

Results of the NamibRand Nature Reserve (NRNR) Bi-annual Game Count

01-02 December 2006



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Summary

This paper provides feedback and results of the bi-annual game count as held on the NamibRand Nature Reserve on 1-2 December 2006.

This end of dry season count was a team effort by the entire NRNR community. Reserve management invited all interested parties to assist with the count. Route 6 was counted on the morning of Friday, 1 December, whilst all other routes were counted on the morning of Saturday, 2 December. All documents were handed out at an informational training session during the afternoon of Friday, 1 December. After all theoretical sections of the training had been discussed a distance estimate exercise was performed for interested participants.

The count had the following three objectives:

Objective 1: Population Estimates

The oryx numbers have increased as predicted by the June 2006 Game Count Report. Numbers of springbok have gone down by 26% after a marked spike in June. Ostrich numbers have increased as well, compensating for and creating a more realistic trend than the unexpected low numbers counted in June.

Objective 2: Wildlife Distribution

The game in general was observed to be more evenly distributed throughout the Reserve due to the good overall grass cover caused by the exceptional rains in 2006. The general trend is that game has moved towards and congregated in the eastern sections of the Reserve, as is to be expected at this time of year.

High numbers of game were also observed in the dunes, as early rains fell in these areas in November 2006 and may account for the decreased number counted on the plains.

Objective 3: Population Change

Although the overall wildlife population has declined by 3% compared to June 2006, the overall trend compared with November 2005 shows an increase of 18%. This discrepancy has to do with the vast migratory routes of the plains game which move deep into the Namib Naukluft Park. After the first rains, these animals begin to return to NRNR, but not necessarily to the same place they were counted before. Boundary fences can also have an influence on the animals' migratory patterns and animals may have easier access to neighbouring farms than to the Reserve. Springbok populations have normalized after the marked spike in June which is probably due to migration and fatalities as predation on springbok increases in response to numbers.

Methodology

The method used to count the game on this end of dry season (2006) game count is the same road count method as described in the previous game count reports since June 2005. For further information and a detailed methodology description please contact Reserve management for a copy of past reports.

This method has proven to be successful and has been duplicated bi-annually for the last two years. Also important is the active participation of the wider NRNR community. This provides concessionaires and other participants with a greater understanding of wildlife dynamics on the Reserve.

As in previous years, correction factors have been used to extrapolate more accurate numbers from the actual game seen and recorded by the observers on the ground. This is done once to account for the margin of error for the species counted and once to compensate for the margin of error caused by the terrain and vegetation of each route. Correction factors were adjusted in June 2006 to specifically reflect conditions on NRNR. This is illustrated in Table 1 below.

Table 1

Correction Factors

Route	Area Correction Factor
1	3.10
2	3.03
3	4.2
4	4.38
5	2.21
6	5.09
7	4.65
8	3.74

Species	Species' Correction Factor
Gemsbok	1.4
Springbok	1.6
Kudu	2.6
Steenbok	10.0
Burchells Zebra	1.2
Ostrich	1.1
Red Hartebeest	1.5

Results

Route Results

Tables 2 - 9 list the data collected on each route. Numbers seen within the strip width (under 500m) have been multiplied by the relevant correction factor for each route. See Table 1 for the relevant correction factor for each route.

Table 2

Route 1			
Species	Numbers seen - Total	Number seen under 500m	No. Corrected For Area - Dec 2006
Gemsbok	73	50	155
Springbok	95	69	214
Kudu			-
Steenbok			-
Burchells Zebra	39	20	62
Ostrich	95	69	214
Blesbok			
Red Hartebeest			-
Total	302	208	644

Table 3

Route 2			
Species	Numbers seen - Total	Number seen under 500m	No. Corrected For Area - Dec 2006
Gemsbok	117	100	303
Springbok	729	699	2,118
Kudu			-
Steenbok			-
Burchells Zebra	60	40	121
Ostrich	15	12	36
Blesbok	11	11	33
Red Hartebeest	16	16	48
Total	948	878	2,660

Table 4

Route 3			
Species	Numbers seen - Total	Number seen under 500m	No. Corrected For Area - Dec 2006
Gemsbok	90	80	338
Springbok	244	213	901
Kudu			-
Steenbok			-
Burchells Zebra	6	6	25
Ostrich	22	20	85
Blesbok			-
Red Hartebeest			
Total	362	319	1,349

Table 5

Route 4			
Species	Numbers seen - Total	Number seen under 500m	No. Corrected For Area - Dec 2006
Gemsbok	49	49	215
Springbok	70	70	306
Kudu			-
Steenbok	2	2	9
Burchells Zebra	12	12	53
Ostrich	17	16	70
Blesbok			-
Red Hartebeest			
Total	150	149	652

Table 6

Route 5			
Species	Numbers seen - Total	Number seen under 500m	No. Corrected For Area - Dec 2006
Gemsbok	38	38	84
Springbok	179	179	396
Kudu			-
Steenbok			-
Burchells Zebra			-
Ostrich	19	19	42
Blesbok			-
Red Hartebeest			
Total	236	236	522

Table 7

Route 6			
Species	Numbers seen - Total	Number seen under 500m	No. Corrected For Area - Dec 2006
Gemsbok	6	4	20
Springbok	267	267	1,360
Kudu	64	63	321
Steenbok			-
Burchells Zebra	34	21	107
Ostrich	11	9	46
Blesbok			-
Red Hartebeest	8	6	31
Total	390	370	1,885

Table 8

Route 7			
Species	Numbers seen - Total	Number seen under 500m	No. Corrected For Area - Dec 2006
Gemsbok	67	50	232
Springbok	176	160	744
Kudu			-
Steenbok			-
Burchells Zebra			-
Ostrich	39	36	167
Blesbok			-
Red Hartebeest			
Total	282	246	1,143

Table 9

Route 8			
Species	Numbers seen - Total	Number seen under 500m	No. Corrected For Area - Dec 2006
Gemsbok	278	277	1,288
Springbok	481	466	2,166
Kudu			-
Steenbok			-
Burchells Zebra			-
Ostrich	44	44	205
Blesbok			-
Red Hartebeest			
Total	803	787	3,658

Population Estimate

Table 10 presents the total population estimate for plains game on the NamibRand Nature Reserve for December 2006. Final figures have been determined by multiplying all sightings under 500m by both the area and species correction factors.

Table 10

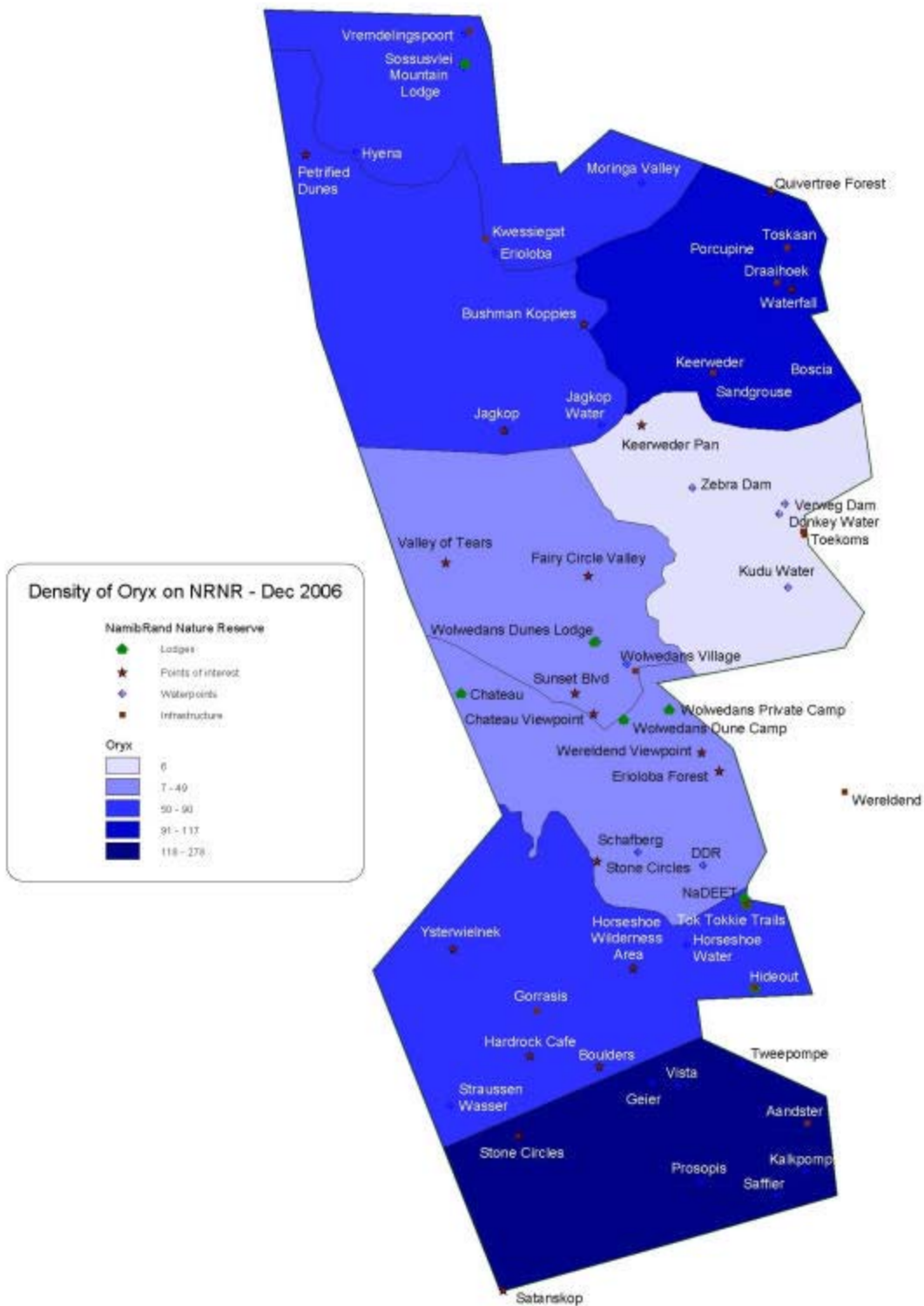
Total Numbers Of Game December 2006			
Species	No. Seen under 500m	No. Corrected For Area	Total No. Corrected For Species Dec 2006
Gemsbok	648	2,635	3,689
Springbok	2,123	8,205	13,127
Kudu	63	321	834
Steenbok	2	9	88
Burchells Zebra	99	368	442
Ostrich	225	864	951
Blesbok*	11		18
Red Hartebeest*	22		75
Total	3,193	12,402	19,224

* numbers known

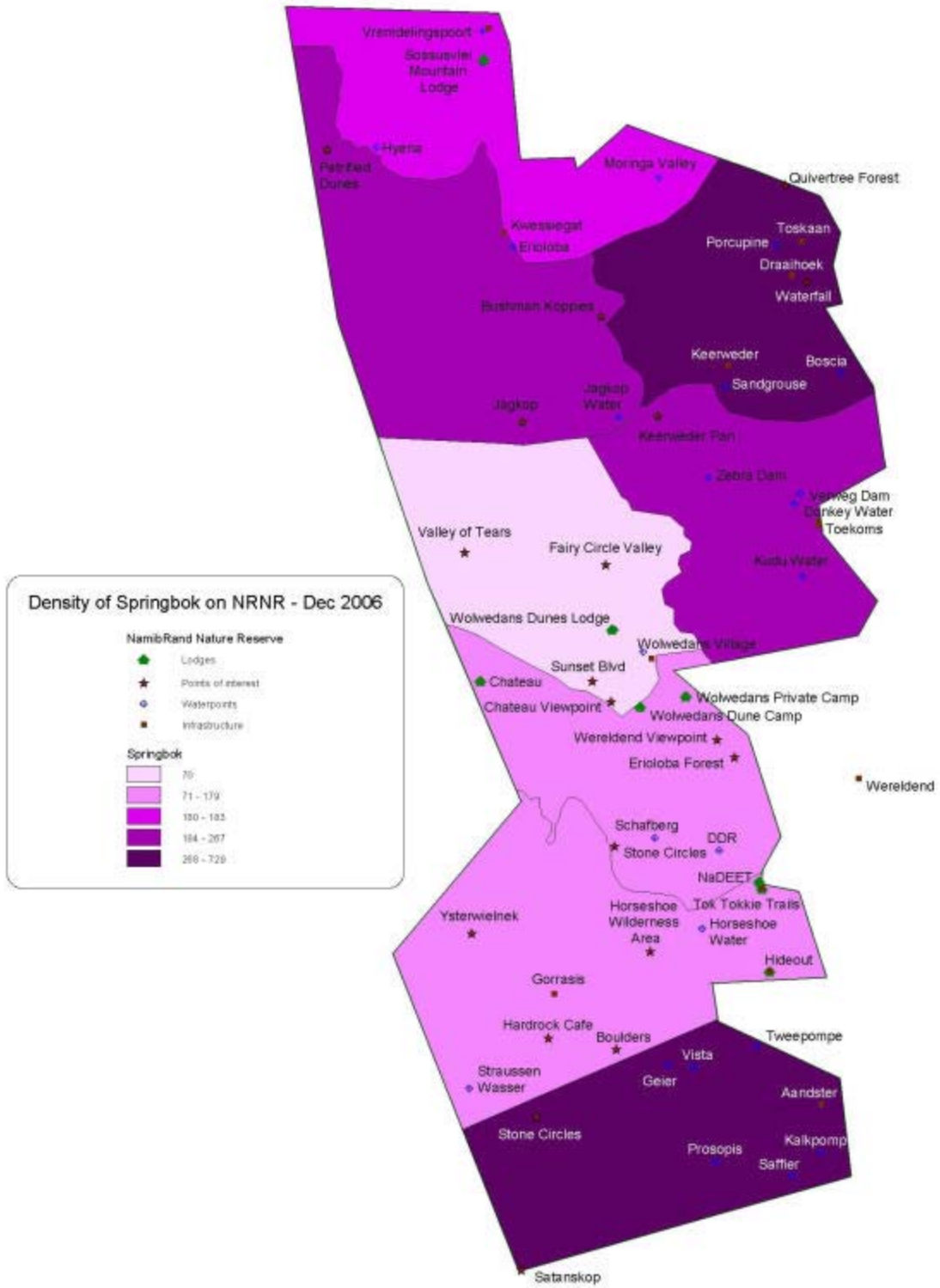
Wildlife Distribution

The following section presents distribution maps for oryx, springbok, kudu, Burchell's zebra and ostrich for December 2006.

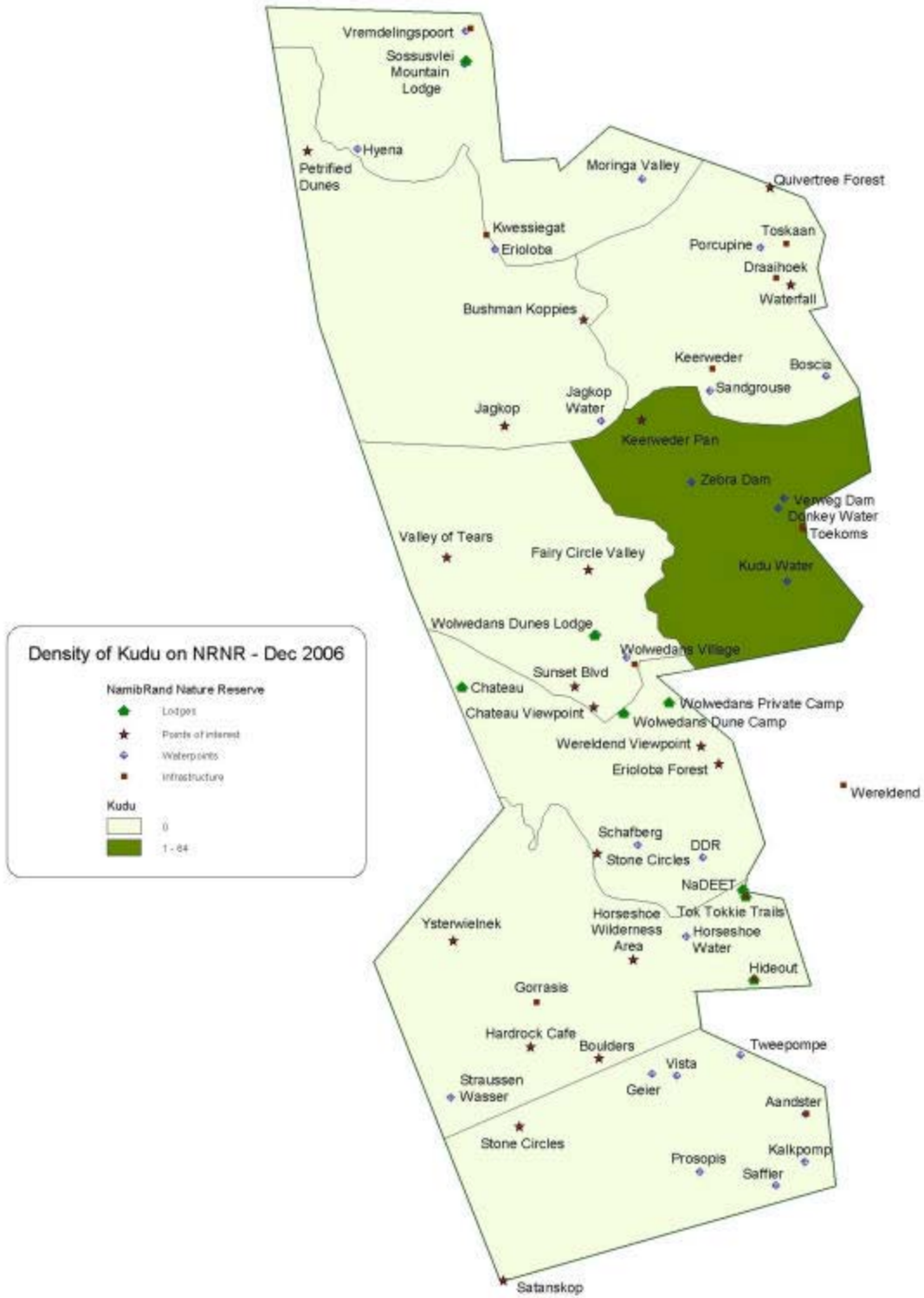
Map 1: *Distribution of Oryx*



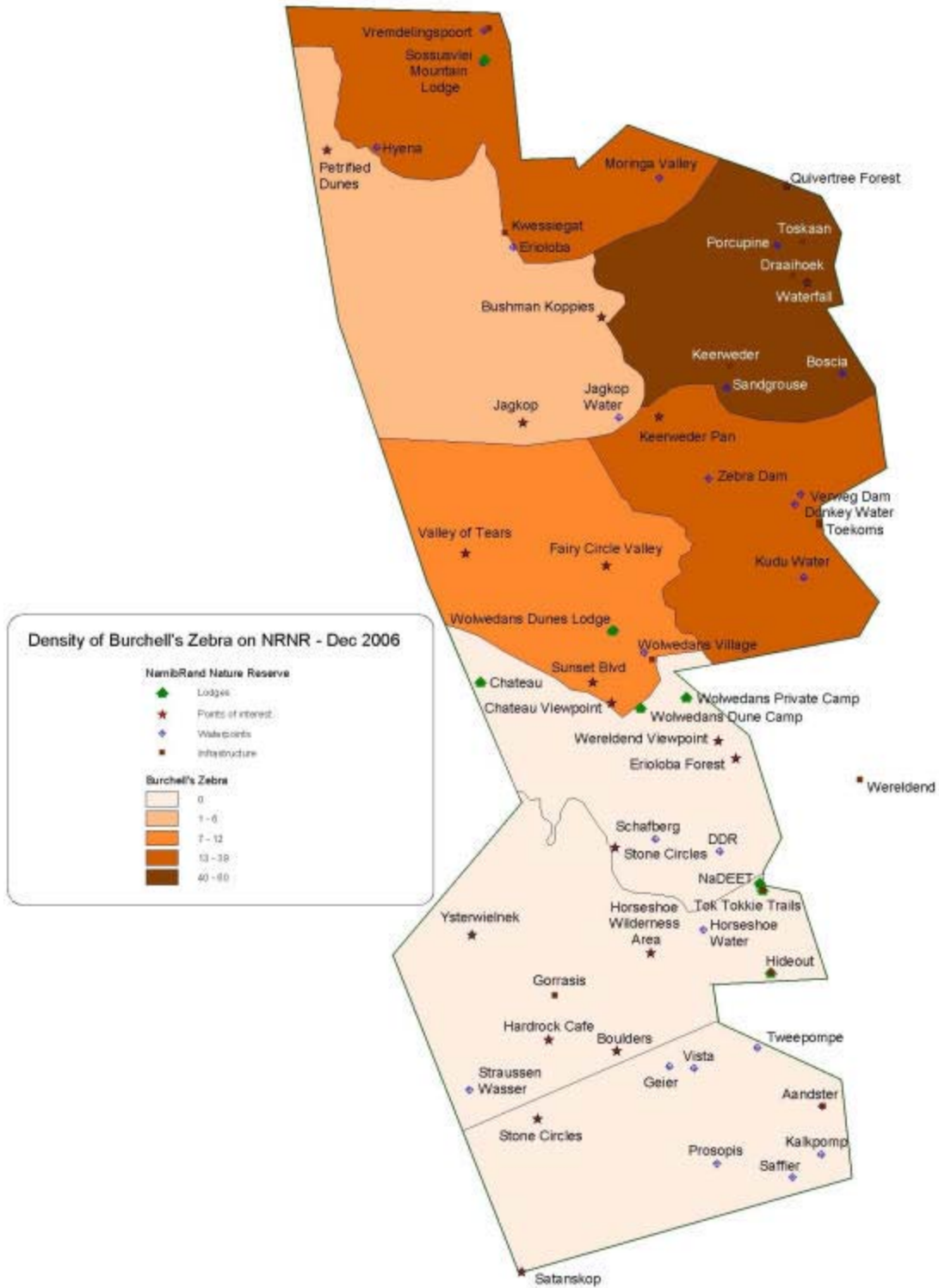
Map 2: Distribution of Springbok



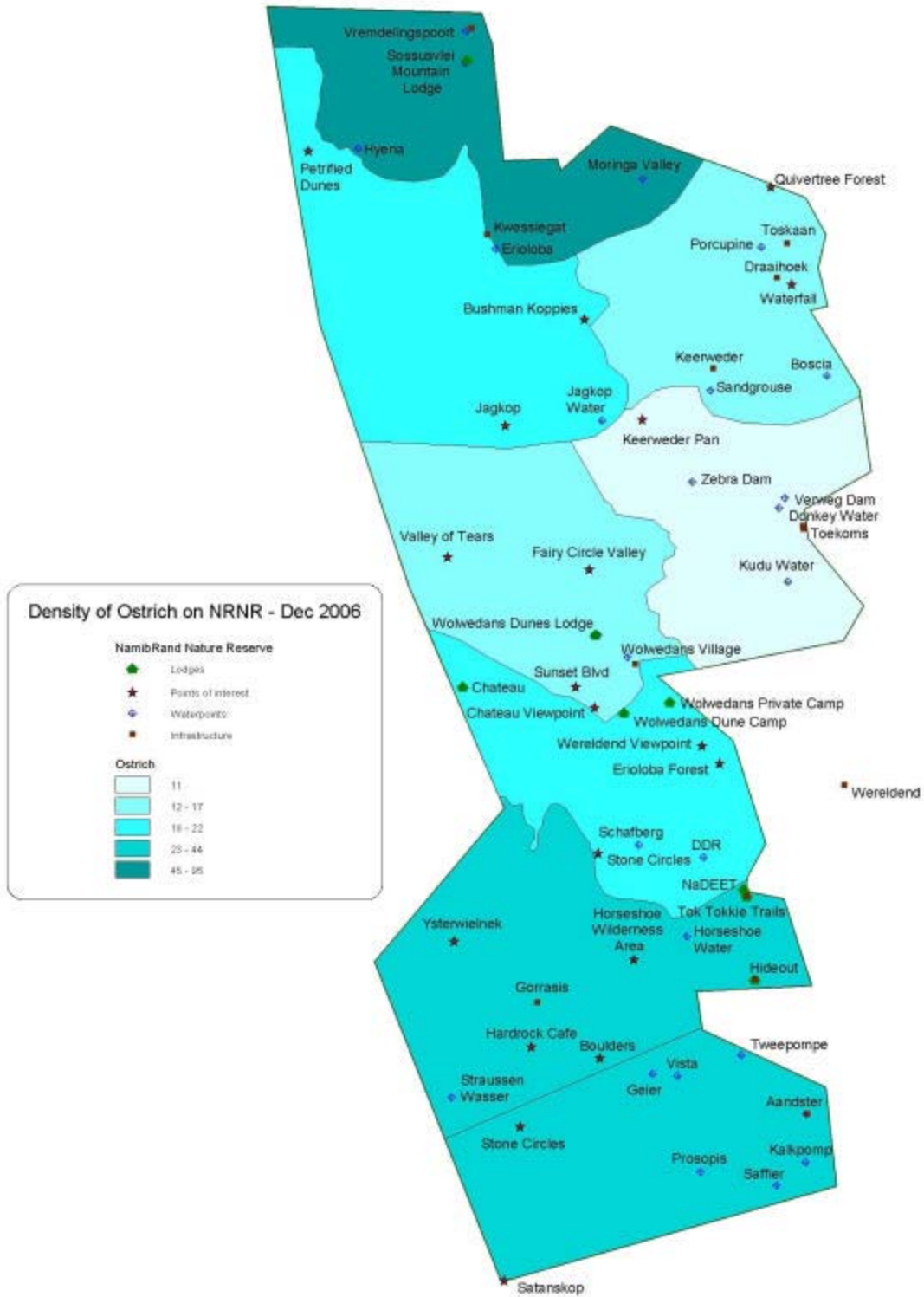
Map 3: Distribution of Kudu



Map 4: Distribution of Burchell's Zebra



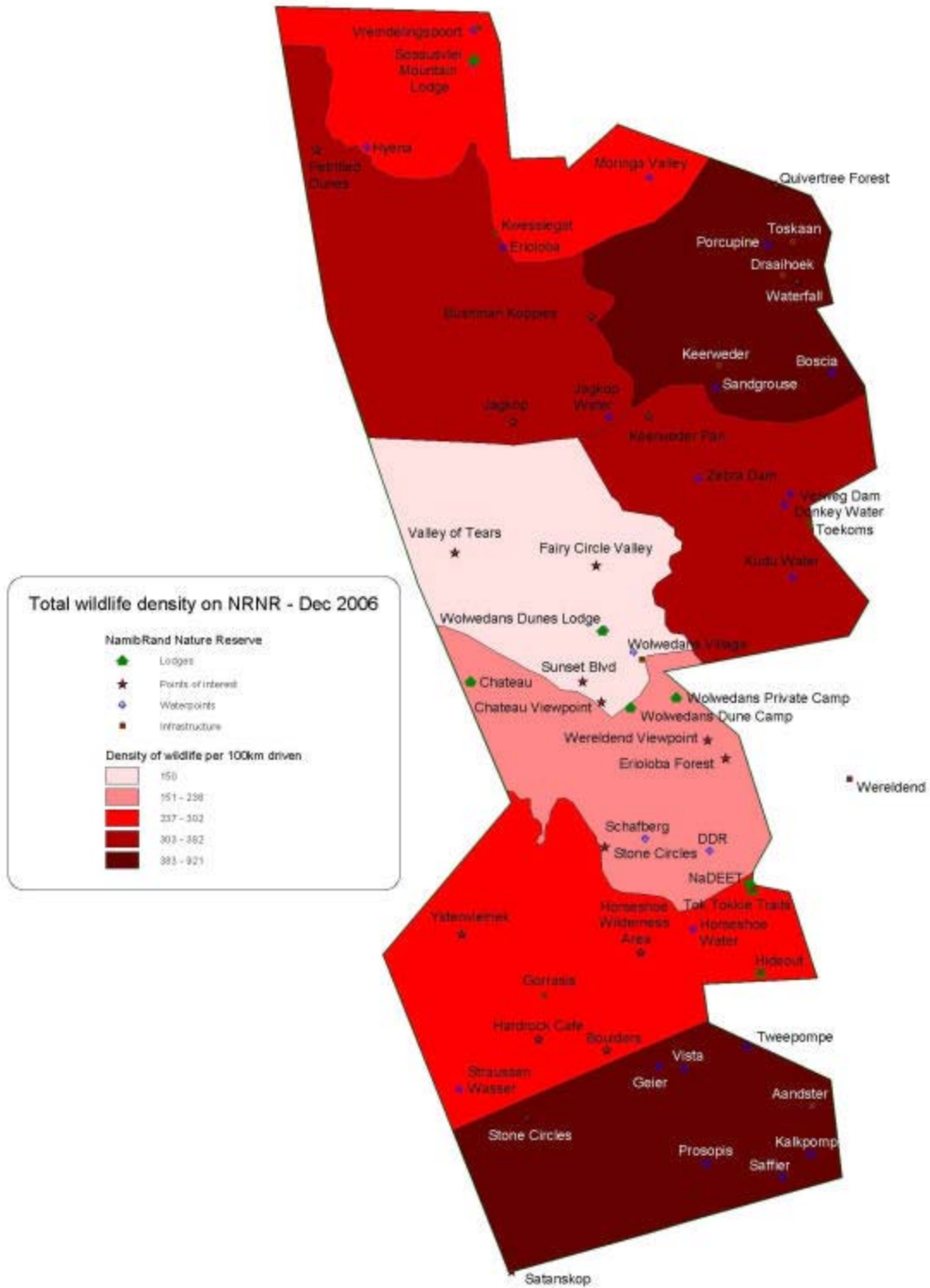
Map 5: Distribution of Ostrich



Total Wildlife Density

Map 6 illustrates the total density in numbers of species for the December 2006 count.

Map 6: Total Wildlife Density



Data Analysis

This section provides some analysis of the data as listed above.

Population Estimates

Table 11 and 12 show comparative data from the last three game counts. Percentage change is calculated between December 2006 and November 2005. This data is illustrated in Figure 1. Note that the percentage change is calculated on numbers actually counted.

Table 11

Species	Dec-06			Jun-06		
	No. Seen under 500m	No. Corrected For Area	Total No. Corrected For Species Dec 2006	No. Seen under 500m	No. Corrected For Area	Total No. Corrected For Species Jun 2006
Gemsbok	648	2,635	3,689	267	1,034	1,447
Springbok	2,123	8,205	13,127	2,862	11,188	17,900
Kudu	63	321	834	44	224	583
Steenbok	2	9	88	1	4	44
B. Zebra	99	368	442	81	366	439
Ostrich	225	864	951	48	194	213
Blesbok*	11		18	0	15	15
Hartebeest*	22		75	0	70	70
Total	3,193	12,402	19,224	3,303	13,009	36,689

Table 12

Nov-05			Jun-05			% Change btw Jun 06 & Dec 06	% Change btw Dec 06 & Nov 05
No. Seen under 500m	No. Corrected For Area	Total No. Corrected For Species Nov 2005	No. Seen under 500m	No. Corrected For Area	Total No. Corrected For Species June 2005		
982	3,988	5,583	801	3,085	4,320	143%	-34%
1,498	5,754	9,207	1,351	4,833	7,733	-26%	42%
64	318	827	25	112	290	43%	-2%
2	10	100	2	5	53	100%	0%
59	259	311	29	145	174	22%	68%
102	403	443	89	371	409	369%	121%
1	11	11	10	10	10	20%	64%
4	55	55	3	50	50	7%	36%
2,712	10,733	16,538	2,310	8,602	13,039	-3%	18%

* Numbers are known

The comparative data shows some interesting trends. Although the total population percentage of game has reduced by -3% from June to December 2006 the general trend since we implemented this count method shows a steady increase of 18% as seen in Figure 2. As we received good rains and have had enough grazing since we started this game count method in 2005, this is not surprising. The reduced numbers can be attributed to the game movements in and out of NRNR. The game distributions show an east-west migration, also observed in all previous years. Routes 2 and 8 also have higher game densities during the end of dry season counts. This has to do with the location of the first rains. These areas attract large numbers of springbok and oryx. Both of these routes also have several easily accessible water points that draw the game into these areas during the dry season. Figure 1 shows that there is a steady increase of ostrich. This can be attributed to chicks hatching throughout the year and the greater rate of survival of these chicks. Springbok numbers are fairly steady with a little decline as compared to June. Oryx numbers have grown as predicted by the June data analysis. This is due to migration from the Namib-Naukluft Park onto NamibRand as the available water decreases in the park.

Figure 1.

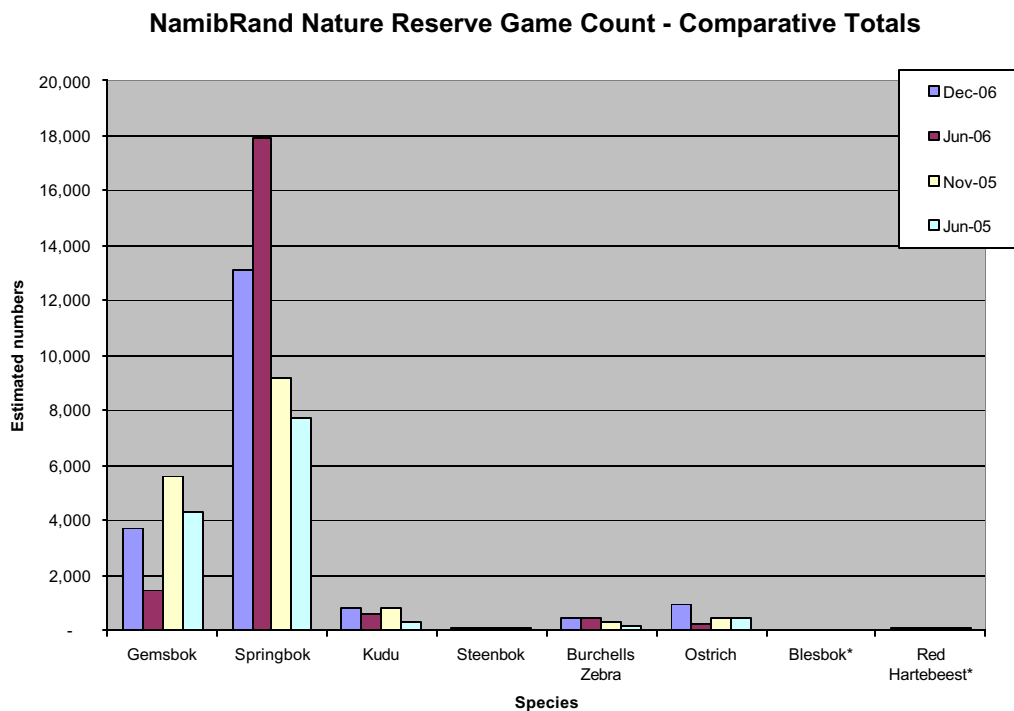
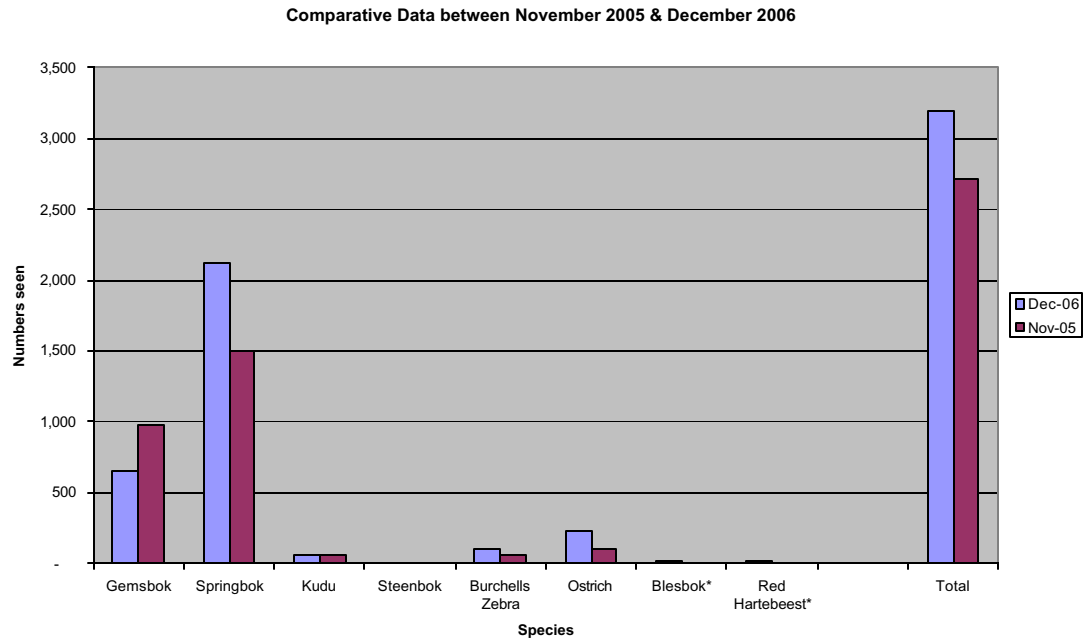


Figure 2.



Biomass Estimates

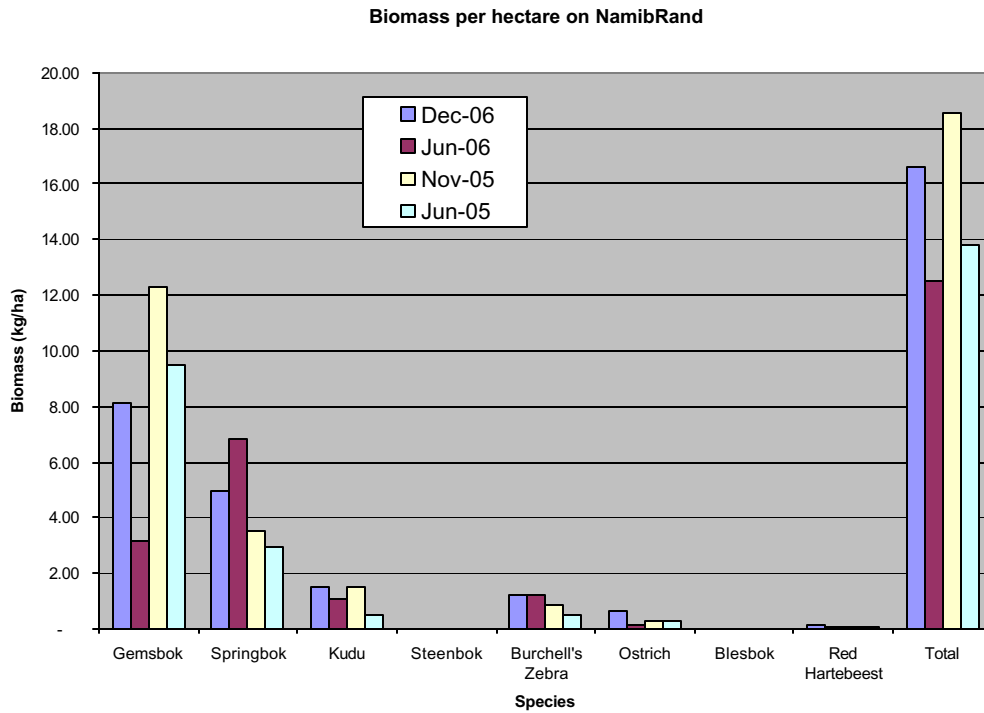
Table 13 and Figure 3 below show wildlife biomass on the NamibRand Nature Reserve. These figures are important as they show the actual impact of a species.

Table 13

Wildlife numbers and wildlife biomass on NamibRand

Wildlife species	Mean mass (kg)	Dec-06			Jun-06			Nov-05		
		Estimated wildlife numbers from Dec 06 game count	Species biomass (kg)	Biomass per ha (kg) 2006	Estimated wildlife numbers from Jun 06 game count	Species biomass (kg)	Biomass per ha (kg) 2006	Estimated wildlife numbers from Nov 05 game count	Species biomass (kg)	Biomass per ha (kg) 2005
Gemsbok	220	3,689	811,605	8.12	1,447	318,358	3.18	5,583	1,228,312	12.28
Springbok	38	13,127	498,843	4.99	17,900	680,203	6.80	9,207	349,871	3.50
Kudu	180	834	150,203	1.50	583	104,904	1.05	827	148,941	1.49
Steenbok	11	88	963	0.01	44	482	0.00	100	1,101	0.01
B Zebra	280	442	123,649	1.24	439	122,836	1.23	311	87,118	0.87
Ostrich	68	951	64,654	0.65	213	14,485	0.14	443	30,125	0.30
Blesbok	100	18	1,800	0.02	15	1,500	0.02	11	1,100	0.01
Hartebeest	130	75	9,750	0.10	70	9,100	0.09	55	7,150	0.07
Total		19,224	1,661,468	16.61	20,710	1,251,867	12.52	16,538	1,853,718	18.54

Figure 3.



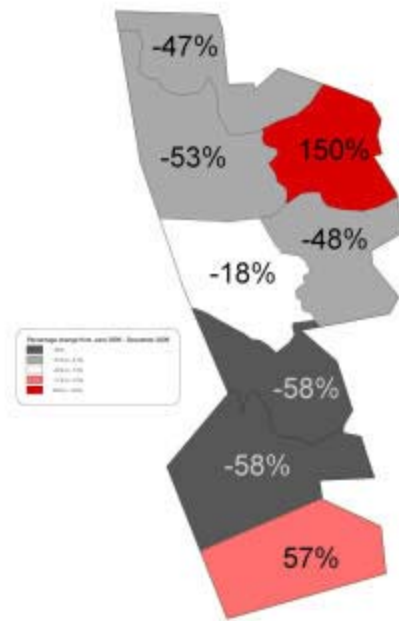
Comments

A biomass of 16.61 is quite high for our area but as we had exceptional rains in the beginning of 2006 and some winter rain as well in many areas, in particular the dunes had green grass until the end of the year. There is still enough grazing to support the number of animals at the moment. The main reason for the high biomass increase since June is that the oryx that have returned from the Namib-Naukluft Park. The animals move in high numbers to areas with fresher grazing and better water availability. The planned capture of Burchell's zebra was undertaken in July and reduced the pressure on the Jagkop area. Oryx were not captured, although this is planned for 2007.

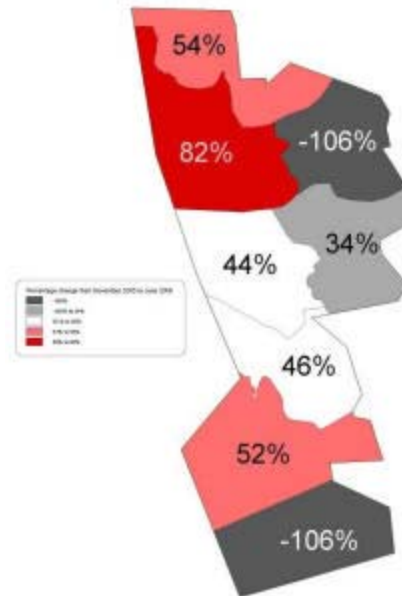
Wildlife Distribution

Map 7 illustrates the change in wildlife distribution between June 2006 and December 2006 while Map 8 illustrates the change in wildlife distribution between November 2005 and June 2006.

Map 7



Map 8



Comments:

Due to the first rains falling in the southern and western areas of NRNR the east / west migration of the game has been observed over several years and is clearly illustrated by the map. This can be also seen in the earlier reports and in comparison with the June 2006 count percentages.

Population Change

In order to make comparisons, data needs to be standardized. Data is standardized into sightings per 100km. Table 14 below shows the data for animals seen per 100km driven

Table 14

Dec 2006 - Species sightings per 100km

Route	Length Of Route (km)	Species											
		Gemsbok		Springbok		Kudu		Steenbok		B.Zebra		Ostrich	
		No	P/100km	No	P/100km	No	P/100km	No	P/100km	No	P/100km	No	P/100km
1	52	73	140	95	183	0	0	0	0	39	75	95	183
2	53.9	117	217	729	1353	0	0	0	0	60	111	15	28
3	57	90	158	244	428	0	0	0	0	6	11	22	39
4	42.9	49	114	70	163	0	0	2	5	12	28	17	40
5	72.9	38	52	179	246	0	0	0	0	0	0	19	26
6	33.9	6	18	267	788	64	189	0	0	34	100	11	32
7	54.6	67	123	176	322	0	0	0	0	0	0	39	71
8	54	278	515	481	891	0	0	0	0	0	0	44	81
Total	421.2	718	170	2241	532	64	15	2	0	151	36	262	62

Table 15

Sightings per route

Route	Length of Route	June 05	November 05	June 06	December 06	% Change (Jun 06 -Dec 06)	% Change (Nov 05 -Dec06)
1	52	608	500	1094	581	-47%	16%
2	53.9	1491	1407	683	1709	150%	21%
3	57	387	247	1342	635	-53%	157%
4	42.9	239	237	424	350	-18%	47%
5	72.9	480	416	776	324	-58%	-22%
6	33.9	875	1423	2159	1127	-48%	-21%
7	54.6	714	596	1238	516	-58%	-13%
8	54	822	1943	944	1487	57%	-23%
Total	421.2	579	794	1037	816	-21%	3%

Table 15 illustrates on which route most animals were seen. In general, as there are many open plains in Routes 2, 6, 7 and 8 these have the highest numbers of sightings.

Compared with the species seen, it is obvious that the most sightings recorded are springbok, then oryx and to a lesser degree, ostrich. Ostrich numbers are steadily increasing.

Figure 4 compares the total animals seen per 100km driven between from June 2005 and December 2006.

Figure 4.

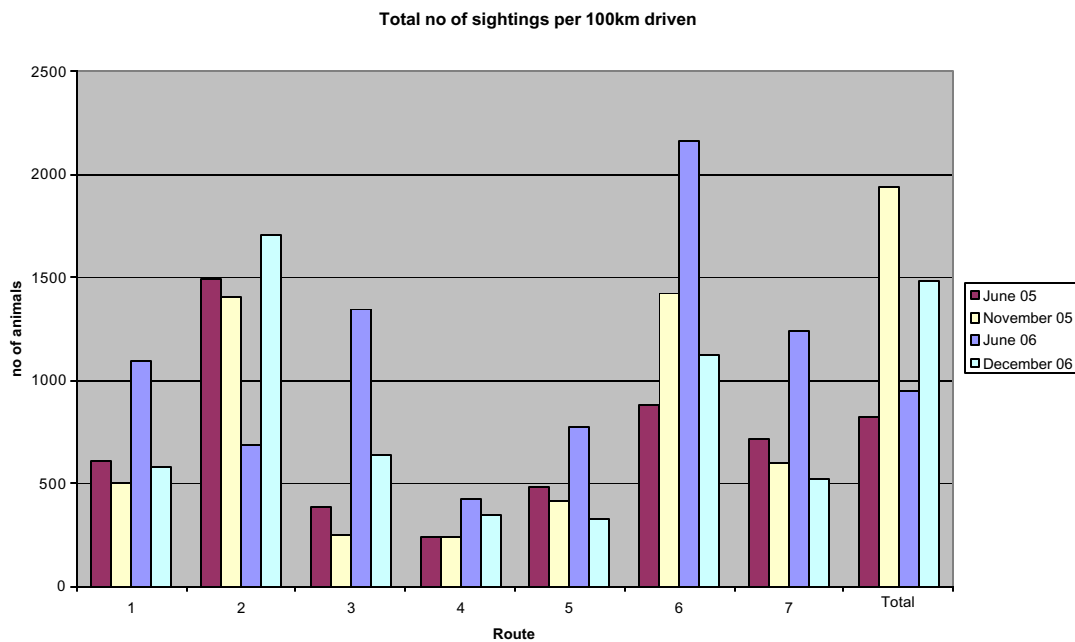


Figure 5.

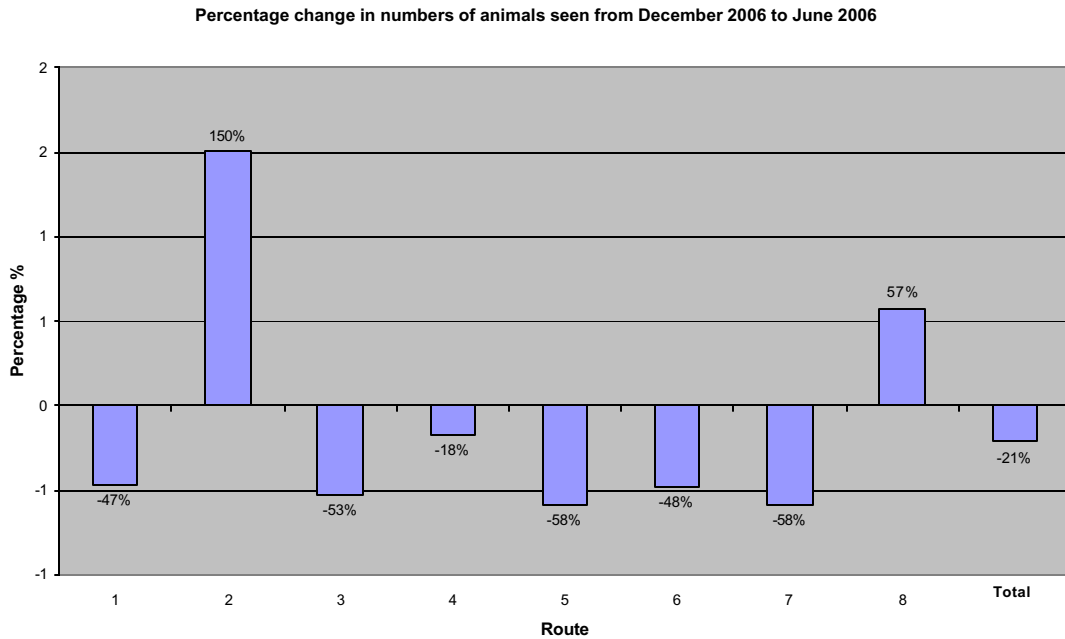
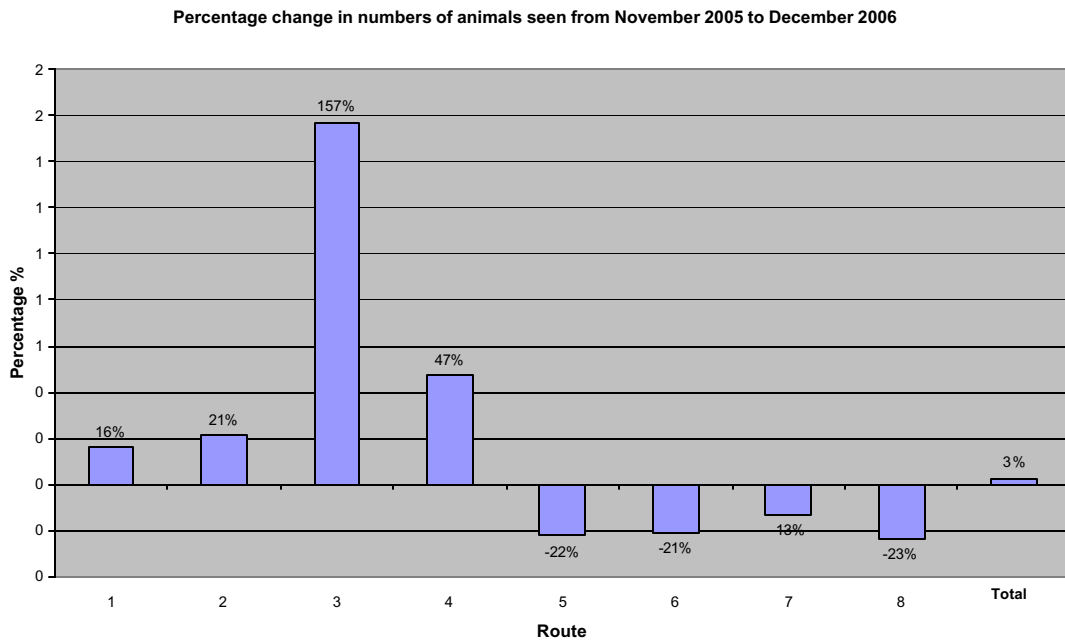


Figure 6.



Comments

Figure 5 once again illustrates the east/west migration.

Figure 6 illustrates that there has been a more even distribution of game throughout NRNR with the exception of Route 3. More animals were seen on Routes 3 and 4 than on any other. This has to do with a more even distribution of grazing available from the good rainy season. A small increase of 3% in total sightings hint towards an general increase in total game population.

Acknowledgements

NamibRand would like to thank everyone who participated in the December game count. Thank you to Wolwedans who again assisted with two teams. Thank you to Sossusvlei Mountain Lodge, Tok Tokkie Trails, the Family Hideout and Kwessiegat who provided a team each. The Hideout team drove all the way to Aandster in the morning to count Route 8. We would also like to thank Mr. Klein for providing his time and vehicle. Thank you to the counters who stood in the sun for several hours – we hope you enjoyed the count as much as we all did.

A special thanks to Nils Odendaal and Danica Shaw for hosting the training and for the effort put in to the analysis, mapping and graphing of data for this report.