

Results of the NamibRand Nature Reserve Annual Game Count

6 June 2009



Report compiled by: Ann Scott – Warden
Corris Kaapehi – Ranger
Nils Odendaal – Chief Executive Officer



NamibRand Nature Reserve
PO Box 131 Maltahöhe, Namibia
Tel. +264-63-683026
Fax: 088 611 446
Email: warden@namibrand.org
Web: www.namibrand.org

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1. Introduction

This paper provides feedback and results of the annual game count as held on the NamibRand Nature Reserve on 6 June 2009. As usual, this event was combined with the Reserve's annual general meeting, which makes this an ideal opportunity to hold a community participation game count. A special welcome to the Pro-Namib Conservancy, who joined us for the first time with a new route, No 9. In order to facilitate comparisons with previous years, the results for the June 2009 count are presented first for Route 1-8 and then, to include the Conservancy, for Route 1-9.

Apart from presenting these results, we would also like to review the broader picture in terms of trends in the information we have gathered over the past five years. As rainfall is one of the main drivers of this complex desert system, the mean annual rainfall figures should provide interesting correlations with game numbers and distribution. This information can then be used for effective management.

2. Summary

Data collected by participants of the June 2009 game count were collated and analyzed, bearing our three core objectives in mind:

Objective 1: Population estimates

The total number of oryx on the Reserve (Route 1-8) in June 2009 is estimated at 4 700, and springbok at 12 551. When the Pro-Namib Conservancy is included (Route 1-9), the total for oryx increases to 5 415 and for springbok to 13 400.

The overall population estimate (Route 1-8) has increased by 9% from June 2008 to June 2009. The addition of the Pro-Namib Conservancy area (16 450 ha; Route 9) in June 2009 resulted in a total increase of 19%.

Natural fluctuations in wildlife populations are primarily rainfall driven, often evidenced in seasonal migrations. Over the total count period, high mean rainfall (200 - 250 mm) was experienced in 2006, 2008 and 2009, accompanied by an overall increase in numbers of 25% in June 2006, 11% in June 2008 and 9% in June 2009 (Route 1-8). In contrast, low mean rainfall (< 75 mm) in 2005 and 2007 brought about a decrease of 20% in numbers.

Looking at the dominant species, estimated numbers of oryx increased gradually from a low of 1 447 in 2006 and remained fairly stable at around 4 000, reaching 4 700 (Route 1-8) in June 2009. This is an increase of 1 440 (44%) since 2008. With the inclusion of Route 9, the total is now 5 414. Springbok numbers (in June) have remained at around 12 500 for the past two years (a trend linked to the good rains), showing an overall increase since the start of the counts (7 733 in June 2005). The maximum of 17 900 in June 2006 has not been reached again. With the inclusion of Route 9, the total is now 13 400.

The total biomass of the Reserve has increased slowly but steadily from 9.0 kg/ha in June 2005 to 10.9 (Route 1-8) and 11.1 kg/ha (Route 1-9) in June 2009. This trend can, in part, be related to good rainfall in 2006, 2008 and 2009. At the same time, the area available to the game has increased with the gradual breaching of fences with

neighbouring properties, and especially with the inclusion of 16 450 ha through the establishment of the Pro-Namib Conservancy (Route 9) in June 2009.

Objective 2: Wildlife distribution/density

The highest density of wildlife was in the north/east (especially Route 1; and Route 2 & 5) and south (Route 8 & 9) of the Reserve, while the south-western (Route 7) and central vegetated dune belt (Routes 3, 4 & 6) had lower densities of game. Compared to June 2008, mainly the north-western parts of the Reserve showed an increase in wildlife (particularly Zone 1, where the increase was over 300%), with a decrease in the central/western areas.

Objective 3: Population change over five years

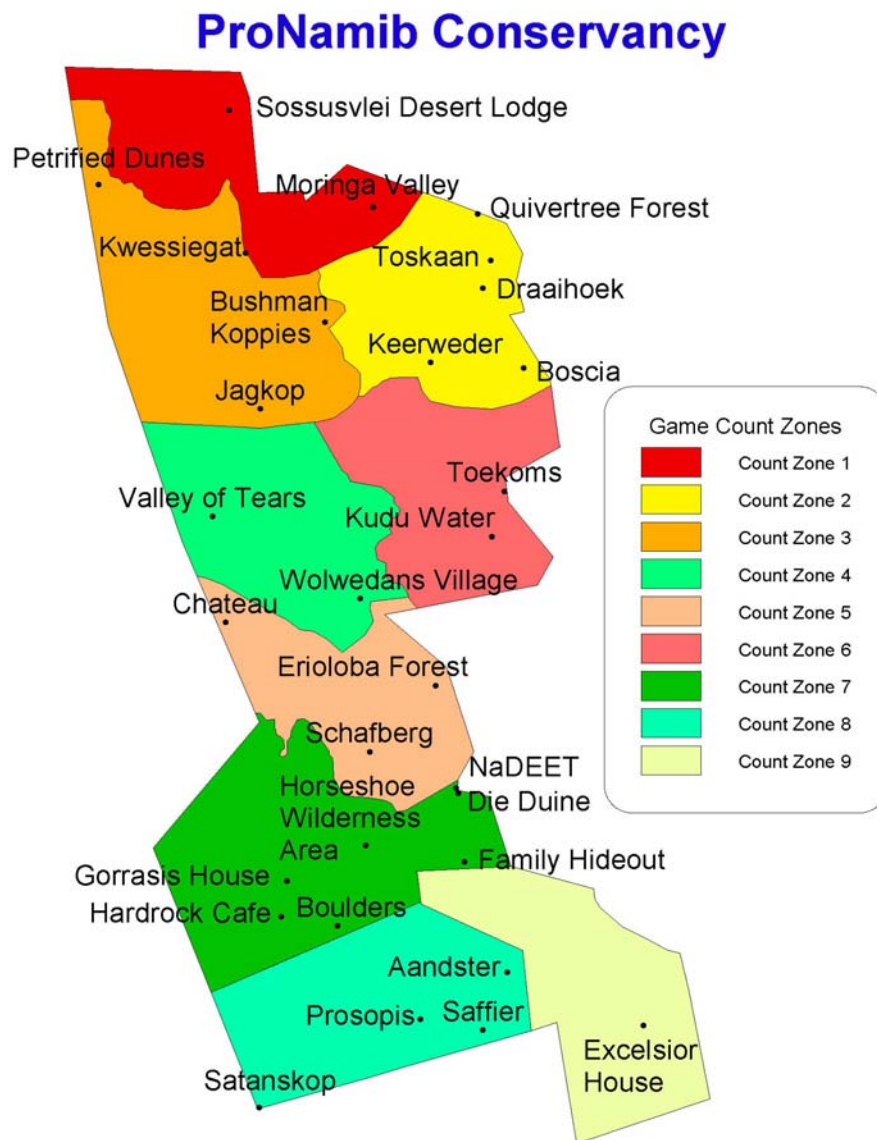
Sightings of oryx continue to increase, reaching 232 animals/100 km for Route 1-8. With the addition of Route 9, these sightings increased to 269/100 km. Springbok sightings for Route 1-8 also increased to 529/100 km but, with the inclusion of Route 9, this figure drops to 514/100 km. The total number of sightings per route is now 715/100 km (Route 1-8) and, with the inclusion of the Conservancy (Route 1-9), 953/100 km. The total population appears to have reached a plateau and has been fairly stable for the past four years.

The effects of increased natural predation by re-introduced predators, including cheetahs, are probably minimal at this stage; however, the effects of increased predation on game numbers in the cheetahs' home range (mainly in count zones 2 and 6) should be monitored in the future.

3. Methodology

For the purposes of the count, the Reserve is divided into nine game count zones, each with its own standardized route. The game count zones used in June 2009 are shown in Figure 1. These include a new route (No. 9) that was added in order to include the adjoining farms Excelsior and Dina, now part of the total area available to game through the establishment of the Pro-Namib Conservancy.

Figure 1. Game count zones used in June 2009



The basic survey methodology used is a combination of the *Distance* and the *Strip-Count* census techniques. In layman's terms these can be explained as follows:

1) Distance

The distance to each animal or group of animals counted is recorded at right angles to the vehicle. This distance allows us to apply a *species correction factor* for each type of animal counted. This is done in order to compensate for animals not seen.

For example, the chances of seeing large animals like zebra over a great distance are much higher than the probability or chances of seeing a smaller animal like a steenbok. Therefore a correction factor of 2 can be used for zebra (because you are likely to see most of them over a set distance). A much higher correction factor of 10 can be used for steenbok – over the same set distance you are likely only to see a few steenbok while the rest will be hidden by dead ground or obstacles.

2) Strip-Count

All animals and the distance, at right angles to the vehicle, are counted. A strip-width is then determined – 1000m in our case, so that the area covered can then be multiplied into the overall area. This is known as an *area correction factor* (the number of times a 1000m wide strip will fit into the whole area). Only the animals inside the 1000m (500m on either side of the road) are multiplied by the correction factor to determine the population estimate for the given area.

Table 1 below lists the area and species correction factors used on the NamibRand Nature Reserve. Note that the area correction factors are based on the precise odometer readings for the route length, and are thus adjusted every year.

Table 1

Correction factors (June 2009)					
Route no.	Route distance (km)	Area correction factor (a.c.f)		Species	Species' correction factor (s.c.f)
1	52	3.10		Oryx	1.4
2	52	3.14		Springbok	1.6
3	59	4.09		Kudu	2.6
4	52	3.61		Steenbok	10.0
5	70	2.30		Burchell's zebra	1.2
6	38	4.55		Ostrich	1.1
7	55	4.62		Red hartebeest	1.5
8	52.4	3.85			
9	51.3	3.21			

Bearing the Reserve's objectives for counting in mind, results are thus calculated as follows:

Objective 1: Population estimates (P)

Actual number of animals seen (S)
Area correction factor (A)
Species correction factor (B)

Formula for calculating population estimates

$$(S \times A) \times B = P$$

Objective 2: Wildlife distribution

Data from actual sightings (i.e. not estimates) are "normalized" for all count zones or routes to animals seen per 100km. This is done in order to standardize the results to a value which is uniform for all count zones, thus enabling us to obtain accurate density and distribution figures.

Actual number of animals seen (S)
Length of route (R)
Animals seen per 100km driven (K)

Formula for calculating animals seen per 100 km driven

$$(S \div R) \times 100 = K$$

Objective 3: Population change

To calculate the change in population, only figures from actual sightings are used (i.e. not estimates). As with distribution above, normalized or standardized data need to be used so that comparisons can be made. The data from each route are then compared to previous data and the percentage change for each route and for the Reserve as a whole can be calculated. The percentage change for the total of each species can also be calculated in the same way.

Previous Value (P)
Current Value (C)
Percentage Change (R)

Formula for calculating percentage change

$$((C - P) \div P) \times 100 = R$$

4. Results

4.1 Route Results

Population estimate using strip count: animals seen x area correction factor x species correction factor

Tables 2.1 – 2.9 list the data collected on each route, which were then analyzed. Numbers seen within the strip width (under 500m) have been multiplied first by the relevant area correction factor (a.c.f.) for each route, and then by the relevant species correction factor (s.c.f.; see Table 1).

Table 2.1

Route 1				
Species	Number seen - total	Number seen under 500m	No. corrected for area (a.c.f. = 3.1)	No. corrected for species
Oryx	316	310	961	1 344
Springbok	657	644	1 994	3 190
Kudu	2			
Steenbok				
Burchell's zebra	25	1	3	4
Ostrich	30	20	62	68
Blesbok				
Red hartebeest				
Total	1 030	975	3 020	4 606
<i>Mountain zebra*</i>	8	2		

*Not included in count

Table 2.2

Route 2				
Species	Number seen - total	Number seen under 500m	No. corrected for area (a.c.f. = 3.14)	No. corrected for species
Oryx	39	33	104	145
Springbok	504	496	1 558	2 492
Kudu	1	1	3	8
Steenbok				
Burchell's zebra	47	47	148	177
Ostrich	86	85	267	294
Blesbok				
Red hartebeest	14	14	44	66
Total	691	676	2 123	3 182

Table 2.3

Route 3				
Species	Number seen - total	Number seen under 500m	No. corrected for area (a.c.f. = 4.09)	No. corrected for species
Oryx	33	106	434	607
Springbok	41	33	135	216
Kudu				
Steenbok				
Burchell's zebra	158	28	115	137
Ostrich	5	5	20	22
Blesbok				
Red hartebeest				
Total	237	172	704	982

Table 2.4

Route 4				
Species	Number seen - total	Number seen under 500m	No. corrected for area (a.c.f. = 3.61)	No. corrected for species
Oryx	74	68	246	344
Springbok	28	28	101	162
Kudu				
Steenbok				
Burchell's zebra	3	0		
Ostrich	11	11	40	44
Blesbok				
Red hartebeest				
Total	116	107	387	550

Table 2.5

Route 5				
Species	Number seen - total	Number seen under 500m	No. corrected for area (a.c.f. = 2.30)	No. corrected for species
Oryx	99	95	219	306
Springbok	88	87	200	321
Kudu				
Steenbok				
Burchell's zebra	3			
Ostrich	18	18	41	45
Blesbok				
Red hartebeest				
Total	208	200	460	672

Table 2.6

Route 6				
Species	Number seen - total	Number seen under 500m	No. corrected for area (a.c.f. = 4.55)	No. corrected for species
Oryx	110	70	319	446
Springbok	210	203	924	1 478
Kudu	6	6	27	71
Steenbok				
Burchell's zebra	56	0		
Ostrich	24	9	41	45
Blesbok				
Red hartebeest	2	2	9	14
Total	408	290	1 320	2 054

Table 2.7

Route 7				
Species	Number seen - total	Number seen under 500m	No. corrected for area (a.c.f. = 4.62)	No. corrected for species
Oryx	73	73	337	472
Springbok	227	227	1 049	1 678
Kudu				
Steenbok				
Burchell's zebra				
Ostrich	42	42	194	213
Blesbok				
Red hartebeest				
Total	342	342	1 580	2 363

Table 2.8

Route 8				
Species	Number seen - total	Number seen under 500m	No. corrected for area (a.c.f. = 3.85)	No. corrected for species
Oryx	256	192	739	1 035
Springbok	520	489	1 883	3 012
Kudu				
Steenbok				
Burchell's zebra				
Ostrich	34	23	89	97
Blesbok				
Red hartebeest				
Total	810	704	2 711	4 144

Table 2.9

Route 9				
Species	Number seen - total	Number seen under 500m	No. corrected for area (a.c.f. = 3.21)	No. corrected for species
Oryx	294	159	510	715
Springbok	202	165	530	847
Kudu				
Steenbok	1	1	3	32
Burchell's zebra				
Ostrich	54	30	96	106
Blesbok	16	0		
Red hartebeest				
Total	567	355	1 139	1 700

4.2 Population estimates

Table 3 presents the total population estimates for plain's game on NamibRand Nature Reserve in June 2009. Final figures have been determined by multiplying all sightings under 500m by both the area and species correction factors.

Table 3

Total numbers of game				
Species	No. seen under 500m		Total no. corrected for area + for species	
	Route 1-8	Route 1-9	Route 1-8	Route 1-9
Oryx	947	1 106	4 700	5 415
Springbok	2 207	2 372	12 551	13 400
Kudu	7	7	79	79
Steenbok	0	1	0	32
Burchell's zebra	76	76	318	318
Ostrich	213	243	829	935
Blesbok	7*	23*	7*	23*
Red hartebeest	16	16	80	80
Total	3 473	3 844	18 564	20 282
<i>Mountain zebra</i>	8**			

* Not counted (Route 1-8) but numbers are known

** Not included in total

4.3 Wildlife distribution/density

Distribution (density) maps for major individual species (oryx, springbok, kudu, Burchell's zebra and Ostrich) are presented below (Figure 3.1 – 3.5). The total density of wildlife on NamibRand Nature Reserve on 6 June 2009 is shown in Figure 3.6.

Figure 3.1. Distribution of oryx

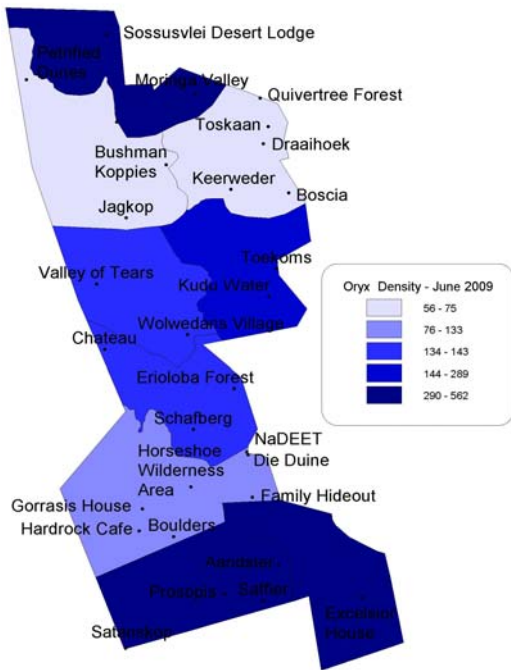


Figure 3.2. Distribution of springbok

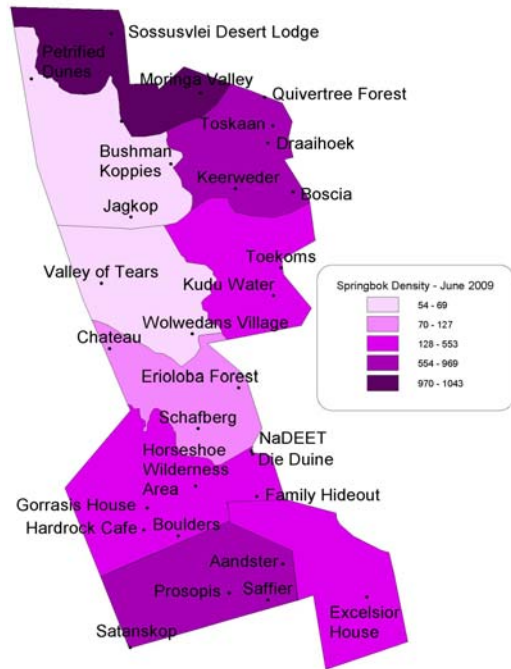


Figure 3.3. Distribution of kudu

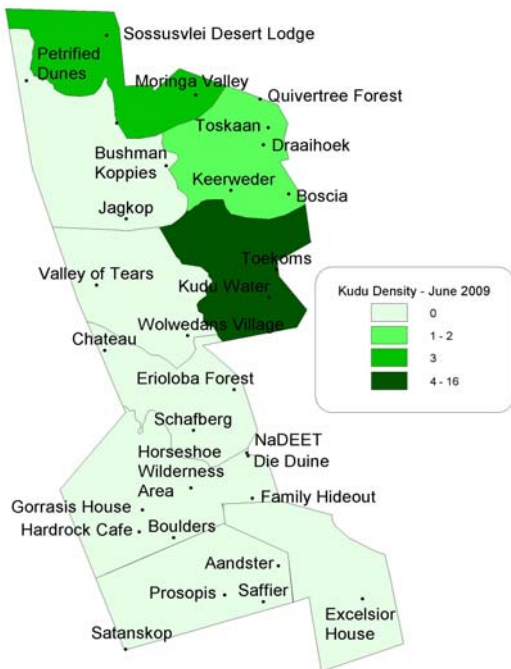


Figure 3.4. Distribution of Burchell's zebra

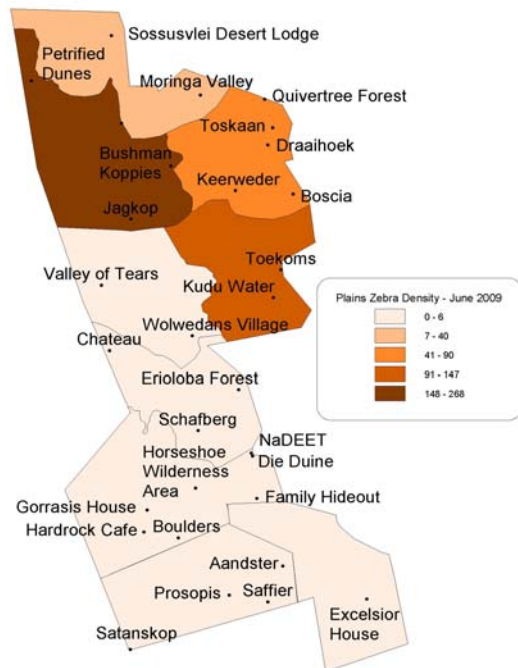


Figure 3.5. Distribution of Ostrich

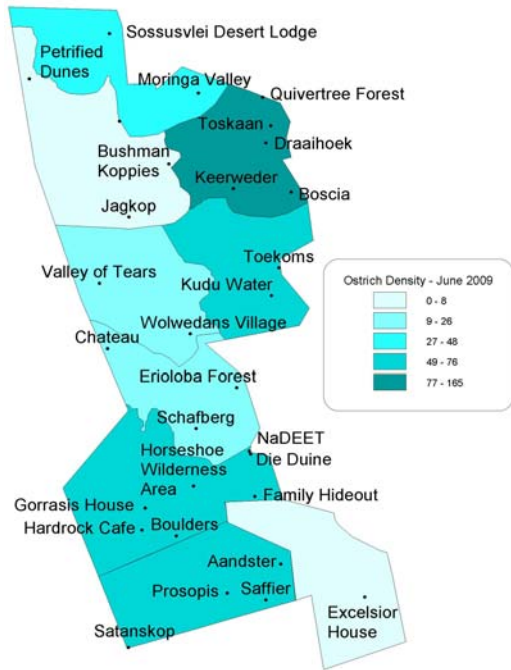
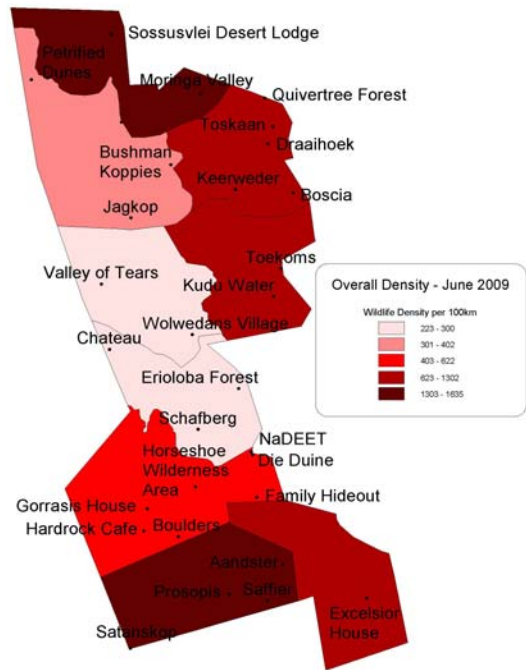


Figure 3.6. Total wildlife density



5. Data analysis

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

5.1 Population estimates

Table 4.1 (below) shows data from the June 2009 count compared to data from the June 2008 count (Routes 1-8 only). Table 4.2 and Figure 4.1 (below) depicts the data over the longer term (June 2005 – June 2009), including data for both Route 1-8 and Route 1-9 in 2009. The same data for species with lower numbers (i.e. excluding oryx and springbok) are presented on a larger scale in Figure 4.2.

Table 4.1

Total numbers of game (Route 1-8; Jun 08 – Jun 09)					
Species	Jun-08		Jun-09		Percentage change
	No. seen under 500m	Total no. corrected for area + for species	No. seen under 500m	Total no. corrected for area + for species	
Oryx	636	3 258	947	4 700	44.3
Springbok	1 974	12 451	2 207	12 551	0.8
Kudu	6	75	7	79	5.3
Steenbok	4	174	0	0	-100.0
B. zebra	116	668	76	318	-52.4
Ostrich	61	262	213	829	216.4
Blesbok		20*		7*	-65.0
Hartebeest	28	80	16	80	0.0
Total	2 825	16 968	3 466	18 564	9.4

* Numbers are known

Table 4.2

Total numbers of game (Jun 05 - Jun 09)								
Species	Jun-05	Nov-05	Jun-06	Dec-06	Jun-07	Jun-08	Jun 09 (1-8)	Jun 09 (1-9)
Oryx	4 320	5 583	1 447	3 689	4 295	3 258	4 700	5 415
Springbok	7 733	9 207	17 900	13 127	9 013	12 451	12 551	13 400
Kudu	290	827	583	834	486	75	79	79
B. zebra	174	311	439	442	677	668	318	318
Ostrich	409	443	213	951	669	262	829	935
Hartebeest	50	55	70	75	80	80	80	80
Steenbok	53	100	44	88	125	174	0	32
Blesbok	10	11	15	18	20	20	7*	23*
Total	13 039	16 538	20 710	19 224	15 366	16 988	18 564	20 282
% change	-	26.8	25.2	-7.2	-20.1	10.6	9.3	19.4
Comments	Low rain	Summer	Good rain	Summer	Low rain	Good rain	Good rain	Conser-vancy

* Numbers are known

Figure 4.1. Total game counts for all plains species, June 2005 – June 2009

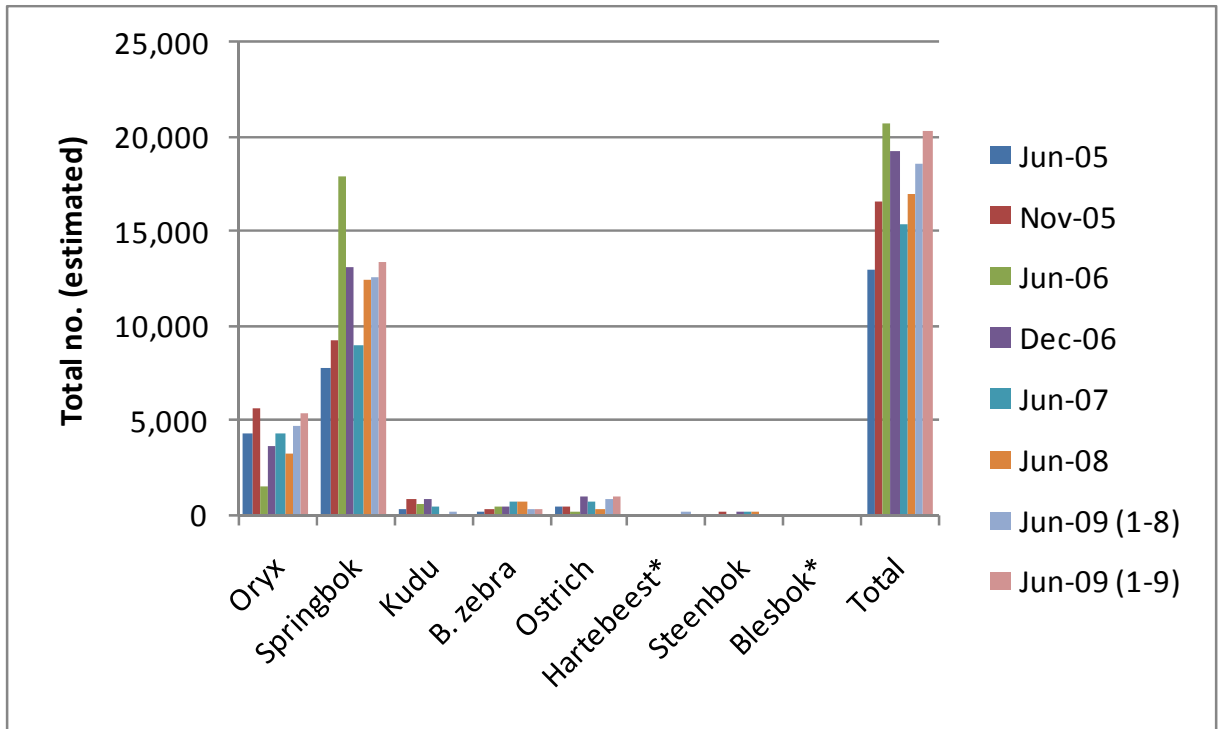
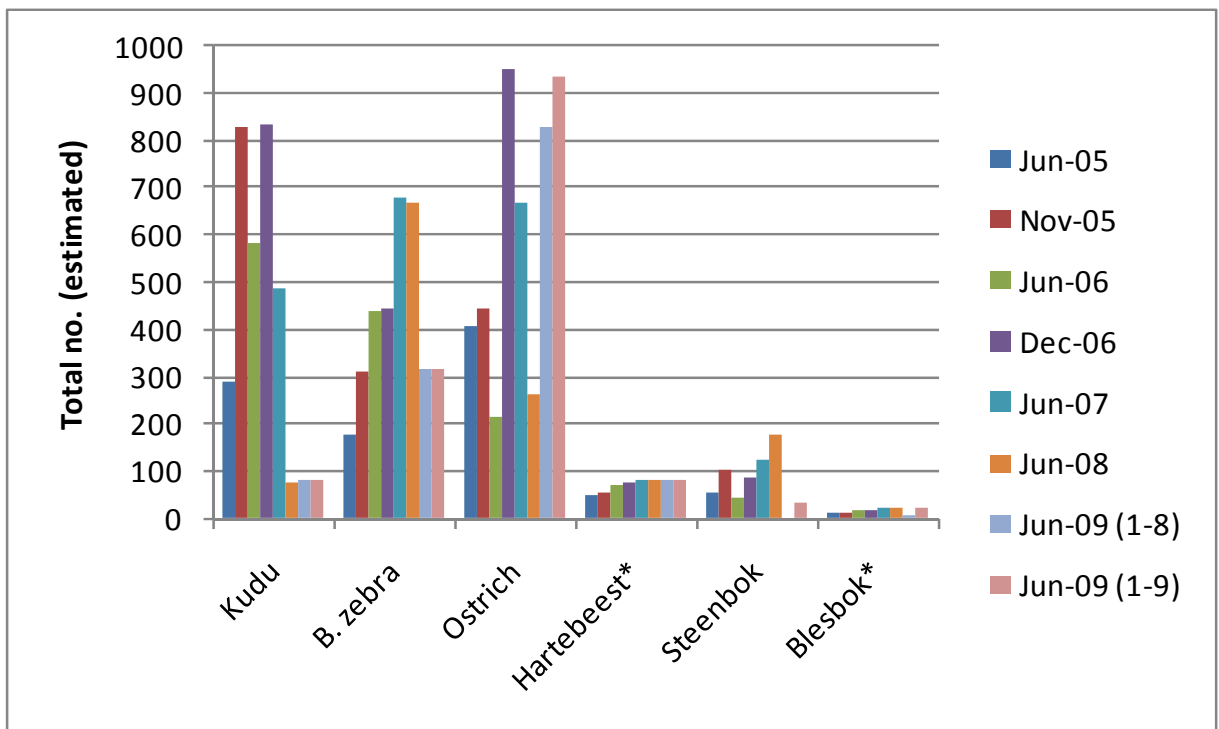


Figure 4.2. Total game counts for all plains species other than oryx and springbok, June 2005 – June 2009



Comments

On comparing the data from June 2009 to June 2008 we note that the overall population estimate (for Route 1-8) has increased by 9%. With the addition of the Pro-Namib Conservancy area (16 450 ha; Route 9) in June 2009 the total increase is 19%.

Natural fluctuations in wildlife populations are primarily rainfall driven, and may be evidenced in seasonal migrations. Percentage change greater than 30% per year is usually attributed to migration of animals in and out of the Reserve. The low number of oryx in June 2006 can, for example, be attributed to the fact that the animals had not yet returned to the plains from the dunes as there was still plenty of green grass there due to the late rains.

Over the total count period, high mean rainfall (200 - 250 mm) was experienced in 2006, 2008 and 2009, but low mean rainfall (< 75 mm) in 2005 and 2007. High mean rainfall was accompanied by an overall increase in numbers of 25% in June 2006, 11% in June 2008 and 9% in June 2009, whereas low mean rainfall in June 2007 brought about a decrease of 20%. Reasons for the differences in pattern between summer and winter counts in 2005 (low rain, 26% increase, oryx <, springbok <) and 2006 (good rain, 7% decrease, oryx <, springbok >) are not immediately evident.

- From a low of 1 447 in 2006, estimated numbers of **oryx** increased gradually and remained fairly stable at around 4 000, reaching 4 700 (Route 1-8) in June 2009. This is an increase of 1440 (44%) since 2008. With the inclusion of Route 9, the total is now 5 415.
- **Springbok** numbers (in June) have remained at around 12 500 for the past two years, showing an overall increase since the start of the counts (7 733 in June 2005). This trend appears to be a response to the good rains, although the maximum of 17 900 in June 2006 has not been reached again. With the inclusion of Route 9, this total is now 13 400.
- **Ostrich** numbers appear to fluctuate widely, with lows of < 270 in 2006 and 2008, but show an overall increase from 409 in 2005 to the present 829 (216%). With the inclusion of Route 9, this figure increases to 935. These fluctuations could be related to a known rapid response to rainfall and related increase in breeding success/survival, and/or to migration.
- Numbers of **kudu** show a marked decrease from a high of 583 (June 2006) to 75 in June 2008, but have stabilized at 79 in June 2009. This census method is not considered to be well suited for non-plains game like kudu.
- **Red hartebeest** numbers have remained stable at 80 in 2007, 2008 and 2009.
- **Burchell's zebra** increased from 174 in 2005 to peak at around 670 in 2007 and 2008, with a sharp decrease to 318 in 2009. In order to reduce grazing pressure on the environment, the resident and non-migrating Burchell's zebra population was reduced by 150 animals during game capture operations in 2006 and 2008. The apparent further decline (by 52%) is regarded as an artifact of the census method rather than any real loss. A total of 230 individuals were counted, of which only 76 fell into the <500m corridor. The 154 (67%) that fell outside this corridor would in theory have translated into an estimated 727, after the necessary correction factors

had been applied. In 2008, 50% of the 254 zebras counted fell outside the <500m corridor, whereas in 2007, 11% of the 152 were outside the corridor. Hence it is preferable in this case to use a “known figure”, rather than applying the area correction factor or species correction factor.

- Numbers of **steenbok** increased steadily from 53 in June 2005 to 174 in June 2008, then dropped to 32 in June 2009. The latter figure represents Route 9 only, with none counted in Route 1-8. This census method is also not considered to be well suited for steenbok.
- A culling operation in 2008 reduced the core population of **blesbok** from an estimated 25 individuals to the present total of seven for Route 1-8, while a further 16 counted in Route 9 bring the total to 23. As the species is alien to Namibia, efforts to eliminate them will continue.
- The effects of increased natural predation by re-introduced predators, including **cheetahs**, are probably minimal at this stage. According to Reserve records of observed prey, the five reintroduced male cheetahs are feeding predominantly on oryx (mostly juveniles) and springbok (adults) at this stage. Their home range is centred in count zones 2 and 6; a female cheetah is also believed to be in the same area. The effects of increased predation on game numbers in these zones should be monitored in the future. Cheetahs are also present in the southern part of the Reserve, on neighbouring property. A recent increase in vulture activity in both the above areas is believed to be associated with the increase in food availability due to these predators.
- The **giraffe** population increased to nine with the birth of two calves in August and September 2008. One of the original females disappeared in February 2009. Another female gave birth to a calf early in November 2009, but both individuals died shortly afterwards. This brings the total (in November 2009) to eight.

Worth reiterating at this stage is that management decisions are not based on population estimate increases / decreases, but rather on wildlife trends and distribution (see below). These data are obtained from actual sightings/counts and are not based on population estimates.

5.2 Biomass estimates

Biomass estimates were made by multiplying the estimated wildlife numbers with the mean mass per species, then dividing by the total number of hectares for the game count areas (i.e. 154 000 ha for Route 1-8 and 170 730 ha for Route 1-9; 18 220 ha of mountainous habitat was excluded from the total no. of hectares for the Reserve). Table 5.1 (below) shows the change in wildlife biomass on the NamibRand Nature Reserve from June 2008 to June 2009 (Route 1-8). Table 5.2 and Figure 5 (below) show the total wildlife biomass from June 2005 to June 2009.

Table 5.1

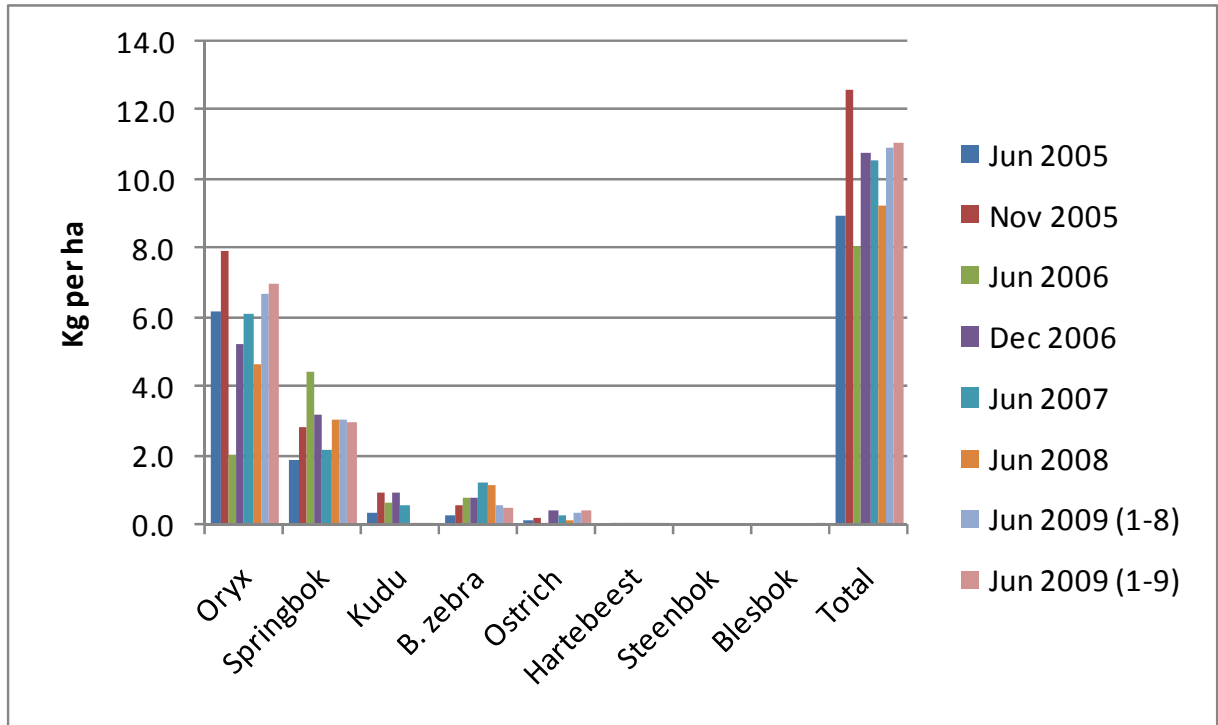
Total wildlife numbers and wildlife biomass on NamibRand for June 2008 and June 2009 (Route 1-8)							
Wildlife species	Mean mass (kg)	Jun-08			Jun-09		
		Estimated wildlife numbers from Jun 08 game count	Species biomass (kg)	Biomass per ha (kg) TOTAL	Estimated wildlife numbers from June 09 game count	Species biomass (kg)	Biomass per ha (kg) TOTAL
Oryx	220	3 258	716 760	4.7	4 700	1 034 000	6.7
Springbok	38	12 451	473 138	3.1	12 551	476 938	3.1
Kudu	180	75	13 500	0.1	79	14 220	0.1
B. zebra	280	668	187 040	1.2	318	89 040	0.6
Ostrich	68	262	17 816	0.1	829	56 372	0.4
Hartebeest	130	80	10 400	0.1	80	10 400	0.1
Steenbok	11	174	1 914	0.0	0	0	0.0
Blesbok	100	20*	2 000	0.0	7*	700	0.0
Total		16 988	1 422 568	9.2	18 564	1 681 670	10.9

*Numbers are known

Table 5.2

Total wildlife biomass (kg/ha) on NamibRand, June 2005 to June 2009								
	Jun-05	Nov-05	Jun-06	Dec-06	Jun-07	Jun-08	Jun-09 (1-8)	Jun-09 (1-9)
Oryx	6.2	8.0	2.1	5.3	6.1	4.7	6.7	7.0
Springbok	1.9	2.8	4.4	3.2	2.2	3.1	3.1	3.0
Kudu	0.3	1.0	0.7	1.0	0.6	0.1	0.1	0.1
B. zebra	0.3	0.6	0.8	0.8	1.2	1.2	0.6	0.5
Ostrich	0.2	0.2	0.1	0.4	0.3	0.1	0.4	0.4
Hartebeest	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Steenbok	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Blesbok	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total	9.0	12.6	8.1	10.8	10.6	9.2	10.9	11.1

Figure 5. Total wildlife biomass (kg per ha) on NamibRand Nature Reserve, June 2005 - June 2009



Comments

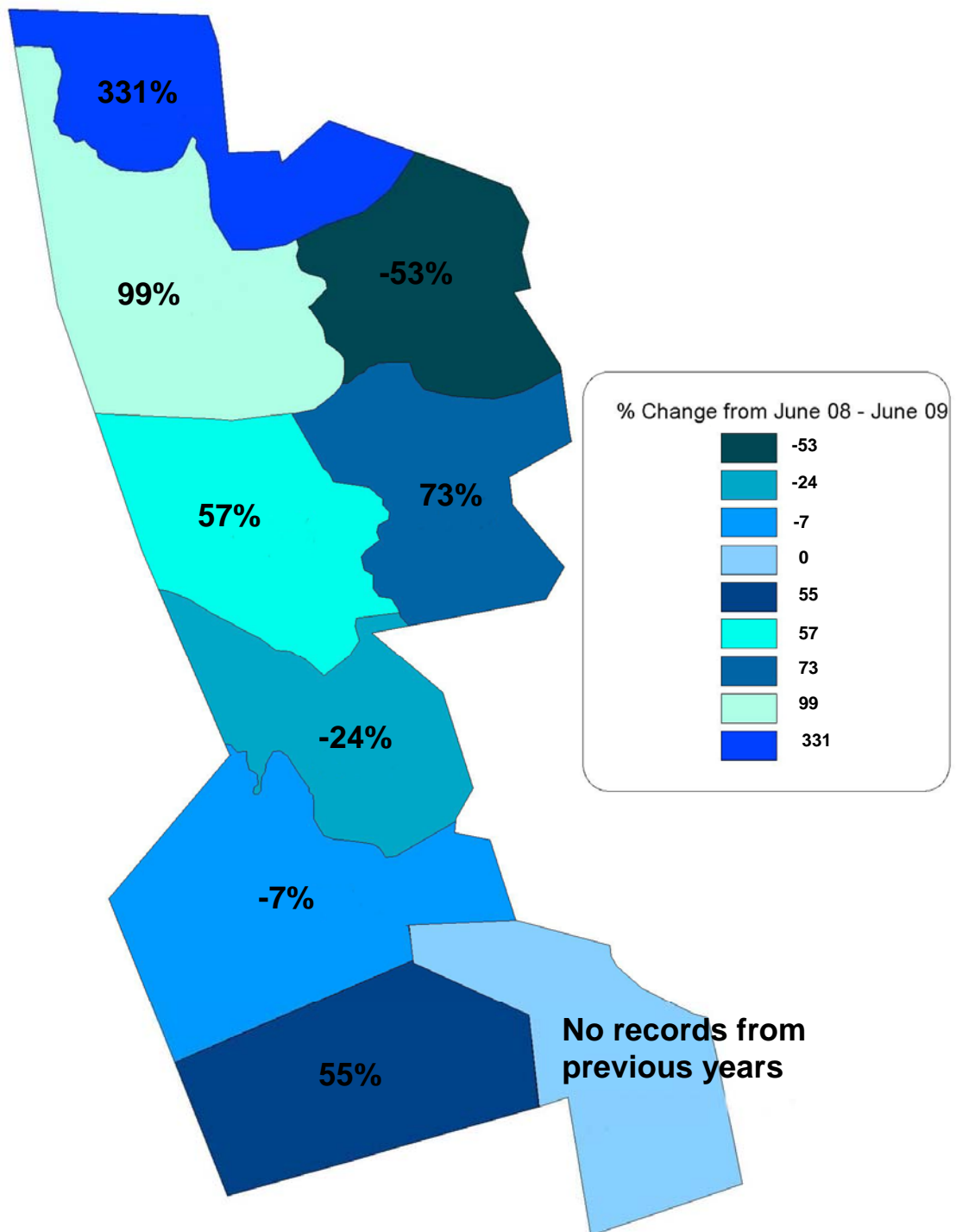
The total wildlife biomass increased from 9.2 kg/ha in June 2008 to 10.9 kg/ha in June 2009. This appears to be largely due to the increase in oryx numbers. With the addition of the Route 9, the biomass for June 2009 was again increased to 11.1 kg/ha.

The total biomass of the Reserve has increased slowly but steadily from 9.0 kg/ha in June 2005 to 10.9 (Route 1-8) and 11.1 (Route 1-9) kg/ha in June 2009. This trend can, in part, be related to good rainfall in 2006, 2008 and 2009. At the same time, the area available to the game has increased with the gradual breaching of fences with neighbouring properties, and especially with the inclusion of 16 450 ha through the establishment of the Pro-Namib Conservancy (Route 9) in June 2009.

5.3 Wildlife distribution/density

Figure 6 (below) illustrates the change in wildlife distribution in game count zones between June 2008 and June 2009.

Figure 6. Change in wildlife distribution between June 2008 and June 2009.



Comments

Compared to June 2008, mainly the north-western parts of the Reserve showed an increase in wildlife, especially Route 1, with a decrease in the central/western dune areas.

5.4 Population change

As described in the methodology section above, data need to be normalized in order to make comparisons. Table 6.1 (below) shows this standardized data for animals seen per 100km driven. Table 6.2 (below) compares the total number of animals seen per 100km driven for consecutive game counts held.

Table 6.1

Species sightings per 100km (June 2009)															
Route	Route length (km)	Oryx		Springbok		Kudu		Steenbok		B. zebra		Ostrich		Hartebeest	
		No	Per 100km	No	Per 100km	No	Per 100km	No	Per 100km	No	Per 100km	No	Per 100km	No	Per 100km
1	52	316	608	657	1264	2	4	0	0	25	48	30	58	0	0.00
2	52	39	75	504	969	1	2	0	0	47	90	86	165	14	26.92
3	59	33	56	41	69	0	0	0	0	158	268	5	8	0	0.00
4	52	74	142	28	54	0	0	0	0	3	6	11	21	0	0.00
5	70	99	141	88	126	0	0	0	0	3	4	18	26	0	0.00
6	38	110	289	210	553	6	16	0	0	56	147	24	63	2	5.26
7	55	73	133	227	413	0	0	0	0	0	0	42	76	0	0.00
8	52.4	256	489	520	992	0	0	0	0	0	0	34	65	0	0.00
9	51.3	294	573	202	394	0	0	1	2	0	0	54	105	0	0.00
Total (1-8)	430.4	1000	232.3	2275	528.6	9	1.9	0	0	292	60.6	250	58.1	16	32.2
Total (1-9)	481.7	1294	268.6	2477	514.2	9	1.9	1	0.2	292	60.6	304	63.1	16	32.2

Table 6.2

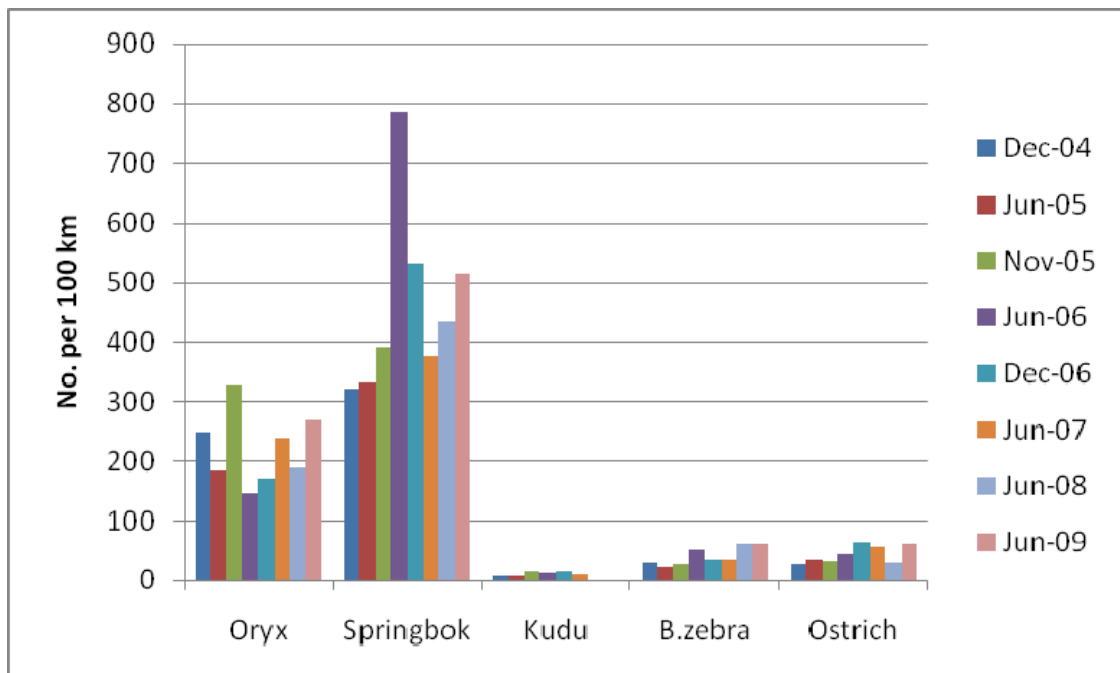
Total no. of animals seen per 100 km per route (June 2005 – June 2009)									
Route	Jun-05	Nov-05	Jun-06	Dec-06	Jun-07	Jun-08	Jun-09	% change (Jun-08 - Jun-09)	
1	608	500	1 094	581	1 117	460	1 981	330.7	
2	1 491	1 407	683	1 709	806	670	1 329	98.4	
3	387	247	1 342	635	454	863	402	-53.4	
4	239	237	424	350	275	129	223	72.9	
5	480	416	776	324	633	687	297	-56.8	
6	875	1 423	2 159	1 127	978	1 414	1 073	-24.1	
7	714	596	1 238	516	704	668	622	-6.8	
8	822	1 943	944	1 487	858	996	1 546	55.3	
9	-	-	-	-	-	-	1 105	-	
Total	579	794	1 037	816	716	715	953	33.2	

These tables put the game count data into a different perspective and help us to equate the data in a more manageable or understandable format. We can, for example, determine that should we drive 100km, or from the top to the bottom of the Reserve, we will see 514 springbok in that distance. This is the true test of the data and helps us put the huge numbers into perspective.

Percentage change in the last column of Table 6.2 indicates the increase or decrease (-) in wildlife trend from the previous year. The number of animals seen per 100 km per route is now up to 953, an increase of 33% over the previous year.

Figure 6 below translates the data listed above into a graph format for easy interpretation.

Figure 6: Population changes (animals observed per 100 km), December 2004 – June 2009



Comments

As mentioned above, only actual sightings are used to analyze these data. For this reason, data from the December 2004 count can be used. Although count zones, routes and correction factors were adjusted as from the June 2005 game count, data for the actual sighting per 100km driven remain the same and can therefore be used.

Sightings of oryx continue to grow, reaching 232 animals/100 km for Route 1-8. With the addition of Route 9, these sightings increased to 269/100 km. Springbok sightings for Route 1-8 have also increased to 529/100 km but, with the addition of Route 9, this figure drops to 514/100 km.

The total number of sightings per route is now 953/100 km and, although there is an increase of 33% over the previous year, the overall population appears to have reached a plateau with numbers being fairly stable over the last four years.

6. Conclusion

The overall population estimate for the Reserve (Route 1-8) has increased by 9% from June 2008 to June 2009, and by 19% when the Pro-Namib Conservancy area is included (Route 1-9). Over the total count period, high mean rainfall (200 - 250 mm) was experienced in 2006, 2008 and 2009, accompanied by an overall increase in numbers of 25% in June 2006, 11% in June 2008 and 9% in June 2009. In contrast, low mean rainfall (< 75 mm) in 2005 and 2007 was associated with a decrease of 20% in numbers. The total biomass of the Reserve has increased slowly but steadily from 9.0 kg/ha in June 2005 to 11.1 kg/ha in June 2009. This trend can be related to factors such as good rainfall and the increasing availability of the area available to the game. The highest density of wildlife was in the north/east and south of the Reserve, while the south-western and central vegetated dune belt had lower densities of game. The total number of sightings per route is now 715/100 km (Route 1-8) and 953/100 km (Route 1-9), the latter an increase of 33% over the previous year. The overall population appears to have reached a plateau with numbers being fairly stable over the last four years.

Acknowledgements

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