

Results of the NamibRand Nature Reserve Annual Game Count

2 June 2007



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Introduction

This paper provides feedback and results of the annual game count as held on the NamibRand Nature Reserve on the 2nd of June 2007.

Veteran game count participants will note the reference to the *annual* game count and may ask: “Why is there now only one count?” In the past an end-of-dry-season count held in December, as well as an end-of-wet-season count held in June was conducted each year. Typically only one count per annum is required to monitor wildlife numbers. Our bi-annual counts were initially set-up with the primary goal of developing the new methodology as well as to document the east-west migration of wildlife in the area. With the aid of data collected from previous game counts our methodology has now been sufficiently fine-tuned to enable us to confidently conduct only one annual count. Good data has also been obtained to accurately document the annual east-west wildlife migration.

The resource management decision to drop the end-of-wet-season count was done in consultation with senior Reserve staff and under the guidance of conservation biology experts from the Ministry of Environment and Tourism and the Namibia Nature Foundation.

It was decided to keep the annual game count scheduled for June each year as this event is usually combined with the Reserve’s annual general meeting, which makes this an ideal opportunity to hold a community participation game count.

Summary

Data collected by participants of this game count was collated and analyzed, bearing our three core objectives in mind:

Objective 1: Population estimates

There are an estimated 4,295 oryx and 9,013 springbok on the Reserve

Objective 2: Wildlife distribution

The highest density of wildlife was in the east of the Reserve, while the vegetated dune belt had the lowest density of game.

Objective 3: Population change

Compared to June 2006 most areas showed a marked decrease in the overall wildlife population, only the northern parts of the Reserve showed an increase in wildlife.

It is interesting to note that while oryx numbers are back up to what they were before the extraordinary high rainfall season in 2005/6. springbok numbers have reduced to a more normal level, the population estimate being closer to figures recorded before all the good rains fell.

In the case of oryx a marked exodus from the Reserve followed the good rains as these animals were able to spread out across good grazing in the larger area. Numbers are now once again higher as oryx are returning to the Reserve in search of permanent water.

Springbok numbers exploded in response to the good rains and their population estimate almost doubled from December 2005 to June 2006. The return to a normal population on the Reserve can be attributed to these animals migrating out of the area as well as a natural response in an increased predator population, which typically follows a few years after the good rains in response to increased population.

Methodology

This paper will not provide a detailed description of the count methodology used. For more information on this please refer to the results paper from 3 – 4 June 2005 (Odendaal & Shaw).

For the benefit of the novice reader and as a refresher the core philosophy of the methodology used will be summarized.

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 done in order to compensate for animals not seen.

For example, the chances of seeing large animals like zebra over a far 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 of 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.

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. no estimates) is normalized for all count zones or routes to animals seen per 100km. This is done so as 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. no estimates). As with distribution above, normalized or standardized data needs to be used so that comparisons can be made. The data from each route is 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

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

Table 1:

Correction Factors

Route	Area Correction Factor	Species	Species' Correction Factor
1	3.10	Oryx	1.4
2	2.93	Springbok	1.6
3	4.2	Kudu	2.6
4	3.91	Steenbok	10.0
5	2.32	Burchells Zebra	1.2
6	4.80	Ostrich	1.1
7	5.08	Red Hartebeest	1.5
8	3.88		

Results

Route Results

Tables 2 - 9 list the data collected on each route which was then analyzed. 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 – June 2007
Oryx	186	110	341
Springbok	315	286	886
Kudu			
Steenbok			
Burchells Zebra	57	41	127
Ostrich	23	10	31
Blesbok			
Red Hartebeest			
Total	581	447	1,384

Table 3

Route 2			
Species	Numbers seen - Total	Number seen under 500m	No. Corrected for area – June 2007
Oryx	70	70	205
Springbok	328	328	962
Kudu			
Steenbok			
Burchells Zebra	10	10	29
Ostrich	41	41	120
Blesbok			
Red Hartebeest	10	10	29
Total	459	459	1,346

Table 4

Route 3			
Species	Numbers seen - Total	Number seen under 500m	No. Corrected for area – June 2007
Oryx	204	142	600
Springbok	31	24	101
Kudu			
Steenbok			
Burchells Zebra			
Ostrich	24	10	42
Blesbok			
Red Hartebeest			
Total	259	176	743

Table 5

Route 4			
Species	Numbers seen - Total	Number seen under 500m	No. Corrected for area – June 2007
Oryx	94	81	317
Springbok	23	23	90
Kudu			
Steenbok			
Burchells Zebra			
Ostrich	15	15	59
Blesbok			
Red Hartebeest			
Total	132	119	466

Table 6

Route 5			
Species	Numbers seen - Total	Number seen under 500m	No. Corrected for area – June 2007
Oryx	145	103	239
Springbok	215	189	739
Kudu			
Steenbok	1	1	2
Burchells Zebra			
Ostrich	78	43	100
Blesbok			
Red Hartebeest			
Total	439	336	780

Table7

Route 6			
Species	Numbers seen - Total	Number seen under 500m	No. Corrected for area – June 2007
Oryx	15	14	67
Springbok	211	205	983
Kudu	39	39	187
Steenbok			
Burchells Zebra	85	85	408
Ostrich	11	9	43
Blesbok	2	2	10
Red Hartebeest			
Total	363	354	1,698

Table 8

Route 7			
Species	Numbers seen - Total	Number seen under 500m	No. Corrected for area – June 2007
Oryx	150	137	695
Springbok	169	169	858
Kudu			
Steenbok	2	2	10
Burchells Zebra			
Ostrich	31	31	157
Blesbok			
Red Hartebeest			
Total	352	339	1,721

Table 9

Route 8			
Species	Numbers seen - Total	Number seen under 500m	No. Corrected for area – June 2007
Oryx	142	119	604
Springbok	283	259	1,315
Kudu			
Steenbok			
Burchells Zebra			
Ostrich	22	11	56
Blesbok			
Red Hartebeest			
Total	447	389	1,975

Population estimate

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

Table 10

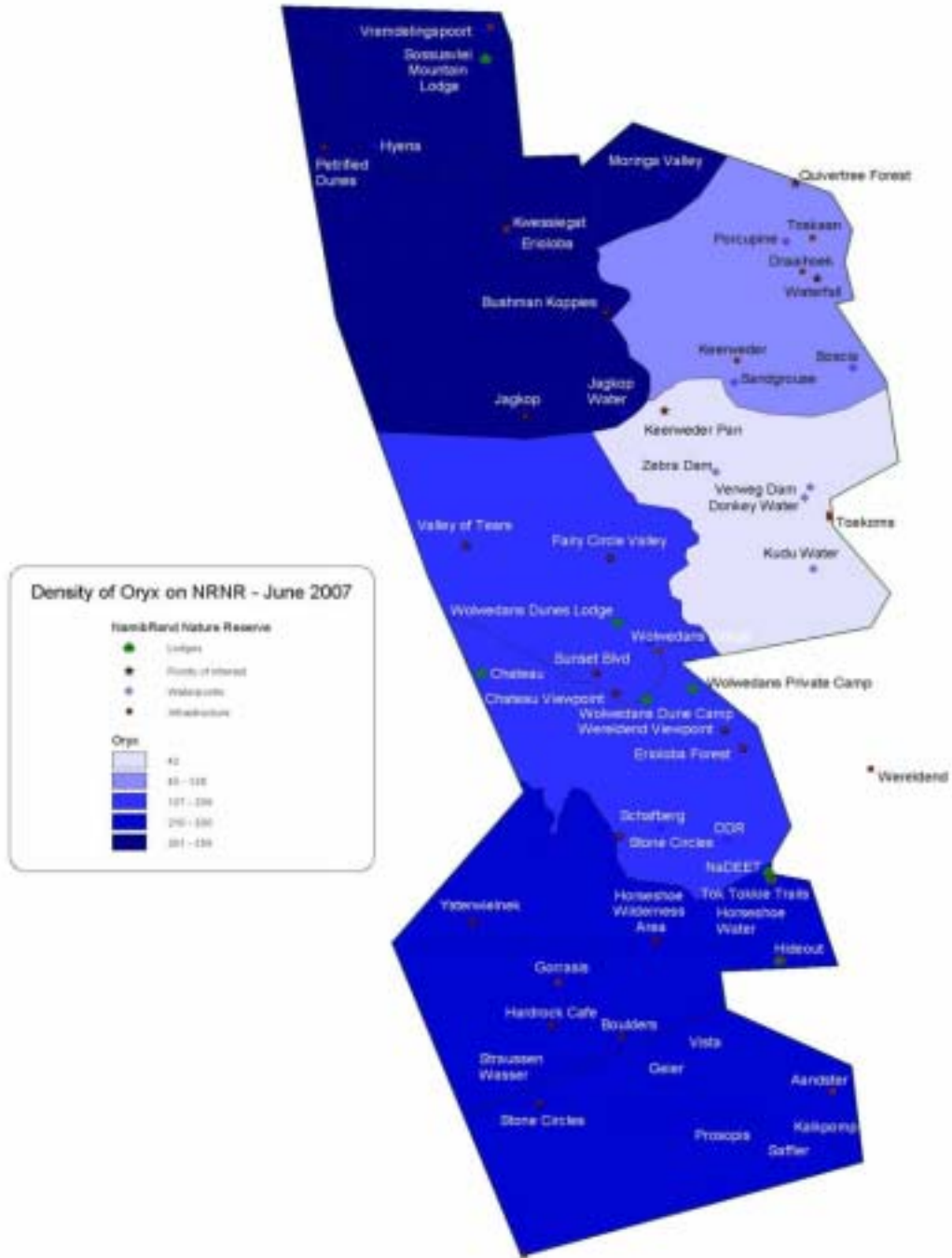
Total Numbers Of Game			
Species	No. Seen under 500m	No. Corrected For Area	Total No. Corrected For Species June 2007
Oryx	776	3,068	4,295
Springbok	1,483	5,633	9,013
Kudu	39	187	186
Steenbok	3	12	125
Burchells Zebra*	136		300
Ostrich	170	608	669
Blesbok*	2		20
Red Hartebeest*	10		80
Total	2,619	9,509	14,989

* numbers are known

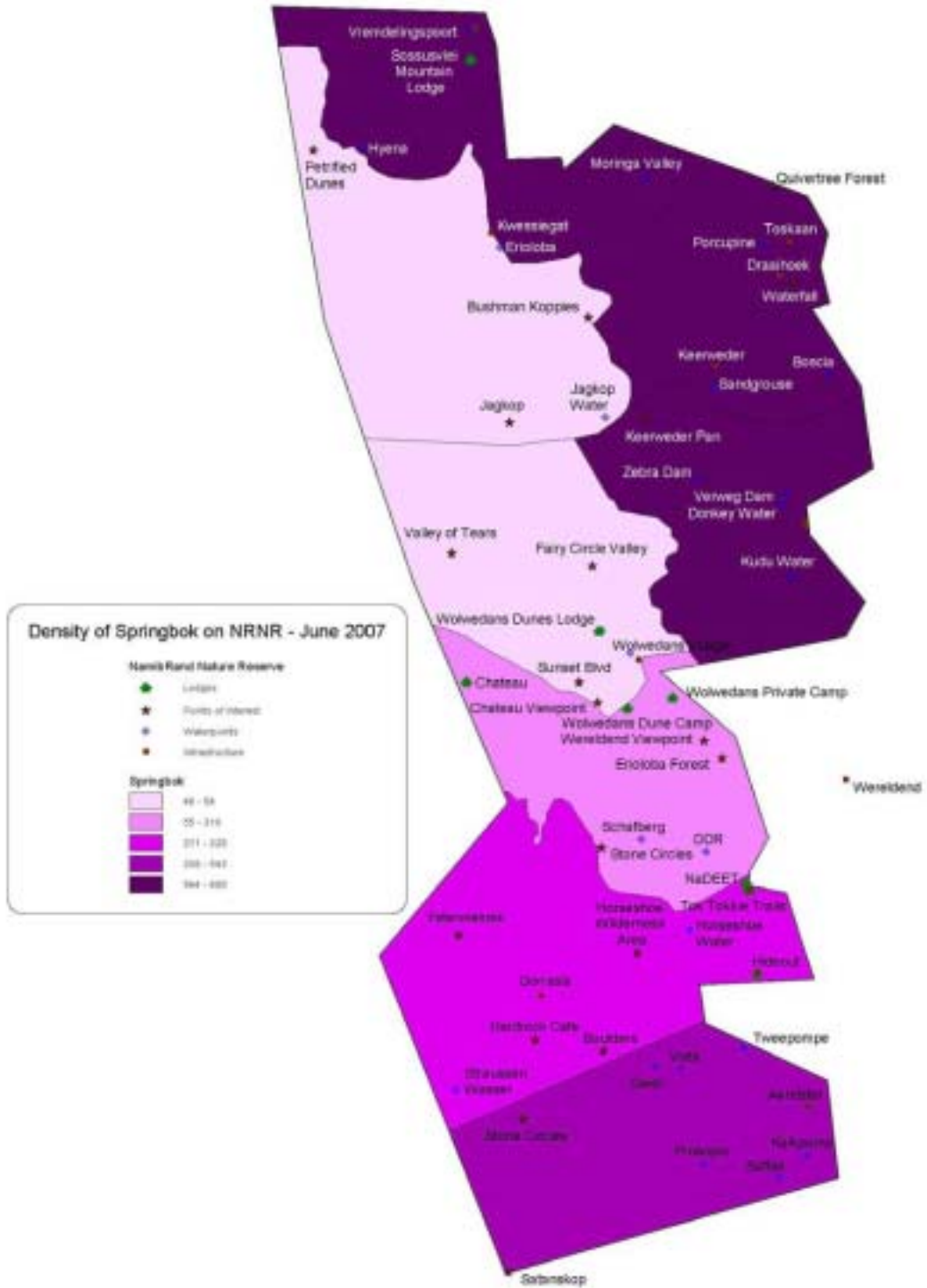
Wildlife Distribution

The following section presents distribution maps for the following species: oryx, springbok, kudu, Burchell’s zebra and ostrich.

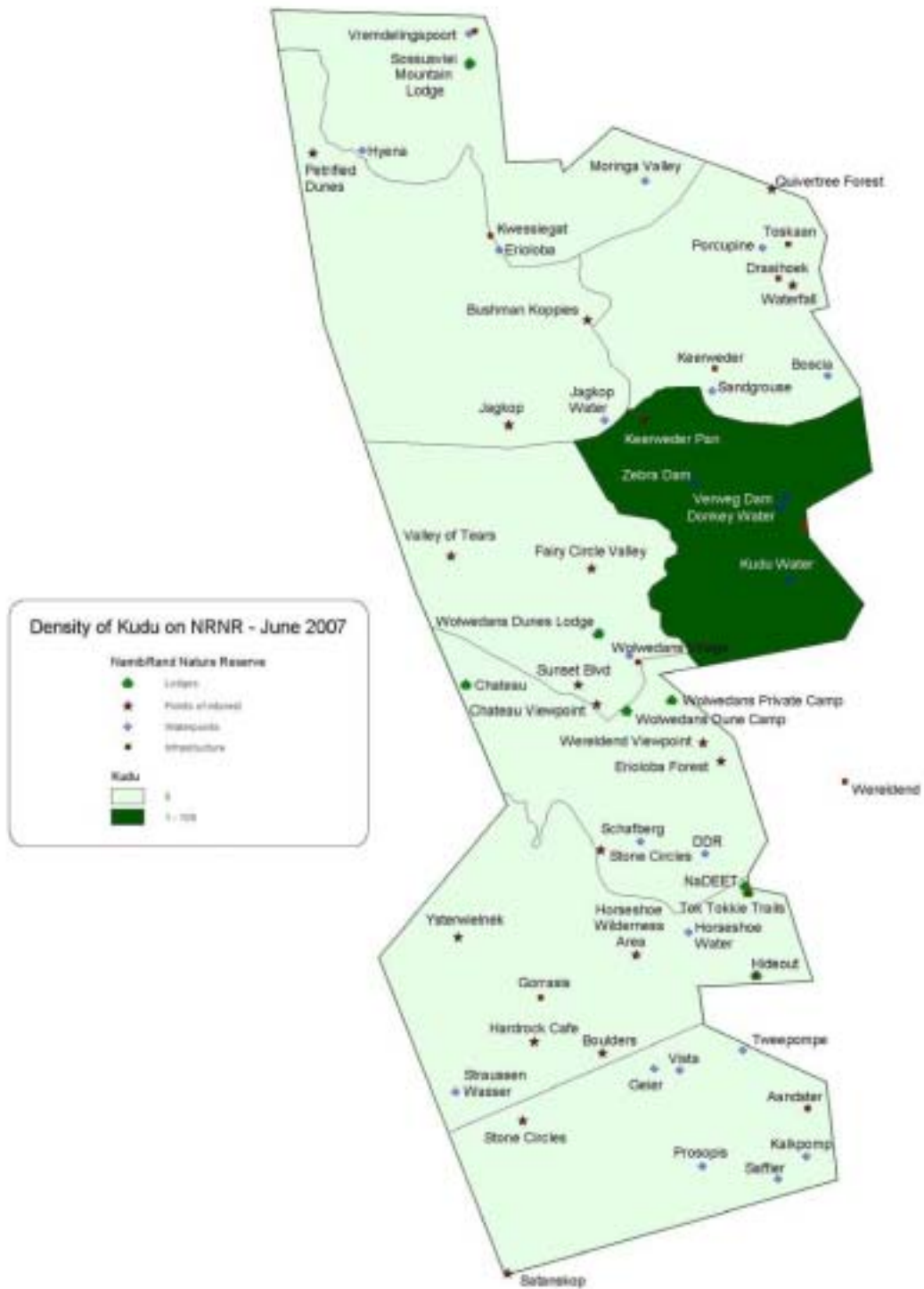
Map 1: *Distribution of oryx*



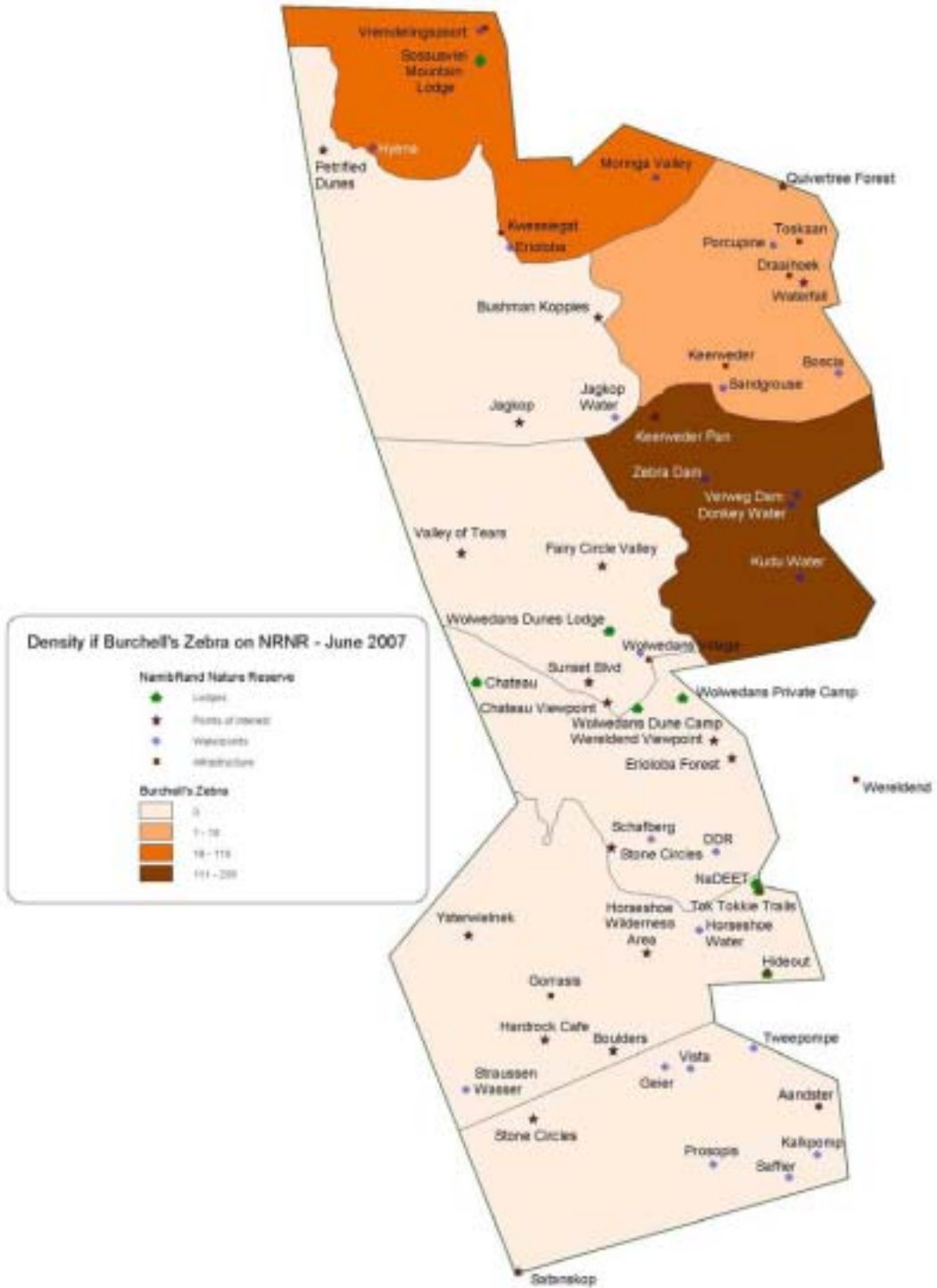
Map 2: *Distribution of springbok*



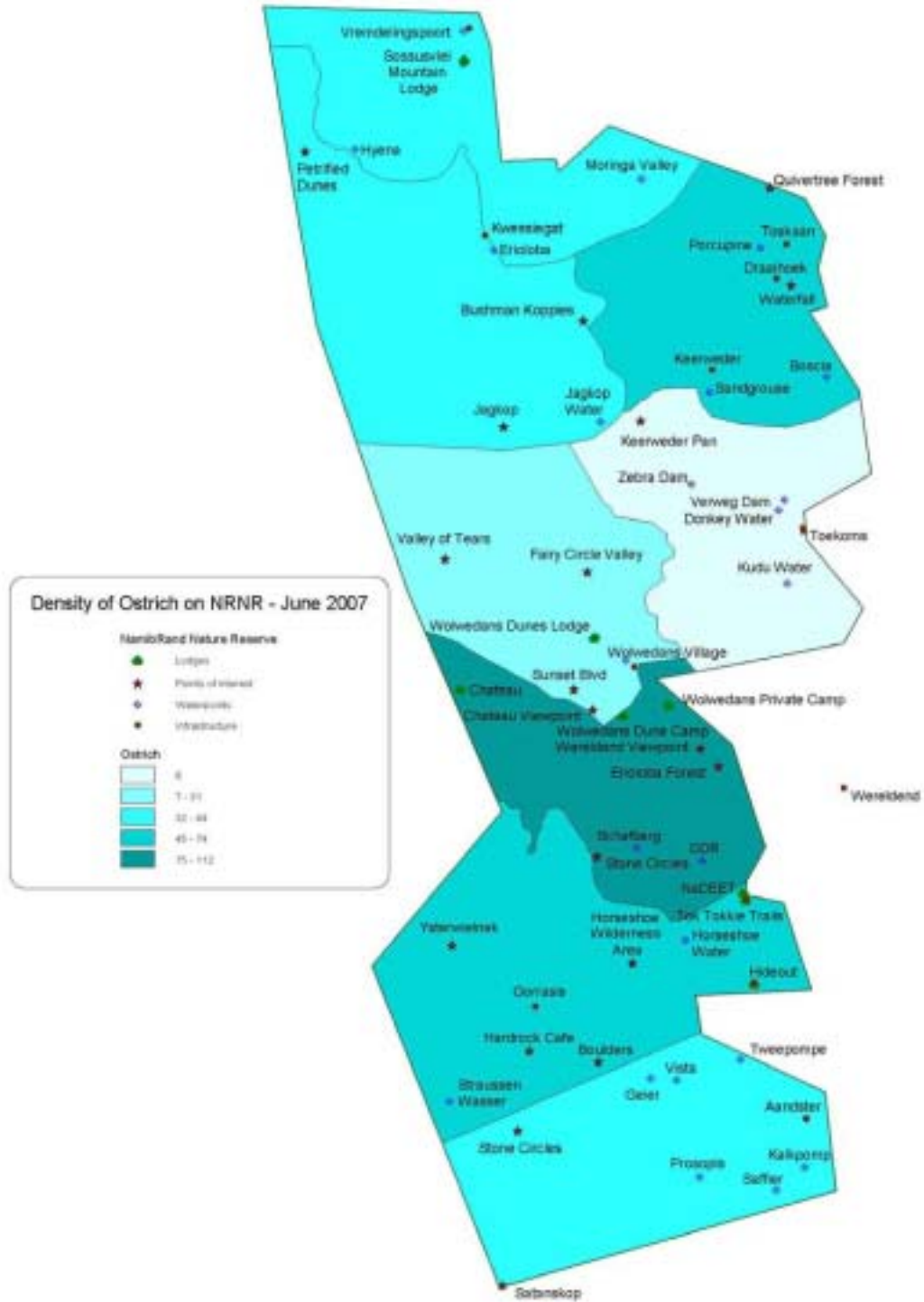
Map 3: *Distribution of kudu*



Map 4: *Distribution of Burchell's zebra*



Map 5: *Distribution of ostrich*



Data Analysis

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

Population estimates

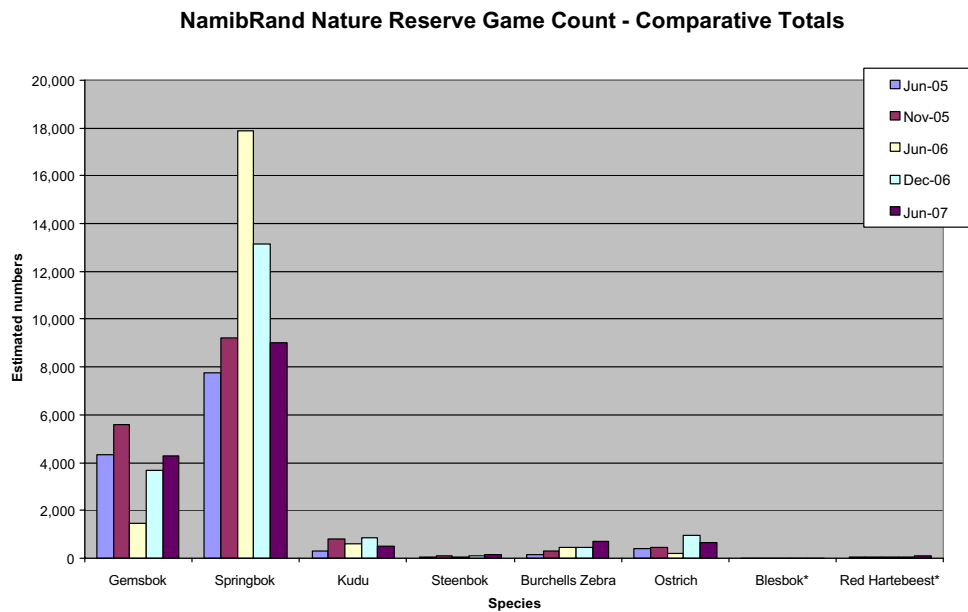
Table 11 below show data from the June 2007 count compared to data from the June 2006 count. This data is illustrated as figure 1 below.

Table 11:

Species	Jun-07			Jun-06			Percentage Change
	No. Seen under 500m	No. Corrected For Area	Total No. Corrected For Species Jun 2007	No. Seen under 500m	No. Corrected For Area	Total No. Corrected For Species June 2006	
Oryx	776	3,068	4,295	267	1,034	1,447	191%
Springbok	1,483	5,633	9,013	2,862	11,188	17,900	- 48%
Kudu	39	187	486	44	224	583	- 11%
Steenbok	3	12	125	1	4	44	200%
Burchell's Zebra	136	564	677	81	366	439	86%
Ostrich	170	608	669	48	194	213	254%
Blesbok*	2		20	0	15	15	33%
Red Hartebeest*	10		80	0	70	70	14%
Total	2,619	10,073	15,366	3,303	13,009	20,710	- 21%

* numbers of these species are known

Figure 1:



Comments

Comparing the data from this count to June 2006 we note that the overall population estimate has decreased by 21%.

Although oryx numbers have significantly increased, springbok numbers are down by almost 48%. These population estimates are close to the numbers recorded before the good rains of 2005 / 6 and represent a normalization of the ecosystem to pre-rain figures. Percentage change greater than 30% per year has to be attributed to migration of animals in and out of the Reserve.

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

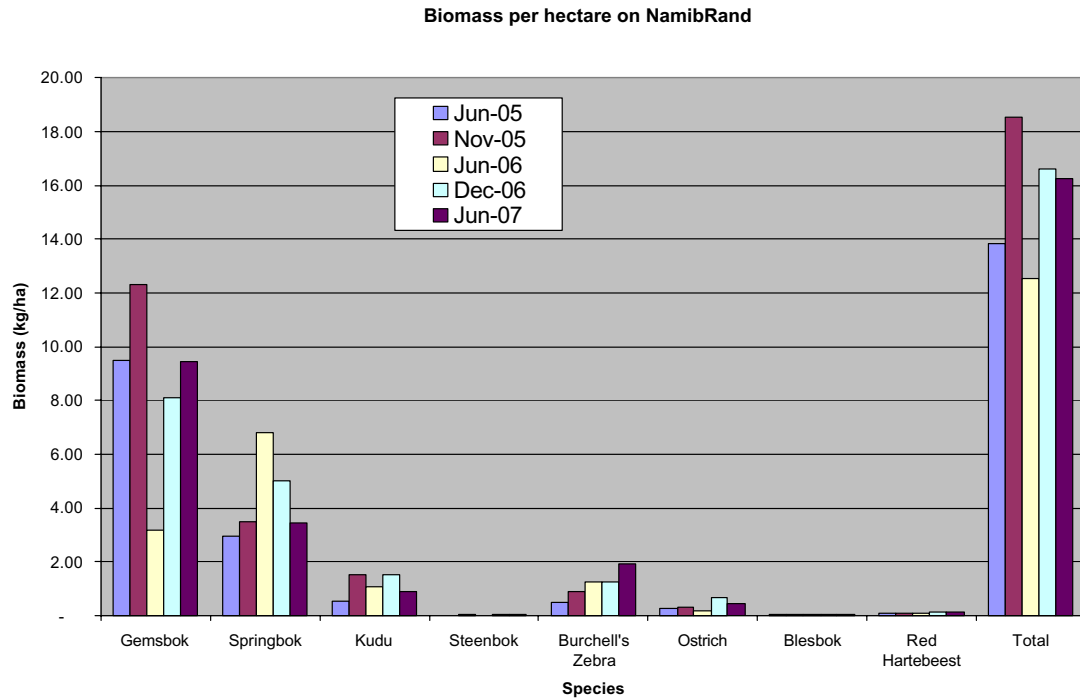
Biomass estimates

Table 12 and figure 2 below show wildlife biomass on the NamibRand Nature Reserve for June 2007 and June 2006.

Table 12:

Wildlife numbers and wildlife biomass on NamibRand for June 2007 and June 2006							
Wildlife species	Mean mass (kg)	Jun-07			Jun-06		
		Estimated wildlife numbers from Jun 07 game count	Species biomass (kg)	Biomass per ha (kg) Nov	Estimated wildlife numbers from June 06 game count	Species biomass (kg)	Biomass per ha (kg) June
Oryx	220	4,295	944,993	9.45	1,447	318,358	3.18
Springbok	38	9,013	342,511	3.43	17,900	680,203	6.80
Kudu	180	486	87,559	0.88	583	104,904	1.05
Steenbok	11	125	1,372	0.01	44	482	0.00
Burchell's Zebra	280	677	189,512	1.90	439	122,836	1.23
Ostrich	68	669	45,502	0.46	213	14,485	0.14
Blesbok	100	20	2,000	0.02	15	1,500	0.02
Red Hartebeest	130	80	10,400	0.10	70	9,100	0.09
Total		15,366	1,623,850	16.24	20,710	1,251,867	12.52

Figure 2:



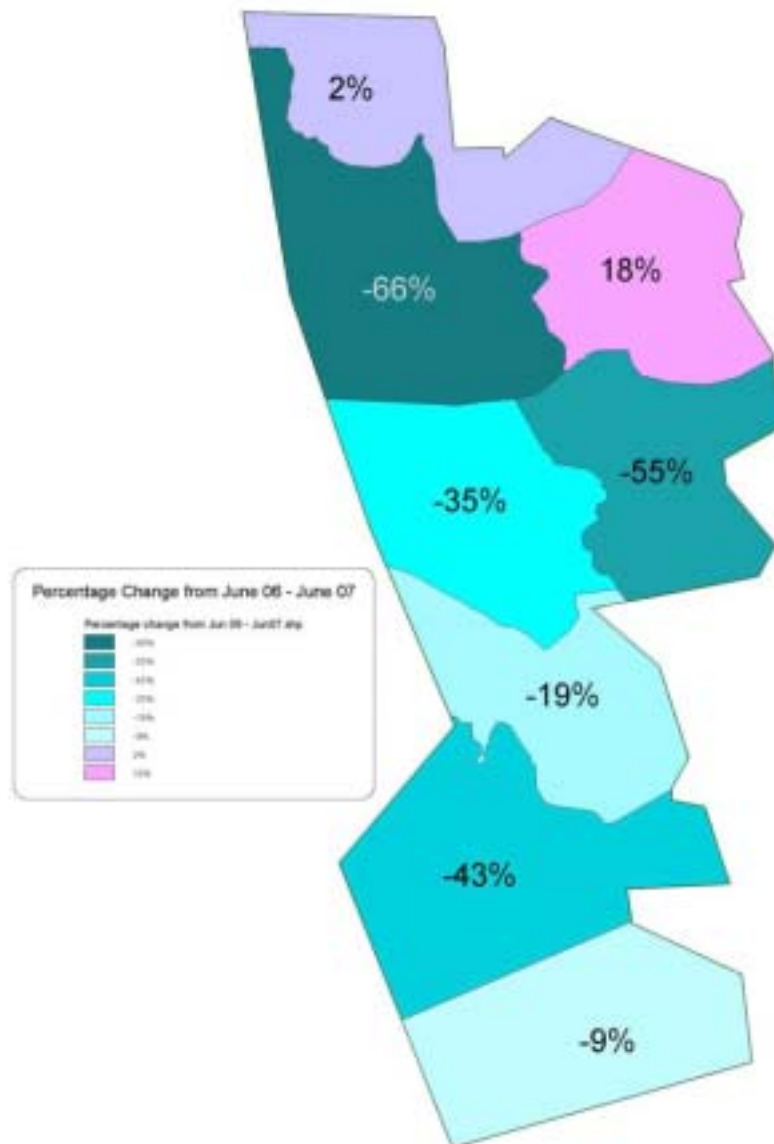
Comments

Although the June 2007 estimate shows less animals than the June 2006 estimate the overall mass per hectare has increased from 12.52kg/ha to 16.24 kg/ha. This increase is due to the return of oryx to the area. Fortunately the figure is not as high as the mass recorded in November 2005 and no immediate wildlife reduction strategies are necessary.

Wildlife distribution

Map 7 below illustrates the change in wildlife distribution between June 2007 and June 2006.

Map 7



Comments

Compared to June 2006, most areas showed a marked decrease in the overall wildlife population, only the northern parts of the Reserve showed an increase in wildlife.

Population Change

As described in the methodology section above, data needs to be normalized in order to make comparisons. Table 13 below shows this standardized data for animals seen per 100km driven.

Table 13
June 2007 - Species sightings per 100km

Route	Length Of Route (km)	Species											
		Oryx		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	186	358	315	606	0	0	0	0	57	110	23	4
2	55.7	70	126	328	589	0	0	0	0	10	18	41	7
3	57.1	204	357	31	54	0	0	0	0	0	0	24	4
4	48	94	196	23	48	0	0	0	0	0	0	15	3
5	69.4	145	209	215	310	0	0	1	1	0	0	78	11
6	36	15	42	211	586	39	108	0	0	85	236	2	
7	50	150	300	169	338	0	0	2	4	0	0	31	6
8	52.1	142	273	283	543	0	0	0	0	0	0	22	4
Total	420.3	1006	239	1575	375	39	9	3	1	152	36	236	5

Table 14 below compares the total number of animals seen per 100km driven for consecutive game counts held.

Table 14
Sightings per route

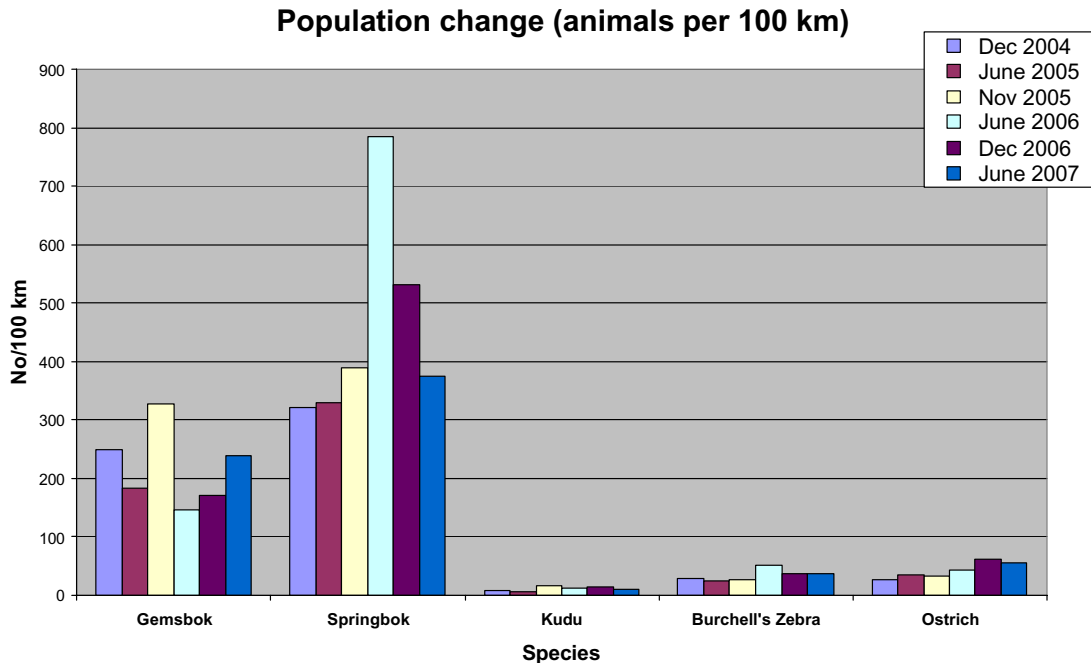
Route	length of route	June 2005	November 2005	June 2006	December 2006	June 2007	% Change (June06-June07)
1	52	608	500	1094	581	1117	2%
2	53.9	1491	1407	683	1709	806	18%
3	57	387	247	1342	635	454	-66%
4	42.9	239	237	424	350	275	-35%
5	72.9	480	416	776	324	633	-19%
6	33.9	875	1423	2159	1127	978	-55%
7	54.6	714	596	1238	516	704	-43%
8	54	822	1943	944	1487	858	-9%
Total	421.2	579	794	1037	816	716	-31%

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 375 springbok in that distance. This is the true test of the data and help us put the huge numbers into perspective.

Percentage change in the last column of table 14 indicates the increase or decrease (-) in wildlife trend.

Figure 3 below translates the data listed above into a graph format for easy interpretation.

Figure 3



Comments

As mentioned only actual sightings are used to analyze this data. For this reason data from the December 2004 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 remains the same and can therefore be used.

The graph again very clearly shows how oryx numbers are recovering on the Reserve, while springbok numbers are tapering off, down to the more realistic pre-rain figures of 2005

Acknowledgement

NamibRand staff would like to thank all those who helped with this game count. The success of our game count effort is dependent upon the participation and generous time contribution from all our stakeholders.