

Results of the
NamibRand Nature Reserve
and Pro-Namib Conservancy
Annual Game Count
23 May 2021

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1. Introduction

This report provides summarized results and analysis of the annual game count held on the NamibRand Nature Reserve and the Pro-Namib Conservancy on the 23rd of May 2021.

A game count briefing was held at the NamibRand Nature Reserve AGM on the day preceding the count where Control Warden Murray Tindall highlighted the objectives of the count and outlined the methodology and rules for the teams who would conduct the count. This helps to ensure consistency over consecutive years and allows a more accurate comparison from year to year.

Previous years data has been entered into a purpose designed database which generates the estimates used in this report in terms of total population, density and biomass. A few minor adjustments have been made to the database in order to improve its accuracy and this has slightly altered the figures for previous years as well as this years' count.

Surprisingly the population estimates, as well as the overall density, showed clear increases this year. Oryx population showed increases of 92.57%. Burchell zebra had a significant rise with 271.90%!! This could be to the fact animals were seen closer to the road and that would include the factor of the calculation. Overall, there was a significant increase in most of the different species' populations this year (28.07% increase). However, the population of Springbok and Ostriches was the only one who showed a decrease of -67.91% and 44.14%.

The distribution of animals across the reserve showed a slight trend of migration towards the middle parts of the NamibRand Nature Reserve. Most animals were concentrated near the middle of the reserve, in plains/grassland areas (Zones 7, 8 and 2). The highest estimated populations of animals were seen in Zones 4.

It is worth reiterating that this census method is best suited to large plains game such as oryx, springbok and Burchell's zebra and is less suited to smaller species such as steenbok, or species with different habitat requirements such as kudu or mountain zebra. In addition, the estimates provided are intended to give an indication of population numbers and enable a comparison from year to year and may not be an entirely accurate reflection of the actual number of animals on the Reserve.

2. Summary

Data collected in the May 2021 game count was entered into our database and analyzed.

The below results give a summary of all animals counted, this includes animals seen further than 500m. This gives an idea of what all was seen on the count.

Table 1. Total number of game seen on the count for May 2021.

Total of Species					
Mammals		Carnivores		Birds	
Giraffe	5	Black-backed Jackal	10	Black-chested snake Eagle	1
Kudu	1			Lappet-faced Vulture	8
Oryx	1,890			Ludwig Bustard	31
Plains Zebra	177			Ostrich	83
Springbok	366			Rüppel Korhaan	25

The results below give you the total of species counted per route, this includes animals seen above 500m.

Table 2. Total number of game seen on each route for May 2021.

Total species counted per route	
1	342
2	221
3	130
4	533
5	244
6	83
7	441
8	410
9	64
10	129

The below table give you the total species per route seen under or by 500m. This is the amount we use to do the calculation for the rest of the document.

Table 3. Total number of game seen on each route less than 500m for May 2021.

Total species counted per route less than 500	
1	275
2	212
3	130
4	533
5	244
6	83
7	360
8	340
9	64
10	129

The results shown below are bearing our three core objectives in mind:

Objective 1: Population and biomass estimates:

Population estimates:

Table 4. Total number of game seen and the estimated numbers for May 2021.

Total estimated numbers of game (Zone 1-10, May 2021)		
Species	No. Counted	Estimate 2021
Gemsbok	1765	13014
Springbok	302	2882
Kudu	1	0
Steenbok	0	0
Ostrich	69	722
Ludwigs Bustard	31	334
Ruppel's Korhaan	25	1173
B. zebra	152	7654
Hartebeest	0	0
Total	2346	25779
Giraffe*	11	11

* Total numbers known

Biomass estimates

Table 5. Wildlife biomass estimates for May 2021.

Total wildlife numbers and wildlife biomass on NamibRand for May 2021 (Zone 1-10) , 224 209 ha)				
Species	Mean mass (kg)	Estimated wildlife numbers from May 2020 game count	Species biomass (kg)	Biomass per ha (kg)
Gemsbok	220	13014	2862981	15.33
Springbok	38	2882	109526	0.59
Kudu	180	0	0	0.00
Steenbok	11	0	0	0.00
Ostrich	68	722	49094	0.26
B. Zebra	300	7654	2296104	12.29
Hartebeest	130	0	0	0.00
Total	947	24271	22985065	28.47

Objective 2: Wildlife distribution and density

Table 6. Total number of animals counted per 100km in each route and the respective density percentage per zone.

Total no of animals counted per 100 km per route			
Route	Route length (km)	No of animals counted/100km	% of total animals counted per 100km
1	56	275	12%
2	51.6	212	9%
3	47.3	130	5%
4	53.6	533	22%
5	71	244	10%
6	35	83	4%
7	58.5	360	15%
8	50	340	14%
9	70	64	3%
10	59	129	5%
Total	552	2370	

Objective 3: Population change

Table 7. The overall population estimate has increased by 0.29%

Total estimated numbers of game (Zone 1-10, May 2020 - May 2021)					
Species	May-20		May-21		Percentage change
	No. Counted	Total estimated number	No. Counted	Total estimated number	
Gemsbok	552	6758	1765	13014	92.57%
Springbok	571	8981	302	2882	-67.91%
Kudu	0	0	1	0	#DIV/0!
Steenbok	0	0	0	0	#DIV/0!
Ostrich	76	1293	69	722	-44.14%
Ludwig's Bustard	10	168	31	334	98.30%
Ruppel's Korhaan	15	984	26	1173	19.20%
B. zebra	152	2058	152	7654	271.90%
Hartebeest	3	8	3	8	0.00%
Total	1379	20134	2349	25787	28.07%
Giraffe*	10	10	11	11	10.00%

* Total (estimate) numbers known

3. Count Methodology

The primary objectives of the game count are to determine the density and distribution of game and to estimate the total number of game in each, or total, area. For this reason, the survey methodology used is a combination of the road strip census and game distribution map techniques. In layman's terms, these can be explained as follows:

Road strip count

This is one of the most effective methods to use when counting in a relatively open and homogenous landscape. For the purposes of the count, the total area is divided into game count zones, each with its own standardized route, as shown in Figure 1 on the next page. The game count zones were, as far as possible, deliberately predetermined into homogenous habitats because the visibility of animals differs in each habitat.

Each route forms a strip transect through its zone within which the animals are counted. A transect width of 1km is used (500m on either side of the road). During the count, all animals on either side of the road are recorded, and the distances (at right angles to the vehicle and road) from the road to the animal or group of animals is recorded. These distance records are important, as they shape the effective strip width (ESW) values, which are automatically adjusted each year when data is entered into the database.

The length of the transect (distance traveled) and its relation to the area represented in the zone is used to calculate the area correction factors for each zone, i.e. $\text{area represented}/\text{route length} = \text{area correction factor}$. The respective effective strip width (ESW) values and transect width then determines the relevant species correction factors, i.e. $\text{transect width (1000m)} / (\text{ESW} \times 2) = \text{species correction factor}$. The area correction factors and species correction factors, adjusted by the relevant effective strip widths, i.e. how far each species is readily seen, is then used to calculate the population estimates. So basically, the area correction factor multiplies the number seen up based on the percentage of the area sampled and assumes all animals within 500m of the transect line are detected.

The species correction factor then adjusts this estimate based on the detection curve (ESW) for the species. The correction factors and route distances as used in the 2021 game count methodology, along with the area represented per zone can be seen in table 5 below.

Table 5. Total count areas per zone (ha), route distances, area correction factors, effective strip widths and species correction factors for each species within each zone for 2021.

Count areas, area correction factors, effective strip widths and species correction factor for 2021										
Route no.	Total area per zone (ha)	Area represented per route	Route distance (km)	Area correction factor	Species	Effective strip width (m)	Species correction factor	Species	Effective strip width (m) routes 1-10	Species correction factor routes 1-10
1	18072	12513	56	2.23	Oryx	167	3.00	Ostrich	120	4.17
					Springbok	122	4.09	Kudu	0	0.00
2	18310	13779	51.6	2.67	Oryx	245	2.04	Steenbok	0	0.00
					Springbok	127	3.93	Rüppells Korhaan	30	16.67
					B. Zebra	120	4.17	Ludwigs bastard	142.5	3.51
3	27039	26424	47.3	5.59	Oryx	298	1.68			
					Springbok	263	1.90			
					B. Zebra	500	1.00			
4	21038	20996	53.6	3.92	Oryx	226	2.21			
					Springbok	293	1.70			
5	18038	17491	71	2.46	Oryx	268	1.86			
					Springbok	400	1.25			
					B. Zebra	350	1.43			
6	19352	11589	35	3.31	Oryx	133	3.76			
					Springbok	158	3.16			
					B. Zebra	200	2.50			
7	28343	18833	58.5	3.22	Oryx	365	1.37			
					Springbok	430	1.16			
					B. Zebra	450	1.11			
8	22452	19291	50	3.86	Oryx	261	1.91			
					Springbok	429	1.17			
9	21710	21125	70	3.02	Oryx	100	5.00			
					Springbok	83	6.00			
					B. Zebra	100	5.00			
10	29855	24721	59	4.19	Oryx	113	4.41			
					Springbok	191	2.62			
					B. Zebra	10	50.00			
Total	224209	186762	552							

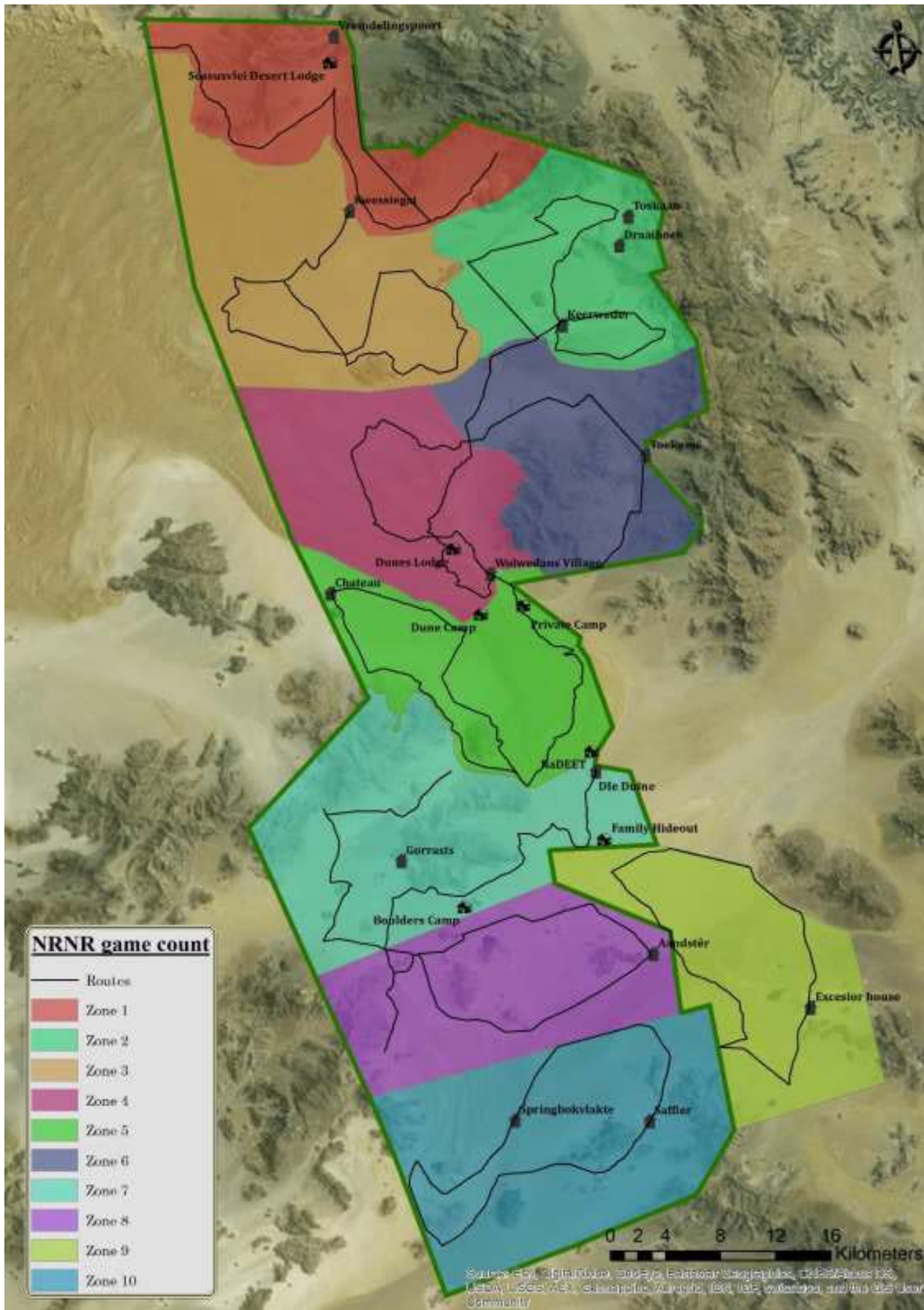


Figure 1. The game count area shows the ten zones used in May 2021 for the NamibRand Nature Reserve (1-8, 10) and the Pro-Namib Conservancy (9).

Game distribution maps

To determine and show the distribution and density of game in the various zones of the count area, monad grids are used to map the locality of the animals counted. Each route is supplied with a map containing the monad, with reference numbers, of the zone in which that route is set as seen in the image below.

During the count the monad grid number in which animal counted is seen, is recorded. This grid number is then used to map the distribution of each recorded animal.



Figure 2. Monad maps.

4. Objectives and results of the May 2021 count:

Objective 1: Population and biomass estimates

Population estimates:

The population estimates for individual species in the total count area are derived from the actual number of animals seen during the count and the relevant species and area correction factors that are applied to that number. The actual numbers seen is multiplied by the relevant area and species correction factors to get the population estimates.

S: Actual number of animals seen*

A: Area correction factor

B: Species correction factor

*Known numbers

Formula for calculating population estimates* $(S \times A) \times B = P$
--

Note that where total numbers of species with small populations are known (e.g. for recently introduced species such as red hartebeest, Burchell's zebra and giraffe), these known totals are used for the final population estimates in reference to the above calculated estimates.

The total estimates per species per zone were then combined for all zones in order to determine the total population estimate for each plains game species in the count area (see Table 1 below).

Table 1. Total number of game seen and the estimated numbers for May 2020.

Total estimated numbers of game (Zone 1-10, May 2021)		
Species	No. Counted	Estimate 2021
Gemsbok	1765	13014
Springbok	302	2882
Kudu	1	0
Steenbok	0	0
Ostrich	69	722
Ludwigs Bustard	31	334
Ruppel's Korhaan	26	1173
B. zebra	152	7654
Hartebeest	0	0
Total	2346	25779
Giraffe*	11	11

* Total numbers known

Biomass estimates

Population estimates are multiplied by the mean weight of the species and divided by the total count area (ha) to get the estimated biomass per species.

E: Estimated wildlife numbers
M: Mean mass per species
H: Total no. of hectares
B: Biomass estimate

$$\text{Formula for calculating biomass estimates} \\ (E \times M) \div H = B$$

Biomass estimates are important in terms of managing habitat conditions and inter-specific competition. Note that agricultural Livestock Units (LSU) are not used for determining the biomass of wildlife species, due to differences between domestic and wild animals. These two species are different in aspects such as grazing/browsing patterns and agricultural stocking. LSU are also in a fenced system opposed to the open, unfenced system within the Reserve.

Tables 6.1, 6.2 and 6.3 below show the biomass estimates for this year, and the biomass estimates for previous years compared to this year.

Table 6.1 Wildlife biomass estimates for May 2021.

Total wildlife numbers and wildlife biomass on NamibRand for May 2021 (Zone 1-10) , 224 209 ha)				
Species	Mean mass (kg)	Estimated wildlife numbers from May 19 game count	Species biomass (kg)	Biomass per ha (kg)
Gemsbok	220	13014	2862981	15.33
Springbok	38	2882	109526	0.59
Kudu	180	0	0	0.00
Steenbok	11	0	0	0.00
Ostrich	68	722	49094	0.26
B. Zebra	300	7654	2296104	12.29
Hartebeest	130	0	0	0.00
Total	947	24271	22985065	28.47

* Total (estimate) numbers known

The chart in figure 3 below shows the biomass composition of the different species across the total count area for the year 2021.

Figure 3. Biomass composition 2021.

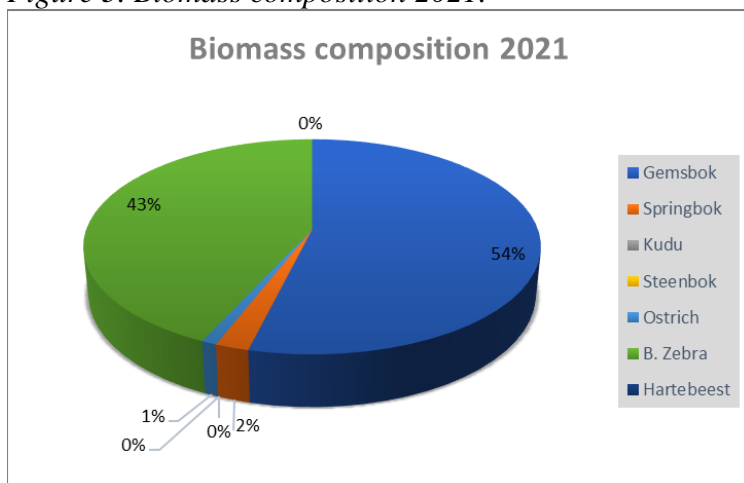


Table 6.2 Wildlife biomass (2020) percentage change compared to the count of May 2021.

Wildlife biomass on NamibRand for May 2020 and May 2021 (Zone 1-10) , 224 209 ha)								
Wildlife species	Mean mass (kg)	May-20			May-21			
		Estimated wildlife numbers from May 2017 game count	Species Biomass (kg)	Biomass per ha (kg)	Estimated wildlife numbers from May 2018 game count	Species Biomass (kg)	Biomass per ha (kg)	Biomass percentage change
				TOTAL			TOTAL	
Gemsbok	220	6758	1486685	7.96	13014	2862981	15.33	92.57%
Springbok	38	8981	341267	1.83	2882	109526	0.59	-67.91%
Kudu	180	0	0	0.00	0	0	0.00	#DIV/0!
Steenbok	11	0	0	0.00	0	0	0.00	#DIV/0!
Ostrich	68	1293	87893	0.47	722	49094	0.26	-44.14%
B. zebra	300	2058	617334	3.31	7654	2296104	12.29	271.94%
Red Hartebeest	130	4	574	0.00	0	0	0.00	-100.00%
Total		19093	2533753.7	13.57	24271	5317704.3	28.47	109.87%

Table 6.3 Wildlife biomass estimates from 2019-2021.

Total wildlife biomass estimates (kg/ha) on NamibRand May 2019 to May 2021					
Wildlife species	May-19	May-20	% change from May-19	May-21	% change from May 20
Gemsbok	4.10	7.96	94.19%	15.33	92.57%
Springbok	0.27	1.83	564.75%	0.59	-67.91%
Kudu	0.00	0.00	#DIV/0!	0.00	#DIV/0!
Steenbok	0.00	0.00	0.00%	0.00	0.00%
Ostrich	0.06	0.47	638.60%	0.26	-44.14%
B. Zebra	0.78	3.31	324.28%	12.29	271.94%
Hartebeest	0.05	0.00	-93.31%	0.00	-100.00%
Total	5.3	13.6	157.78%	28.5	109.87%

Objective 2: Wildlife density and distribution

To calculate the population density, the actual number of animals per species counted in each zone is divided by the respective route length and then multiplied by 100 to get the total number of animals seen per 100km.

S: Actual number of animals seen

R: Length of route

K: Wildlife density - i.e. Animals seen per 100km driven

$$\text{Formula for calculating wildlife density} \\ (S \div R) \times 100 = K$$

For the purposes of this report, wildlife distribution is based on the amount of animals seen in each monad. During the game count, each sighting is marked to the corresponding monad the animal(s) was seen in. This data is then used to map the distribution of the animals (i.e. where animals were seen).

Please note that for the total wildlife distribution, all game species counted were used in the (mapping) calculation. The total wildlife (species) distribution and density are shown in the maps below. These densities were calculated using the formula prescribed above.

Note that the data is indicated on a gradient from light (low values) to dark (high values).

Figure 4.1 Total wildlife distribution

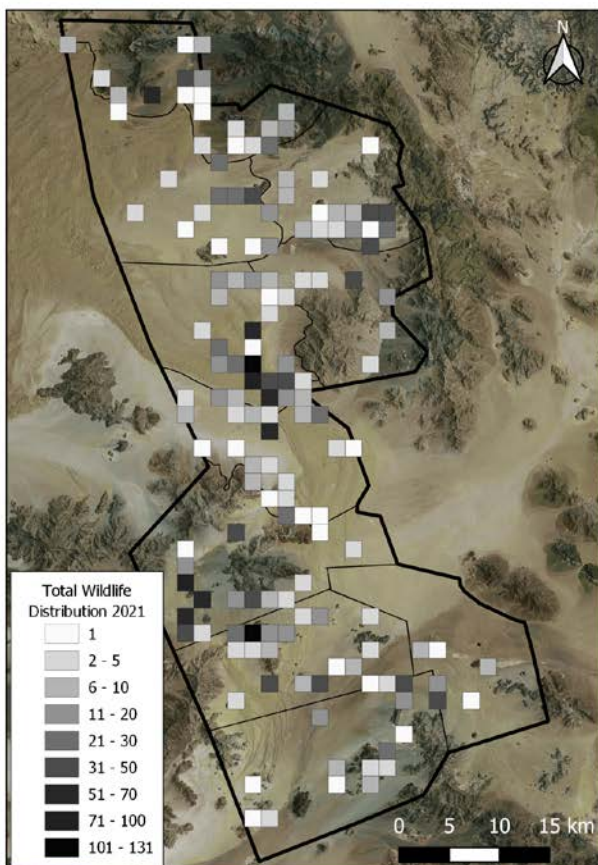


Figure 4.2 Total wildlife density

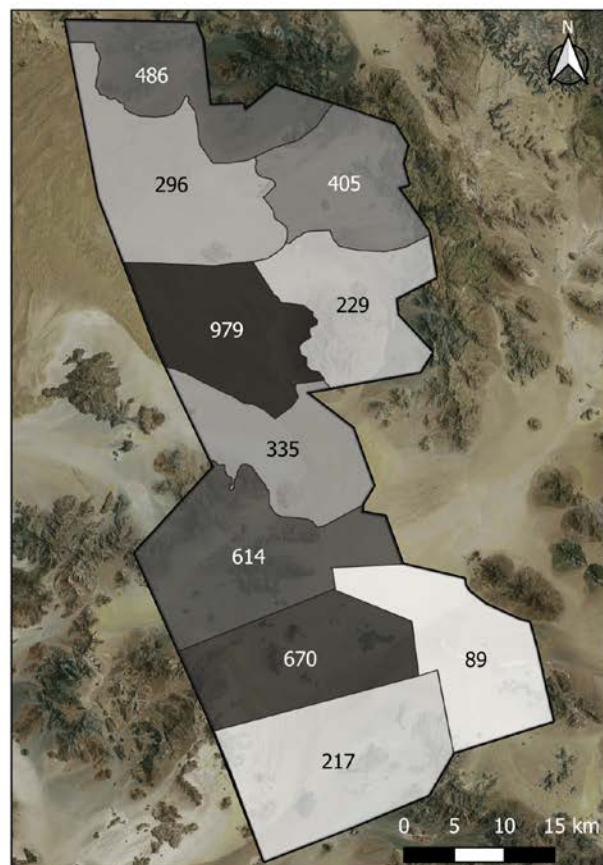


Figure 4.3 Distribution of gemsbok

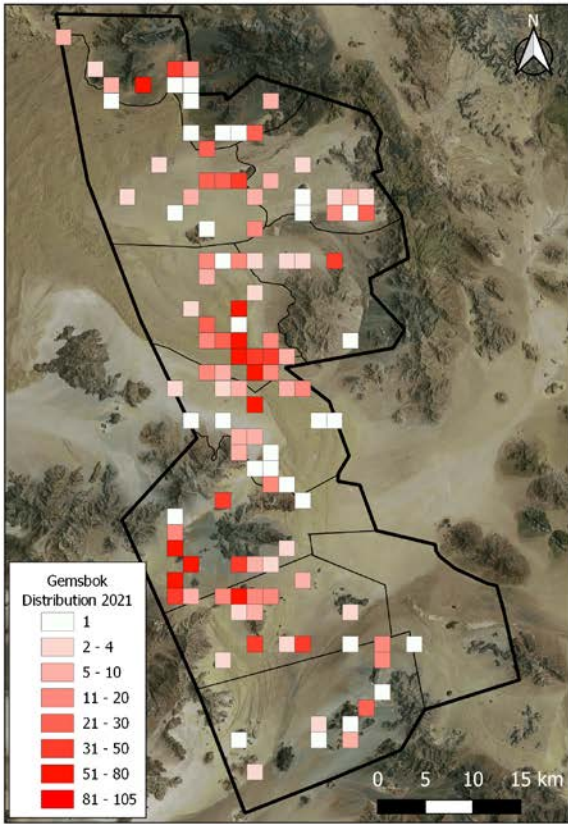


Figure 4.4 Density of gemsbok

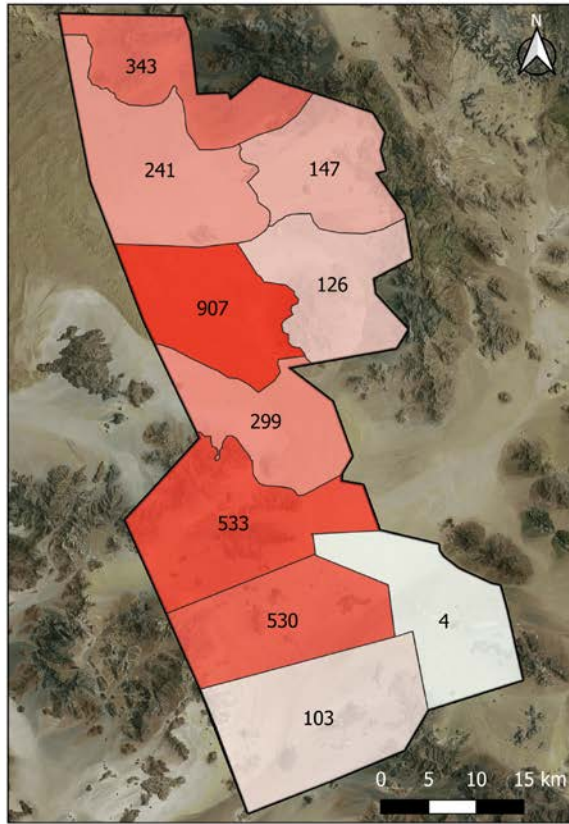


Figure 4.5 Distribution of springbok

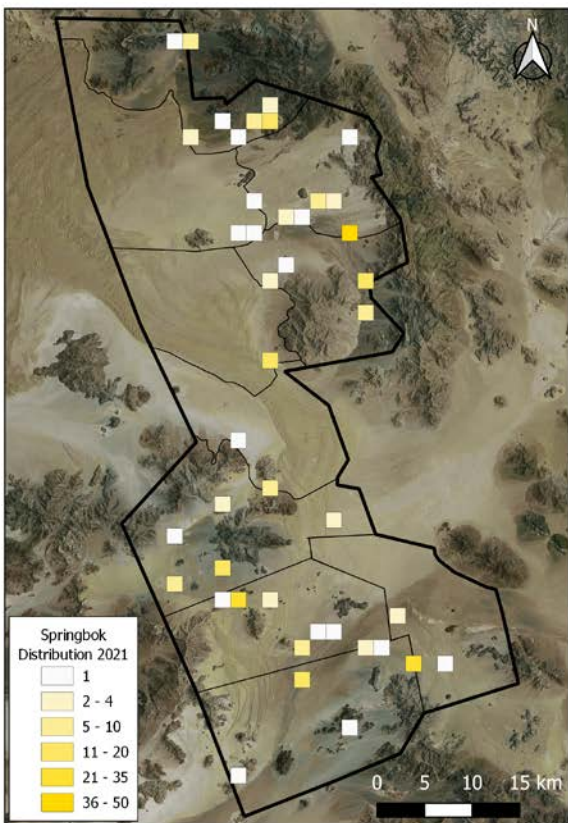


Figure 4.6 Density of springbok

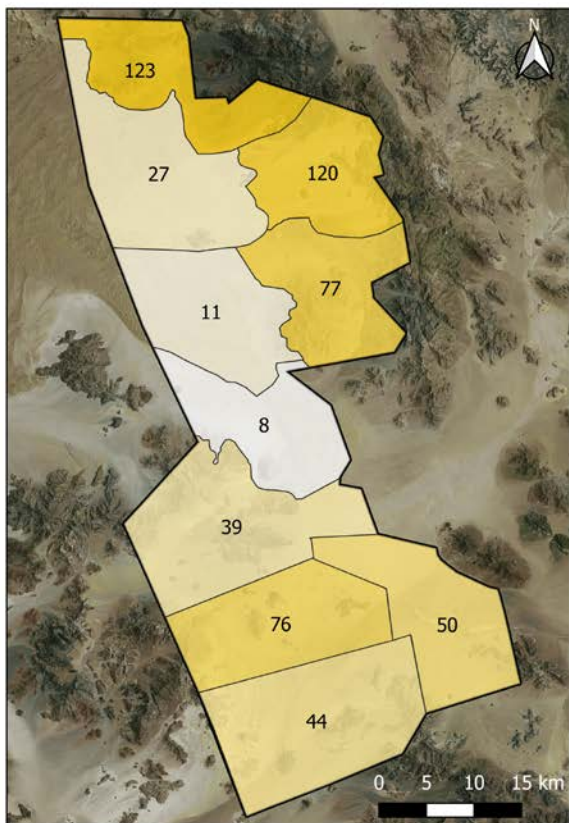


Figure 4.7 Distribution of *B. zebra*

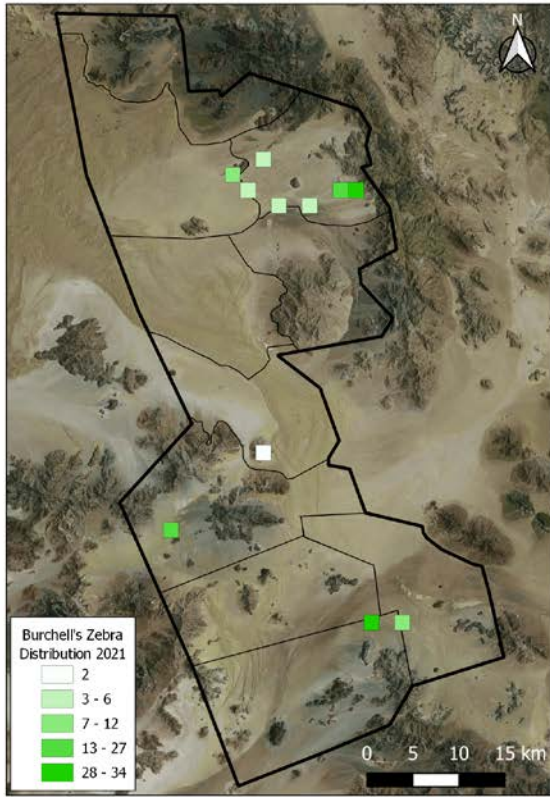


Figure 4.8 Density of *B. Zebra*

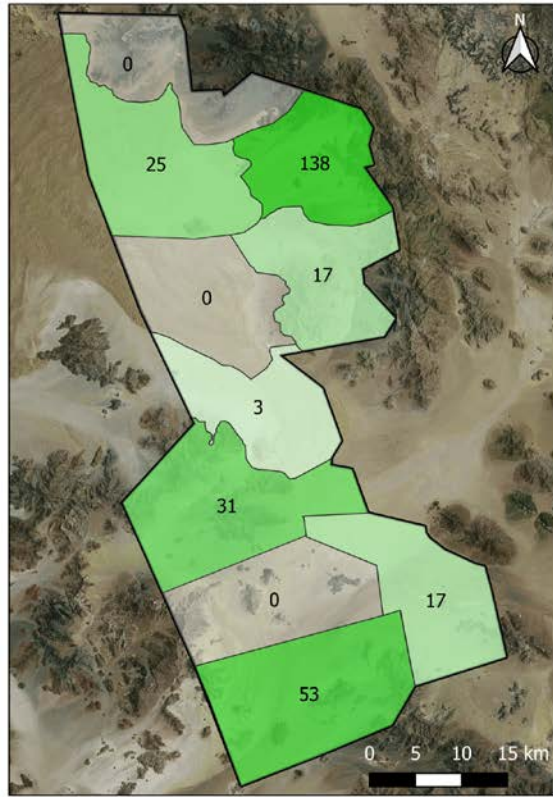


Figure 4.9 Distribution of ostrich

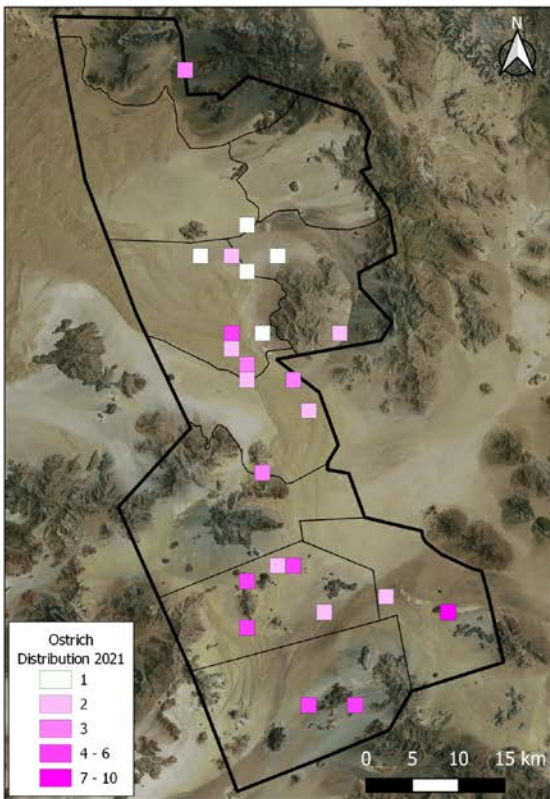


Figure 4.10 Density of ostrich

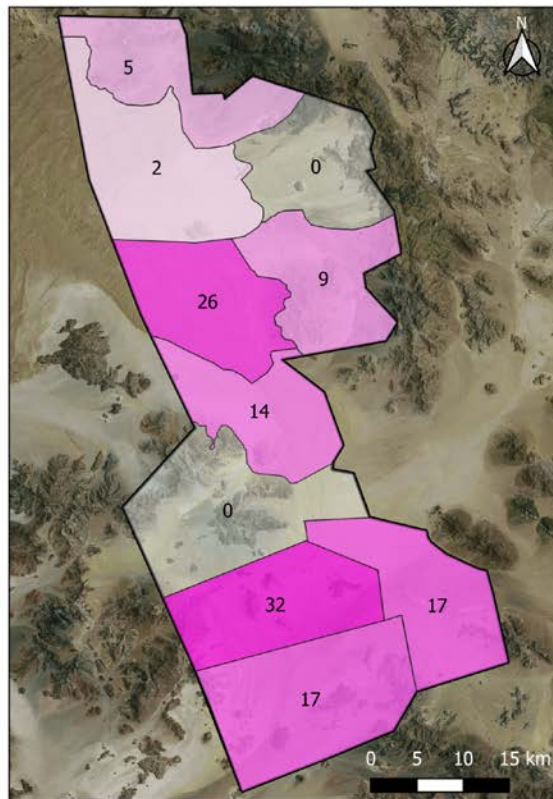


Figure 4.9 Distribution of Rüppel's Korhaan

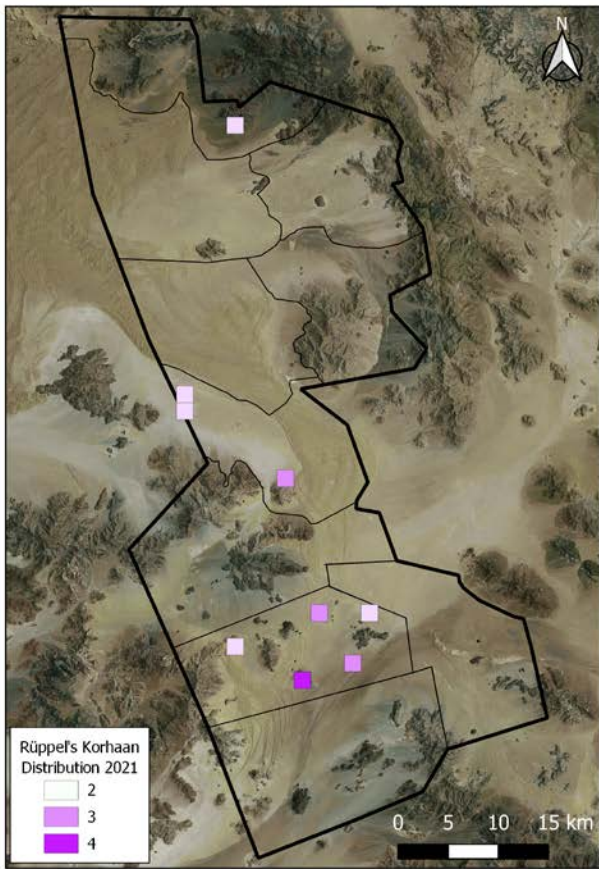


Figure 4.10 Density of Rüppel's Korhaan

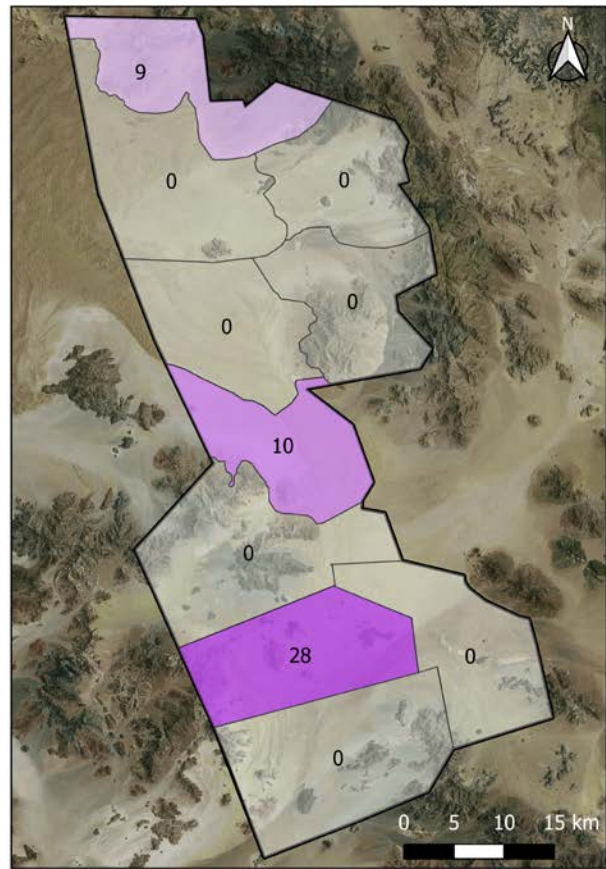


Figure 4.11 Distribution of Ludwig's Bustard

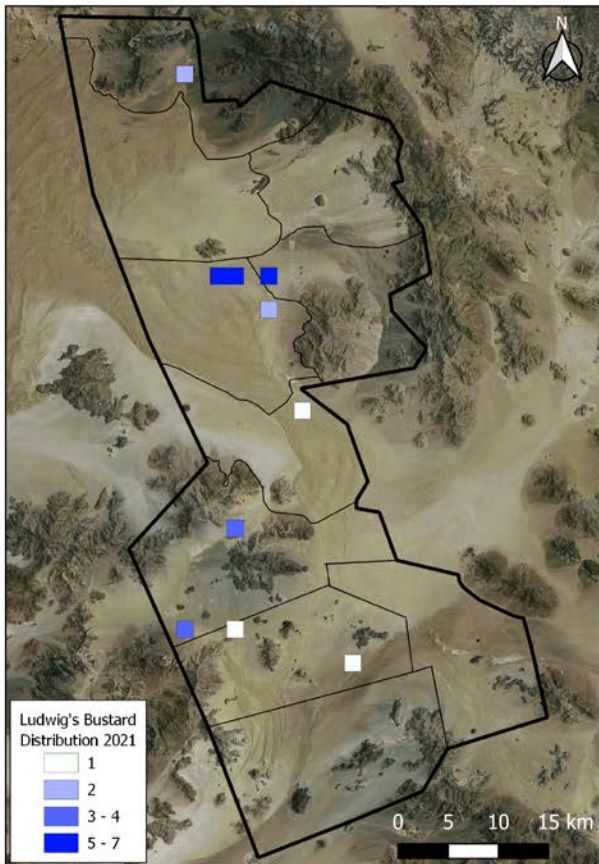
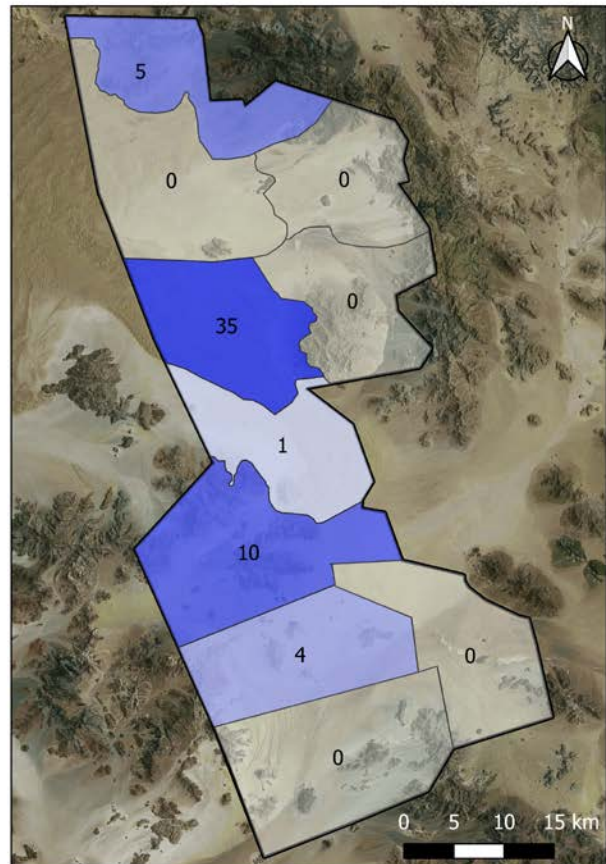


Figure 4.12 Density of Ludwig's Bustard



The population densities and actual number seen for individual species per zone are shown in tables 7.1-7.7 below.

Table 7.1

Gemsbok			
Route	Route length	Actual number seen	Density
1	56	192	342.86
2	51.6	76	147.29
3	47.3	114	241.01
4	53.6	486	906.72
5	71	212	298.59
6	35	44	125.71
7	58.5	312	533.33
8	50	265	530.00
9	70	3	4.29
10	59	61	103.39
Total	552	1765	319.75

Table 7.2

Springbok			
Route	Route length	Actual number seen	Density
1	56	69	123.21
2	51.6	62	120.16
3	47.3	13	27.48
4	53.6	6	11.19
5	71	6	8.45
6	35	27	77.14
7	58.5	23	39.32
8	50	38	76.00
9	70	35	50.00
10	59	26	44.07
Total	552	305	55.25

Table 7.3

Ostrich			
Route	Route length	Actual number seen	Density
1	56	3	5.36
2	51.6	0	0.00
3	47.3	1	2.11
4	53.6	14	26.12
5	71	10	14.08
6	35	3	8.57
7	58.5	0	0.00
8	50	16	32.00
9	70	12	17.14
10	59	10	16.95
Total	552	69	12.50

Table 7.4

Burchell's zebra			
Route	Route length	Actual number seen	Density
1	56	0	0.00
2	51.6	71	137.60
3	47.3	12	25.37
4	53.6	0	0.00
5	71	2	2.82
6	35	6	17.14
7	58.5	18	30.77
8	50	0	0.00
9	70	12	17.14
10	59	31	52.54
Total	552	152	27.54

Table 7.5

Red Hartebeest			
Route	Route length	Actual number seen	Density
1	56	0	0.00
2	51.6	0	0.00
3	47.3	0	0.00
4	53.6	0	0.00
5	71	0	0.00
6	35	0	0.00
7	58.5	0	0.00
8	50	0	0.00
9	70	0	0.00
10	59	0	0.00
Total	552	0	0.00

Table 7.6

Rüppell's korhaan			
Route	Route length	Actual number seen	Density
1	56	5	8.93
2	51.6	0	0.00
3	47.3	0	0.00
4	53.6	0	0.00
5	71	7	9.86
6	35	0	0.00
7	58.5	0	0.00
8	50	14	28.00
9	70	0	0.00
10	59	0	0.00
Total	552	26	4.71

Table 7.7

Ludwig's bustard			
Route	Route length	Actual number seen	Density
1	56	3	5.36
2	51.6	0	0.00
3	47.3	0	0.00
4	53.6	19	35.45
5	71	1	1.41
6	35	0	0.00
7	58.5	6	10.26
8	50	2	4.00
9	70	0	0.00
10	59	0	0.00
Total	552	31	5.62

The total wildlife density for all game species (including Ludwig’s Bustard and Ruppel’s Korhaan) combined in each count zone for May 2021 is shown in Table 8 below, and the percentage distribution in each zone is shown in Figure 5 that follows.

Table 8. Total number of animals counted per 100km for each route in 2021.

Total no of animals counted per 100 km per route			
Route	Route length (km)	No of animals counted/100km	% of total animals counted per 100km
1	56	275	12%
2	51.6	212	9%
3	47.3	130	5%
4	53.6	533	22%
5	71	244	10%
6	35	83	4%
7	58.5	360	15%
8	50	340	14%
9	70	64	3%
10	59	129	5%
Total	552	2370	

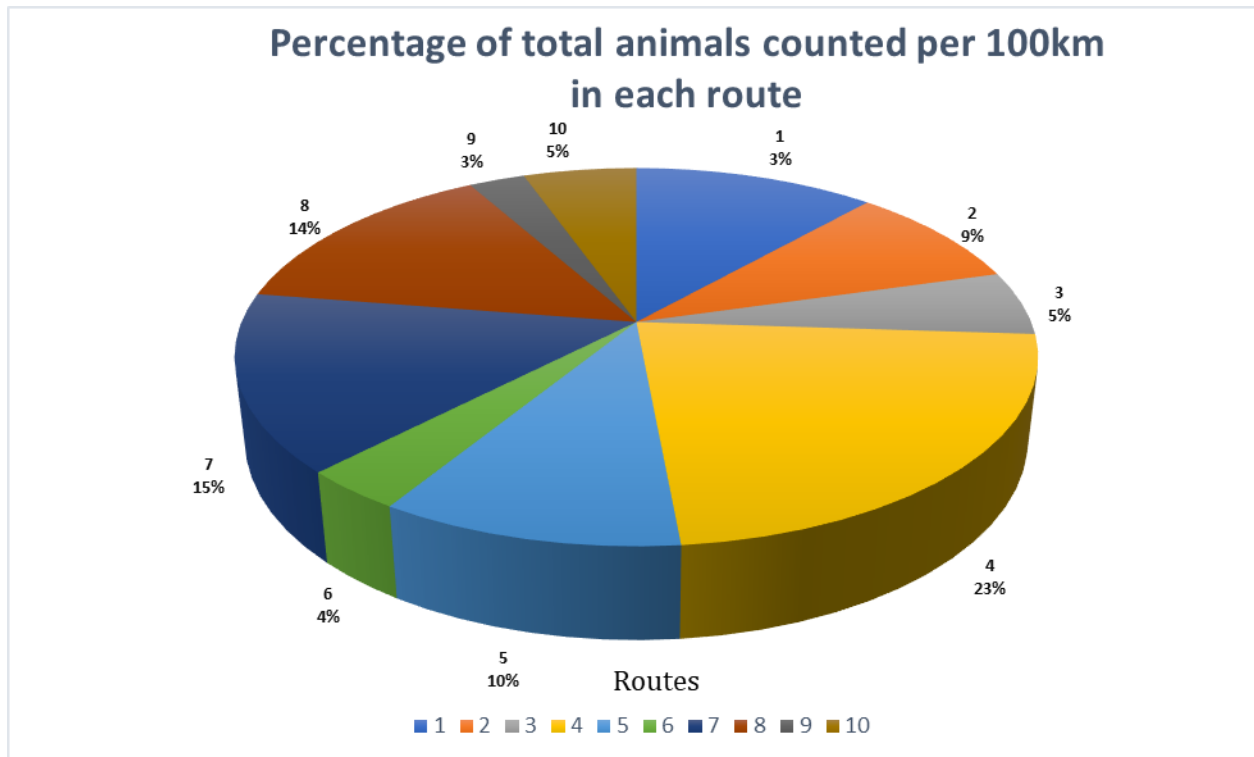


Figure 5. Population density percentages throughout the count area.

The total wildlife density for all species (including Ludwig’s Bustard and Ruppel’s Korhaan) combined per count zone in May 2019, compared to May 2020 and May 2021, is shown in Table 9 below.

Table 9. Total number of animals counted per 100km for each route in 2021 compared to 2020 and 2019.

Total no of animals counted per 100 km per route (May 2019 - May 2021)				
Route	May-19	May-20	May-21	% change (May-19 to May-21)
1	131	15	275	1733.33%
2	286	142	212	49.30%
3	121	354	130	-63.28%
4	480	8	533	6562.50%
5	710	35	244	597.14%
6	243	182	83	-54.40%
7	316	320	360	12.50%
8	518	75	340	353.33%
9	233	269	64	-76.21%
10	177	25	129	416.00%
Total	3215	1425	2370	66.32%

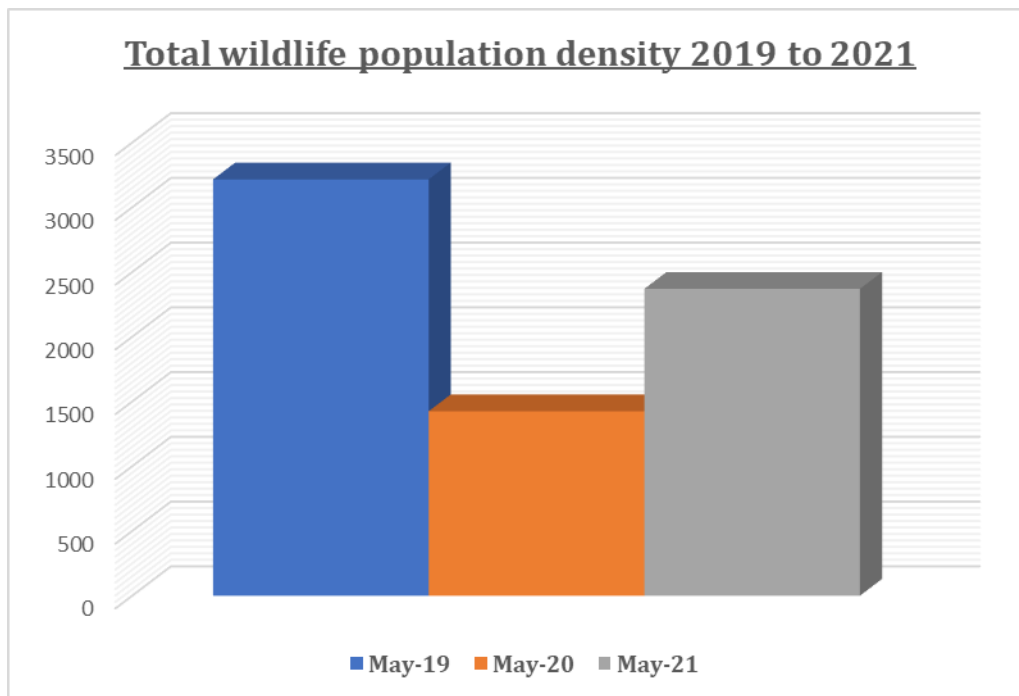


Figure 6. Total wildlife density changes from 2019-2021.

Objective 3: Population change

The total estimated numbers of game for the May 2019 count is compared to those from previous years to illustrate the population change and are shown in Tables 10 and 11 below. The overall population estimate has increased by 43% and the number of animals counted per 100km per route has increased by 38.42%.

Table 10. Population estimates for 2020 compared to 2019.

Total estimated numbers of game (Zone 1-10, May 2020 - May 2021)					
Species	May-20		May-21		Percentage change
	No. Counted	Total estimated number	No. Counted	Total estimated number	
Gemsbok	552	6758	1765	13014	92.57%
Springbok	571	8981	302	2882	-67.91%
Kudu	0	0	1	0	#DIV/0!
Steenbok	0	0	0	0	#DIV/0!
Ostrich	76	1293	69	722	-44.14%
Ludwigs Bustard	10	168	31	334	98.30%
Ruppel's Korhaan	15	984	26	1173	19.20%
B. zebra	152	2058	152	7654	271.90%
Hartebeest	3	8	3	8	0.00%
Total	1379	20134	2349	25787	28.07%
Giraffe	10	10	11	11	10.00%

The long-term total population estimates are presented in the table below. Please take into consideration June 2011 is only for route 1 to 9. Whereas from June 2012 till present it includes route 1 to 10.

Table 11. Population estimates for years 2011-2021.

Total estimated numbers of game (Jun 2011 - May 2021)											
Species	Jun 2011	Jun 2012	Jun 2013	May20 14	May 2015	May 2016	May 2017	May 2018	May 2019	May 2020	May 2021
Gemsbok	6696	7493	8112	9087	7447	6650	10625	3699	3480	6758	13014
Springbok	9968	6225	5828	3024	3420	2944	3243	1720	1351	8981	2882
Kudu	15	16	5	0	7	0	4	0	0	0	0
Steenbok	0	0	0	0	0	0	0	0	0	0	0
Ostrich	365	748	183	220	218	145	226	130	175	1293	722
Ludwigs Bustard	286	285	381	247	119	92	222	0	192	168	334
Ruppel's Korhaan	335	468	388	229	145	362	234	119	293	984	1173
B. zebra	370	470	320	352	367	510	509	329	485	2058	7654
Hartebeest	125	177	204	197	220	149	174	67	66	0	0
Giraffe*	6	6	6	7	7	9	9	9	10	10	11

Total population estimate	18166	15888	15427	13363	11950	10861	15246	6073	6052	20252	25779
Blesbok*	18	7	3	0	0	0	0	0	0	0	0
% change	38.04 %	-12.54%	-2.90%	-	10.57%	-9.11%	40.37 %	60.17 %	-0.35%	234.63%	27.29%

The graphs in figure 7.1-7.4 below, show the total long term individual estimate changes for the four most common species. Please note that the figures of these graphs are taken from the respective species estimates from the maximum number of routes counted in each year.

Figure 7.1

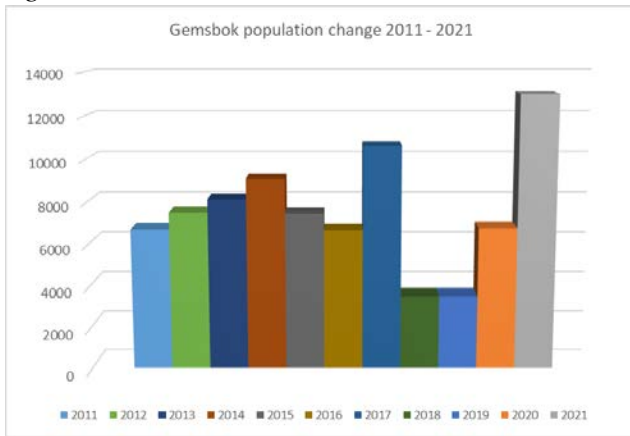


Figure 7.2

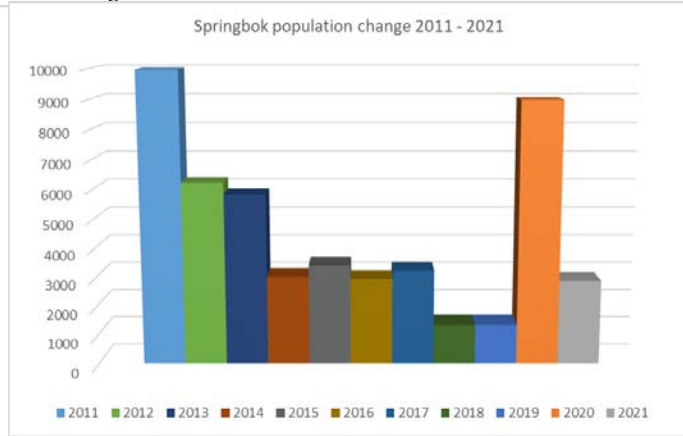


Figure 7.3

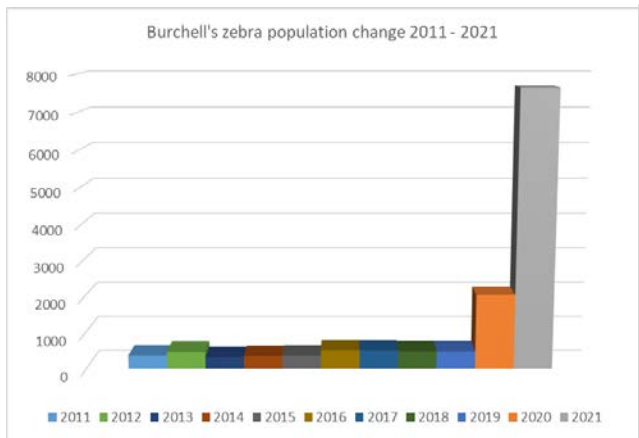
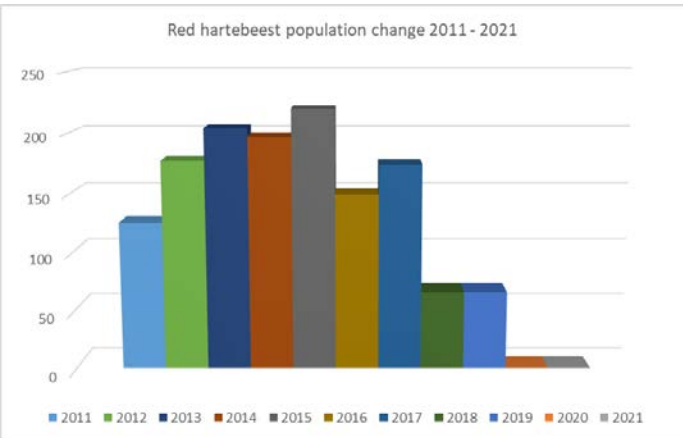
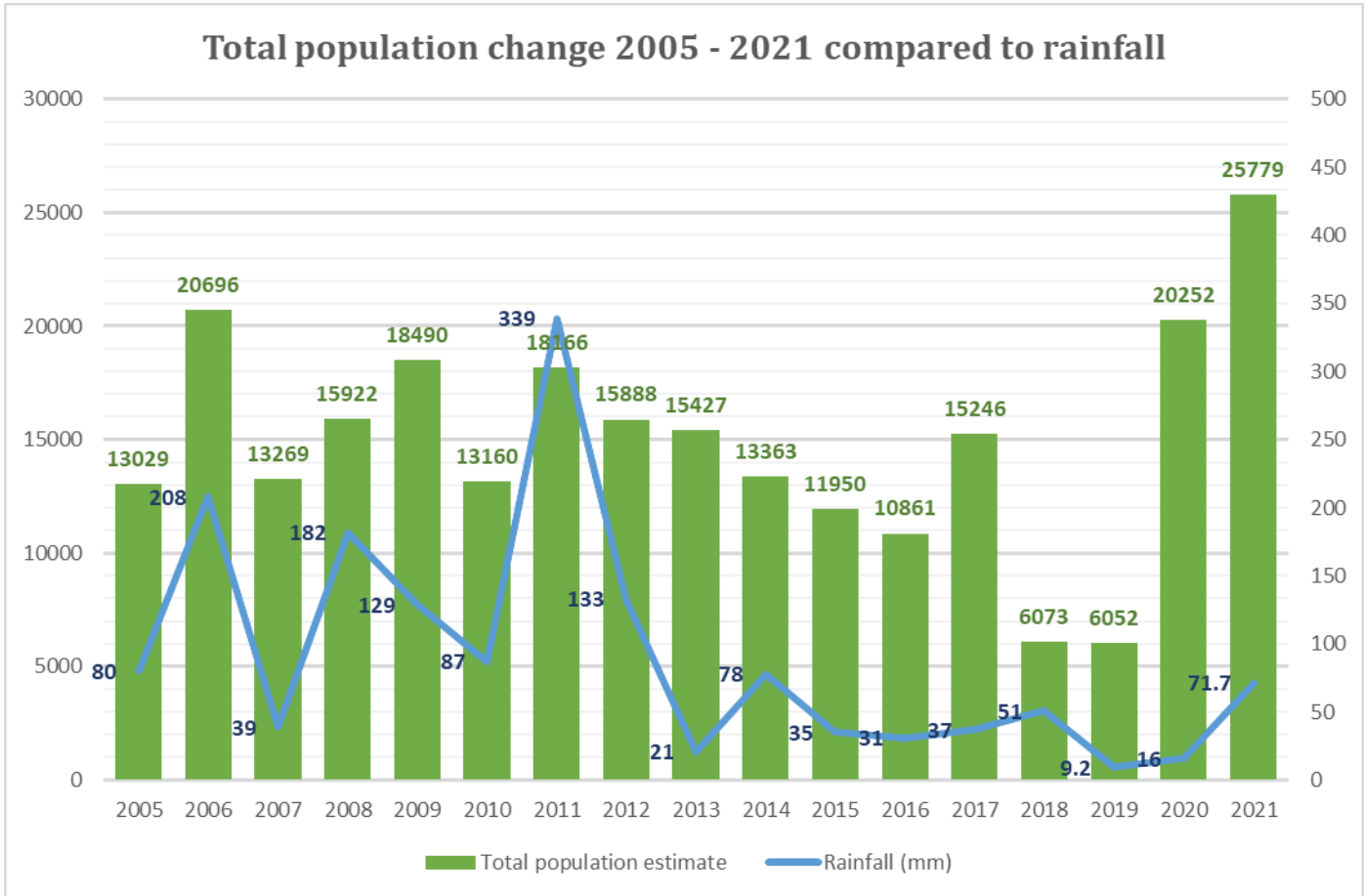


Figure 7.4



The graph in Figure 8 below shows long term total population estimate change compared to the average annual rainfall received for the same period. Please note that as with the previous graphs, the figure for this graph was taken from the total population estimates and from the maximum number of routes counted in each year.

Figure 8. Total population change 2005 to 2021 compared to average rainfall.



5. Discussion and conclusions

Gemsbok

The estimate population for oryx this year was 13014, that's an increase of 92.57% compared to last year. The highest density of oryx was seen in Zone 4, where the density was 907. Last year the oryx were more found towards the east then compared to the dunes this year. The second highest density was in Zone 7 with a density of 533 compared to last year Zone 7 had a density of only 202.

Springbok

The springbok population estimate (2882) decreased with -67.91% compared to last year estimate of 8981. The springbok was predominantly concentrated in Zones 2 and 7. Compared to last year, springbok and gemsbok now share most of the areas together, where last year was a pattern seen of who preferred which area.

Ostrich

This year's ostrich population estimate is 722. This is an -44.14% decrease from last year's population estimate. Most of the sightings were in Zone 8 followed by zones 4 and 9 and 10, showing a clear shift of staying in the southern part of the reserve.

Burchell's Zebra

This year, a total of 177 zebra were counted, however this includes animals seen above 500m. The amount seen under 500m and used for calculating the estimate was 152 animals and the population estimate is 7654, making it an increase of 271.20% compared to last years estimated population of 485.

Red Hartebeest

This year no hartebeest was seen this year on the game route, however last year one was seen on the route and its suspected he is still around.

Giraffe

There were 5 giraffe sightings during this year's game count. Although there were only five sightings there are regular sightings that suggest there are 11 giraffes on the reserve. The sighting of the five giraffes happened in two areas of the reserve. Two of the giraffes were seen on route two on Keerweder farm, and the other three were seen on route eight of Aandster.

Ludwig Bustard

The population increase by 98.30% compared to last year. They are predominately seen in the middle of the reserve.

Rüppels Korhaan

The population of them only increased by 19.20% but were only seen in Zone 1, 5 and 8.

6. Acknowledgments

The NamibRand Nature Reserve would like to thank all of its concessionaires, stakeholders, neighbors and participants for their enthusiastic involvement to make this year's game count another success.

This year's participants were:

Murray Tindall, Lee Tindall, Nils Odendaal, Danica Shaw, Hayley Odendaal, Anina Becker, Precious Hewicke Mario Irion, Philip Hamunyela, Patrick Symington, Shafeeka Broderick, Lisa Schriver, Hendrik Boois, Rehabiam Mweshipandeka, Uavangua Kazombaue, Moses Hanse, Abrahm Tsaobeb, Theresia Angula, Melody Kambende, Standly Brandt, Fillemon Haimbondi, Sebastiaan Kazimbu, Elizabeth, Ruben, Katherine, Alisa, Martin, Etienne Rossouw, Sanet Rossouw, Johannes Benisius, Abraham Hantanya

7. Appendix

Results per count route per zone

Tables 12.1 to 12.11 list the data collected on each route in May 2021, which were used as a basis for the analysis.

Table 12.1

Route 1				
Species	Route length	Total number counted	Density	Estimated population
Oryx	56	192	342.86	1285
Springbok	56	69	123.21	632
Burchells Zebra	56			
Hartebeest	56			
Kudu	56			
Ostrich	56	3	5.36	26
Rüppel Korhaan	56	5	8.93	186
Ludwig Bustard	56	3	5.36	56
Total	56	272	485.71	2185
Black-backed Jackel*	56	3	5.36	39

*Not included in count

Table 12.2

Route 2				
Species	Route length	Total number counted	Density	Estimated population
Oryx	52	76	146.15	414
Springbok	52	62	119.23	652

Plains Zebra	52	71	136.54	790
Hartebeest	52			
Kudu	52			
Ostrich	52			
Rüppel Korhaan	52			
Ludwig Bustard	52			
Total	52	209	401.92	1856
Giraffe*	52	2	3.85	
Black-chested snake Eagle*	52	1	1.92	

*Not included in count

Table 12.3

Route 3				
Species	Route length	Total number counted	Density	Estimated population
Oryx	47.3	114	241.01	1069
Springbok	47.3	3	6.34	32
Plains Zebra	47.3	12	25.37	67
Hartebeest	47.3			
Kudu	47.3			
Ostrich	47.3	1	2.11	28
Rüppel Korhaan	47.3			
Ludwig Bustard	47.3			
Total	47.3	130	274.84	1196

Table 12.4

Route 4				
Species	Route length	Total number counted	Density	Estimated population
Oryx	53.6	486	906.72	4212
Springbok	53.6	13	24.25	87
Plains Zebra	53.6			
Hartebeest	53.6			
Kudu	53.6			
Ostrich	53.6	14	26.12	103
Rüppel Korhaan	53.6			
Ludwig Bustard	53.6	19	35.45	113
Total	53.6	532	992.54	4514

Black-backed Jackel*	53.6	1	1.87	4
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*Not included in count

Table 12.5

Route 5				
Species	Route length	Total number counted	Density	Estimated population
Oryx	71	212	298.59	974
Springbok	71	6	8.45	18
Plains Zebra	71	2	2.82	7
Hartebeest	71			
Kudu	71			
Ostrich	71	10	14.08	38
Rüppel Korhaan	71	7	9.86	56
Ludwig Bustard	71	1	1.41	12
Total	71	238	335.21	1105
Lappet-faced Vulture*	71	6	8.45	21

*Not included in count

Table 12.6

Route 6				
Species	Route length	Total number counted	Density	Estimated population
Oryx	35	44	125.71	548
Springbok	35	27	77.14	283
Plains Zebra	35	6	17.14	50
Hartebeest	35			
Kudu	35	1	2.86	4
Ostrich	35	3	8.57	47
Rüppel Korhaan	35			
Ludwig Bustard	35			
Total	35	81	231.43	932
Black-backed Jackel*	35	2	5.71	17

*Not included in count

Table 12.7

Route 7				
Species	Route length	Total number counted	Density	Estimated population
Oryx	59	312	528.81	1376
Springbok	59	23	38.98	86
Plains Zebra	59	18	30.51	64
Hartebeest	59			
Kudu	59			
Ostrich	59			
Rüppel Korhaan	59			
Ludwig Bustard	59	6	10.17	43
Total	59	359	608.47	1569
Black-backed Jackel*	59	1	1.69	5

*Not included in count

Table 12.8

Route 8				
Species	Route length	Total number counted	Density	Estimated population
Oryx	50	265	530.00	1959
Springbok	50	38	76.00	171
Plains Zebra	50			
Hartebeest	50			
Kudu	50			
Ostrich	50	16	32.00	116
Rüppel Korhaan	50	14	28.00	397
Ludwig Bustard	50	2	4.00	110
Total	50	335	670.00	2753
Black-backed Jackel*	50	0	0.00	135
Giraffe*	50	3	6.00	
Lappet-faced Vulture*	50	2	4.00	39

*Not included in count

Table 12.9

Route 9				
Species	Route length	Total number counted	Density	Estimated population
Oryx	70	3	4.29	45
Springbok	70	35	50.00	636
Plains Zebra	70	12	17.14	181
Hartebeest	70			
Kudu	70			
Ostrich	70	12	17.14	241
Rüppel Korhaan	70			
Ludwig Bustard	70			
Total	70	62	88.57	1104
Black-backed Jackel*	70	2	2.86	75

*Not included in count

Table 12.10

Route 10				
Species	Route length	Total number counted	Density	Estimated population
Oryx	59	61	103.39	1131
Springbok	59	26	44.07	285
Plains Zebra	59	31	52.54	6495
Hartebeest	59			
Kudu	59			
Ostrich	59	10	16.95	123
Rüppel Korhaan	59			
Ludwig Bustard	59			
Total	59	128	216.95	8034
Black-backed Jackal*	59	1	1.69	14

*Not included in count

Table 12.11

Total number of game				
Species	Route length	Total number counted	Density	Estimated population
Oryx	552	1765	319.75	13014
Springbok	552	302	54.71	2882
Plains Zebra	552	152	27.54	7654
Hartebeest	552			
Kudu	552	1	0.18	0
Ostrich	552	69	12.50	722
Rüppel Korhaan	552	26	4.71	1173
Ludwig Bustard	552	31	5.62	334
Total	552	2346	425.00	25779
Lappet-faced Vulture	552	8	1.45	60
Black-backed Jackal	552	10	1.81	289

**Not included in count*