



2019 Annual Progress Report

Reporting Period

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By

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I. Executive Summary

This year Cheetah Conservation Fund (CCF) celebrated many accomplishments including two anniversaries: the 10th anniversary of the Life Science Conservation Genetics Laboratory, and the 25th anniversary of the Livestock Guarding Dog Programme. Both are very important milestones in the work that CCF does to ensure the survival of the cheetah for future generations. Highlights this year include:

- The purchase of a parcel of land known as Padberg, which is an additional 4,361 hectares land protected and managed by the CCF. The seasonal game counts in October included the Padberg transect for the first time.
- Completion of the Go Green project on carnivore landscape distribution and the pilot E-shepherd and Foxlight projects. Data is being analysed and will help in CCF's mission to help communities coexist with wildlife in the study area. CCF focused its efforts in the high human-wildlife conflict zone, mainly in the Okamatapati and Otjituuo GWL communal conservancies, where attitudes of communities toward predators have changed considerably, and increase in knowledge.
- An increase in the reach of the Future Conservationist of Africa (FFA) education program by more than 300%+ from 2018 to 2019. Providing information and training to students and educators in Namibia.
- A new mobile care clinic thanks to grants by FHREE, Disney and Tusk organizations helped CCF expand its awareness and education strategy, bringing rabies vaccinations, veterinary and training directly to the community in the GWL conservancies. CCF has vaccinated over 1,000 domestic animals since the mobile clinic began, to stop the spread of rabies.
- The addition of a new creamery to CCF in September, thanks to the donation and sponsorship from the Turkish Cooperation and Coordination Agency (TIKA). The creamery started producing goat milk yogurt and a new cheese, Chevrotain has been added to the various cheeses the creamery produces.
- An increase of 15.49% over 2018, 15,048 tourists hosted at CCF during this year. CCF further received a Certificate of Excellence from TripAdvisor for the seventh consecutive year.

The Life Technologies Conservation Genetics Laboratory under Dr. Anne Schmidt-Küntzel continues to be an official placement for fourth year undergraduate students from the University of Namibia (UNAM) and Namibia University of Science and Technology (NUST). The laboratory hosted two collaborators, one from the Ongava Research Centre, and another from Stanford University who sent two students to be trained in genetics laboratory work and continue a project to test the relatedness of elephants in Etosha National Park.

CCF's Genetics and Ecology Departments also co-hosted the fourth workshop for UNAM students from Katima Mulilo Campus, under the direction of Dr. E. Fabiano, one of CCF's past Ph.D. students. The CCF Scat Detection team found 105 carnivore samples on 11 farms in Namibia, and 183 in Angola through a collaboration with Dr. Fabiano and Centro de Investigação em Biodiversidade e Recursos Genéticos (CIBIO).

Two students from Namibia University of Science and Technology (NUST) completed their six months projects as part of their training and requirement to graduate with a Bachelor of Natural Resources & Nature Conservation degree, while two students from the University of Bristol, Canada completed their projects at CCF, in Global Wildlife Health and Conservation.

The Future Conservationist of Africa (FFA) programme engaged 16,785 students from 54 schools in Namibia. This achievement has contributed to CCF winning the national clean-up campaign twice consecutively, with the help of students and teachers from local schools in Otiwarongo.

As of Dec. 31, CCF has placed 651 Livestock Guarding Dogs (LGD) with farmers throughout Namibia and other parts of Africa. CCF continues to reach greater heights in its research, education, conservation, and capacity building programs both in Namibia and Somaliland.

The Ecology team continued to follow the progress of Savanna; a cheetah born to a CCF cheetah that was released in 2014. Savanna lives in the wild and has successfully raided two cubs that have now gone on and become independent. These two cubs are officially the second wild-born generation (grandsons) from a captive-raised, rehabilitated and released CCF cheetah. CCF is a very excited at this significant milestone to this small family. We will continue to watch her progress.

CCF continues to host guests, visitors, and friends. In February, the Namibian Board was hosted at the Centre with guest attendance from USA Ambassador to Namibia, Ms. Lisa Johnson, as well as the Namibian Deputy Minister of Environment and Tourism (MET), Hon, Bernadette Jagger, and the Executive Director of MET, Mr. Teoufilus Nghitila. Dr. Terry Gipson from Langston University held a second goat seminar at the Centre later during the same month.

CCF hosted a one-month training course on immobilization techniques, ecological and epidemiological survey, for Wildlife officials from the Republic of Niger in October. The seven participants learnt hands-on from CCF staff and other stakeholders, about cheetah research, education, and conservation. We hope that this knowledge will help them in their conservation efforts back in Niger.

However, the year was not without challenges, especially with the drought that many describe as the worst one in Namibia's history and the increase in cheetahs confiscated from the Illegal Wildlife Trade (IWT). Following my site visit to Somaliland in May, and a series of meetings with Somaliland government ministries and President Bihi, it was decided that CCF would handle the management of confiscated cubs in Somaliland. To provide for these cubs CCF remodelled the triage facility known as Safe House 1 (both for cheetahs and staff), then constructed Safe House 2 to allow appropriate enclosures and exercise areas for maturing cheetahs. Staff members were hired staff to better care for the growing number of confiscated cheetah cubs and oversee day to day operations.

At the same time CCF was building Safe House 2 the team was also laying foundations for education and capacity building activities to help Somaliland people to try and bring an end to the Illegal Wildlife Trade (IWT) in cheetah cubs to the Middle East. These growing developments saw the registration of CCF as a Somaliland NGO. Although we have had successes in Somaliland, we still face challenges with illegal cheetah trafficking with some cubs too weak to survive after being brought to the CCF safe house. In 2019, CCF Somaliland received 44 confiscated cheetah cubs, many died within hours after confiscation. CCF Somaliland was caring for 35 cubs at the end of 2019.

CCF's work is funded through fundraising donations, grants, and ecotourism. I hope you will join us in continuing to support the successful research, education, and conservation programs including the fight against IWT. Saving the cheetah means saving the world. Won't you join us?



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 the Nederlands. In addition, CCF has Memoranda of Understanding with partner fundraising organisations in France and Germany.

CCF's International Research and Education Centre in Namibia is the primary base for all 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 advisers 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, Bynadaar and Padberg totalling 50,361 hectares. CCF's Centre is in a 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 Okakarara District.

III. Research

During 2019, the Cheetah Conservation Fund continued working toward 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 2019, the number of CCF's resident captive cheetahs has increased to 39 individuals (22M, 17F), compared to December 2018, 33 individuals (22M, 11F).

Throughout 2019, four deaths (2M, 2F), four transfers in (4F, 0M), and seven additions (2M, 5F).

The deaths were:

- Fossey (AJU 1515), age 12 years, euthanised due to renal failure on 21 Feb. 2019.
- Romeo (AJU 1647), age 13 years, died from ruptured spleen on 13 Aug. 2019.
- Padme (AJU 1560), age 13 years, euthanised due to renal failure on 9 Sep 2019.
- Kiana (AJU 1517), age 13 years, died from acute renal failure on 2 Dec. 2019.

The transfers in, from the lodge facility Kiripotib, were:

- Kayla (AJU 1514), 13 years old, returned to CCF due to poor health on 2 Dec. 2019.
- Kiana (AJU 1517), 13 years old, returned to CCF due to poor health on 2 Dec. 2019.
- Bella (AJU 1578), 11 years old, returned to CCF due to poor health on 4 Oct. 2019.
- Padme (AJU 1560), 11 years old, returned to CCF due to poor health on 4 Oct. 2019.

The additions were:

- Ben and Adina (AJU 1898, AJU 1899), estimated age eight months old, wild caught on 22 Jan. 2019.
- Savannah (AJU 1900), estimated age 1.5 years, confiscated on 1 Feb. 2019.
- Jaya (AJU 1910), estimated age six weeks old, rescued 9 May 2019.
- Nandi (AJU 1922), estimated age 5 years old, confiscated on 6 Aug. 2019.
- Rocket (AJU 1923), estimated eight weeks old, rescued on 10 Aug. 2019.
- Gracie (AJU 1969), estimated 5 years old, wild caught on 18 Nov. 2019.

B. Medical Examinations

During 2019, CCF performed 39 medical examinations on 30 individuals (13M, 17F). Thirty-one examinations were performed under anaesthesia on 26 individuals (10M, 16F; Table 1) and eight without anaesthesia on six individuals (4M, 2F; Table 2).

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). During this reporting period, CCF performed 31 examinations under anaesthesia on 26 individuals (10M, 16F; Table 1).

TABLE 1: SUMMARY OF EXAMS PERFORMED ON WILD AND CAPTIVE CHEETAHS DURING 2019. 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	
1898	M	26 Jan 19	x	x				Wild cheetah exam
1899	F	26 Jan 19	x	x				Wild cheetah exam
1900	F	01 Feb 19		x				Entry exam
1667	F	20 Feb 19			x			Collar replacement at EPGR
1669	F	20 Feb 19			x			Collar replacement at EPGR
1670	F	20 Feb 19			x			Collar replacement at EPGR
1671	F	20 Feb 19			x			Collar replacement at EPGR
1777	F	18 Mar 19				x		Vomiting & diarrhoea, foreign body
1903	M	01 Apr 19				x		Non weight bearing lameness, paralysis of the front leg
1582	F	12 Apr 19				x		Vomiting & diarrhoea, inappetence
1648	F	01 May 19			x			Collar replacement at EPGR
1668	M	01 May 19			x			Collar replacement at EPGR
1903	M	19 May 19				x		Check-up, little improvement
1583	M	18 Jul 19				x		Gored by wild animal, needed suturing
1922	F	07 Aug 19		x				Entry exam

AJU	Date of Exam	Sex	Exam Type					Detail
			Predator	Entry	Routine	EEJ	Dental	
1776	M	08 Aug 19					x	Sterilisation
1647	M	13 Aug 19					x	Suspected GI blockage, exploratory surgery – discovered ruptured spleen, animal did not recover from anaesthesia
1771	F	23 Aug 19					x	Attempted spay, found no ovaries
1908	M	29 Aug 19		x				First Collaring in EPGR
1560	F	03 Sep 19					x	Check-up at other facility and transfer to CCF, suspected renal failure
1578	F	03 Sep 19					x	Check-up at other facility and transfer to CCF, suspected internal blockage
1578	F	04 Sep 19					x	Surgery to remove foreign body in stomach
1664	M	06 Sep 19					x	Emergency workup to treat injuries from lion attack
1582	F	14 Oct 19		x				Educational
1778	M	31 Oct 19					x	Emergency workup to treat injuries from fights with other predators
1548	M	04 Nov 19					x	Education, exploratory laparoscopy
1778	M	11 Nov 19					x	Emergency workup to treat injuries from fights with other predators
1664	M	11 Nov 19		x				Recollaring at EPGR
1969	F	18 Nov 19	x	x				Entry exam and collaring for release
1514	F	02 Dec 19					x	Check-up at other facility and transfer to CCF, suspected renal failure
1517	F	02 Dec 19					x	Check-up at other facility and transfer to CCF, suspected renal failure

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 2019, CCF performed eight examinations without anaesthesia on six (4M, 2F) individuals (Table 2).

TABLE 2: SUMMARY OF EXAMINATIONS PERFORMED WITHOUT ANAESTHESIA ON CAPTIVE CHEETAHS IN 2019. 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	
1910	F	10 May 19	X	X			Entry examination & blood collection without anaesthesia
1473	M	30 May 19			X		Blood collection
1513	M	30 May 19			X		Blood collection
1548	M	01 Jun 19			X		Blood collection
1923	M	10 Aug 19	X	X			Entry examination without anaesthesia
1922	F	19 Sep 19			X		Blood collection
1922	F	15 Oct 19			X		Blood collection
1922	F	20 Nov 19			X		Blood collection

3. Health-Related Medical Examinations: Captive Cheetahs

During this reporting period, CCF performed eight health-related medical examinations or procedures requiring anaesthesia (other than dental procedures, released cheetah examinations and wild cheetah examinations). Details of on and off-site procedures are provided hereafter in order of ascending AJU numbers.

Resident males AJU 1473 (Ron) and AJU 1513 (Livingstone) had blood drawn on 30 May 2019 as part of a routine health check, since they are all getting older and have had some health issues in the past year. All blood results came back within reference ranges so there is no indication of any disease at this time.

Resident male AJU 1548 (Ndunge) had blood drawn on 1 June 2019 as part of a routine health check, he is also getting older and has had some health issues in the past year. All blood results came back within reference ranges so there is no indication of any disease now besides the chronic gastritis. Ndunge has had chronic gastritis since he had severe dental disease last year and receives permanent medication for it.

Resident female AJU 1582 (Polly) had watery diarrhoea, vomiting and no appetite for two days and was therefore anaesthetised for a workup on 12 April 2019. No indication for a foreign body was found and she was treated for a viral infection. She received IV fluids, vitamin B, anti-nausea medication and medication for stomach protection. She improved substantially after the work up but still did not have a great appetite. The treatment was repeated in the squeeze cage on 16 April 2019 and some diazepam was added to stimulate her appetite.

Female AJU 1777 (Aisha), residing at Daktari, was brought in for a workup due to acute vomiting on 18 March 2019. After she was anaesthetised a sock was found in her faeces and removed.

On 1 February 2019 female AJU 1900 (Savannah) was confiscated by the Ministry of Environment and Tourism. She had been since captive from a very young age in a very small yard with a concrete wall for almost two years. She will therefore become a resident at CCF.

On 1 April 2019 male AJU 1903 (Diego), residing at Aloe Grove, received an examination under anaesthesia after being found with a non-weight bearing lameness of the right front leg for three days. He had abrasions on his shoulder similar to those found with (electric) fence damage and a puncture wound in the armpit, in the brachial plexus region. The wounds were cleaned and flushed with chlorhexidine and he was started on pain medication and antibiotics. Concerning was the apparent paralysis of the leg and possible damage to the nerves of the brachial plexus. On 19 May 2019, the CCF team visited him again after receiving the report that there had been no improvement and he was still dragging his leg. On arrival slight improvement was noted and the leg was definitely not paralysed anymore, he also had a new wound open on top of his shoulder and it was decided to anaesthetise him again to treat the wound and do another examination to see if any other new injuries could be found. After many weeks in a confined space to recover Diego is now out in his big enclosure again and has fully recovered.

Resident female AJU 1910 (Jaya) arrived at CCF after she was found by the side of the road trying to suckle from her dead mother. An examination without anaesthesia was done and blood was collected on 10 May 2019 for the genetics laboratory and biochemistry analysis. The orphaned cub only received medical examinations without anaesthesia and her health is continuously monitored. She will need to remain in captivity due to being orphaned at a very young age.

Resident male AJU 1583 (Phil) was gored by a wild animal inside his enclosure (suspected warthog). The wound was large and deep and therefore required a workup under anaesthesia for suturing on 18 July 2019. AJU 1583 recovered fine from this injury.

Female AJU 1922 (Nandi) was confiscated by MET from a lodge facility holding her without permit and handed over to CCF for continued care. AJU 1922 checked out fine during her entry exam on 7 August 2019.

Resident male AJU 1776 (Dominic) was castrated under anaesthesia on 8 August 2019.

Resident male AJU 1647 (Romeo) was not feeling well for a few days and CCF's vet team decided to perform a workup on 13 August 2019 to determine the cause, which was suspected to be a GI blockage. However, upon exploratory surgery the team discovered his spleen had ruptured. AJU 1647 did not recover from the anaesthesia and was euthanised shortly after the exam.

Resident female AJU 1771 (Bella 2) was scheduled for sterilisation on 23 August 2019. However, no ovaries were found, and it was determined she had already been spayed before arriving to CCF.

Females AJU 1560 and 1578 on loan to another facility in Namibia were reported to be in poor health. CCF travelled to the facility and performed workups on both females on 3 September 2019. These cheetahs were in unacceptably poor health and were confiscated from the facility.

Following confiscation from another facility, and additional workup on 4 September 2019 was performed on female AJU 1578 as there was a suspected internal blockage. Surgery was performed and a mass of grass and other material was removed from her stomach. AJU 1578 recovered fine from this procedure.

Resident female AJU 1582 was worked up on 14 October 2019 for educational purposes.

Resident male AJU 1548 was worked up on 4 November 2019 for educational purposes and for an exploratory laparoscopy procedure to check the condition of upper GI track.

Females AJU 1514 and 1517 on loan to another facility in Namibia were reported in poor health. CCF travelled to the facility and performed workups on both females on 2 December 2019, their poor health was suspected to be due to renal failure and neglect. Both females were confiscated from the facility but AJU 1517 did not survive the transport back to CCF as her condition was so poor. AJU 1514 however recovered with proper care and is doing well at CCF now.

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

No dental procedures were performed during this reporting period.

5. Released Cheetah Examinations

During 2019, CCF performed eight examinations on seven individuals (3M, 4F) released into the Erindi Private Game Reserve (EPGR).

Released females AJU 1667 (Susan), AJU 1669 (Daenerys), AJU 1670 (Georgia) and AJU 1671 (Tatjana) were darted on 20 February 2019 and had their collars replaced at Erindi Private Game Reserve (EPGR).

Released male AJU 1668 (Elwood) was darted on 1 May 2019 at EPGR for collar replacement.

Released male AJU 1664 (Kamin) was darted on 6 September 2019 in EPGR for emergency treatment after he had been attacked by lions. AJU 1664 was moved to a holding boma for recovery as his wounds were severe. AJU 1664 recovered well from this attack.

Released male AJU 1778 (Miers) was darted on 11 November 2019 in EPGR for emergency treatment after sustained serious injuries from fighting with other predators, likely other male cheetahs, in the reserve. AJU 1778 was moved to a holding boma for recovery as his wounds were severe. AJU 1778 recovered well from these injuries.

Released male AJU 1665 (Kamin) was darted on 11 November 2019 for recollaring in EPGR.

6. Wild Cheetah Examinations

During this reporting period, CCF performed wild cheetah examinations on six cheetahs (3M, 3F).

On 1 May 2019 wild female AJU 1648 (Savanna) was darted for a collar change. AJU 1648 is the offspring of released cat Jacomina, AJU 1510 who was released in 2014. The anaesthesia was kept as short and smooth as possible, while her two cubs were waiting for her at the kill she had made that morning.

On 25 June 2019, a workup was performed on two wild cheetahs (1M, 1F), AJU 1898 (Ben) and AJU 1899 (Adina). They had been in captivity on a farm for about three weeks before their arrival at CCF and were about eight months old and in good health. They will stay in temporary captivity at CCF until old enough for release.

On 10 August 2019, wild cheetah cub AJU 1923 (Rocket) was worked after arrival to CCF at a very young age (~two weeks). Due to his age on arrival, AJU 1923 will remain in captivity for the duration of his life.

On 29 August 2019, AJU 1908 (Oban) was darted to be collared for the first time. AJU 1908 and his brother AJU 1909 (Talisker) are the wild-born offspring of AJU 1648.

On 18 November 2019, wild female AJU 1969 was worked up following her rescue from the Gobabis region. This adult female was in perfect condition and was therefore collared, in preparation for release in early 2020.

7. Deaths, Euthanasia and Necropsies

During 2019 CCF performed 12 necropsies. 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.

Released male AJU 1665 (Cyclone) was found dead in EPGR on 26 January 2019. The body stayed in the freezer at EPGR until he could be picked up and the necropsy was done on 14 February 2019. He had bite marks in the dorsal neck area, two bottom canine punctures were three fingers apart. The neck was dislocated between C3 and C4. The injuries indicated he was killed by a leopard.

Loaned out male AJU 1463 (Porthos) died on 20 February 2019. CCF performed a necropsy on 30 October 2019 and the cause of death was discovered to be neoplasia of the heart and lungs.

Resident male AJU 1515 (Fossey) was euthanized on the late afternoon of 21 February 2019 due to him collapsing after he had been treated for kidney failure for an extended period of time. He was cachexic and very dehydrated despite all the fluid therapy he had received. The necessary samples for genetics were taken that day and the rest of the necropsy was done the next morning. Both kidneys were very small, of firm consistency, had a rough surface and looked extremely pale. He had also developed moderate anaemia due to the chronic kidney disease.

Released male AJU 1561 (Obi Wan) was found with severe neurological symptoms on 7 June 2019. He could not walk or get up anymore. The CCF team decided to go to EPGR to check on him. He had severe bite wounds in the dorsal spinal cord area and the decision was made to euthanize him. RNA later samples were taken immediately, and a full necropsy was done the next day. There were many large haemorrhages in the neck and shoulder area and part of his dorsal neck muscles were crushed. Some of the spinal processes were fractured and there was bleeding in the spinal cord. His kidneys were pale in some areas; those areas seemed to have contracted as well. Blood results showed beginning stage renal failure, although these could have been affected by dehydration. The creatine kinase was severely increased due to the extensive muscle damage and there was blood and proteins in the urine which could have been caused by the muscle damage and/or kidney disease.

On 10 June 2019 released female AJU1667 (Susan) was found dead in EPGR. It appeared she was killed by baboons as there were struggle marks with tracks all-around the scene and she had several severe bite wounds on the right side of her head, neck and thorax. It appeared she bled to death as she was lying in a pool of blood and vomit. She will be kept in the EPGR freezer until CCF will be able to pick her up to perform a full necropsy.

On 13 August 2019, resident male AJU 1647 (Romeo) was anaesthetised for a workup as he had not been feeling very well for the previous few days. Upon exploratory surgery, it was discovered that his spleen had ruptured, and he had severe internal bleeding. AJU 1647 did not recover well from the surgery and was euthanised. A necropsy

performed the same day discovered splenic tumor, massive inflammation, autoimmune mediated haemolytic anaemia, and multiple organ failure.

On 2 September 2019, resident male AJU 1668 (Elwood) was found dead in EPGR due to suspected lion attack. A necropsy performed on 10 September 2019 revealed that this male likely died of severe blood loss.

On 9 September 2019, female AJU 1560 (Padme) was euthanised due to extremely poor condition/health. A necropsy performed on the same day revealed severe renal failure as the cause of death.

On 10 October 2019, on loan male AJU 1442 (Saturn) was found dead. The carcass had been left for about three days in the field after death and therefore the necropsy performed on 26 November 2019 was inconclusive, but signs suggest chronic renal failure as cause of death.

In late November, male cheetah AJU 1970 was brought to CCF from another facility in Namibia as the male was in poor health. A workup was performed but not much sign as to cause of poor health was found. AJU 1970 died on 26 November 2019 in CCF's clinic, and a necropsy performed on 27 November 2019 revealed lung and kidney stenosis and acute heart failure as cause of death.

On-loan female AJU 1517 did not survive transport to CCF from the facility where she was being housed. A necropsy performed on 3 December 2019 confirmed renal failure as the cause of death.

A necropsy was performed on a male AJU 14562 (Athos) on 29 October 2019. Cause of death was inconclusive, but renal failure is the suspected cause of death.

8. Non-cheetah Carnivore Examinations and Necropsies

African Wild Dogs

During this reporting period, CCF performed 26 examinations without anaesthesia on 17 African painted dogs, eight of which were free roaming at EPGR.

Blood was collected from eight free roaming painted dogs on 21 June 2019 for genetic study purposes. This is a requirement from the Ministry of Environment and Tourism before introduction of animals from CCF to the packs at EPGR. The techniques were shared with the EPGR team for them to collect blood from their other painted dogs without anaesthesia when necessary.

Since there is very little known about the efficacy of vaccinations in African painted dogs, blood was collected from CCF's resident individual on a regular basis in a squeeze cage (Table 3). A total of 97 samples were sent to the Cornell laboratory for analysis on canine distemper antibodies.

TABLE 3: BLOOD COLLECTIONS DONE ON RESIDENT AFRICAN PAINTED DOGS IN 2019

Individual	Date 1	Date 2
LPI 10	27 Mar 19	05 Jun 19
LPI 11	27 Mar 19	05 Jun 19
LPI 12	27 Mar 19	05 Jun 19
LPI 13	27 Mar 19	05 Jun 19
LPI 14	27 Mar 19	05 Jun 19
LPI 15	27 Mar 19	05 Jun 19
LPI 16	27 Mar 19	05 Jun 19
LPI 17	27 Mar 19	05 Jun 19
LPI 18	27 Mar 19	05 Jun 19

Other non-cheetah carnivores

No necropsies were performed by CCF on non-cheetah carnivores during this reporting period.

C. Health and Reproduction

1. Genome Resource Bank

Since 2002 CCF has been collecting, evaluating and freezing cheetah sperm. No collections were performed, and no samples were added during this reporting period.

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 overall 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, now Thermo Fisher Scientific) and the Ohrstrom Foundation. Since then, the most important addition to the CCF genetics laboratory was 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 to be able 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.

Laboratory manager Dr. Nina Sausgruber left the laboratory at the end of her one-year contract in May 2019. Monika Nanghama and Hafeni Hamalwa, who both started as interns in the laboratory in the first half of 2017, are still part of the laboratory: Monika accepted a position as the laboratory assistant in January 2018 and Hafeni is pursuing his MSc at the University of Namibia. Julia Zumbroich (MSc) and Francois Jenkins (MSc) started as Laboratory Technicians in December 2018 and September 2019, respectively. Julia is planning to conduct her Ph.D. research at CCF.

CCF's genetics laboratory is an official placement for fourth year undergraduate students of the University of Namibia (UNAM) since 2017 and of Namibia University of Science and Technology (NUST) since 2018, allowing students to earn credit for their internship at the CCF laboratory. The laboratory also trains recent graduates through its internship programme. Throughout 2019, the laboratory hosted two Namibian research interns and two students. All were provided hands-on experience with conservation genetics and taught best laboratory practices. Marco Kalunduka, a UNAM MSc. Microbiology graduate did a six-week internship, and Apa-Opawa Nekwaya of the same course did her 6-months internship starting in March. NUST students Josephina Itope and Benny Munyandi joined the laboratory from 22 September – 26 October 2019.

Furthermore, the laboratory hosted three collaborators: Abigail Guerier from the Ongava Research Centre, visited the laboratory in February and October 2019, to process new samples from their rhinoceros' population. Dr. Caitlin O'Connell from Stanford University sent two students, Lucy Edy (Stanford) and Reginald Nekwaya (UNAM) from July 22 to 02 September, to be trained in genetic laboratory work and continue a project to test the relatedness of elephants in Etosha National Park.

In September, CCF's Genetics and Ecology Departments, co-hosted the fourth workshop for UNAM students from the Katima Mulilo Campus (8 – 14 September). The workshop included hands on experience on camera trapping, kill identification (human wildlife conflict), and a variety of genetic techniques (sequencing for species ID and genotyping for individual ID). The students further were provided with lectures on how to apply the knowledge gained.

Genetics Projects

- **Cheetah genotypes of known individuals (blood/tissue samples) - Namibia:** As part of CCF's on-going research in the genetics laboratory, DNA is extracted for all individuals of which blood and tissue samples are available. All extracted DNA samples are assessed for quality via gel electrophoresis and genotypes obtained for 15 microsatellite markers. In 2019, 20 new cheetah samples were added to the sample collection.
- **Cheetah genotypes of unknown individuals (scat samples) using non-invasive techniques - Namibia:** Since the identity of the cheetah is unknown for 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 Enya and Ole. Other samples were obtained from collaborators from other conservation organizations, taxidermists, and the farming community. In 2019, 35 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.

All other suspected cheetah samples are analysed so that unique individuals can later be included in population studies. Over 400 samples collected between 2008 and 2016 are currently being processed to obtain their genetic profile. Of those, 282 could be assigned an individual ID as cheetah (corresponding to less than 20 individuals), 55 could be assigned to other carnivore species using a barcode sequencing approach. Of the 35 samples collected in 2019, 31 could be confirmed as cheetah and were assigned to 11 individuals, and 2 were identified as carnivore (leopard).

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. Only one sample could be found during the 2018/2019 camera trap survey, which was conducted until January.

- **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: Product 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. PCR products were taken to the United States by Dr. Schmidt-Kuntzel to do next generation sequencing in a collaborator's laboratory. Cheetah cub trade: between 2004 and 2019, CCF has received 384 samples (146 in 2019 alone) from 121 individuals (mostly cubs rescued from the illegal wildlife trade). In 2019, 97 samples were extracted and genotyped to verify their provenance. The obtained results of these studies are sensitive and 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, three months, six months and 15 months. A last test will be performed in 2020.

- **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 U.S. 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 once the final results are obtained.
- **Illegal trade:** The collaboration with cheetah holding facilities and veterinary clinics in the UAE was initiated during a trip in June 2013 and renewed in February 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 the species. This work was done in collaboration with the Brown Hyena Project in Lüderitz and will be part of Sarah Edward's Ph.D. The genetic analysis was finalised in 2014, and the Ph.D. successfully defended in October 2015.
- **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 Ph.D. Most samples were processed. The remaining samples are in process and will be finalised in 2020.
- **Rhinoceros:** A pedigree for white rhinoceros (*Ceratotherium simum*), performed by visiting researcher 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. Abigail continues to visit the laboratory once or twice a year with new batches of samples.
- **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 10 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 172 samples.

- **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 by CCF's collaborators.
- **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 as soon as the whole genome of the brown hyaena is mined by our collaborator.
- **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'Connell, the genetics laboratory has received 426 elephant scat samples, of which 203 in 2019. Two hundred samples were identified as priority. To date 178 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. Scat samples are analysed at the CCF genetics laboratory as part of CCF's ongoing conservation efforts to gather valuable information on an animal's gender, individual and species. Working with scat detection dogs on cheetahs is quite challenging, and we calculated a 22km distance covered for each sample found along a road (data presented in the 'black gold' chapter of "Cheetahs: Biology and Conservation," 2018).

The test phase of the programme started with the arrival of Border Collie, Finn, in February 2009. Since 2009 the programme has trained and/or hosted several scat detection dogs, including Tiger a border collie donated by dog trainer Steve Austin, and Belgian Malinois mix, Levi, who left with CCF's dog handler Quentin de Jager in the beginning of this year to return to the private security sector to fight poaching. CCF's current team consists of Tim Hofmann (MSc) who joined CCF last year as scat dog researcher, his Weimaraner Ole, and CCF's two Belgian Malinois, Enyakwa and Gamena.

Despite her young age of only two-years, Enya has already worked herself up to be the main scat dog of the program. Her high drive, passion and precision in work are making her a great detection dog. She has been able to cover more ground, find more samples, and goes on more trips than our other dogs.

In 2019, 11 farms were visited by the scat dog team. Enya and Ole covered 214 km resulting in 105 carnivore samples, most of which were found by the dogs. Only 20 samples were indicated (sitting down next to the sample; Figure 1) as being cheetah or found on a playtree and therefore also classified as potential cheetah scat. On CCF land, the team continued to regularly monitor all the known playtrees. In 2019 only a few cheetah sightings were caught on the camera traps placed at some of the playtrees, and only 12 cheetah scat samples were found during the year, of which eight were found between the 3 - 14 January, one on the March 21, one on June 18, one on 28 August and one on 16 October. In addition, the programme is monitoring CCF land by regularly walking transects on roads. These efforts returned three potential cheetah scat samples. These results emphasize how much effort is required to find cheetah scat in the wild.

The dog's training is an ongoing process and we are continuously increasing the level of difficulty in terms of distance to the samples and number of false samples that the dogs are not supposed to indicate on. All of them are progressing well but again Enya's results are most promising.

The Scat Dog Team's collaboration involving long-term CCF collaborator Dr. Ezequiel Fabiano and CIBIO (Centro de Investigação em Biodiversidade e Recursos Genéticos) is still ongoing. Quentin and Levi joined the research team to survey two regions in Angola in March. They found 21 scat samples in Bicuar National Park and 12 in Cuatir Private Game reserve, despite March being characterised by heavy rainfalls which not only washed the scat samples away but also drastically increased the activity of dung beetles (Figure 1) that remove the scats. In June Tim and Enya went to survey the same areas again and found 99 samples in Bicuar and 51 in Cuatir. Tim and Enya visited Angola again in November; as heavy rains had already started in Bicuar and temperatures were very high, they extended the search grid to compensate for the "unfriendly" conditions. This way they managed to find 102 carnivore samples in Bicuar and 22 carnivore samples in Cuatir.



FIGURE 1: LEFT - ENYA WITH POTENTIAL CHEETAH SCAT SAMPLES AT A PREVIOUSLY UNKNOWN PLAYTREE DISCOVERED ON A FARM VISIT. RIGHT – ENYA INSPECTING ELEPHANT DUNG COVERED WITH DUNG BEETLES.

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 2). This project was completed in March 2019.

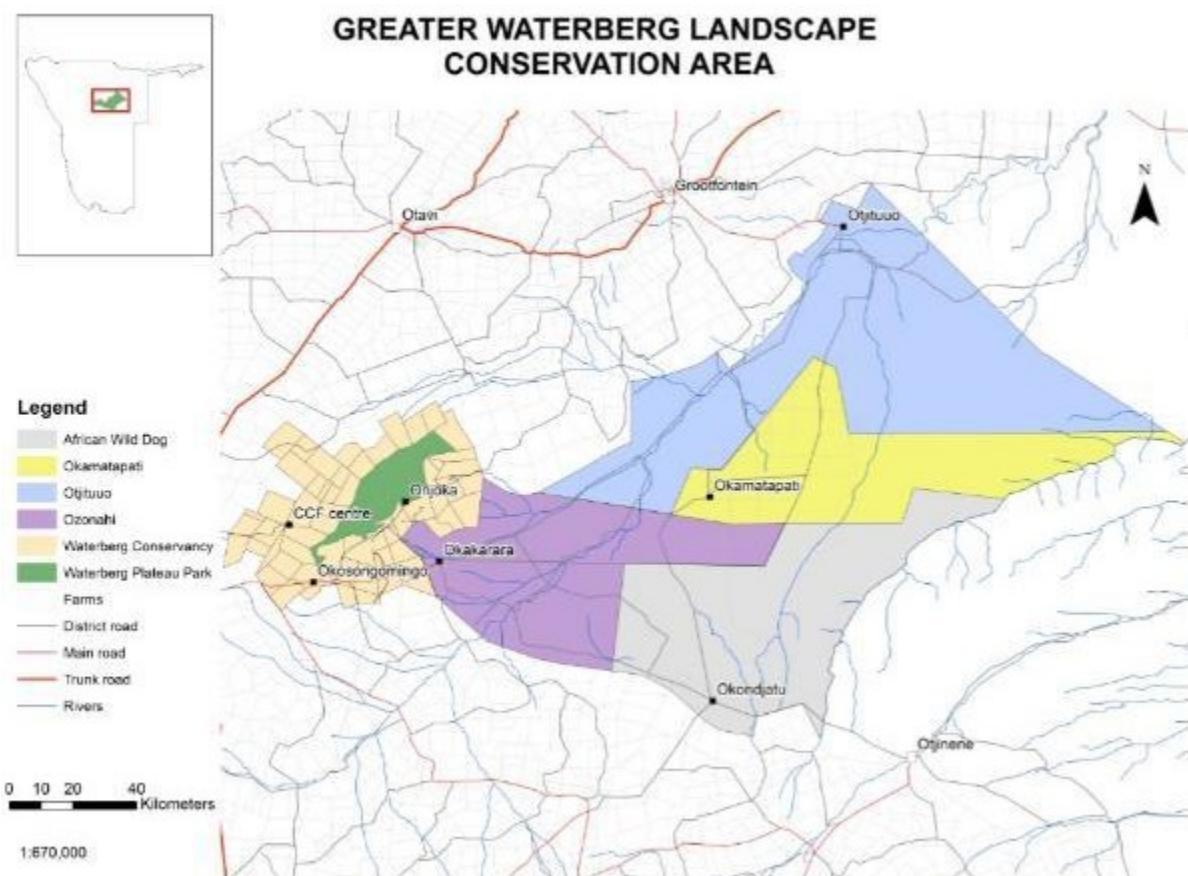


FIGURE 2: LOCATION OF THE GWL AND THE FIVE INDIVIDUAL CONSERVANCIES; THE WATERBERG (COMMERCIAL), OTJITUOO, AFRICAN WILD DOG, OKAMATAPATI AND OZONAH (COMMUNAL) CONSERVANCIES.

The current distribution and densities of key carnivore species including the African wild dog and cheetah across the GWL are 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 ($2,111 \text{ km}^2$), which was divided into four survey areas (Figure 3). Camera traps were deployed for 30 nights on a $4 \times 4 \text{ km}$ 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 next year. Additionally, CCF also conducted farmer questionnaires to better understand land use, wildlife presence and carnivore conflict across the GWL.

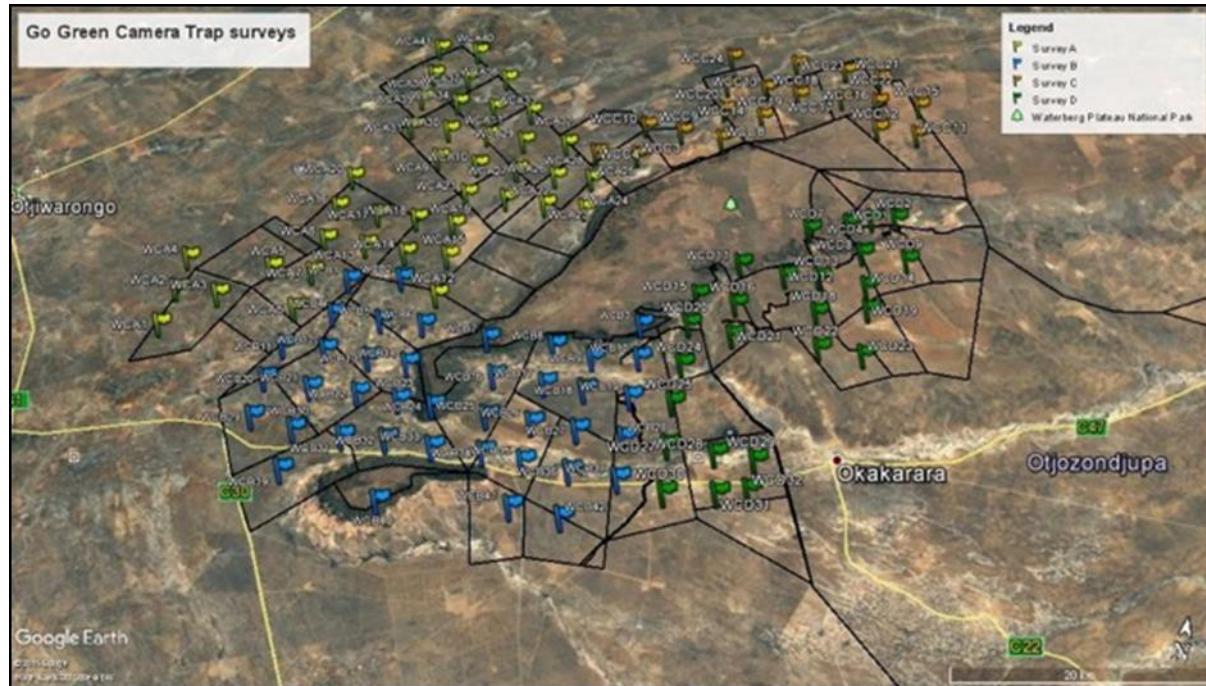


FIGURE 3: CAMERA TRAPPING SITES IN THE FREEHOLD FARMS OF THE GREATER WATERBERG LANDSCAPE SHOWING THE 4 SURVEY AREAS.

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 the total number of species seen. Overall, a total of 14 species were captured 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
Aardwolf	169	45
African Wild Cat	339	369
Banded Mongoose	240	100
Bat-eared Fox	337	407
Black-backed Jackal	3,408	1,995
Brown Hyena	1,547	784
Cape Fox	61	9
Caracal	333	133
Cheetah	11	9
Genet	565	475
Leopard	249	475
Serval	14	3
Slender Mongoose	94	168
Striped Polecat	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 4). 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 4).



FIGURE 4: 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 ($n=22$). Most 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 5).

In terms of mitigation methods, more than half the 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. Many farmers (72%) reported that leopards were on the increase.

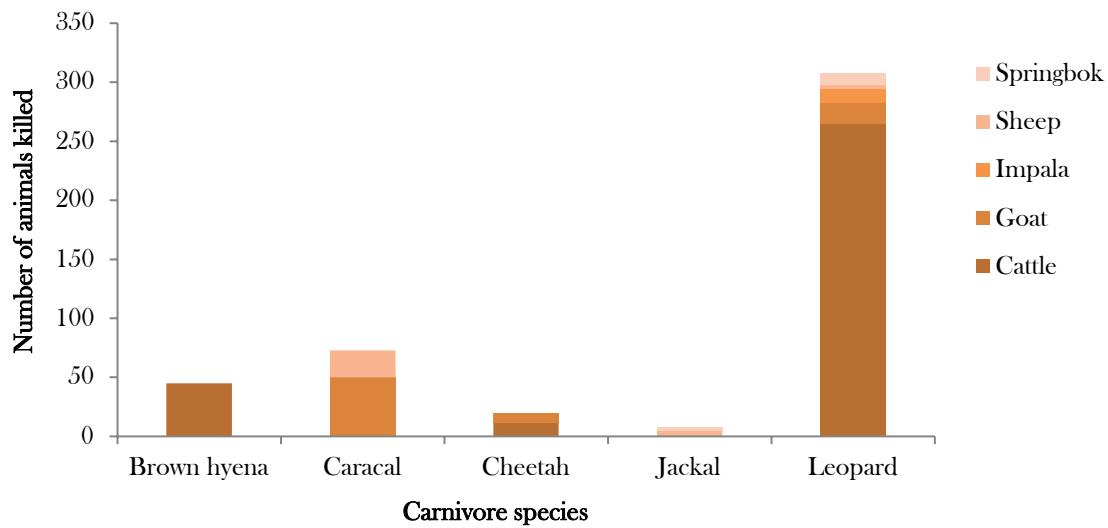


FIGURE 5: NUMBER OF LIVESTOCK LOST TO PREDATOR SPECIES AND PREDATOR PREFERENCE OF LIVESTOCK AND GAME ON FREEHOLD FARMS IN THE GWL.

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 6). 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.

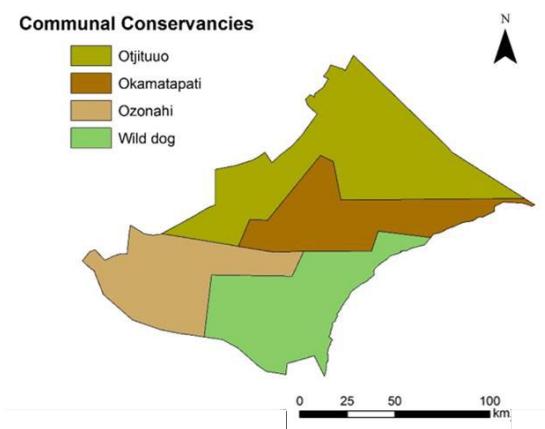


FIGURE 6: MAP OF FOUR COMMUNAL CONSERVANCIES: OTJITUOO, OKAMATAPATI, OZONAHII AND AFRICAN WILD DOG IN NORTH-CENTRAL NAMIBIA.

Camera Trapping

The study area was divided into three survey areas with 35 grid cells each (Figure 7). Each grid cell was 8x8km with a single camera trap randomly selected per grid cell (although accessibility and likelihood of capturing wildlife were important in the placement). This resulted in 35 camera trap sites per survey area and 105 sites overall. The camera trapping was done in the wet (November–April) and dry (May–October) season. Camera trap deployment commenced in January 2018. Community members were extremely helpful in deploying camera traps and would frequently check cameras, taking ownership of the cameras while they were deployed on their land (Figure 8).

After 13 months and approximately 20,000km driven, CCF completed the camera trapping project on 25 February 2019, covering 210 sites. CCF's Ecology team is currently analysing the camera trap data, and only present preliminary results in this report.

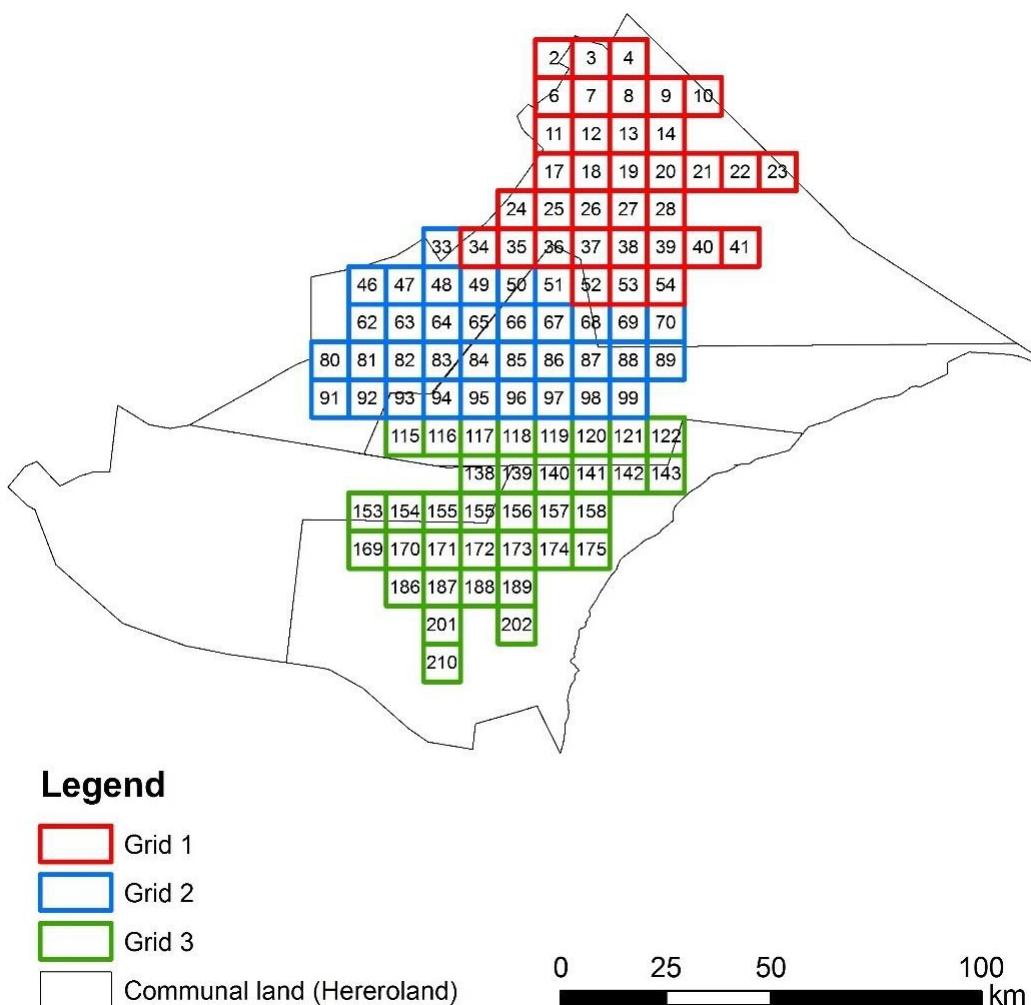


FIGURE 7: CAMERA TRAP DESIGN (8X8KM) IN THE COMMUNAL CONSERVANCIES WHICH WAS DIVIDED INTO THREE SURVEY AREAS, WITH ONE CAMERA TRAP PLACED WITHIN EACH GRID CELL.



FIGURE 8: CAMERA TRAP DEPLOYED WITH THE HELP OF COMMUNITY MEMBERS (TOP LEFT); COMMUNITY MEMBERS GETTING INVOLVED IN CAMERA TRAPPING (BOTTOM LEFT); FINAL CAMERA TRAP TAKEN DOWN ON 25 FEBRUARY 2019 (RIGHT).

Results

A total of 31 species were captured on camera traps during the study period (Table 6). Of all the carnivore species, black-backed jackal (*Canis mesomelas*) were captured most regularly at 96.2% of camera trap sites (Figure 9). Other small carnivore species were at 19.0 – 41.0% of sites. The brown hyena (*Hyaena brunnea*), one of the large carnivores, was the most regularly captured (53.3% of sites). African wild dogs (*Lycaon pictus*) were captured at 4.8% of sites, while the other larger carnivores such as cheetah (*Acinonyx jubatus*), leopard (*Panthera pardus*) and spotted hyena (*Crocuta crocuta*), were captured at <2% of camera sites.

TABLE 6: THE 31 SPECIES CAPTURED ON CAMERA TRAPS IN THE STUDY SURVEY AREAS.

Common name	Scientific name	Survey Area 1	Survey Area 2	Survey Area 3
Aardvark	<i>Orycteropus afer</i>	•	•	•
Aardwolf	<i>Proteles cristata</i>	•	•	•
African wild cat	<i>Felis silvestris</i>	•	•	•
African wild dog	<i>Lycaon pictus</i>	•	•	•
Baboon	<i>Papio ursinus</i>	•		
Banded mongoose	<i>Mungos mungo</i>		•	
Bat-eared fox	<i>Otocyon megalotis</i>	•	•	•
Black-backed jackal	<i>Canis mesomelas</i>	•	•	•

Common name	Scientific name	Survey Area 1	Survey Area 2	Survey Area 3
Brown hyena	<i>Hyaena brunnea</i>	•	•	•
Cape fox	<i>Vulpes chama</i>	•	•	•
Caracal	<i>Caracal caracal</i>	•	•	•
Cheetah	<i>Acinonyx jubatus</i>	•		
Common duiker	<i>Sylvicapra grimmia</i>	•	•	•
Ground squirrel	<i>Xerus inauris</i>	•	•	•
Honey badger	<i>Mellivora capensis</i>	•	•	•
Kudu	<i>Tragelaphus strepsiceros</i>	•	•	•
Leopard	<i>Panthera pardus</i>	•		
Pangolin	<i>Smutsia temminckii</i>		•	
Porcupine	<i>Hystrix africaeaustralis</i>	•	•	•
Red hartebeest	<i>Alcelaphus buselaphus</i>			•
Scrub hare	<i>Lepus saxatilis</i>	•	•	•
Slender mongoose	<i>Galerella sanguinea</i>	•	•	•
Small (Cape) grey mongoose	<i>Galerella pulverulenta</i>			•
Small-spotted genet	<i>Genetta genetta</i>	•	•	•
Spotted hyena	<i>Crocuta crocuta</i>	•		
Springhare	<i>Pedetes capensis</i>	•	•	•
Steenbok	<i>Raphicerus campestris</i>	•	•	•
Striped polecat	<i>Ictonyx striatus</i>	•	•	•
Tree squirrel	<i>Paraxerus cepapi</i>	•		
Warthog	<i>Phacochoerus africanus</i>	•	•	•
Yellow mongoose	<i>Cynictis penicillata</i>	•		•
Total species		27	23	24

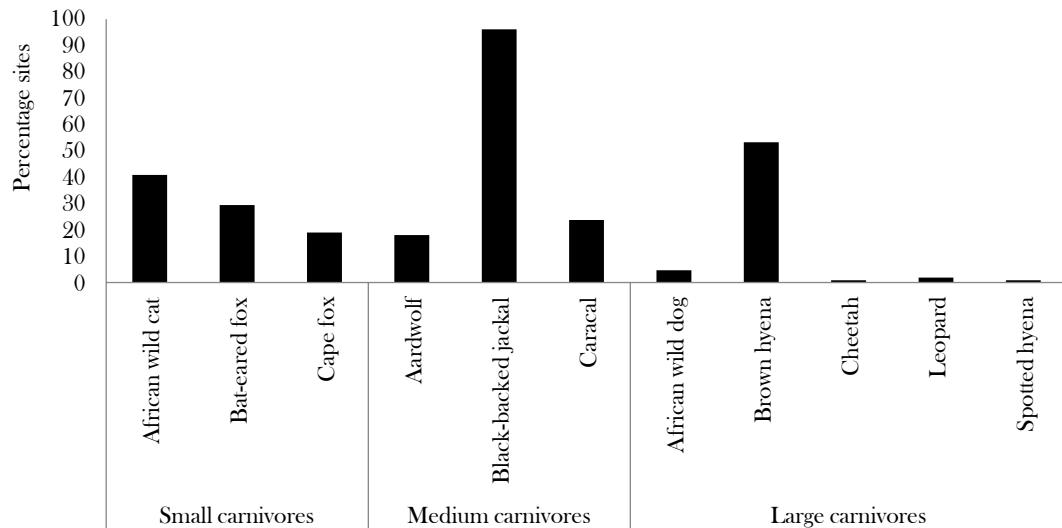


FIGURE 9: PERCENTAGE OF CAMERA TRAP SITES WHICH CAPTURED EACH CARNIVORE SPECIES IN OUR STUDY AREA.

The most common antelope species was the common duiker (95.2% of sites), followed by steenbok (80.0%, Figure 10). Kudu were captured at 15.2% of sites, while red hartebeest were only captured on one occasion. Porcupines were captured at 58.1% of sites, while warthogs were only present at 8.6% of sites. Scrub hares were also regularly captured (71.4% of sites).

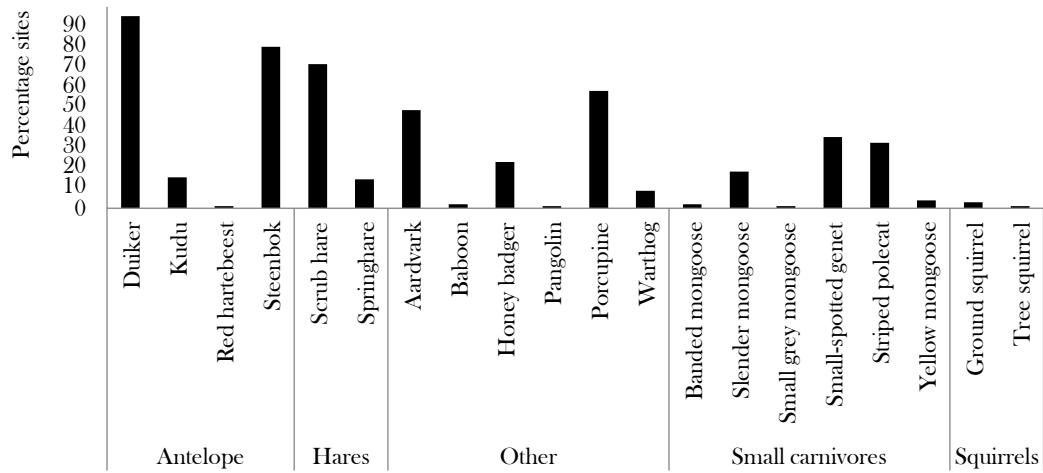


FIGURE 10: PERCENTAGE OF CAMERA TRAP SITES WHICH CAPTURED POTENTIAL PREY SPECIES IN OUR STUDY AREA.

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 (*Lycaon 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 ecotourism/cultural market in the area.



FIGURE 11: CAMERA TRAP PHOTOS OF SOME OF THE CARNIVORE SPECIES CAPTURED DURING THE SURVEY IN THE COMMUNAL CONSERVANCIES.

Future Work in the Communal Areas

CCF will continue to work in the communal conservancies by continuing the rabies vaccination campaign which started in April 2019, with the aim of preventing the transmission between domestic dogs and African wild dogs. CCF will also continue with community development and education, following up on the human-wildlife conflict mitigation projects (Foxlights and e-shepherd collar projects), as well as continue with integrated livestock and wildlife management workshops.

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 the 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 has 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 acknowledges 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 HEADS 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 mind sets, 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 countrywide 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 (3 to 18 months), 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 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 of 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.

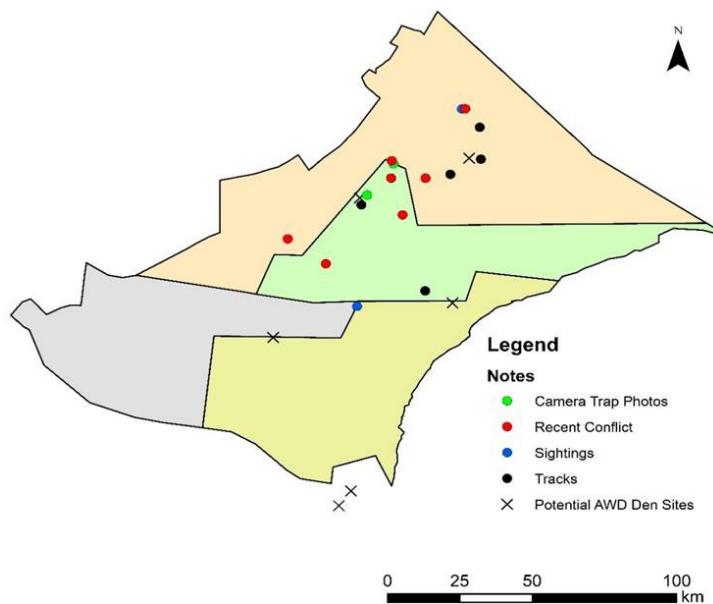


FIGURE 14: CONFIRMED LOCATIONS OF AFRICAN WILD DOGS IN THE OKAKARARA DISTRICT COMMUNAL CONSERVANCIES.

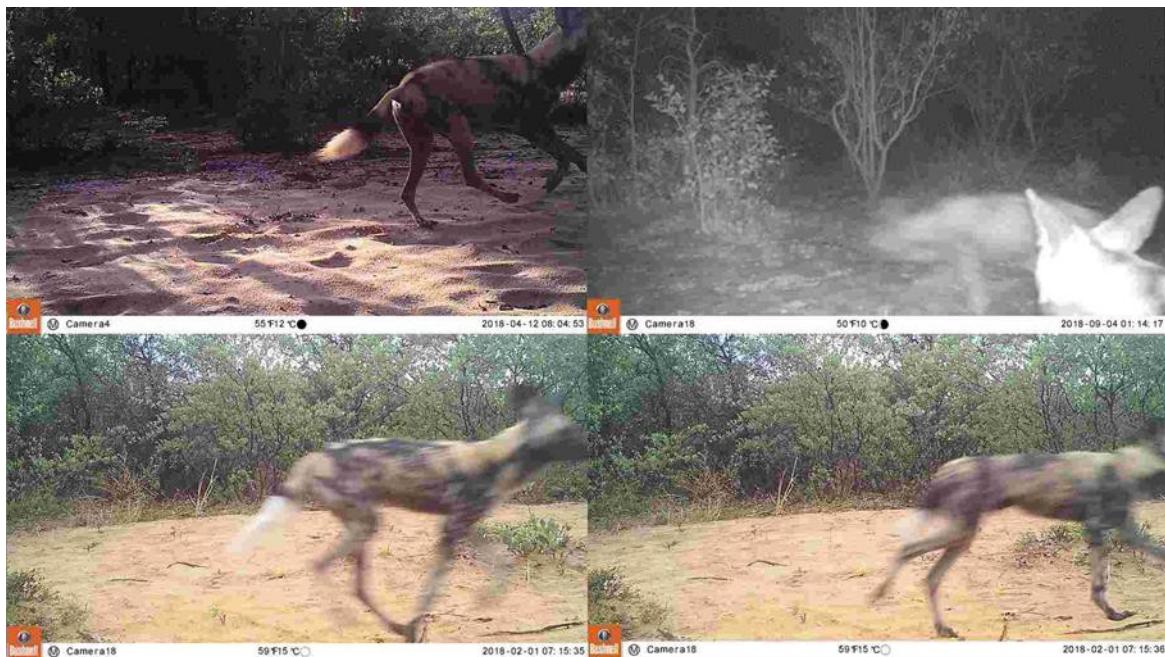


FIGURE 15: AFRICAN WILD DOGS CAPTURED ON CAMERA TRAPS DURING THE STUDY PERIOD IN THE EASTERN COMMUNAL CONSERVANCIES OF THE OKAKARARA DISTRICT.

Status on the Project

Since completion of the project in February 2019, the images have been sorted to species level. The HWC questionnaire data has been entered into an excel spreadsheet. The R package camtrapR was then used to extract the metadata from the images and construct an excel spreadsheet of the communal camera trap data for further analysis.

An MSc student, Emma Reasoner, will further analyse both the camera trap and questionnaire data. This will be part of Emma's MSc project in Wildlife Management for the University of Namibia (UNAM) which begins in 2020. Analysis will involve determining occupancy of predator species on the communal land using prey presence and predator mitigation techniques as covariates for the analysis. The aim will be to explore HWC in the Okakarara Eastern Communal Conservancies, and to determine how predator occupancy may be influenced by both prey availability and conflict mitigation techniques in place.

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 aimed 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 were to:

- Assess 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 the deployment – one year.
- Verify 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 – one year.
- Check 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 April 30 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 May 14 and May 18. 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 was concluded in January 2019, and Phase 2 and 3 in May 2019.

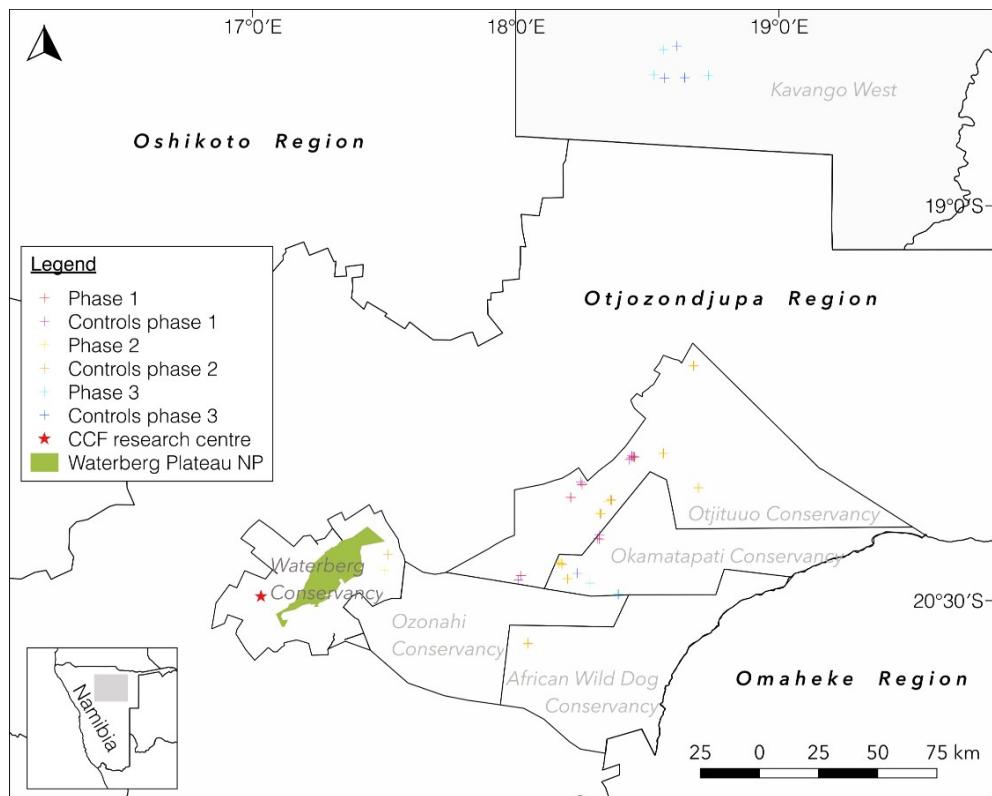


FIGURE 17: E-SHEPHERD PLACEMENTS AND CONTROLS SITES.

Sixty-nine small stock collars and 18 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 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 two 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 toward predators evolves.

Results

The study has revealed the following:

- (1) From January 2018 to June 2019, 1,342 animals were lost to predators for both groups of farmers (E-Shepherd: n=569; Controls: n=773), which shows that even though the group with collars have had fewer losses overall, the collars are not entirely predator-proof.
- (2) Overall, farmers are mostly losing goats (adults 43%, kids 8%) to predators, followed by sheep (adults 32%, lambs 2%), and cattle (adults 2%, calves 8%, Figure 19).
- (3) Predators that are affecting these farmers the most are black-backed jackals (*Canis mesomelas*), responsible for 48% of overall losses, and caracals (*Caracal caracal*), responsible for 17% of losses. Both carnivore species seem to prefer 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 a lower frequency (4%, 7%, 4%, and 1% respectively; Figure 20).

- (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 17%; Figure 20), which could potentially bias the results of the collar's effectiveness.

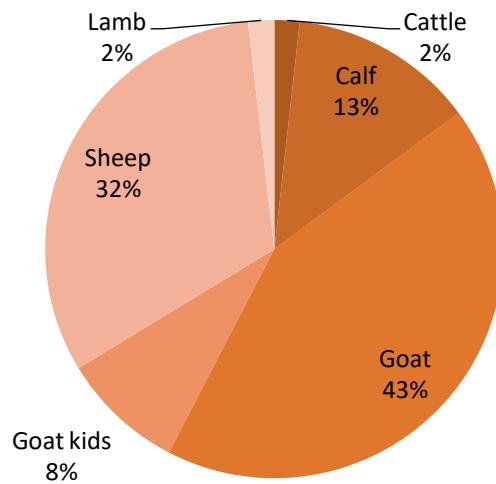


FIGURE 19: REPORTED LIVESTOCK LOSSES PER TYPE.

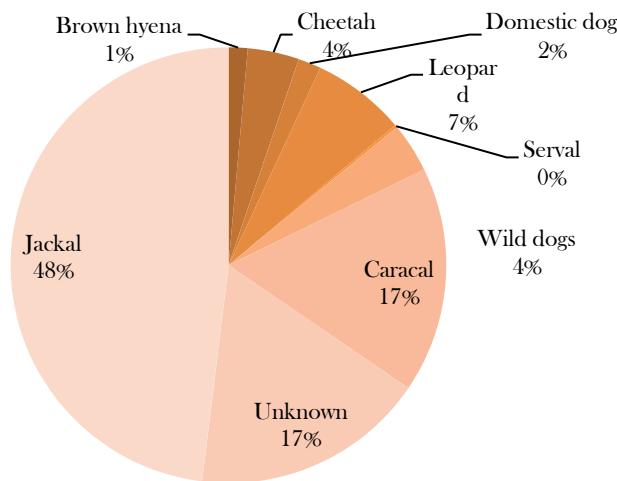


FIGURE 20: REPORTED PREDATORS RESPONSIBLE FOR LIVESTOCK LOSSES BY FARMERS.

- (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 depends 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.

In November 2019, the collars were sent to South Africa for refurbishment and repairs. Additionally, CCF will receive the activation data from the collars (i.e., how many times and for how long the collars were activated throughout the study). This information will provide more insight on results previously described.

Additionally, CCF will test the collars through a controlled experiment with its captive cheetahs. Potentially, getting more useful information as to the effectiveness of the collars as deterrents for predators.

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 helps 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 conducted five workshops with a twofold 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 must fulfil the following conditions:

- 1) *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 10 farms (Table 9) in two Eastern Communal Conservancies (Otjituuo 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.

Name	Village	Conservancy
Ndike Narukuiani	Okamututjindo	Otjituuo
Puume Uriapi	Okamututjindo	Otjituuo
Hitjivirue Uatanaua	Okamututjindo	Otjituuo
Kapenauame Katjiveri	Okamututjindo	Otjituuo
Clive Majuoka	Otjiwamutenga	Okamatapati
Dokies Tjirimuje	Mooiplaas	Okamatapati
Jackson Kandinhgua	Ombekeremba	Okamatapati
Paporor Ratoveri*	Okaperongo	Okamatapati
Dije Tjirare	Ongambi	Okamatapati
Ebenhard Karita	Okamatapati	Okamatapati

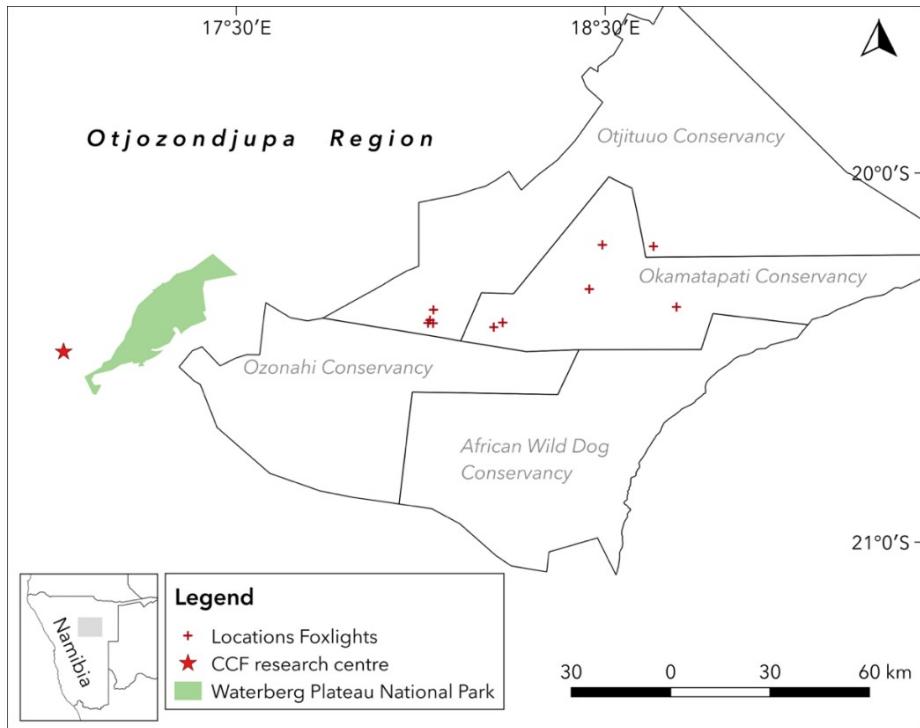


FIGURE 22: LOCATIONS OF FOXLIGHT DEPLOYMENT.

CCF ecologists Willem Briers-Louw and Stijn Verschueren 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 was 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).

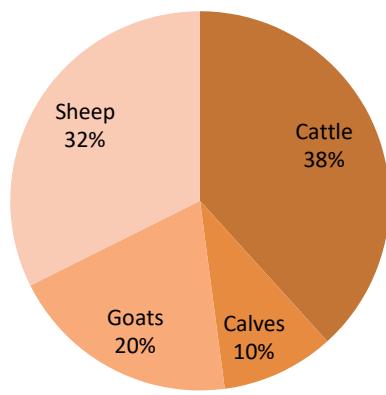
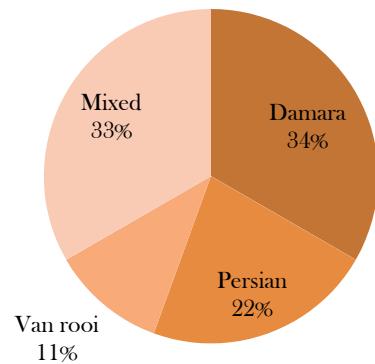


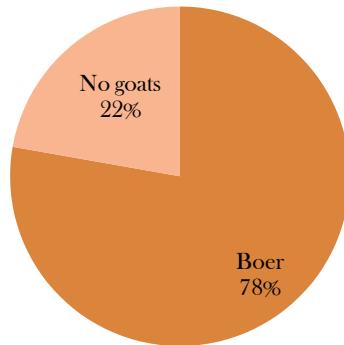
FIGURE 25: LIVESTOCK NUMBERS REPORTED BY RECIPIENTS OF FOXLIGHTS.

Reported livestock breeds indicate most 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).

Sheep breed



Goat breed



Cattle breed

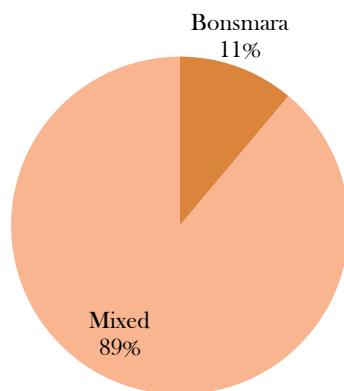


FIGURE 26: BREED OF LIVESTOCK OWNED BY RECIPIENTS OF FOXLIGHTS.

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 keeping 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 varies 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 most 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).

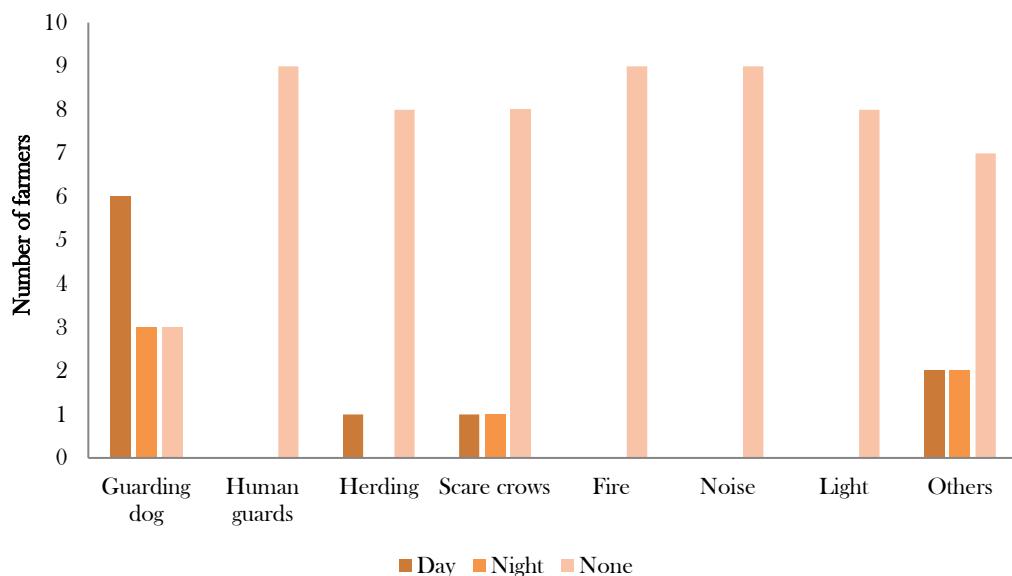


FIGURE 27: SUMMARY OF PREVENTIVE METHODS USED BY PARTICIPANT FARMERS.

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).

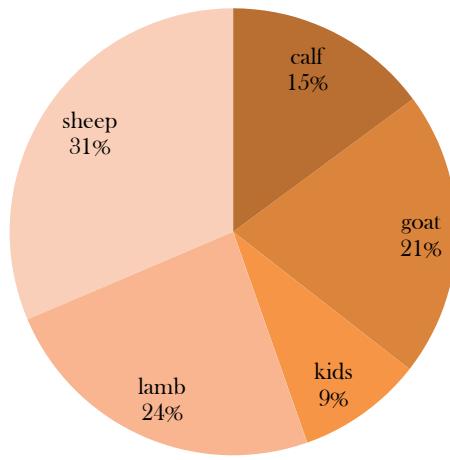


FIGURE 28: TOTAL LIVESTOCK LOSSES FOR 2018.

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 prefer 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).

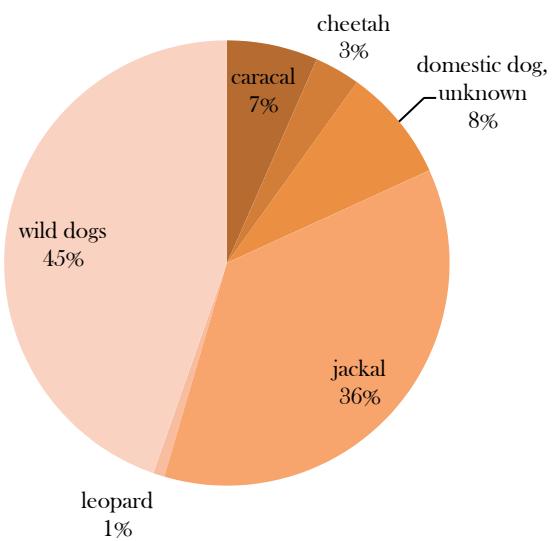


FIGURE 29: PREDATORS RESPONSIBLE FOR LIVESTOCK LOSSES.

According to the time farmers reported their losses (Figure 30), 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.

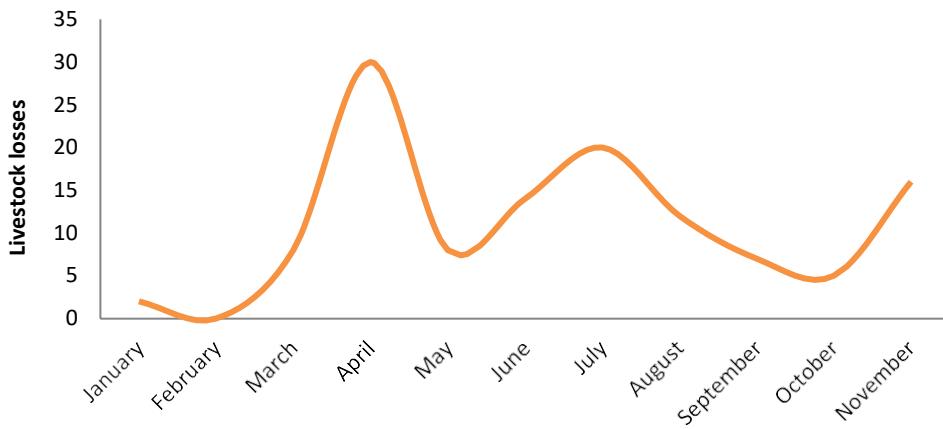


FIGURE 30: TOTAL LIVESTOCK LOSSES THROUGHOUT THE YEAR (2019).

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).

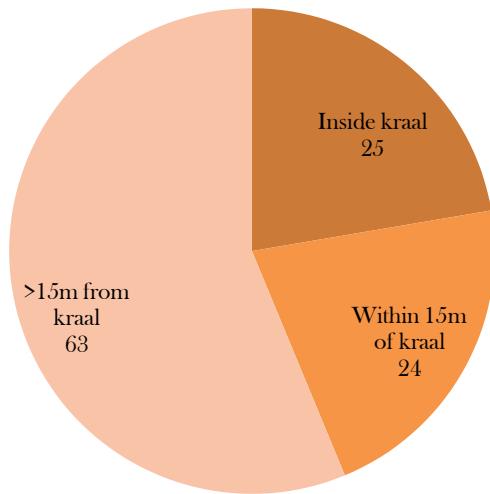


FIGURE 31: LOCATION REPORTED FOR LOSSES.

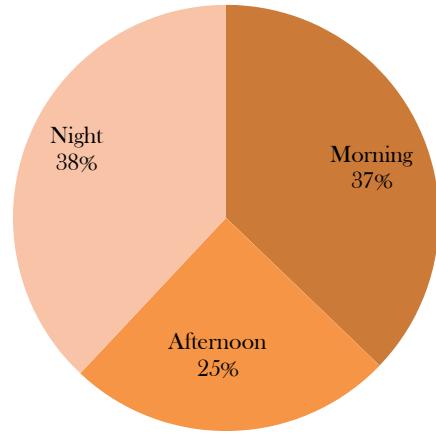


FIGURE 32: TIME OF DAY FOR REPORTED LOSSES.

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)

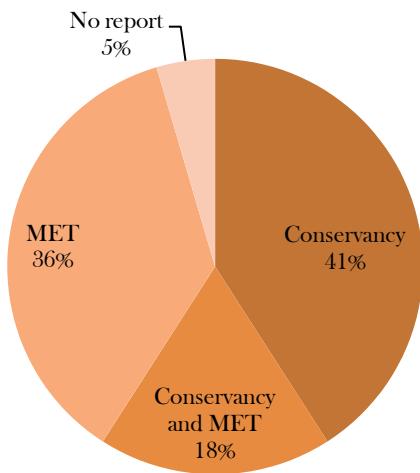


FIGURE 33: REPORTED PREDATOR ATTACKS.

Current Status of the Project

At the time of writing this report the final questionnaires and evaluations were being conducted. Farmers are being reached through phone calls to evaluate the effectiveness of the lights. Additionally, CCF gave ownership of the Foxlights to the farmers who participated in this pilot project.

So far 6 out of the 10 farmers have been reached. Mobile service is intermittent in the areas, however, CCF will keep trying to contact the remaining 4 farmers.

From these a preliminary analysis was completed, and the main conclusions are the following:

- 1) The lights seem to be effective in preventing attacks inside the kraal, as none of the farmers interviewed so far have experienced any depredation inside the kraal. The farmers who have reported loss, lost livestock outside of the kraal (more than 15m).
- 2) Overall, there were more losses on account of drought and disease than depredation.

Further analysis will be done once the remainder evaluations and final questionnaires are done.

3. Cheetah Releases and Monitoring

Savanna (AJU1648)

On 5 May 2018 Savanna gave birth to a litter of four cubs. Three of those four survived through the end of 2018, however in the first half of 2019 she lost another cub either to a car accident or a leopard. Despite this loss, the surviving two cubs, Oban and Talisker, are doing extremely well as of the end of June 2019 and both have already been participating in hunts along with Savanna and have made independent kills of their own.

The second half of 2019 brought some significant milestones to this small family. In August 2019, CCF and Erindi decided to collar one of the males, Oban, to be prepared for the time when they separate from Savanna. In early December, Savanna and her cubs separated for the last time and since Oban and Talisker have been surviving well on their own without Savanna. These males moved to a southern section of the reserve and have been seen regularly making kills and supporting themselves (Figure 34). CCF and Erindi are very excited about these two being out on their own as they are officially the second wild-born generation (grandsons) from a captive-raised, rehabilitated and released CCF cheetah.

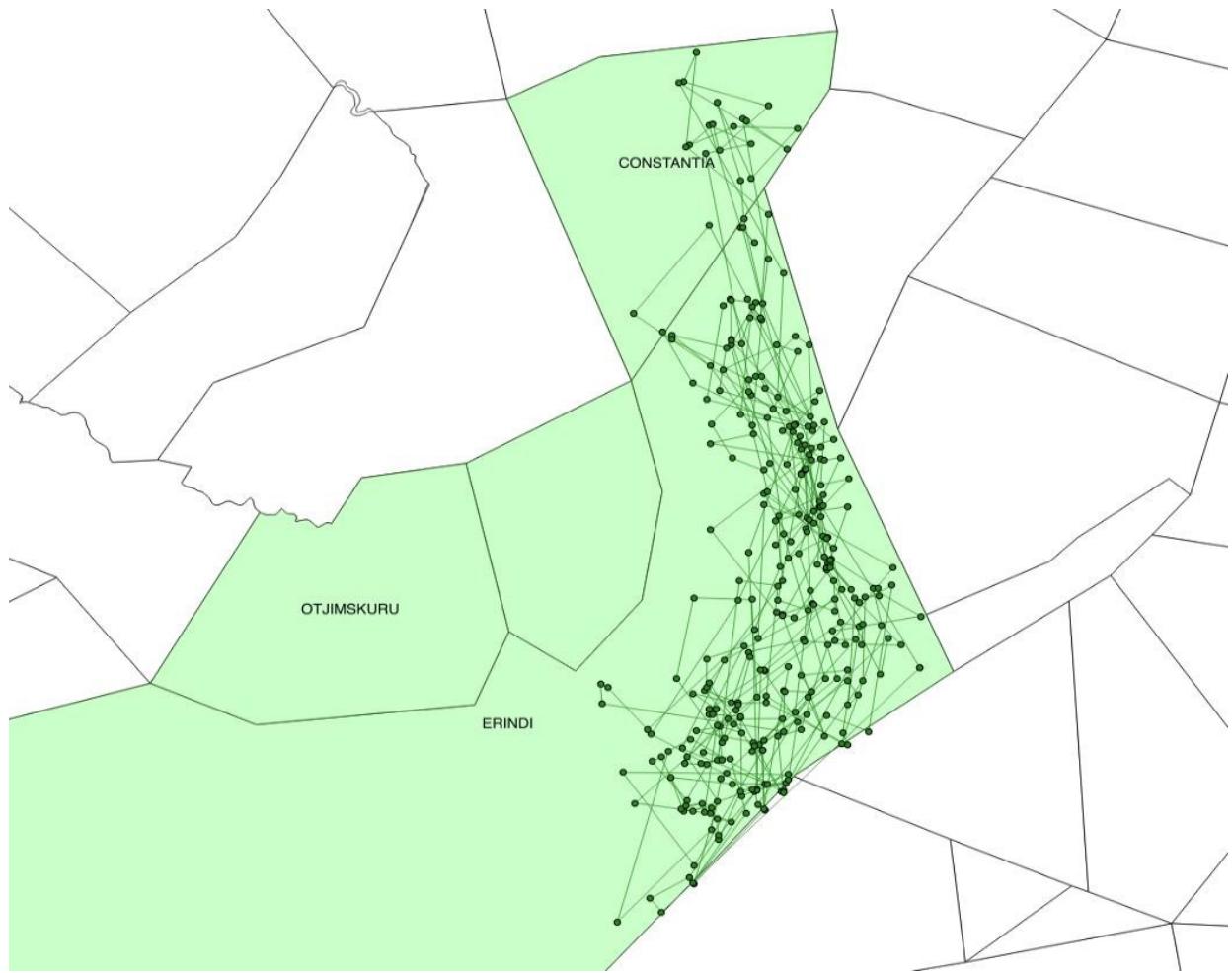


FIGURE 34: GPS COLLAR DATA FOR SAVANNA FROM 2019, TRUNCATED TO ONE POINT PER DAY.

Obiwan (AJU1561)

Obiwan had been doing very well since his coalition mate Chester died in November 2016. He was making successful kills every few days and is in good condition considering his age of 11 years. During the beginning of 2019 Obiwan surrendered his core home-range in the 'Vlei' of Erindi to younger males and moved to the northern part of the reserve within the same range as Savanna. Here, Obiwan was doing very well making regular kills and enjoying his retirement.

Sadly, at the beginning of June 2019, Obiwan was found by Erindi staff in very poor condition. He was extremely weak and could not move very well. CCF's team immediately headed out to check on Obiwan and upon closer inspection under anaesthesia, found that he had been attacked by some other predator such as a hyena or leopard. Due to his injuries, there was nothing that could be done and there was no chance of him recovering. So, the decision was made to euthanise him to relieve his suffering.

While CCF and Erindi were very saddened by the loss of this magnificent individual, Obiwan remains one of our greatest success stories. After rehabilitation at CCF, Obiwan and his coalition returned to the wild and dominated the cheetah world of Erindi for nearly six years. Obiwan and his coalition provided countless once-in-a-lifetime

experiences for people from all over the world and was the ultimate ambassador for his species. Obiwan likely fathered many cubs during his time in Erindi, and though he is gone his legacy will live on forever both in the offspring he leaves behind and in the memories he made for people all over the world.

Kamin, Cyclone and Elwood (AJU1664, AJU1665, & AJU1668)

At the end of January 2019, the coalition of males in the holding bomas at Erindi Private Game Reserve were released from their boma into the reserve. From the time of release, the males began to explore their new environment and began making attempts to hunt shortly after release. Sadly, one male, Cyclone (AJU1665) was killed about one week after release by a leopard. The coalition was drinking at a waterhole in the middle of the night when the leopard managed to ambush the cheetahs. Luckily the other two males escaped unharmed.

After the loss of their coalition mate, the remaining males Kamin (AJU1664) and Elwood (AJU1668) seemed to realize the importance of remaining hyper vigilant while navigating their new environment. This event also strengthened the bond between Kamin and Elwood, they started paying much close attention to each other at all times.

Kamin and Elwood made their first kill post-release just 10 days after release. They had only been supplementally fed a couple of times before this first kill and subsequently they began to make regular kills on their own and therefore no longer required supplemental feeding from CCF's monitoring team. By the end of June 2019, the males were still doing extremely well entirely independent and on their own (Figure 35).

Sadly, in early September 2019 Erindi staff found Elwood dead and Kamin severely injured in the Vlei area of the reserve. From the tracks and signs left behind, it appears as if these two males accidentally stumbled upon a pair of lionesses, one of which managed to catch and kill Elwood on the spot. Kamin was also severely injured but managed to escape from the lions. CCF's team immediately travelled to Erindi to dart and treat Kamin's wounds and to move him back to a holding boma for safe recovery. Though Kamin's wounds were extensive, with treatment and rest he made a full recovery and was released back into the reserve at the end of October. Kamin required a few additional supplemental meals, but by the end of 2019 he was supporting himself entirely with regular kills. CCF and Erindi were saddened by the loss of Elwood, but Kamin appears to be doing well on his own in the reserve.

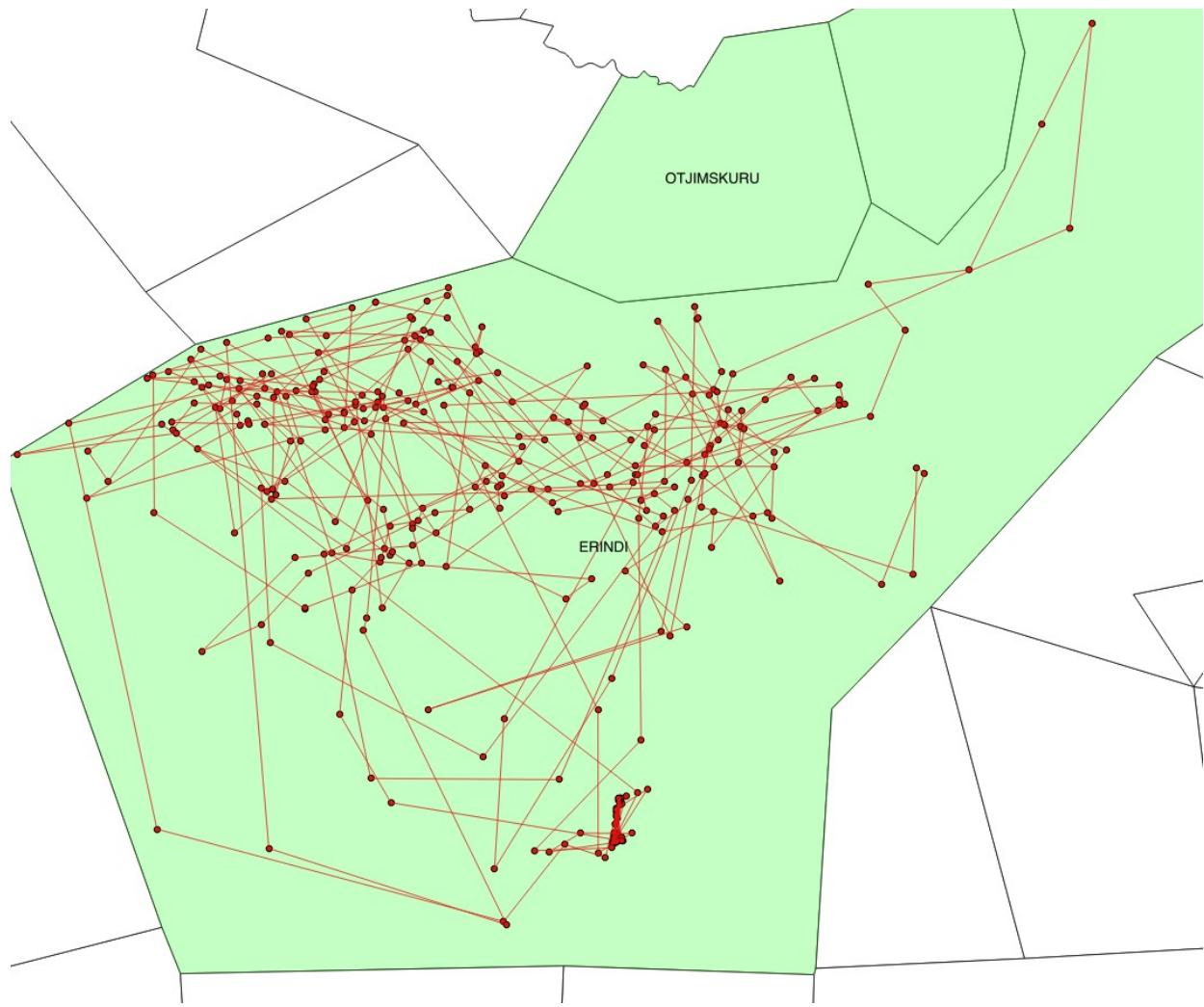


FIGURE 35: GPS COLLAR DATA FOR KAMIN AND ELWOOD FROM 2019, TRUNCATED ONE POINT PER DAY.

Miers (AJU1778)

In September 2018, CCF released a single male cheetah, named 'Miers', into Erindi Private Game Reserve. Miers was rescued from a property south of CCF's headquarters as an adult, rehabilitated, then released after making a full recovery. From the time of release, Miers only required a single supplemental feeding before becoming fully self-sufficient on his own.

From January to June 2019, Miers continued to perform very well on his own in Erindi and took over the area of Erindi known as 'Vlei' as his core home-range (Figure 36) from another older male, Obiwan. Though more shy than other CCF cheetahs in Erindi, Miers has been providing wonderful sightings to Erindi visitors and has become a star within the reserve.

In October, Erindi staff found Miers with some wounds and scratches and he was limping. They kept a close eye on him and throughout the month it seemed he would heal and then get more wounds. Based on his movements and the wounds, it appeared as if he had been fighting with other cheetahs in the reserve, likely of an area of core home-

range. In late October, Erindi staff found Miers in very bad condition, likely the result of a fight with two other males who had been seen in the area Miers was found. CCF's team travelled to Erindi to treat his wounds and move him to a holding boma for safe recovery. Miers' condition was quite poor, but he received good treatment and by the end of 2019 had made a full recovery. By the end of 2019, Miers was still in the holding boma. In early 2020 CCF will re-collar Miers as his current collar battery is depleted and then will release him back into the reserve.

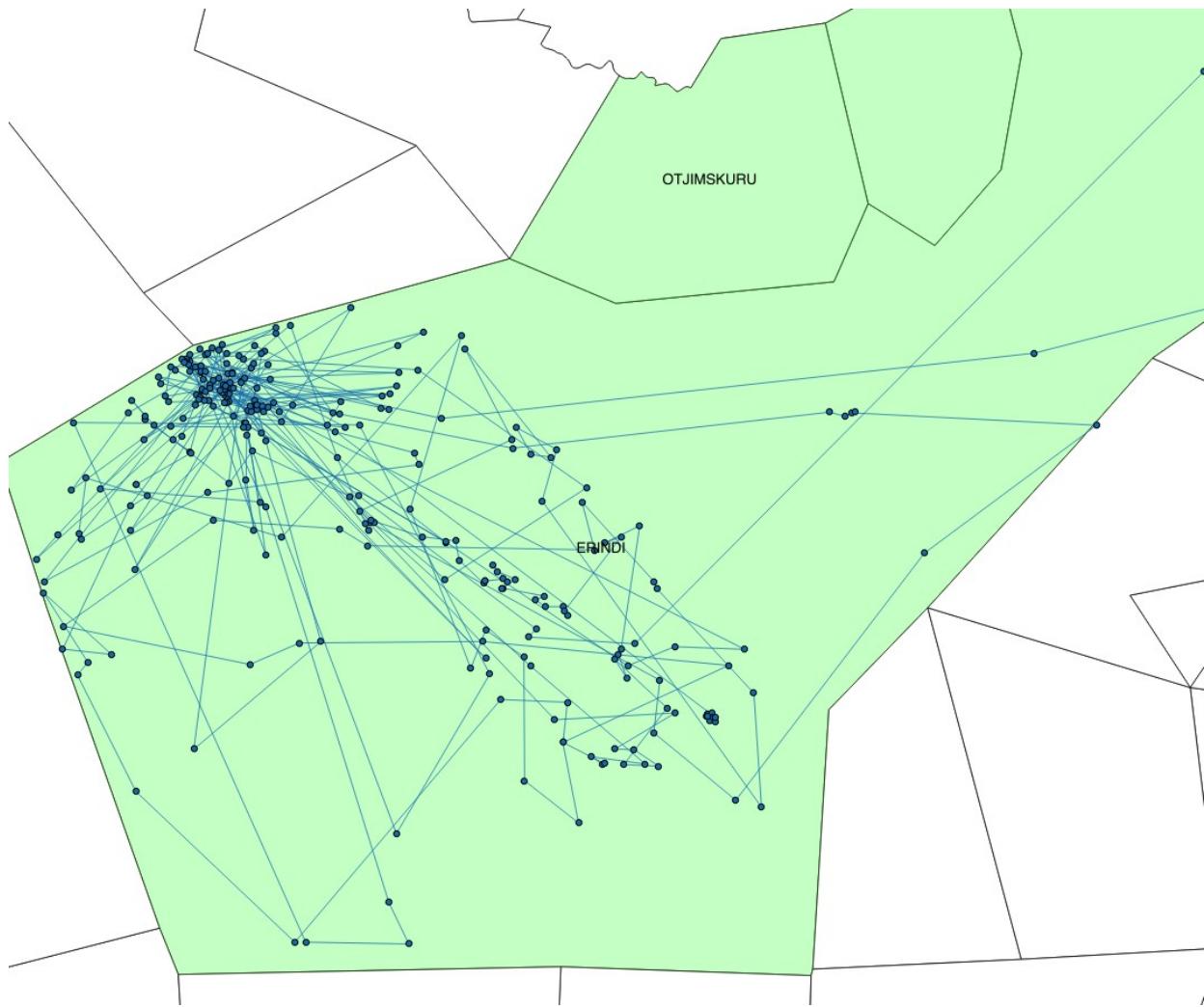


FIGURE 36: GPS COLLAR DATA FROM MIERS FROM, TRUNCATED TO ONE POINT PER DAY. HIS CORE HOME-RANGE IN THE ‘VLEI’ IS CLEARLY VISIBLE BY THE CLUSTERING OF POINTS.

Susan, Daenerys, Georgia, and Tatjana (AJU1667, 1669, 1670, 1671)

Four female cheetahs, the sisters of Elwood (AJU1668), rescued by CCF in 2016 were transferred to Erindi Private Game Reserve in 2018 to begin their soft release holding period in preparation for their release in early 2019. On 25 February 2019, these four females were released from their holding boma in Erindi to begin their new wildlife. Upon release, the females were fed a large piece of giraffe meat to ensure they were full for the first few days of release.

After release, the four females remained in the area of the holding boma for about three days before moving on to explore the reserve. The four females remained together in a group of four for about two weeks following their release, but then began to split up from each other but eventually settle down into two groups of two; Georgia and

Tatjana, and Susan and Daenerys (Figure 37). Susan and Daenerys remained within the southern part of the reserve and began making regular kills together completely supporting themselves. Georgia and Tatjana moved to the northern area of the reserve in the area that Savanna lives and while they took a while longer to support themselves, eventually got the hang of it and started making more regular kills but still required supplementation from time to time as of the end of June 2019.

Sadly, in mid-June 2019 Erindi staff found Susan dead and upon closer inspection it appeared that she had been killed by a troop of baboons. A single baboon on its own would not pose much threat to a cheetah, but if an entire troop manages to surround a cheetah the encounter can be fatal for the cheetah. After losing her sister, Daenerys began to struggle making kills on her own and started to require supplemental feeding after the loss. While she is struggling on her own, we have high hopes that Daenerys will learn to support herself on her own and our teams will continue providing support to her as necessary until she is self-sufficient once again.

In the second half of 2019, the three remaining females began to become more and more independent, only requiring supplemental feeding from time to time. Georgia, Tatjana, and Daenerys (Figure 38**Error! Reference source not found.**) began supporting themselves by making more frequent kills. These females still require supplemental feeding from time to time, but they are well on the road to complete independence. CCF and Erindi have high hopes for these three females in early 2020.

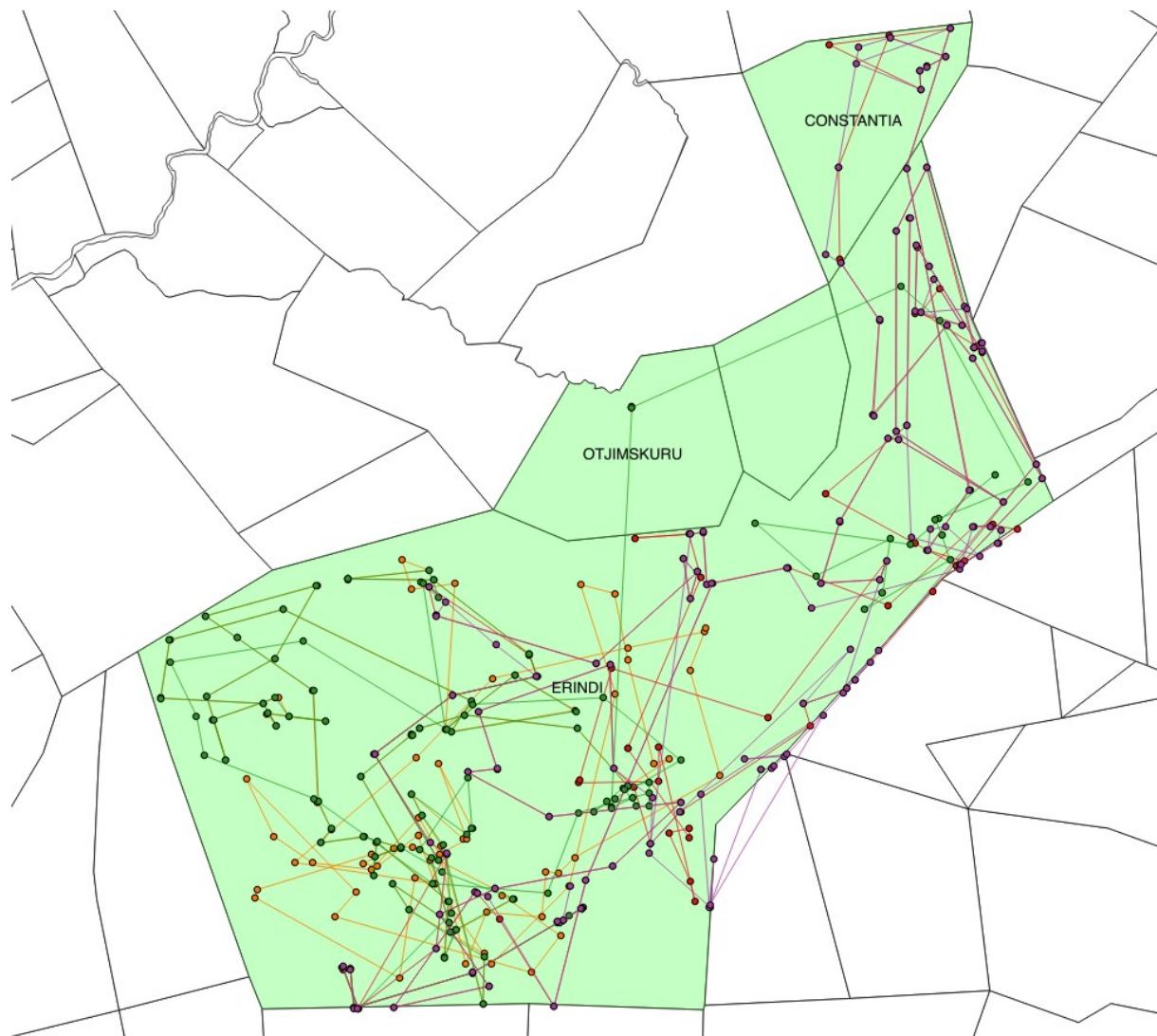


FIGURE 37: GPS COLLAR DATA FROM ALL FOUR FEMALES FROM RELEASE TO JUNE 2019; GREEN = SUSAN; ORANGE = DAENERYS; RED = GEORGIA; PURPLE = TATJANA.

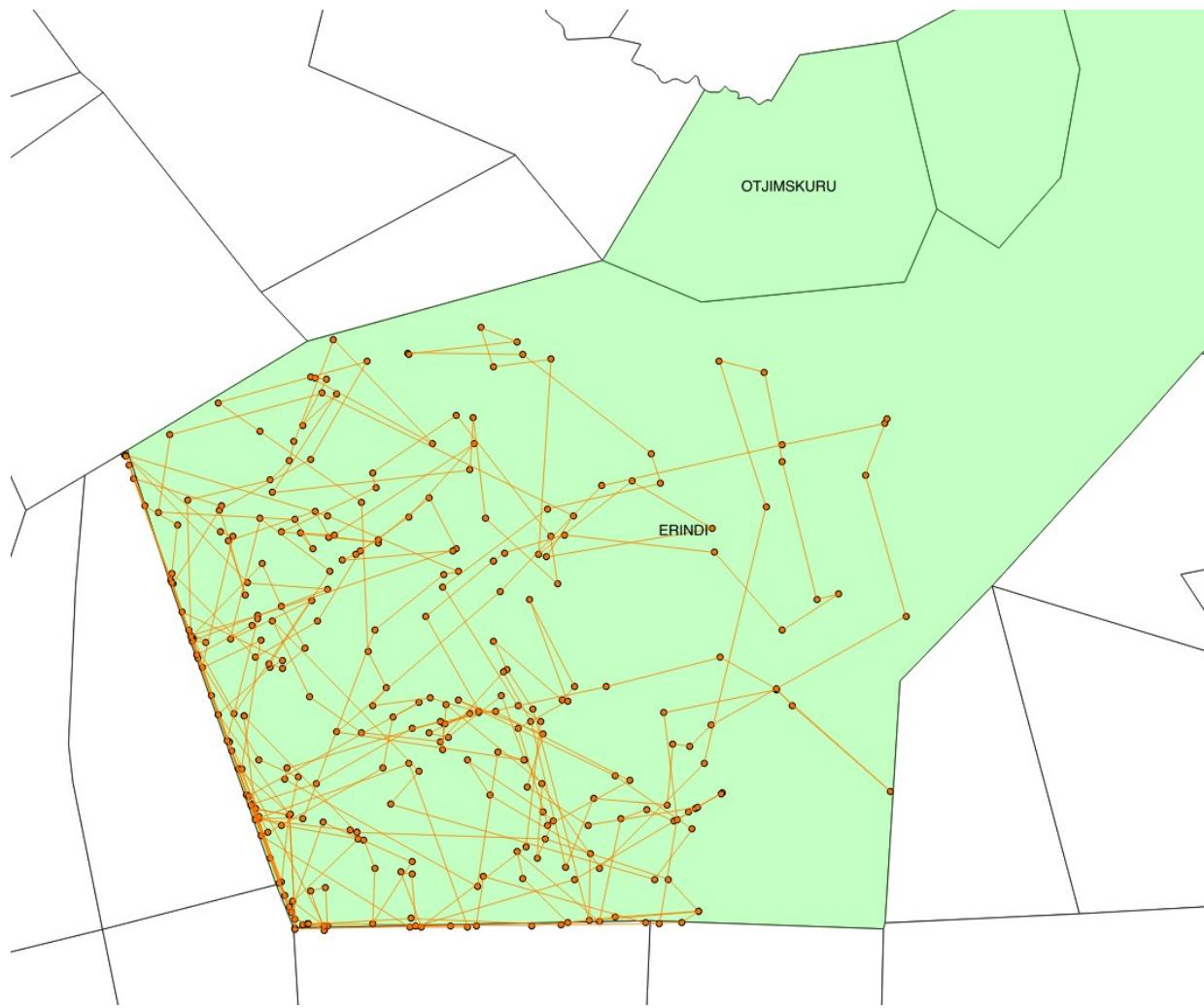


FIGURE 38: GPS COLLAR DATA FOR DAENERYS FROM 2019, TRUNCATED TO ONE POINT PER DAY.

Gracie (AJU1970)

In mid-November 2019, CCF was contacted by MET requesting we assist in collecting a cheetah that had been captured in a trap cage in the Gobabis region of Namibia. Upon arrival, CCF found an adult female cheetah who was still very wild and in relatively good condition. After a full medical check-up, receiving a GPS tracking collar, and a brief period of rest at CCF, the cheetah, named Gracie, was transferred to a holding boma in Erindi for eventual release. Gracie will be released into the reserve sometime in early 2020.

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 2019 (Figure 39 & Figure 40). Between January and December 2019, CCF received 156.60 mm. The first drops in the summer fell on 7 October 2019 (<1mm) and the first significant rain event was on 6 December, receiving an average of 17.3mm throughout CCF land, and as high as 24mm in the areas closer to the Waterberg. During the wet season 2018-2019 (October – April), CCF received 125.80 mm of rain, which is lower than the median (384mm) rainfall for the last 10 years.

The lowest temperatures in 2019 were recorded on 12 June, 1, 2 and 5 July with temperatures ranging between 1 – 5°C, and the highest temperature was recorded on 24 October at 38°C. In comparison to 2018, the monthly minimum temperatures are similar, while the maximum temperatures are considerably higher toward the end of the year (Figure 40).

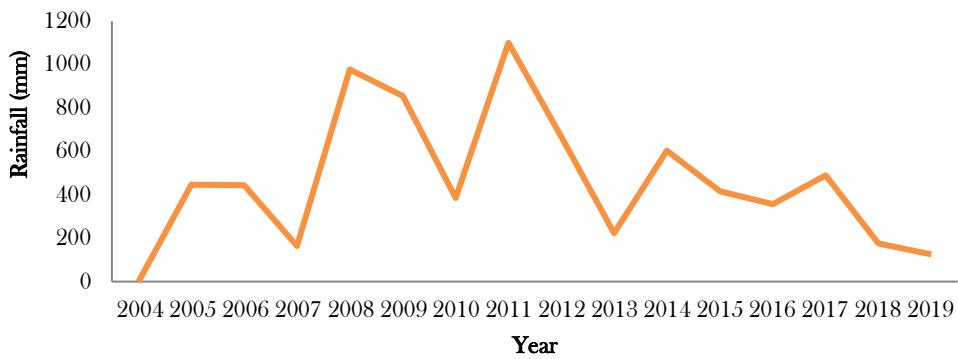


FIGURE 39: ANNUAL RAINFALL FROM 2004 TO 2019. EACH RAINY SEASON COMPRISES THE PRECIPITATIONS OCCURRING BETWEEN OCTOBER OF ONE YEAR AND JULY OF THE FOLLOWING YEAR.

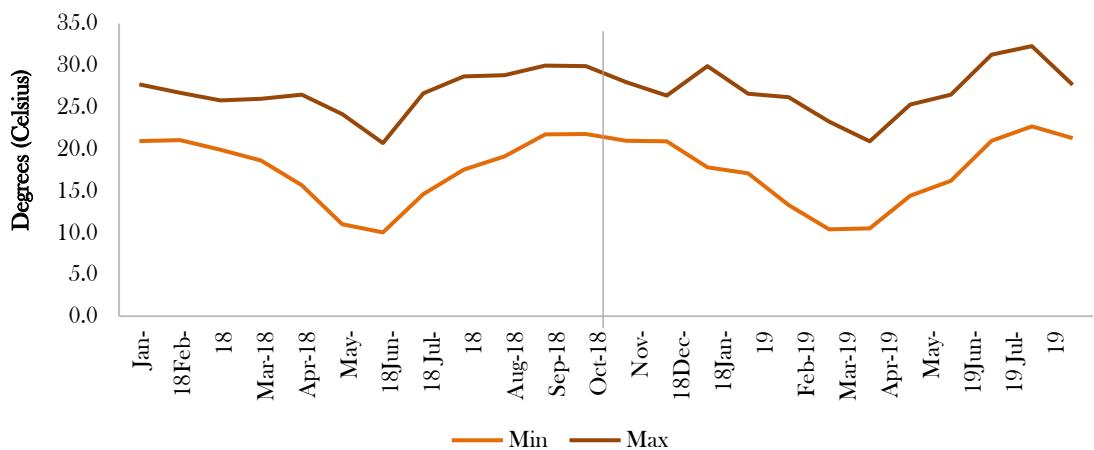


FIGURE 40: MONTHLY AVERAGE MINIMUM AND MAXIMUM TEMPERATURES (°C) FROM JANUARY TO DECEMBER 2018 AND 2019.

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 the patterns and trends of game density, movements, demographics, and habitat utilization. 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 (*Pachuel-loeschea leubuitziae*), which has triggered a change in species density on the field.

During this reporting period, 36 replicate counts (3 routes sampled daily for three 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 41). The total distance travelled by three teams is 16.48km per day and 49.44km per month.

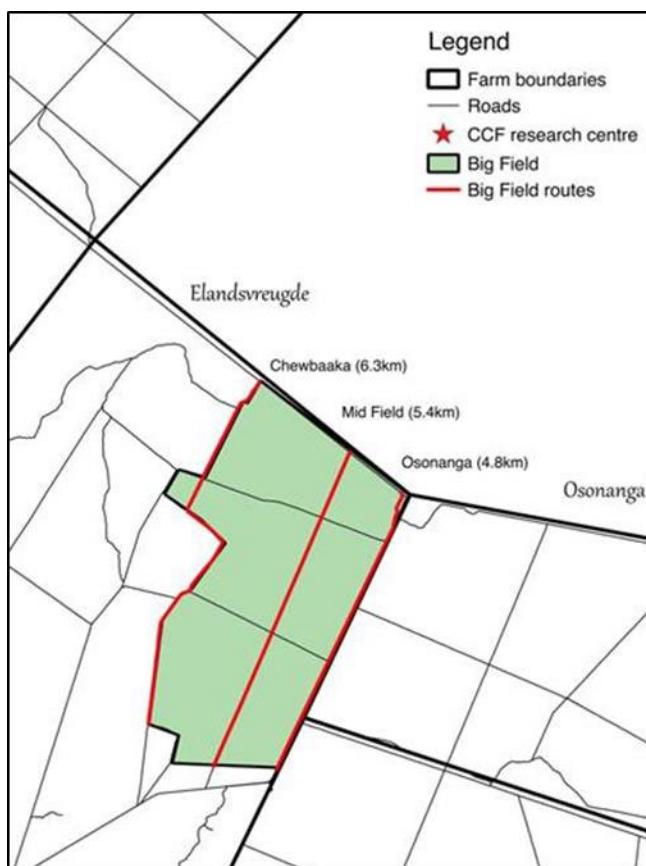


FIGURE 41: MAP OF CCF LAND AND LOCATION OF THE BIG FIELD SHOWING THE THREE TRANSECTS DRIVEN MONTHLY FOR GAME COUNTS.

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 in the R package.

The current period was compared to the same period in 2018, showing an increase in warthog, springbok, red hartebeest, oryx, eland and kudu (Table 10). All other species are compared in Figure 42 and Figure 43, which show a significant increase in springbok, steenbok, black-backed jackal, kudu and giraffe.

TABLE 10: DENSITY ESTIMATES (INDIVIDUAL/KM²) WITH 95% CONFIDENCE INTERVAL OF THE MOST COMMON SPECIES SEEN ON BIG FIELD IN 2018 AND 2019.

Species	2018			2019		
	Mean	Lower CI	Upper CI	Mean	Lower CI	Upper CI
Warthog (<i>Phacochoerus africanus</i>)	3.15	1.33	7.62	3.84	3.11	4.73
Springbok (<i>Antidorcas marsupialis</i>)	0.72	0.14	3.77	8.18	0.47	141.7
Red hartebeest (<i>Alcelaphus buselaphus caama</i>)	0.32	0.08	1.71	1.99	0.87	4.51
Oryx (<i>Oryx gazella</i>)	1.10	0.43	3.07	5.9	1.91	18.23
Eland (<i>Taurotragus oryx</i>)	0.28	0.05	5.31	0.45	0.06	3.34
Kudu (<i>Tragelaphus strepsiceros</i>)	0.56	0.12	2.98	2.75	0.49	15.37

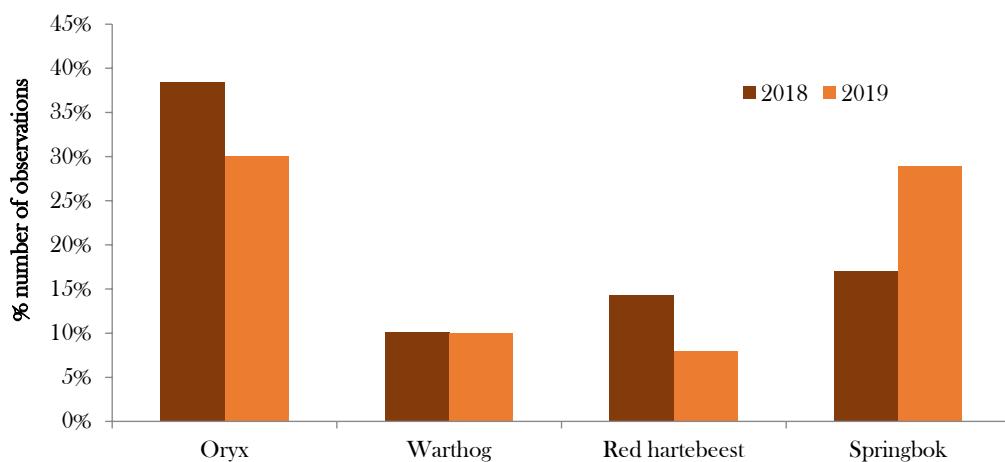


FIGURE 42: NUMBER OF SIGHTINGS FOR THE MOST COMMON SPECIES DURING THE BIG FIELD COUNTS IN 2018 AND 2019.

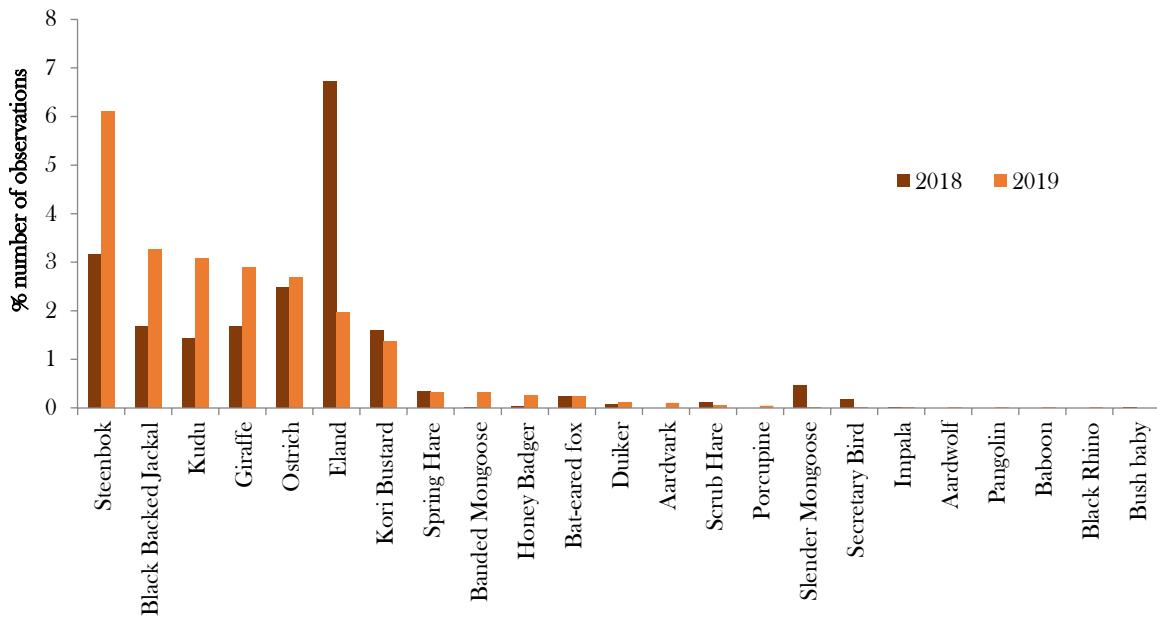


FIGURE 43: DISTRIBUTION OF SPECIES SEEN DURING THE BIG FIELD GAME COUNTS IN 2018 AND 2019.

Night counts - Circuit B

The night count (also known as Circuit B) was also driven on once a month (7 p.m. – 10 pm in winter, and 8 pm – 11 pm in summer) using spotlights on both sides of the vehicle (Figure 44). 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 45).

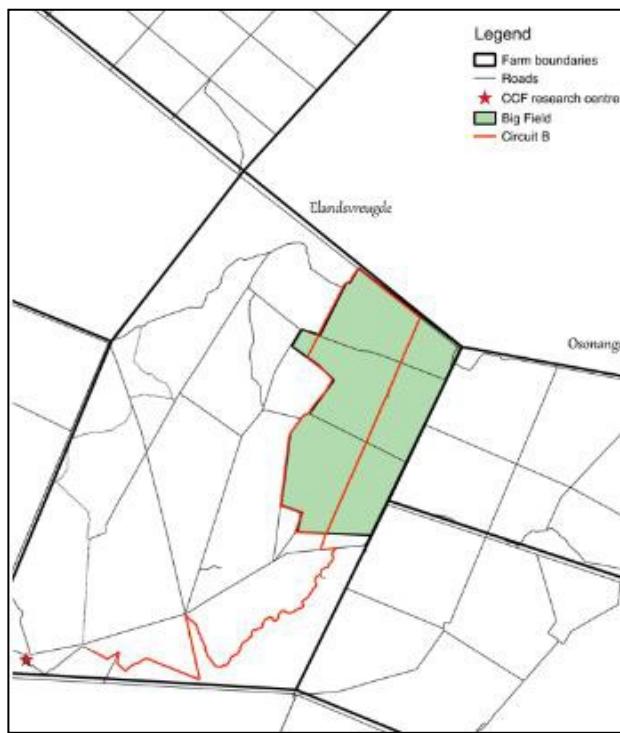


FIGURE 44: LOCATION OF CIRCUIT B ON FARM ELANDSVREUGDE.

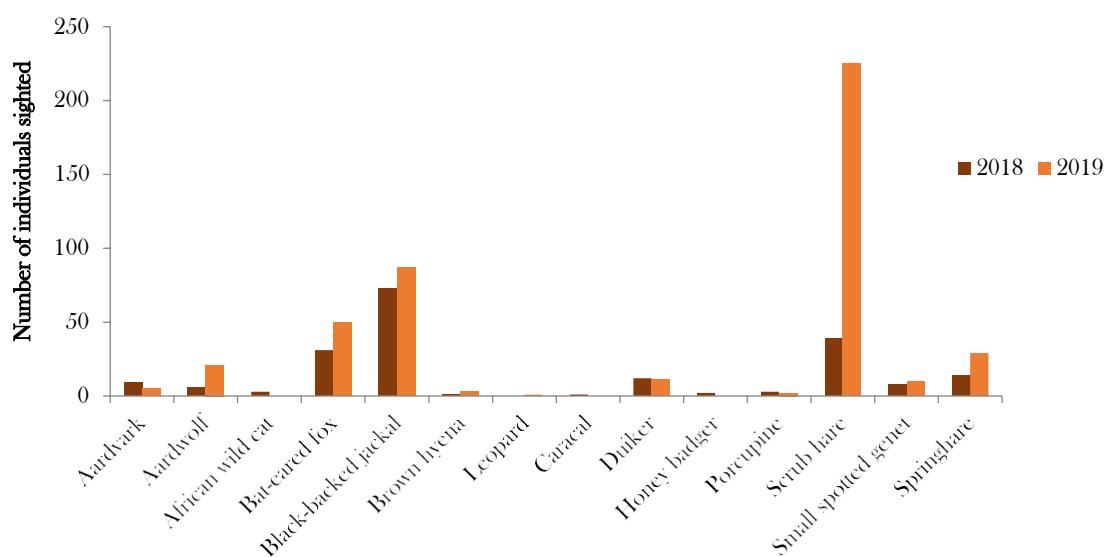


FIGURE 45: SIGHTINGS OF NOCTURNAL SPECIES DURING NIGHT COUNTS IN 2018 AND 2019.

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 6 am to 6 pm 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 2019, waterhole counts were conducted on six different occasions (bimonthly). A total of 3,189 animals were counted involving 18 different species. Here we show the most common species recorded during the waterhole counts in Figure 46 and their densities in Table 11.

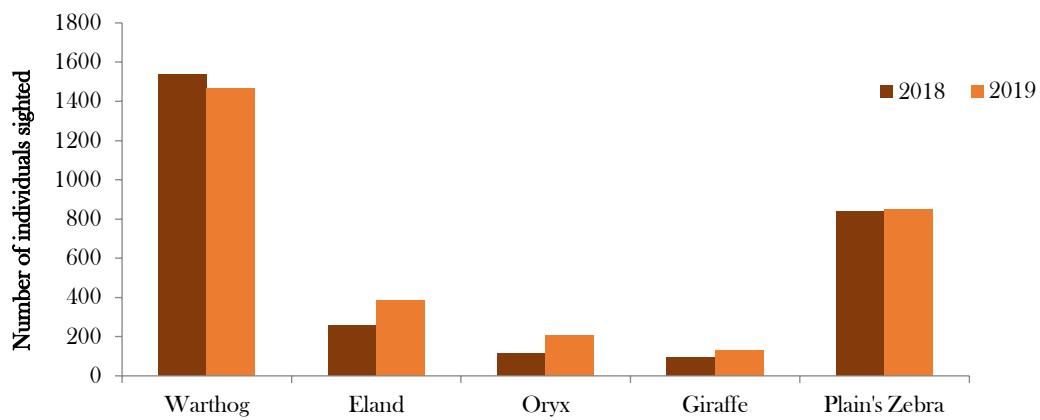


FIGURE 46: FREQUENTLY SIGHTED SPECIES DURING THE BELLEBENNO WATERHOLE COUNT.

TABLE 11: DENSITY ESTIMATES (INDIVIDUAL/1000HA AND INDIVIDUAL/KM2) OF THE MOST COMMON SPECIES SEEN ON THE BELLEBENNO WATERHOLE COUNTS IN 2018 AND 2019.

Year	Species	Total counted	Population size estimated (p)	Density per 1000ha	Density per km2
2018	Warthog	1538	3076	426.8	42.7
	Eland	256	2560	355.2	35.5
	Oryx	113	1130	156.8	15.7
	Giraffe	94	188	26.1	2.6
	Plain Zebra	839	1678	232.8	23.3
2019	Warthog	1468	2936	407.3	40.7
	Eland	385	3850	534.2	53.4
	Oryx	208	2080	288.6	28.9
	Giraffe	128	256	35.5	3.6
	Plain Zebra	847	1694	235.0	23.5

Annual waterhole counts

The annual 12h waterhole counts took place on 16 July 2019 and 2 August 2019. A total of 15 waterholes (Figure 47) were surveyed this year by teams of 2 observers comprised of CCF volunteers/interns/staff and Earth Expedition members, during the first waterhole count. During the second waterhole count, all waterholes were included except for Picnic dam which was dry at the time, and in addition to CCF volunteers/interns/staff, students from Otjiwarongo's Paresis Secondary School assisted with the count.

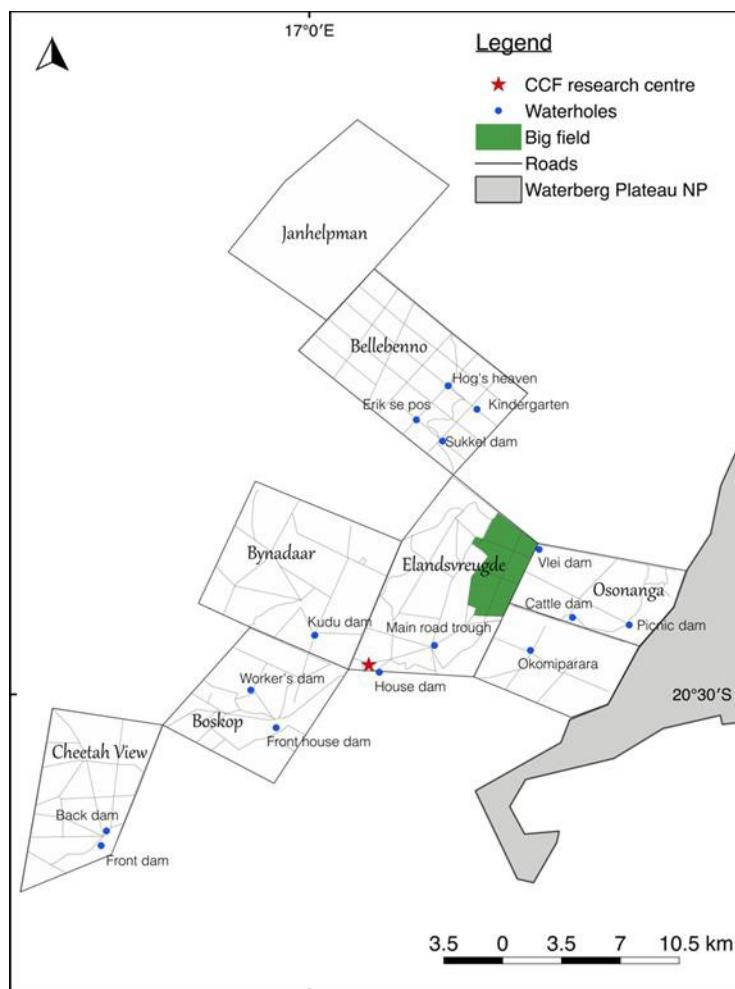


FIGURE 47: LOCATION OF WATERHOLES SURVEYED DURING THE ANNUAL 12-HOUR.

Density estimates for the most common species for both surveys are shown in Figure 48. Oryx and eland showed the biggest fluctuation between the surveys. The increase in eland density could be explained by new births, while the decrease in oryx density could show movement to other areas in search of water resources, given the drying dams and food scarcity during the second survey.

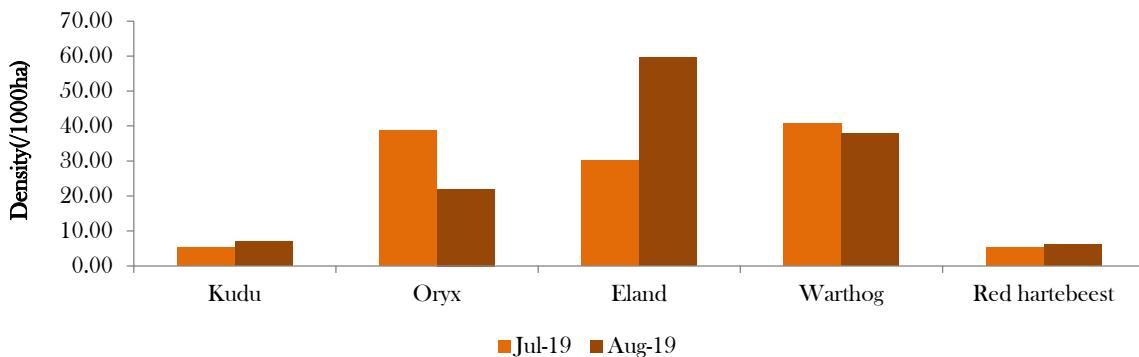


FIGURE 48: DENSITY ESTIMATES FOR THE MOST FREQUENTLY SIGHTED GAME SPECIES DURING THE TWO WATERHOLE COUNTS IN 2019.

Comparison of density estimates of the five frequently sighted game species since 2016 are shown in Figure 49. The overall trend indicates an increase in game numbers after a drop in 2017.

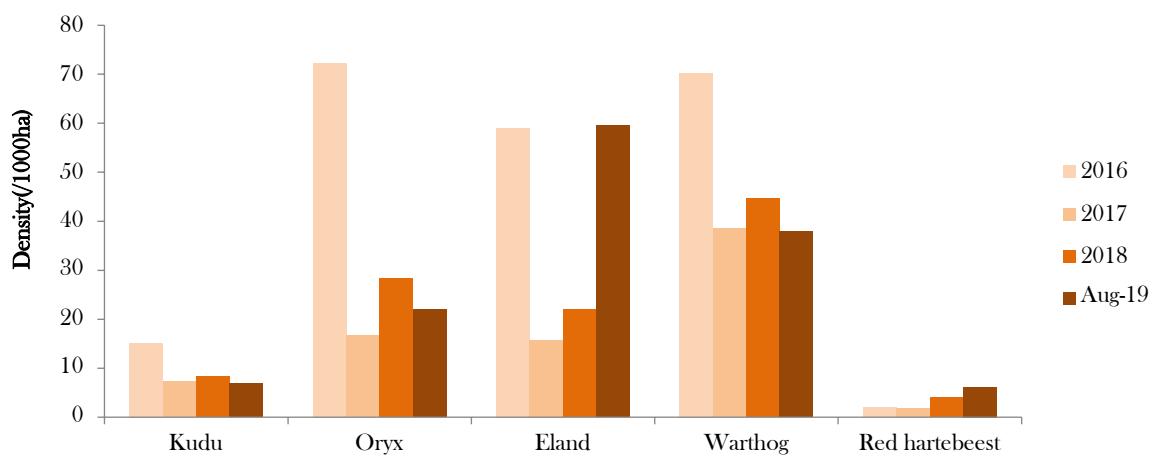


FIGURE 49: COMPARISON OF DENSITY ESTIMATES OF MOST FREQUENTLY SIGHTED GAME SPECIES DURING THE 12-HOUR WATERHOLE COUNTS FROM 2016 - 2019.

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, the non-game fenced section of Bellebenno, and the newly added Padberg (Figure 50). They are repeated twice (one morning and one-afternoon count) for each season (wet, early, and late dry). The 10 transects cover a total of ~192 km (383 km including the repetitions). We estimated densities for the most commonly seen species following the same methods as for Big Field counts.

The Padberg transect was included in the seasonal count for the first time in October 2019, during the hot dry season. Densities for the most frequently sighted species were calculated using Distance 7.3.

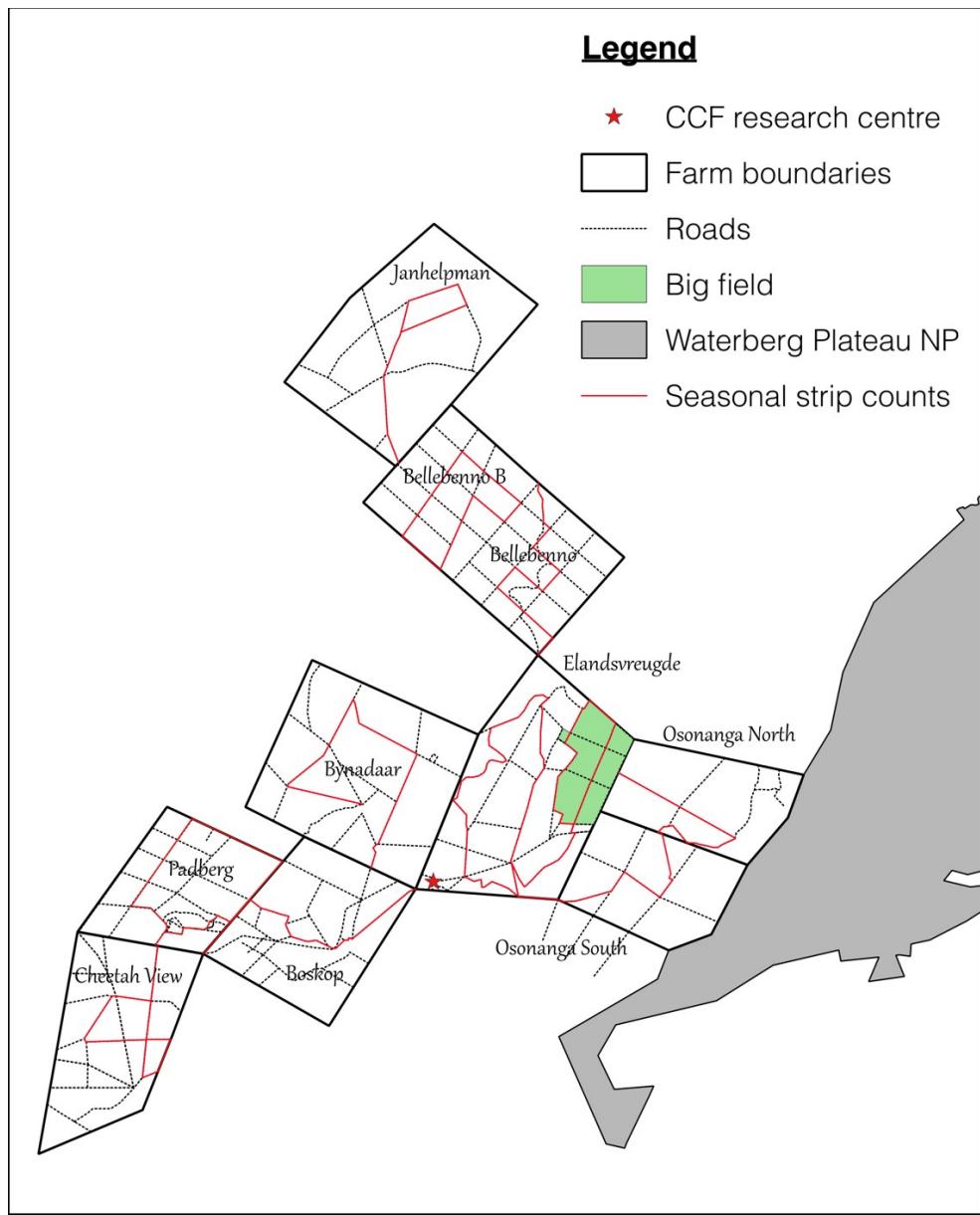


FIGURE 50: MAP OF SEASONAL STRIP COUNT TRANSECTS ON CCF LAND.

Based on the density estimates (Table 12), steenbok, kudu, eland, warthog and oryx are the most abundant species on CCF land. 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 Elandsvreugde and sightings are infrequent.

TABLE 12: DENSITY ESTIMATES OF MAIN SPECIES COUNTED DURING SEASONAL STRIP COUNTS, BY SEASON DURING 2018 AND 2019.

Density estimate (individual/km ²)				2019		
Species	2018			Wet (March)	Early Dry (July)	Late Dry (October)
	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)	1.3 (0.68-2.42)	0.59 (0.04 – 0.87)	1.28 (0.68-2.42)
Eland <i>(Taurotragus oryx)</i>	0.9 (0.2-4.9)	1.8 (0.3-9.8)	1.3 (0.3-8.3)	7.8 (0.01 – 24)	0.2 (0.02-1.54)	0.1 (0.01 -0.62)
Giraffe <i>(Giraffa camelopardalis)</i>	1.2 (0.3-6.0)	0.8 (0.1-4.5)	1.0 (0.2-4.7)	0.17 (0.03-1.33)	0.07 (0.01-0.59)	0.14 (0.07-0.28)
Kudu <i>(Tragelaphus strepsiceros)</i>	1.5 (0.1-21.5)	2.1 (0.3-16.7)	3.6 (0.5-26.0)	0.5 (0.19-1.3)	2.2 (0.9-5.5)	0.24 (0.13-0.42)
Oryx <i>(Oryx gazella)</i>	2.5 (0.6-11.7)	1.7 (0.3-10.2)	1.4 (0.3-6.8)	1.28 (0.01-218.3)	0.35 (0.11-1.08)	0.43 (0.08- 2.34)
Red hartebeest <i>(Alcelaphus buselaphus caama)</i>	0.3 (0.0-2.6)	0.1 (0-1.0)	0.0 (0.0-0.1)	0.32 (0.11-0.89)	0.44 (0.1-1.81)	0.33 (0.02-5.36)
Springbok <i>(Antidorcas marsupialis)</i>	0.1 (0-1.1)	0.2 (0-0.8)	0.1 (0.1-0.5)	0.44 (0.01-15.96)	0.12 (0.01-27.4)	0.41 (0.01 -3.2)
Steenbok <i>(Raphicerus campestris)</i>	4.7 (1.0-23.3)	8.9 (1.4-70.4)	9.2 (2.0-43.5)	4.43 (3.26 – 6.02)	3.22 (2.6-4)	4.57 (2.64 - 7.92)
Warthog <i>(Phacochoerus africanus)</i>	10.2 (2.0-53.5)	4.9 (0.9-28.4)	6.4 (1.4-29.1)	2.11 (0.43-103.94)	0.42 (0.19-0.94)	0.38 (0.21-0.68)
Plains zebra <i>(Equus quagga)</i>	2.9 (0.65-13.0)	1.7 (0.3-9.8)	1.7 (0.4-7.3)	1.02 (0.36-2.92)	0.27 (0.03-2.22)	0.07 (0 – 5)

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 the 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 2019. During this reporting period, a manuscript on the responses of wildlife towards bush harvesting was submitted for publication in the journal of Forest Ecology and

Management. Also, another manuscript on the regeneration patterns of encroaching species following thinning on CCF farms was in preparation.

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.

Analysis of soil properties (chemical and physical properties) between harvested and non-harvested bush encroached habitat to understand long-term natural regeneration and recovery of the soils and restored vegetation continued, and the preparation of the manuscript. 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. This project is part of CCF's Senior Ecologist and Forest Steward, Matti Nghikembua's Phd research.

In 2019, as part of Paulus Maseka's in-service training (Bachelor of Natural resources & Nature Conservation) research, a bird survey was conducted between harvested and non-harvested sites, in plots harvested during 2018 on farm Elandsvreugde. 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.

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.

Since the first initial survey in 2005, CCF has been monitoring play trees on its land on a permanent basis. During this reporting period, eight different individuals have been identified (Figure 51), one female with two older male cubs, a coalition of 2 males, two other females and another male. Prior to the survey, the last capture of a cheetah on a reserve camera trap was in December 2018.



FIGURE 51: A FEW CAMERA TRAP PHOTOS OF LEOPARDS AT PLAY TREES.

Given the low occasions of cheetahs captured at these scent-marking sites it was not possible to calculate densities. Leopards densities and abundance were calculated using SPACECAP (Gopalaswamy *et al.*, 2012) version 1.1.0 in R version 3.5.3 (R Core Team, 2018). SPACECAP uses spatially explicit capture-recapture models to estimate animal densities using closed model capture-recapture sampling from photographic captures (Gopalaswamy *et al.*, 2012). This package uses a Bayesian approach and Markov chain Monte Carlo (MCMC) simulation to generate samples from the posterior distribution of each parameter (Royle *et al.*, 2009). This package provides non-asymptotic inferences which are more appropriate for small numbers of captures typical of photo-capture studies (Gopalaswamy *et al.*, 2012).

A total of 32 leopards were captured during the study period. More females ($n = 17$, 65.38%) were captured compared to males ($n = 9$, 34.62%). Single females also had higher capture occasions (48.78%) compared to single males (30.49%), while 10.98% of captures were of a male and female together and 9.76% of captures were of a female with one or two cubs. Behaviour of leopards was also noted at each tree: 62.33% of leopard captures displayed scent-marking behaviour (scratching, rubbing, sniffing tree, urine spraying), 32.19% walked passed/sat by the tree, 4.79% of captures were of leopard hunting, climbing or playing and <1% of captures were of leopards looking at the camera trap. Leopard activity was largely nocturnal and crepuscular, with peaks varying slightly between sexes (Figure 52). Of the 168 leopard capture occasions, 20 were during the day (11.90%) and 148 were at night (88.10%). Only one site had no captures. Mean captures occasions per site was 7.05 (range = 1–28).

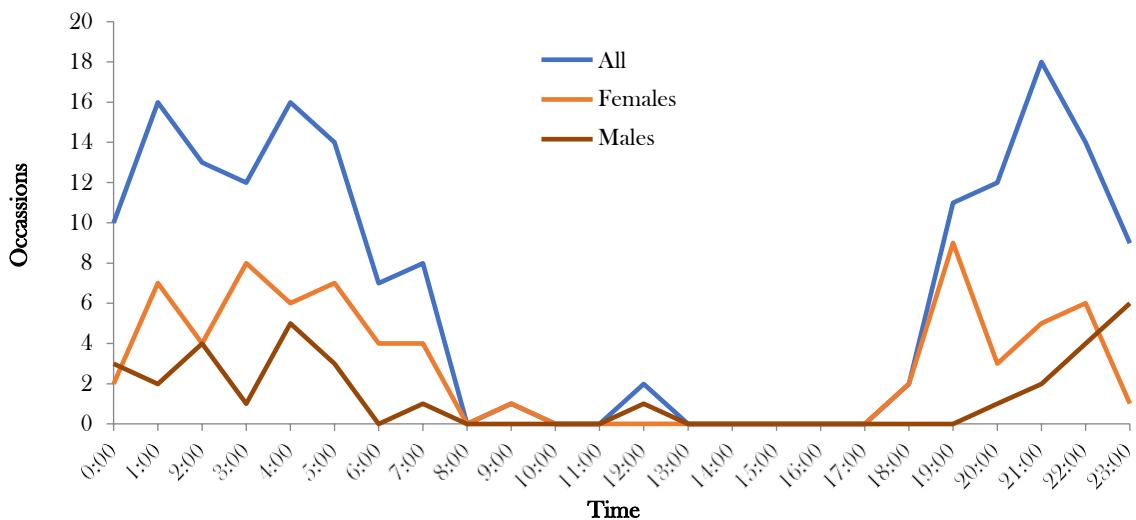


FIGURE 52: CAPTURE OCCASIONS OF LEOPARDS AT DIFFERENT TIMES OF THE DAY.

Leopard density was estimated at $4.87 (\pm 1.03)$ leopards per 100 km^2 in our study area with a confidence interval of $3.27\text{--}6.82$ leopards per 100 km^2 . The model also estimated an abundance of $53 (\pm 11)$ leopard individuals in our study area, with a 95% confidence interval range of $35\text{--}74$ individuals.

Results also show that leopards on freehold farmland in north-central Namibia occur at a higher density compared to other areas in Namibia (Table 13).

TABLE 13: LEOPARD DENSITIES IN NAMIBIA BASED ON DIFFERENT STUDIES.

Location	Density	Vegetation	Rainfall (mm)	Reference
Etosha NP	0.5	-	-	Berry, 1981
Freehold farmland, SW Namibia	0.6–0.9	-	-	Edwards <i>et al.</i> , 2015
Range-wide, Namibia	2.5–3.8	-	-	Hanssen & Stander, 2004
Kaudom NP & Bushmanland, NE Namibia	1.5	Savanna woodland	400–500	Stander <i>et al.</i> , 1997
Waterberg NP,	1.0	Bush savanna; mixed shrub/tree woodland	400–500	Stein <i>et al.</i> , 2011
Freehold farmland, NC Namibia	3.6	Acacia shrubland & woodland	400–500	Stein <i>et al.</i> , 2011

Location	Density	Vegetation	Rainfall (mm)	Reference
Freehold farmland, NC Namibia	4.9	Acacia shrubland & woodland	400–500	This study

5. Giraffe Identification

Since 2003, CCF has been recording and identifying Giraffes. 128 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. Of the 128 Giraffes, 97 (56 males, 31 females and 10 unknown) were seen and recorded alive in 2019, which include seven new individuals who are yet to be identified and recorded according to age, ID and sex (Table 14).

TABLE 14: TOTAL NUMBER AND PERCENTAGE OF INDIVIDUALS OF EACH SEX.

Number of individuals (%)	
Males	56 (58)
Females	31 (32)
Unknown	10 (9.4)
Total	97

Of the 97 seen and recorded individuals, 59 are adults, 31 sub-adults and 7 calves. This population was estimated using the number of individuals observed between 2015 and 2019 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 or observed since 2015 but were re-photographed in late 2017. It is therefore likely that there are other individuals who are present but have not been documented in the last couple of years.

Calves are individuals estimated to have been born in 2019, sub-adults are individuals between the estimated ages of two and four, and adults are individuals estimated five years or older. In Figure 53, the majority of individuals are adults (61%) followed by sub-adults (32%) and then calves (7%).

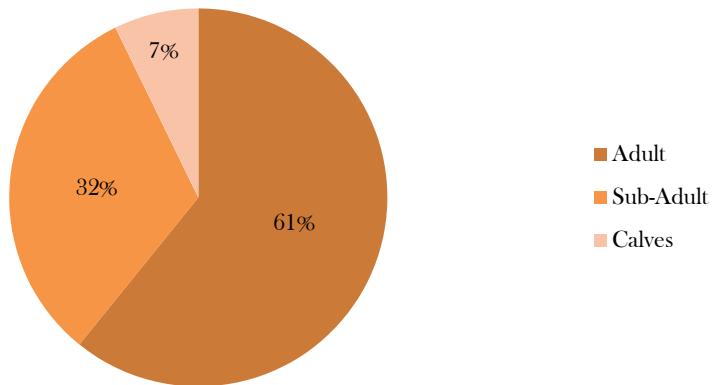


FIGURE 53: PERCENTAGES OF GIRAFFES PER AGE GROUP OBSERVED IN 2019.

During 2019, 58 individuals have been observed in Bellebenno, 39 in the Reserve and no overlaps have been observed in 2019 (Table 15). Overall, the largest numbers of Giraffes have been observed in Bellebenno with 58 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 15: TOTAL NUMBER AND PERCENTAGES OF INDIVIDUAL GIRAFFES OBSERVED IN 2019. INDIVIDUALS OBSERVED IN BOTH BELLEBENNO AND THE RESERVE ARE CATEGORIZED UNDER “OVERLAP”.

Location	Number of individuals (%)
Bellebenno	58 (59.8)
Reserve	39 (40.2)
Overlap	0 (0)
Total	95

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 is now 16 years old. Most individuals were first observed in 2010 ($n=20$), and the youngest individuals from that year are now adults (ten years old). The 14 individuals from 2013, the majority of whom were calves born that year have also reached adulthood (seven years old). In 2019 seven new calves were observed, two in the reserve during game drives and game counts and five in Bellebenno (Figure 54).

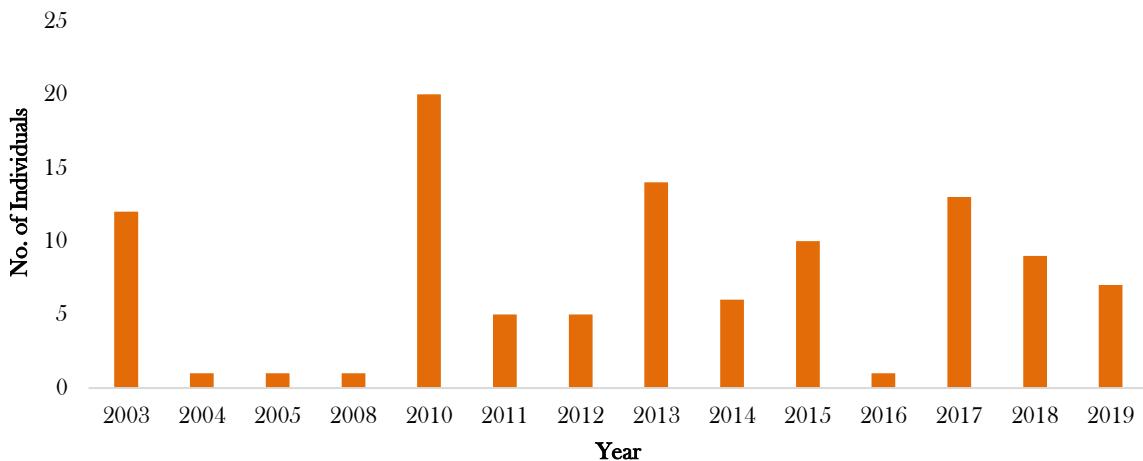


FIGURE 54: YEARS IN WHICH INDIVIDUALS WERE FIRST OBSERVED.

7. Visiting Researchers

Termite Research: Dr. Paul Bardunias, Dr. Daniel Calovi, Dr. Nicole Carey and Dr. Andrea Surovek and Hannah Moen

Dr. Paul Bardunias a visiting research scientist, along with Dr. Daniel Calovi, Dr. Nicole Carey and Dr. Andrea Surovek and Hannah Moen visited and conducted research at CCF from 9 May 9 – 15 June 2019. This joint team from Harvard's Wyss Institute and the State University of New York- Environmental Science and Forestry are investigating the role of humidity in governing the mound construction process in the *Macrotermes* species. Their findings challenge long-held beliefs about the way 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, who continued his data collection in 2019. 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 came back in December 2019 to continue checking on the installed hornbill nest boxes.

Soil Research: Jona Luther-Mosebach

Jona Luther-Mosebach visited on 17 March 2019 to check on the four soil monitoring stations he installed at CCF. The objective of this project was 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. Jona came back on 29 November 2019 to continue monitoring the soil stations.

Small stock scientist: Dr. Terry Gipson

In February 2019, 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.

6. Training Courses

In May 2019, the National Directorate for Wildlife and Protected Areas in Niger contacted CCF on the possibility of hosting a training course for Nigerians Wildlife officials. After five months of preparing for this groups, CCF successfully hosted one-month (6 October – 7 November) course on training on immobilization techniques, ecological and epidemiological survey, for Wildlife officials from the Republic of Niger in October. The seven participants learnt hands-on from CCF staff and other stakeholders, about cheetah & wildlife research, education, and conservation.

G. Scientific Publications and Papers

1. Papers

Marker, L. (2019). Loving a Species to Death. *Biodiversity*, 2(1): 50 – 55

Marker, L. (2019). Cheetahs Race for Survival: Ecology and Conservation. *InTechOpen*, DOI: 10.5772/intechopen.82255.

2. Accepted Papers

Meachen, J., Marker, L., Schmidt-Kuentzel, A. Regional variation in the cheetah (*Acinonyx jubatus*) morphology of wild and captive populations. *Zoo Biology*.

Sanchez, C., Hayek, L. C., Carlin, E. Brown, S.A., Citino, S., Marker, L., Jones, K.L., Murray, S. Determination of glomerular filtration rate via single-dose inulin serum clearance and its relationship with endogenous symmetric dimethylarginine in cheetahs (*Acinonyx jubatus*). *American Journal of Veterinary Research*.

3. Submitted Papers

Fabiano, E., Sutherland, C., Fuller, A., Eizirik, E., Nghikembua, M., Marker, L. Trends in cheetah *Acinonyx jubatus* density in north-central Namibia. *Population Ecology*.

Claydon, H., Humle, T., Marker, L. Building evidence for the social impacts of alternative livelihood projects: a case study from Namibia. *Human Dimensions of Wildlife Journal*.

Verschueren, S., Briers-Louw, W., Torress-Uribe, C., Siyaya, A. and Marker, L. Livestock losses in an unbalanced ecosystem in eastern communal conservancies, Namibia. *Human Dimensions of Wildlife*.

Nghikembua, M., Marker, L., Brewer, B., Mehtätalo, L., Appiah, M., Pappinen, A. Response of wildlife to bush thinning on the north central freehold farmlands of Namibia. *Forest Ecology and Management*.

Verschueren, S., Briers-Louw, W.D., Fabiano, E., Nghikembua, M., Torres-Uribe, C., Marker, L. Heterospecific use of scent-marking sites by cheetahs (*Acinonyx jubatus*) and leopards (*Panthera pardus*) in north-central Namibia. *African Journal of Ecology*.

Verschueren, S., Briers-Louw, W.D., Fabiano, E., Nghikembua, M., Torres-Uribe, C., Marker, L. Space-time characterization of movements to describe territoriality in cheetahs in north-central Namibia *Journal of Zoology*.

4. Papers in Preparation

Schmidt-Küntzel A., Hils, K., O'Brien S., Marker, L. A molecular tool kit for genotyping low quality non-invasively collected cheetah (*Acinonyx jubatus*) samples. *Journal of Heredity*.

Lindenberg, M. T., Walker., E.H., Keenlance, P., Jacquot, J.J., Locher, A., Marker, L. Is the ecology of reintroduced, captive-raised female cheetahs the same as wild cheetahs? A study in north-central Namibia.

Mhuulu, L., Marker, L., Naomab, E., Schmidt-Küntzel, A. Identification of individual cheetahs (*Acinonyx jubatus*) combining non-invasive genetic and camera-trapping techniques on Namibian farmland.

Marker, L., Fleury, G., Siyaya, A., Nghikembua, M. T. Human-Carnivore Conflict in the Eastern Communal Conservancies.

Walker, E., Schmidt-Kuentzel, A., Verschueren, S., Briers-Louw, W.D., Marker, L. Recommendations for the rearing and release of wild-born, captive-raised cheetah.

Aslam, A., O'Flaherty, C., Marker, L., Nicola Rooney, N. Assessing proximity and behaviour as factors that influence Livestock Guarding Dog effectiveness

Cristescu, B., Traylor-Holzer K., Leus K., Traeholt C., Fabiano, E., Schwartz, K.R., Schmidt-Küntzel., A., Brewer, B., Marker, L. Viability projection for cheetah populations predicts range-wide decline in the absence of conservation intervention

Nghikembua, M., Marker, L., Brewer, B., Leinonen, A., Mehtätalo, L., Appiah, M., Pappinen, A. Regeneration patterns of encroaching species following bush thinning on the north central freehold farmlands of Namibia

Siyaya, A., Hughes, C., White, W., Nitsche, C., Manfredo, M., and Marker, L. Pathways Africa 2018 – Namibia Training: Impacts on participant experience

Reasoner, E.M., Verschueren, S., Torres-Uribe, C., Briers-Louw, W. D. Nghikembua, M., Siyaya, A., Marker, L. Activity overlap of ungulate species on freehold farmland in the Greater Waterberg Landscape, Namibia.

Fabiano, E. C., Bonatto, S. L., Schmidt-Küntzel, A., Ferrand, N., Marker, L.L., Eizirik, E. Inferring the historical demography of the Namibian cheetah (*Acinonyx jubatus*) population using Bayesian analyses of molecular genetic data.

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

Hofmann, T., Marker, L. and Hondong, H. Factors influencing the detection success of cheetah scat by dog-human and human-only teams in a semi-arid thorn bush savannah (Waterberg Conservancy, Namibia).

5. MSc. Papers

Leadbeater, Bridget. Understanding Factors that Influence Livestock Guarding Dogs [LGD] Success on Livestock Protection, Existing Alongside Predators such as Cheetah in Namibia. MSc Thesis for Edinburgh Napier University. School of Applied Sciences. Edinburgh, UK.

Carlyle, James. Feline infectious peritonitis in cheetahs (*Acinonyx jubatus*): a retrospective study. MSc. Thesis for Global Wildlife Health and Conservation in the Faculty of Medical and Veterinary Sciences. Bristol Veterinary School, University of Bristol.

Pineda, Karina Flores. Serological Response of African Wild Dogs (*Lycaon pictus*) to canine distemper vaccinations with a live attenuated vaccine and possible factors affecting it. MSc. Thesis for Global Wildlife Health and Conservation in the Faculty of Medical and Veterinary Sciences. Bristol Veterinary School, University of Bristol.

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 651 (331M, 320F) Livestock Guarding Dogs with farmers throughout Namibia and other parts of Africa. As of December 2019, there were 204 (96M, 108F) dogs alive in the programme (Table 16), of which 174 (80M, 94F) are working dogs and 30 (16M, 14F) are retired or housed as pets.

TABLE 16: DOGS ALIVE AS OF 31 DECEMBER 2019. THE DOGS IN SOUTH AFRICA AND ONE FEMALE IN TANZANIA ARE NOW PET DOGS.

Location	M	F	Total
Commercial	29	33	62
Commercial (CCF Working)	5	14	19
Communal	24	32	56
Emerging Commercial	12	6	18
Resettled	9	8	17
Tanzania	1	1	2
Total Working	80	94	174
Retired/Pet (breeding)	16	14	30
Total dogs alive:	96	108	204

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 to helping farmers protect their livestock and thus save more cheetahs.

Currently, there are 16 (3M, 13F) intact dogs in CCF's breeding programme (**Error! Reference source not found.**), of which 11 (2M, 9F) reside at CCF as working dogs, three (0M, 3F) work on commercial farms, and two (1M, 1F) reside 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. Kaspas (SB#456), a breeding male on a commercial farm, was sterilised on 28 October 2019 due to hip dysplasia, arthritis, and old age. Three dogs were added to **Error! Reference source not found.** in 2019.

- Koda (SB#772), a Lady (SB#535) puppy kept at CCF to become a breeding and working female.
- Delarey (SB#707), a breeding male donated to the Cheetah Outreach to help with their livestock guarding dog programme.
- Lisboa-Bella (SB#788), a future breeding female imported from Portugal arrived at CCF on 2 October 2019
- Mia (SB#789), a future breeding female imported from Cheetah Outreach arrived at CCF on 12 December 2019

TABLE 17: INTACT LIVESTOCK GUARDING DOGS AS OF 31 DECEMBER 2019.

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

The LGD programme is a crucial part of 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. Calum O'Flaherty arrived in June 2019 to manage the programme. Stella Emvula has assisted in managing the programme for 2 years.

2. Breeding and Puppy Placements

Since the programme's inception, 84 litters have been born at CCF for a total of 693 (335M, 343F, 15U) puppies. From January to December 2019, a total of 29 (13M, 16F) puppies were born to four of CCF's breeding females (Table 18). Of the 29 puppies born, one female was stillborn, one male rolled on by their dam, one male died from internal health issues, and two puppies (1M, 1F) were euthanised due to decreasing health.

TABLE 18: PUPPIES BORN AND TYPE OF PLACEMENT AS OF 31 DECEMBER 2019 (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	660/451		660/498		660/535		660/628		660/507		TOTALS	
DOB:	17Nov'18		03APR'19		21APR'19		04JUN'19		17JUN'19			
SEX:	M	F	M	F	M	F	M	F	M	F	M	F
K	2	1	1	3	0	1	1	0	1	1	5	6
C	0	1	0	2	2	1	2	0	3	5	7	9
EC	0	0	0	0	1	0	0	0	0	0	1	0
R	1	0	0	0	0	0	0	0	0	0	1	0
P/B	0	0	0	0	0	0	0	0	0	0	0	0
D	0	0	2	1	0	1	0	0	0	1	2	3
NP	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	2	3	6	3	3	3	0	4	7	16	18
IP	0	0	0	0	0	1	0	0	0	0	0	1

- 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. These puppies were placed in February 2019. Three (2M, 1F) puppies were placed on commercial farms. One male was placed on a resettled farm and one female was placed on a communal farm.
- !Usi (SB# 498) was bred with our Kangal male, Bolt (SB# 660), for the second time in January 2019. She gave birth to 9 (3M, 6F) puppies on 3 April 2019. Only six puppies survived and were healthy. These puppies were placed in June 2019. Four (1M, 3F) puppies were placed on commercial farms. Two females were placed on communal farms.
- Lady (SB#535) was bred with our Kangal male, Bolt (SB#660), for the third time in February 2019. She gave birth to 6 (3M, 3F) puppies on 21 April 2019. One female was stillborn. These puppies were placed in July 2019. One male puppy was placed on an emerging commercial farm. Three (2M, 1F) puppies were placed on communal farms. One female was kept at CCF to become a breeding and working dog.
- Susie (SB# 628) was bred with our Kangal male, Bolt (SB# 660), for the second time in April 2019. She gave birth to 3 (3M, 0F) puppies on 4 June 2019. All puppies survived and were healthy. All puppies were placed in August 2019. One male was placed on a commercial farm and the other two were placed on communal farms.
- Repet (SB# 507) was bred with our Kangal male, Bolt (SB#660), for the third time in April 2019. She gave birth to 11 (4M, 7F) puppies on 17 June 2019. One female was euthanised due to decreasing health issues. These puppies were placed in August and September 2019. Two (1 M, 1 F) were placed on commercial farms and eight (3 M, 5 F) puppies were placed on communal farms.

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 into 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 2019, CCF staff visited 159 (76M, 83F) 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 159 dogs, 23 (11M, 12F) 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

- Otjiwarongo (SB#304), a working dog on an emerging commercial farm, died from old age within the last 6 months of 2019. CCF was not informed until calling to schedule a farm visit in May 2019.
- Duma (SB#326), a pet dog which was hit and killed by a car in late 2018. CCF was not informed until calling to schedule a visit in July 2019.
- Cheetah (SB#712), a working dog on a communal farm, disappeared along with the farmers goats in December 2018. He is presumed dead as has not been seen again.
- Diamond (SB#459), a working dog on a commercial farm, died from a snakebite in November 2018.
- Kenda (SB#545), a pet dog, was hit and killed by a car within the last 6 months of 2019. CCF was not informed until calling to schedule a visit in June 2019.
- Tjevera (SB#554), a working dog on a communal farm, was hit and killed by a car in December 2018. CCF was not informed until calling to schedule a visit in June 2019.
- Tjevera (SB#557), a working dog on a communal farm, died from a snakebite in June 2018. Owner had taken dog to the vet, but it was too late to treat the dog. CCF was not informed until calling to schedule a visit in February 2019.
- Cheetah (SB#567), a working dog on a communal farm, was euthanised on 8 June 2019 due to squamous cell carcinoma (SCC). See section, Dog Health, for more information.

- Wolfie (SB#597), a working dog on a commercial farm, is suspected to be dead by the farmer, as she never returned to the kraal sometime late 2018. CCF was not informed until calling to schedule a visit in January 2019.
- Oubaas (SB#600), a working dog on a resettled farm, is suspected to be dead by the farmer, as he never returned to the kraal in December 2018. CCF was not informed until calling to schedule a visit in April 2019.
- Meiriza (SB#627), a working dog on a communal farm, is suspected to be dead, farmer died last year and upon CCF's arrival to the farm for their annual visit, worker at the farm said dog probably moved on with the goats.
- Hope (SB#636), a working dog on a commercial farm, is suspected to be dead by the farmer, as she and her herd never returned from the field, suspects they might have been stolen. CCF was not informed until calling to schedule a visit in February 2019.
- Mbungu (SB#684), a working dog on a communal farm, died from a snakebite in January 2019.
- Becky (SB#734), a working dog on a communal farm, died from a snake bite in February 2019.
- Bokkie (SB#675), a working dog on a commercial farm, euthanised due to declining health caused by renal failure in January 2019. See section, Dog Health, for more information.
- Unnamed Dog (SB#760), eight day old puppy born to !Usi (SB#498) at CCF, died from septic peritonitis due to ulceration and perforation of the small intestines on 11 April 2019.
- Unnamed Dog (SB#761), three day old puppy born to !Usi (SB#498) at CCF, died due to dam rolling on him on 6 April 2019.
- Unnamed Dog (SB#767), 19 day old puppy born to !Usi (SB#498) at CCF, euthanised due to declining health caused by the complete obstruction of the distal duodenum/ proximal jejunum on 22 April 2019.
- Karibib (SB#524), CCF's retired breeding female was euthanised due to declining health on 24 July 2019, still unclear of the cause. See section, Dog Health, for more information.
- Light Blue Puppy (SB#786), 5-month-old puppy born to Repet (SB#507) at CCF, euthanised due to declining health caused by toxic liver failure, which had brought on severe seizures that led to deteriorating health on 29 August 2019.
- Penda (SB#287), CCF's retired diabetic breeding and working female was euthanised due to declining health, as she could no longer regulate her glucose on 8 September 2019. See section, Dog Health, for more information.
- Rambo (SB#652), a working dog on a communal farm, died by unknown causes on 15 September 2019.
- Unnamed Dog (SB#764), a working dog on a communal farm, died from potential snakebite or suspected poison from neighbour on 22 September 2019.
- Wolf (SB#635), a working dog on a communal farm, killed by baboon attack CCF was not informed until calling to schedule a follow-up visit on 18 July 2019.

- Susie (Marilyn) (SB#634), a working dog on a communal farm, was shot by neighbour on 13 October 2019.
- Hage (SB#699), a working dog on a communal farm, was stolen from farm. CCF was not informed until calling to schedule a visit 20 November 2019.
- Naleli (SB#714), a working dog on a communal farm, was hit by a car. CCF was not informed until calling to schedule a visit on 1 November 2019.
- Mairiza (SB#708), a working dog on a communal farm, died from suspected snakebite. CCF was not informed until calling to schedule a follow-up visit on 1 December 2019.
- Cheetah (SB#614), a working dog on a communal farm, died from unknown causes sometime in 2018. CCF was not informed until calling to schedule a follow-up visit on 1 November 2019.

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.

- 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 was rehomed as a pet dog in the USA by a former intern that volunteered at CCF on 15 March 2019
- 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 gained weight over a period of months and was rehomed as a working dog to CCF's herder, Armas on 11 March 2019
- Lady (SB# 741), a working dog on a commercial farm, was returned on 4 November 2018 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 stronger 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 was rehomed as a working dog on 7 February 2019.
- 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 has been re-evaluated with CCF's herd and was rehomed as a working dog on 20 February 2019.
- 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. However, due to numerous problems on different farms, decision was made to rehome her as a pet dog on 6 June 2019.

- Kaspas (SB#456), a working dog from a commercial farm, was returned to CCF on 23 January 2019 due to injuries sustained by baboon attacks. Farmer had notified us that dog was at neighbouring farm when this occurred. Upon arrival dog was in good condition aside from severe injuries along his neck. CCF's vet team treated and stitched him up. He will stay at CCF until a home is found for him.
- Pula (SB#622), a working dog from a resettled farm, was confiscated on 15 Mar 2019 due to malnourishment at his farm. He was re-evaluated with our herd and re-homed as a working dog on 11 September 2019
- Spucky (SB#711), a working dog from a communal farm, was returned on 15 May 2019 as he was said to be roaming to neighbouring farms and nipping their livestock. He had also killed a lamb. Upon arrival at CCF, Spucky was in good condition but he 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 stronger than them, but there are numerous tricks to reducing this behaviour. Spucky has been re-evaluated with CCF's herd and is working very well and not playing rough with the small stock anymore. He will soon be re-homed as a working dog on a new farm.
- Robyn (SB#568), a working dog from a commercial farm, was returned on 25 June 2019 as farmer said she had not been eating well for quite some time. CCF had been in contact with farmer about this issue and originally thought it may be due to SCC, but she had been fed an improper diet. Upon arrival, she was in poor condition. CCF's vet team suspected she may have tick bite fever. Her condition improved; she had no signs of tick bite fever. She was re-evaluated with CCF's herd and was not suitable as she did not have any desire to and would return from being out. She was re-homed as a pet dog on 25 September 2019.
- Rocky (SB#739), a working dog from a communal farm, was originally brought in to CCF on 19 September 2019 for a few days as the farmer needed help moving the dog to new grazing area with livestock as he could not get them in the car. Upon conducting a pre-approval for new area, we found that it was not suitable for the dog. Rocky was confiscated on 19 September 2019. Upon arrival, dog was in poor condition. He was re-evaluated with CCF's herd, worked well, and was re-homed as a working dog on 26 November 2019.
- Leeu (SB#701), a working dog from a communal farm, was confiscated on 4 October 2019 during a farm visit when discovering that their owner had moved farms without contacting us and being in poor condition. Upon arrival, Leeu had a slight limp and stitches on his left thigh that had been left for too long and gotten infected. They were removed and cleaned, but we noticed his limp persisted after being re-evaluated with CCF's herd. He was treated but because of this circumstance, he will be placed as a pet dog in January 2020. See section, Dog Health, for more information
- Maya (SB#683), a working dog on a communal farm, was returned on 24 October 2019 due to roaming at night. Dog had been going to neighbouring farms and causing problems with other mongrels and

Anatolians in the area. Upon arrival, dog was in average condition. She has been re-evaluated with CCF's herd and will be re-homed as a working dog in January 2020.

- Thousand (SB#474), a working dog on a communal farm was confiscated on 25 October 2019 due to severe malnourishment. Since he has suffered through this in the past and is a senior dog, the decision was made to re-home him as a pet dog. He was re-homed as a pet dog on 21 December 2019.
- Fisch (SB#583), a working dog on a communal farm, was returned on 9 November 2019 due to increasing issues on his tongue. The farmer did not want him to suffer as he would not eat well on the farm and felt CCF could solve this issue. Upon arrival, he was given pre-soaked food and ate extremely well. CCF's vet team started him on a pain relief regimen as his tongue is too far gone to do surgery on. He has gained weight and energy and has been re-homed as a pet dog on our farm. See section, Dog Health, for more information.
- Cheetah (SB#720), a working dog from a communal farm, was confiscated on 24 December 2019 due to very poor condition through malnourishment. She will be re-evaluated with CCF's herd once she has gained weight and will hopefully be re-homed as a working dog in January 2020.

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 the 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. The following are some of the special cases CCF's veterinary team dealt with during this reporting period.

- Taya (SB #490), a working dog at CCF, began having issues in January 2019. First identified through the swelling of her elbow joint and two abnormal heat cycles within a month of each other. From that date onwards several other issues occurred including lethargy, nausea, anorexia, depression, a bloody nose, and recurring oedemas of the lower limbs. Blood tests were completed, and results were within normal reference ranges and specific tests for diseases and parasites were negative. X rays and ultrasounds were also completed and showed potential abnormalities of the spleen. At the start of April surgery was completed to acquire samples of the spleen in order to do further diagnostics, however, the decision had to be made to remove the entire spleen due to its abnormal appearance and subsequent problems with controlling the bleeding after the biopsy was taken. The spleen was sent off for histopathology tests, but no conclusive diagnostics came back from it. Taya was monitored in the clinic post-surgery and started on

empirical antibiotic and corticosteroid treatments until her condition improved and with no definitive diagnosis, she will be closely monitored for the next few months.

- Bokkie (SB#675), a working dog on a commercial farm, began having issues in 2016 due to contracting tick bite fever. She recovered from this illness but left a lasting effect on her kidneys which led to complications later in life. She was brought into CCF for an evaluation in January 2019 due to a loss of appetite and a decline in her general health. Decision was made to euthanise her after two weeks as condition continued to decline even while on fluid therapy.
- Penda (SB#287), CCF's retired breeding and working dog, in early August she began showing signs of diabetic mellitus and having no proper reaction to insulin injections and this led to anorexia. She was in and out of the clinic for a couple of weeks until around the 2 September 2019 she started having seizures induced by the diabetic mellitus. The vet team gave her fluid therapy and regulated amounts of insulin to try and stabilise her but unfortunately there was no improvement and the decision was made to euthanise her. On completing a necropsy, they found that she had an enlarged pancreas (20cm by 5cm) and had succumbed to chronic cystitis.
- Karibib (SB#524), CCF's retired breeding and ambassador dog, had a peripheral oedema on all 4 of her paws and a swollen muzzle on July 19 2019, CCF's vet team suspected it was a possible allergic reaction, she was monitored and fine by end of day. Unfortunately, she was then hospitalised on 23 July 2019, as we noticed a change in personality, she did not want to get up and there were signs of vomiting in her pen and some diarrhoea. We found blood on her right neck – cleaned and shaved the area and it appeared to be a bite mark with dark red blood. Karibib was placed on a drip and received doses of furosemide, over the next 4 days, her vitals fluctuated but on the 27th, a decision was made to euthanise her due to a rapid decline in health – there was no conclusive necropsy result, as it could have been numerous factors but it is suspected that she was bitten by a snake.
- Leeu (SB#701), a working dog on a communal farm, was confiscated on 4 October 2019 during a farm visit. Upon arrival, Leeu had a slight limp and stitches on his left thigh that had been left for too long and gotten infected. They were removed and cleaned, and his sites healed perfectly. He had been re-evaluated with CCF's herd, but we noticed the limp that had initially gone away, came back. We brought him in for x-rays as he stopped eating as often, there was no sign of break or fracture but had potential rapid growth causing problems with his joint. He was started on a course of anti-inflammatories and is on a calcium supplement until further notice. We tested him out with CCF's herd, and the limp persists, he will be re-homed as a pet dog in the future.
- Tjevera (SB#680), a working dog on a communal farm, was brought in for the second time for entropion. In June 2018 she had come in because of poor appetite, her owner wanted her to be examined by CCF's vet team – she had suspected tick bite fever and was placed on antibiotics. During this time, we had noticed that she had entropion in her left eye. CCF's vet team completed surgery on her eye on 4 June 2018, and after recovery she was placed back at her farm. In late 2019, during the mobile clinic rabies awareness workshop hosted by CCF in Namibia's eastern communal conservancies, they had vaccinated Tjevera and noticed her entropion had gotten worse, she was brought in on 31 October 2019 for eye surgery. She experienced strange reactions to the anaesthesia and bloods were taken to understand why – she had signs of heartworm/a type of microfilaria. Tjevera was then placed on a course of antibiotics (both vaccinations and tablets) and further tests were taken to make sure she was rid of her parasites – she returned to her farm on 16 December 2019.

Squamous Cell Carcinoma (SCC)

Each dog that comes into 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.

- 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 have been received yet. Unfortunately, towards the end of May she had been experiencing issues with eating and did not want to go out with the herd as often. CCF had been communicating with the farmer about this issue, that farmer asked that she be brought in for treatment/check-up. Upon arrival it was clear that she had dropped in condition. Decision was taken to euthanise her on the 8 June 2019 and a necropsy was completed with samples being 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 9 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 since reduced, and he is eating much better and is in perfect condition again. He received treatment this year on 23 January 2019 and 18 October 2019. No more biopsy results received.
- Fisch (SB#583), a working dog on a communal farm, had experienced problems with eating in the past, and we had encouraged farmer to pre-soak his pelleted food, but his condition worsened. The farmer asked that the dog be returned and looked at on 9 November 2019 as he felt we could better provide for him. He was started on meloxicam tablets to reduce pain and inflammation although his case is moderately severe as he is missing the sides of his tongue. We will continue him on meloxicam and keep him on soaked pelleted food.

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 19 provides an overview of CCF's livestock.

TABLE 19: CCF LIVESTOCK FROM JANUARY TO DECEMBER 2019.

	Stock Start	Born	Purchased	Sold	Died	Slaughtered/ CCF use	Stolen	Stock End
Cattle	362	165	0	82	13	7	5	420
Boer Goats	97	41	0	20	11	0	0	107
Damara Sheep	133	36	0	36	4	0	0	129
Dairy Goats	178	101	0	36	12	0	0	231
Donkeys	7	0	191	0	20	177	0	1
Horses	15	0	31	0	6	30	0	10

CCF's Farm Manager, Johan Britz; Large Stock Assistant Manager, Bessie Simon; Small Stock Manager, Calum O'Flaherty; 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 due to shortage of bulls. 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. This reporting period has been one of the driest years in Namibia's history, as such, a lot of effort was put into ensuring the survival of cattle at CCF.

By the end of December 2019, CCF had 420 cattle compared to 362 at the end of 2018. Total cattle production for 2019 included 165 calves born (80M, 85F), and 82 sold (1 Bull, 1 cow, 54 male calves, 26 female calves Table 19). CCF 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 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 19 Anatolian shepherd and Kangal dogs mentioned in the previous section, as of December 2019, the kraal contains 231 (14M, 178F, 39 wethers) dairy goats, 107 (5M, 82F, 20 wethers) Boer goats, and 128 (6M, 79F, 43 wethers) Damara sheep.

Boer Goats

The Boer goat herd stood at 107 at the end of this reporting period, up from 97 at the end of 2018. Out of the 34 Boer goats that were bred between August and September 2018, 27 females gave birth between January and February 2019 to a total of 41 kids (Table 20).

TABLE 20: BOER GOAT BIRTHS FROM 1 JANUARY 2019 TO 31 DECEMBER 2019 (cM = CASTRATED MALE, iM = INTACT MALE).

Studbook #	Sex	DOB	Dam	Sire	Dead/Alive
619	F	02-Jan-19	28-15	14-197	Alive
620	cM	03-Jan-19	1-14	14-197	Alive
621	F	03-Jan-19	1-14	14-197	Alive
622	F	04-Jan-19	35-15	14-197	Alive
623	F	04-Jan-19	35-15	14-197	Dead
624	F	04-Jan-19	19-15	14-197	Alive
625	iM	04-Jan-19	3-15	14-197	Dead
626	iM	04-Jan-19	3-15	14-197	Dead
627	cM	05-Jan-19	71-15	14-197	Alive
628	cM	07-Jan-19	5-13	14-197	Dead
629	cM	07-Jan-19	5-13	14-197	Alive
630	cM	08-Jan-19	67-15	14-197	Alive
631	F	08-Jan-19	67-15	14-197	Alive
632	cM	09-Jan-19	52-15	14-197	Alive

Studbook #	Sex	DOB	Dam	Sire	Dead/Alive
633	cM	09-Jan-19	14-14	14-197	Alive
634	cM	09-Jan-19	14-14	14-197	Alive
635	F	09-Jan-19	29-15	14-197	Alive
636	cM	09-Jan-19	8-15	14-197	Alive
637	cM	09-Jan-19	61-15	14-197	Alive
638	cM	09-Jan-19	61-15	14-197	Alive
639	cM	09-Jan-19	11-15	14-197	Alive
640	F	09-Jan-19	11-15	14-197	Alive
641	iM	10-Jan-19	24-14	14-197	Dead
642	F	10-Jan-19	24-14	14-197	Alive
643	iM	10-Jan-19	2-13	14-197	Dead
644	F	10-Jan-19	2-13	14-197	Alive
645	cM	10-Jan-19	35-15	14-197	Alive
646	F	10-Jan-19	35-15	14-197	Alive
647	cM	12-Jan-19	11-16	14-197	Alive
648	cM	13-Jan-19	33-13	14-197	Alive
649	cM	13-Jan-19	16-13	14-197	Alive
650	F	13-Jan-19	16-13	14-197	Alive
651	F	13-Jan-19	15-13	14-197	Alive
652	F	13-Jan-19	15-13	14-197	Alive
653	cM	14-Jan-19	43-15	14-197	Alive
654	cM	14-Jan-19	23-14	14-197	Alive
655	cM	20-Jan-19	18-14	14-197	Alive
656	cM	22-Jan-19	82-15	14-197	Alive
657	F	17-Jan-19	44-15	14-197	Alive
658	cM	17-Jan-19	9-12	14-197	Alive
659	cM	17-Jan-19	9-12	14-197	Alive

In 2019, 11 Boer goats died due to causes listed in Table 21.

TABLE 21: BOER GOAT DEATHS FROM 1 JANUARY 2019 TO 31 DECEMBER 2019.

Tag #	Sex	Date of Death	Cause of Death
23-19	Male	01-Jan-19	Rejected by doe
5-19	Female	04-Jan-19	Pneumonia
10-19	Male	07-Jan-19	Pre-mature birth
25-19	Male	10-Jan-19	Asphyxiation by mother

22-18	Male	14-Jan-19	Internal parasite (coccidia)
20-17	Male	04-Feb-19	Internal parasite (coccidia)
18-16	Male	01-Mar-19	Did not return from grazing
25-15	Female	19-May-19	Depredation by leopard
20-18	Female	28-Oct-19	Internal parasite (coccidia)
7-19	Male	Unknown	Unknown
8-19	Male	Unknown	Unknown

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 2019, 20 goats (5 Females, 15 Wethers) 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 129 (6M, 80F, 43 wethers) at the end of this reporting period, down from 133 at the end of 2018.

To increase the muscle mass of the Damara sheep, CCF bought a Meatmaster ram to crossbreed with the Damara sheep. The Meatmaster ram was bred with 40 ewes between November and December 2018. They gave birth in March to April 2019. Of the 40 ewes, 35 gave birth to 36 lambs (7M, 9F, Table 22).

TABLE 22: DAMARA SHEEP BIRTHS FROM JANUARY 2019 TO DECEMBER 2019 (cM = CASTRATED MALE, IM = INTACT MALE).

Studbook #	Sex	DOB	Dam	Sire	Dead/Alive
533	cM	26-Mar-19	42-15	DS6204	Alive
534	F	26-Mar-19	74-16	DS6204	Alive
535	F	26-Mar-19	36-16	DS6204	Alive
536	cM	27-Mar-19	7-15	DS6204	Alive
537	cM	27-Mar-19	51-15	DS6204	Alive
538	F	27-Mar-19	22-14	DS6204	Alive
539	F	27-Mar-19	49-15	DS6204	Alive
540	F	27-Mar-19	33-14	DS6204	Alive
541	cM	29-Mar-19	46-16	DS6204	Alive
542	F	29-Mar-19	3-16	DS6204	Alive
543	cM	29-Mar-19	68-16	DS6204	Alive
544	F	29-Mar-19	25-12	DS6204	Alive
545	F	30-Mar-19	39-16	DS6204	Alive
546	F	30-Mar-19	39-16	DS6204	Alive

Studbook #	Sex	DOB	Dam	Sire	Dead/Alive
547	F	31-Mar-19	52-16	DS6204	Alive
548	F	31-Mar-19	25-14	DS6204	Alive
549	F	01-Apr-19	17-15	DS6204	Alive
550	cM	03-Apr-19	4-16	DS6204	Alive
551	cM	04-Apr-19	48-16	DS6204	Alive
552	cM	05-Apr-19	11-15	DS6204	Alive
553	cM	07-Apr-19	39-17	DS6204	Alive
554	F	07-Apr-19	12-16	DS6204	Alive
555	F	07-Apr-19	33-16	DS6204	Alive
556	cM	11-Apr-19	12-14	DS6204	Alive
557	F	11-Apr-19	23-13	DS6204	Alive
558	F	11-Apr-19	3-13	DS6204	Alive
559	F	14-Apr-19	52-15	DS6204	Alive
560	cM	15-Apr-19	16-14	DS6204	Alive
561	cM	16-Apr-19	27-16	DS6204	Alive
562	F	16-Apr-19	45-16	DS6204	Alive
563	F	19-Apr-19	44-16	DS6204	Alive
564	F	19-Apr-19	65-16	DS6204	Alive
565	cM	19-Apr-19	72-16	DS6204	Alive
566	cM	27-Apr-19	13-16	DS6204	Alive
567	cM	30-Apr-19	15-16	DS6204	Alive
568	F	01-May-19	40-15	DS6204	Alive

In 2019, four sheep died due to causes listed in Table 23.

TABLE 23: DAMARA SHEEP DEATHS FROM 1 JANUARY 2019 TO 31 DECEMBER 2019.

Studbook #	Sex	Date of Death	Cause of Death
64-18	Female	19-Jan-19	Euthanasia (underdeveloped)
60-15	Female	04-May-19	Euthanasia (broken neck)
29-19	Male	20-Aug-19	Euthanasia (missing leg)
40-15	Female	16-Sep-19	Euthanasia (broken neck)

CCF's Damara sheep are managed for meat production and castrated males and old or inferior dams are sold at auction. Between January and December 2019, 36 sheep (26 ewes, 10 wethers) were sold. No Damara sheep were purchased.

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

Dairy Goats

The dairy goat herd increased by 52, from 179 animals on 31 December 2018 to 231 (14M, 178F, 39 wethers) on 31 December 2019.

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. In late August 2018, six does were bred and only two gave birth to three kids (2M, 1F) in January 2019 (Table 24). Between March and April 2019, 53 does were bred. Of the 53, 48 does gave birth to a total 72 kids (33M, 39F) in August 2019. Another 19 does were bred in July 2019 and gave birth to a total of 26 kids (10M, 16F) in December.

TABLE 24: BREEDING AND KIDDING MONTHS FOR 74 DAIRY DOES FROM JANUARY TO DECEMBER 2019.

Goat	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mhlali			Bred					Kid				
Lizzie			Bred					Kid				
Snow			Bred					Kid				
Marigold			Bred					Kid				
Lolita			Bred					Kid				
Olifa			Bred					Kid				
Brier			Bred					Kid				
Halali			Bred					Kid				
Henrietta			Bred					Kid				
Maggie			Bred					Kid				
Marie Antoinette			Bred					Kid				
Mary			Bred					Kid				
Nigella			Bred					Kid				
Tulip			Bred					Kid				
Violet			Bred					Kid				
Wendy			Bred					Kid				
Omao			Bred					Kid				
Stella			Bred					Kid				
Joan			Bred					Kid				
Hilma			Bred					Kid				
Isla			Bred					Kid				
Zemba			Bred					Kid				
Erin			Bred					Kid				
Jade			Bred					Kid				
Claret			Bred					Kid				
Syrah			Bred					Kid				
Bianca			Bred					Kid				
Becky			Bred									
Onyx			Bred					Kid				

Goat	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Noma			Bred					Kid				
Nolana			Bred					Kid				
Rose (AI)			Bred									
Cayenne			Bred					Kid				
Orchid			Bred					Kid				
Camellia			Bred					Kid				
Mia			Bred					Kid				
Kir			Bred					Kid				
Glory			Bred					Kid				
Kristofina			Bred					Kid				
Marsala			Bred					Kid				
Burgandi (AI)			Bred									
Chianti			Bred					Kid				
Addie			Bred					Kid				
Caitlin				Bred				Kid				
Astrid				Bred				Kid				
Kimberley	Kid											
Eve	Kid											
Princess Eugenie			Bred					Kid				
Blossom			Bred					Kid				
Brenna					Bred							Kid
Caroline			Bred					Kid				
Edeleweiss			Bred					Kid				
Margaret			Bred									
Noir			Bred					Kid				
Zinfandel (AI)			Bred					Kid				
Anne-Bolyne				Bred								Kid
Opal				Bred								Kid
Whinnie				Bred								Kid
Beulah				Bred								Kid
Ruacana				Bred								Kid
Trycolyn				Bred								Kid
Princess Adela				Bred								Kid
Brenna				Bred								Kid
Yarrow				Bred								Kid
Blanc				Bred								Kid
Mirabai				Bred								Kid
Pinotage				Bred								Kid
Salt				Bred								Kid

Goat	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Poppy							Bred					Kid
Chenin Blanc							Bred					Kid
Tina2							Bred					Kid
Pearl							Bred					Kid
Indira							Bred					Kid
Monica							Bred					

In 2019, 101 (45M, 56F) dairy kids were born (Table 25).

TABLE 25: DAIRY GOAT KIDS FROM JANUARY TO DECEMBER 2019.

Studbook #	Name	Sex	Date of Birth	Dam	Sire	Alive or Dead
473	Malbec	cM	20-Jan-19	Kimberly	Monet	Alive
474	Barbera	cM	20-Jan-19	Kimberly	Monet	Alive
475		F	21-Jan-19	Eve	Monet	Dead
476		F	03-Aug-19	Mhlali	Monet	Dead
577	Tugela	F	03-Aug-19	Mhlali	Monet	Alive
477		cM	04-Aug-19	Lolita	Monet	Dead
478	Elsa	F	04-Aug-19	Lolita	Monet	Alive
479		cM	05-Aug-19	Wendy	Monet	Alive
480		cM	05-Aug-19	Wendy	Monet	Alive
481		iM	05-Aug-19	Lizzie	Monet	Alive
482	Ada	F	05-Aug-19	Lizzie	Monet	Alive
483		cM	06-Aug-19	Marigold	Monet	Alive
484	Lotus	F	06-Aug-19	Marigold	Monet	Alive
485		cM	07-Aug-19	Tulip	Picasso	Alive
486	Zinnia	F	07-Aug-19	Tulip	Picasso	Alive
487	Selena	F	08-Aug-19	Erin	Monet	Alive
488		cM	09-Aug-19	Nigella	Monet	Alive
489	Rosemary	F	09-Aug-19	Nigella	Monet	Alive
490		cM	09-Aug-19	Isla	Picasso	Alive
491		cM	09-Aug-19	Maggie	Monet	Alive
492	Ablonia	F	09-Aug-19	Omao	Monet	Alive
493		F	09-Aug-19	Kristofina	Monet	Alive
494		cM	10-Aug-19	Olifa	Picasso	Alive
495		cM	10-Aug-19	Olifa	Picasso	Alive
496		cM	10-Aug-19	Marry	Monet	Alive
497		cM	10-Aug-19	Brier	Monet	Alive
498	Meredith	F	10-Aug-19	Stella	Monet	Alive
499		cM	10-Aug-19	Henrietta	Monet	Alive

Studbook #	Name	Sex	Date of Birth	Dam	Sire	Alive or Dead
500		cM	10-Aug-19	Henrietta	Monet	Alive
501		cM	05-Aug-19	Snow	Monet	Alive
502		iM	05-Aug-19	Snow	Monet	Alive
503		cM	11-Aug-19	Halali	Picasso	Alive
504	Takue	F	11-Aug-19	Halali	Picasso	Alive
505	Tonga	F	11-Aug-19	Halali	Picasso	Alive
506	Lily	F	11-Aug-19	Joan	Picasso	Alive
507	Archie	F	11-Aug-19	Marie Antoinette	Picasso	Alive
508	Charlotte	F	11-Aug-19	Marie Antoinette	Picasso	Alive
509		cM	11-Aug-19	Hilma	Picasso	Alive
510	Crystal	F	12-Aug-19	Onyx	Monet	Alive
511	Topaz	F	12-Aug-19	Onyx	Monet	Alive
512	Moyo	F	12-Aug-19	Zemba	Monet	Alive
513	Nicole	F	13-Aug-19	Noma	Monet	Alive
514	Constantia	F	14-Aug-19	Syrah	Monet	Alive
515	Quartz	F	14-Aug-19	Jade	Picasso	Alive
516		F	15-Aug-19	Claret	Picasso	Dead
517		cM	15-Aug-19	Princess Beatrice	Picasso	Dead
518	Lena	F	15-Aug-19	Princess Beatrice	Picasso	Alive
519		F	16-Aug-19	Cayenne	Monet	Alive
520	Nutmeg	F	16-Aug-19	Cayenne	Monet	Alive
521	Barolo	F	16-Aug-19	Kir	Monet	Alive
522	Madeira	F	16-Aug-19	Kir	Monet	Alive
523	Iris	F	17-Aug-19	Camelia	Picasso	Alive
524		cM	17-Aug-19	Glory	Monet	Alive
525		cM	17-Aug-19	Rose	Picasso	Alive
526		cM	17-Aug-19	Rose	Picasso	Alive
527		cM	17-Aug-19	Marsala	Picasso	Alive
528	Rioja	F	17-Aug-19	Marsala	Picasso	Alive
529		cM	18-Aug-19	Mia	Monet	Alive
530		iM	18-Aug-19	Nolana	Monet	Alive
531		cM	18-Aug-19	Orchid	Picasso	Alive
532	Lora	F	18-Aug-19	Bianca	Monet	Alive
533	Cortese	F	22-Aug-19	Chianti	Picasso	Alive
534		cM	22-Aug-19	Noir	Monet	Alive
535		cM	22-Aug-19	Noir	Monet	Alive
536		F	22-Aug-19	Noir	Monet	Dead
537		cM	22-Aug-19	Addie	Picasso	Dead
538		cM	27-Aug-19	Caitlin	Picasso	Alive

Studbook #	Name	Sex	Date of Birth	Dam	Sire	Alive or Dead
539	Soini	F	27-Aug-19	Caitlin	Picasso	Alive
540		cM	27-Aug-19	Blossom	Picasso	Alive
578	Petunia	F	27-Aug-19	Blossom	Picasso	Alive
541	Kylie	F	29-Aug-19	Caroline	Picasso	Alive
542	Louise	F	30-Aug-19	Princess Eugenie	Monet	Alive
543	Zara	F	30-Aug-19	Princess Eugenie	Monet	Alive
544		cM	30-Aug-19	Edelwiess	Picasso	Alive
545	Blush	F	30-Aug-19	Edelwiess	Picasso	Alive
546		F	31-Aug-19	Zinfandel	Monet	Dead
551	Augusta	F	01-Dec-19	Anne-Bolyne	Picasso	Alive
552		F	01-Dec-19	Anne-Bolyne	Picasso	Dead
553	Amber	F	05-Dec-19	Opal	Monet	Alive
554	Dominique	F	08-Dec-19	Whinnie	Monet	Alive
555	Eveline	F	11-Dec-19	Trycolyn	Monet	Alive
556		M	12-Dec-19	Ruacana	Picasso	Alive
557		M	12-Dec-19	Salt	Monet	Alive
558	Chive	F	12-Dec-19	Salt	Monet	Alive
559		M	14-Dec-19	Princess Adela	Picasso	Alive
560		M	14-Dec-19	Pearl	Monet	Alive
561	Tayla	F	15-Dec-19	Beulah	Monet	Alive
562	Vistoria	F	15-Dec-19	Beulah	Monet	Alive
563	Julia	F	15-Dec-19	Brenna	Picasso	Alive
564	Petit	F	16-Dec-19	Pinotage	Monet	Alive
565		F	16-Dec-19	Pinotage	Monet	Dead
566	Buttercup	F	17-Dec-19	Yarrow	Monet	Alive
567		M	17-Dec-19	Yarrow	Monet	Alive
568		M	19-Dec-19	Poppy	Monet	Alive
569		M	19-Dec-19	Poppy	Monet	Alive
570	Veneto	F	20-Dec-19	Chenin Blanc	Picasso	Alive
571		M	20-Dec-19	Tina2	Monet	Alive
572	Simone	F	20-Dec-19	Tina2	Monet	Alive
573		M	21-Dec-19	Indira	Monet	Alive
574	Aune	F	21-Dec-19	Indira	Monet	Alive
576		M	23-Dec-19	Blanc	Picasso	Alive
575	Benitto	F	24-Dec-19	Mirabai	Picasso	Alive
547	Saima	F	21-Jan-19	Eve	Monet	Alive

In 2019, 13 (4M, 9F) dairy goats died to causes listed in Table 26, and 34 (1 buck, 33 wethers) were sold.

TABLE 26: DAIRY GOATS THAT DIED FROM JANUARY TO DECEMBER 2019.

Studbook #	Sex	Date of Death	Cause of Death
477	Female	06-Mar-19	Infection (Orf)
476	Male	06-Mar-19	Joint illness
475	Female	18-Apr-19	Pneumonia
377	Female	05-Aug-19	Pulpy kidney
536	Female	23-Aug-19	Euthanasia (pre-mature)
546	Female	02-Sep-19	Inconclusive
537	Male	26-Sep-19	Inconclusive
516	Female	12-Oct-19	Bacterial infection
517	Male	12-Oct-19	Bacterial infection
552	Female	11-Dec-19	Inconclusive
565	Female	16-Dec-19	Stillborn
75	Female	17-Dec-19	Inconclusive

CCF's Dairy goats are managed for milk production and castrated males and inferior bucks are sold at auction. Between January and December 2019, 36 dairy goats (2 bucks, 34 wethers) were sold. No dairy goats were purchased.

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 2019, up to 89 goats were milked every day for a total production of 44,706.2kg of milk. Of this milk, 10,780.5kg was used to raise goat kids and 32,643.7kg was supplied to the creamery (Table 27).

TABLE 27: GOATS MILKED, AMOUNT PRODUCED (KILOGRAMS), AND HOW MUCH ALLOCATED TO KIDS AND CREAMERY IN 2019.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Goats milked	60	60	61	61	61	60	39	74	81	81	69	89
Total Produced	4265. 2	3760. 8	3801. 2	3373. 1	3280. 1	2332. 8	1770. 5	3363. 2	4865. 3	4944. 9	2951. 6	5997. 5
Used to Raise Kids	1314	560	620	193	37.5	30	0	1847. 5	2970	3208. 5	1035	247
To Creamery	2951. 2	3200. 8	3181. 2	3180. 1	3242. 6	2302. 8	1770. 5	1515. 7	1895. 3	1736. 4	1916. 6	5750. 5

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 28 shows amounts of milk production per goat per month.

TABLE 28: MILK PRODUCTION (KILOGRAMS) PER GOAT PER MONTH FOR 2019.

Goat	SB #	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Safire	48	0	0	0	0	0	0	0	41	71.5	65.4	0	Safire
Addie	176	39.5	54.4	57.6	76.6	56.2	65	68.6	71.1	66.2	75.5	67	66.4
Anise	272	0	0	0	0	0	0	0	51.9	100.8	120.2	117.6	93.4
Ann-Bolyne	300	0	0	0	0	0	0	0	44.9	78.5	89.5	79.1	87.6
Astrid	293	0	0	0	0	0	0	0	26.5	66.1	76.1	70.4	74.3
Beatrice	178	44.1	73.4	72.2	79.4	77.6	181.3	92.8	71	37.9	0.4	81	83.2
Becky	270	0	0	0	0	0	0	0	25.5	61.9	61.6	59.2	49.7
Blossom	150	34	45.8	51.1	58	56.7	71.7	68.2	66.7	60.8	68.9	62.1	57.7
Brenna		47.6	61.4	66.7	77	70.7	81.6	84.1	73.1	0	0	0	0
Bridget	277	0	0	0	0	0	0	0	36.1	81.7	92.2	82.6	88.9
Caitlin	132	48.6	68	75	69.3	69.8	71.7	83	44.4	0	0	87.2	105.8
Caroline	131	37.4	51.7	55.4	57.2	53.6	58.4	58.5	45.3	12.3	0	75.9	87.4
Chardonnay	53	68.6	70.9	63.9	60.3	47.9	46.3	44.9	47.5	0	0	0	0
Chenin	100	42.5	54.2	54.7	54.5	50.8	73.7	77	76.8	81.6	100.8	80.5	83.5
Diamond	291	0	0	0	0	0	0	0	18.1	74	76.4	68.9	77
Diana	59	0	0	0	0	0	0	0	0	0	0	59.9	63.4
Dolly Parton	65	61	70.5	24.6	0	0	0	0	0	0	0	0	0
Edelweiss	74	31.4	39.2	39.8	44.3	52.7	51.7	71	63.2	0	0	0	0
Emma	243	24.8	40	45.5	58.6	58.3	54.3	55.6	35.5	0	0	77.2	90.9
Gretel	67	63.7	76	71.6	0	0	0	0	0	0	0	0	0
Halali	279	0	0	0	0	0	0	0	28.1	69.5	82.4	75.9	71.1
Hannah	121	0	0	0	0	0	129.3	0	88.9	85.1	93.8	86	63
Henrietta	296	0	0	0	0	0	0	0	26.7	61	72.3	71.4	64.6
Indira	49	38	48.8	45.5	55.1	60.2	75.5	68.6	60.3	18.2		52.9	97.6
Jasmin	44	92.3	130	73.6	82	77.6	87.8	80.1	78.9	84.5	103.9	95.9	101.6
Josaphine	42	27.8	24.1	22	14.3	12.1	4.5	0	0	0	0	61.5	90.2
Katrina	142	31.4	48.1	52.1	57	53.3	62	67.3	45.5	0	0	78.4	82.4
Kimberley	56	53.4	76.2	50.1	14.5	17.9	4.7	92.8	0	0	0	0	0
Kyla	253	27.1	46.9	46.9	49.8	43.3	56.5	53.4	29.3	0	0	79.9	94.2
Lady Jane	174	51.7	80.7	83.8	87.2	68	99.1	91.9	61.1	0	0	0	0
Lil Red	130	40	48.5	53.2	53.6	51.4	50.6	49.2	45	0	0	46.3	87.4
lizzie	289	0	0	0	0	0	0	0	32.4	72.4	94.7	85	93.5
Lolita	265	0	0	0	0	0	0	0	42.1	73.7	82.4	74.5	72.5
Maggie	317	0	0	0	0	0	0	0	28.4	67.2	83.3	76.6	75.8
Margaret	72	50.3	65.4	69	76.7	83.6	103.2	89.6	86.2	99.2	104.3	89.4	93.4

Goat	SB #	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Marie-Antoinette	301	0	0	0	0	0	0	0	30.2	80.8	80.1	81.6	91.1
Marigold	284	0	0	0	0	0	0	0	26.2	60.2	62.3	49.3	52.4
Marry	295	0	0	0	0	0	0	0	32	62.4	70.6	68	62.9
Meriam	244	79.7	52.7	52.5	52.1	45.4	54	55.3	57.3	61.3	78.2	68.3	61.8
Mhalali	268	0	0	0	0	0	0	0	0.6	62.3	82.5	84.2	148
Monica	254	8.6	0	0	0	0	0	0	0	0	0	0	0
Nigella	268	0	0	0	0	0	0	0	43.6	74.5	84.5	73.5	0
Nina	195	32.2	40.6	39	43.2	51.8	60.7	64.2	64.4	64.6	82.8	76.5	82.6
Noir	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
Noma	390	0	0	0	0	0	0	0	0	0	0	44.8	77.1
Olifa	280	0	0	0	0	0	0	0	30.5	63.5	73.8	65.3	68
Onsie	246	8.9	0	0	0	0	0	0	0	0	0	0	0
Onyx	303	0	0	0	0	0	0	0	0	57.9	84	69.8	70.7
Pearl	186	30.1	51.3	63.2	73.3	69.9	78.9	74.9	67.6	56.1	36.2	26.7	70.2
Peony	163	37.6	49.4	51.3	82.3	71	98	86.6	72	0	0	0	0
Petrina	336	0	0	0	0	0	0	0	31.1	61.8	72.5	65.3	76.4
Pinotage	75	55.3	65.3	67	66.7	68.4	70.8	70.6	67	47.2		54.6	125.4
Poppy	137	46.3	72	70.4	70.9	71.7	92.5	85.9	69.8	77.9	95.8	82.9	87
Primerose	138	46.4	68.5	63.3	74.8	77	82.3	76.9	57.8	0	0	71.7	114.5
Princess Adela	152	19.7	35.4	42.1	53.2	43.4	49.1	48.2	43.2	19.3	0	47.3	62.3
Princess Eugene	319	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
Ruacana	144	94.3	82.9	86.5	81.2	75.6	65.5	67.8	73.6	59.5	24.2	0	
Ruby 2	108	48.2	45	56	50	48	41.3	46.2	52.8	46.4	51.2	35.1	
Rapunzel	187	85.6	79	82	76.7	68.5	56.9	67	77.5	63.8	61.7	39.0	
Salt	115	85.5	76.5	73.7	64.8	61.3	38.9	0	0	0	0	0	
Snow	275	0	0	0	0	0	0	0	35.2	57.2	55.4	36.2	
Stella	359	0	0	0	0	0	0	0	28.8	55.2	56	37.1	
Syrah	315	56.6	49.2	47.1	46.4	47.3	14.3	0	19.6	71.7	81.1	53.4	
Tina2	124	93.6	83.9	90.1	82.4	84.2	72.8	71.2	83.8	57	10.6	0	
Trycolin	181	74.7	60.8	58.6	43.1	39.3	34.7	45.2	52.9	44.9	14.5	0	
Tulip	309	80.2	73.6	57.2	69	68.8	19.7	0	54.9	83.1	89.9	58.2	
Violet	282	71.3	56.7	46.9	55.7	45.8	11.3	0	35.9	64.2	70.3	54.2	
Wendy	266	61.3	53.6	46.6	52.1	46.1	11.8	0	55.2	71.4	73.4	49.6	
Whinnie	109	95.6	77.3	87.3	78.2	73.4	65.1	52.3	49.8	37.4	4.9	0	
Yarrow	45	92.6	74.8	69.9	62.1	41.9	30.1	36.3	57.3	37.5	33.9	0	

Goat	SB #	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Zemba	367	0	0	0	0	0	0	0	26.6	67	72.3	46.7	
Zinfandel	52	0	0	0	0	0	0	0	0	64	90.4	39.5	
Total	-	4265.2	3760.8	3801.2	3373.1	3280.1	2332.8	1770.5	3363.2	4865.3	4944.9	2961.6	

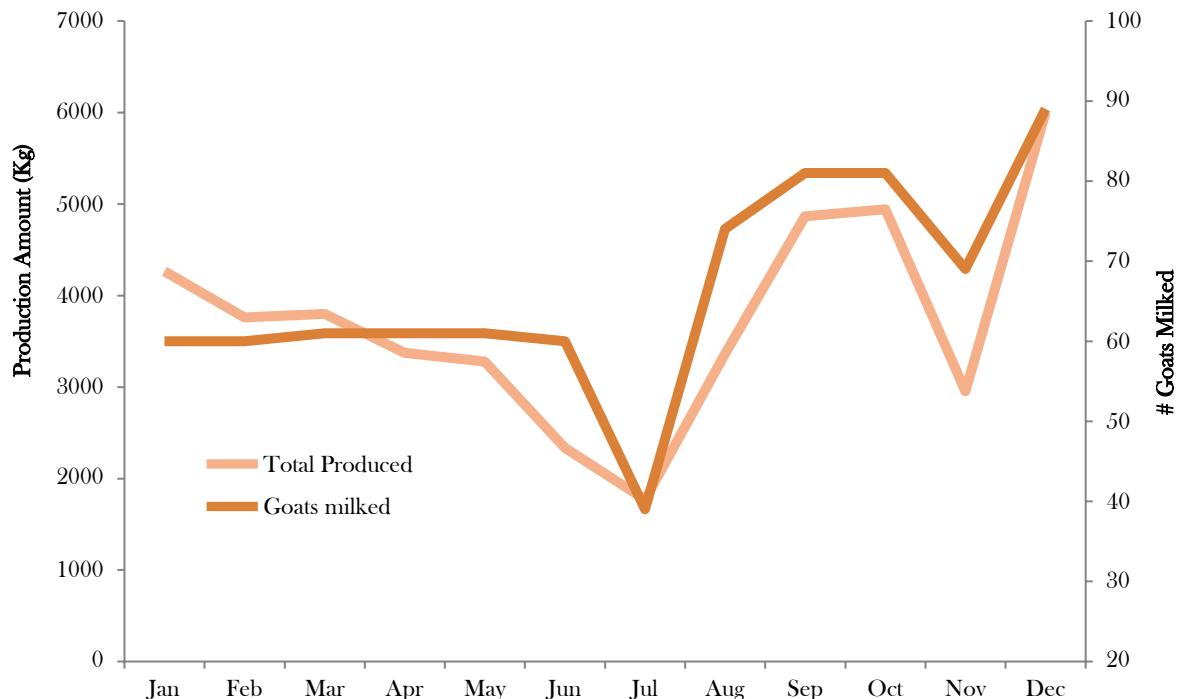


FIGURE 55: MILK PRODUCTION VERSUS GOATS MILKED FROM JANUARY TO DECEMBER 2019.

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 56 shows the amount used for each during this reporting period.

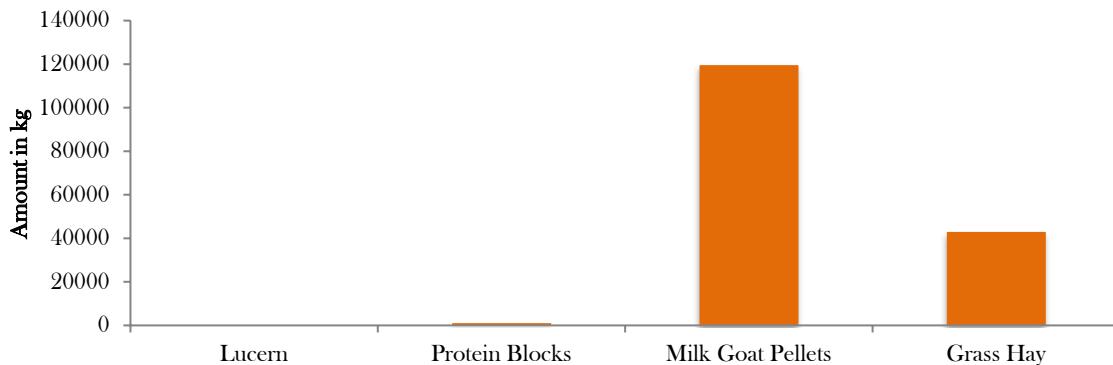


FIGURE 56: AMOUNT OF FEED PROVIDED TO CCF SMALL STOCK IN 2019.

Vaccinations and De-worming

All 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; anthelmvehicleintic products are rotated between drug classes in order to help prevent the 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 the 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 caseouslymphadenitis (*Corynebacterium 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 *Chlamydophilapsittaci*, an organism that causes early and late-term abortions.

- All female animals are vaccinated one month before breeding on an annual basis.
- Rabies – for the prevention of rabies virus which causes fatal encephalitis.
 - All adult animals are vaccinated yearly.
 - All newborns are vaccinated at nine months of age and then annually thereafter.

3. Hay Production

In 2019, 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 57 below displays the amount of wild game removed for consumptive use for this reporting period.

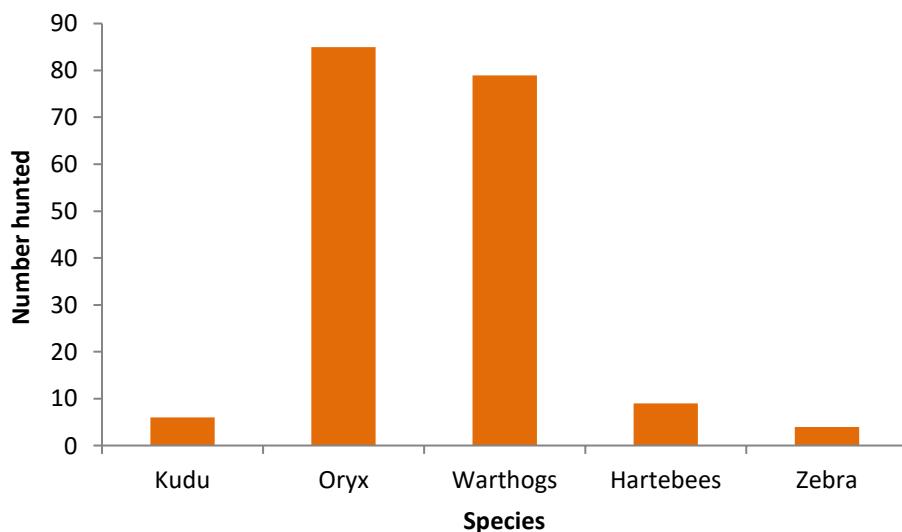


FIGURE 57: AMOUNT OF GAME UTILISED BY CCF IN 2019.

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 58) 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 58: CERTIFIED WILDLIFE FRIENDLY LOGO.

2. Bushblok

Operations

Production of BUSHBLOK was reduced in 2019 as resources were diverted to producing a bush-based animal feed as drought relief. Processing of raw wood for export continued. BUSHBOLK production in 2019 amounted to 229 tonnes (138 tonnes down from production in 2018), with sales of 286 tonnes. Table 29 shows the monthly block production during this reporting period.

TABLE 29: MONTHLY BLOCK PRODUCTION JANUARY TO DECEMBER 2019.

Month	Amount (tonnes)
January	17
February	29
March	12
April	34
May	27
June	23
July	20
August	18
September	14

Month	Amount (tonnes)
October	10
November	18
December	7
Total	229

General Information

The Biomass Technology Centre (BTC) at CCF was in full operation. The former BUSHBLOK factory in Otjiwarongo continued operations as the CCF depot. Additionally, the final bush feed mixture was produced there under direction of Farms Manager Johan Britz.

A fourth shed was under construction at the BTC this incorporates wood labs, a classroom and a workshop area. New equipment included a small skid steer, two woodchippers and a small wood-pellet production line. The annual Forest Stewardship Council (FSC) inspection concluded with re-certification.

David Shipingana joined the biomass team as Forestry and Safety Officer in 2019. Forest Steward and Senior Ecologist Matti Nghikembua continued studies in Finland for a PhD in Forestry in addition to overseeing biomass activities.

Dr. Bruce Brewer, CCF's General Manager, remained active in groups involved with bush encroachment in Namibia. These included the Namibia Biomass Group (N-BiG), and the GIZ/MAWF De-bushing project, which is supported by the German Development Authority. Dr. Brewer presented at the first Namibian Biomass Symposium at the Namibian University of Science & Technology (NUST).

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 2019, there were 89 dairy goats at CCF with up to 26 being milked daily for a daily average of 122.5 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 33,011 kg of milk, however, due to human error and faulty scales, there was a difference of 367.3kg in milk supplied by CCF's Model Farm and the milk that was actually used in the creamery. Table 30. shows amounts of milk allocated to the production of each creamery product. Of this milk, 76.8% was used to produce two of the Creamery's original cheeses, feta and chèvre.

TABLE 30: MILK ALLOCATION PER PRODUCT FROM JANUARY TO DECEMBER 2019.

Product	Milk Used (kg)
Feta	12764
Chèvre	9627
Ricotta	7099
Mozzarella	1084
Fudge	1419
Ice cream	237
Chevrotin	573
Yogurt	208
Soap	12764
Total	33,011

Table 31 shows the amounts of two of these varieties produced each month in 2019. In addition, the Creamery produced a total of 127.70 kg of fudge, 267.87 kg of ice cream, 667.68 kg of ricotta and 97.56 kg mozzarella cheeses. The creamery started making a new hard cheese called Chevrotin, for which 355.0 kg of milk was used to produce and develop this cheese. All cheese that was made was used on cheese platters in the café or as promotions.

TABLE 31: FETA AND CHÈVRE MONTHLY PRODUCTION (KILOGRAMS) IN 2019.

Month	Feta	Chèvre	Total
January	101.25	121.77	223.02
February	111.42	91.89	203.31
March	93.15	79.92	173.07
April	93.51	45.90	139.41
May	124.74	67.12	191.85
June	78.73	63.14	141.88
July	76.05	41.76	117.81
August	50.13	31.86	81.99
September	30.69	31.23	61.92
October	79.37	90.78	170.15

Month	Feta	Chèvre	Total
November	162.70	57.15	219.85
December	153.54	274.18	427.72
Total	1155.28	996.70	2151.98

The creamery also started producing goat milk yogurt, and 218.04kg of milk was used to develop and produce the yogurt. The yogurt was used at the staff kitchen, Cheetah café and lodge. The new cheese Chevrotin and yogurt will be included in all tables from 2020.

Expenses

Creamery expenses such as cheese cultures, packaging, labelling, herbs, labour, gas, and electricity are estimated at N\$13,589 for this period, averaging N\$5.46 per kilogram of product. Total milk costs amounted to N\$64.83 at an average of N\$61.77 per kilogram of product. The average amount of milk required to produce a kilogram of cheese is 10.61kg, whereas ice cream requires 0.88kg. Table 32 shows the breakdown of costs for the various creamery products as well as the total cost per kilogram of product.

TABLE 32: PRODUCTION COSTS (N\$) OF CREAMERY PRODUCTS FROM JANUARY TO DECEMBER 2019.

Product	Production (kg)	Milk per kg	Total Used (kg)	Milk Total Cost	Milk Total Other Cost	Total Production Cost	Total cost per kg
Feta	1,155.28	11.05	12,763.81	69,690.40	4,427.29	74,117.70	64.16
Chèvre	996.70	9.66	9,627.31	52,565.11	3,819.56	56,384.67	56.57
Ricotta	667.68	10.63	7,098.65	38,758.63	2,558.69	41,317.32	61.88
Fudge	127.70	11.11	1,418.87	7,747.03	489.37	8,236.40	64.50
Ice cream	267.87	0.88	236.58	1,291.73	1,026.54	2,318.26	8.65
Chevrotin/ Yoghurt	233.20	2.46	573.04	3,128.80	893.69	4,022.48	17.25
Mozzarella	97.5591	11.11	1,083.99	5,918.5854	373.87	6,292.45	64.50
Total	3,545.99		32,802.25	179,100.30	1,3589.01	192,689.30	

Sales

Total revenue from creamery products in 2019 was N\$391,952.00. Creamery product sales totalled 3,114.49 kg, while 54.5kg were distributed as promotional samples and gifts at events such as agricultural shows, farmer's markets and tourism fairs and 245.60kg of products were left in inventory (Table 33).

TABLE 33: CREAMERY PRODUCT SALES (N\$) IN 2019. FIGURES IN PARENTHESIS DO NOT INDICATE PROFIT FROM PRODUCTS.

Product	Kg	Cost/Kg	Total Cost	Revenue	Profit
Feta	40.15	64.16	2,575.84	4780	2,204.16

Product	Kg	Cost/Kg	Total Cost	Revenue	Profit
Chèvre	6.25	56.57	353.57	930	576.43
Ricotta	0	61.88	0.00	0	0.00
Ice cream	0.11	8.65	0.95	20	19.05
Soap	0	17.25	0.00	0	0.00
Fudge	14.9	64.50	961.03	3,865	2,903.97
Stores and Lodges	61.41		3,891.40	9,595.00	5,703.61
Fudge Gift Shop	30.35	64.50	1,957.54	10,545	8,587.46
Soap Gift Shop	5.6	17.25	96.59	2,300	2,203.41
Cheese Gift Shop	47.45	61.78	2,931.32	8,258	5,26.68
Ice cream Gift Shop	91.88	8.65	795.17	24,210	23,414.83
Total CCF Gift Shop	175.28		5,780.62	45,313.00	34,205.70
Ice Cream Babson	82	8.65	709.66	18,040	17,330.34
Soap Babson	0	17.25	0.00	0.00	0.00
Cheese Babson	267	61.78	16,494.45	32,040.00	15,545.55
Fudge Babson	66.3	64.50	4,276.28	9,945.00	5,668.72
Total Babson	415.3		21,480.39	60,0250.00	38,544.61
Ice Cream Café	81	8.65	701.01	17,820	17,118.99
Cheese Café	1,991	61.78	122,997.94	238,920	115,922.06
Total Café	2,072.00		123,699.00	256,740.00	133,041.10
Cheese Hotspot	327	61.78	20,201.07	20,201.07	0.00
Ice Cream Hotspot	9	8.65	77.89	77.89	0.00
Total Hotspot	336.00		20,278.96	20,278.96	0
Total CCF	3,059.99	0.00	175,130.31	391,952.00	211,494.97
Cheese samples	50	61.78	3,088.85	0.00	(3,088.85)
Fudge samples	2.75	64.50	177.37	0.00	(177.37)
Ice cream samples	1.75	8.65	15.15	0.00	(15.15)
Promotional samples	54.5		3,281.37	0	(3,281.37)
Total All Products	3,114.49	0.00	178,411.68	391,952.00	205,387.23

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 33, during this period the Creamery supplied the Gift Shop with 175.28 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 3,059.99 kg of ice cream, fudge, cheese and soap.

At the end of this period, the remaining inventory in CCF's freezers was 230.07 kg of cheese, 13.40 kg fudge, and 2.13 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. Chevreton was developed in 2018 and we plan to start making blue cheese in 2020.

CCF will continue to place special emphasis on customer satisfaction and quality assurance 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 the 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, squash, lettuces, rocket, spinach, basil, kale, zucchini, eggplant, corn, cucumber, spring onion and arugula. Figure 59 shows the amounts of vegetables harvested during the reporting period. Cucumbers, spinach, and tomatoes were the most harvested during this reporting with 210.6kg, 118.00kg and 102.2kg respectively.

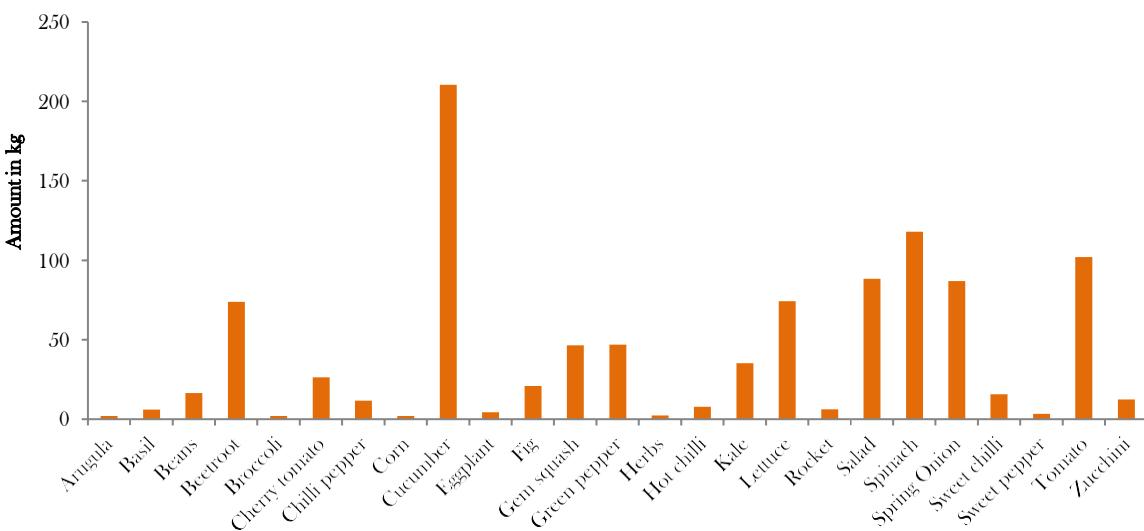


FIGURE 59: VEGETABLES AND HERBS HARVESTED FROM THE CHEWBAAKA MEMORIAL GARDEN IN 2019.

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 Pete Kruger from Ball Horticulture, California, USA.

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 2018, 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 are 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. Netting was put over vines in November 2019 to make sure no birds eat the grapes. The harvest for end of January 2020 looks promising.

D. Eco-Tourism

Tourism is one of Namibia's fastest growing industries, with many 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 2019, CCF had received a total of 15,048 visiting tourists, of which 1,412 (Cheetah View Lodge & Babson) were overnight tourists. This represents a 15.49% increase from 13,030 in 2018. In terms of income, this period saw a 28.60% increase at N\$11,211,873.00 compared with N\$8,715,106.00 in 2018. In addition to school groups and film crews mentioned separately, CCF hosted many CCF friends, supporters and collaborators in 2019, many of them on return visits. Visits include those of CCF Board members who returned to CCF on 23 June 2019 and stayed for three days.

The following friends, supporters, and collaborators visited CCF during this reporting period.

January

- Peter and Susan Scheufler with four other friends. Peter and Susan are long-time friends and generous supporters of CCF and have a particular interest and talent for photography.
- Aurore Giroud, a French Artist and Journalist with a passion for CCF's mission, visited to document the CCF Centre to be featured on her blog.

February

- CCF hosted the Namibian Board Meeting and the following members and guests were in attendance; Board Members were Mrs Jane Katjavivi, Mr Mark Dawe, Mr Mike Hill, Ms Mary Kruger and her daughter Lynn, Jackie Asheeke and her daughter Martha and Charlie Bodenstein .US Ambassador to Namibia, Ms Lisa Johnson, Namibian Deputy Minister of Environment and Tourism, Bernadette Jagger, Executive Director of the Ministry of Environment and Tourism, Teoufilus Ng hitila and his family were also in attendance.
- Dr. Terry Gipson returned to CCF for another goat seminar.

March

- Christy Wycoff and her two sisters visited. Christy with her work on mountain lions is the Senior Wildlife Ecologist for the Santa Lucia Preserve. Christy and her family came to see and learn about our human-wildlife conflict strategies.

- Mr. Len Le Roux hosted the 2019 Synergos Global Meeting here at CCF, which was a weeklong dialogue and conference for the World-wide organisation.
- Chris and Emily Liebenberg as well as other members of the Travel Company, Piper & Heath, visited for a site inspection and stay of CCF.

Aprils

- Returning working guests Charles and Linder Bieber from the USA visited for 14 days.

May

- CCF long-time friend Sherry Atterbury and her family stayed at Babson House.
- John and Laura Nachbur, who are cousins of Dr. Marker, visited CCF for a week.
- Barbara and David Beasley, winners of the third Annual Champagne and Cheetah Celebration Auction, from California, stayed at Babson House.
- Dr. Marker invited, Christian Detrich who is a US Collaborator, to CCF.
- Nancy Boyton, our long time repeat working guest visited for her 15th year in a row.

June

- Auction voucher winners Randall & Terri Pattee, from Indianapolis, USA, stayed at Babson House for 3 nights.
- US staff member from San Francisco, USA, Justin Birkhoff, visited us with his parents.
- Shari Leinwand and her friends stayed at Babson House. Shari is a friend of Laurie's who met on one of Laurie's tours. Shari and her friends stayed for 3 nights and got to do all centre activities and learn about the work we do.
- Mike Chedester from the Living Desert zoo in the USA also long-time friend and colleague of CCF's, hosted his group at Cheetah View Lodge.
- Long-time friend of CCF, photographer and board member Susan Janin visited CCF and stayed at Babson House again.
- Tim Radekewo, Chairman of San Diego Chapter of The Explorers Club, Kathleen McGuire, Professor of Biology at San Diego State University, and Mike Dobbs stayed at Babson house for a few days.

July

- Alan Feldstein, owner of Infinite Safaris, hosted the CCF donor trip visiting CCF. He also attended the CCF Annual Gala in Windhoek.
- CCF Supporters Bob & Andrea Lapsley stayed in Babson House and joined us for the CCF Gala as well.
- Dr. Shira Yashphwe of CCF Israel, visited and joined CCF Namibia at the CITES Conference in Switzerland.

August

- Mariarosi Cama, veterinarian, and friend through CCF Italy, stayed at Cheetah View Lodge. She later volunteered as a working guest.

- Josanne Virene and Randy Spark who are both dear and long-time friends and supporters of CCF, and frequently visit CCF's Namibian Centre.
- Nancy & Joe Visenberg from USA. They met Dr. Marker last year at the Forestry Center Event. They are friends of Janet Waggoner's from Semester at Sea. Nancy has been joining Laurie's events in Portland for over 10 years. She also joined the Board of Trustees at the Oregon Zoo last year.

September

- Ludwig and David Tolzmann, known to Laurie through their connection to Living Desert Zoo.
- Hilliard Wiese and Miriam Hibel from the USA stayed for two weeks. Both are returning working guests and supporters of CCF.
- Voucher Winner, Marjorie Espenschade from the UK, stayed at Babson House.
- David van Smeerdijk, Owner of Natural Selection Tours, and his family stayed at Babson House.

October

- Mr Robert Koberlein enjoyed a 4-night stay at Babson House. He is a long-time follower of CCF and had long wanted to visit CCF.
- CCF Italy brought a group from Italy and France for a visit to CCF Namibia, twice in a row. These were William Rogora and Silvia Focolari of CCF Italy, and Christian Barbaud of CCF France who all enjoyed their stay at CVL.

November

- Sanya Hunsucker, a member of the Nambian USA Embassy, visited as a tourist.
- The breeders of LSGD Aleya, and supporters of CCF visit and stayed at Cheetah View Lodge and they also brought vet clinic donations.
- Susan McCord and Richard Castro who have been CCF supporters since 1993, visited as Voucher Winners.

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 continues to show strong growth with 16.35% increase in Day visiting tourists, from 13,636 in 2019 compared to 13,030 in 2018 (Figure 6o).

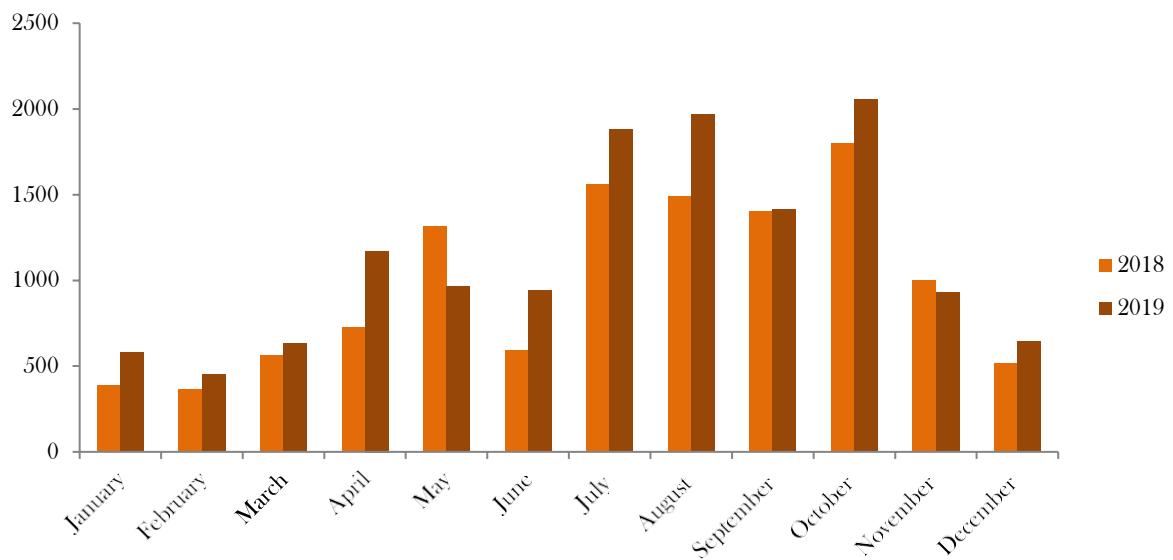


FIGURE 60: NUMBER OF VISITORS TO CCF PER MONTH FROM JANUARY TO DECEMBER 2019.

The predominant language spoken by visitors during this period was English and French (23%), followed by German (17%), and Italian (10%; Figure 61). In terms of nationalities, the largest proportions of visitors were from France (23%), followed by Germany (17%) and China (13%; Figure 62).

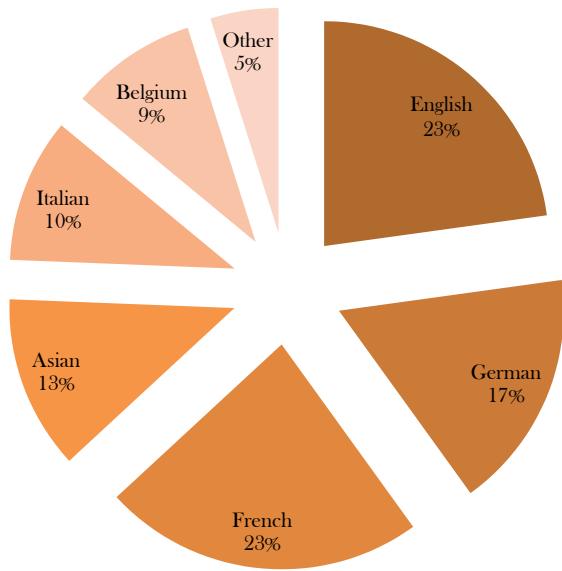


FIGURE 61: LANGUAGES SPOKEN BY VISITORS JANUARY TO DECEMBER 2019.

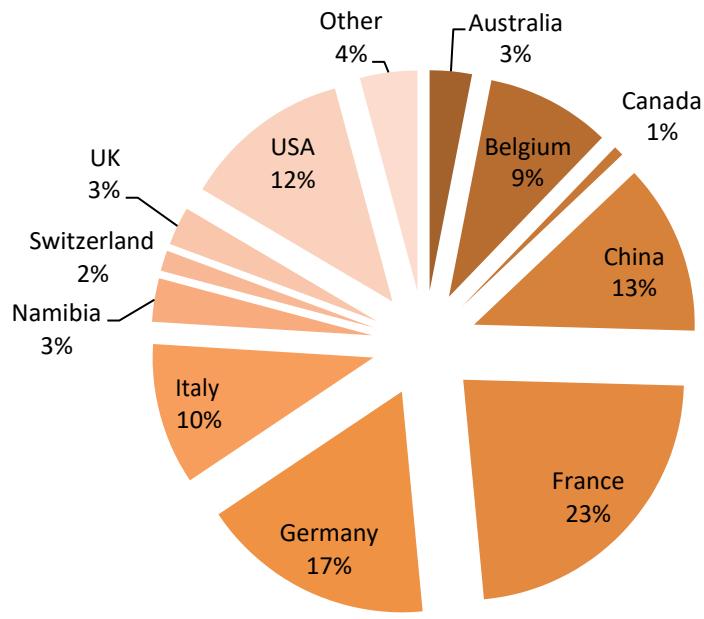


FIGURE 62: PERCENTAGE OF VISITORS PER COUNTRY FROM JANUARY TO DECEMBER 2019.

Most visitors continue to be walk-ins at 51%, including direct bookings from our reservation office, Exclusive Reservations, whom also represent 39% bookings from tour operators (Figure 63). The number of visitors booked by Exclusive Reservations, increased from 5,067 in 2018 increased to 5,817 in 2019 (excluding direct bookings).

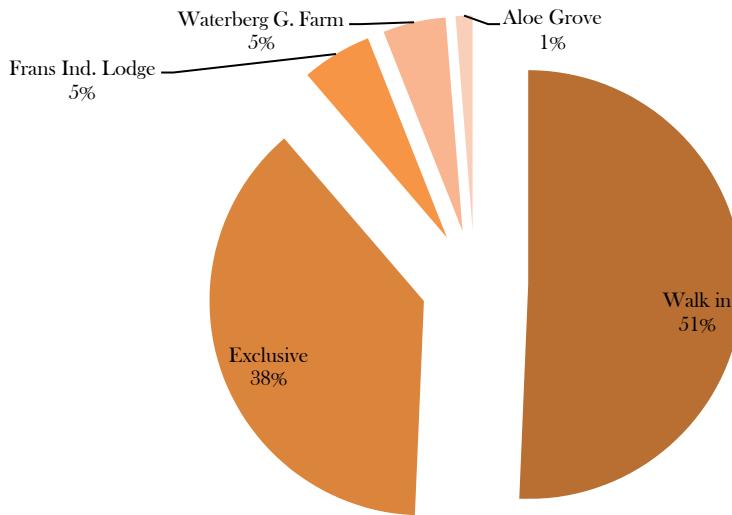


FIGURE 63: SOURCE OF VISITORS FROM JANUARY TO DECEMBER 2019.

2. Financial

In terms of tourism revenue from day visiting guests, CCF saw an increase of 5.94% during this period, at N\$8,036,854.00 compared to N\$7,585,768.00 in 2018 (Figure 64). This excludes revenue from all accommodations and activities lodge guests paid for onsite.

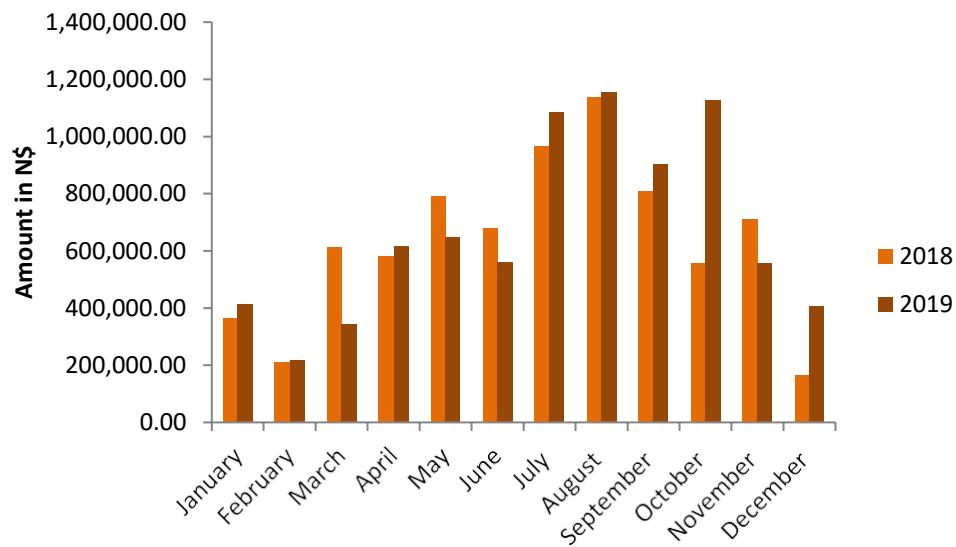


FIGURE 64: TOURISM INCOME (N\$) COMPARISON 2018 VERSUS 2019.

Table 34 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 January 2019 at N\$716.50 and the lowest month was April with N\$527.19 per visitor. The average amount spent by visitors at CCF shows a 0.88% decrease in 2019 with N\$592.03 compared to N\$597.30 in 2018. Cheetah Drives (Elands) represented the highest income source during this period, at 39.28 % of total income. Gift Shop revenue showed a 3.20% increase and places Centre Tours as the third highest revenue driver a 13.23% increase relative to 2018. Unlike the 2018 report, lodge guest activities paid for onsite are excluded from this data.

TABLE 34: BREAKDOWN OF REVENUE IN 2019 BASED ON ACTIVITY.

ACTIVITY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	%
ELANDS	158,760	90,465	95,535	227,523	184,745	182,243	451,566	526,421	370,064	473,699	226,565	169,229	3,156,814	39.28%
GIFT SHOP	85,675	42,421	111,652	134,751	123,731	171,978	264,030	243,962	183,863	236,735	114,012	105,228	1,818,038	22.62%
ED CENTER	36,590	24,940	59,065	102,170	84,380	81,550	128,740	122,430	105,110	166,936	104,530	46,651	1,063,092	13.23%
RUN	38,219	33,027	40,590	80,255	66,796	60,640	118,545	97,688	75,053	124,516	49,191	29,019	813,537	10.12%
ACCOM	12,022	3,228	0	8,280	110,986	0	4,800	39,369	54,863.85	280	1,060	3,520	238,409	2.97%
CAFÉ	35,617	18,219	28,089	48,495	48,258	55,724	88,601	100,330	74,677	87,065	47,604	32,421	665,100	8.28%
SERENGETI	9,758	0	0	4,700	16,785	2,840	2,974	14,455	24,013	26,206	5,286	6,122	113,138	1.41%
BEHIND THE SCENES	8,321	0	1,620	4,910	7,920	2,295	9,855.5	6,450	14,220	3,825	3,825	8,175	71,416	0.89%
DONATIONS	10,000	0	0	0	0	3,000	10,000	1825	1,480	4,034.45	1,770	1,907.8	34,017	0.42%
SERVICES	16,275	4,710	5,800	6,195	3,595	1,455	4,080	2,965	245	4,060	1,470	2,175	53,025	0.66%
Cheese	105	105	570	1,110	1,030	0	2,025	810	840	500	850	245	8,190	0.10%
EXCLUSIVE	2,080.00	0	0	0	0	0	0	0	0	0	0	0	2,080.00	0.03%
TOTAL	413,422	217,115	342,921	618,389	648,226	561,725	1,085,217	1,156,705	904,429	1,127,856	556,163	404,693	8,036,856	100.00%
VISITORS	577	391	634	1173	966	942	1878	1,970	1415	2054	932	643	13,575	
Avg Exp/ Visitor	716.50	555.28	540.88	527.19	671.04	596.31	577.86	587.16	639.17	549.10	596.74	629.38	592.03	

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. The total number of bed nights during this reporting period is 1,856 with a 9.63% increase compared to 1,693 in 2018. The lowest bed nights were recorded in March at 64 and highest in August at 281 bed nights.

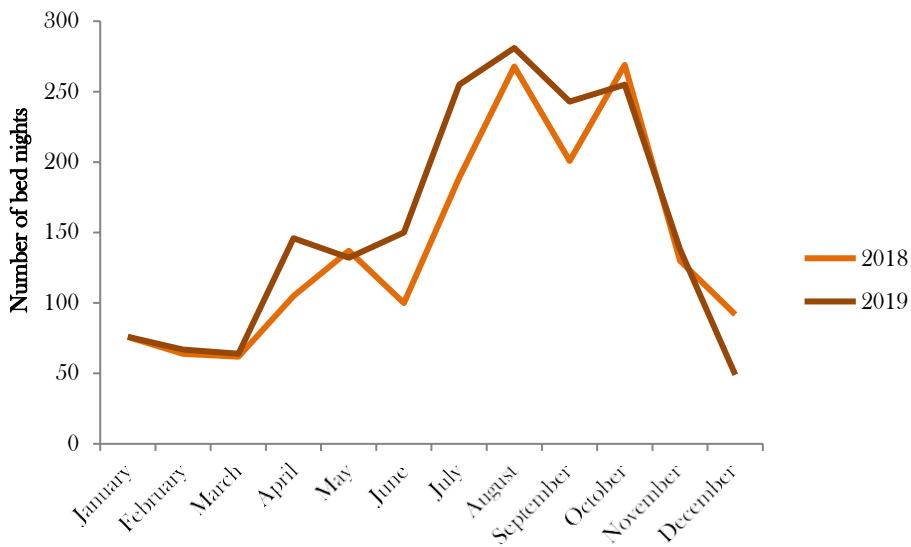


FIGURE 65: NUMBER OF BED NIGHTS AT CHEETAH VIEW LODGE COMPARING 2018 vs. 2019.

Revenue from the Cheetah View Lodge saw an increase of 25%, from N\$2,055,707.60 in 2018 to N\$2,570,271.48 in 2019 (Figure 66).

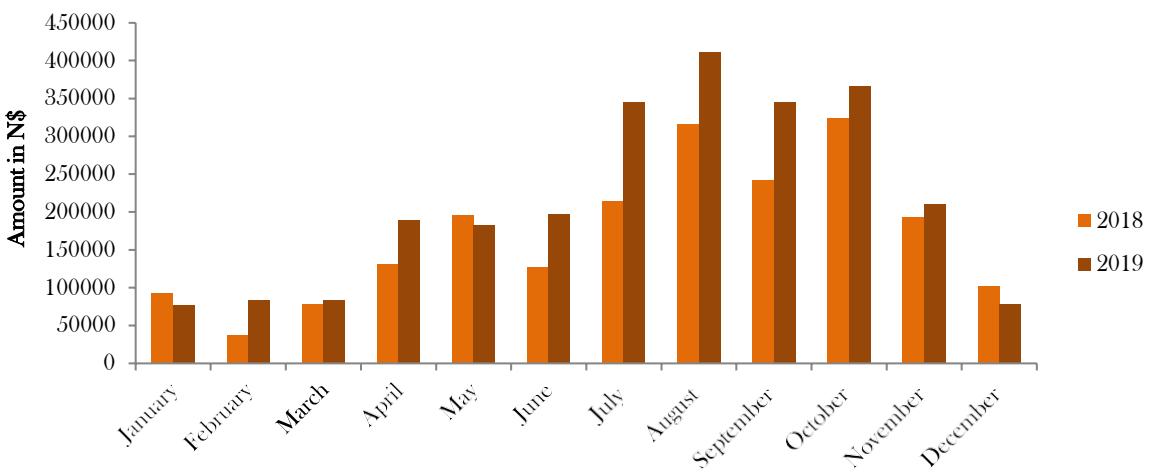


FIGURE 66: REVENUE FROM THE CHEETAH VIEW LODGE COMPARING 2018 vs. 2019.

Most visitors were booked by various companies through our reservation office, Exclusive Reservations, representing 23% of all sources (Figure 67) with 152 bookings, followed by direct and website at 12% with 79 bookings. The total number of confirmed bookings during this reporting period was 661. We currently have 69 different sources through which bookings for Cheetah View Lodge are received, presenting an increase of 27.8% from 54 sources in 2018. Exclusive Reservations also handles all CCF tour operator bookings such as Abenteuer Afrika, Cardboardbos Travel Shop, and Namibia Tracks and Trails.

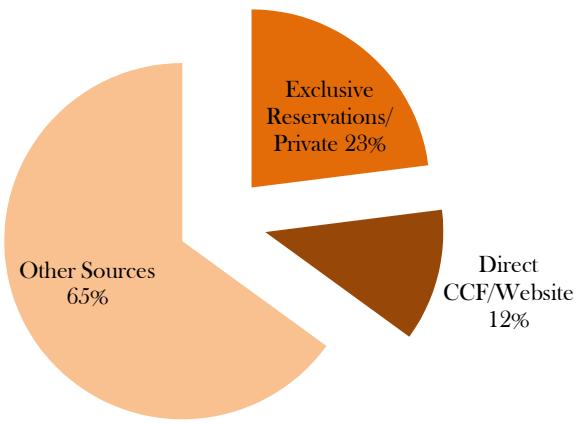


FIGURE 67: BOOKING SOURCES FOR CHEETAH VIEW LODGE, 2019.

In terms of nationalities, most guests at Cheetah View Lodge were from Germany (29%), followed by USA (21%) and Italy (17%; Figure 68).

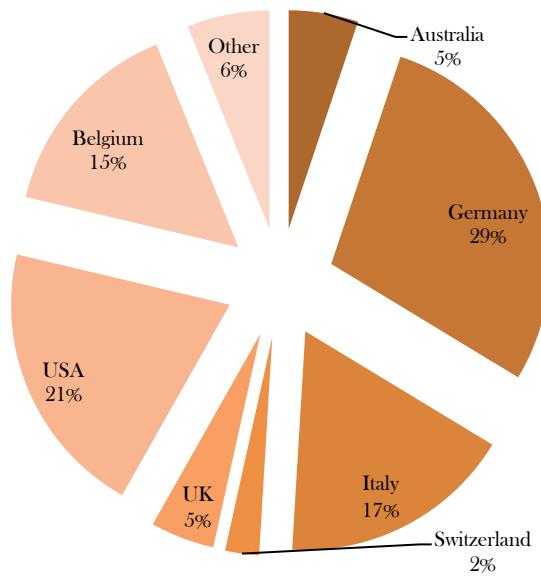


FIGURE 68: NATIONALITIES OF VISITORS STAYING AT CHEETAH VIEW LODGE, JANUARY TILL DECEMBER 2019.

4. Babson House

Babson House has been open to the public since April 2017, with bookings via Nights Bridge, 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 2019, the number of overnight guests was 235 bed nights, compared to 180

bed nights during the same period in 2018. The highest number of overnight guests was in August with a total of 49 bed nights. The lowest number of 2 bed nights occurred in January, March, and December 2019.

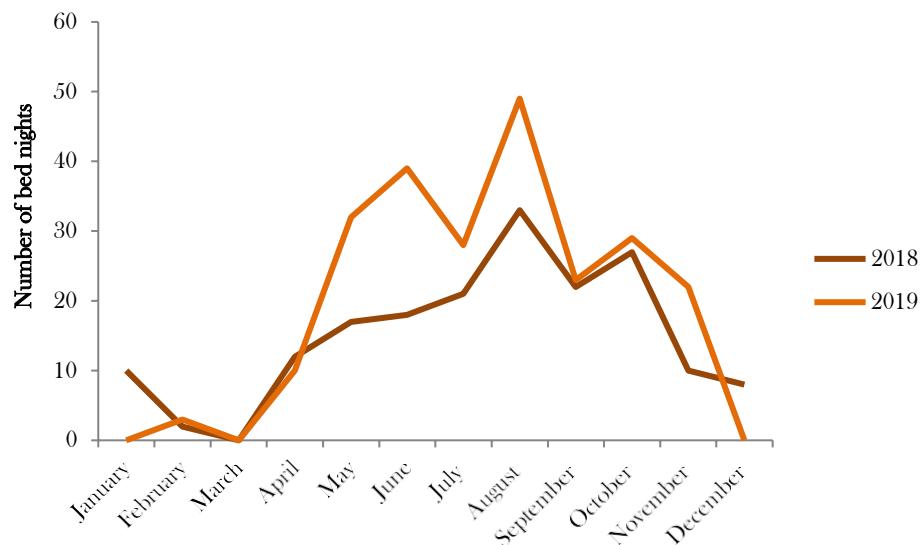


FIGURE 69: NUMBER OF BED NIGHTS FOR BABSON HOUSE COMPARING 2017 vs. 2018.

Revenue from the Babson House saw an increase of 33%, from N\$758,392.50 in 2018 to N\$1,009,087.50 in 2019 (Figure 70).

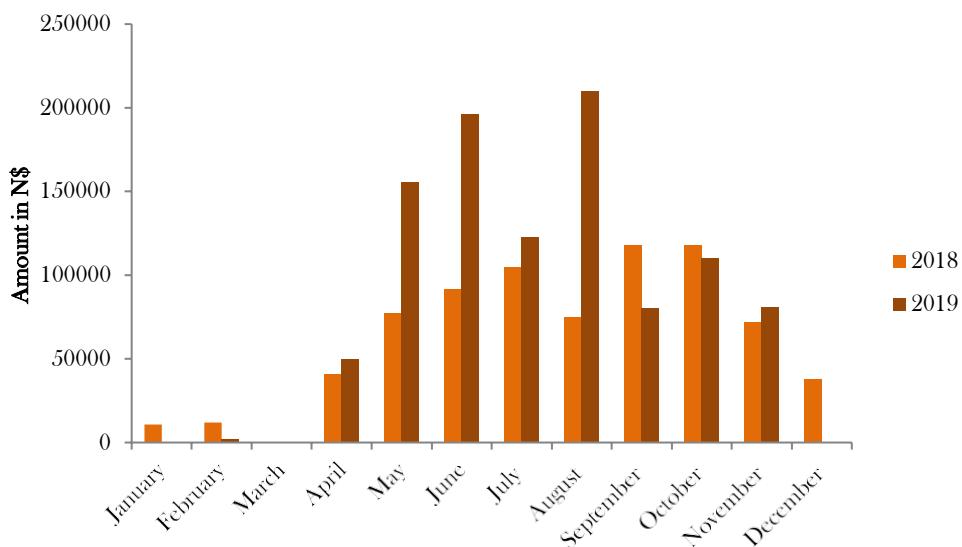


FIGURE 70: REVENUE FROM BABSON HOUSE COMPARING 2018 vs. 2019.

Most of Babson House guests this booked directly through CCF (21%), followed by private Exclusive Reservations (19%, Figure 71). A total of 41 bookings were received for Babson House during this reporting period. The tour operator with the highest percentage of bookings was Tracks & Trails at 9%) and Cardboard box Travel Shop and Ultimate Safaris both at 7% (all of which are included in the 'Other' category in Figure 71).

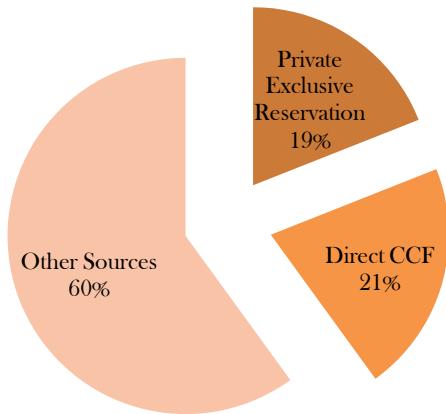


FIGURE 71: SOURCES OF BABSON HOUSE BOOKINGS, 2019.

Most overnight visitors came from the USA (73%) and UK (15%), and Germany and Canada (both 5%) as shown in Figure 72.

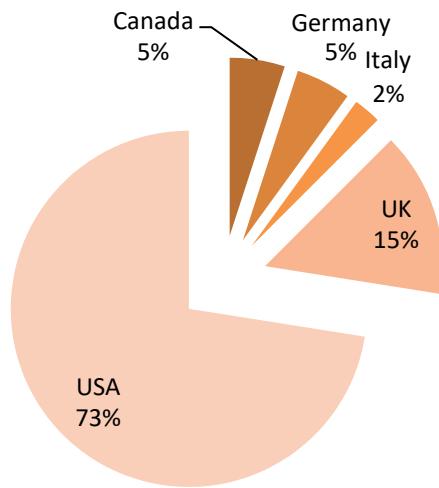


FIGURE 72: NATIONALITIES OF OVERNIGHT VISITORS AT THE BABSON, 2019.

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 35 shows the number of lunches and dinners that were cooked at CCF's community dining room, the Hot Spot, each month. A total of 31,293 meals were cooked during 2019 for an average of 87 meals per day.

TABLE 35: NUMBER OF MEALS SERVED AT CCF'S HOT SPOT FROM JANUARY TO DECEMBER 2019.

Meal	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lunch	1,279	1,065	1,154	1,122	1,495	1,502	1426	1441	1298	1263	1254	1355
Dinner	1,277	1,067	1,151	1,128	1,487	1,478	1430	1442	1299	1265	1259	1356
Total	2,556	2,132	2,305	2,250	2,982	2,980	2,856	2,883	2,597	2,528	2,513	2,711
Average/day	85	71	77	75	99	99	95	96	87	84	84	90

Half of the meals (50%) served at the Hot Spot were for CCF staff members. Volunteers and interns represented 43%, while Working Guests (WG) and other guests represented 7% (Figure 73).

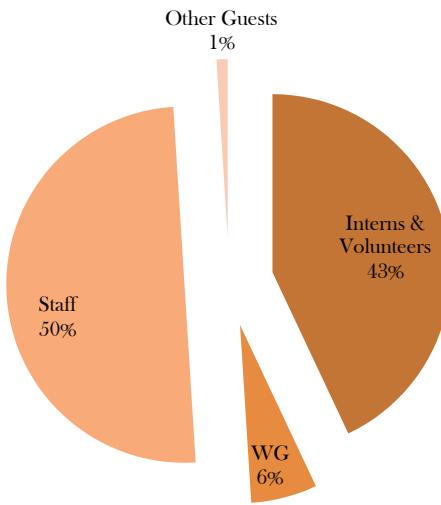


FIGURE 73: OVERALL CATEGORIES OF PEOPLE SERVED AT THE HOT SPOT IN 2019.

4. Marketing

For the seventh consecutive year, CCF received a Certificate of Excellence from TripAdvisor in December 2019. 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 2020.

Between January and December 2019, CCF had several site inspections from agents from Wilderness Safaris, who were joined by CCF's dear friends Chris and Emily Liebenberg (Namibia), owners of Piper and Health (USA), Christine Hub from TUI (Germany), Extraordinary Journeys (Namibia), and Mosa African Tours (Germany).

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. In April 2019, CCF was represented by our Guest experience Coordinator, Tayla Green and Administration Assistant, Dense Crause, at the Federation of Namibian Tourism Associations' (FENATA) Networking Lunch and Tourism Dialogue. In June 2019, both Tayla and Denise also attended the four-day Annual Tourism Expo, starting off with a Networking Conference and marketing CCF throughout Expo. Also, in June, Tayla attended the annual Hospitality Association of Namibia's (HAN's) Hospitality Tourism Trade Forum (HTTF), spreading the word on CCF, meeting up and networking with tour consultants and operators of Namibia. While at the HTTF, she joined an EcoQuest workshop discussing teamwork, development, enhancement, and team productivity. This was hosted by the owner of EcoQuest, and HAN member Shanna Groenwald. We also attended the Annual Trade Fairs throughout Namibia, the Ongandiva Trade fair being the Highlight of them all.

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, African Safaris Magazine, as well as the newly added Manzani Travel for Hidden Gems of Namibia social Media and online advertising.

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.

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.

The new Cheetah Café is now positioned to better serve guests since the rebuild after a lightning fire on 16 October 2013 destroyed the CCF Visitor Centre, where the Cheetah Café was housed. The Cheetah Café, operated from a small room in the Cheetah Museum building, until the re-opening in June 2017. The 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\$655,711.00 up from N\$584,069.08.00 during the same period in 2018. A la carte sales accounted for 75.5%, with revenues of N\$495,266.08 (Table 36). However, the popularity of pre-booked lunches with tour groups like African Eagle, Nat Geo and Karibu Safaris continues to grow. We plan to increase the booked lunches even more in 2020 and promote the different booked lunch menus.

TABLE 36: CHEETAH CAFÉ SALES FROM JANUARY TO DECEMBER 2019 (N\$).

Month	Pre-Booked	A la Carte	Total
January	4,520.00	31,097.00	35,617.00
February	5,400.00	12,306.00	17,706.00
March	11,250.00	16,839.00	28,089.00
April	12,075.00	31,913.00	43,988.00
May	13,800.00	34,458.00	48,258.00
June	16,200.00	37,255.00	53,455.00
July	12,300.00	76,301.00	88,601.00
August	12,150.00	88,180.00	100,330.00
September	23,550.00	51,127.00	74,677.00
October	31,200.00	55,865.00	87,065.00
November	14,550.00	33,054.00	47,604.00
December	3,450.00	26,871.00	30,321.00
Total Sales	160,445.00	495,266.00	655,711.00

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 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, 4 June, and 14 November 2019, where various member- organisations gave progress reports on their current projects. LCMAN has been contributing towards the Namibian Carnivore Red Data Book with the book launch being schedule for mid-2020. Some of the concerns discussed during meetings have included the wild horse conflict with the spotted hyena (*Crocuta crocuta*) in the south of the Namib Desert, and the increasing number of high game fences within Namibia, preventing migrations of wild animals. Both topics were discussed in depth during the LCMAN meetings. LCMAN also provided a statement to the Maltahohe Farmers' Association regarding the predator issues raised at the Greater Sossusvlei-Namib Landscape meeting, earlier in the year. During the 2019 AGM, Lauren Pfeiffer was voted in as the LCMAN secretary and will hold this position until the next AGM.

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.

In 2019, CCF worked closely with the Ministry of Environment and Tourism (MET), and we were joined by the MET National Carnivore Coordinator, Regional Community Based Natural Resource Management (CBNRM) Warden and Regional CBRNM Ranger on one of our field trips, increasing their exposure to CCF's work in the area and the challenges faced by the conservancies. CCF and MET held joint facilitated meetings with each of the four communal conservancies, discussing future plans for the governance development of the conservancy committees, HWC and Natural Resource Management (NRM) plan, and jointly audited the Community Game Guard (CFF) event books.

The MET team also joined CCF field staff at workshops conducted to raise increased awareness on the MET HWC Self Reliance Scheme, a mechanism put in place where farmers can claim a small offset financial contribution of loss of livestock to carnivores.

3. Communal Conservancy Development

Human-Wildlife Conflict in Eastern Communal Conservancies in Okakarara District

In 2019 CCF focused their efforts in the high human wildlife conflict zone (HHZ), mainly the Okamatapati and Ojituu GWL communal conservancies. Following CCFs research in 2018 investigating wildlife species presence, this area was identified as having the highest number of incidents with conflict between farmers and carnivores. The project focused on reducing livestock losses and HWC to conserve remaining cheetah and AWD populations, and to create sustainable livelihoods for the residents of the GWL, by delivering CCF's successful Future Farmers of Africa (FFA) training, and by providing urgent and sustained veterinary support. CCF has successfully implemented the training within the HHZs in the GWL (

Figure 74).

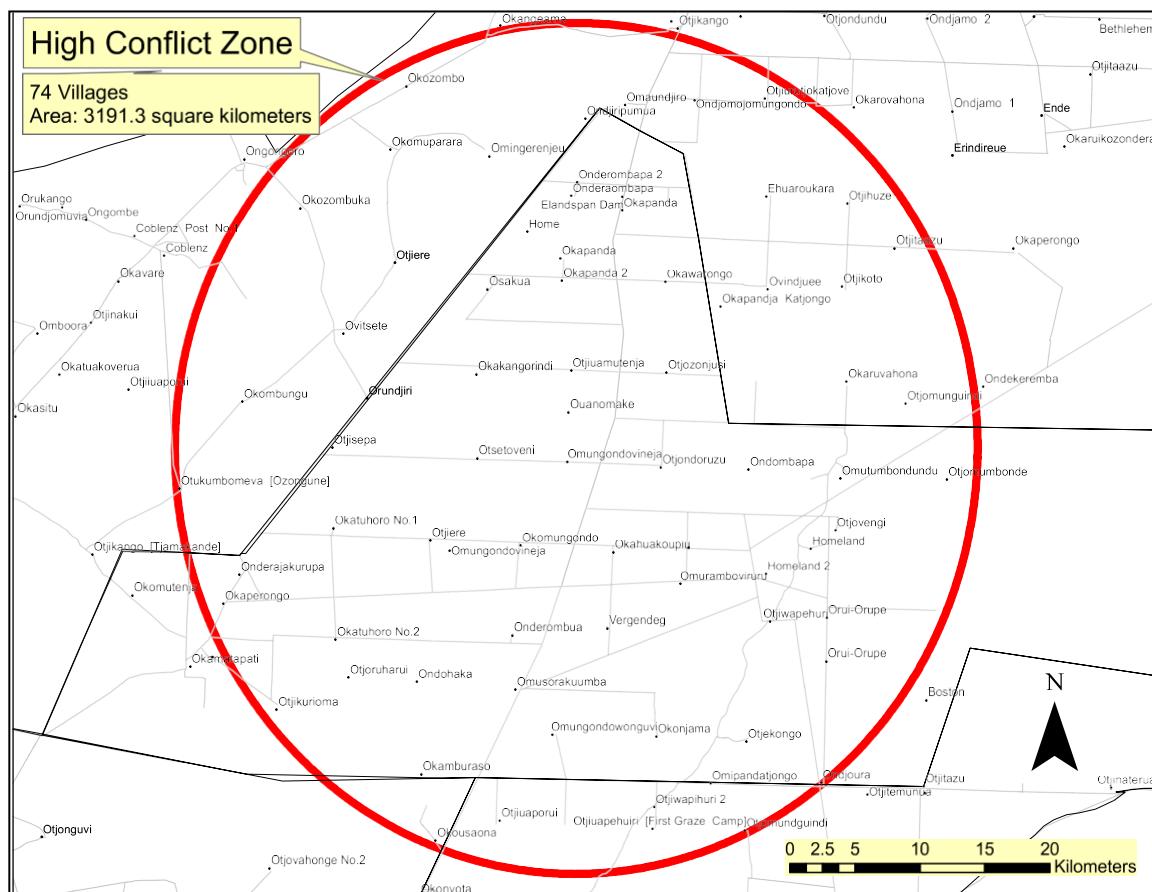


FIGURE 74: HIGH HUMAN WILDLIFE CONFLICT (HWC) ZONE.

The Greater Waterberg Landscape (GWL), where the project is located, is an area in crisis. Some 25,000 residents, most of whom are farmers, have experienced considerable loss of livestock and income because of escalating HWC and persistent drought. The poor condition of livestock has only reinforced deep-seated cultural attitudes of low predator tolerance, further increasing HWC.

Prior to training, 83% of farmers cited issues with predators but reported that the training made a real and measurable difference. CCF reached 3,960 people (directly and indirectly) through 79 training workshops, across 74 villages. Training workshop topics included CCF's proven mitigation measures such as Integrated Livestock Management & Conservation tools, Livestock Health, Carnivore Ecology, and Adaptive Mitigations relevant to the current drought and proposed changes in farming methods, to equip farmers with options to reduce conflict.

As a result of CCF's ongoing efforts in this area, attitudes towards predators have changed; 71% of participants understand the value of wildlife to their communities versus no tolerance to predators at all, when the project began. Further achievements during 2019 include:

- Local knowledge and capacity have been improved
- Stronger community networks have been built within existing structures
- Creation of community-based roles to support conservation and sustainability efforts long-term

Project results show that drought has contributed heavily to the number of livestock losses recorded over the year. Livestock losses from poor health almost equal those resulting from HWC.

During this phase of the project, CGGs were also recruited. Project staff then worked together to identify hot spots of HWC, engage and galvanize the support of the farming community, and source suitable and accessible training locations. Following training jointly facilitated by CCF and MET in 2018, the CGGs recruited on the ground received practical training, supporting the theory training they have received. Skill development included event book record keeping, setting up camera traps, tracking, kill ID, use of GPS's and facilitation of workshops.

Over the course of the year, the Community team worked closely with community members to better understand the perception and treatment of predators in the project area. CCF recorded all locations where HWC incidents occurred using GPS. This spatial data has been used alongside the outcome of farmer questionnaire data, to analyse the trends in HWC within project locations, over the course of the year.

Survey data shows that of the 262 participants who completed questionnaires, more than 83% reported they had a problem with predators. Detailed data analysis also showed more than 1,200 livestock (almost 50% goats) were lost to predators during the year. An increase in poaching of smaller prey species was also noted throughout the year – though CCF did encounter farmers who expressed their commitment to anti-poaching.

Feedback from the community (and training participants) throughout the year indicated an increased willingness of farmers to report and communicate predator presence or conflict first rather than taking matters into their own hands. Interestingly, more than 65% of training participants felt they would benefit from working more closely with each other to improve animal health and reduce HWC. CCF is very supportive of this community and collaborative approach.

Embedding CCF's presence in the area is working but the impact of drought has been so severe it has presented challenges to reducing HWC within 12 months. However, the need for sustained intervention to achieve this outcome is recognised by both CCF and local community members.

In addition, since the initial project proposal was submitted, species population data reveals that the number of cheetahs within the GWL has halved between 2015 and 2018. There are now just 50 cheetahs remaining in the project area, and even fewer AWDs (estimated 30). The small populations of cheetah and AWD that remain are amongst the most persecuted. Without CCF's presence, these small populations may disappear within the next two years.

It is anticipated that the on-going presence of CCF's Community and training team, along with the CLAs/CGGs, will help to reinforce training messages and methodologies across the area and, where needed, deliver additional and/or follow up training. In turn, this will ensure communities continue to farm in a way which reduces both predator and livestock losses, whilst creating sustainable sources of income.

African Wild Dogs (AWD)

Farmers kill the AWDs (and their pups) in retaliation, resulting in high conflict between farmers and AWDs. Once a den is located the farmers typically set snares around the den to catch adults which return to feed the pups. If an adult is captured in such a snare, that individual is killed, and the den is burned with the pups inside it. Unfortunately, there is an emotional hatred of the wild dogs. It will take much time to build trust in these communities and find ways to mitigate the conflict, hopefully before these animals are totally extirpated from this area.

Based on a combination of camera traps and local knowledge, we were able to identify areas of African wild dog activity and conflict (Figure 75). Opportunistic camera traps captured a total of six individual wild dog photos during the study period in 2019. These camera trap photos taken during 2018 and 2019, 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 of 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.

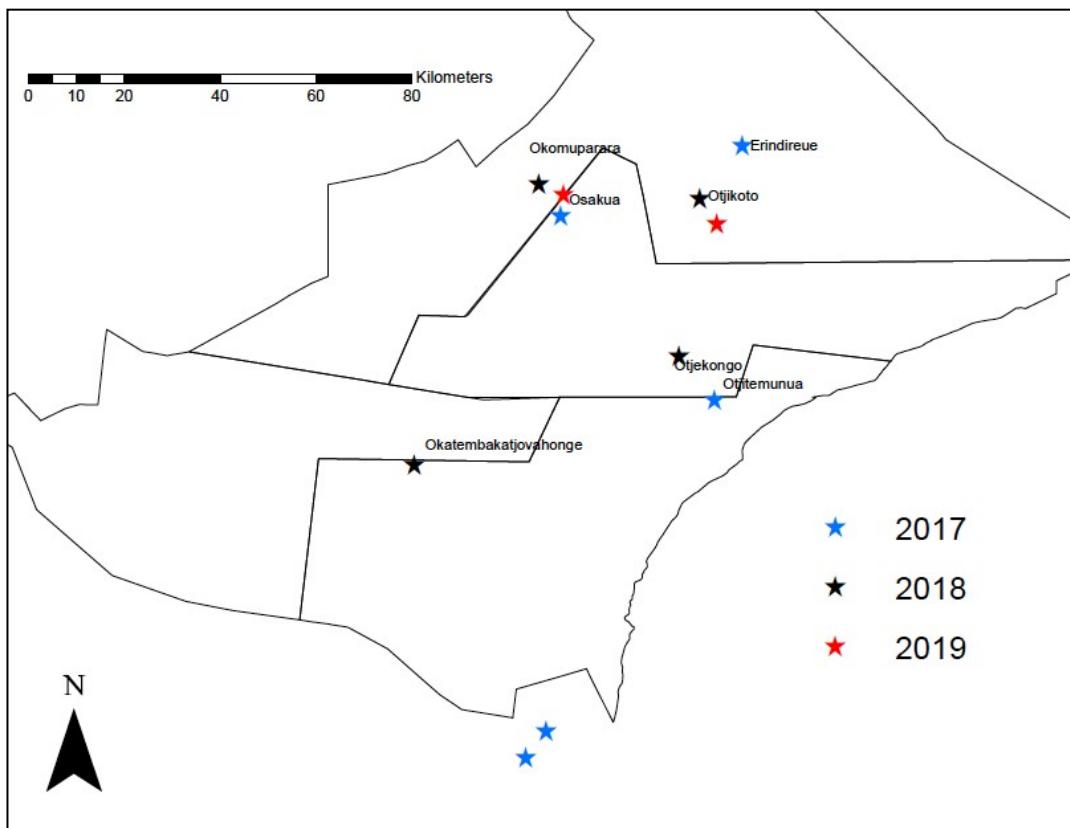


FIGURE 76: CONSOLIDATED LOCATIONS OF AFRICAN WILD DOG DENS.

In 2019, only three packs were found to have returned to the area, of which only one den consisting of three confirmed adult dogs was successful, however only one pup was raised to three months of age (Figure 77). No further data has been able to confirm the survival of this pup. A second den estimated to contain six dogs (2 adults, 4 pups) was destroyed. A third pack was identified, consisting of eight individuals (6 adults, 2 sub-adults) however, no den was found for this pack.



FIGURE 77: CAMERA TRAP PHOTO OF AN ALPHA FEMALE AND A PUP.

Two additional dogs, both males and presumably solitary, were also identified, but are not known to be associated with a particular pack (Figure 78).



FIGURE 78: UNIDENTIFIED MALES WITH NO KNOWN PACK ASSOCIATION.

Eight AWDs were captured on camera traps on Sandveld Game Farm, a bordering the range of the study area (Figure 79) moved through their farm. It is unclear if this pack is part of the identified packs in the Okakarara communal conservancies, or an independent pack coming from the Tsumkwe area. However, through spoor tracks it was confirmed that the pack had moved in and then out of the research area.



FIGURE 79: AFRICAN WILD DOGS CAPTURED ON SANDVELD GAME FARM WITHIN THE RANGE OF THE STUDY AREA, FROM AN UNCONFIRMED PACK.

Estimated demographics of the African wild dogs in this area are shown in Table 37 .

TABLE 37: ESTIMATED AFRICAN WILD DOG DEMOGRAPHICS AS OF DECEMBER 2019.

TOTAL ADULTS ESTIMATED	TOTAL SUBADULTS ESTIMATED	TOTAL ESTIMATED	PUP	TOTAL ADULT MORTALITIES CONFIRMED	TOTAL SUBADULT MORTALITIES CONFIRMED	TOTAL PUP MORTALITIES ESTIMATED
17	2	1		2	4	6

Rabies Vaccinations

It is estimated that there are 12,800 people in the 4 conservancies, with each homestead comprising 5 people on average. For many years, there has been a complete absence of veterinary support in the area and many do not have the finances or transport to access this support from outside of the area.

The drought has had a serious detrimental effect on livestock health. During community visits, CCF noted that livestock were in very bad condition, largely due to limited grazing. Survey results showed that some 1,000 livestock losses occurred as a result of drought and resulting sickness.

The team also noted a considerable number of livestock injuries (mostly in cattle and goats) resulting from predator attacks, often causing very deep abscesses (up to the bone) needing marsupialisation. Other common problems were mostly related to parasites, hoof problems and eye injuries/infections.

The presence of CCF's mobile veterinary clinic was therefore welcome and needed. The team made a total of six trips during April, June, July, August, and November, to the same 74 villages as the Community team. These were

identified as HHZs within the four communal conservancies of Okamatapati, Otjituuo, African Wild Dog and Ozonahi.

The team collaborated with conservancy leaders to highlight when they would be visiting and to promote available services. The veterinary team provided vaccination services to livestock and domestic animals, and routine health checks of livestock. A total of 1,150 rabies vaccinations were administered (versus 240 planned) and 1,684 health checks given (versus 1,200 planned). At least 500 members of the farming community benefitted from these services.

The team are now actively being contacted by community members. During the second half of the project, the team received a call from one community where dogs were dying. Following health checks, it was determined the dogs were suffering from Tick Bite Fever - a deadly bacteria passed on from ticks. The community was advised on treatment and the importance of medicating their dogs and cats with flea and tick repellents.

Calls from two other communities, approximately 30km apart, were received because dogs were also falling sick and dying. An outbreak of distemper was determined, a highly contagious disease that can be avoided by vaccinations. CCF worked in collaboration with the State Veterinarian to advise communities on how to correctly dispose of bodies of sick dogs and quarantine of dogs showing symptoms, as well as the importance of vaccinations.

The work of the project teams will continue in 2020 and fundraising to support this activity has already begun. CCF plan to revisit villages within 1 year to provide booster vaccines, by which time there will also be new animals to vaccinate.

Long-term, CCF's mobile veterinary clinic is expected to contribute to the reduction in livestock losses and HWC, and ultimately result in less killing of cheetahs and AWDs. In addition, it will help to increase income for farming families by having healthier livestock.

There is also now consistent veterinary support to help improve animal health and reduce the risk of rabies. Prior to the availability of CCF's mobile veterinary service, there was no accessible veterinary support for local communities. Rabies was a real concern as rabid dogs have the potential to infect humans, livestock, other domestic animals, and even wild species.

As a result of the tireless work of the project team during 2019, attitudes towards predators have changed; 71% of participants understand the value of wildlife to their communities versus no tolerance to predators at all at the start of the project. Local knowledge and capacity have also been improved and stronger community networks have been built - within existing structures and by the creation of community-based roles to support conservation and sustainability efforts long-term.

Project results show that drought has contributed heavily to the number of livestock losses recorded over the year. Livestock losses from poor health almost equal those resulting from HWC. Plans to address these issues are set in detail, in the challenges section of the report.

In summary, CCF will continue its focus in the GWL during 2020. It is clear These longer-term goals will build on the work and reduce the incidences of livestock losses and HWC.

4. Workshops, Trade Fairs & Conferences

Okakarara Agriculture Trade Fair (2 - 8 September 2019)

Community Development Officer, Veisy Kasaona represented CCF at the Annual Okakarara Trade Fair, along with Nelson Maamberua, Community Game Guard from the Okamatapati Communal Conservancy. CCF's aim was to share information with farmers and the community living in the Okakarara Constituency, and the whole country in general. Veisy and Nelson shared information on CCF's ongoing support in the Okakarara communal conservancies with livestock farmers, shared information on mitigation tools for better livestock protection and livestock health, amongst others. An average of 20 farmers visited CCF's stand per day, and more than three different school groups. Most of the students had visited CCF before, while some had been visited by CCF's Environmental Education Team at their school. Most farmers were interested in the Livestock Guarding program and they completed the LSGD application forms.

Conservation Conflict Transformation Workshop - Tanzania (12 - 16 September 2019)

Veisy Kasaona CCF's Community Development Officer attended and participated in a 5-day Conservation Conflict Transformation (CCT) capacity building workshop, hosted by Conservation Peace in Arusha, Tanzania. The aim of the workshop was to improve the ability of leaders, practitioners, stakeholders, and teams to better understand conflict dynamics and establish more effective skills, processes, and strategies to address them. The following were some of the topics and discussion that were covered during this workshop.

- The Third-Party Neutral Role and responsibility
- Level of Conflicts
- Human Need Theory
- Re framing
- Conciliation
- Mediation
- Individual Case Analyze

Navigating Conflict over iconic wildlife workshop (7 November 2019)

The Navigating Conflict over iconic wildlife was also amongst the workshops that CCFs Community Development Department participated in. The one-day workshop that was held in Windhoek looked at novel approaches that align with good and inclusive governance practices and manage human wildlife conflict, specifically with the elephants. The workshop covered a variety of HWC issues nationally and looked at solutions.

Building Community Conservation Success Workshop (15 - 20 November 2019)

CCF's Community Development Coordinator, Nadja le Roux attended a 5-day workshop in Victoria Falls, Zimbabwe facilitated by the Living Desert Zoo and Gardens. The workshop was titled "Answering Perception and Evaluation Research Questions".

Recognizing that conservation is essentially behavior, we are most successful as conservationists when we successfully engage the communities living in and around the areas in which we work in our conservation projects. Communities who are involved in and are consulted on projects are more likely to support them, even becoming vital participants.

For conservationists to better engage with nearby communities, we need to be able to understand their perceptions of our work, of our species, and of our conservation areas – all of which are essential for a well-designed set of interventions that address Community-Based Conservation Engagement. Increasingly, conservations recognize that local communities determine our conservation successes, but most conservationists have not had the opportunity to learn how to conduct community perception or evaluation studies.

The goal of this workshop was therefore to introduce participants to creating community perception and evaluation studies in a rigorous, scientifically valid manner. Participants were led through the entire process of conducting perception and evaluation studies, beginning with creating the testable questions and ending with planning for data analyses.

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 Otjozondjupa Regions.

A total of 40 questionnaires were administered during this reporting period, covering 43 farms in the Gobabis District. Thirty-two respondents (80%) reported sighting cheetahs on their farm. Twenty-eight of these respondents (86%) deemed cheetahs to be a problem on the farm, while only 4 respondents (13%) reported cheetahs as not to be a problem. Only three respondents reported seeing cheetahs weekly, but 13 respondents sighted cheetahs at least monthly (Figure 8o).

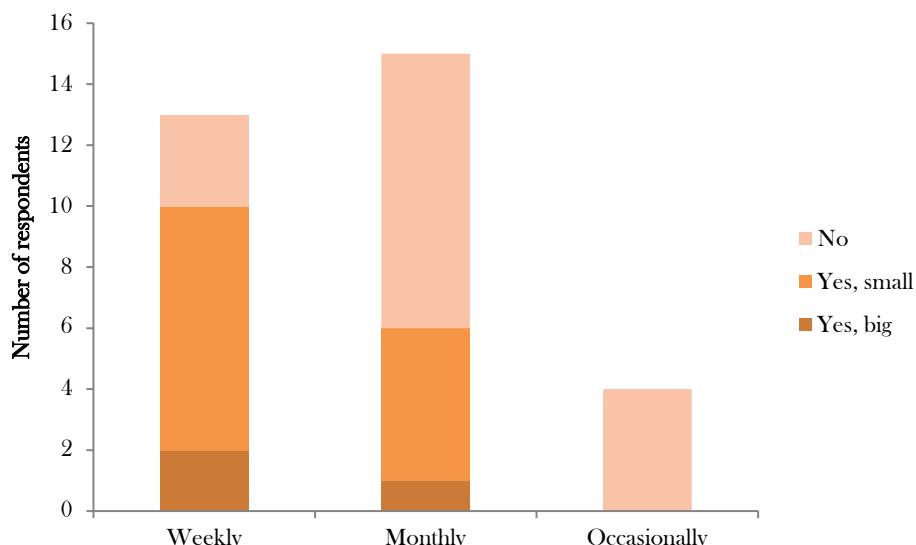


FIGURE 80: CHEETAH SIGHTINGS AND LEVEL OF PROBLEM AMONG RESPONDENTS IN THE GOBABIS DISTRICT.

Scat and Camera Trap Surveys

CCF Scat Dog Researcher, Tim Hofmann conducted a scat survey on Farm Hinterland (#180). Two cheetah playtrees were located by the scat detection dog. Four camera traps were deployed at various times and sites. Unfortunately, some of the cameras reset their date and time to a default setting (manufacturing fault), thus only an approximate date and time could be determined. Wildlife species recorded were kudu, hartebeest, oryx, duiker, aardvark, honey badger, warthog, black-backed jackal, Guinea fowl, caracal, brown hyaena, cheetah and leopard. All the game species recorded were in good physical condition and none showed obvious signs of malnutrition or disease.

Cheetah Play Tree 1 site (180CPT1), Station 1/1, Camera deployment date 30 Sept to 26 Oct 2019

180CPT1 was located during a scat survey in August 2019 by the Scat Detection Team. Cheetah scat was located on the tree (Figure 81). These samples still need to be analysed and hair readings are in the process to determine diet.

The camera trap survey showed oryx were regular visitors, either passing by or at times sniffing the tree. Other species recorded included duiker, kudu calf, honey badger, aardvark, and black-backed jackal.



FIGURE 81: TREE (LEFT) ON WHICH CHEETAH SCAT (RIGHT) WAS LOCATED BY SCAT DETECTION TEAM.

Individual predators that were identified were given a unique identification number (Table 38). The identification number works as follows: Farm number where first seen (e.g. 180 for Hinterland), sex (M-male, F-female, U-unknown sex), unique number (e.g. 001 for first cheetah identified, month and year first seen (e.g. 10/19 denotes October 2019).

TABLE 38: PREDATORS CAPTURED DURING CAMERA TRAP SURVEYS ON FARMS IN THE GOBABIS DISTRICT.

Date	Predator spp	Photo	Video	Time	Behaviour
3 – 10 Oct 2019	Leopard 1	Bad	None	Night	Scent-marked tree
10 – 23 Oct 2019	Cheetah, adult, male (180M001-10/19)	Good	None	Night	Sniffed against tree and at base
10 – 23 Oct 2019	Cheetah (180M001-10/19)	Good	None	Day	Passed tree, no sniffing or marking
23 – 26 Oct 2019	Cheetah, adult, unknown sex (180U002-10/19)	Good	None	Day	Passed by
<hr/>					
Trap cage set					
23 – 26 Oct 2019	Cheetah (180M001-10/19)	Bad	None	Night	Walked pass between camera and fallen tree log
23 – 26 Oct 2019	Leopard 2	Good	Bad	Night	Walked up to fallen tree log, sniffed camera, did not approach trap
23 – 26 Oct 2019	Cheetah (180M001-10/19)	Fairly	None	Night	Passed by, did not approach trap
<hr/>					
Night of honey badger caught in cage					
23 – 26 Oct 2019	Cheetah (180M001-10/19)	Good	Good	Day (morning)	Walked up to fallen tree log, sniffed branch packed around trap, left. Honey badger still in trap cage.
23 – 26 Oct 2019	Cheetah (180M001-10/19)	Fairly	None	Night	Walked pass
23 – 26 Oct 2019	Leopard 3	Fairly	None	Night	Walked pass

Cheetahs

Two individual cheetahs were identified (Figure 82). The first male cheetah to visit the play tree was identified as 180M001-10/19. He was recorded at the play tree on six occasions, 4 night-time visits and 2 daytime visits. He was recorded scent-marking the tree at the base, but not climbing up.

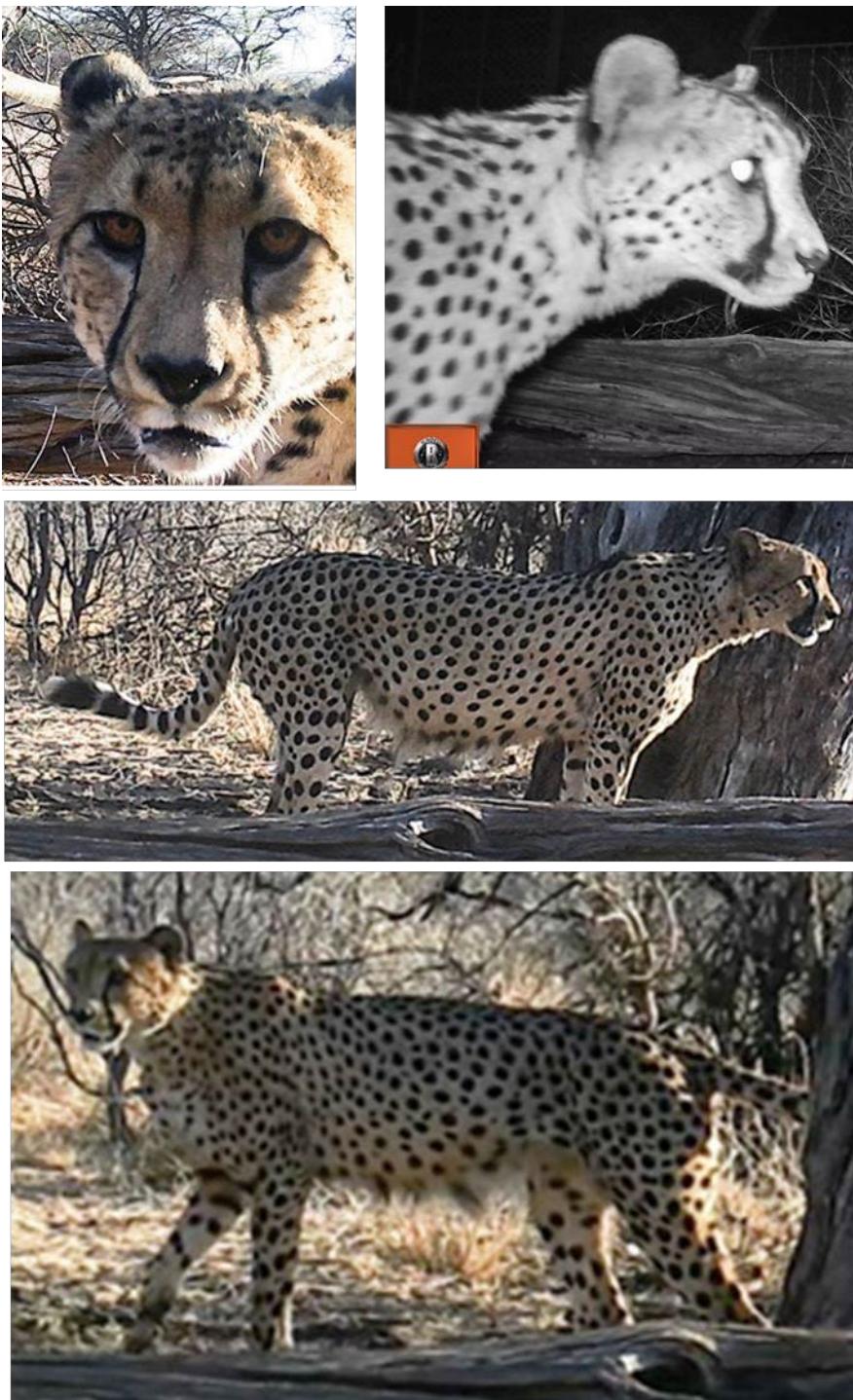


FIGURE 82: CHEETAHS CAPTURED AT A PLAY TREE.

This male cheetah was recoded at the play tree on three night-time occasions after the trap cage was set up. On all three occasions, he did not approach the tree, but walked pass by quickly (Figure 83).

The second cheetah was identified as 180U002-10/19. This individual was recorded only once, before the trap cage was set, and walked pass by too quickly for the video to record. Sex could not be determined.



FIGURE 83: CHEETAH CAPTURED ON CAMERA TRAP SURVEY.

Leopard

Leopards were recorded on three occasions, only during night-times. One male visited the play tree soon after the camera trap was deployed, and the leopard was recorded scent-marking the tree. The occasion was before the trap

cage was set. Two more sightings of leopard were recorded after the trap cage was set, but on neither occasion did they approach the tree nor the trap (Figure 83).

Leopard Male 1 (~ 4 Oct 2019)



Leopard 2 (23-26 October 2019)



Leopard 3 (23-26 October 2019)



FIGURE 84: LEOPARDS CAPTURED ON CAMERA TRAP SURVEY.

Martin's Post (180MaPo), Station 1/1, Camera deployment date 30 Sept - 10 Oct 2019

Species recorded at Martin's Post were kudu, oryx, black-backed jackal, warthog, and honey badger. The only large predator recorded was a brown hyaena on one occasion during the night, between 1-3 October 2019 (Figure 85).



FIGURE 85: HYAENA CAPTURED ON CAMERA TRAP SURVEY.

Richards's Post (180RiPo), Station 1/1, Camera deployment date 22 Oct - 24 Nov 2019

Species recorded at Richard's Post were hartebeest, kudu, oryx, warthog, duiker, black-backed jackal, and honey badger. The only two larger predators recorded were caracal and cheetah. Both species were recorded only once (Figure 86).



FIGURE 86: CARACAL (LEFT) AND CHEETAH (RIGHT) CAPTURED ON CAMERA TRAP SURVEY.

Livestock Losses

On 2 October 2019, a calf carcass was inspected. The calf was approximately 2 months old. Scat samples were collected in the surrounding area of the kill site, and included black-backed jackal, brown hyaena and maybe cheetah (Figure 87). These samples are yet to be analyzed.

As the carcass was being fed on by vultures and other scavengers, the exact cause of death could not be positively identified. No characteristic bite marks could be found on the throat to indicate cheetah, but this finding is in no way conclusive due to the state of the carcass. Cheetah tracks were however found at the site.



FIGURE 87: CALF CARCASS AND SCAT FOUND AT KILL SITE.

On 23 October 2019, a 4-month-old calf was killed at Martin's Post. The carcass was inspected by Dr. Hanlie Winterbach and according to the location and size of the bite, scratch and feeding wounds, as well as tracks and dragging marks observed at the kill site, depredation by a cheetah was confirmed (Figure 88).



FIGURE 88: CALF KILLED BY CHEETAH (LEFT) AND CHEETAH TRACKS (RIGHT).

Long claw marks were evident on the cheek and back of the neck of the calf, and bite wound on lower part of the throat was \pm 35 – 40 mm wide (Figure 89).



FIGURE 89: CLAW MARKS LEFT ON A CALF KILLED BY A CHEETAH.

Samples were collected at 4 wound sites and stored in tubes with ethanol. These samples will be processed at the CCF Genetics Laboratory.

Table 39 shows a summary of calf losses obtained from the Farm Manager.

TABLE 39: CALF LOSSES FROM 2015 – 2018 AT THE THREE STUDY AREAS.

Year	East Post	Richard's Post	Martin's Post	North Post	Total
2015 - 2016	6	8	8	3	25
2017	3	5	7	4	19
2018	7	4	5	3	19
Total					63

Farmer Engagements

Farmer Associations (FA) and Individual Farmers

A series of Farmers' Association meetings were attended by CCF staff and an official from the MET Gobabis office, to facilitate a better relationship between the two groups. CCF Gobabis Office obtained and analysed the MET Gobabis Problem Animal Report records and found human-wildlife conflict incidents and predators killed on farms to be incomplete and mostly few and far between.

Analysis of the MET Problem Animal Reports

There are 378 commercial farms in the Omaheke Region however, only 49 HWC incidents were reported at the Gobabis MET office for the period February 2016 to February 2019. Only a total of 12 reports were cheetah related (Figure 90).

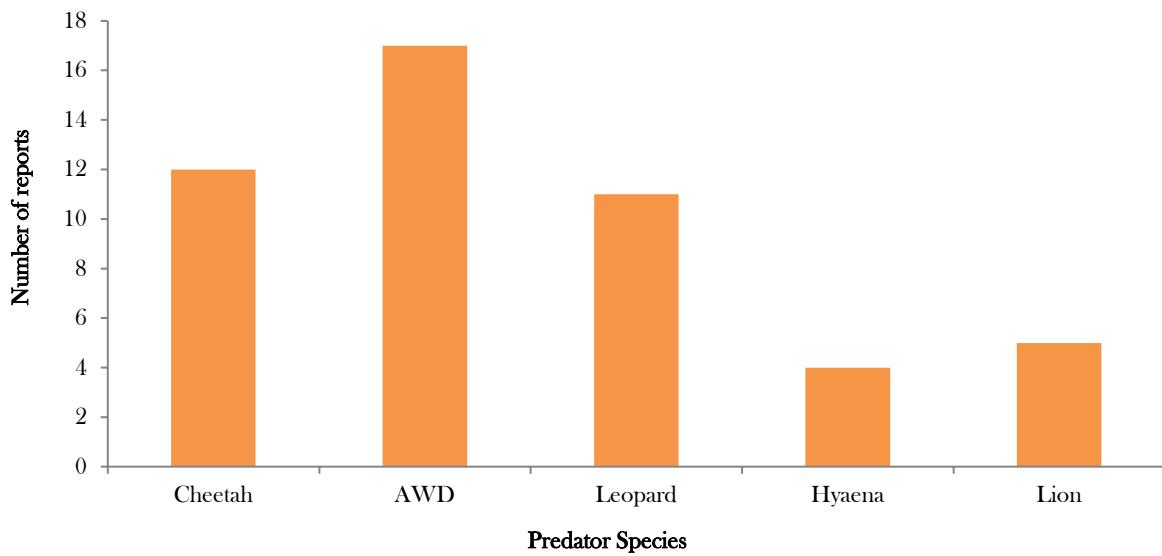


FIGURE 90: REPORTED HWC INCIDENTS WITH VARIOUS PREDATOR SPECIES.

A total of 12 (n=35) cheetah were reported killed from February 2016 to February 2019, followed by leopard (15, Figure 91), yet one Farmers' Association submitted a predator conflict report to the NLU stating 10 cheetahs were killed from June to August 2019.

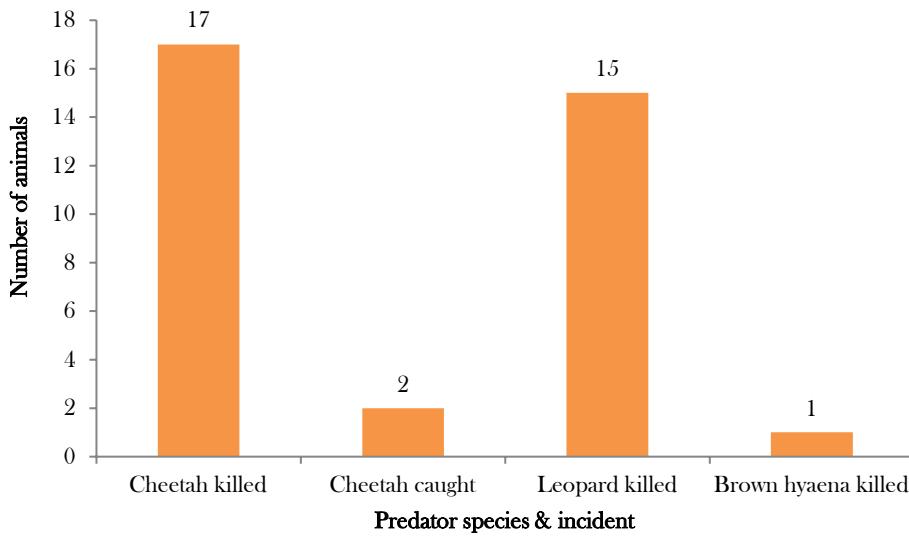


FIGURE 91: NUMBER OF PREDATORS INVOLVED IN HWC INCIDENCES.

Cattle (60, n=128) were the most reported killed followed by sheep (32) and goats (28, Figure 92).

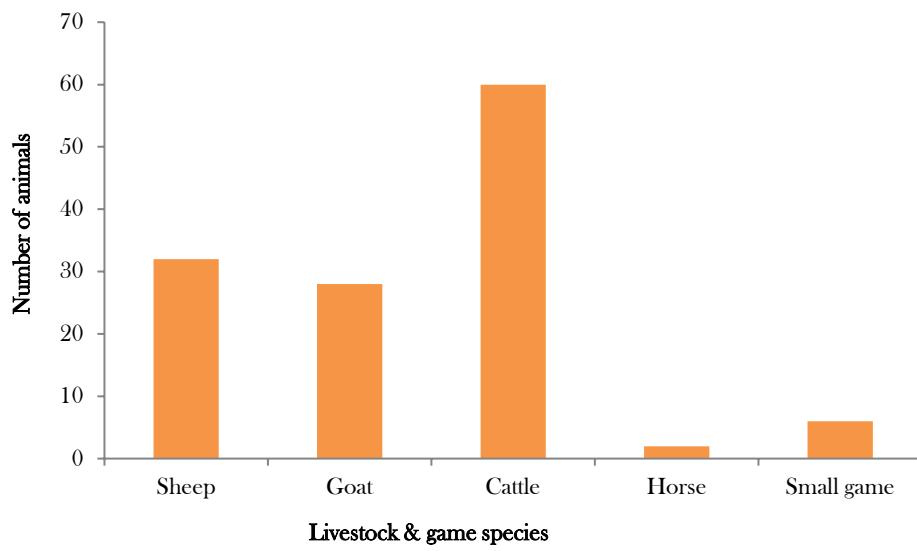


FIGURE 92: NUMBER OF LIVESTOCK THAT WERE REPORTED KILLED.

The majority of predators reported sighted were African wild dogs (38, n=55, Figure 93) followed by cheetah (11) and Lion (5).

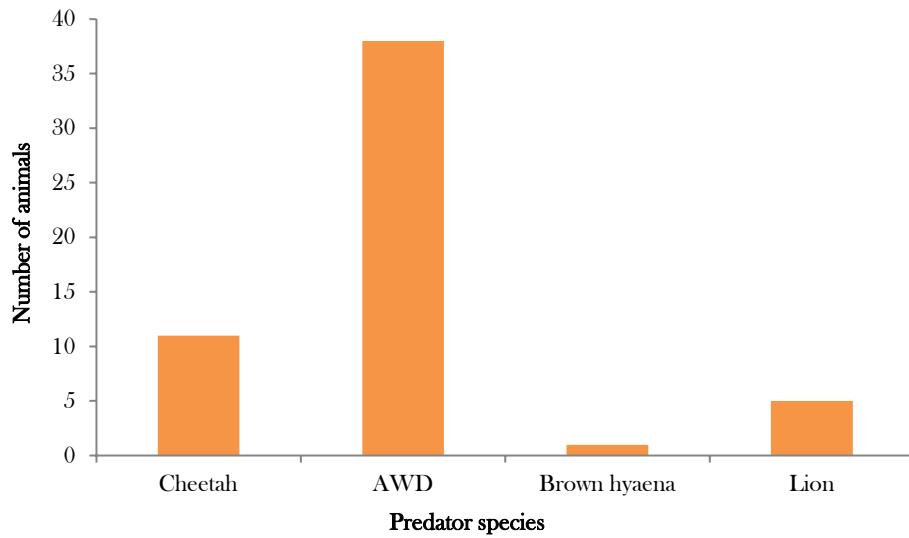


FIGURE 93: NUMBER OF PREDATOR SPECIES SIGHTED.

During the Farmers' Association meetings, farmers were informed about the Nature Conservation Ordinance of 1975, and the requirement to report predators killed because of HWC within 10 days of the incident. In addition, farmers were also informed of the value of reporting incidents, and CCF's kill identification form and the Forensic

Sampling form were explained to them. These forms were handed out at the meetings and then emailed to the entire Farmers' Associations to send it to their members.

Gobabis (Namibia Agricultural Union)

CCF Gobabis attends all the Gobabis District Agricultural Union meetings to give feedback on the scat detection survey program, discusses issues such as the lack of reporting HWC incidents to MET, as well as answer questions.

BioBank

CCF Gobabis office was contacted by farmers regarding two African wild dogs and two brown hyaenas that were killed due to HWC. The farms were visited, samples collected, and autopsies were conducted. A summary of samples collected, as well as roadkill samples collected opportunistically, are shown in the Table 40 below.

TABLE 40: SAMPLES COLLECTED FROM VARIOUS SPECIES BOTH PLANNED AND OPPORTUNISTICALLY.

Date	Species	Sex	Samples collected	Reason	Place
14-Jan-19	AWD	Female	Fecal wet, fecal dry, Ectoparasites, hair skin, tissue	HWC	Gobabis East
14-Jan-19	AWD	Male	Blood, fecal wet, fecal dry, Ectoparasites, hair, tissue	HWC	Gobabis East
21-Mar-19	Cheetah	Female	Hair	MET case	Gobabis
10-Apr-19	Warthog		Body hair	Roadkill	
05-Jun-19	Cheetah (scat)		Scat	Collected by farmer	Gobabis, fortuna
21-Jun-19	Slender mongoose	Male	Hair, skin, tissue	HWC	Gobabis, fortuna
05-Jul-19	Porcupine	Male	Hair	HWC	Gobabis District
17-Jul-19	Suricate	Female	Hair, skin	Roadkill	
20-Jul-19	Bat-eared fox	Male	Tissue, whiskers	Roadkill	B6 to Windhoek
20-Jul-19	Caracal		Hair	Roadkill	
20-Jul-19	Small spotted genet	Female	Hair, tissue, whiskers	Roadkill	Roadkill
28-Aug-19	Bat-eared fox		Hair, skin, tissue	Roadkill	Gobabis
28-Aug-19	Brown Hyaena	Female	Fecal wet, hair, tissue, whiskers	HWC	

Captive Cheetahs at Sanddune Lodge

Sanddune Lodge was informed by MET that no permit would be issued for the three captive cheetahs, and that the decision was made they would be put down. CCF Gobabis office was requested by MET in Gobabis to visit the Lodge and write a report on their condition, as they received a complaint the cheetahs were being starved. This was done on 15 July 2019 (Figure 94).

- Behaviour: All three cheetahs were alert, showed no sign of undue stress, and laid down in a relaxed posture.
- Movement: None of the cheetahs had any visible signs of injury or open wounds and walked without signs of a limp.
- Body condition: All three cheetahs' body score is ideal to moderately low overweight. Ribs were not visible, and the hip angle, points of hips and buttocks were visible, with points smooth/rounded. Tail head blended smoothly into rump.

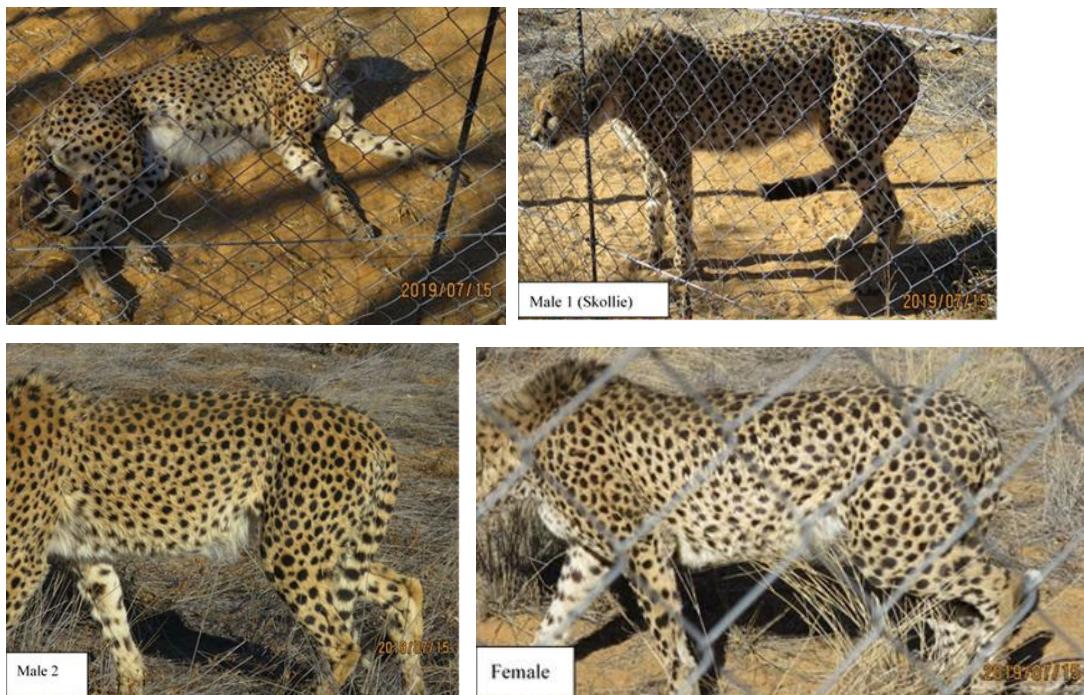


FIGURE 94: THREE OF THE CHEETAHS THAT CCF WAS REQUESTED TO WRITE A REPORT ON.

- Scats: No signs of diarrhoea were observed from the perimeter of the large enclosure, nor inside the feeding enclosure. Only one scat was seen (Figure 95).



FIGURE 95: A SCAT SAMPLE FROM ONE OF THE THREE CHEETAHS FROM SUNDDUNE LODGE.

- Enclosures: Both the large and the feeding enclosures were reasonably clean of old bones, and the water trough was clean and filled (Figure 96).



FIGURE 96: ENCLOSURES IN WHICH THE THREE CHEETAHS WERE KEPT AT THE SANDDUNE LODGE.

The three cheetahs were eventually darted by a vet from Windhoek at the request of MET, and one male was moved to Omaruru Game Lodge, and one male to Epako Lodge, and the female died at Sandune during anaesthesia.

Cheetah Removal from Farm Horing

An adult female and four cubs were caught in two trap cages (Figure 97). The cubs were seven months old and comprised two males and two females.

The first cub was trapped on 27 December 2019 in one cage, followed by the adult female on 30 December 2019, the second cub on 1 January 2020, the third cub on 2 January 2020 and the fourth cub on 3 January 2020 all in a second trap cage.



FIGURE 97: TRAP CAGES WITH A FEMALE CHEETAH AND HER FOUR CUBS ON FARM HORING.

The cheetahs were supplied with a constant source of water and fed twice a day with a minimum of 3kg mix of oryx and hartebeest meat at a time.

CCF staff (Eli Walker, Carolina Torres and Dr. H. Winterbach) and an MET Gobabis officer, Friedrich W. Nauhaus visited the farm on 4 January 2020, where the cheetahs were loaded into two crates and transported to CCF Headquarters in Otjiwarongo (Figure 98).

The cheetahs were medically examined on 8 January 2020. All the cats were in good health, but the female had extensive capture trauma. One of the female cubs was very thin, but the presence of live tape worms in this cub could be a contributor for her thin physical condition.

According to Mr Bievenga, a farmer, he lost four calves (approximately 2 months old) within the last 3 months. Pregnant cows are kept in a calving kraal close to the house until their calves are two months old. The livestock is then moved to grazing camps, and donkeys are used as livestock guarding animals.

Mr Bievenga observed a female cheetah with 4 cubs on a calf kill and proceeded to set up the trap cages. He tried to contact HARNAS both on the 29 and 30 December 2019 after the first cub and adult female were captured, but there was no answer. On the 2 January 2020, he phoned the MET Gobabis office, and reported the cheetahs captured to the secretary who said they will get back to him, but unfortunately, he got no further response. Mr Bievenga then contacted the Cheetah Hotline at CCF on 3 January 2020, and CCF was granted permission by MET Headquarters to fetch the cheetahs and take them to CCF in Otjiwarongo.



FIGURE 98: TRAPPED CHEETAHS BEING LOADED INTO WOODEN CRATES BY CCF STAFF AND MET OFFICIALS.

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 the support of the International Species Inventory System (Species360) and personal communications.

The 2019 studbook is currently in preparation. The 2018 studbook was completed and distributed in November 2018 with the assistance of Becky Johnston. In 2018, 301 (133.131.37) 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 2018 but had not been reported until after the publication of the 2017 Studbook. Captive-born cubs from known breeding facilities totalled 229 (106.88.35) born in 66 litters in 40 facilities in 18 countries. The captive cheetah population on 31 December 2018 was 1,846 (931.912.3) animals in 282 known facilities in 48 countries (Figure 99).

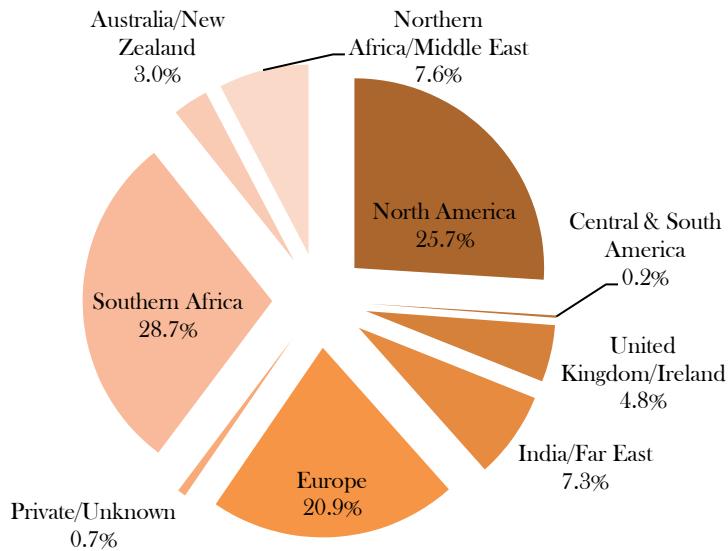


FIGURE 99: CAPTIVE CHEETAH POPULATIONS BY REGION, 2018: 1846 (931.912.3).

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 the 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 January – June 2019, CCF registered 10 cases of illegal cheetah trafficking involving 93 cheetahs (Figure 100); 73 were skins found for sale in South African traditional, or muti markets, while 21 were cheetahs for the pet trade. Of these, 3 deaths were recorded; two were cubs that died soon after confiscation in Somaliland and one was an adult cheetah found dead in 2018 but not reported at the time.

Fourteen cubs were confiscated in total: 13 in Somaliland and one in Kenya. Five cubs were still under investigation in Somaliland at the time this report was written.

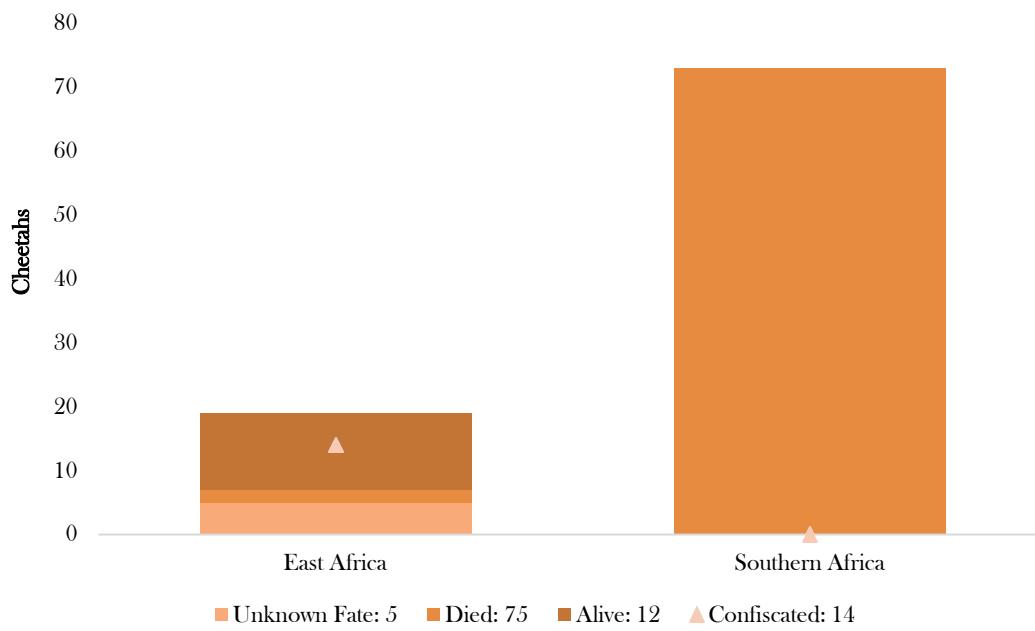


FIGURE 100: SUMMARY OF ILLEGAL CHEETAH TRAFFICKING BY GEOGRAPHIC REGION FROM JANUARY TO JUNE 2019.

Confiscated Cubs Update

Since CCF became actively involved in the fight against illegal cheetah trade, we have organised or assisted with the confiscation of 75 cheetahs (29M, 32F, 14UNK; Table 41). Of these, 68 (25M, 31F, 12UNK) were confiscated in Somaliland, where CCF now provides care for 25 (10M, 11F, 4UNK) cheetahs, including 13 added during this period (Table 41).

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 41: CHEETAHS CONFISCATED IN SOMALILAND THROUGH CCF INTERVENTION, JANUARY – JUNE 2019.

Date Reported	Est. Age	Sex	Alive	Dead	Date of Transfer	Date of Dead
19-Feb-19	3W	M	1		19-Feb-19	
19-Feb-19	3W	F	1		19-Feb-19	
19-Feb-19	3W	M	1		19-Feb-19	
11-Mar-19	10W	F	1		11-Mar-19	
11-Mar-19	10W	F	1		11-Mar-19	
11-Mar-19	10W	M	1		11-Mar-19	
11-Mar-19	10W	M	1		11-Mar-19	
12-Mar-19	12W	M	1		13-Mar-19	

Date Reported	Est. Age	Sex	Alive	Dead	Date of Transfer	Date of Dead
12-Mar-19	12W	F		1	13-Mar-19	23-Mar-19
19-Mar-19	5M	F	1		19-Mar-19	
10-Jun-19	4M	M	1		10-Jun-19	
10-Jun-19	4M	F		1	10-Jun-19	12-Jun-19
10-Jun-19	4M	F	1		10-Jun-19	

The CCF team and volunteers in Somaliland have been working to expand the enclosures at the safe house rented in late September 2018 to provide better conditions for all the cats, with the support of CCF UK and our German partner, Aktionsgemeinschaft Artenschutz (AGA).

Horn of Africa (HoA) Efforts - Somaliland

Cheetah Rescue and Conservation Centre

In 2011, CCF began collaborating with the Somaliland Ministry of Environment & Rural Development (MoERD) to provide support for efforts to disrupt illegal wildlife trade in cheetah.

From 2011 until 2016, CCF's primary activities involved assisting the Ministry with the placement of intercepted specimens in accredited facilities in neighboring Horn nations, communicating with cheetah stakeholders and international enforcement agencies, and leveraging CCF's media profile to raise awareness of the cheetah trade. Following a change in Somaliland law in 2016, CCF began assisting the Ministry with the management of confiscated cubs in Somaliland. CCF raised funds that made it possible to establish the first temporary holding facility in Hargeisa in April 2017. CCF also began paying for food and care of confiscated cubs, cooperating with MoERD and Gunther Wirth of GIZ to manage on the ground. By April 2019, it became apparent that the project had grown beyond the capacity of Mr. Wirth.

In May 2019, following a site visit by Dr. Laurie Marker, CCF Founder & Executive Director, and a series of meetings with Somaliland government ministries and President Bihi, CCF took over management of the cubs.

While in Hargeisa, CCF proposed a plan to create a permanent sanctuary for cheetahs that will drive conservation, wildlife education and tourism in Somaliland. Below is a summary of CCF's key accomplishments from during this reporting period.

- CCF spent \$285,000 in Somaliland on cheetah care, facilities, and capacity building in the MoERD.
- CCF created 23 jobs for Somaliland nationals: 7 skilled positions and 16 construction laborers.
- CCF absorbed a tripling of cheetah care expenses in the span of six months, from \$5,000 to the current cost of \$15,000 per month, while taking over from Gunther Wirth.
- CCF purchased two new Toyota 4x4 vehicles, computer laptops and cameras for the project.
- CCF facilitated donations from U.S.-based zoological NGOs of medications, supplies and equipment for the Safe House veterinary clinic.

- CCF developed protocols for MoERD in cheetah confiscation, handling, and perpetual care.
- In 2020, CCF projects it will spend approximately \$560,000 on cheetah care, Somaliland capacity building activities and the development of Geeddeeble.
- In 2020, CCF will create additional positions for Somaliland veterinarians, researchers, animal keepers, drivers, security guards, construction workers and project managers.

Improving Facilities and Increasing Capacity for Confiscated Cheetah

Receiving approval from the government to advance its plan, CCF immediately initiated a complete remodel and upgrade of the existing Cheetah Safe House, tearing down and rebuilding cheetah enclosures to increase the size of the holding pens and adding an outdoor quarantine area, meat preparation room and outdoor kitchen. CCF also reorganized the vet clinic and created a bedroom for Nejuum Jimmy in the Safe House, our onsite animal caremanager and veterinarian.

In June 2019, CCF's Executive Director, Dr. Marker, toured potential sites for the permanent sanctuary recommended by Minister Shukri Ismail of MoERD. In late June, Dr. Marker returned to Somaliland with a small delegation from the U.S. and UK to celebrate State of Somaliland Independence Day. During this second trip, Dr. Marker identified sites for the interim holding facilities that will add immediate outdoor capacity, and she visited Geeddeeble, the site topping the list for CCF's Cheetah Rescue and Conservation Centre.

In August 2019, CCF helped Minister Shukri transfer a confiscated lion cub to Born Free in Ethiopia, and CCF prepared a file on the death of cheetah cub, Kidi, to assist Minister Shukri in court. By September, CCF secured a lease on a plot of land near the existing facilities that is approximately 3.5 times larger than the Safe House plot.

Working with the Somaliland landlord, a local construction company, and volunteers from the U.S. and UK, the perimeter wall was expanded, a house/office structure was built, and plumbing and electricity developed. The process of building large cheetah enclosures has begun. CCF estimates construction will be completed in February 2020, three months ahead of projected schedule. When ready, CCF will move older cats to the larger, outdoor enclosures of Compound 2 ("The Yard").

To keep pace with the responsibilities that come with managing growing numbers of animals and a major construction project, CCF added both full-time and part-time staff to the project in Q3 and Q4 2019. CCF hired an experienced veterinarian and expanded its volunteer program, taking over total management of Veterinaires Sans Frontieres program from Gunther Wirth and bringing in additional volunteers from American zoological institutions and animal welfare organizations to lend support.

During July, CCF dealt with the sudden decline and death of a cheetah cub named Kidi, who later was determined to have died from Feline Infectious Peritonitis (FIP), a rare and fatal autoimmune disease that is not well understood. This disease is a problem for cheetahs, as the species lacks genetic variation, and this makes them more vulnerable. In response, CCF reformulated protocols involving quarantine housing, feeding and care at the Cheetah Safe House to diminish chances for spreading.

Beginning in June 2019, CCF put current several Somaliland workers on CCF's payroll. In September, CCF added housing for international staff and volunteers and hired a cook to provide daily meals for the entire cheetah project team. The same month, CCF completed its registration as a Somaliland NGO. In November, CCF took delivery of two new vehicles and hired a local driver.

Harmonizing Somaliland Dispute Resolution Systems

In June, Dr. Marker introduced CCF's IWT Law Enforcement Advisor, Mr. Chris Dietrich, to Minister Shukri, to aid in capacity building along the confiscation chain and with international enforcement agencies. Chris spent time with Abdinassir Hussein, MoERD Wildlife Director conducting trainings with he and his staff and had meeting with police in Somaliland. In November, Chris visited Somaliland a second time and traveled to the Somaliland-Ethiopia border along several points, including the Borama-Aw Barre checkpoint. Mr. Edwin Brown, CCF's Project Manager for the DEFRA LICIT (Legal Intelligence for Cheetah Illicit Trade) program visited Somaliland in November to set the stage for a workshop (Q1) and training (Q3) to link Horn of Africa agencies involved in wildlife trade enforcement in 2020 and bolster Somaliland environment laws.

Somaliland Stakeholders

In November, CCF held a dinner in Hargeisa for local cheetah stakeholders, inviting leaders from Somaliland government, education, and business to engage on the issue of illegal trade. The goal was to establish a group that can work with and advise CCF on local issues moving forward. Members of the Somaliland Veterinarians Association, Somaliland Women's Veterinary Association and the Dean of the Veterinary School at University of Hargeisa met with CCF staff and others representing Somaliland business, education, and healthcare systems.

Education and Capacity Building

At the same time CCF has been building facilities for cheetahs, the team has been laying foundations for education and law enforcement capacity-building activities to help Somaliland people. During Dr. Marker's visit in late June, she addressed the entire student body at Amoud University and spoke to a group studying environmental science at the University of Hargeisa. She met with Professor Suleiman Ahmed Gulaid and Dr. Mohamud Yusuf Muse to discuss CCF's proposed wildlife education program in Somaliland. In addition to traditional classroom experiences, the planned program will incorporate internship opportunities for university students in Somaliland and at CCF's Centre in Namibia.

In September 2018, Patricia Tricorache met with two veterinary medicine professors from USAMV Cluj-Napoca (Romania) and the University of Veterinary and Pharmaceutical Sciences Brno (UVPS, Czech Republic) in Hargeisa, to discuss a collaboration aimed at building veterinary and wildlife medicine capacity in Somaliland. This partnership, which is led by Vétérinaires Sans Frontières Czech Republic (VSF-cz) and includes University of Hargeisa (UOH) and Heritage Somaliland, began on 1 November 2018. USAMV and UVPS researchers carry out teaching activities at UOH with the students of the Faculty of Veterinary Medicine, contribute to the setting up of parasitological diagnostic laboratories, and conduct training for teaching and laboratory staff. Since the programme began, the CCF Hargeisa team has welcomed nine volunteers from the Czech Republic, Romania, Poland, and the UAE, all of whom are graduated veterinarians or in their last year of veterinary school. Table 42 and Figure 101 show the various lectures and practical work imparted by volunteer veterinarians for UOH veterinary students. In total, eight lectures and practical work sessions were imparted between 1 November 2018 and 30 June 2019 to groups of up to 20 students.

TABLE 42: ACTIVITIES BY VOLUNTEER VETERINARIANS AT THE UNIVERSITY OF HARGEISA.

Date	Type	Description	# of Students
15-Nov-18	Theoretical lecture	Filaroid infections in domestic animals in Africa	20

Date	Type	Description	# of Students
22/24-Nov-18	Practical work	Sampling and microscopical identification of blood parasites for each session	10
27/29-Nov-18	Practical work	Castration of tomcat (27) and spaying of queen (29)	20
4-Dec-18	Theory/Practice	Parasitic vector-borne diseases in Europe and Africa	16
10-Dec-18	Theory/Practice	Coproscopy (main principles, flotation, sedimentation, and an introduction to antiparasitic treatment) part 1	15
13-Dec-18	Theory/Practice	Coproscopy (main principles, flotation, sedimentation, and an introduction to antiparasitic treatment) part 2	13
14-Feb-19	Theory/Practice	Basics of suturing: suture patterns, suturing instruments and how to handle them	5
21-Feb-19	Practical work	Sedimentation techniques for faecal examination utilising lion faeces	



FIGURE 101: VOLUNTEER VETERINARIANS TEACHING VETERINARY STUDENTS AT UNIVERSITY OF HARGEISA.

VSF-cz also provides specialized volunteer veterinary support for confiscated animals under CCF's care; a programme designed to promote working with wildlife, including basic veterinary care. Since the programme began, the CCF Hargeisa team has welcomed 10 volunteers from the Czech Republic, Romania, Poland, and the UAE, all of whom are graduated veterinarians or in their last year of veterinary school. The volunteers stay 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.

On 2 February 2019, one of the confiscated cheetahs under CCF's care, Moonlight, suffered an open fracture on her right hind leg (Figure 102). The CCF team and volunteer vets were able to obtain authorization to have the cheetah x-rayed at a human hospital the day the accident happened (Figure 102). The calcaneus, or heel bone, was broken, and would require surgery to give Moonlight the best chances of walking again. After making sure Moonlight could not do any further damage to her leg, the team consulted with a few orthopaedic surgeons locally. It was determined that due to the cheetahs' high level of activity, the surgery would have to be more specialised than what was feasible in Somaliland. VSF-cz immediately mobilised to bring Dr. Robert Srnec, an orthopaedist and neurosurgeon from the Faculty of Veterinary Medicine at UVPS Brno to perform the surgery. Two days later, Dr. Srnec was ready to travel to Somaliland along with his very specialized equipment.



FIGURE 102: FRACTURED CALCANEUS (LEFT) AND RADIOGRAPH (RIGHT) OF BROKEN CALCANEUS ON CONFISCATED CHEETAH IN SOMALILAND.

The CCF team and volunteer vets Patrycja Kwiatkowska and Lulia Melega conditioned the cheetah safe house to function as an operating theatre, and the surgery, which involved osteosynthesis using a plate and rod fixation, was performed on 7 February 2019 (Figure 103). Moonlight was on her feet the next day and improved under the watchful care of the team.

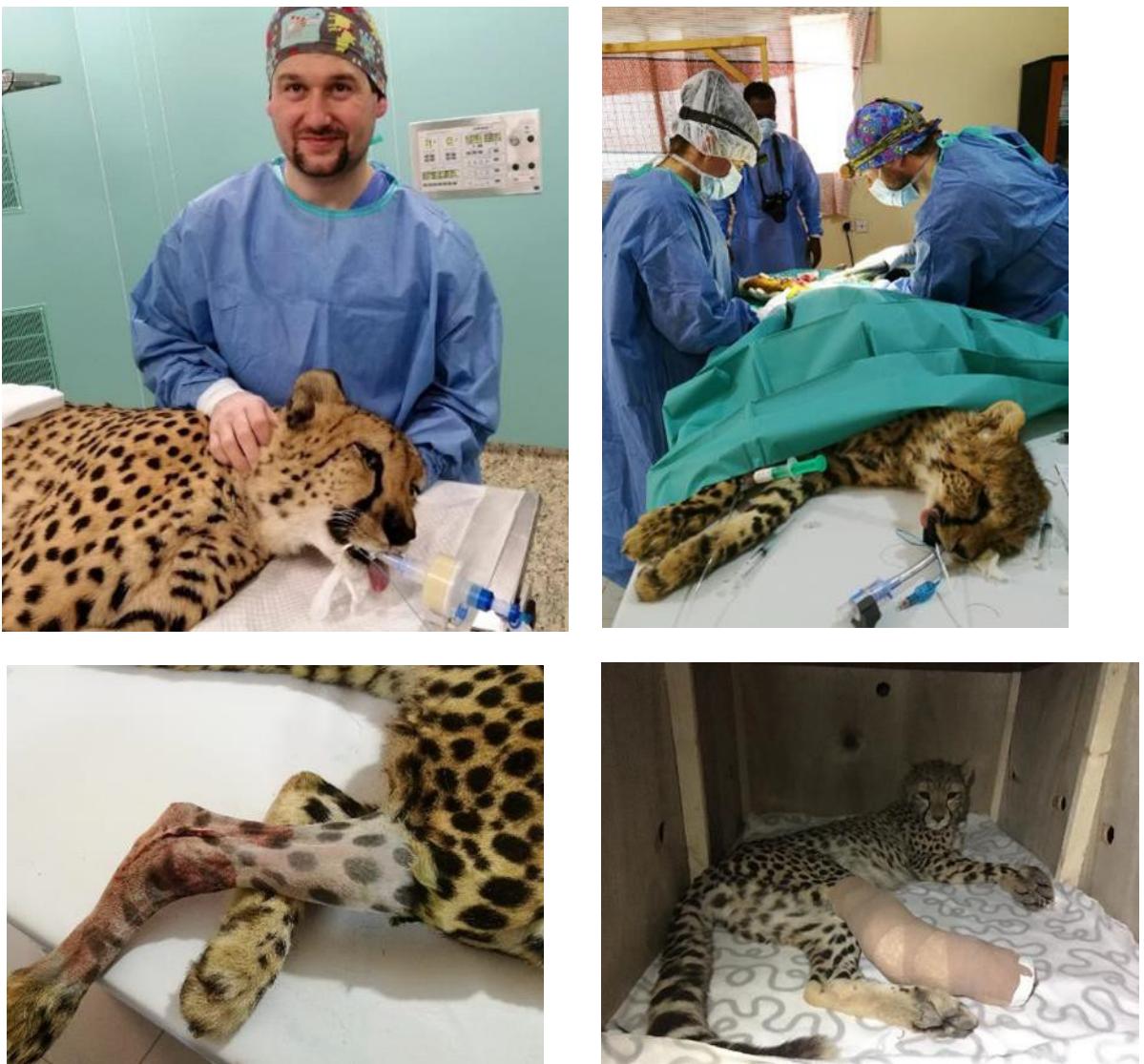


FIGURE 103: DR. ROBERT SRNEC WITH CCF TEAM AND VOLUNTEERS ASSISTING IN THE SURGERY OF CHEETAH MOONLIGHT.

On 22 May 2019, USAMV Cluj-Napoca (Romania) organised a Cheetah Awareness Day, which included the Participation via Skype by Dr. David Modry of VSF-cz, Dr. Lee Dugatkin, Distinguished University Scholar and Professor of Biology at University of Louisville (USA), Patricia Tricorache of CCF, as well as past Hargeisa volunteers. Topics centred around illegal cheetah trade in Somaliland, while Dr. Dugatkin spoke about Animal Behaviour and Species Conservation (Figure 104).



FIGURE 104: CHEETAH AWARENESS DAY AT USAMV CLUJ-NAPOCA (ROMANIA).

International Cheetah Day

On 4 December, CCF held its first local celebration of International Cheetah Day in Somaliland, by co-sponsoring a public cheetah talk at the Hargeisa Cultural Centre with the UK Foreign Commonwealth Office, distributing a poster and delivering an SMS text message throughout the country. Minister Shukri of the MoERD and CCF's Director of Conservation Outreach, Brian Badger, were the featured speakers. Local television and print media covered the event.

Public Policy

CITES

CCF continued to follow up on CITES-related issues, particularly regarding the development of a Cheetah Trade Resource Kit. CCF is a member of an inter-sessional working group formed at the CITES 69th Standing Committee meeting (SC69) held in December 2017. One of the group mandates is to review the draft CITES Cheetah Trade Resource Kit. A draft of this toolkit was presented to the group on 11 March 2019. Since then, CCF has been working on reviewing the draft and preparing suggestions. The kit is slated to be reviewed at the 71st Standing Committee meeting, to be held together with the CoP18.

CCF also continues to work with the Wildlife Conservation Society, the Zoological Society of London and the Born Free Foundation in preparation for the CITES 18th Conference of the Parties (CoP18), which was scheduled to take place in Sri Lanka in late May 2019. However, due to the tragic events of Easter Sunday in Sri Lanka, the conference has been postponed to late August 2019. The group continues to discuss strategies to ensure that illegal cheetah

trade continues getting the attention it requires, given that CITES concluded at its 70th Standing Committee Meeting that this trade remained "limited" and is proposing to delete decisions adopted at CoP17.

United States

In between visits to Somaliland during Q3 and Q4 2019, Dr. Marker traveled to Johannesburg for the Southern Africa Regional IUCN Meeting; Barcelona, Spain, to deliver the Keynote Address for the Global Explorers Expo; and Geneva for CITES CoP18, where she monitored two weeks of proceedings and advocated on behalf of the cheetah. In the U.S., Dr. Marker completed a five-week speaking tour on illegal trade with engagements in New York City, Los Angeles, San Francisco, Portland, Seattle, Indianapolis, Dallas and Columbus, Ohio. Dr. Marker ended the tour with an event on Capitol Hill in Washington DC to inform U.S. lawmakers about the illegal wildlife trade threat for cheetah cubs and CCF's partnership with Somaliland. In Washington, Yassin Meri from the U.S. Somaliland Mission spoke alongside Dr. Marker.

United Kingdom

In the UK, CCF held an event on the 24th of September hosted by Her Royal Highness Princess Michael of Kent to drive awareness among London-based corporations. Ayan Mahamoud, Head of UK Mission, represented the Somaliland government. Princess Michael expressed interest in visiting Somaliland in the future.

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. By attending these meetings, CCF staff can share current information on challenges, obstacles, and programmes that might impact recommendations.

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, 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 at their hometowns or workplaces.

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. In March 2018, CCF began the application process to collect samples from cheetahs in Ethiopia through EWCA. Negotiations continue.

Laying Foundation for 2020 Somaliland Delegation Visit to Namibia

In Namibia, CCF had meetings in November and December with the Ministry of Environment & Tourism and the Speaker of the Parliament, leaders from local civil society organizations, and B2Gold Mining Company to discuss a Somaliland delegation visit in Q2 or Q3 of 2020. Tentative agenda to include site visits to one or more Namibian national parks, Walvis Bay Beach Resort, communal conservancies, a gold mine within a conservation area, and the CCF Centre in Otjiwarongo. The delegation would also meet with Namibian government counterparts and University of Namibia and Namibia University of Science & Technology representatives in Windhoek.

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. CCF social media channels aim to raise awareness on social media about the threat that the illegal pet trade presents to the cheetah by providing information about the trade, and about actions being taken, hoping to turn public opinion against ownership of pet cheetahs and, in particular, to reach those who might own or plan to acquire one.

Media

In 2019, CCF continued to drive awareness for the cheetah trade threat in international media. In late June and early July, a CNN crew came to Somaliland to make two stories, one about the cheetah trade and the other about how climate change has impacted Somaliland people. The first story aired in August 2019 and the second in December 2019. In September, CCF helped facilitate a BBC Studios producer working with BBC Presenter Giles Clarke (*Big Cat Diaries*) to make a documentary about the Somaliland cheetah project. Minister Shukri and DG Nuur participated in the production, representing Somaliland government. On November 9, Giles appeared on *BBC Breakfast* to present his report.

During the same visit in September, Dr. Laurie Marker gave an interview and tour of the Cheetah Safe House to visiting U.S. security expert and think-tank writer Michael Horton. In November, a journalist from *Smithsonian Magazine* accompanied Dr. Marker to Hargeisa. She met with Minister Shukri and DG Nuur and photographed everyone for a feature story on the cheetah trade. A follow-up visit in early 2020, will take place before publication in late 2020 by the same journalist to create additional imagery. CCF also generated significant international stories in *The Times*; *The National*; *Le Monde*; *France 24*; *France 2* and local Somaliland media stories connected to the International Cheetah Day.

The illegal wildlife trade was covered by 17 independent sources during this reporting period (Table 43).

CCF Collaborations with NGOs

In June 2019, CCF met with the Turkish consul and the TIKA team based in the Horn. CCF also met Stuart Brown of the UK Foreign Commonwealth Office and senior leadership from Axiom International. The UK organizations agreed to collaborate with CCF and support the Somaliland cheetah project.

In July, CCF traveled at its own expense to meet with Minister Shukri and representatives from organizations interested in translocating Somaliland cheetahs to South Africa. Dr. Marker and CCF's Chief Cheetah Curator in Namibia, Eli Walker, toured facilities at Ashia Cheetah Conservation and Kuzuko Game Reserve & Lodge, where they had a series of discussions regarding the Somaliland cheetahs in South Africa.

Cheetah Care in Somaliland

In September and November, CCF collaborated with veterinarians representing the South African organizations to perform comprehensive health examinations, administer vaccines and establish common management protocols. Dr. Laurie Marker travelled to Somaliland both times to facilitate and assist with the work. In September, international veterinarians were invited by CCF to assist, Dr. Margarita Woc Colburn from the Nashville Zoo, one of the United States' top cheetah specialists; Dr. Frank Sedden from the UK; and Dr. Lucia Bel from the Czech Republic. CCF veterinarians Nejuum Jimmy and Mussa Saed Jama assisted with the workups. In November, CCF's newly hired veterinarian, Dr. Karina Pineda Flores, contributed to the efforts, working with the South African vets and the CCF Somaliland team to vaccinate cubs.

Development of CCF Cheetah Rescue & Conservation Centre (CRCC)

In September, CCF approached African Parks Foundation (APF) to propose collaboration on the development of Somaliland's first national park and a permanent cheetah sanctuary in Somaliland. In December, CCF met with APF leadership in The Netherlands, and Minister Shukri agreed to receive APF and CCF in Hargeisa for meetings and site visits. Dates were set for the first week of February 2020.

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.

A. Future Conservationists of Africa

During this reporting period, CCF's Education department engaged 16,785 Namibian students from primary and secondary school levels, as well as 434 teachers in both its outreach and centre-based programmes.

1. Outreach

The outreach programmes are tailor made for specific audiences and run for approximately 45 minutes covering CCF's research, conservation, and education efforts. They 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, and balanced ecosystems.

School outreach started in mid-January 2019. The Education Department visited a total of 54 schools in four regions, reaching a total of 15 435 students and 214 teachers (Table 44), four times more than the number of students and teachers reached in 2018 (Figure 105 & Figure 106).

TABLE 44: NAMIBIAN SCHOOLS REACHED WITH CCF'S SCHOOL OUTREACH PROGRAM, JANUARY - DECEMBER 2019.

Date	Namibian School Outreach Groups	Students	Adults	Total
21 Jan 19	Waterberg Primary School	182	2	184
21 Jan 19	Waterberg Junior Secondary School	296	1	297
22 Jan 19	Ludwig Ndinda Primary School	150	1	151
22 Jan 19	Okamatapati Combined School	190	1	191
23 Jan 19	Okakarara Primary School	320	4	324
29 Jan 19	Donatus Primary School	272	1	273
29 Jan 19	Otjiwarongo Christian School	85	3	88
31 Jan 19	Monica Geingos Junior Secondary School	346	10	356
31 Jan 19	Paresis Secondary School	23	0	23
01 Feb 19	Orwetoveni Primary School	600	5	605
01 Feb 19	Vooruit Primary School	500	6	506
05 Feb 19	Moses //Garoeb Primary School	360	4	364
05 Feb 19	Deutsche Höhere Privatschule	190	3	193

Date	Namibian School Outreach Groups	Students	Adults	Total
06 Feb 19	Dr. Abraham Iyambo Primary School	546	12	558
06 Feb 19	Hochland High School	50	5	55
07 Feb 19	Academia Secondary School	880	10	890
07 Feb 19	Auas Primary School	280	3	283
07 Feb 19	Windhoek International School	100	4	104
07 Feb 19	Hage Geingob High School	969	10	979
08 Feb 19	Constantia Private School	60	2	62
08 Feb 19	Welwitschia Private School	80	4	84
12 Feb 19	Tobias Hainyeko	207	4	211
12 Feb 19	Pioneer Boys School	266	13	279
12 Feb 19	Khomasdal Primary School	160	3	163
12 Feb 19	Ella Du Plessis High School	140	2	142
13 Feb 19	Elim Primary School	150	2	152
13 Feb 19	Baumgartsbrunn Primary School	196	3	199
13 Feb 19	David Bezuidenhout Secondary School	900	16	916
14 Feb 19	Bethold Himumuine Primary School	480	5	485
14 Feb 19	Cimbebas Primary School	232	5	237
14 Feb 19	Herman Gmeiner Primary School	80	2	82
14 Feb 19	Namutoni Primary School	261	3	264
15 Feb 19	Gammams Primary School	530	10	540
15 Feb 19	Moses van der Byl Primary School	120	4	124
27 Feb 19	Five Rand Primary School	253	8	261
27 Feb 19	German Private School Otavi	8	1	9
27 Feb 19	Aurora Primary School	484	1	485
27 Feb 19	Khorab Secondary School	137	5	142
27 Feb 19	Shalom Primary School	50	1	51
27 Feb 19	Otavi Primary School	223	2	225
28 Feb 19	Eden Combined School	87	2	89
01 Mar 19	JG van der Wath Secondary School	690	3	693
01 Mar 19	Nau-Aib Primary School	540	2	542
03 May 19	Gobabis Project School	124	1	125
03 Jun 19	Rakutuka Primary School	340	2	342
03 Jun 19	Wennie Du Plessis Secondary School	760	3	763
04 Jun 19	Johannes Dohren Roman Catholic High School	355	2	357
04 Jun 19	Gunichas Roman Catholic School	54	1	55
05 Jun 19	Epako High School	80	1	81
05 Jun 19	Khoandawes Primary School	380	2	382

Date	Namibian School Outreach Groups	Students	Adults	Total
05 Jun 19	Gobabis Gymnasium	250	2	252
05 June 19	Gobabis Gymnasium Kindergarten	30	2	32
05 Jun 19	Nossobville Primary School	192	2	194
16 Sep 19	Joy to the world English Private Primary School	197	8	205
Total Namibian School Outreach Groups:		15 435	214	15 691

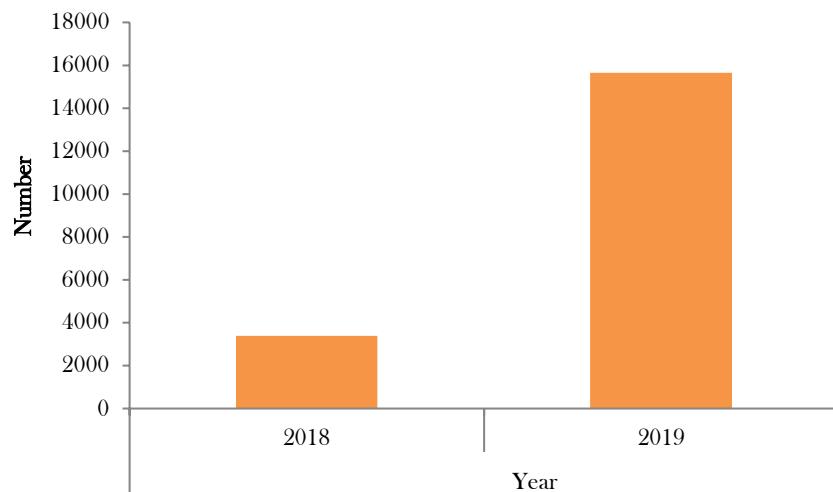


FIGURE 105: TOTAL NUMBER OF STUDENTS AND TEACHERS REACHED DURING CCF'S SCHOOL OUTREACH PROGRAMME DURING 2018 AND 2019.





FIGURE 106: CCF’s EDUCATION TEAM AND SOME OF THE STUDENTS AND TEACHERS WHO PARTICIPATED IN THE SCHOOL OUTREACH PROGRAMME IN 2019.

This reporting period, CCF’s Education Department started collecting extensive data during the outreach programmes, with the objective to understand some of the impacts of the programme on knowledge gain, understanding and perception & attitude of students. Data is currently being analysed.

2. Centre-based Programmes: Primary to High School

Organised education programmes at CCF as of the December 2019 involved 40 Namibian groups totalling 1,350 students and 220 teachers, parents, or volunteers. Of these, nine groups consisting of 225 students and 26 teachers participated in overnight programmes at CCF’s Camp Lightfoot, including an all teacher group of 27. Two groups of 28 students participated in a social responsibility project assisting CCF staff with day-to-day tasks. These groups commuted daily from Otjiwarongo for 4 days each (Table 45).

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.

TABLE 45: NAMIBIAN SCHOOL GROUPS PARTICIPATING IN CENTRED-BASED PROGRAMMES AT CCF, JANUARY TO DECEMBER 2019.

Date In	Date Out	Namibian Overnight School Groups School	Students	Adults	Total
22 Feb 19	24 Jan 19	Waterberg Secondary School	39	4	43
24 May 19	13 May 19	S.I. Gobs Secondary School	28	4	32
19 Jul 19	21 Jul 19	Tsara Aibes Primary School	18	2	20
01 Aug 19	03 Aug 19	Paresis Secondary School	18	0	18
09 Aug 19	11 Aug 19	Suiderhof Primary School	27	3	30
19 Aug 19	21 Aug 19	Baobab Environmental Club	14	3	17
28 Aug 19	29 Aug 19	Epukiro Senior Secondary School	51	7	58
06 Sep 19	08 Sep 19	Suiderhof Primary School	30	3	33
20 Sep 19	22 Sep 19	Khondawes Primary School	0	27	27
Total Namibian Overnight School Groups:			225	53	278

Date In	Date Out	Namibian Overnight School Groups School	Students	Adults	Total
Namibian Day Visit School Groups					
Date	School	Students	Adults	Total	
16 Feb 19	Acacia High School	12	3	15	
05 Apr 19	Eagle Christian Academy	15	2	17	
19 Apr 19	Nicholas Witbooi Memorial School	53	6	59	
20 Apr 19	De Duine Secondary School	17	3	20	
22 Apr 19	Etosha Secondary School	55	7	62	
29 Apr 19	Otjiwarongo Secondary School	15	0	15	
09 May 19	Mweshipandeka Secondary School	71	8	79	
20 May 19	Vooruit Primary School	40	1	41	
21 May 19	Vooruit Primary School	41	2	43	
22 May 19	Vooruit Primary School	39	2	41	
07 Jun 19	Shining Stars Pre-Primary School	42	5	47	
08 Jun 19	Auas Primary School	21	5	26	
08 Aug 19	Emono Combined School	24	4	28	
09 Aug 19	Augeikhas Primary School	49	10	59	
10 Aug 19	Theo Katjimune Primary School	72	10	82	
11 Aug 19	Martti Ahtisaari Primary School	45	6	51	
11 Aug 19	Versteende Wald Primary School	54	6	60	
11 Aug 19	Moses Van Der Byl Primary School	41	6	47	
13 Aug 19	Usiel Ndjavera Primary School	57	7	64	
13 Aug 19	Paresis Secondary School	13	0	13	
16 Aug 19	Aranos ELCRN Parish	42	9.	51	
16 Aug 19	Maria Mwengere Secondary School	24	4	28	
17 Aug 19	Opuwo Christian School	11	3	14	
22 Aug 19	Dr. Romanus Kampungu S Secondary School	55	2	57	
22 Aug 19	Kayec Otjiwarongo	23	5	28	
25 Aug 19	Noordgrens Secondary School	39	3	42	
04 Sep 19	Gems Field Private School	17	3	20	
13 Sep 19	Otavi Primary School	34	5	39	
06 Oct 19	Adventurer Club SDA Church	7	5	12	
12 Oct 19	Otala Combined School	40	8	48	
25 Oct 19	Otjikondo Primary School	31	3	33	
12 Nov 19	G.K. Wahl Combined School	24	2	26	
22 Nov 19	Steps for Children	2	22	24	

Date In	Date Out	Namibian Overnight School Groups School	Students	Adults	Total
		Total Day Visit:	1 125	167	1 291
		Total Namibian School Groups:	1 350	220	1 569

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 until 26 July 2019 when she died. Kiri, a 9-year-old female breeding dog has taken over the ambassador role.

By allowing the children to meet Kiri 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 CCF's ambassador animals work well together to represent the farming and livestock management programme as they are comfortable with small children and big groups.

4. Camp Lightfoot

CCF continued to host both local and international groups at Camp Lightfoot. Under the direction of CCF Lead Environmental Educator, Ignatius Davids, maintenance at Lightfoot continued in 2019, which included the general cleanliness of the huts and surrounding area. During the first half of this reporting period, the Lightfoot power supply was connected to the main campus power supply, to allow for 24 hours of power.

5. Higher Education and In-Service Training

CCF is committed to empowering Namibians in 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). These students conduct research projects with the goal of producing a research paper at the conclusion of their internships. Several former interns have gone on to work at conservation organisations or for MET.

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 2019, CCF hosted five groups. A total of 131 Namibian university students participated in various aspects of CCF's work in the areas of Wildlife Management, Environmental Management and Tourism (Table 46). Three Bachelor's students (two in Nature Conservation and one in Agriculture) from the NUST conducted and completed their projects at CCF.

TABLE 46: NAMIBIAN HIGHER-EDUCATION GROUPS PARTICIPATING IN EDUCATION PROGRAMMES AT CCF, JANUARY TO DECEMBER 2019.

Date	Students	Adults	Total
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Namibian Day Visit Higher Education Groups					
27 Jan 19		University of Namibia Main Campus	10	1	11
19 Jul 19		University of Namibia Ongongo Campus	20	3	23
Total Namibian Day Visit Higher Education Groups:			30	4	34

Namibian Overnight Higher Education Groups					
Date In	Date Out	School	Students	Adults	Total
25 Aug 19	26 Aug 19	University of Namibia Main Campus	38	8	44
12 Oct 19	13 Oct 19	Namibia University of Science and Technology	25	1	26
02 Sep 19	03 Sep 19	Triumphant College Windhoek	27	3	30
Total Namibian Overnight Higher Education Groups:			90	12	100
Total Namibian Higher Education Groups:			120	16	134

A. Other Collaboration with Educational Institutions

During this reporting period, CCF Centre hosted 14 international groups (193 students and 45 teachers/accompanying persons) from international schools and universities participating in educational programmes, including lectures on HWC, cheetah runs and tours of CCF's Centre. Four of these groups stayed at Camp Lightfoot (Table 47).

TABLE 47: INTERNATIONAL GROUPS PARTICIPATING IN EDUCATIONAL PROGRAMMES AT CCF, JANUARY TO DECEMBER 2019.

Date In	Date Out	International Overnight School Groups	Students	Adults	Total
11 Mar 19	13 Mar 19	St. Mark's School (USA)	18	5	23
12 May 19	13 May 19	University of Nebraska (USA)	12	2	14
27 May 19	30 May 19	Grand Valley State University (USA)	10	1	11
31 May 19	01 Jun 19	Daktari (Germany)	13	5	18
07 Jun 19	16 Jun 19	Earth Expeditions (USA)	19	2	21
30 Jun 19	03 Jul 19	Murdoch University (Australia)	12	2	14
05 Jul 19	08 Jul 19	National Geographic Student Expeditions (USA)	11	2	13
09 Jul 10	18 Jul 19	Earth Expeditions (USA)	20	2	22
16 Oct 19	18 Oct 19	Dartmouth College (USA)	16	2	18
29 Nov 19	30 Nov 19	University of Hamburg (Germany)	0	2	2
Total International Overnight Education Groups:			131	25	156

Date	International Day-Visit Higher Education Groups	Students	Adults	Total
29 April 19	University of Arizona (USA)	10	1	11

Date In	Date Out	International Overnight School Groups	Students	Adults	Total
08 Jun 19		Christophorus-Kantorei (Germany)	35	15	50
25 Oct 19		Beau Soleil – Voyager Travel (Switzerland)	9	2	11
12 Nov 19		Struer Statsgymnasium (Denmark)	8	2	10
Total International Day Visit Education Groups:			62	20	82
Total International Education Groups:			193	45	238

B. Working Guests and International Interns

Working Guests are the backbone of CCF and vital in daily operations. During this reporting period, CCF hosted 26 working guests (7 returns) from the USA, United Kingdom and Germany. 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 45 international student interns from the USA, Spain, France, South Africa, United Kingdom, Taiwan, Canada, Zimbabwe, and Australia. The interns were trained in veterinary medicine, zoology, ecology, wildlife science, animal science, environmental studies, international development, and genetics. Three MSc students; James Carlyle and Karina Flores Pineda collected data at CCF on feline infections and on parasitology & behaviour of African wild dogs respectively, both from the University of Bristol in the UK. Ya-Ching Lin from the Feng-Chia University in Taiwan, collected data through interview surveys with CCF staff on all aspects of CCF's operation; research, education, conservation, and tourism & hospitality.

C. Conferences and Other Activities

1. Namibia Environmental Education Network (NEEN)

During this reporting period, Ignatius Davids and Elizabeth Pius attended the annual Namibia Environmental Education Network (NEEN) Conference. The theme this year was "Promoting blue and green economy through communication and public awareness". Ignatius and Elizabeth presented (Figure 107) on the impacts of CCF's education outreach programme on knowledge gain and attitude change of students towards cheetah and other predators. This outreach programme which targets upper primary (grades 4 – 7) and secondary (8 – 12) students aims at not only raising awareness about the cheetah but aims to additionally impart positive attitudes towards predators.

Both Ignatius and Elizabeth emphasized the significance of CCF's outreach programme in providing opportunity for young people to learn about wildlife conservation, as the future of conservation lies in the hands of this young generation.



FIGURE 107: IGNATIUS DAVIDS AND ELIZABETH PIUS PRESENTING ON IMPACT OF CCF'S SCHOOL OUTREACH PROGRAMME AT THE ANNUAL NEEN CONFERENCE.

2. High School Volunteers

During this reporting period 28 students (15 Otjiwarongo Secondary School, 13 Paresis Secondary school) volunteered in April and August, respectively. They assisted CCF staff with day-to-day tasks which included pen cleaning, husbandry, gardening and data entry (Figure 108). CCF staff took the opportunity to help the students understand the importance of its mission in ensuring the survival of the cheetah in the wild, and how every task they performed contributed to this mission.



FIGURE 108: STUDENTS FROM THE TWO LOCAL HIGH SCHOOLS ASSISTING CCF STAFF WITH DAILY TASKS AROUND THE CENTRE.

3. Earth Day

The Education Department celebrated Earth Day on 22 April 2019 with students from Etosha High School, and younger children of CCF staff living at the centre. We had a total of 75 students and seven teachers join us in celebrating this day, themed 'Protect our Species'. We had craft stations for the little ones, while the older kids took part in talks on the importance of species found in Namibian ecosystems, and why we should all work to protect these species. Tim Hofmann our Scat Dog Manager gave a brilliant demonstration on how CCF uses dogs for conservation research. The day ended with a quiz on everything the students had learned throughout the day, and prizes were awarded to those who got the answers correct (Figure 109).



FIGURE 109: STUDENTS PARTICIPATING IN CCF ACTIVITIES ON EARTH DAY.

4. National Clean-up Day

CCF staff and interns participated in the 2nd National Clean-up Day on 21 September 2019. Four high schools from Otjiwarongo helped pick trash along the D2440 Road which leads to CCF. A total of 311 people participated and filled over 3,000 bags with trash, making CCF the winners of the Tourism Supporting Conservation (TOSCO) clean-up competition, two years in a row. CCF is thankful to all the teachers and students who took the time to help with this clean-up (Figure 110).



FIGURE 110: CCF STAFF, INTERNS, TEACHERS AND STUDENTS WHO TOOK PART IN THE NATIONAL-CLEAN-UP CAMPAIGN.

5. International Cheetah Day

On 4 December CCF along with the rest of the world, celebrated the ninth annual International Cheetah Day. CCF staff and interns took to the town of Otjiwarongo – the Cheetah Capital, where we celebrated through various fun information sharing activities including quizzes and games, and face painting. CCF engaged the public on the

importance of predators such as the cheetah, and what we are doing to help conserve this magnificent species. Sixty (60) Otjiwarongo residents from the ages of 5 - 60 participated in our ICD activities (Figure 111).

The centre was open to the public, and the standard admission fee was waived for Namibian residents. Visitors at the centre enjoyed a guided tour around our facility and met some of our Livestock Guarding dogs and our resident ambassador cheetah.



FIGURE 111: DR. LAURIE MARKER ALONG WITH CCF STAFF AND INTERNS, CELEBRATING INTERNATIONAL CHEETAH DAY WITH OTJIWARONGO TOWN RESIDENTS.

6. Ongwediva Trade Fair

CCF's Education Department participated in the Ongwediva Trade Fair, one of the most popular and well attended trade fairs in Namibia (Figure 112). The trade fair took place from 23 – 31 August 2019. Below are some stats collected at the event.

- 12 farmers visited our display
- 32 members of the public took part in activities
- 103 people participated in our educational quiz



FIGURE 112: CCF EDUCATION TEAM AT THE ONGWEDIVA TRADE FAIR.

7. Other Conferences, Workshops & etc.

CIC Conference (2 - 4 May 2019)

Annetjie Siyaya and Julia Zumbroich represented CCF at the International Council for Game and Wildlife Conservation (CIC) Conference in Windhoek, which was co-hosted by the Ministry of Environment and Tourism at the Safari Hotel. Annetjie was part of a panel by the Young Opinion Organisation, where she shared how CCF uses social media as a tool to raise awareness on its mission to conserve the cheetah (Figure 113). The conference held talks on research & importance of hunting in conservation, and panel discussions on conservation in North America, Latin America, Europe, Asia, and Africa.



FIGURE 113: CCF'S ANNETJIE AND JULIA WHO ATTENDED AND PARTICIPATED IN THE CIC CONFERENCE HELD IN WINDHOEK.

CLP Conservation Management & Leadership Workshop (25 June - 9 July 2019)

CCF's Research and Education Manager, Annetjie Siyaya attended a two-weeks Conservation and Leadership Programme in Brazil, hosted at REGUA, an ecological reserve in the Atlantic Forest of Rio de Janeiro. This programme was led by the Conservation Leadership Programme (CLP) together with their partners, Fauna & Flora International, World Conservation Society and Birdlife International. The workshop covered areas such as conservation leadership, project planning and management, communications for behaviour change and fundraising. Annetjie was one of eight participants who were sponsored by the De Beers Group. The workshop, designed to build the next generation of conservation leaders, brought together 19 young conservationists from all over the world (Figure 113).



FIGURE 114: ANNETJIE ALONG WITH PARTICIPANTS AND TRAINERS AT THE CONSERVATION MANAGEMENT AND LEADERSHIP PROGRAMME IN BRAZIL.

Association of Diplomatic Spouses (ADS) Bazaar (28 September 2019)

Annetjie and Julia put up a stall at the food and crafts Bazaar organised by the Association of Diplomatic Spouses in Windhoek, Namibia. CCF was invited to put up a free stall at this year's bazaar by the wife of the Spanish Ambassador to Namibia, after she had attended CCF's Annual Gala Dinner, and was impressed with our work. She thought CCF would benefit by having us present ourselves to the international community. Different embassies in Namibia put up their stalls with food and crafts from their countries. Our stall was next to that of the USA Embassy, and Ambassador Lisa Johnson helped point people to our stall and told them about the wonderful work CCF does to save the cheetah in the wild (Figure 115).



FIGURE 115: CCF'S ANNETJIE AND JULIA AT THE ASSOCIATION OF DIPLOMATIC SPOUSES BAZAAR IN WINDHOEK.

TUSK Conservation Symposium (7 - 10 October 2019)

The 2019 Tusk Conservation Symposium was held at The Mount Kenya Safari Club, Nanyuki, Kenya from 7 – 10 October. This brought together a total of 54 participants from various conservation organizations across 17 African countries and a team of 7 from Tusk, as well as three facilitators. Participants all came from project partners funded by the Tusk charity. The focus of the symposium was on how conservation needs to adapt to the current pressures on Africa's wildlife habitats. During this four-day event, participants were given a forum to share their experiences, ideas and methodologies with other Tusk project participants, with the hope for greater collaboration in the future.

Attendees also participated in team building training sessions, as well as visits to various conservation centres in Kenya (Figure 116). Research and Education Manager, Annetjie Siyaya represented CCF at the symposium.



FIGURE 116: ANNETJIE ALONG WITH REPRESENTATIVES FROM DIFFERENT TUSK FUNDED PROJECTS AT THE SYMPOSIUM IN KENYA.

VI. Structural Activities

A. Namibian Facility Developments

1. Existing Structural Projects and New Projects

Mid-year 2019 saw continued investment in the CCF Namibia infrastructure. Improvements include:

- Installation of 25MB internet access.
- Installation of UNTANGLE firewall and migration of the CCF server.
- Continued upgrade of visitor graphics and wayfinding signs.
- BUSHBLOK production moved to BTC.
- Completion of two staff houses and Canada House
- Major upgrade to power-control/battery room.
- On-going staff training included discussions of general worker safety and chemical use, and another first aid course.
- 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 48 lists CCF's vehicles and their condition at the end of December 2019.

TABLE 48: CCF'S VEHICLE FLEET AND EACH VEHICLE'S STATUS AT THE END OF DECEMBER 2019.

Vehicle	Status
Nissan4x4(4349)	Running
Old Toyota4x4(dogs)	Broken
Toyota4x4(feeding)	Running
Quantum Old (2131)	Running
Quantum New (3878)	Running
Green safari cruiser	Running
GWM	Broken
Toyota 4x4 Farm	Running
Nissan N5947OT	Running
Nissan N7025OT	Running
Pajero Bruce N1198OT	Broken
Toyota Laurie	Running
1997 Tracking Toyota	Running
1987 Toyota ecology 1	Running
1987 Toyota ecology 2	Running
Big trekker	Running
New small trekker	Running
Ford game view	Running
Bynadaar trekker	Running
New Cruiser, Game view	Running
New Cruiser double cab	Running
New Cruiser (Farm Manager)	Running
New Toyota (Laurie and Bruce)	Running
New Cruiser (APU)	Running
Old farm Cruiser (Estate Manager)	Running

B. Staffing

1. CCF Namibia Staff

As of 31 December 2019, CCF Namibia employs 50 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

- Laura Allen – Head Carnivore Keeper
- Anne-Marie Bekker – Business Manager
- Vincent Bellwoar – Facility Engineer
- Bruce Brewer, PhD - General Manager
- Johan Britz – Farms Manager
- Tanya Britz - CCF Bush Accountant
- Ignatius Davids – Education and Tourism Officer
- Karin Falk – CCF Accountant
- Raul Carlos – Executive Chef
- Josephine Gabriel – Tourism and Education Assistant
- Tim Hofmann – Scat Detection Dogs
- 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 Coordinator
- Matti Nghikembua – Forest Steward & Chief Ecologist
- Gebhardt Nikanor – Education and Tourism Officer
- Lauren Pfeiffer– Personal Assistant to the Director
- Anne Schmidt-Küntzel, DVM, PhD - Research Geneticist & Asst. Director for Animal Health and Research
- 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
- 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 Hamundjebo – Tourism Assistant
- Maria Lazarus – Education Officer
- Sidney Shipefi – Veterinarian
- Simonne Klebber – Veterinarian
- Calum O'Flaherty – Livestock Guarding Dog Program Manager
- Winnie Skrywer – Tourism Assistant
- Veisy Kasaona - Community Programs Assistant
- Tayla Green - Guest Experience Coordinator
- Vistoria Tuhemwe – Veterinary Technician
- Francois Jenkins – Laboratory Technician
- David Shipingana - Forestry and Safety Officer
- Hanlie Winterbach – Carnivore Research
- Mike Mikael – Small Stock Assistant
- Emma Reasoner – Ecology 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 – Digital Media and Graphic Design Manager
- Dionne Stein – Development Manager (Events and Special Projects)

VII. Organizational Activities

A. Fundraising

1. Namibia

Board of Governance

CCF Namibia underwent its annual financial audit in March 2019 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 4 September 2019. A regular Board meeting followed immediately.

Fundraising

Annual Gala Dinner

CCF's 21st Annual Fundraising Gala Dinner took place on 12 July at the Windhoek Country Club and brought together more than 175 guests from the business, conservation, agriculture and government sectors in Namibia, plus international guests, including members of the CCF USA Board of Directors and Trustees.

The gala dinner was once again a celebration of the cheetah and highlighted 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 award ceremony and a silent auction of items donated by local and international businesses, including artwork, 'get-aways' at exclusive Namibian and international tourism destinations and a variety of other very attractive items.

This year's event marked several milestones for CCF, including the 10th anniversary of its Life Science Conservation Genetics Laboratory and the 25th anniversary of its highly successful Livestock Guarding Dog Programme.

Namibia's Minister of Environment and Tourism, the Honourable Minister Pohamba Shifeta, delivered the evening's keynote address on the value of conservation and the economy and how the Cheetah Conservation Fund has helped in these areas in order to help save the cheetah.

CCF Founder and Executive Director, Dr. Laurie Marker, presented the 2019 State of the Cheetah Address, underscoring the need to conserve Namibia's natural resources and foster an economic system in which humans and livestock not only coexist with wildlife, but thrive in a healthy, biodiverse landscape.

The guest speaker, Mr. Deon Cillier, a conservation biologist from Cheetah OutReach in South Africa, spoke about his farmer/predator conflict mitigation.

- Dr. Marker presented the 2019 Cheetah Conservation Award on behalf of the CCF Board of Directors, recognising those who have helped conserve the cheetah and the Namibian environment.
- Mrs. Mary Kruger and Family received the 2019 Cheetah Conservationist of the Year award for her and her family's years of support to the Cheetah Conservation Fund.
- The 2019 Long-Standing Services to Cheetah Conservation Award was presented to Mr. Armas Shaanika, for his care and dedication to CCF's livestock guarding dog programme.
- The 2019 Cheetah Conservation Programme of the Year Award was given to Cheetah OutReach, for their Livestock Guarding Dog Programme in South Africa.
- The 2019 Long-Term Conservation Achievement Award was presented to World Wildlife Fund for Nature, Namibia for their on-going support of community conservancies.

The wide range of auction items, and ticket and wines sales brought in over N\$133,000.00 for CCF's research, conservation, and education programmes.

Grants

There were no significant locally awarded grants during 2019.

2. International

CCF USA

Board Governance

During this period, the USA Board of Directors and Trustees had three meetings via teleconference: 15 February, 28 June, and 6 December. Additionally, an annual meeting was held in Bronx, NY on 20-21 September. The annual

meeting was hosted by the Bronx Zoo, and had an open session on 20 September. Four resolutions were passed during these meetings. All were quarterly resolution to recognise restricted and designated funds. In addition, the Exco approved a resolution to open a Stifel account to receive funds from a bequest. These funds should arrive in 2020 and will be moved to our Merrill Lynch account. There were no new elections to the Board of Directors or Trustees in 2019.

CCF underwent its annual audit in March with the field portion conducted on site in CCF's Alexandria, Virginia offices on 29-30 April 2017. The audit was conducted by GRF CPAs and Advisors.

Operations

CCF's rental agreement was renewed for the office at 200 Daingerfield Rd. Suite 200, Alexandria, VA 22314. The blue and yellow lines of the metro were shut down this summer making it difficult to attract summer interns.

Beth Leonard, a professional analyst volunteered to analyze our donor data in efforts to map out a comprehensive development plan with measurable benchmarks and deliverables for all staff in 2020. Four opportunities were presented as areas to develop:

- Expand Digital and Social Media Strategy
- Extend Major Giving Focus
- Build Additional Regions
- Establish Corporate Giving Program

CCF renewed our donor database agreement with Blackbaud and also invested in developing a new website design. The combination of a robust database and mobile friendly website will enhance the CCF donor experience. Development Managers have increased their use of Blackbaud and have begun working within a moves management system.

As 31 December 2019, no new staff had been hired and all staff had been retained.

Finance

An investment account was opened at Merrill Lynch. The Will group at Merrill Lynch are CCF's advisors on the account, and the investment committee will monitor the investments. Restricted and operating funds that do not need to be immediately accessible will be invested in this account.

Fundraising

Areas of Focus

Eight areas of focus were defined for the year: Global Branding and Messaging, Annual Theme LSD, Founder's Circle, challenger Program, Corporate Giving, Communications, Events/Special Projects, and Moves Management. 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 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

Spring Appeal

An initial mailing to 10,787 USA subscribers was sent on 21 March 2019 that included high, medium, low, and non-donors.

Chewbaaka Memorial Challenge

An initial mailing to 13,454 USA subscribers was sent on 1 July 2019 that included high, medium, low, and non-donors. A second effort was mailed to 4,441 USA subscribers and sent on 9 August 2019.

Fall Appeal

An initial mailing to 14,174 USA subscribers was sent on 4 October 2019 that included high, medium, low, and non-donors.

Year-End Challenge

An initial mailing to 14,233 USA subscribers was sent on 14 November 2019 that included high, medium, low, and non-donors. A second effort was mailed to 4,166 USA subscribers on 15 December 2019 that included high, medium, low, and non-donors.

Year-End Donation Mailing: A comparison of donors that gave during Year-End 2018 and 2019 are included Table 50.

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 and late December 2019. Many of our appeals and Facebook posts promote cheetah sponsorships.

Newsletters and e-Blasts

Cheetah Strides

Two 'Cheetah Strides' newsletters were mailed in Year-End 2019. Issue no. 17 was mailed on 1 March 2019 to 11,356 people in the USA, generating. Issue no 18 was mailed on 13 September 2019 to 13,680 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 e-letters are sent in the months of February, April, June, August, October, and December to between 22,489 to 30,776 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.

Welcome Series e-blasts

Welcome Series e-blasts are sent to new constituents that are added to the database each month. The Welcome Series includes a total of four emails that focus on these topics: Welcome to CCF, Educational Programming at CCF, Human Wildlife Conflict Solutions and Research Program at CCF.

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. There are 97,889 constituent records in the Raiser's Edge database. There are 18,745 USA email subscribers and 14,233 USA subscribers on the appeal mailing lists. The creation of our online auctions remains hosted through Bidding for Good.

Designated Giving/Grants/Awards

CCF has expanded the focus on grants to include strategic ask to increase designated giving and support the vital programs that CCF manages. This effort has succeeded in renewing old partnerships and creating new ones. Here are just a few highlights that show how the support of so many partners are helping CCF in their mission to save cheetahs in the wild.

CCF was the beneficiary of a large donation from an anonymous donor that covered many capital purchases and improvements to the everyday operation of the CCF Research and Education Centre. Much needed vehicles and equipment, housing pods, education facilities and construction of wells and much more. This grant has made a noticeable difference to assist with overall operations of the Centre and CCF's programs.

The Foundation for Human Rabies Education and Eradication (FHREE) has also helped to accelerate the rabies prevention education and mobile clinic vaccination programs. Thanks to the generosity and assistance from this donor CCF has been able to provide vaccinations for 1000+ animals to help eradicate rabies in the Eastern Communal Conservancies around the Greater Waterberg Landscape.

The Ad Astra Foundation provided additional funding for a Train the Trainer program where CCF and Langston University are working in conjunction to provide education opportunities for an international exchange of information for goat production to trainers in both Namibia and Oklahoma. This foundation has been a very generous partner for many years.

CCF is very appreciative of the substantial donations made by Major Thomas Spencer to fund ongoing cheetah programs. Supporters like this make it possible for CCF to maintain the research, education and conservation programs that are protecting cheetahs from extinction. These partners along with so many others are helping make a difference.

Thank you to all our Canadian partners, The Alan and Patricia Koval Foundation, The Gordon and Patricia Animal Welfare Foundation and The Eric Margolis Foundation that made it possible to reprint education guides, care for cheetahs and wild dogs and continue our vaccination program. Each of these donations make a real difference. Having funding for these operational expenses required for programs allow CCF to do more to protect cheetahs in the wild.

The grants our many UK donors, including Tusk Trust, have provided support to CCF's core program to help mitigate human-wildlife conflict which continues to make a marked difference. Providing training through the Future Farmers of Africa (FFA) and Future Conservationists of Africa (FCA) and having Livestock Guarding Dogs in the field is necessary to help protect cheetahs in the wild. The UK DEFRA Grant is supporting CCF's capacity building efforts to bring multiple countries together to fight IWT. The Debmarine Namdeb Foundation provided much needed veterinary supplies in Namibia and Somaliland.

Dr. Laurie Marker's Tours

Fall and Spring Tour e-blasts

Multiple targeted e-blasts were sent out to invite partners to events with Dr. Marker during her USA Spring Tour to subscribers based on regional areas. Additionally, there were multiple targeted e-blasts that were sent out to invite partners to events with Dr. Marker during her USA Fall Tour that were sent to subscribers based on regional areas.

Spring Tour

Dr. Marker's North American tour for spring 2019 was seven weeks in duration as she travelled to 9 states and 17 cities and to Ottawa, Canada to fund raise for the endangered cheetah.

The spring tour began 15 March in New York City and lasted until 30 April in Northern California. Dr. Marker participated in over 20 events to fundraise for the plight of the cheetah.

Fall Tour

Dr. Marker's North American tour for fall 2019 was seven and a half weeks in duration as she travelled to 13 states and 24. The fall tour began September 19 in New York City and lasted until 4 November in Northern California. Dr. Marker participated in over many events to fundraise for the plight of the cheetah.

Dr. Marker also had the pleasure of celebrating the 25 Anniversary of the Livestock Guarding Program throughout her travels.

In summary for 2019, Dr. Marker travelled to 22 states and 41 cities over a total of 14 weeks collectively for the spring and fall fundraising tours. The mission of CCF was delivered to over 3,962 interested cheetah supporters and participants throughout the tours of 2019.

Brian Badger's Outreach and Education Events

Brian Badger's events this year included 29 talks and special events supported by the CCF USA Chapters and Board members and co-hosted by the Columbus Zoo and Wild Hearts African Farm and other organizations.

Additionally, Brian presented to several other audiences were addressed and presented to, including several Schools, Colleges, Social Groups, Scout Troops and alike were exposed to CCF for the first time.

From November - December 2019, Brian traveled to Somaliland to help and organize the building of a new holding facility, giving new quarantine, rehab, and housing capacity to the existing operation.

Chapter Events

Supplementing Dr. Marker's visits to the US, regional chapters are encouraged to organize events that support CCF in US communities. During this period, CCF Chapters from New York, Denver, and the Southern California and Northern California areas participated in cultivation and fundraising events outside of Dr. Marker's Spring and Fall Tours organized over 34 events including zoo talks, Cheetah Runs, International Cheetah Day celebrations, and participations in Earth Day and other community events.

In 2019 some of these events were supported with multiple e-blasts targeted to a specific people based on regional areas and have also been posted to Facebook. The total revenue for these events during 2019 was \$123,655.28, including Brian Badger's Outreach and Education Events.

International Affiliates Support 2019

CCF has registered charitable organisations in Australia, Belgium, Canada, Italy, Japan, and the UK. CCF also has fundraising partners in France, Germany, and the Netherlands. All CCF's partner organisations promote education, fundraising and conservation awareness.

Cheetah Conservation Canada (CCFC)

In 2019, CCFC welcomed Laurie to Ottawa in April, to deliver a keynote luncheon address at the capital's Rideau Club, on the "Cheetah Diplomacy", highlighting the importance of working with all stakeholders to save the cheetah from extinction. Dr. Marker also spoke at a fundraising dinner event in Ottawa, which provided an opportunity for guests to have in-depth exchange on CCF and its work. Dr. Marker was a guest on Ottawa's foremost morning radio program, to speak in-depth on CCF's work to stop the illegal pet trade.

CCFC raised \$105,000 from individual Canadians and family foundations. The volunteer run affiliate is continuing to expand the number of individual Canadians who are supporting CCF, due in large part to Dr. Marker's annual visits to Canada, CCFC's active role in social media, and their efforts to keep Canadians informed about the work of CCF in Namibia as well as in Somaliland.

For the third year in a row, the vet students at Guelph University's Vet College held a fundraiser on International Cheetah Day. 2019 also marked the third year that vet students have visited CCF Namibia as part of their Global Vets program, designed to give these students experience with the best wildlife conservation programs in the world. CCFC have formally arranged with Vanier College, in Montreal, to have their students participate as interns at CCF.

Cheetah Conservation Fund United Kingdom (CCFUK)

Objectives of CCF UK

- Increasing awareness of CCF UK and the conservation status of the cheetah through website, media, social media, and events
- Raising income through grants, corporate partnerships, and individual giving for CCF with enough in reserve to have a sustainable UK organisation.
- *Increasing awareness of CCF UK and the conservation status of the cheetah through website, media, social media, and events*

Website

- Annual website visitors: 7,544, increase of 39.6% over 2018
- 10,176 sessions, up 35.25%
- 1.88 pages viewed per session, up 7.35%
- 1.43 minutes per session, up 13.08%

Public Relations (PR)

Our PR point person, Emma Daley, went on maternity leave in May 2019 and the focus turned instead to Social Media, bringing on board Hannah Mulvany. Emma will still support us when PR needed.

- Major interview/photoshoot with Laurie at CCF Namibia in Telegraph Magazine (circ. 500,000) July 2019. Small number of donations.
- BBC2 Documentary in 2Q 2019: Big Cat Surgeries featuring CCF and presented by Liz Bonin.
- BBC Breakfast Show December: Giles Clark, CCF UK Ambassador, was interviewed about the IWT Crisis and CCF Somaliland. Social media spike and some donations.
- Channel 5: Dogs with Extraordinary Dogs in September showcasing Livestock Guarding Dogs at CCF Namibia.
- Work for Good Charity Film Awards: Entered in late 2019 with a short documentary of CCF made by a British filmmaker. Shortlisted early 2020.

Social Media

Since becoming the Digital Lead in May 2019, Hannah has improved statistics across all SM channels and created meaningful relationships with our followers to convert them into supporters of CCF UK. Through regular features such as Cheetah of the Month, wildlife photographer takeovers, increased blog posting and improved reporting, our SM channels became more of a one-stop-shop for all things cheetah, with slightly less frequent, but still regular, fundraising asks. Despite asking for money less, we have raised more money through SM due to increased support and improved donor relationships and will continue to be improved in 2020.

- Facebook: Following has increased from 1,948 to 2,849 in the past year, representing an increase of 46%. Conversion: Most of our web traffic comes through Facebook. When we transition to the new website, the responsiveness of the new format will improve the usability of the website for future visitors and help decrease bounce rate. There has been an increase in traffic from Facebook of over 166%, as a direct response to the number of times we have shared links to our website through the platform.
- Twitter: In May 2019, there were 700 Twitter followers which has grown to 1,046, a 49% increase in 7 months. Conversion – A focus of SM shares has been to increase the number of posts that direct to our

website. Despite being one of the largest referrers of traffic to our website, Twitter has seen the smallest increase in conversions at 3% and improving this statistic further will be a focus for 2020.

- Instagram: Our most liked posts were generated by our wildlife photographer takeovers. In May 2019, we had 400 Instagram followers and now have 1,424, representing an increase of 1,024 or 256% over 7 months. Conversions: With the introduction of more 'link in bio' posts, our web traffic from Instagram has increased by over 740%.

Improvements have been made across all SM channels with regards to engagement, followers, traffic conversions and general audience communication. There is room for improvement and in 2020, we will continue to grow the relationship between SM and fundraising. With the introduction of the Cheetah Communities in 2020, who will provide further content for the SM channels, which will help us build a deeper relationship with our followers and supporters by becoming an even more accessible, friendly and proactive organisation.

Communications

- Subscriber database is 2,972. 33% are either highly or sometimes engaged, and 64% rarely.
- There were 8 communications ranging from campaigns (IWT and LDGD), notification of events and 4 Cheetah Tails newsletters. Open rates varied from 6-37%. In 2020, we will improve segmentation of our existing subscriber base and send more targeted communications.

Grants

- DEFRA IWT Challenge Fund: Jane supported this proposal at the final stages, and project managed all activities April – July from win notification to finalisation of contract. The project "Legal Intelligence for Cheetah Illicit Trade" is for 2 years, 9 months.
- UK Trusts and Foundations:
 - Investors in Wildlife for CCF Somaliland
 - Wildlife Heritage Foundation for CCF Somaliland
 - Zoological Society of Hertfordshire for CCF Somaliland
 - Ernest Kleinwort Charitable Trust Livestock Guarding Dogs
 - Panton Charitable Trust for Future Farmers of Africa
 - Lindeth Charitable Trust for Future Farmers of Africa

After 3 years of funding from Tusk Trust, we were not successful in the 2019 application. The reason given was that CCF were too large and they wanted to focus on smaller organisations. We will approach them again in 2021.

Events

- Big Cat Festival: Stand at Bradt Publishers BCF in April at the Royal Geographical Society headlined by Chris Packham & other well-known conservationists, wildlife photographers, and CCF's Royal Patron, HRH Princess Michael of Kent. Jane and HRH were part of a panel discussion on big cat conservation. Raised awareness & over 50 new supporters but not big fundraiser.
- Hamerton Zoo: Cheetah Day in August raised.
- Partnerships with Purpose (not a fundraiser): Held at Mayfair hotel, hosted by HRH with 2 CCF UK Ambassadors, Jackie Fast and Giles Clark giving presentations to an audience of over 40 people from various companies & individuals. The objective was to build relationships with corporates which will be further developed in 2020. From the event, we invited 6 people from various corporate backgrounds to join the Commercial Advisory Committee which will help realise our goals.

Developing Volunteering & Building UK Operations

This process is being managed by Laura Dempsey who joined CCF UK in March 2019. The goals are to:

- To increase the depth and breadth of the volunteer network by streamlining ways of working with core volunteers and building Cheetah Communities.
- To enhance the experience and impact of existing staff and volunteer roles
- To develop a high quality, scalable and easy to manage volunteering programme
- To increase supporter engagement through volunteering to ensure they feel even more part of the CCF UK community, to lead to an increase of their level of activity and £ contributions

Key Achievements

1. Streamline ways of working with core volunteers

Introduced changes to enhance ways of working as a team including:

- Appointment of a Senior Management Team to lead delivery of key areas of work & increased communications across all team members.
- Introduction of a structured 'master plan' allocating tasks, timings and owners for each area of work to aid planning and team management.
- Creation of a Volunteer Policy, Volunteer Agreement and Volunteer Role descriptions which outline expectations and ways of working with volunteers.
- Development of a dedicated volunteering page on the CCF UK website to advertise opportunities and share resources

2. Building Cheetah Communities

- Successful appointment of a Midland's Cheetah Community - currently four members (one more to be recruited) First event to take place on 26th January to engage the public, recruit supporters and increase database. Further events to focus on community fundraising, sales of merchandise, a fashion show (TBC) and engagement of local businesses.
- Successful appointment of a London Cheetah Community - currently seven members aiming for ten members in total. First event to take place in February – details TBC.
- Recruitment underway for a Brighton Community and North West Community.
- By end of March 2020, CCF UK will have approx. 25 cheetah community members, across four geographies. Members will be recruited from across the public, private and voluntary sectors, with skills and experience within fundraising, conservation, zoology, education, events, and partnership development.
- Successful appointment of two 'Fundraising Projects' volunteers to lead on prospect research, fundraising ideas and supporter administration.
- In total, CCF UK has the support of 34 active and engaged volunteers, more than doubling the number of volunteers since 2018.

3. Significant Meetings & Visits

- CITES Liaison Group: Jane attended one meeting by phone and CCF IWT lead represented CCF in two meetings.
- Population Sustainability Network: CCF UK was one of the first conservation organisations to join this network in 2017. CCF continues to support the work of PSN (with CCF UK being the main contact) and was a signatory to the Thriving Together Campaign. We also encouraged the IUCN to include an agenda item at their global conference on the important of cross-sector working, understanding the data of other sectors, and ensuring policy is gender sensitive with reference to reproductive health and rights. This will be the first time that the IUCN has included this topic.
- DEFRA: Jane attended a meeting with the IWT Team at DEFRA in December to progress contacts at the FCO and DEFRA in the Horn of Africa countries to develop networks and contacts for the DEFRA project and beyond.
- CCF Somaliland: Jane volunteered at CCF Somaliland in July to support the development of Cheetah Safe House 1.

CCF UK Board

- Meetings: The board met in April, June, and October.

- Board movements: Maggie du Pree stood down in June with a move to the US and Alex von Sponeck resigned in December after 3 years on the Board. Four new board members will be joining in January 2020, including a new Treasurer.

Cheetah Conservation Fund Australia (CCFA)

2019 has not been a very active year for our chapter, mainly due to health issues or other commitments of volunteer Board members.

Although cheetah cubs born in 2017 and 2018 across Australian zoos have continued to do well, there have been no new births. These would not be encouraged at this point, as Australian zoos have a full complement, and would be looking at further genetic diversity.

In 2019, new members were added to the Board, with Chris Stitt joining as a new representative for Victoria. Kathleen Ager will be moving to Queensland this coming year, and will take on representing Queensland, which has been unrepresented to date.

Dr. Marker's Personal Assistant, Lauren Pfeiffer, continues to contribute to CCFA's monthly meetings, and they have followed the events in Somaliland with concern and interest. CCFA has illustrated these events in their newsletters and disseminated them to ensure raised awareness of the illegal pet trade and its devastating consequences for the wild cheetah population.

Donations have continued to come through, and during 2019, three fund-raising events which have also brought in monies. As a result, CCFA will soon be able to make another contribution to Namibia. Again, Zoos South Australia has pledged a major donation. Monarto Zoo is increasing its range and has recently rebranded as Monarto Safari Park. There are rumours that exciting new exhibits are in store for their cheetahs.

As the world knows, Australia has had a tragic end to 2019 and beginning to 2020, as fires have ravaged the bushland, decimating the native wildlife population to the tune of 500 million animals, in addition to destroying unique ecosystems and taking human lives and homes.

Cheetah Conservation Fund Italy (CCFI)

Last year CCFI organized Laurie's Europe Tour, which started on January 29, 2019 in Strasbourg.

The cooperation started in early October 2018, from Strasbourg and from Italy for the Italian part which followed the Strasbourg meetings. CCFI cooperated to get the maximum support inside the Townhall and the Council of Europe.

CCFI had the tour details and locations organized by Betty von Hoenning and Teresia Robitschko in Europe (Susan Yannetti in US), so to make a maximum yield in a few days' time.

Betty von Hoenning contacted Matto Barfuss who lives very near to Strasbourg, to arrange a visit to him and his gallery of cheetah paintings. Matto is exhibiting his art all over Europe and had a long love story with the cheetah Maleika, which became a movie in 2018.

CCFI were invited by the Maire of Strasbourg for a private meeting with Dr. Laurie Marker and Dr. Bruce Brewer, Dr. Nawel Rafik, Dr. Keltoum Belaid, and the representatives of the Council of Europe, as well as the associations

and members who were present. CCFI held a conference in the Council of Europe with Council's Biodiversity Department and organized a sale of CCF's Italia items.

CCF France

Amifélins has become the official Partner of CCF in France – Cheetah Conservation Fund France (CCF FRANCE), now registered in the Prefecture of Nanterre. This reporting period allowed us to enlarge the Board, with members with high profiles and diversified experiences and competences – Christian BARBAUD, Stephanie DI MATTIA and Frank MAIRE.

The European Tour of Dr. Marker included 2 stays in France, one in Strasbourg end of January, with Events organized by Frank MAIRE in the Town Hall, and a conference by Laurie in the Council of Europe, with the help of Betty von Hoenning. The other was in early February which included an Interview with Dr. Natacha Harry for French T.V. Channel 2, then a conference by Laurie in the National School for Veterinary Surgeons (ENVA) in Maisons-Alfort. Dr. Marker had also a 1-hour interview by tel. for Radio Enghien, a popular radio for Paris area. On 9 February, Laurie, with CCF France team, spent the day in Parc des Félin (Animal park with Felids), with exchanges with the Staff - the Veterinary surgeon, the person in charge of animal exchanges with other Animal Parks for the The European Endangered Species Programmes (EEP) and the caretakers of the cheetahs. Laurie had a conference for the Public present in this Animal Park and she had the opportunity of meeting the younger Members of Etoile Football Club Ecquevilly (EFCE), this Club sponsoring "Dominic" in CCF Namibia.

So far, presentations and conferences about cheetahs and CCF programs of actions have made it possible to reach directly more than 1,500 persons, including 800 children between 8 and 14 years of age. This means many more persons informed since each child or adult tends to spread out our messages to family, friends, school staff, colleagues.

CCF France is cooperating with the School of Philanthropy: this school has now set up a site allowing any school in France to ask an Association to make a presentation in their school. CCF France is present on this Site and can be contacted by schools. This new site can give CCF France more opportunities for presentations to children between 8 and 12 years of age, since before, only Paris public schools were involved in their actions to promote Philanthropy to encourage children to get involved and help Associations. Now, all public and private schools in France can apply for presentations in their schools. Brigitte PETRAZ will cover several Departments in the area of Savoie, Catherine Ebbs-Perin will cover Paris, the Departments west of Paris and Eure-et-Loir, for the time being.

Brigitte Petraz and Cécile Falbert go on developing many actions in schools in Savoie, with B2 being sponsored by pupils of Saint-Alban-Leysse College and being the Mascot of this College.

B. PR, Marketing, and Media

1. Social Media

CCF Facebook

Currently, CCF staff manages four 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 are filled with fan photos and user content shared to the page.

@CCFCheetah: As of 31 December, CCF's Facebook page has likes 256,503, up from 254,046 on 1 January 2019. Also, during the same time-period, CCF's Facebook page saw an increase in followers to 252,712, up from 249,598 on 1 January 2019.

@Chewbaaka's CheetahFriends 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, Chewbaaka's Cheetah Friends fan page has 865 likes.

@DrLaurieMarker 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 31 December 2019, Dr. Laurie Marker's Facebook page has 4,731, up from 4,269 at the beginning of January 2019. Also, during the same time-period, Dr. Marker's page saw an increase in followers to 4,763, up from 4,283 on 1 January 2019.

@CCFKeepCheetahsWild: CCF's Facebook page dedicated to the illegal pet trade in cheetahs was created in 2018. As of December 2019, So You Want A Pet Cheetah has 2,365 likes, up from 1,819 at the beginning of January 2019. Also, during the same time-period, So You Want A Pet Cheetah, saw an increase in followers to 2,407, up from 1,840 on 1 January 2019.

Twitter

@CCFCheetah is CCF's Twitter feed, managed by volunteers with guidance from CCF staff. CCFCheetah currently has 20,730 followers and CCF's content had 1,108,662 impressions over the course of this reporting period.

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 2019, CCF's Instagram has 36,322 followers up from 26,544 followers January 2019. CCF's Instagram has received 241,532 likes across all its posts. The most liked post received 7,500 likes and was a photo of a Somaliland cheetah cub.

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 2019, CCF's Pinterest page has 189 followers up from 135 followers in January 2019. CCF's pins were saved 198 times during this reporting period.

Website

On June 14, 2019, CCF staff and Avidano Digital, finalized a total website redesign and implementation to Dreamhost, CCF's web server. The site went live and suffered zero downtime for site users. From June - July,

intensive work was completed by CCF staff on backend functionality for the purposes of streamlining reporting, enhancing search engine performance, and republishing edited content into the new site structure.

Website Redesign Key Goals

In response to user feedback, professional guidance, and industry standards, key goals were identified for CCF's site redesign:

- Mobile responsive website content
- Cohesion of CCF's international affiliates
- Improved search engine optimization (SEO)
- Streamlined navigation
- Donation page tracking

Mobile responsive

Monetizing CCF's most valuable online asset - interesting and educational content - to increase funding for CCF's programs. Cheetah.org is now mobile responsive and Google Search Console is updated with a new sitemap.

Comparing SEO by device January 2019 - 31 December 2019:

- **165 thousand Clicks** on CCF's content from Google's search engine results across all platforms (desktop, mobile, and tablet)
- **11.6 million Impressions** of CCF's content from Google's search engine results, across all platforms (desktop, mobile, and tablet)
- CCF's **average position** in Google's search results for desktop users is 17.2.
 - Mobile position is 8.3
 - Tablet position is 6.9

Comparing site traffic by device January 2019 - 31 December 2019:

- **76,289 Mobile** users to CCF's site
- **122,944 Desktop** users to CCF's site
- **21,401 Tablet** users to CCF's site decreased by 797 users

Bounce Rate from 1 August - 31 December 2019 is 60.97%

Bounce rate for the first part of the year are unreliable.

For nonprofit websites, the industry average bounce rate is between 60% – 70%.
<https://www.williamswhittle.com/>

Cohesion of CCF's international affiliates

Bringing CCF's affiliates under one brand identity.

- Minimize volunteer time in recreation of content from Namibia
- Ensure accuracy of CCF's news and messaging
- Increase user confidence in the overall organization
- Increase oversight and access to affiliate content
- Apply consistent brand identity across CCF affiliates

CCF staff used CCF USA as the test site for moving internationals forward.

Improved search engine optimization (SEO)

Making CCF's content easy to find in Google's search engine to access new supporters searching for relevant content.

Prior to the rebuild, to overcome the negative impact and downgrading of CCF's content due to unresponsiveness, CCF staff utilized SEO on most published blogs whether the content was key.

As a result, pages that are no longer available on the new site are still shown in search results. Currently and moving forward, only main navigation and cornerstone content within blogs will be placed into SEO. This will make it so that relevant content pulls into search, helping deliver the best.

Streamlined navigation

Bringing our best content forward to help users gain a greater understanding of CCF's programming. Making it easier to understand CCF's work - scientifically complex and multifaceted holistic conservation.

New: **Laurie Marker** page moved to main navigation with focus on lifetime and career - Visible on homepage click down menu and one click to access.

- 1 August - 31 December 2019 - 2,600 unique pageviews - Avg time: 2 minutes 54 seconds

Previous: **Laurie Marker** page part of staff listings - Not visible on homepage three clicks to access.

- 1 January - 31 July 2019 - 2,466 unique pageviews - Avg time: 1 minute 2 seconds

New: **Volunteer** page focus on Namibia with button to redirect non-Namibia volunteers.

- August 1 - 31, 2019 - 6,327 unique pageviews - Avg time: 2 minutes 21 seconds

Previous: **Multiple Volunteer pages** in topline navigation - Internship or Working Guest, Humans for Cheetahs and Volunteer Locally.

- **Internship page:** 1 January - 31 August 2019 - 5,743 unique pageviews - Avg time: 55 seconds
- **Volunteer Locally:** 1 January - 31 August 2019 - 2,331 unique pageviews - Avg time: 45 seconds
- **Humans for Cheetahs:** 1 January - 31 August 2019 - 3,490 unique pageviews - Avg time: 31 seconds

User confusion for the volunteer process was expressed in the quantity of applications submitted for the wrong volunteer opportunity. Since 2017, of the 179 total volunteer applications to volunteer in the US, 97 were from people living in the US, which is 54% accuracy rate for relevant volunteers. Of the 21 entries received since June 2019, all are from people living in the US.

New: **Kids** page at the top of the homepage with kids' logo link. Landing page splits to Cheetah Facts and CCF Kids features.

- **Cheetahs Facts:** August 1 - December 31, 2019 - 7,714 unique pageviews- Avg time: 1:58
- **CCF Kids:** August 1 - December 31, 2019 - 1,006 unique pageviews - Avg time: 1:17

Previous: **Kids** page under about the cheetah.

- January 1 - 31, 2019 - 84,880 unique pageviews

In reviewing Google Search Console, SEO for the new kid's web address has not recovered 2018 traffic within this time frame - success or failure on the objective of featuring kids will be more informative later with more information.

Donation Page Tracking

Knowing what we do and who we reach to make informed decisions for online fundraising.

To deliver a mobile responsive donation page prior to full-site responsiveness, CCF staff implemented the donation page as the first step in website redesign. During 2018, CCF's donation page was hosted outside of WordPress and on a private server without access to Google Analytics. Post launch, CCF's donation page is hosted within site structure on CCF's server with access to reporting from Google Analytics.

CCF's Donation Page

- Donate Once: 6,156 unique pageviews
- Donate Sponsor: 2,000 unique pageviews
- Recurring: 474 unique pageviews

2. Media

CCF issued 10 press releases between January and December 2019.

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. Table 51 below shows media coverage of CCF from January to December 2019.