Regular monitoring of the wildlife populations provides important information that is essential for sustainable management. Rural communities in northwestern Namibia are becoming involved in the management of wild animals through the registration of conservancies. Whilst conservancies are the dominant form of land use in the region, they adjoin freehold land, protected areas and privately run concession areas and so these areas are also important. Consequently, all stakeholders in the region, whatever their role, require some data on the wildlife resource in order to make wise decisions.

Monitoring has taken place in the area since before the early 1970's. The quality of these monitoring efforts has varied tremendously. Whilst a reasonable amount of information is available, one of the limitations has been that these monitoring efforts have not been consistent in terms of either methodology, spatial extent or timeliness. The earlier attempts have also tended to be undertaken in a sectoral manner – either by MET, NGOs or by communities.

A workshop attended by representatives from organizations of natural resource stakeholders in the northwest recommended that monitoring efforts should be more closely coordinated. Furthermore, the workshop recognized that no single approach or technique would satisfy all information needs. An approach was adopted whereby different monitoring methods should work side by side so as to create synergy between the approaches. The road counts reported on here form part of this approach.

### Synergy between different monitoring approaches

<table>
<thead>
<tr>
<th>Road counts</th>
<th>Aerial census</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community ranger patrols</td>
<td>Local knowledge</td>
</tr>
<tr>
<td>Specialist species monitoring</td>
<td></td>
</tr>
</tbody>
</table>

More specifically, we know that road counts will not yield good results for all species especially smaller secretive animals, nocturnal animals, and animals in mountainous areas where roads are often non-existent. It is here that managers will need to look to the other monitoring methods (e.g. aerial census, foot patrols, specialist species monitoring) and local knowledge as important sources of data.
We emphasize again - the philosophy is that the road counts will augment rather than replace or compete with these other methods and initiatives.

Whilst the data produced are of prime importance, the road count has an additional role. Because the method is simple and inexpensive, local field-based people can implement the road counts with a minimum of equipment and scientific expertise. This makes it an inclusive activity that helps to develop working relationships between the different stakeholders. The data and information produced by this common activity provide a common currency upon which wise management decisions can be based.

In specific terms, the objectives and rationale for the northwest road counts are detailed in the table below.

<table>
<thead>
<tr>
<th>OBJECTIVE</th>
<th>REASONS WHY INFORMATION IS NEEDED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Estimate the numbers of game</td>
<td>It is important to know how many animals there are so that:</td>
</tr>
<tr>
<td>[How many?]</td>
<td>- reasonable hunting (or capture) quotas can be set;</td>
</tr>
<tr>
<td></td>
<td>- the stocking rate is known so as to minimize competition with livestock and to</td>
</tr>
<tr>
<td></td>
<td>- protect the veld; and</td>
</tr>
<tr>
<td></td>
<td>- the asset base of the wildlife can be ascertained.</td>
</tr>
<tr>
<td>2. Produce Game Distribution maps.</td>
<td>To facilitate proper land-use planning (zonation), it is important to know game</td>
</tr>
<tr>
<td>[Where are they?]</td>
<td>distribution, especially areas of high game concentrations. Also these distributions</td>
</tr>
<tr>
<td></td>
<td>can change in future years in reaction to rainfall or other factors such as water</td>
</tr>
<tr>
<td></td>
<td>distribution or human settlement and it is important to know this.</td>
</tr>
<tr>
<td>3. Monitor Population Change over time (trends).</td>
<td>With successive censuses, graphs can eventually be drawn showing population</td>
</tr>
<tr>
<td>[Is wildlife increasing or decreasing?]</td>
<td>fluctuations of each species (e.g. are springbok increasing or decreasing). This will</td>
</tr>
<tr>
<td></td>
<td>tell the managers whether or not they are achieving their goals with respect to game</td>
</tr>
<tr>
<td></td>
<td>numbers and, consequently, if it is necessary to change their management</td>
</tr>
<tr>
<td></td>
<td>strategies.</td>
</tr>
</tbody>
</table>

It is important to emphasize that the counts are intended to achieve all three of the above objectives. Consequently, whilst much discussion will focus on determining population estimates, the other two objectives should not be forgotten.

Trying to meet all three objectives with one count necessitates a number of compromise decisions. For example; using binoculars would greatly improve the accuracy of the count (i.e. determining numbers). However, because binoculars will not always be available for successive counts, these have been banned because their intermittent use would diminish precision - making it more difficult to detect population trend. A number of count rules were developed to ensure that the objectives were not compromised (Appendix 1).
METHODS

A vehicle-based road count was adopted because of the size of the area (in excess of 5 million ha) and the inherently low game densities. The methodology evolved during 2000 through repeated field-testing in seven conservancies over a four-month period.

Because the northwest is an open system, there were fears that there could be significant movements between the different conservancies. Consequently, it was resolved to count the entire area over a short period of no more than three weeks. To achieve this the region was broken up into five count areas and the differing areas counted simultaneously.

A two-day planning meeting was held between a number of workers representing various government and NGO institutions (see Appendix 2). This meeting reviewed and agreed on the methodology that had been used in previous years. It also sorted out a host of logistical planning issues that covered both the count and subsequent data analysis.

It was agreed that the fixed routes used in previous years would again be used so that this survey would be comparable in terms of determining wildlife population trend. 118 routes (roads or tracks) were driven, totaling approximately 6290.6 km.

Immediately prior to the count, a training session was held with all observers, drivers and data recorders. The session started with a practical explanation of sample counting and then moved into a discussion of how the count would actually be conducted. A number of field rules were presented and their rationale fully discussed (see Appendix 1). Practical training in distance estimation and map reading followed. The training ended with a practical session where data sheets were filled in during an exercise that simulated a number of expected scenarios. The various count teams then attended to a number of logistical issues in preparation for an early morning start the following day.

People from conservancies, a number of private concessionaires, MET, NNF, IRDNC, RISE, DEA, SRT, WWF and a few private persons participated in the count (Appendix 3).

Observers stood on the back of open bakkies. They counted all game sighted and recorded their position on 2 km by 2 km grid-maps.

Prior to the count, satellite images of each area were examined for habitat. Each count route was allocated an area that the team felt was represented by the road being traversed. Some areas were not adequately represented by any of the routes (e.g. some mountains, dune fields, etc) and it was decided to exclude these areas during any population projections. The practical implication of this action is that almost 20% of the area is by default assumed to have no game at all. This is obviously not correct, as there certainly are animals in these areas. This means that the projected populations will inherently be an underestimate.

This 'intentional error' means that the final population estimates are likely to be extremely conservative and it is particularly important that this conservative approach be borne in mind when using the information for decision-making.

The logistical statistics for each count area are summarized in the following table.
<table>
<thead>
<tr>
<th>Area</th>
<th>Management unit</th>
<th>Total route length</th>
<th>Total time taken (h)</th>
<th>Number of routes</th>
<th>Average strip width (m)</th>
<th>Area represented (ha)</th>
<th>Area excluded (ha)</th>
<th>% excluded</th>
<th>Total area (ha)</th>
<th>Average sampling %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Opuwambe</td>
<td>273</td>
<td>14.1</td>
<td>5</td>
<td>0.657</td>
<td>2,259</td>
<td>1307</td>
<td>37%</td>
<td>3,566</td>
<td>8%</td>
</tr>
<tr>
<td>1</td>
<td>Sanititas gap</td>
<td>42</td>
<td>3.5</td>
<td>2</td>
<td>0.615</td>
<td>368</td>
<td>140</td>
<td>28%</td>
<td>508</td>
<td>6%</td>
</tr>
<tr>
<td>1</td>
<td>Meriennifuss</td>
<td>287</td>
<td>13.8</td>
<td>5</td>
<td>0.647</td>
<td>2,172</td>
<td>862</td>
<td>28%</td>
<td>3,034</td>
<td>6%</td>
</tr>
<tr>
<td>1</td>
<td>Purros</td>
<td>318</td>
<td>21.5</td>
<td>6</td>
<td>0.531</td>
<td>2,460</td>
<td>1104</td>
<td>31%</td>
<td>3,564</td>
<td>7%</td>
</tr>
<tr>
<td>1</td>
<td>Sanititas</td>
<td>161</td>
<td>8.7</td>
<td>4</td>
<td>0.571</td>
<td>1,045</td>
<td>401</td>
<td>26%</td>
<td>1,446</td>
<td>8%</td>
</tr>
<tr>
<td>2</td>
<td>Anableb</td>
<td>216</td>
<td>16.0</td>
<td>5</td>
<td>0.600</td>
<td>805</td>
<td>839</td>
<td>51%</td>
<td>1,644</td>
<td>18%</td>
</tr>
<tr>
<td>2</td>
<td>Etendeke concession area</td>
<td>109</td>
<td>19.9</td>
<td>3</td>
<td>0.650</td>
<td>357</td>
<td>150</td>
<td>30%</td>
<td>507</td>
<td>20%</td>
</tr>
<tr>
<td>2</td>
<td>Palmwag</td>
<td>557</td>
<td>47.7</td>
<td>11</td>
<td>0.532</td>
<td>3,335</td>
<td>2556</td>
<td>43%</td>
<td>5,891</td>
<td>9%</td>
</tr>
<tr>
<td>2</td>
<td>Skeleton Coast</td>
<td>315</td>
<td>25.9</td>
<td>6</td>
<td>0.685</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Sesfontein</td>
<td>310</td>
<td>22.4</td>
<td>7</td>
<td>0.473</td>
<td>1,246</td>
<td>1044</td>
<td>46%</td>
<td>2,230</td>
<td>11%</td>
</tr>
<tr>
<td>3</td>
<td>Omamelendeke</td>
<td>213</td>
<td>13.7</td>
<td>4</td>
<td>0.457</td>
<td>858</td>
<td>774</td>
<td>47%</td>
<td>1,632</td>
<td>11%</td>
</tr>
<tr>
<td>3</td>
<td>Okangundumba</td>
<td>124</td>
<td>7.8</td>
<td>2</td>
<td>0.350</td>
<td>795</td>
<td>338</td>
<td>30%</td>
<td>1,131</td>
<td>6%</td>
</tr>
<tr>
<td>3</td>
<td>Orupupa</td>
<td>128</td>
<td>6.8</td>
<td>2</td>
<td>0.267</td>
<td>736</td>
<td>0</td>
<td>0%</td>
<td>736</td>
<td>5%</td>
</tr>
<tr>
<td>3</td>
<td>Ehir/o/puka</td>
<td>277</td>
<td>17.2</td>
<td>5</td>
<td>0.323</td>
<td>1,422</td>
<td>562</td>
<td>26%</td>
<td>1,994</td>
<td>6%</td>
</tr>
<tr>
<td>3</td>
<td>Ondundu</td>
<td>50</td>
<td>2.7</td>
<td>1</td>
<td>0.300</td>
<td>318</td>
<td>426</td>
<td>57%</td>
<td>746</td>
<td>5%</td>
</tr>
<tr>
<td>4</td>
<td>Sarris somis</td>
<td>226</td>
<td>11.9</td>
<td>4</td>
<td>0.573</td>
<td>1,879</td>
<td>411</td>
<td>15%</td>
<td>2,290</td>
<td>7%</td>
</tr>
<tr>
<td>4</td>
<td>Tseleb</td>
<td>629</td>
<td>26.4</td>
<td>8</td>
<td>0.744</td>
<td>6,685</td>
<td>1223</td>
<td>15%</td>
<td>7,908</td>
<td>7%</td>
</tr>
<tr>
<td>4</td>
<td>Hlab</td>
<td>415</td>
<td>22.8</td>
<td>8</td>
<td>0.447</td>
<td>1,742</td>
<td>75</td>
<td>4%</td>
<td>1,817</td>
<td>11%</td>
</tr>
<tr>
<td>4</td>
<td>Doro N/was</td>
<td>517</td>
<td>28.5</td>
<td>9</td>
<td>0.612</td>
<td>4,184</td>
<td>240</td>
<td>5%</td>
<td>4,424</td>
<td>8%</td>
</tr>
<tr>
<td>4</td>
<td>Olimbooyo</td>
<td>67</td>
<td>4.0</td>
<td>1</td>
<td>0.649</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Torea</td>
<td>499</td>
<td>37.5</td>
<td>8</td>
<td>0.649</td>
<td>2,633</td>
<td>859</td>
<td>25%</td>
<td>3,492</td>
<td>12%</td>
</tr>
<tr>
<td>5</td>
<td>#Khadist//Haas</td>
<td>490</td>
<td>34.9</td>
<td>9</td>
<td>0.421</td>
<td>1,845</td>
<td>1513</td>
<td>45%</td>
<td>3,358</td>
<td>11%</td>
</tr>
<tr>
<td>5</td>
<td>Hebetere</td>
<td>68</td>
<td>5.8</td>
<td>3</td>
<td>0.266</td>
<td>245</td>
<td>13</td>
<td>5%</td>
<td>258</td>
<td>8%</td>
</tr>
</tbody>
</table>

**NOTE:** Because each route was considered an independent sampling entity, the average strip width and average sampling % in the table above are for indicative purposes only and should not be used in calculations.

Immediately following the count in each area, a debriefing meeting was held and the count data verified and discussed with all participants. Rough population estimates were made using field correction factors and comments and responses from local persons were recorded. It was emphasized to all present at these meetings that the estimates were extremely rough and that further analysis and feedback was still necessary before any management decisions should be taken.

Following the count, a workshop was held between some of the natural resource support people who participated and provided technical support during the count. These persons represented the following support organizations as follows: MET, IRDNC, SRT, WWF/LIFE, RISE and NNF. The objectives of the workshop were to:

- collectively analyse the data
- develop a reporting format, and
- agree on further follow-up steps

The meeting achieved these objectives. Individual conservancy/concession-area reports were prepared and the regional summary from all of these is detailed in this report. The follow-up resolutions are detailed in the minutes of the meeting, and are available from the Natural Resource Working Group, Namibian Association of CBNRM Support Organizations (NACSO).
RESULTS

The results of the count will be presented in terms of the three count objectives described at the beginning of this report, ie:

1. population estimates,
2. game distribution, and
3. population trend.

Before presenting the details relating to these objectives, however, it is necessary to present the numbers of animals actually seen in each area during the count. These are presented in the following table.

Number of animals actually sighted during the June 2003 road count in the northwest of Namibia.

<table>
<thead>
<tr>
<th>Animal</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baboon</td>
<td>203</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Caracal</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Duker</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Elephant</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Gemsbok</td>
<td>3,418</td>
<td>66</td>
<td>227</td>
<td>181</td>
<td>309</td>
<td>73</td>
<td>22</td>
<td>211</td>
<td>235</td>
<td>782</td>
</tr>
<tr>
<td>Giraffe</td>
<td>178</td>
<td>15</td>
<td>22</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Hyena</td>
<td>16</td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Jackal</td>
<td>69</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Klopstruif</td>
<td>49</td>
<td>6</td>
<td>9</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Kudu</td>
<td>241</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Ostrich</td>
<td>791</td>
<td>10</td>
<td>90</td>
<td>56</td>
<td>36</td>
<td>28</td>
<td>26</td>
<td>49</td>
<td>50</td>
<td>41</td>
</tr>
<tr>
<td>Rhino</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Springbok</td>
<td>10,694</td>
<td>305</td>
<td>189</td>
<td>185</td>
<td>165</td>
<td>146</td>
<td>86</td>
<td>287</td>
<td>1,238</td>
<td>59</td>
</tr>
<tr>
<td>Steenbok</td>
<td>121</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td></td>
<td>3</td>
<td>7</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>Zebra</td>
<td>1,442</td>
<td>11</td>
<td>27</td>
<td>43</td>
<td>76</td>
<td>37</td>
<td>181</td>
<td>446</td>
<td>70</td>
<td>36</td>
</tr>
</tbody>
</table>

* Note that the Total column indicates the total number of animals seen during this count. This value may not agree with the sum of sightings listed for each conservancy due to shared routes.

1. Population Estimates

To achieve both local ownership and scientific accuracy, the road-count was conducted in a manner that allows population estimates to be determined in two different ways:

1. using the conventional "Strip-Count" approach; and
2. the more accurate but more sophisticated "Distance" approach.

Readers wishing to obtain more background on the methodology are referred to a booklet "Northwest Game Counts: Background Information, 2001 (Natural Resource Working Group, NACSO).

The estimated population for each of the areas is contained in the table below. Importantly, this table contains the population estimates that were made without any manipulation other than accounting for areas not adequately surveyed (through zonation). These are the figures that emerge from a 'pure' analysis of the data.
### Manipulating the population estimates in order to be Conservative

As in previous years, it was decided to take a cautious approach and manipulate the population estimates to account for the following issues of concern:

- A number of extremely large herds of springbok were seen on some routes and it was felt that population numbers would be overestimated if these large herds were simply multiplied by the route's correction factor.
- Many people felt that the effective strip width was considerably wider than that estimated during the count. If the strip widths were actually wider than estimated, this would lead to exaggerated population estimates.
- People with local knowledge of the areas were concerned that whilst they knew that certain species were present or had an idea of the sizes of known herds, the estimates of these species were inadequate (absent or too low).

Concerns over sampling distribution (i.e. ensuring that the routes covered all habitats and did not concentrate around high game density areas) were also raised but as mentioned earlier, these concerns were addressed through the zonation exercise. The effect of the zonation would in effect cause the population to be underestimated. Because large areas were excluded from the analysis, the default effect of this is that it method 'assumes' that there were NO animals in these areas! It was nevertheless acknowledged that in future years the zonation could be improved.

As previously, the concern over the impact of the few extremely large herds was mathematically addressed by excluding any herd in excess of 100 animals from the population estimation calculations. The animals in these large herds were later added to the population estimate (because these animals were definitely present) (see equations below).

#### Normal population estimate equation

\[ NS \times CF = \text{Population estimate} \]

#### Population estimate equation that accounts for the influence of larger herds

\[ ((NS - LH) \times CF) + LH = \text{Population estimate} \]

Where:  
- **NS** = Numbers of animals seen  
- **CF** = Correction factor  
- **LH** = Large herds: numbers of animals in herds greater than 100 individuals
In total, 7777 springbok (in 31 herds) were excluded from the population projection calculations. Whilst these herds were treated as outliers in the calculations, in reality they are not that rare - 31 herds of this size were seen! This manipulation is likely to have resulted in extremely conservative estimates.

The effective strip width was another area of concern. The northwest is largely open terrain and casual observers commented that the effective strip widths used in the determination of correction factors seemed to be too narrow. This was investigated by developing frequency diagrams on the distance data for a number of the more common species (refer to distance profiles).

To most people's surprise, the distance profiles confirmed that the effective strip widths were indeed much narrower than expected. This was largely accounted for by the amount of 'dead ground', vegetation, terrain, speed of vehicles, observer fatigue, not using binoculars (to identify the species of animals seen at distance), etc. The strip width estimates for each route could still be considerably improved and, in the longer term, each species should have its own strip width.

**Final population estimates**

These were derived through a combination of 'science and art'. The science has been discussed above. The art involved triangulation with other sources of information such as specialist species monitoring, past aerial census and local knowledge.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>1</th>
<th>1</th>
<th>1</th>
<th>1</th>
<th>2</th>
<th>2</th>
<th>2</th>
<th>2</th>
<th>2</th>
<th>3</th>
<th>3</th>
<th>3</th>
<th>3</th>
<th>4</th>
<th>4</th>
<th>4</th>
<th>4</th>
<th>5</th>
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<td>6.0</td>
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</tr>
<tr>
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</tr>
</tbody>
</table>

2. **Game Distribution**

Game distribution maps for any of the species found can be generated by using the CBNRM GIS. These can be produced at any scale (up to A0 in size) or for any given area. A few examples are included at the end of this report. It is necessary to bear in mind that the distribution maps are only as good as the survey coverage and so they should be viewed in conjunction with the 2km x 2km grid coverage map.
3. Population Trend

For tracking population trend over time it is best to avoid using population estimates. Confusion can arise because different correction factors are inevitable used over time. Consequently, only the numbers of animals actually sighted will be used for trend monitoring in the North-West.

<table>
<thead>
<tr>
<th>Distance (km)</th>
</tr>
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<tbody>
<tr>
<td>Baboon</td>
</tr>
<tr>
<td>Caracal</td>
</tr>
<tr>
<td>Duiker</td>
</tr>
<tr>
<td>Elephant</td>
</tr>
<tr>
<td>Gemsbok</td>
</tr>
<tr>
<td>Giraffe</td>
</tr>
<tr>
<td>Hyaena</td>
</tr>
<tr>
<td>Jackal</td>
</tr>
<tr>
<td>Klipspringer</td>
</tr>
<tr>
<td>Kudu</td>
</tr>
<tr>
<td>Ostrich</td>
</tr>
<tr>
<td>Rhino</td>
</tr>
<tr>
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</tr>
<tr>
<td>Steenbok</td>
</tr>
<tr>
<td>Zebra</td>
</tr>
</tbody>
</table>

Number of animals seen during the count

<table>
<thead>
<tr>
<th>Number of animals seen during the count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baboon</td>
</tr>
<tr>
<td>Caracal</td>
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<tr>
<td>Duiker</td>
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<tr>
<td>Gemsbok</td>
</tr>
<tr>
<td>Giraffe</td>
</tr>
<tr>
<td>Hyaena</td>
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<tr>
<td>Jackal</td>
</tr>
<tr>
<td>Klipspringer</td>
</tr>
<tr>
<td>Kudu</td>
</tr>
<tr>
<td>Ostrich</td>
</tr>
<tr>
<td>Rhino</td>
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<tr>
<td>Springbok</td>
</tr>
<tr>
<td>Steenbok</td>
</tr>
<tr>
<td>Zebra</td>
</tr>
</tbody>
</table>

In the longer term it is highly likely that new routes may be added and some routes may be removed from the annual survey. To make the results comparable between years, the sampling effort (i.e. number of km driven) needs to be standardized in some way. The numbers in the table below are expressed as the number of animals seen during the game count per 100km driven.

<table>
<thead>
<tr>
<th>Number of animals seen per 100km</th>
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</thead>
<tbody>
<tr>
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<td>Kudu</td>
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<tr>
<td>Rhino</td>
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<tr>
<td>Steenbok</td>
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<tr>
<td>Zebra</td>
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Once sufficient successive counts have been undertaken, wildlife population trends can be presented.
<table>
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<th>2003</th>
<th>2004</th>
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<th>2007</th>
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<tr>
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Total number of animals seen

<table>
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<tr>
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Total number of km driven:

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<td>6056</td>
</tr>
<tr>
<td>2003</td>
<td>6291</td>
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2002
24
2703
199
297
659
14554
1274

2003
44
3484
169
241
815
16733
1411
DISCUSSION

Whilst the survey achieved much, there is still room for improvement as follows.

1. At present only the strip count approach has been used to determine population estimates. Currently there are insufficient observations to use the DISTANCE program (except perhaps for springbok, zebra and gemsbok). Data from this and subsequent surveys can be added to determine improved “detection functions” (i.e. better “distance graphs”) and in future years the results from the more sophisticated data analysis will be included in the count report.

2. The count should always be integrated with neighboring conservancies so that a regional picture of game can be developed and to account for seasonal movements.

3. This information should be integrated with other sources of information such as foot patrols and aerial census.

4. More ‘fine tuning’ of correction factors (i.e. strip widths and zonation) should take place in future years. Importantly, improved correction factors can be used in subsequent years as this only affects the population estimates (objective 1). The correction factors have no impact on trend or distribution (objectives 2 & 3) as the latter only use actual sightings.

In terms of repeating this survey we recommend the following.

1. Training in distance estimation prior to each count is important.

2. Make sure that the same routes and methods are followed each year. No new routes should be added (excepting for the new conservancies). No routes should be dropped. Keep the field work the same each year even if in time the method is found to be inefficient. Deviating from the original method in a monitoring programme plays havoc with later interpretation of trend. The detailed descriptions of each route are in the respective conservancy/concessions’ Game Census File and in the CBNRM

3. GIS.

CONCLUSIONS

This count has successfully provided data that can be used for population estimation for a number of the more common species. It has provided some data on game distribution in the North-West but this needs to be read in conjunction with the sampling coverage. The count has successfully provided another data point for monitoring long-term population trend for a number of species. The count is not perfect. Improvements are necessary and information from other monitoring programmes are essential, particularly for those species not well represented by this count.

The following actions are recommended:

1. The count should be repeated each year in June, using the same routes and method.

2. The route zonation and strip-width estimation should be continually improved so as to arrive at better estimates of game populations.

3. A few routes in the high density game areas should be resurveyed every three months to help “fine tune” the yearly counts and provide better ‘trend’ data. At least one route should be done per management area (conservancy or concession).

4. A small working committee should be formed to organize next year’s count.

Finally, it should be recognized that the count has values other than the data it produces. It also serves an important team building and information exchange function. Once a year, it gets people out into the veld, often in areas they have never seen before.

APPENDICES

1. Field Rules for the Northwest Game Count
2. Northwest Game Count Planning Committee
3. Participants in Northwest Game Count
4. Map of 2 x 2 km grid cells covered in the count
5. Distribution maps for selected species
Appendix 1

Road Count Rules

A number of field rules have been developed to ensure that the assumptions are upheld. They are as follows:

1. Centre line (the road and immediately next to the road) are priority areas for searching.
2. Distance must be to the animal before it runs away
3. Distance must be at right angles to the road
4. Distance is to center of groups of animals (before the group moves away)
5. Where the route travels next to a fence only the animals inside the fence are counted (the route distance is then halved for that section of the route)
6. Routes must represent all habitats proportionally (i.e. also count low density areas)
7. Measure strip width per route
8. Only count adults and sub-adults - make a note of numbers of newly born juveniles (or newly hatched chicks – ostriches)

For TREND analysis, a number of additional rules were added:

9. Fixed routes will be used for subsequent counts
10. Start time is at sunrise
11. No binoculars to be used (knowing that leads to underestimation of numbers)
12. Always count from the back of an open bakkie
13. Speed must never exceed 35 km/hr

For Game distributions, an additional rule was added:

14. Location of each sighting is mapped using the Conservancy’s 2km x 2km grid square maps
# Appendix 2

**Northwest Game Count Planning Committee**

<table>
<thead>
<tr>
<th>NAME</th>
<th>INSTITUTION</th>
<th>FROM WHERE</th>
<th>CONTACT</th>
</tr>
</thead>
</table>

2008 North West Game Count Report
Appendix 3

Participants in Northwest Game Count

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<th>INSTITUTION</th>
<th>FROM WHERE</th>
</tr>
</thead>
<tbody>
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<td></td>
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