artists can submit their work to boards and participate in discussions. CCF's DeviantArt page is volunteer managed. Each month there is a contest in which users can submit entries and earn currency as spots on their very own virtual cheetah. CCF's DeviantArt page has 14 members and 4,287 page views.

Reddit

CCF's reddit account u/CheetahCF is used to share and communicate in discussion groups that focus tightly around curated submissions to appropriate groups. CCF staff shares Original Content [OC].gifs and images on pages that correspond with the subject matter. During this reporting period, CCF has posted many updates on Dominic the orphan cheetah cub. The primary board for Dominic updates is r/babybigcatgifs, which is focused on submissions of .gifs of baby big cats. The most active post during this reporting period had 2.2k upvotes. It is a post titled *Blue Towel noms* Orphan Cheetah Cub Update*. It is a repeating close-up .gif of Dominic gumming a towel.

CCF staff creates the .gifs from video files to post directly to Reddit as well as using Imgur links. CCF staff answers questions and engages with the board subscribers (r/babybigcatgifs has 111k subscribers) in the comments section of each post. CCF's engagement on this board earned CCF status as their Monthly Charity for the month of June, which pinned our information and website to the top of their feed. CCF's Reddit account has 48 followers and has received 13,883 karma, the site's way of tracking user behavior and upvotes.

CCF Blogs

Cheetah.org Blog

The CCF blog is hosted on our website. Posts on the blog are sent out every other month to supporters as an e-newsletter entitled *Notes from the Field – CCF's Electronic Newsletter* and are also shared to Facebook and Twitter. The purpose of the CCF blog is to present longer format stories from our facility in Namibia that allow us to share with our audience the recent happenings at CCF.

Website

Google Analytics for cheetah.org

CCF staff utilises Google Analytics to monitor user engagement. Google Analytics is a feature that inserts code into select web pages to gather user information.

Between 1 January and 31 December 2018, CCF's website cheetah.org received 1,190,266 page views and had 237,081 users. Almost 85% of the total sessions represent new users. Sessions are measured by observing the amount of time a user with a unique IP address spends on a web site during a specified time-period. The average session duration for site users was 2 minutes and 5 seconds.

Site Traffic – Mobile

Google analytics is monitoring and assigning higher ranking based on mobile usage and sites that are mobile-friendly; as such, sites formatted for mobile phone users receive the highest ranking. CCF's website, cheetah.org does not currently have a mobile-friendly version. Mobile users represent 29% of all visitors to cheetah.org.

Site Traffic – Search Engine Optimisation (SEO) and AdWords

Starting in January 2018, CCF staff installed Yoast, an SEO optimising plugin, to cheetah.org. This free tool allows staff to set keyword and custom descriptions when posting to the site. The SEO optimiser assists by suggesting ways to improve the searchability of posts within web search engines. CCF is searched most frequently using Google's search engine, representing most of all traffic through user keyword searches. This tool's effectiveness relies on regular posting and regular posting is rewarded by more frequent visitors through higher search-engine ranking.

CCF USA has again received a Google for Non-Profits grant and has Google AdWords enabled on its sites including cheetah.org. AdWords keywords are set to key pages within the site to promote visibility in organic searches using Google. Suggested CCF site pages appear at the top of the search results, bringing CCF to a potentially new audience.

Site Traffic – Social Media

Google Analytics provides data for site traffic via social media channels. Social media is responsible for only 4% of all referred traffic to cheetah.org representing a total of 14,036 users.

The top referring social site to cheetah.org is CCF's Facebook representing 13,048 users during this reporting period. CCF's Instagram is the second top referring social site representing 1,804 users followed very closely by Twitter with 1,419 users referred during this reporting period. Pinterest referral was 415 and Reddit was 291.

The top socially referred pages on cheetah.org are CCF's home page with 2,964 users and a blog post about Dominic the cheetah cub with 385 users.

Site Traffic – Sessions by Geography

Google Analytics provides data for sessions based on country. The United States had the highest number of sessions during this period at 163,673 sessions, the United Kingdom was second with 25,656 sessions, India was third with 12,301 sessions, Canada was fourth with 12,109 sessions Australia was fifth with 11,879 sessions. Namibia and South Africa combined came in with 14,670 sessions.

Within the United States California represented the most visits to cheetah.org during this period, with 27,338 sessions, Texas was second with 12,874 sessions, New York was third with 9,899 sessions, Florida was fourth with 7,269 sessions, and Ohio and Illinois came in close with 7,158 and 6,719 sessions respectively.

International Cheetah Day website

A number of changes have been made to Internationalcheetahday.org including a site structure shift from scrolling one page to multipage navigation, moving social media to an internal page. Users visited the page and bounce rates decreased significantly without the social media content on the homepage.

- Share with friends (new page)

- o 24 November - 4 December , 2018: 1,411
- o 24 November - 4 December , 2017: 0
- Bounce Rate Day of:
 - o 4 December 2018: 1.98%
 - o 4 December 2017: 72.83%
 - o -97.28%

The usage for ICD site remains localized around the week leading up to 4 December and the week leading away. The remainder of the year shows minimal visitation.

- Page Users Day of:
 - o 4 December 2018: 1,676
 - o 4 December 2017: 1,656
 - o +1.21%
- New Users Day of:
 - o 4 December 2018: 1,577
 - o 4 December 2017: 1,523
 - o +3.55%

2. Media

CCF issued 23 press releases between January and December 2018 to 10,686 subscribers.

3. Media Monitoring

CCF staff monitors media primarily through Google's free News Alerts service, using specific query terms relevant to CCF's activity. Media reports are received through CCF's contacts, staff, and volunteers. below shows media coverage of CCF from January to December 2018.