Summary of second carnivore diversity assessment at Verlorenvallei Nature Reserve, Mpumalanga, 2018

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Summary

This report is a short summary of camera trap survey finding at Verlorenvallei during 2018. During 23rd August to the 5th of October (43) days, we surveyed the Verlorenvallei nature reserve outside Dullstroom. An effective camera effort of 1720 trap nights were achieved. We detected 16 carnivore species, six species more than during the previous assessment. Another 17 non-carnivore species were detected excluding feral cats, domestic cattle, birds and humans.

Introduction

Carnivores are a generic term for species that mostly predate on other species rather than plants or vegetation. Normally mammalian carnivores would be a vital part of ecosystems in maintaining and balancing the structure of the larger ecosystem. It is therefore very important for conservation managers to understand the dynamics of the carnivore diversity and to allow for reasonable natural fluctuations in numbers (Ripple et al. 2014).

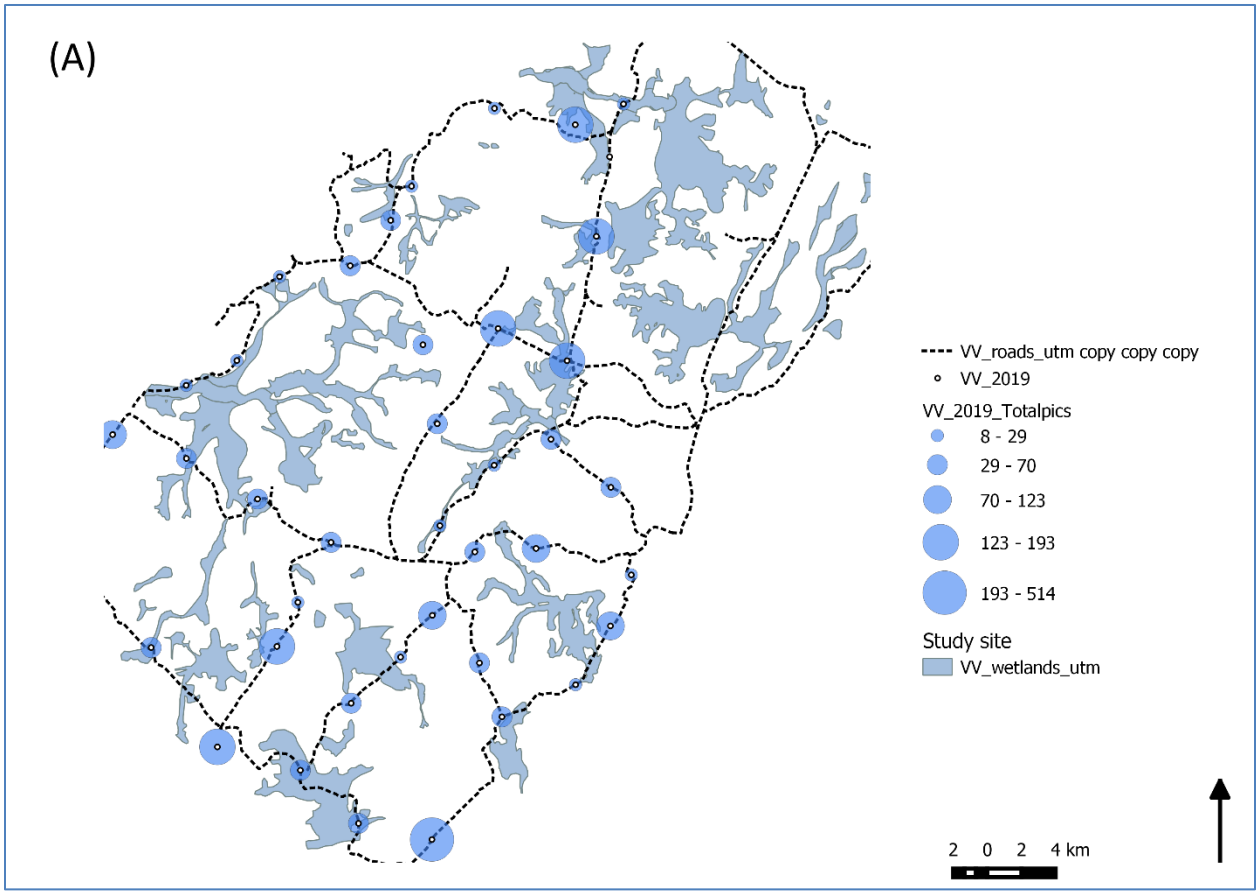

Fig. 1. Study area showing Verlorenvallei Nature Reserve with the number of animal pictures per camera trap

Large carnivores are important in ecosystems where their impacts are mostly directly predation driven or indirectly fear driven. These impacts roles out in prey communities and later on in ecosystem structure and function (Roemer et al. 2009). However most of the carnivores are not large, they are actually medium to small carnivores known as mesocarnivores. These carnivores are found in larger numbers and species diversity is greater than large carnivores making this group very important to study, especially in smaller reserves (Roemer et al. 2009; Prugh et al. 2009).

This study conducted on Verloren Vallei and is the first monitoring study following a baseline study conducted during 2015, and one of the recommendations from the baseline assessment (Swanepoel, LH. 2016). Verloren Vallei is a nature reserve located approximately 20 km outside Dullstroom, part of the Steenkampsberg plateau. The landscape includes some of the most pristine grasslands and sensitive wetlands in Mpumalanga.

In order to report on the species diversity as a recommendation from the baseline assessment we made use of a camera trapping technique to collect our data set. Camera trap sites were located exactly on the same previous trap sites to repeat the previous trapping protocol (Figure 1.)

Objectives

I. To estimate carnivore species diversity as detected by camera trap surveys.
II. To report on non-carnivore species diversity detected with camera trap surveys.

Methods

I. Study area

The monitoring assessment was conducted from the 23rd of August to the 5th of October 2018 at Verlorenvallei nature reserve approximately 20 kms north of Dullstroom in Mpumalanga (Figure 1). The reserve consists of 6061 hectares, with rocky outcrops, grass and wetlands, 18% or 1120 hectares is classified as wetland (Swanepoel, LH. 2016). The remainder of the surface area can be classified as Lydenburg Montane Grassland (Grassland biome) (Mucina and Rutherford 2006).

The monitoring assessment had 40 camera trap stations deployed over roughly a surface area of 80% of the reserve (Figure 1). The reserve portion west of the larger reserve divided by the road is not included in the survey.

II. Carnivore species list

The monitoring effort is based on Mammal list prepared by Dr L Swanepoel for the basic assessment in 2015. Verlorenvallei nature reserve could potentially harbor 23 carnivore species (Table 2) 16 species are classified as ‘least concern’, five species as ‘near threatened’ and one specie as ‘data deficient’ (Swanepoel, LH. 2016).

Table 1: Potential species list and conservation status of carnivore species at Verloren Vallei nature reserve based on 2004 Red data book of mammals of South Africa (Red Data Book of the Mammals of South)

Species	Common Name	Sa Red Data Status	2015	2018	Frequency
Canis mesomelas	Black-backed Jackal	Least concern	✓	✓	high
Vulpus chama	Cape Fox	Least concern	✓	✓	low
Caracal caracal	Caracal	Least concern	✓	✓	low
Felis silvestris	African Wild Cat	Least concern	✓	✓	medium
Atilax paludinosus	Marsh Mongoose	Least concern	✓	✓	low
Cynictis penicillata	Yellow Mongoose	Least concern	✓	✓	low
Civettictis civetta	African civet	Least concern	✗	✓	low
Genetta genetta	Small spotted genet	Least concern	✗	✗	low
Genetta maculata	Rusty spotted genet	Least concern	✗	✓	
Genetta tigrina	Large spotted genet	Least concern	✗	✗	
Ictonyx striatus	Striped polecat	Least concern	✗	✓	low
Galerella sanguinea	Slender Mongoose	Least concern	✗	✓	low
Ichneumia albicauda	White-tailed Mongoose	Least concern	✗	✗	
Mungos mungo	Banded Mongoose	Least concern	✗	✗	
Proteles cristatus	Aardwolf	Least concern	✗	✓	low
Aonyx capensis	Cape Clawless Otter	Least concern	✗	✗	
Panthera pardus	Leopard	Least concern	✗	✗	
Canis adustus	Side-striped Jackal	Near threatened	✓	✓	medium
Leptailurus serval	Serval	Near threatened	✓	✓	high
Hyaena brunnea	Brown Hyaena	Near threatened	✓	✓	low
Mellivora capensis	Honey Badger	Near threatened	✓	✓	medium
Felis nigripes	Small spotted cat	Near threatened	✗	✓	low

Lutra maculicollis	Spotted-necked Otter	Near threatened	×	×	
Poecilogale albinucha	African Weasel	Data deficient	×	×	

III. Camera trapping

The monitoring assessment replicated the baseline study of 2015. The trapping survey followed guidelines for closed-population studies. Cameras were deployed within preset grids of 1.2km x1.2km. The average spacing between camera sites were 758 m (Swanepoel, LH. 2016). Forty camera traps were deployed for 43 days resulting in 1720 trap nights. Cuddeback Ambush whiteflash cameras were used in the survey. Units were programmed with a one minute delay between pictures. Cameras were positioned next to trail roads approximately 30 cm above ground level. All cameras were serviced once every two weeks. No cameras were lost during the survey.

DigiCam software were used to catalogue images once downloaded from the SD cards. We used vegan R-package to produce species accumulation curves.

Results

Camera Trapping

During the monitoring assessment the trapping effort constitutes of 1720 trap nights from the 23rd August to the 5th of October 2018. The carnival trapping success rate is 3.26%. The total carnivore species detected were 16 species and for other non-carnivore species also 17 species, excluding domestic cattle, feral dogs and cats, humans and bird species (Table 2).

Table 2: Table indicates the trapping effort and the total amount of carnivore images recorded during the survey

Survey start data	2018/08/23
Survey end date	2018/10/05
Trap nights	1720
Trap sites	40
Total Carnivores species	16
Total Carnivores	474
Total non-carnivore species	17
Total non-carnivore images	2006

Table 3: Indicates the number of species at various detectors

Carnivore Species detected	**Species**	**Number of detection**	**Number of sites detected**
Black-backed jackal	*Canis mesomelas*	320	35
Serval	*Leptailurus serval*	106	26
African wildcat	*Felis silvestris lybica*	11	7
Cape Fox	*Vulpes chama*	9	9
Honey badger	*Mellivora capensis*	7	5
Side Stripe jackal	*Canis adustus*	6	4
Yellow mongoose	*Cynictis penicillata*	2	2
African civet	*Civettictis civetta*	2	2
Aardwolf	*Proteles cristatus*	1	1
Rusty spotted genet	*Genetta maculata*	1	1
Striped polecat	*Ictonyx striatus*	1	1
Small spotted cat	*Felis nigripes*	1	1
Slender Mongoose	*Galerella sanguinea*	1	1
Marsh mongoose	*Atilax paludinosus*	1	1
Caracal	*Caracal caracal*	1	1
Brown hyeana	*Hyaena brunnea*	1	1

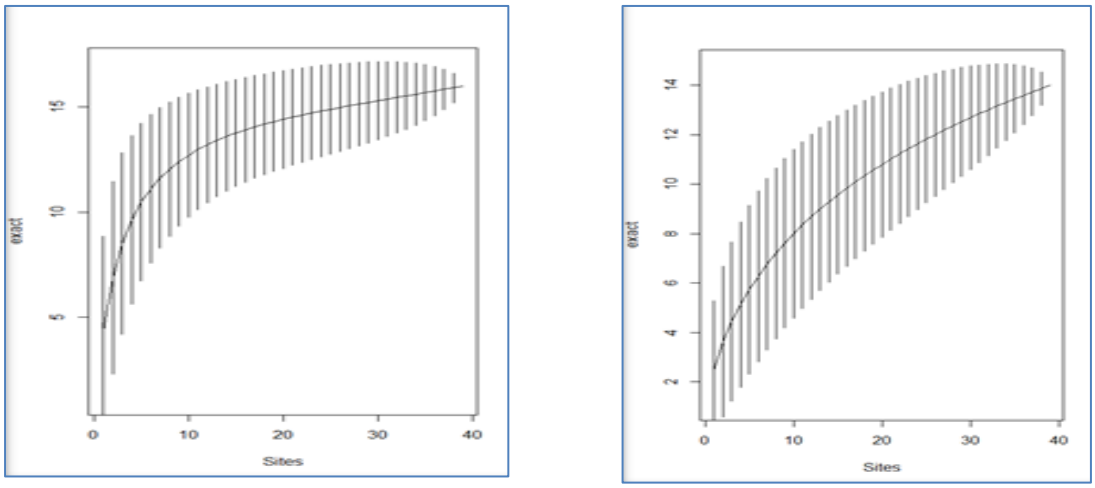

Figure 2: This figures indicates the species accumulation curve for a) carnivores and b) non-carnivore species detected during the survey. The x-axes indicate the number of trap sites, and the y- axes indicates the number of carnivore species detected.

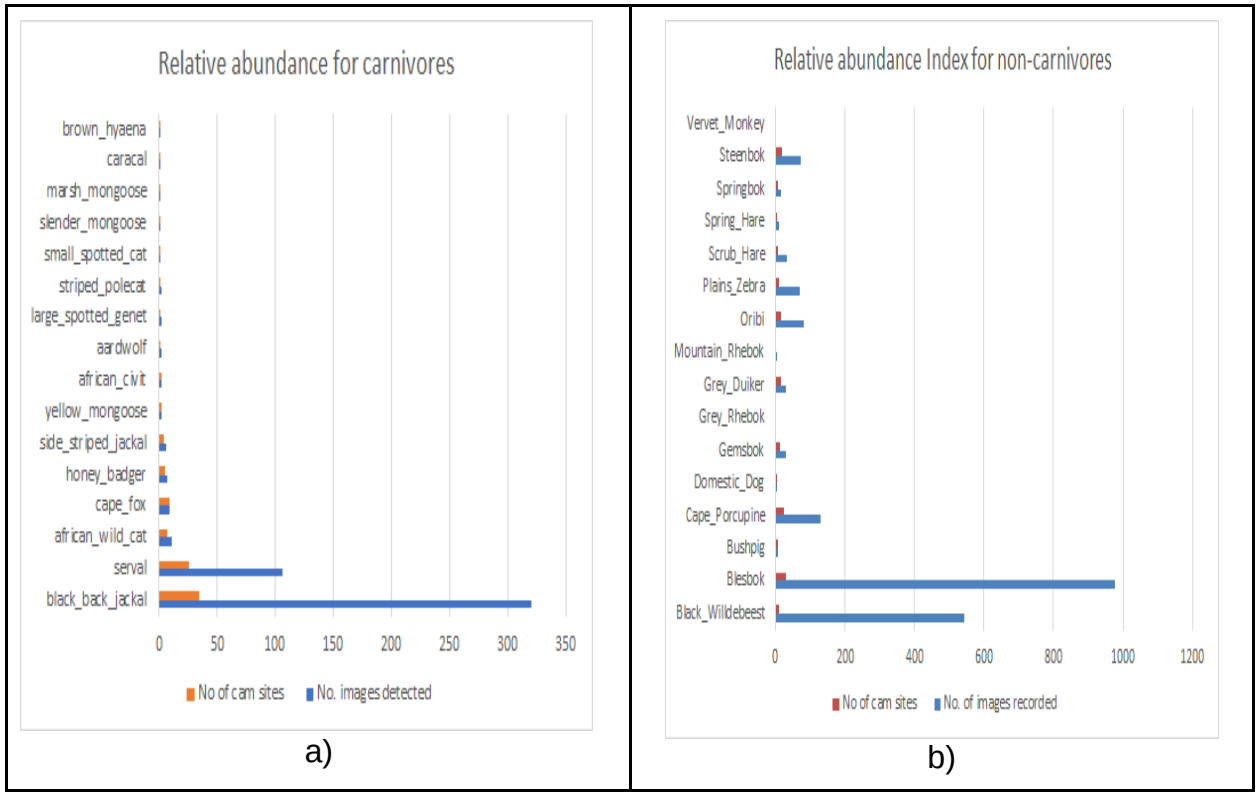

Figure 4: Relative abundance index for carnivores and non-carnivores detected during the survey

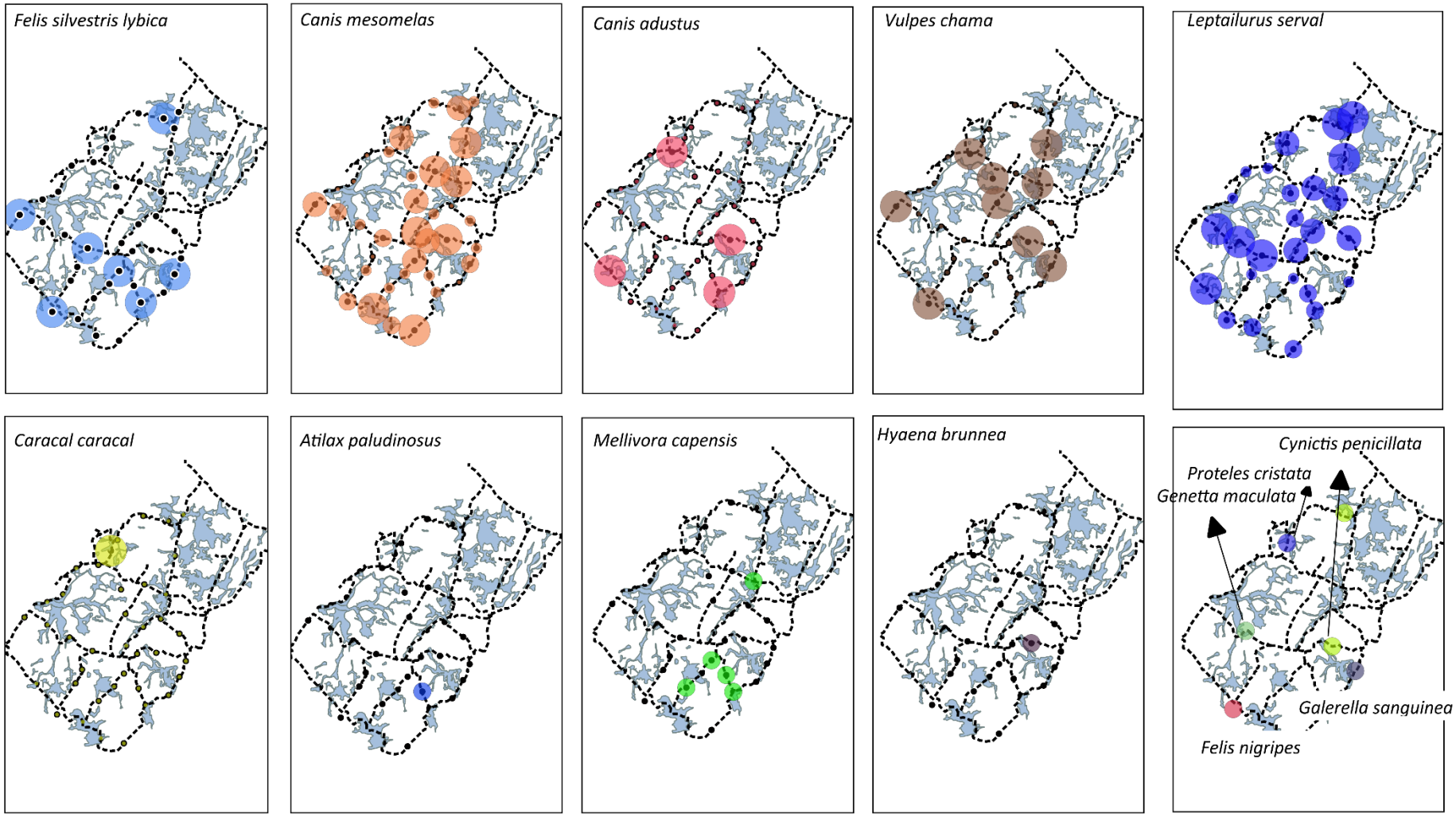

Fig. 2. Distribution and RAI of carnivores at Verlorenvallei Nature reserve as determined by camera trapping, circle size graphically indicates the number of pictures taken (e.g. ↑ circle ↑ nr of pictures)

Discussion

This is the first monitoring effort after the camera trapping baseline assessment in 2015. This report focus on a short summary of results and detailed analysis is currently underway by Dr L Swanepoel and his ecology lab members at University of Venda.

Preliminary results suggest that both Black backed Jackal and Serval detections slightly increased from the previous assessment (2015). There were six additional carnivore species recorded compared to the previous assessment namely 1) African Civet 2) Rusty spotted genet, 3) Striped polecat, 4) Slender mongoose, 5) Aardwolf and 6) Small spotted cat.

Our results thus far show a higher diversity than previous assessment, which could be attributed to several reasons. We still believe our survey grid where too large to adequately survey the smaller carnivore species.

Pending availability of funding for 2019 we would like to resample the reserve with a finer grid layout which covers the complete reserve.

Acknowledgments

Funding for this research was by University of Venda and National Research Foundation; equipment was supplied by African Institute of Conservation Ecology (AICEG) and Mr Daan Loock.

Interested parties who would like to assist in funding and/or surveys are welcome to contact Dr Lourens Swanepoel or Mr Daan Loock.

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