



**AERIAL CENSUS OF
ELEPHANTS AND OTHER
LARGE HERBIVORES IN
NORTH WEST
MATABELELAND,
ZIMBABWE: 2001**

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The opinions expressed herein are those of the author and do not necessarily reflect the view of USAID.

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SUMMARY

Elephants and other large herbivores, wild and domestic, in the Parks & Wild Life Estate, Forest Lands and communal lands of north-west Matabeleland, Zimbabwe, were surveyed from the air during the period 9-22 September 2001. The area surveyed totalled 25 072 km² and included Hwange National Park, Zambezi National Park, Kazuma Pan National Park, Matetsi Safari Area and Deka Safari Area. The overall sampling intensity was 7.8 %.

The survey was designed to estimate the number of elephants. Some large herbivores are not easily seen from the air and their numbers were undoubtedly underestimated. Nonetheless, population estimates are given for these species, because the estimates provide useful indices of abundance (with measures of precision) that can be used to determine spatial distribution, as well as temporal trends in population number. No corrections have been applied to any of the estimates to compensate for any undercounting or missed animals.

The estimated population numbers of the principal large herbivores were: elephant 49310 (95% confidence interval (CI) 12.3 %); buffalo 13703 (CI 53 %); zebra 6566 (CI 25 %); sable 5854 (CI 44 %), kudu 2735 (CI 29 %); impala 5207 (CI 32 %); waterbuck 821 (CI 71 %); giraffe 3437 (CI 24 %); eland 725 (CI 71 %); cattle 20390 (CI 32 %); sheep and goats 5247 (CI 65 %); and donkeys 1941 (CI 64 %). The cattle, sheep, goats and donkeys were confined to the communal lands and forest areas.

Carcass “ratios” were low in Hwange National Park, but high in the Matetsi complex, in the Communal Lands and in some Forest Areas. The estimated density of elephant carcasses in the Matetsi complex was more than twice the density recorded in Hwange NP and nearly twice as great as the density recorded in the same area two years previously. Both increased mortality and emigration are probably responsible for the high ratio in the Matetsi complex. But for the entire survey area, the estimated total number of elephant carcasses was only 3.2 % of the estimated total number of live and dead elephants, which is indicative of a population that is stable or increasing in number.

All three of the fresh carcasses of elephant seen during the survey and two of the four recent carcasses were found on four adjacent transects in the south-central part of Shakwanki stratum. Elephant mortality in this area was obviously above-average during the earlier part of 2001. The cause of the mortality is not known, but drought-related mortality of elephants is not uncommon in this area of Hwange NP.

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INTRODUCTION

Large wild and domestic herbivores were censused in north-west Matabeleland, western Zimbabwe, as part of a continuing study to monitor their numbers in Parks & Wild Life Estate and Communal Lands of Zimbabwe. This survey was part of a nation-wide survey of the elephant range in Zimbabwe. The area covered during this survey includes the largest block of Parks & Wild Life Estate in Zimbabwe, which has Hwange National Park as its centrepiece.

METHODS

Survey Area

The survey area covered 25072 km² and was divided into 23 strata (see Map 1 and Table 1). A digital text file containing the co-ordinates (in degrees latitude and longitude) of the boundaries of the strata was provided by D. Gibson, who designed the 1999 survey in this region (Dunham 2000). The file format was modified to form a bna file that could be used by the WWF software for designing aerial surveys. The co-ordinates were not changed and therefore strata boundaries are the same as those used during the 1999 survey.

The survey area included Parks & Wild Life land (Hwange National Park, Zambezi National Park, Kazuma Pan National Park, Matetsi Safari Area and Deka Safari Area), Forest Land (Sikumi Forest Land, Ngamo Forest Land and Kazuma Forest Land), Communal Land (parts of Tsholotsho and Maitengwe Communal Lands) adjacent to the eastern boundary of Hwange National Park, and small, privately-owned estates adjacent to Sikumi Forest Land. To the west of the survey area is Botswana, and elephants are free to cross the international border at will. The northern border of the survey area is the Zambezi River, which forms the international border with Zambia, and elephants are also free to cross this boundary.

Survey Design

The procedures used followed those well established for aerial surveys of African large herbivores (Norton Griffiths 1978) and utilised during earlier surveys of large herbivores in Zimbabwe.

Systematic, parallel transects were positioned across each stratum. Transects were arranged at right angles to the principal environmental feature within a stratum (see Map 1 and Table 1 for transect orientations). The distance between adjacent transects varied between strata, according to the planned sampling intensity in each stratum. Overall sampling intensity was planned to be 7.2 % and the planned sampling intensity in each stratum was determined by using the mean of the elephant densities in each stratum during 1997, 1998 and 1999 (Gibson 1997, 1999, Dunham 2000) as the predicted elephant densities in equation 1 of Gibson (1992). As a consequence, those strata expected to contain large numbers of elephants were sampled more intensively than strata expected to contain few elephants. The transect spacings used are given in Table 1.

Surveys were designed using WWF's custom software (AIRDESW, version dated 29/05/97). Given a stratum boundary in the form of a bna file, and the transect orientation and spacing, this program generated flight lines (the transects), with the first flight line offset from the end of the stratum by the random number entered as the "offset". The start and end points for each

transect were transferred as waypoints to a GPS receiver in the plane prior to flying each stratum.

Flight Procedure

The aircraft used was a Cessna 206. It was fitted with a radar altimeter and a Trimble GPS100 GPS receiver. During surveys, the aircraft was flown at approximately 160 km per hour at about 300 feet above ground level. The actual height was recorded from the radar altimeter every 30 seconds (of time) while flying along transects and later the mean height for each transect was calculated. Navigation along the transects was undertaken by the pilot, with reference to the GPS receiver and its course deviation indicator.

The aircraft crew included a pilot (Jon Cadd), a recorder (Kevin Dunham) who sat next to the pilot, and two observers (Fungai Muroki and David Chipesi) who sat behind the pilot and recorder. Both observers had previous experience of observing during aerial surveys and were the observers for the 1999 survey of this area (Dunham 2000). All four crew could talk to one another through an intercom system.

All animals seen by the observers within the strips (see section *Strip Width and Calibration* below) were called to the recorder, who wrote down the species, the number of individuals of the group that were within the strip, and the GPS location against the time (to the nearest 30 seconds) after the start of the transect. Location was recorded as longitude when flying north-south, as latitude when flying east-west and consistently as one or the other when flying transects with other orientations. The recorder used a stopwatch to record the time (to the nearest second) taken to fly each transect.

Although the survey was designed especially to count elephants, all wild herbivores larger than impala were counted, together with domestic cattle, sheep, goats and donkeys. Sheep and goats could not be differentiated from the air and were lumped together as “sheep and goats”.

During the survey, groups of elephant bulls were differentiated from elephant cow herds, although the latter may have included some bulls. Elephant carcasses were recorded and classified as:

Carcass category	Definition
1	Fresh: intact; white droppings of vultures visible; vegetation trampled; fluid stain on ground around carcass visible (animal likely to have died within the last 3 months).
2	Recent: pieces of hide still attached; skeleton still partly articulated; no vulture droppings; no trampled vegetation; no fluid stain evident (less than 1 year old, but generally since the last rainy season, i.e. 3 to 8 months old).
3	Old: bones scattered and bleached (probably died during or before the last rainy season, i.e. more than 8 months old but generally more than 1 year old and up to several years old).

The carcass “ratio”, *sensu* Douglas-Hamilton *et al.* (1992), (although it is not a ratio, but a percentage) was calculated as the estimated number of all elephant carcasses (i.e. age categories 1, 2 and 3) as a percentage of the estimated number of all elephants (i.e. live + dead). Carcasses that could not be identified as elephant carcasses were recorded as “unidentified carcasses”.

Ostriches were recorded because they are large herbivores that are ecologically similar to large mammalian herbivores. Ground hornbills are large and conspicuous birds and any seen during the survey were recorded, at the request of the DNPWLM ornithology section.

Poachers’ camps were also recorded. They were identified by the presence of meat racks (horizontal branches mounted above the ground), with or without meat, or meat hanging in trees.

Some large herbivores, e.g. kudu, are not easily seen from the air and their numbers were undoubtedly underestimated. Nonetheless, population estimates are given for these species, because the estimates provide useful indices of abundance (with measures of precision) that can be used to determine spatial distribution, as well as temporal trends in population number. No corrections have been applied to any of the estimates to compensate for any undercounting or missed animals.

All strata were flown during the period 9-22 September 2001 (Table 1).

Strip Width and Calibration

Two fishing rods were attached with custom brackets to each wing strut, so that the rods pointed backwards and parallel to the ground during level flight. The distance between the rods on each strut was arranged so that, when the aircraft was flying at 300 feet agl, the distance represented a strip about 150 m wide on the ground. Each rod was marked with a small piece of tape to provide the observers with a “decision point” (it was at this point that the observer decided whether an animal was inside the strip).

The strip widths were calibrated by flying the aircraft at right angles across an airstrip that had two sets of large-sized numbers (from 1 to 30) arranged at 10 meter intervals along the side of the airstrip. The numbers were arranged as 30, 29, 28 ...1, 0, 1,28, 29, 30, with 0 near the centre of the airstrip. Each observer noted the largest and smallest number within his strip and the recorder noted the aircraft’s height, which varied between 250 and 320 feet.

The nominal combined strip width at 300 feet was determined by averaging the combined strip widths, after adjusting these to 300 feet agl (see Appendix 1 for data and calculations).

Data Analysis

Population estimates and confidence intervals for individual strata were calculated with WWF’s custom software (AIRSURVW, version dated 22/05/97), which uses Jolly’s (1969) method 2 for unequal-sized sample units. Given the combined strip width when the plane was flying at 300 feet, and the mean height for each transect, the software determined the actual combined strip width for each transect. The area of each transect was calculated as the product of the actual combined strip width and the transect length (provided by AIRDESW). Search intensity (in minutes km⁻²) for a stratum was defined as the total time spent flying all transects within that stratum, divided by the total area of those same transects. The greater the

search intensity, the less the probability that observers will not observe animals that are within the strips.

Transects near the boundary of a stratum were often broken into two or more sections, with land outside the stratum between the sections. For the purposes of analysis, data for all sections of the same transect were combined and entered into the program as one transect. The value of Student's t entered in the program to calculate the confidence interval was t_{n-1} for $P = 0.05$ (Rohlf & Sokal 1981).

Population estimates for the entire study area and for various land units within it were calculated as the sum of the estimates for the strata within each land unit. The confidence interval for the population estimate for the entire study area and for land units that comprised more than one stratum was calculated as:

$$t_v \cdot \sqrt{\text{(Sum of Variances)}}$$

where:

v = the degrees of freedom estimated by Satterthwaite's rule (Gasaway *et al.* 1986).

RESULTS

The estimated numbers of elephants, elephant bulls in bull groups, elephants in cow herds, elephant carcasses (categories 1, 2 & 3), unidentified carcasses, buffalo, impala, sable, zebra, giraffe, kudu, warthog, wildebeest, waterbuck, eland, tsessebe, roan antelope, gemsbok, cattle, sheep and goats, and donkeys, ostrich and ground hornbill is given in Tables 2 to 26. Estimates are given for each stratum and for the entire survey area. Separate estimates are provided for the Matetsi Complex (comprising Matetsi Safari Area, Zambezi National Park, Kazuma Pan National Park, Panda Masuie Forest Land and Kazuma Forest Land), Hwange National Park (including Deka Safari Area), Forest Land (Sikumi Forest Land and Ngamo Forest Land), and the surveyed parts of Tsholotsho & Maitengwe Communal Lands. Confidence intervals (CI) and confidence limits (CL) are 95 % confidence intervals and limits. "No. seen" is the number seen in the strips during the survey. There may be small errors in the sums given at the foot of some tables. These are rounding errors: estimates, variances and sums were calculated with great precision in a spreadsheet, before being rounded to zero decimal places.

Small numbers of duiker, reedbuck, crocodile and hippopotamus were seen during the survey, but no attempt has been made to estimate the numbers of these species. Only two rhinos (species not determined) were seen during the survey.

The spatial variation in the density of the principal wildlife species within the survey area is shown in Maps 2 to 16. To facilitate comparisons, these maps follow the same format as that used to report the results of the previous survey of this region (Dunham 2000).

DISCUSSION

Elephant Carcasses

Carcass “ratios” of 2-8 % are regarded as indicative of elephant populations that are stable or increasing in number, while “ratios” greater than 8 % suggest that population number is declining (Douglas-Hamilton *et al.* 1992). “Ratios” were low throughout Hwange National Park, but generally high in the Matetsi complex, in the Communal Lands and in Sikumi Forest (Table 7). The Communal Lands and Forest Areas adjacent to Hwange National Park probably serve as sink areas for the very numerous population of elephants in the adjacent National Park. In other words, the elephant populations in the communal and forest areas would probably not be viable in the long-term without the arrival of immigrants from the National Park.

The high carcass “ratio” in Matetsi complex could reflect simply a decline in the number of live elephants as a result of movements, rather than an increase in the number of dead animals. But the estimated density of elephant carcasses in the Matetsi complex was more than twice the density estimated in Hwange NP (Table 7) and nearly twice as great as the density recorded in the same area two years previously (0.13 km⁻² during 2001 vs. 0.07 km⁻² during 1999). This suggests that increased mortality has contributed to the decline in the number of live elephants in the Matetsi complex, *cf.* two years ago. But for north-west Matabeleland overall, the carcass “ratio” was only 3.2 %, which is indicative of a population whose number is stable or increasing.

All three of the fresh carcasses of elephant and two of the four recent carcasses seen during the survey were found on four adjacent transects in the south-central part of Shakwanki stratum. Elephant mortality in this area was obviously above-average during the earlier part of 2001. The cause of this mortality is not known, but drought-related mortality of elephants is not uncommon in this part of Hwange NP (Dudley *et al.* 2001).

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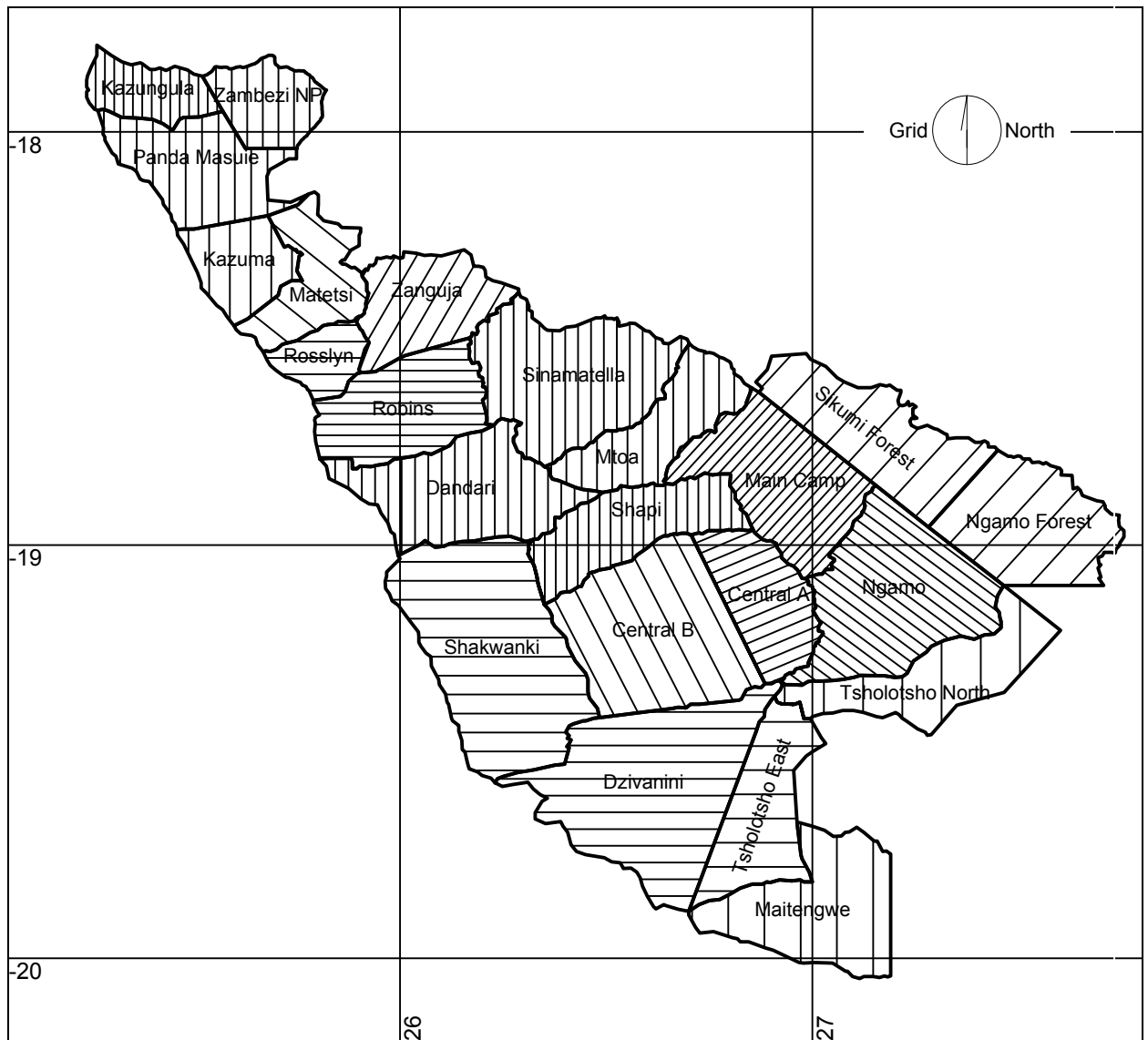
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- the staff at Main Camp and at Sinamatella Camp for their hospitality and assistance during the fieldwork;
- Dr Ivan Bond of WWF SARPO who managed the aerial survey programme, but still retained his sense of humour.



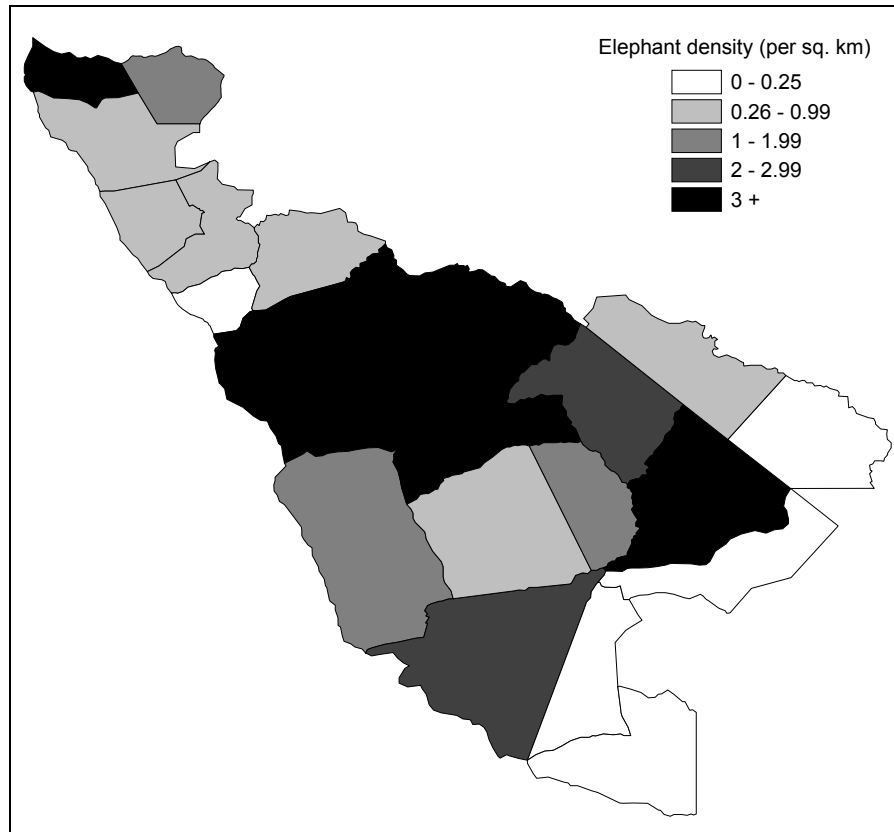
Map 1. The survey area in north-west Matabeleland, Zimbabwe. Strata names, strata boundaries (bold lines) and transects (thin, parallel lines) are shown.

Table 1. Sampling statistics for the 2001 aerial survey of elephants and other large herbivores in north-west Matabeleland

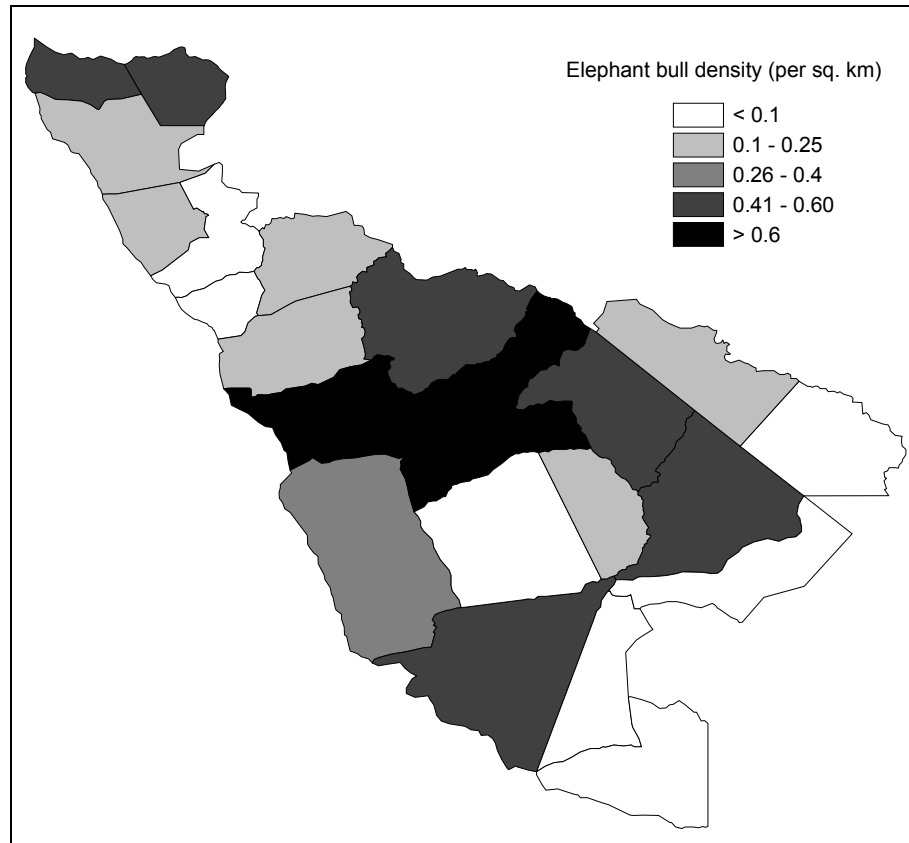
Stratum name	Area (km ²)	Transect spacing (km)	Transect orientation (°)	Number of transects (= <i>n</i>)	Percent of stratum sampled	Time and Date sampled	Hours flown			Search intensity (mins km ⁻²)
							Transects	Stratum	Total	
Zambezi NP	543	4.0	0	8	7.92	am 17/9	0.73	1.05	3.93 ^a	1.02
Kazungula	446	2.4	0	14	13.59	am 17/9	0.98	1.35	- ^a	0.97
Panda Masuie	963	4.2	0	13	7.72	am 19/9	1.25	1.78	4.10 ^b	1.01
Kazuma	561	5.3	0	6	6.22	am 19/9	0.56	0.85	- ^b	0.97
Matetsi	703	7.3	130	5	4.28	am & pm 17/9	0.49	0.62	1.98 ^c	0.98
Rossllyn	344	4.4	90	5	7.55	pm 17/9	0.44	0.60	- ^c	1.02
Zanguja	839	4.7	29	8	6.93	pm 19/9	0.86	1.15	1.87	0.89
Robins	1029	2.9	90	13	11.19	am 20/9	1.99	2.63	3.63	1.04
Dandari	1290	3.4	0	22	9.61	am 22/9	2.11	2.83	3.65	1.02
Shakwanki	2143	5.1	90	13	6.46	am 13/9	2.14	2.92	3.85	0.93
Dzivanini	2098	4.5	90	13	7.15	am 10/9	2.62	3.23	4.23	1.05
Sinamatella	1522	3.3	0	17	10.28	am 18/9	2.58	3.30	3.90	0.99
Mtoa	826	3.9	0	14	8.35	pm 13/9	1.17	1.72	2.12	1.01
Main Camp	1261	2.2	41	23	15.02	am 16/9	3.23	4.00	4.47	1.02
Shapi	923	2.8	0	20	11.64	pm 15/9	1.79	2.38	2.98	1.00
Central B	1723	5.8	154	7	5.45	am 12/9	1.64	1.88	5.10 ^d	1.05
Central A	775	3.0	66	15	10.82	am & pm 12/9	1.42	1.78	- ^d	1.01
Ngamo	1629	2.7	128	21	11.91	am 11/9	3.30	3.88	4.40	1.02
Tsholotsho East	910	6.5	90	8	4.77	am 9/9	0.79	1.20	3.58 ^e	1.09
Maitengwe	1224	9.2	0	6	3.52	am 9/9	0.77	1.17	- ^e	1.07
Tsholotsho North	976	10.0	0	8	3.13	pm 9/9	0.52	1.02	1.80	1.02
Ngamo Forest	1171	7.6	41	5	4.03	pm 11/9	0.78	0.98	1.73	0.99
Sikumi Forest	1173	7.5	41	8	4.20	pm 10/9	0.85	1.23	1.63	1.04
Total	25072 km²			Overall	7.83 %				Mean	1.01

Table 2 : Population estimates and statistics for Elephant in north-west Matabeleland

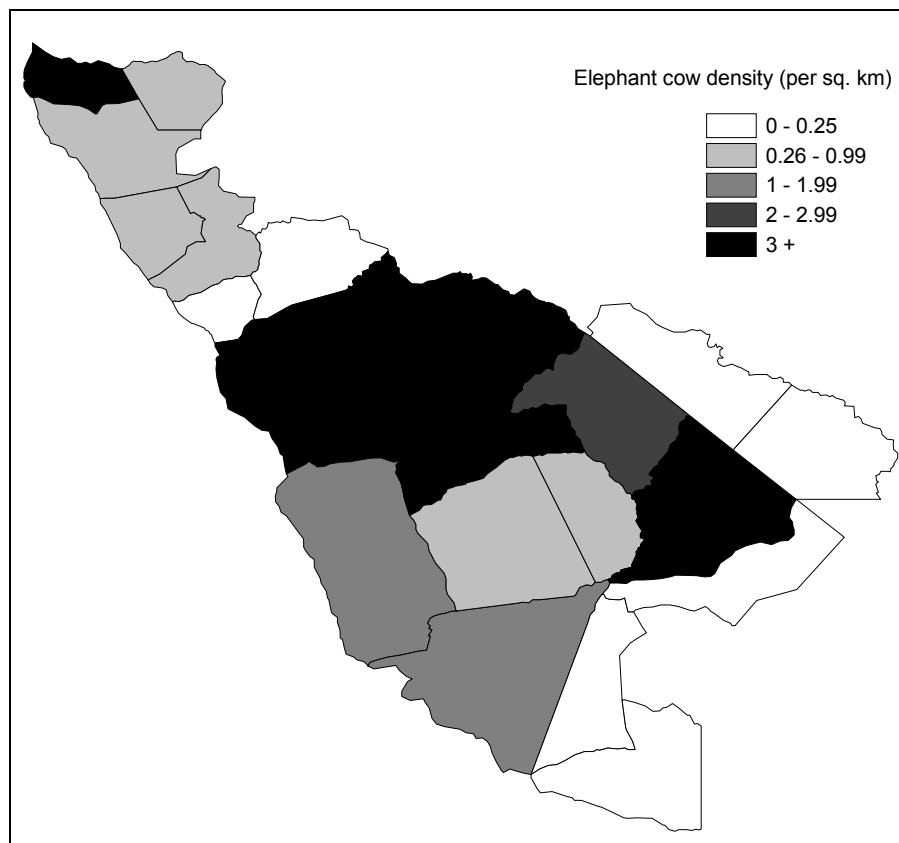
Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km⁻²)
Matetsi Complex							
Zambezi NP	656	52	45234	76.6	153	1159	1.21
Kazungula	1869	254	411615	74.1	484	3255	4.19
Panda Masuie	647	50	125031	119.0	0	1418	0.67
Kazuma	482	30	75471	146.6	0	1188	0.86
Matetsi	257	11	47141	234.5	0	860	0.37
Rosslyn	0	0	0	0.0	0	0	0.00
Zanguja	289	20	21756	120.8	0	638	0.34
Subtotals	4201	417	726249	41.3	2465	5937	0.95
Hwange National Park							
Robins	3851	431	706027	47.5	2020	5682	3.74
Dandari	6057	582	742173	29.6	4265	7849	4.70
Shakwanki	3251	210	729599	57.2	1390	5113	1.52
Dzivanini	5077	363	1709361	56.1	2228	7926	2.42
Sinamatella	5408	556	1970839	55.0	2431	8384	3.55
Mtoa	4636	387	746579	40.3	2770	6502	5.61
Main Camp	3762	565	355782	32.9	2525	4999	2.98
Shapi	4613	537	816444	41.0	2722	6504	5.00
Central B	1247	68	148583	75.6	304	2190	0.72
Central A	795	86	55317	63.5	290	1299	1.03
Ngamo	5796	690	686326	29.8	4068	7524	3.56
Subtotals	44492	4475	8667030	13.1	38654	50329	2.92
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	0	0	0	0.0	0	0	0.00
Tsholotsho North	64	2	1628	149.1	0	159	0.07
Subtotals	64	2	1628	149.1	0	159	0.02
Forest Areas							
Ngamo Forest	149	6	6676	152.2	0	376	0.13
Sikumi Forest	404	17	57315	140.0	0	971	0.35
Subtotals	553	23	63991	105.4	0	1137	0.24
Totals	49310	4917	9458898	12.3	43222	55398	1.97



Map 2. Distribution of elephants in NW Matabeleland during September 2001



Map 3. Distribution of elephant bulls in NW Matabeleland during September 2001



Map 4. Distribution of elephant cows in NW Matabeleland during September 2001**Table 3 : Population estimates and statistics for Elephant Bulls in north-west Matabeleland**

Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km⁻²)
Matetsi Complex							
Zambezi NP	227	18	7254	88.7	26	429	0.42
Kazungula	221	30	6433	78.5	48	394	0.50
Panda Masuie	168	13	8445	119.0	0	369	0.18
Kazuma	112	7	16408	292.9	0	442	0.20
Matetsi	0	0	0	0.0	0	0	0.00
Rosslyn	0	0	0	0.0	0	0	0.00
Zanguja	144	10	2961	89.1	16	273	0.17
Subtotals	873	78	41501	48.2	453	1294	0.20
Hwange National Park							
Robins	179	20	3182	68.8	56	302	0.17
Dandari	791	76	22347	39.3	480	1102	0.61
Shakwanki	743	48	37809	57.0	319	1167	0.35
Dzivanini	1119	80	44054	40.9	661	1576	0.53
Sinamatella	778	80	33463	49.8	390	1166	0.51
Mtoa	1126	94	55739	45.3	616	1636	1.36
Main Camp	699	105	13896	35.0	455	944	0.55
Shapi	765	89	14559	33.0	512	1017	0.83
Central B	128	7	5237	137.9	0	305	0.08
Central A	194	21	4764	76.3	46	342	0.25
Ngamo	790	94	21932	39.1	481	1099	0.49
Subtotals	7311	714	256982	13.8	6306	8317	0.48
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	0	0	0	0.0	0	0	0.00
Tsholotsho North	64	2	1628	149.1	0	159	0.07
Subtotals	64	2	1628	149.1	0	159	0.02
Forest Areas							
Ngamo Forest	99	4	3951	175.6	0	274	0.09
Sikumi Forest	190	8	10143	125.2	0	428	0.16
Subtotals	290	12	14094	91.3	25	554	0.12
Totals	8538	806	314205	13.0	7429	9647	0.34

Table 4 : Population estimates and statistics for Elephant Cows in north-west Matabeleland

Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km⁻²)
Matetsi Complex							
Zambezi NP	429	34	37980	107.4	0	890	0.79
Kazungula	1649	224	405181	83.4	274	3023	3.70
Panda Masuie	479	37	116587	155.3	0	1223	0.50
Kazuma	369	23	59064	169.1	0	994	0.66
Matetsi	257	11	47141	234.5	0	860	0.37
Rosslyn	0	0	0	0.0	0	0	0.00
Zanguja	144	10	18795	224.6	0	469	0.17
Subtotals	3328	339	684748	50.8	1638	5017	0.76
Hwange National Park							
Robins	3672	411	702845	49.7	1845	5499	3.57
Dandari	5266	506	719826	33.5	3501	7030	4.08
Shakwanki	2508	162	691790	72.3	696	4321	1.17
Dzivanini	3958	283	1665307	71.0	1146	6770	1.89
Sinamatella	4630	476	1937376	63.7	1679	7580	3.04
Mtoa	3510	293	690840	51.2	1715	5305	4.25
Main Camp	3063	460	341885	39.6	1850	4275	2.43
Shapi	3849	448	801885	48.7	1974	5723	4.17
Central B	1119	61	143346	82.8	192	2045	0.65
Central A	601	65	50554	80.3	118	1083	0.78
Ngamo	5006	596	664394	34.0	3306	6707	3.07
Subtotals	37180	3761	8410048	15.5	31430	42931	2.44
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	0	0	0	0.0	0	0	0.00
Tsholotsho North	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Forest Areas							
Ngamo Forest	50	2	2725	291.7	0	195	0.04
Sikumi Forest	214	9	47172	239.9	0	728	0.18
Subtotals	264	11	49897	200.3	0	792	0.11
Totals	40772	4111	9144693	14.7	34785	46759	1.63

Table 5 : Population estimates and statistics for Elephant Carcasses 1 in north-west Matabeleland

Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km⁻²)
Matetsi Complex							
Zambezi NP	0	0	0	0.0	0	0	0.00
Kazungula	0	0	0	0.0	0	0	0.00
Panda Masuie	0	0	0	0.0	0	0	0.00
Kazuma	0	0	0	0.0	0	0	0.00
Matetsi	0	0	0	0.0	0	0	0.00
Rosslyn	0	0	0	0.0	0	0	0.00
Zanguja	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Hwange National Park							
Robins	0	0	0	0.0	0	0	0.00
Dandari	0	0	0	0.0	0	0	0.00
Shakwanki	46	3	1019	149.8	0	116	0.02
Dzivanini	0	0	0	0.0	0	0	0.00
Sinamatella	0	0	0	0.0	0	0	0.00
Mtoa	0	0	0	0.0	0	0	0.00
Main Camp	0	0	0	0.0	0	0	0.00
Shapi	0	0	0	0.0	0	0	0.00
Central B	0	0	0	0.0	0	0	0.00
Central A	0	0	0	0.0	0	0	0.00
Ngamo	0	0	0	0.0	0	0	0.00
Subtotals	46	3	1019	149.8	0	116	0.003
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	0	0	0	0.0	0	0	0.00
Tsholotsho North	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Forest Areas							
Ngamo Forest	0	0	0	0.0	0	0	0.00
Sikumi Forest	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Totals	46	3	1019	149.8	0	116	0.002

Table 6 : Population estimates and statistics for Elephant Carcasses 2 in north-west Matabeleland

Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km⁻²)
Matetsi Complex							
Zambezi NP	13	1	161	237.5	0	43	0.02
Kazungula	0	0	0	0.0	0	0	0.00
Panda Masuie	0	0	0	0.0	0	0	0.00
Kazuma	0	0	0	0.0	0	0	0.00
Matetsi	0	0	0	0.0	0	0	0.00
Rosslyn	0	0	0	0.0	0	0	0.00
Zanguja	0	0	0	0.0	0	0	0.00
Subtotals	13	1	161	237.5	0	43	0.003
Hwange National Park							
Robins	0	0	0	0.0	0	0	0.00
Dandari	0	0	0	0.0	0	0	0.00
Shakwanki	31	2	407	142.0	0	75	0.01
Dzivanini	14	1	191	215.4	0	44	0.01
Sinamatella	0	0	0	0.0	0	0	0.00
Mtoa	0	0	0	0.0	0	0	0.00
Main Camp	0	0	0	0.0	0	0	0.00
Shapi	0	0	0	0.0	0	0	0.00
Central B	0	0	0	0.0	0	0	0.00
Central A	0	0	0	0.0	0	0	0.00
Ngamo	0	0	0	0.0	0	0	0.00
Subtotals	45	3	598	113.2	0	96	0.003
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	0	0	0	0.0	0	0	0.00
Tsholotsho North	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Forest Areas							
Ngamo Forest	0	0	0	0.0	0	0	0.00
Sikumi Forest	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Totals	58	4	759	98.0	1	114	0.002

Table 7 : Population estimates and statistics for Elephant Carcasses 3 and carcass ratios in north-west Matabeleland

Carcass “ratio” was calculated as the estimated number of all elephant carcasses (i.e. age classes 1, 2 and 3) as a percentage of all (i.e. live + dead) elephants.

Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km⁻²)	Carcass ratio
Matetsi Complex								
Zambezi NP	151	12	2802	82.7	26	277	0.28	20.0
Kazungula	66	9	331	59.3	27	106	0.15	3.4
Panda Masuie	104	8	611	52.0	50	157	0.11	13.8
Kazuma	32	2	1062	260.8	0	116	0.06	6.3
Matetsi	117	5	5618	178.1	0	325	0.17	31.3
Rosslyn	53	4	423	107.7	0	110	0.15	100 ^a
Zanguja	29	2	274	135.7	0	68	0.03	9.1
Subtotals	552	42	11121	41.3	324	780	0.13	11.9
Hwange National Park								
Robins	89	10	278	40.7	53	126	0.09	2.3
Dandari	146	14	2908	77.0	34	258	0.11	2.3
Shakwanki	124	8	5356	128.7	0	283	0.06	5.8
Dzivanini	98	7	1330	81.2	18	177	0.05	2.2
Sinamatella	19	2	155	135.5	0	46	0.01	0.4
Mtoa	24	2	234	137.8	0	57	0.03	0.5
Main Camp	73	11	482	62.2	28	119	0.06	1.9
Shapi	69	8	570	72.7	19	119	0.07	1.5
Central B	18	1	321	239.0	0	62	0.01	1.4
Central A	28	3	192	107.2	0	57	0.04	3.4
Ngamo	50	6	250	65.5	17	83	0.03	0.9
Subtotals	739	72	12074	29.9	518	960	0.05	1.8
Communal Areas								
Tsholotsho East	21	1	480	247.1	0	73	0.02	100 ^a
Maitengwe	57	2	2305	217.3	0	180	0.05	100 ^a
Tsholotsho North	96	3	2004	110.3	0	202	0.10	40.0 ^b
Subtotals	174	6	4789	86.0	24	323	0.06	73.1
Forest Areas								
Ngamo Forest	0	0	0	0.0	0	0	0.00	0.0
Sikumi Forest	71	3	2438	163.6	0	188	0.06	15.0
Subtotals	71	3	2438	163.6	0	188	0.03	11.4
Totals	1536	123	30421	22.7	1187	1884	0.06	3.2

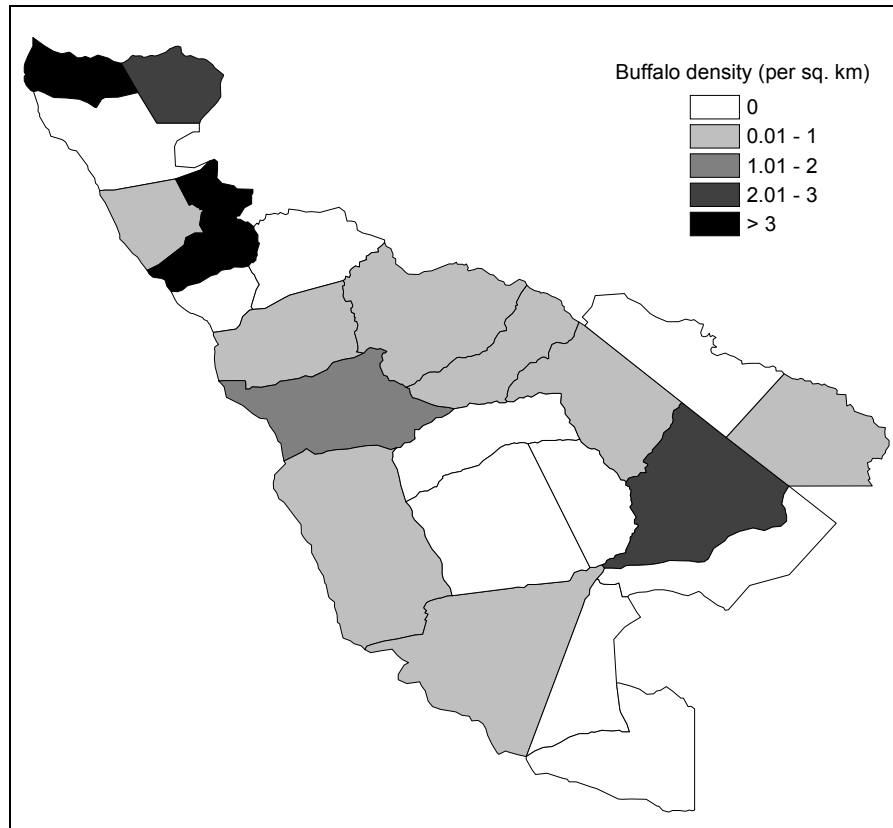
^a no live elephants seen in these strata; ^b only 2 live and 3 dead elephants seen in this stratum

Table 8 : Population estimates and statistics for Unidentified Carcasses in north-west Matabeleland

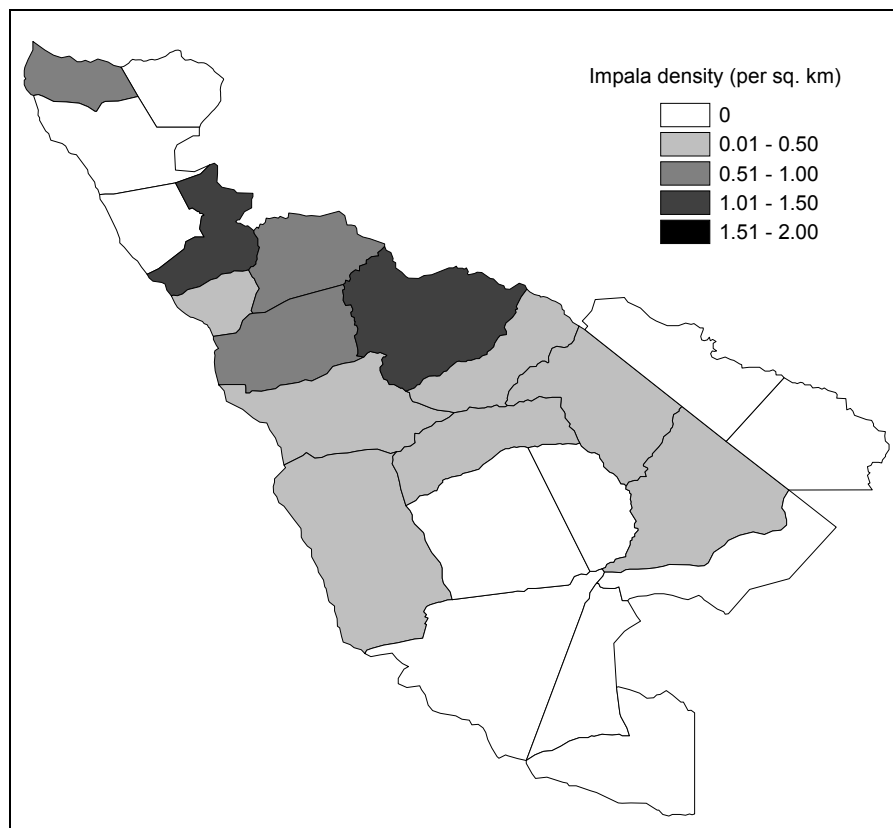
Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km⁻²)
Matetsi Complex							
Zambezi NP	25	2	573	224.3	0	82	0.05
Kazungula	44	6	269	80.3	9	80	0.10
Panda Masuie	52	4	685	110.1	0	109	0.05
Kazuma	48	3	753	146.4	0	119	0.09
Matetsi	23	1	390	234.5	0	78	0.03
Rosslyn	27	2	225	157.2	0	68	0.08
Zanguja	0	0	0	0.0	0	0	0.00
Subtotals	219	18	2895	50.0	110	329	0.05
Hwange National Park							
Robins	9	1	62	191.6	0	26	0.01
Dandari	0	0	0	0.0	0	0	0.00
Shakwanki	201	13	2541	54.6	91	311	0.09
Dzivanini	56	4	910	117.5	0	122	0.03
Sinamatella	97	10	1263	77.5	22	173	0.06
Mtoa	0	0	0	0.0	0	0	0.00
Main Camp	53	8	360	73.9	14	93	0.04
Shapi	26	3	170	105.9	0	53	0.03
Central B	18	1	321	239.0	0	62	0.01
Central A	18	2	137	135.9	0	44	0.02
Ngamo	168	20	1090	41.0	99	237	0.10
Subtotals	647	62	6854	25.6	482	813	0.04
Communal Areas							
Tsholotsho East	42	2	674	146.4	0	103	0.05
Maitengwe	57	2	1063	147.5	0	141	0.05
Tsholotsho North	32	1	958	228.7	0	105	0.03
Subtotals	131	5	2694	83.8	21	240	0.04
Forest Areas							
Ngamo Forest	50	2	959	173.1	0	136	0.04
Sikumi Forest	24	1	530	229.0	0	78	0.02
Subtotals	73	3	1490	121.1	0	162	0.03
Totals	1071	88	13933	21.8	837	1305	0.04

Table 9 : Population estimates and statistics for Buffalo in north-west Matabeleland

Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km⁻²)
Matetsi Complex							
Zambezi NP	1224	97	833943	176.4	0	3384	2.26
Kazungula	1899	258	1931870	158.1	0	4901	4.26
Panda Masuie	0	0	0	0.0	0	0	0.00
Kazuma	64	4	4077	255.5	0	228	0.12
Matetsi	3506	150	3656374	151.4	0	8814	4.99
Rosslyn	0	0	0	0.0	0	0	0.00
Zanguja	0	0	0	0.0	0	0	0.00
Subtotals	6693	509	6426263	83.4	1113	12272	1.52
Hwange National Park							
Robins	197	22	12377	123.3	0	439	0.19
Dandari	1322	127	689648	130.7	0	3049	1.03
Shakwanki	573	37	239240	186.1	0	1639	0.27
Dzivanini	28	2	343	144.3	0	68	0.01
Sinamatella	253	26	25855	134.8	0	594	0.17
Mtoa	731	61	413763	190.1	0	2120	0.89
Main Camp	166	25	8090	112.1	0	353	0.13
Shapi	0	0	0	0.0	0	0	0.00
Central B	0	0	0	0.0	0	0	0.00
Central A	0	0	0	0.0	0	0	0.00
Ngamo	3394	404	4729834	133.7	0	7930	2.08
Subtotals	6663	704	6119149	75.6	1624	11702	0.44
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	0	0	0	0.0	0	0	0.00
Tsholotsho North	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Forest Areas							
Ngamo Forest	348	14	129853	287.7	0	1348	0.30
Sikumi Forest	0	0	0	0.0	0	0	0.00
Subtotals	348	14	129853	287.7	0	1348	0.15
Totals	13703	1227	12675266	52.9	6451	20955	0.55



Map 5. Distribution of buffalo in NW Matabeleland during September 2001



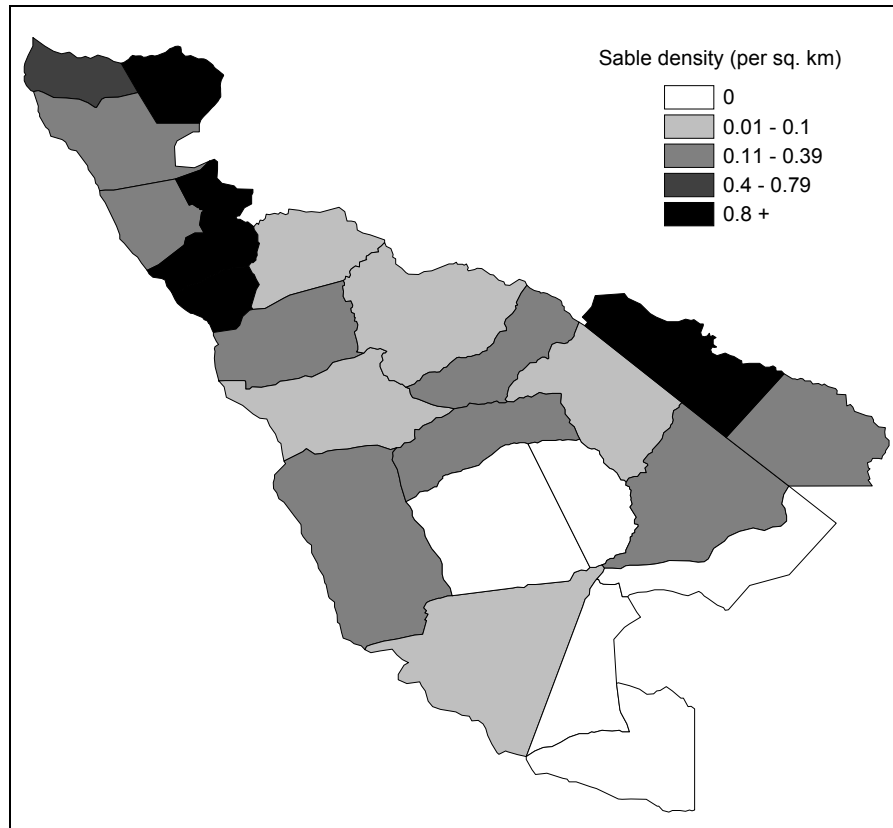
Map 6. Distribution of impala in NW Matabeleland during September 2001

Table 10 : Population estimates and statistics for Impala in north-west Matabeleland

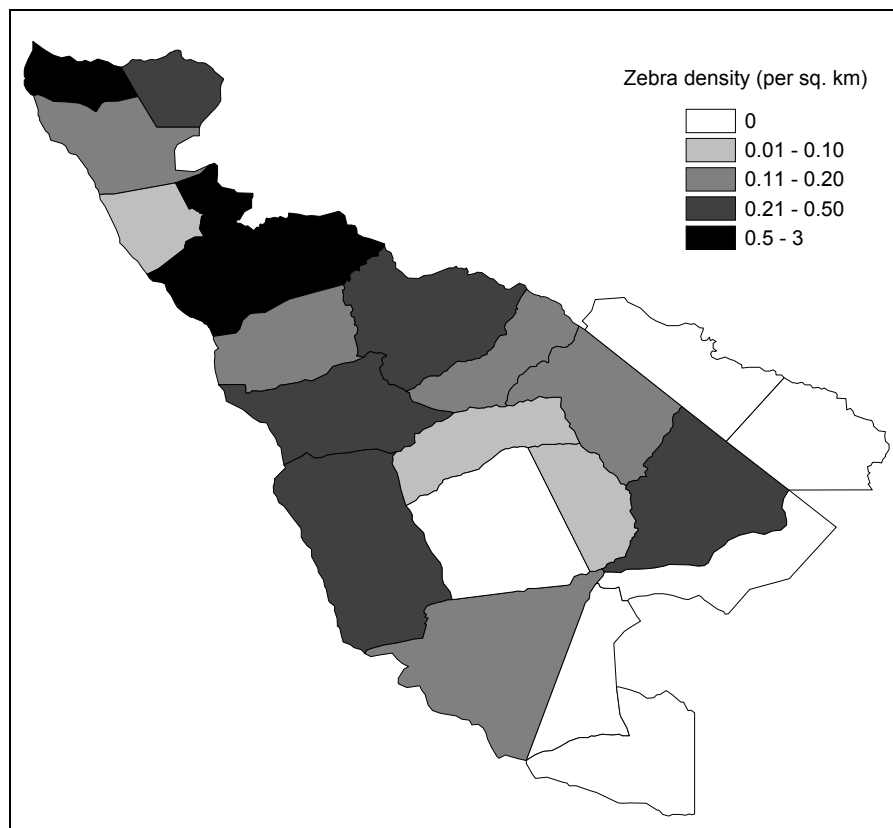
Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km ⁻²)
Matetsi Complex							
Zambezi NP	0	0	0	0.0	0	0	0.00
Kazungula	294	40	11088	77.3	67	522	0.66
Panda Masuie	0	0	0	0.0	0	0	0.00
Kazuma	0	0	0	0.0	0	0	0.00
Matetsi	748	32	118118	127.6	0	1702	1.06
Rosslyn	172	13	17136	210.9	0	536	0.50
Zanguja	751	52	96113	97.7	18	1484	0.90
Subtotals	1965	137	242454	54.6	892	3038	0.45
Hwange National Park							
Robins	867	97	197670	111.8	0	1835	0.84
Dandari	52	5	2183	186.8	0	149	0.04
Shakwanki	155	10	17700	187.2	0	445	0.07
Dzivanini	0	0	0	0.0	0	0	0.00
Sinamatella	1614	166	175062	54.9	727	2502	1.06
Mtoa	72	6	3522	178.4	0	200	0.09
Main Camp	93	14	5589	166.3	0	248	0.07
Shapi	95	11	7007	185.4	0	270	0.10
Central B	0	0	0	0.0	0	0	0.00
Central A	0	0	0	0.0	0	0	0.00
Ngamo	294	35	53288	163.8	0	776	0.18
Subtotals	3242	344	462022	42.4	1866	4617	0.21
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	0	0	0	0.0	0	0	0.00
Tsholotsho North	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Forest Areas							
Ngamo Forest	0	0	0	0.0	0	0	0.00
Sikumi Forest	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Totals	5207	481	704476	32.4	3519	6895	0.21

Table 11 : Population estimates and statistics for Sable in north-west Matabeleland

Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km ⁻²)
Matetsi Complex							
Zambezi NP	568	45	111004	138.7	0	1356	1.05
Kazungula	353	48	23719	94.2	21	686	0.79
Panda Masuie	155	12	4103	89.8	16	295	0.16
Kazuma	177	11	9412	141.2	0	426	0.32
Matetsi	935	40	365187	179.5	0	2612	1.33
Rosslyn	318	24	75304	239.5	0	1080	0.93
Zanguja	43	3	494	121.4	0	96	0.05
Subtotals	2549	183	589222	68.1	813	4286	0.58
Hwange National Park							
Robins	152	17	8343	131.0	0	351	0.15
Dandari	21	2	182	134.7	0	49	0.02
Shakwanki	232	15	50668	211.2	0	723	0.11
Dzivanini	14	1	191	215.4	0	44	0.01
Sinamatella	68	7	4415	206.9	0	209	0.05
Mtoa	96	8	1403	84.4	15	177	0.12
Main Camp	127	19	2582	83.3	21	232	0.10
Shapi	112	13	5617	140.5	0	269	0.12
Central B	0	0	0	0.0	0	0	0.00
Central A	0	0	0	0.0	0	0	0.00
Ngamo	361	43	24126	89.7	37	685	0.22
Subtotals	1182	125	97527	53.5	550	1815	0.08
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	0	0	0	0.0	0	0	0.00
Tsholotsho North	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Forest Areas							
Ngamo Forest	124	5	4628	152.1	0	313	0.11
Sikumi Forest	1998	84	792360	105.4	0	4103	1.70
Subtotals	2122	89	796989	99.5	11	4234	0.91
Totals	5854	397	1483737	43.9	3284	8424	0.23



Map 7. Distribution of sable in NW Matabeleland during September 2001



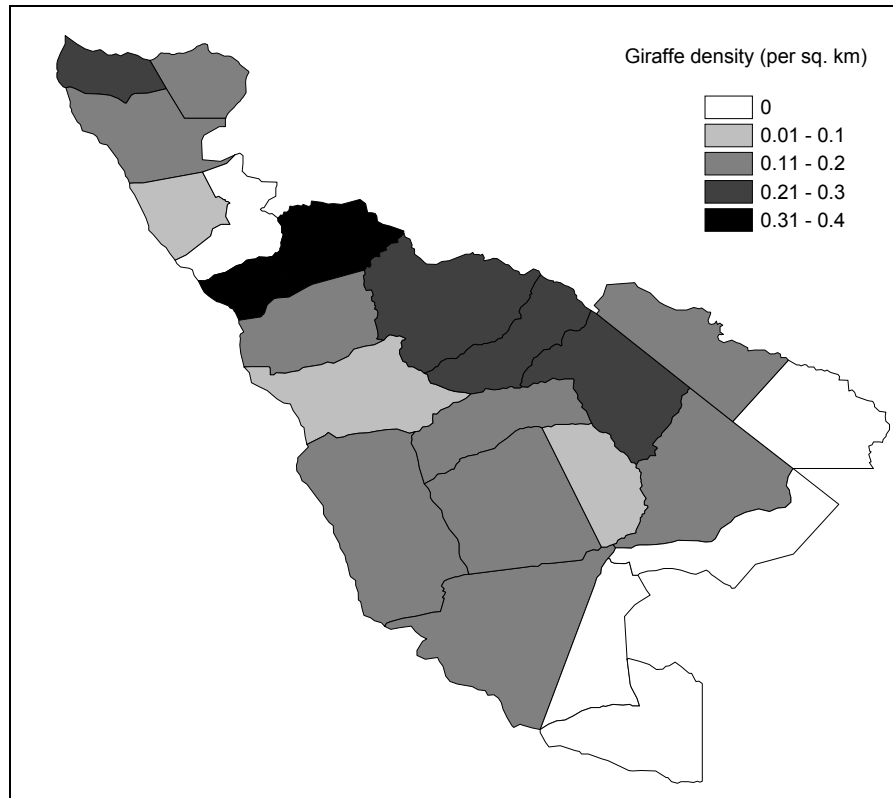
Map 8. Distribution of zebra in NW Matabeleland during September 2001

Table 12 : Population estimates and statistics for Zebra in north-west Matabeleland

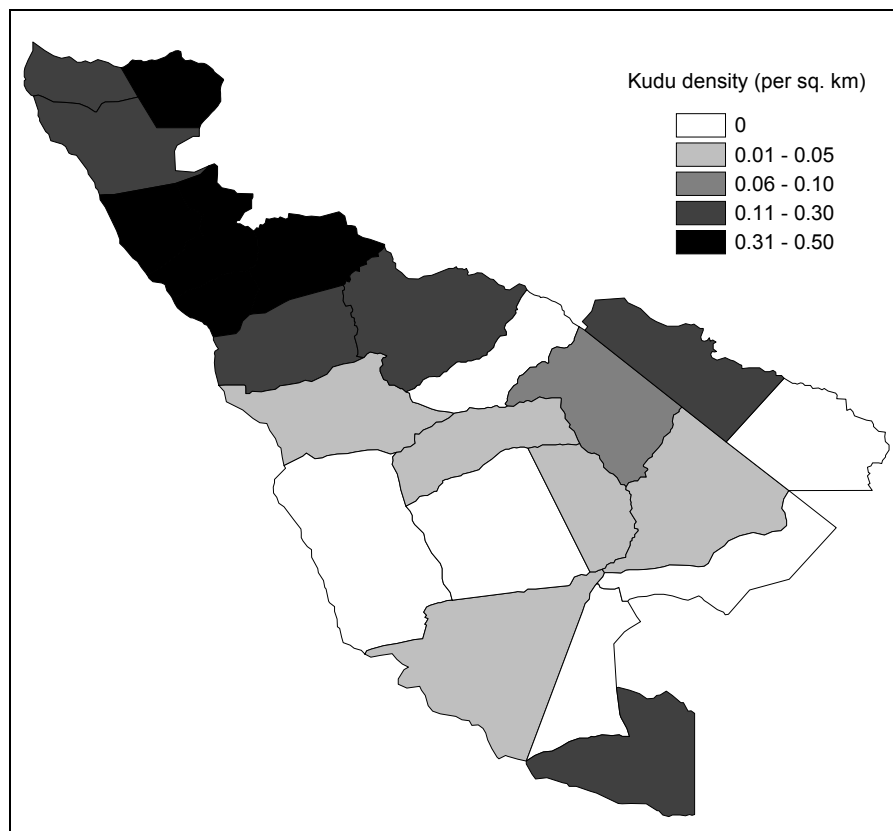
Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km ⁻²)
Matetsi Complex							
Zambezi NP	252	20	19659	131.4	0	584	0.47
Kazungula	228	31	21603	139.2	0	546	0.51
Panda Masuie	194	15	36420	214.1	0	610	0.20
Kazuma	48	3	2926	288.6	0	187	0.09
Matetsi	1987	85	218550	65.3	689	3284	2.83
Rosslyn	318	24	63689	220.3	0	1019	0.93
Zanguja	606	42	27921	65.2	211	1002	0.72
Subtotals	3634	220	390768	37.9	2258	5010	0.83
Hwange National Park							
Robins	170	19	4596	87.0	22	317	0.17
Dandari	635	61	38628	64.4	226	1044	0.49
Shakwanki	604	39	90112	108.3	0	1258	0.28
Dzivanini	350	25	34382	115.6	0	754	0.17
Sinamatella	340	35	9792	61.6	131	550	0.22
Mtoa	120	10	4190	116.7	0	260	0.15
Main Camp	200	30	12237	114.9	0	429	0.16
Shapi	26	3	332	148.1	0	64	0.03
Central B	0	0	0	0.0	0	0	0.00
Central A	18	2	294	199.2	0	55	0.02
Ngamo	470	56	28645	75.1	117	823	0.29
Subtotals	2933	280	223209	32.3	1986	3879	0.19
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	0	0	0	0.0	0	0	0.00
Tsholotsho North	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Forest Areas							
Ngamo Forest	0	0	0	0.0	0	0	0.00
Sikumi Forest	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Totals	6566	500	613977	24.5	4955	8177	0.26

Table 13 : Population estimates and statistics for Giraffe in north-west Matabeleland

Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km⁻²)
Matetsi Complex							
Zambezi NP	88	7	1862	115.5	0	190	0.16
Kazungula	96	13	3031	124.3	0	215	0.22
Panda Masuie	104	8	1611	84.4	16	191	0.11
Kazuma	16	1	266	260.8	0	58	0.03
Matetsi	0	0	0	0.0	0	0	0.00
Rosslyn	106	8	1530	102.4	0	215	0.31
Zanguja	188	13	5483	93.3	13	363	0.22
Subtotals	597	50	13782	40.1	358	837	0.14
Hwange National Park							
Robins	134	15	6823	134.3	0	314	0.13
Dandari	42	4	880	148.2	0	103	0.03
Shakwanki	356	23	8105	55.1	160	552	0.17
Dzivanini	336	24	18301	87.8	41	630	0.16
Sinamatella	370	38	16387	73.4	98	641	0.24
Mtoa	180	15	5339	87.8	22	338	0.22
Main Camp	353	53	8939	55.6	157	549	0.28
Shapi	163	19	4593	86.9	21	305	0.18
Central B	348	19	39013	138.7	0	832	0.20
Central A	74	8	1252	102.7	0	150	0.10
Ngamo	294	35	5675	53.5	137	451	0.18
Subtotals	2649	253	115307	25.9	1964	3334	0.17
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	0	0	0	0.0	0	0	0.00
Tsholotsho North	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Forest Areas							
Ngamo Forest	0	0	0	0.0	0	0	0.00
Sikumi Forest	190	8	35485	234.1	0	636	0.16
Subtotals	190	8	35485	234.1	0	636	0.08
Totals	3437	311	164574	23.7	2623	4251	0.14



Map 9. Distribution of giraffe in NW Matabeleland during September 2001



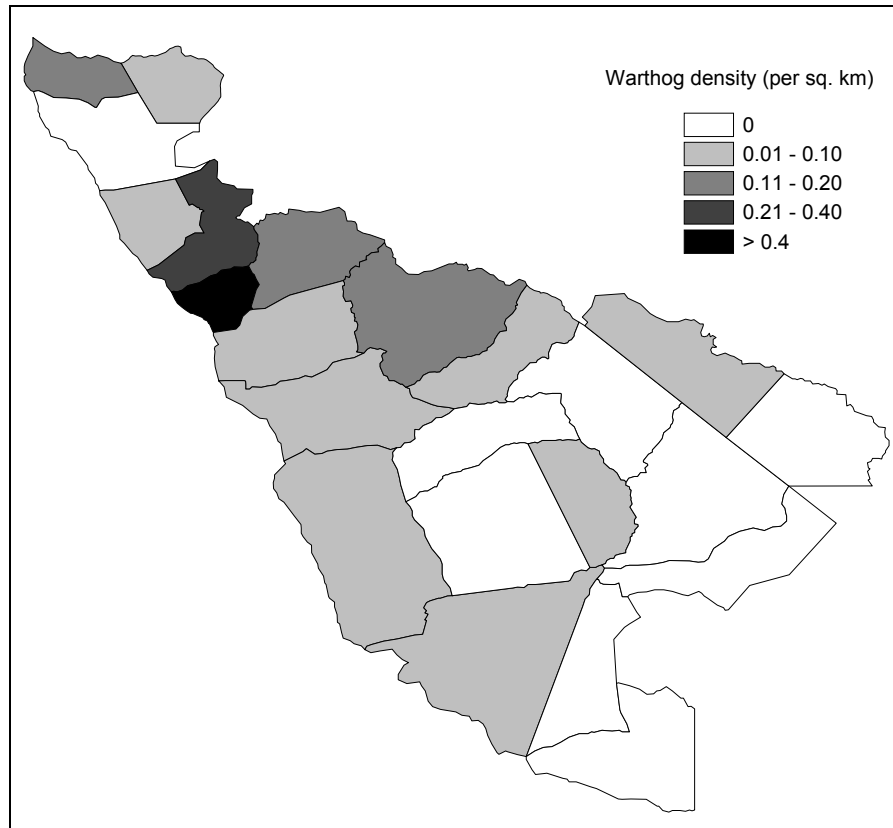
Map 10. Distribution of kudu in NW Matabeleland during September 2001

Table 14 : Population estimates and statistics for Kudu in north-west Matabeleland

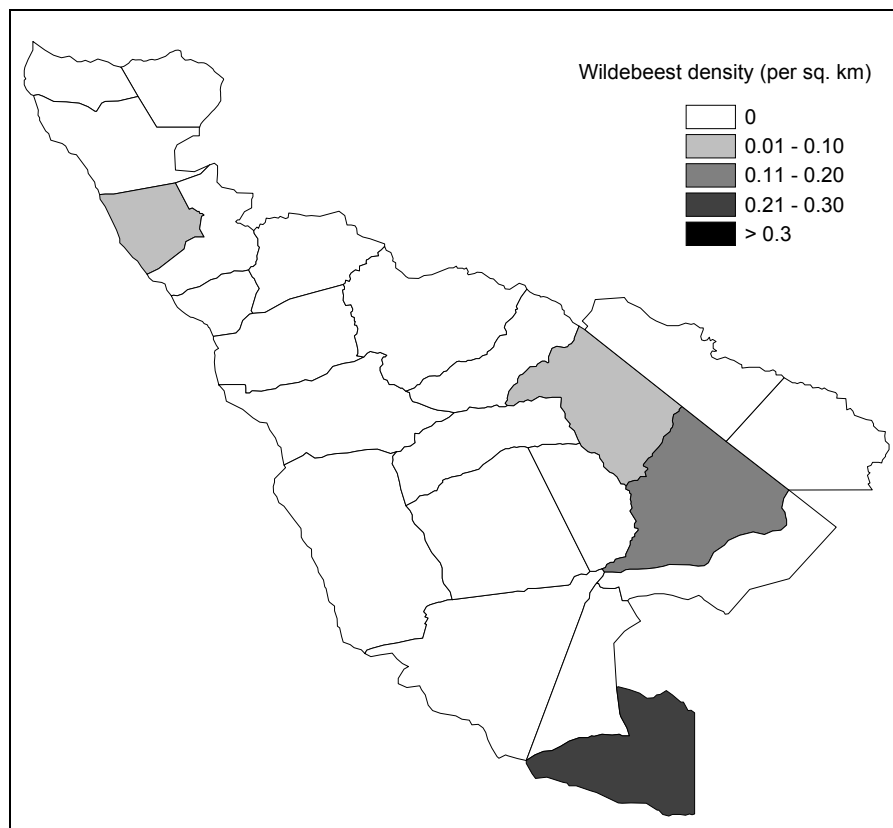
Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km ⁻²)
Matetsi Complex							
Zambezi NP	215	17	8640	102.5	0	434	0.40
Kazungula	96	13	1289	81.1	18	173	0.22
Panda Masuie	181	14	19250	166.8	0	484	0.19
Kazuma	225	14	20889	165.2	0	596	0.40
Matetsi	280	12	12144	109.1	0	586	0.40
Rosslyn	199	15	21293	203.8	0	604	0.58
Zanguja	289	20	9108	78.2	63	514	0.34
Subtotals	1484	105	92614	41.9	862	2107	0.34
Hwange National Park							
Robins	214	24	7256	86.6	29	400	0.21
Dandari	42	4	1558	197.3	0	124	0.03
Shakwanki	0	0	0	0.0	0	0	0.00
Dzivanini	28	2	364	148.6	0	70	0.01
Sinamatella	438	45	21921	71.7	124	752	0.29
Mtoa	0	0	0	0.0	0	0	0.00
Main Camp	120	18	1436	65.6	41	198	0.10
Shapi	9	1	67	198.9	0	26	0.01
Central B	0	0	0	0.0	0	0	0.00
Central A	37	4	1212	202.0	0	112	0.05
Ngamo	50	6	693	109.0	0	105	0.03
Subtotals	937	104	34507	40.3	560	1315	0.06
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	170	6	20743	217.3	0	541	0.14
Tsholotsho North	0	0	0	0.0	0	0	0.00
Subtotals	170	6	20743	217.3	0	541	0.05
Forest Areas							
Ngamo Forest	0	0	0	0.0	0	0	0.00
Sikumi Forest	143	6	5883	127.1	0	324	0.12
Subtotals	143	6	5883	127.1	0	324	0.06
Totals	2735	221	153748	28.7	1950	3520	0.11

Table 15 : Population estimates and statistics for Warthog in north-west Matabeleland

Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km⁻²)
Matetsi Complex							
Zambezi NP	25	2	518	213.2	0	79	0.05
Kazungula	74	10	598	71.7	21	126	0.17
Panda Masuie	0	0	0	0.0	0	0	0.00
Kazuma	48	3	2293	255.5	0	171	0.09
Matetsi	280	12	41949	202.7	0	849	0.40
Rosslyn	225	17	24507	192.9	0	660	0.66
Zanguja	101	7	4334	154.1	0	257	0.12
Subtotals	754	51	74198	81.7	138	1370	0.17
Hwange National Park							
Robins	27	3	258	130.5	0	62	0.03
Dandari	31	3	472	144.8	0	76	0.02
Shakwanki	46	3	1137	158.2	0	120	0.02
Dzivanini	126	9	8818	162.6	0	330	0.06
Sinamatella	165	17	7753	112.9	0	352	0.11
Mtoa	24	2	444	190.0	0	69	0.03
Main Camp	0	0	0	0.0	0	0	0.00
Shapi	0	0	0	0.0	0	0	0.00
Central B	0	0	0	0.0	0	0	0.00
Central A	9	1	82	210.7	0	29	0.01
Ngamo	0	0	0	0.0	0	0	0.00
Subtotals	429	38	18964	65.2	149	709	0.03
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	0	0	0	0.0	0	0	0.00
Tsholotsho North	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Forest Areas							
Ngamo Forest	0	0	0	0.0	0	0	0.00
Sikumi Forest	48	2	2040	224.5	0	154	0.04
Subtotals	48	2	2040	224.5	0	154	0.02
Totals	1230	91	95203	53.8	568	1892	0.05



Map 11. Distribution of warthog in NW Matabeleland during September 2001



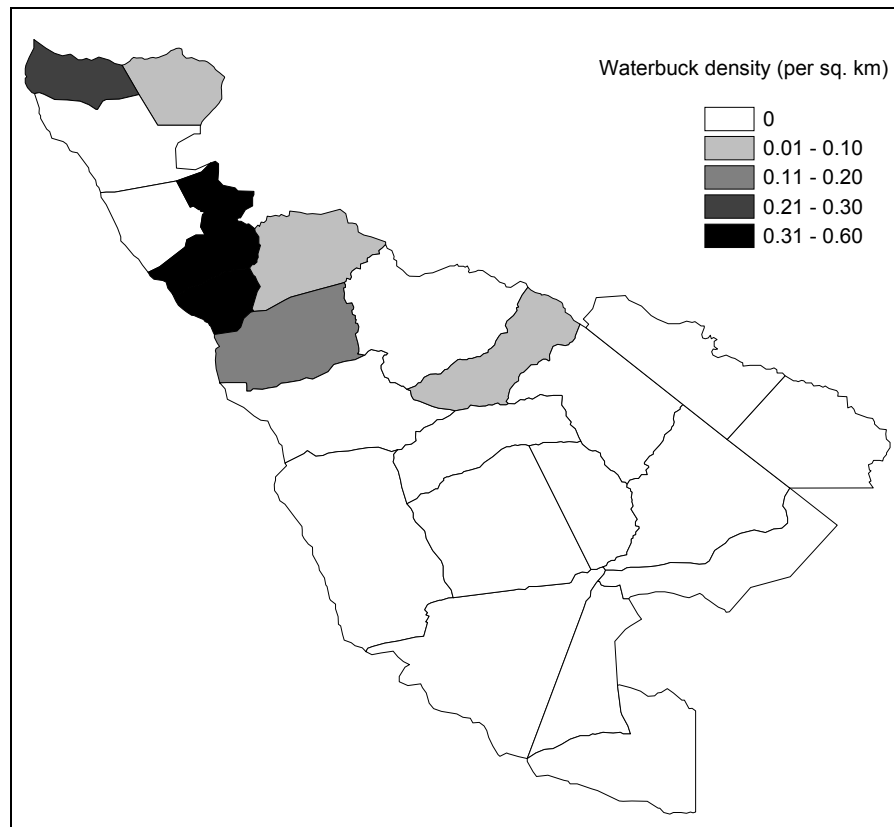
Map 12. Distribution of wildebeest in NW Matabeleland during September 2001

Table 16 : Population estimates and statistics for Wildebeest in north-west Matabeleland

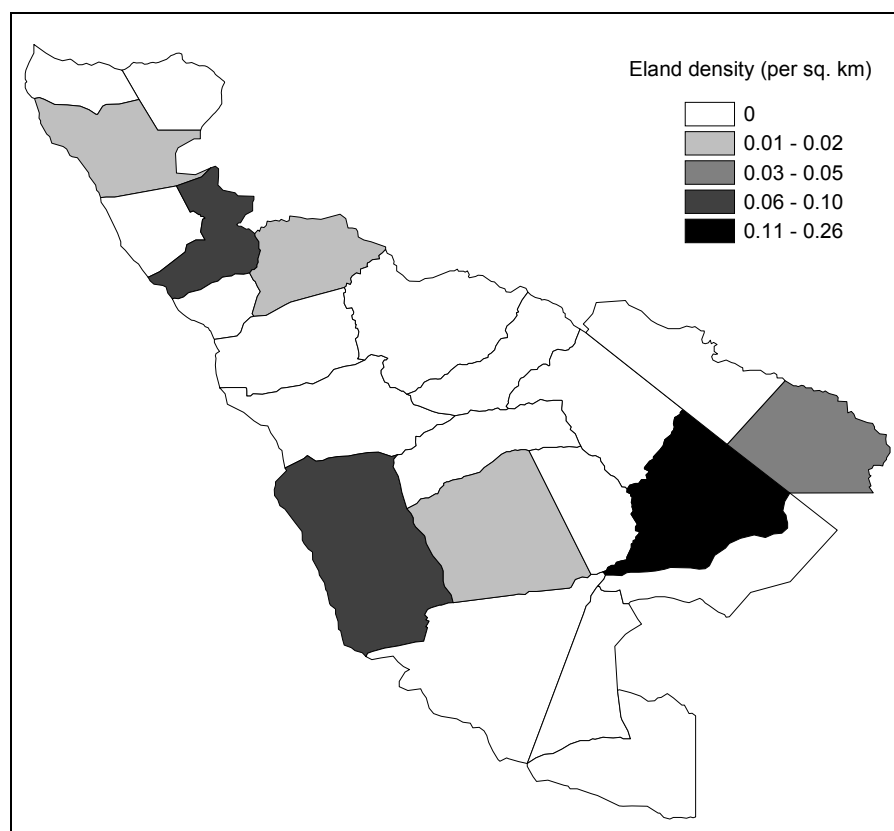
Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km⁻²)
Matetsi Complex							
Zambezi NP	0	0	0	0.0	0	0	0.00
Kazungula	0	0	0	0.0	0	0	0.00
Panda Masuie	0	0	0	0.0	0	0	0.00
Kazuma	16	1	266	260.8	0	58	0.03
Matetsi	0	0	0	0.0	0	0	0.00
Rosslyn	0	0	0	0.0	0	0	0.00
Zanguja	0	0	0	0.0	0	0	0.00
Subtotals	16	1	266	260.8	0	58	0.004
Hwange National Park							
Robins	0	0	0	0.0	0	0	0.00
Dandari	0	0	0	0.0	0	0	0.00
Shakwanki	0	0	0	0.0	0	0	0.00
Dzivanini	0	0	0	0.0	0	0	0.00
Sinamatella	0	0	0	0.0	0	0	0.00
Mtoa	0	0	0	0.0	0	0	0.00
Main Camp	7	1	38	192.7	0	19	0.01
Shapi	0	0	0	0.0	0	0	0.00
Central B	0	0	0	0.0	0	0	0.00
Central A	0	0	0	0.0	0	0	0.00
Ngamo	235	28	42644	183.2	0	666	0.14
Subtotals	242	29	42682	178.2	0	673	0.02
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	341	12	80339	213.8	0	1070	0.28
Tsholotsho North	0	0	0	0.0	0	0	0.00
Subtotals	341	12	80339	213.8	0	1070	0.11
Forest Areas							
Ngamo Forest	0	0	0	0.0	0	0	0.00
Sikumi Forest	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Totals	599	42	123287	130.7	0	1381	0.02

Table 17 : Population estimates and statistics for Waterbuck in north-west Matabeleland

Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km⁻²)
Matetsi Complex							
Zambezi NP	13	1	129	213.2	0	40	0.02
Kazungula	96	13	2503	112.9	0	204	0.22
Panda Masuie	0	0	0	0.0	0	0	0.00
Kazuma	0	0	0	0.0	0	0	0.00
Matetsi	280	12	20721	142.5	0	680	0.40
Rosslyn	186	14	32010	267.7	0	682	0.54
Zanguja	29	2	686	214.5	0	91	0.03
Subtotals	603	42	56049	90.5	57	1149	0.14
Hwange National Park							
Robins	170	19	15015	157.3	0	437	0.17
Dandari	0	0	0	0.0	0	0	0.00
Shakwanki	0	0	0	0.0	0	0	0.00
Dzivanini	0	0	0	0.0	0	0	0.00
Sinamatella	0	0	0	0.0	0	0	0.00
Mtoa	48	4	1980	200.6	0	144	0.06
Main Camp	0	0	0	0.0	0	0	0.00
Shapi	0	0	0	0.0	0	0	0.00
Central B	0	0	0	0.0	0	0	0.00
Central A	0	0	0	0.0	0	0	0.00
Ngamo	0	0	0	0.0	0	0	0.00
Subtotals	218	23	16995	127.6	0	495	0.01
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	0	0	0	0.0	0	0	0.00
Tsholotsho North	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Forest Areas							
Ngamo Forest	0	0	0	0.0	0	0	0.00
Sikumi Forest	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Totals	821	65	73044	71.1	237	1405	0.03



Map 13. Distribution of waterbuck in NW Matabeleland during September 2001



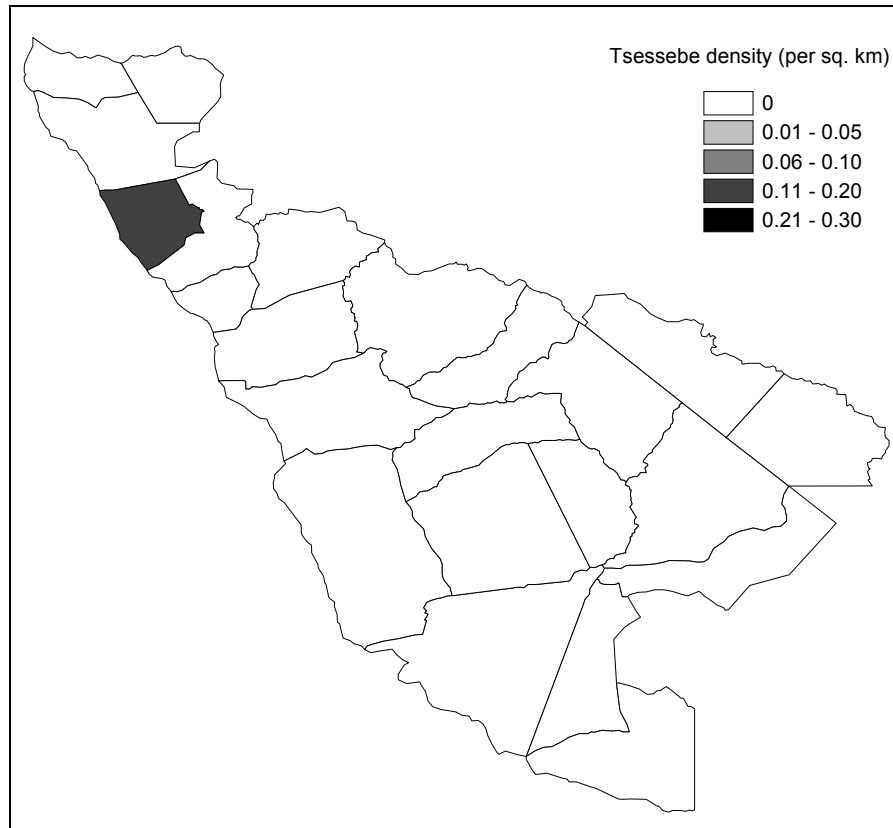
Map 14. Distribution of eland in NW Matabeleland during September 2001

Table 18 : Population estimates and statistics for Eland in north-west Matabeleland

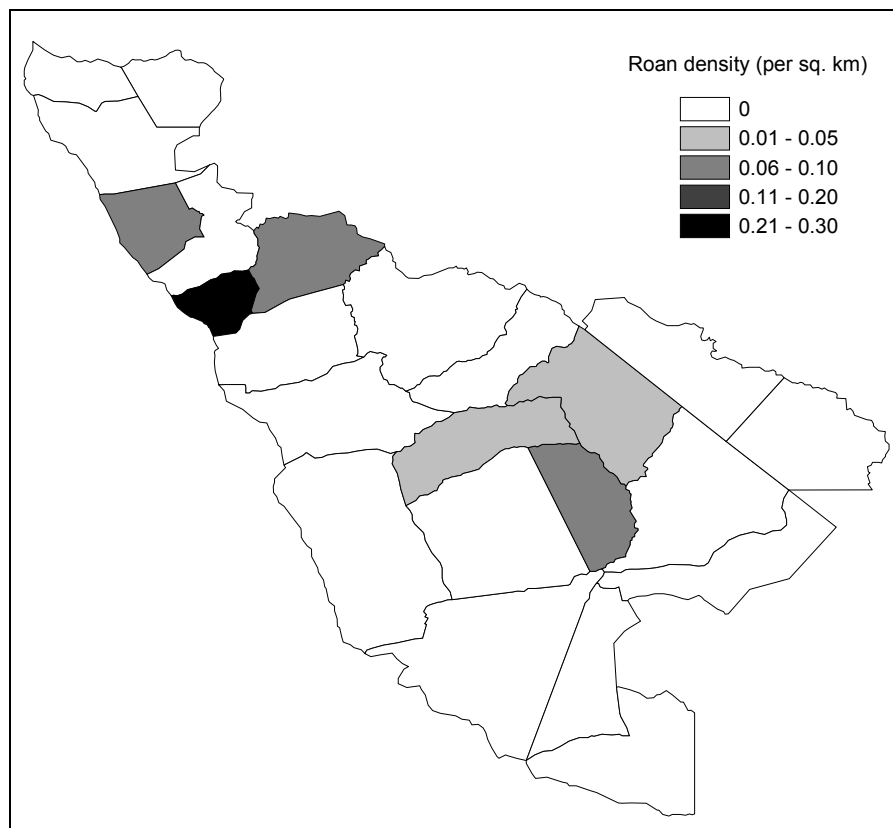
Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km ⁻²)
Matetsi Complex							
Zambezi NP	0	0	0	0.0	0	0	0.00
Kazungula	0	0	0	0.0	0	0	0.00
Panda Masuie	13	1	163	214.6	0	41	0.01
Kazuma	0	0	0	0.0	0	0	0.00
Matetsi	47	2	1558	234.5	0	156	0.07
Rosslyn	0	0	0	0.0	0	0	0.00
Zanguja	14	1	222	244.0	0	50	0.02
Subtotals	74	4	1943	145.5	0	182	0.02
Hwange National Park							
Robins	0	0	0	0.0	0	0	0.00
Dandari	0	0	0	0.0	0	0	0.00
Shakwanki	155	10	13922	166.1	0	412	0.07
Dzivanini	0	0	0	0.0	0	0	0.00
Sinamatella	0	0	0	0.0	0	0	0.00
Mtoa	0	0	0	0.0	0	0	0.00
Main Camp	0	0	0	0.0	0	0	0.00
Shapi	0	0	0	0.0	0	0	0.00
Central B	18	1	333	243.6	0	63	0.01
Central A	0	0	0	0.0	0	0	0.00
Ngamo	428	51	45214	103.5	0	872	0.26
Subtotals	602	62	59470	82.9	103	1100	0.04
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	0	0	0	0.0	0	0	0.00
Tsholotsho North	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Forest Areas							
Ngamo Forest	50	2	2650	287.7	0	193	0.04
Sikumi Forest	0	0	0	0.0	0	0	0.00
Subtotals	50	2	2650	287.7	0	193	0.02
Totals	725	68	64062	71.0	211	1240	0.03

Table 19 : Population estimates and statistics for Tsessebe in north-west Matabeleland

Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km⁻²)
Matetsi Complex							
Zambezi NP	0	0	0	0.0	0	0	0.00
Kazungula	0	0	0	0.0	0	0	0.00
Panda Masuie	0	0	0	0.0	0	0	0.00
Kazuma	80	5	5615	239.9	0	273	0.14
Matetsi	0	0	0	0.0	0	0	0.00
Rosslyn	0	0	0	0.0	0	0	0.00
Zanguja	0	0	0	0.0	0	0	0.00
Subtotals	80	5	5615	259.0	0	288	0.02
Hwange National Park							
Robins	0	0	0	0.0	0	0	0.00
Dandari	0	0	0	0.0	0	0	0.00
Shakwanki	0	0	0	0.0	0	0	0.00
Dzivanini	0	0	0	0.0	0	0	0.00
Sinamatella	0	0	0	0.0	0	0	0.00
Mtoa	0	0	0	0.0	0	0	0.00
Main Camp	0	0	0	0.0	0	0	0.00
Shapi	0	0	0	0.0	0	0	0.00
Central B	0	0	0	0.0	0	0	0.00
Central A	0	0	0	0.0	0	0	0.00
Ngamo	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	0	0	0	0.0	0	0	0.00
Tsholotsho North	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Forest Areas							
Ngamo Forest	0	0	0	0.0	0	0	0.00
Sikumi Forest	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Totals	80	5	5615	259.0	0	288	0.003



Map 15. Distribution of tsessebe in NW Matabeleland during September 2001



Map 16. Distribution of roan in NW Matabeleland during September 2001

Table 20 : Population estimates and statistics for Roan in north-west Matabeleland

Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km ⁻²)
Matetsi Complex							
Zambezi NP	0	0	0	0.0	0	0	0.00
Kazungula	0	0	0	0.0	0	0	0.00
Panda Masuie	0	0	0	0.0	0	0	0.00
Kazuma	48	3	2021	239.9	0	164	0.09
Matetsi	0	0	0	0.0	0	0	0.00
Rosslyn	106	8	13798	307.6	0	432	0.31
Zanguja	58	4	2581	208.1	0	178	0.07
Subtotals	212	15	18400	156.6	0	544	0.05
Hwange National Park							
Robins	0	0	0	0.0	0	0	0.00
Dandari	0	0	0	0.0	0	0	0.00
Shakwanki	0	0	0	0.0	0	0	0.00
Dzivanini	0	0	0	0.0	0	0	0.00
Sinamatella	0	0	0	0.0	0	0	0.00
Mtoa	0	0	0	0.0	0	0	0.00
Main Camp	7	1	37	190.6	0	19	0.01
Shapi	9	1	67	198.7	0	26	0.01
Central B	0	0	0	0.0	0	0	0.00
Central A	65	7	3554	197.7	0	193	0.08
Ngamo	0	0	0	0.0	0	0	0.00
Subtotals	80	9	3658	162.3	0	210	0.01
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	0	0	0	0.0	0	0	0.00
Tsholotsho North	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Forest Areas							
Ngamo Forest	0	0	0	0.0	0	0	0.00
Sikumi Forest	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Totals	292	24	22059	115.1	0	628	0.01

Table 21 : Population estimates and statistics for Gemsbok in north-west Matabeleland

Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km⁻²)
Matetsi Complex							
Zambezi NP	0	0	0	0.0	0	0	0.00
Kazungula	0	0	0	0.0	0	0	0.00
Panda Masuie	0	0	0	0.0	0	0	0.00
Kazuma	0	0	0	0.0	0	0	0.00
Matetsi	0	0	0	0.0	0	0	0.00
Rosslyn	0	0	0	0.0	0	0	0.00
Zanguja	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Hwange National Park							
Robins	0	0	0	0.0	0	0	0.00
Dandari	0	0	0	0.0	0	0	0.00
Shakwanki	31	2	941	215.9	0	98	0.01
Dzivanini	56	4	1399	145.7	0	137	0.03
Sinamatella	0	0	0	0.0	0	0	0.00
Mtoa	0	0	0	0.0	0	0	0.00
Main Camp	0	0	0	0.0	0	0	0.00
Shapi	0	0	0	0.0	0	0	0.00
Central B	18	1	344	247.6	0	64	0.01
Central A	18	2	291	198.0	0	55	0.02
Ngamo	0	0	0	0.0	0	0	0.00
Subtotals	124	9	2975	89.7	13	235	0.01
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	0	0	0	0.0	0	0	0.00
Tsholotsho North	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Forest Areas							
Ngamo Forest	0	0	0	0.0	0	0	0.00
Sikumi Forest	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Totals	124	9	2975	89.7	13	235	0.01

Table 22 : Population estimates and statistics for Cattle in north-west Matabeleland

Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km ⁻²)
Matetsi Complex							
Zambezi NP	0	0	0	0.0	0	0	0.00
Kazungula	0	0	0	0.0	0	0	0.00
Panda Masuie	0	0	0	0.0	0	0	0.00
Kazuma	0	0	0	0.0	0	0	0.00
Matetsi	0	0	0	0.0	0	0	0.00
Rosslyn	0	0	0	0.0	0	0	0.00
Zanguja	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Hwange National Park							
Robins	0	0	0	0.0	0	0	0.00
Dandari	0	0	0	0.0	0	0	0.00
Shakwanki	0	0	0	0.0	0	0	0.00
Dzivanini	0	0	0	0.0	0	0	0.00
Sinamatella	0	0	0	0.0	0	0	0.00
Mtoa	0	0	0	0.0	0	0	0.00
Main Camp	0	0	0	0.0	0	0	0.00
Shapi	0	0	0	0.0	0	0	0.00
Central B	0	0	0	0.0	0	0	0.00
Central A	0	0	0	0.0	0	0	0.00
Ngamo	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Communal Areas							
Tsholotsho East	5138	245	2842388	77.6	1150	9125	5.65
Maitengwe	7328	258	2783831	58.5	3038	11617	5.99
Tsholotsho North	6975	218	3934328	67.3	2284	11666	7.15
Subtotals	19441	721	9560548	33.4	12945	25937	6.25
Forest Areas							
Ngamo Forest	497	20	320407	316.3	0	2068	0.42
Sikumi Forest	452	19	147752	201.1	0	1361	0.39
Subtotals	949	39	468159	170.6	0	2567	0.40
Totals	20390	760	10028707	32.4	13784	26996	0.81

Table 23 : Population estimates and statistics for Sheep and Goats in north-west Matabeleland

Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km⁻²)
Matetsi Complex							
Zambezi NP	0	0	0	0.0	0	0	0.00
Kazungula	0	0	0	0.0	0	0	0.00
Panda Masuie	0	0	0	0.0	0	0	0.00
Kazuma	0	0	0	0.0	0	0	0.00
Matetsi	0	0	0	0.0	0	0	0.00
Rosslyn	0	0	0	0.0	0	0	0.00
Zanguja	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Hwange National Park							
Robins	0	0	0	0.0	0	0	0.00
Dandari	0	0	0	0.0	0	0	0.00
Shakwanki	0	0	0	0.0	0	0	0.00
Dzivanini	0	0	0	0.0	0	0	0.00
Sinamatella	0	0	0	0.0	0	0	0.00
Mtoa	0	0	0	0.0	0	0	0.00
Main Camp	0	0	0	0.0	0	0	0.00
Shapi	0	0	0	0.0	0	0	0.00
Central B	0	0	0	0.0	0	0	0.00
Central A	0	0	0	0.0	0	0	0.00
Ngamo	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Communal Areas							
Tsholotsho East	503	24	291776	253.8	0	1781	0.55
Maitengwe	170	6	11876	164.4	0	451	0.14
Tsholotsho North	4288	134	1913926	76.3	1016	7559	4.39
Subtotals	4961	164	2217579	67.9	1593	8330	1.60
Forest Areas							
Ngamo Forest	0	0	0	0.0	0	0	0.00
Sikumi Forest	285	12	73451	224.5	0	926	0.24
Subtotals	285	12	73451	224.5	0	926	0.12
Totals	5247	176	2291030	65.3	1823	8671	0.21

Table 24 : Population estimates and statistics for Donkeys in north-west Matabeleland

Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km⁻²)
Matetsi Complex							
Zambezi NP	0	0	0	0.0	0	0	0.00
Kazungula	0	0	0	0.0	0	0	0.00
Panda Masuie	0	0	0	0.0	0	0	0.00
Kazuma	0	0	0	0.0	0	0	0.00
Matetsi	0	0	0	0.0	0	0	0.00
Rosslyn	0	0	0	0.0	0	0	0.00
Zanguja	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Hwange National Park							
Robins	0	0	0	0.0	0	0	0.00
Dandari	0	0	0	0.0	0	0	0.00
Shakwanki	0	0	0	0.0	0	0	0.00
Dzivanini	0	0	0	0.0	0	0	0.00
Sinamatella	0	0	0	0.0	0	0	0.00
Mtoa	0	0	0	0.0	0	0	0.00
Main Camp	0	0	0	0.0	0	0	0.00
Shapi	0	0	0	0.0	0	0	0.00
Central B	0	0	0	0.0	0	0	0.00
Central A	0	0	0	0.0	0	0	0.00
Ngamo	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	85	3	5709	228.0	0	279	0.07
Tsholotsho North	1856	58	272362	66.5	622	3090	1.90
Subtotals	1941	61	278071	64.3	694	3188	0.62
Forest Areas							
Ngamo Forest	0	0	0	0.0	0	0	0.00
Sikumi Forest	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Totals	1941	61	278071	64.3	694	3188	0.08

Table 25 : Population estimates and statistics for Ostrich in north-west Matabeleland

Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km⁻²)
Matetsi Complex							
Zambezi NP	0	0	0	0.0	0	0	0.00
Kazungula	0	0	0	0.0	0	0	0.00
Panda Masuie	13	1	148	205.1	0	39	0.01
Kazuma	16	1	220	237.2	0	54	0.03
Matetsi	93	4	10559	305.1	0	379	0.13
Rosslyn	0	0	0	0.0	0	0	0.00
Zanguja	0	0	0	0.0	0	0	0.00
Subtotals	122	6	10927	236.9	0	413	0.03
Hwange National Park							
Robins	63	7	1298	125.5	0	141	0.06
Dandari	0	0	0	0.0	0	0	0.00
Shakwanki	0	0	0	0.0	0	0	0.00
Dzivanini	28	2	755	214.0	0	88	0.01
Sinamatella	0	0	0	0.0	0	0	0.00
Mtoa	0	0	0	0.0	0	0	0.00
Main Camp	0	0	0	0.0	0	0	0.00
Shapi	0	0	0	0.0	0	0	0.00
Central B	0	0	0	0.0	0	0	0.00
Central A	0	0	0	0.0	0	0	0.00
Ngamo	42	5	312	87.7	5	79	0.03
Subtotals	133	14	2364	75.0	33	232	0.01
Communal Areas							
Tsholotsho East	0	0	0	0.0	0	0	0.00
Maitengwe	0	0	0	0.0	0	0	0.00
Tsholotsho North	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Forest Areas							
Ngamo Forest	0	0	0	0.0	0	0	0.00
Sikumi Forest	0	0	0	0.0	0	0	0.00
Subtotals	0	0	0	0.0	0	0	0.00
Totals	255	20	13291	110.6	0	537	0.01

Table 26 : Population estimates and statistics for Ground Hornbill in north-west Matabeleland

Stratum	Estimate	No. Seen	Variance	% CI	Lower CL	Upper CL	Density (km⁻²)
Matetsi Complex							
Zambezi NP	38	3	1165	213.2	0	119	0.07
Kazungula	15	2	192	203.6	0	45	0.03
Panda Masuie	0	0	0	0.0	0	0	0.00
Kazuma	0	0	0	0.0	0	0	0.00
Matetsi	0	0	0	0.0	0	0	0.00
Rosslyn	0	0	0	0.0	0	0	0.00
Zanguja	0	0	0	0.0	0	0	0.00
Subtotals	53	5	1358	158.5	0	136	0.01
Hwange National Park							
Robins	45	5	1664	199.0	0	134	0.04
Dandari	62	6	1734	138.7	0	149	0.05
Shakwanki	31	2	902	211.4	0	96	0.01
Dzivanini	0	0	0	0.0	0	0	0.00
Sinamatella	117	12	4523	122.2	0	259	0.08
Mtoa	72	6	1955	132.9	0	167	0.09
Main Camp	13	2	157	195.1	0	39	0.01
Shapi	17	2	137	142.6	0	42	0.02
Central B	0	0	0	0.0	0	0	0.00
Central A	0	0	0	0.0	0	0	0.00
Ngamo	25	3	527	190.1	0	73	0.02
Subtotals	382	38	11600	56.2	167	597	0.03
Communal Areas							
Tsholotsho East	21	1	507	253.8	0	74	0.02
Maitengwe	85	3	1923	132.3	0	198	0.07
Tsholotsho North	0	0	0	0.0	0	0	0.00
Subtotals	106	4	2430	109.8	0	223	0.03
Forest Areas							
Ngamo Forest	99	4	10901	291.7	0	389	0.09
Sikumi Forest	0	0	0	0.0	0	0	0.00
Subtotals	99	4	10901	291.7	0	389	0.04
Totals	640	51	26288	52.7	303	978	0.03

Appendix 2. Aerial survey flight summary

Date	Time	Flight time (hours:minutes)	Duty
8 Sept 2001	pm	2:00	Positioning, Harare to Main Camp
8	pm	0:30	Calibration
9	am	3:35	Strata, Tsholotsho East & Maitengwe
9	pm	1:48	Stratum, Tsholotsho North
10	am	4:14	Stratum, Dzivanini
10	pm	1:38	Stratum, Sikumi Forest
11	am	4:28	Stratum, Ngamo
11	pm	1:44	Stratum, Ngamo Forest
12	am	3:25	Strata, Central B & part of Central A
12	pm	1:41	Stratum, remainder of Central A
13	am	3:51	Stratum, Shakwanki
13	pm	2:07	Stratum, Mtoa
15	pm	2:59	Stratum, Shapi
16	am	4:28	Stratum, Main Camp
17	am	3:56	Strata, Kazungula, Zambezi NP & part of Matetsi
17	pm	1:59	Strata, Rosslyn & remainder of Matetsi
18	am	3:54	Stratum, Sinamatella
19	am	4:06	Strata, Panda Masuie & Kazuma
19	pm	1:52	Stratum, Zanguja
20	am	3:38	Stratum, Robins
22	am	3:39	Stratum, Dandari
22 September	pm	2:00	Positioning, Main Camp to Harare

Appendix 3. Transect start and end points.

Central A

Number of transects : 15
 Transect Bearing : 66.00 Degrees
 Transect Spacing : 3.00 km

Transect # : 1 Start Lat : S 18 : 57.834 Start Lon : E 26 : 47.452 Finish Lat : S 18 : 59.731 Finish Lon : E 26 : 42.948 Length : 8.64 km	Transect # : 9 Start Lat : S 19 : 6.597 Start Lon : E 27 : 0.330 Finish Lat : S 19 : 11.454 Finish Lon : E 26 : 48.797 Length : 22.11 km
Transect # : 2 Start Lat : S 19 : 1.197 Start Lon : E 26 : 43.679 Finish Lat : S 18 : 57.919 Finish Lon : E 26 : 51.463 Length : 14.92 km	Transect # : 10 Start Lat : S 19 : 12.920 Start Lon : E 26 : 49.529 Finish Lat : S 19 : 8.377 Finish Lon : E 27 : 0.315 Length : 20.68 km
Transect # : 3 Start Lat : S 18 : 59.151 Start Lon : E 26 : 52.748 Finish Lat : S 19 : 2.662 Finish Lon : E 26 : 44.410 Length : 15.99 km	Transect # : 11 Start Lat : S 19 : 10.099 Start Lon : E 27 : 0.438 Finish Lat : S 19 : 14.385 Finish Lon : E 26 : 50.260 Length : 19.52 km
Transect # : 4 Start Lat : S 19 : 4.127 Start Lon : E 26 : 45.142 Finish Lat : S 19 : 0.056 Finish Lon : E 26 : 54.808 Length : 18.53 km	Transect # : 12 Start Lat : S 19 : 15.850 Start Lon : E 26 : 50.991 Finish Lat : S 19 : 11.640 Finish Lon : E 27 : 0.989 Length : 19.17 km
Transect # : 5 Start Lat : S 19 : 1.538 Start Lon : E 26 : 55.500 Finish Lat : S 19 : 5.593 Finish Lon : E 26 : 45.873 Length : 18.46 km	Transect # : 13 Start Lat : S 19 : 13.344 Start Lon : E 27 : 1.154 Finish Lat : S 19 : 17.316 Finish Lon : E 26 : 51.722 Length : 18.09 km
Transect # : 6 Start Lat : S 19 : 7.058 Start Lon : E 26 : 46.604 Finish Lat : S 19 : 2.818 Finish Lon : E 26 : 56.672 Length : 19.31 km	Transect # : 14 Start Lat : S 19 : 18.781 Start Lon : E 26 : 52.453 Finish Lat : S 19 : 15.553 Finish Lon : E 27 : 0.118 Length : 14.70 km
Transect # : 7 Start Lat : S 19 : 4.007 Start Lon : E 26 : 58.060 Finish Lat : S 19 : 8.524 Finish Lon : E 26 : 47.335 Length : 20.56 km	Transect # : 15A Start Lat : S 19 : 18.522 Start Lon : E 26 : 57.279 Finish Lat : S 19 : 18.525 Finish Lon : E 26 : 57.272 Length : 0.01 km
Transect # : 8 Start Lat : S 19 : 9.989 Start Lon : E 26 : 48.066 Finish Lat : S 19 : 5.211 Finish Lon : E 26 : 59.410 Length : 21.75 km	Transect # : 15B Start Lat : S 19 : 19.067 Start Lon : E 26 : 55.985 Finish Lat : S 19 : 20.100 Finish Lon : E 26 : 53.533 Length : 4.70 km

Central B

Number of transects : 7
 Transect Bearing : -26.00 Degrees
 Transect Spacing : 5.80 km

Transect # : 1 Start Lat : S 18 : 58.401 Start Lon : E 26 : 39.681 Finish Lat : S 19 : 20.709 Finish Lon : E 26 : 51.180	Length : 45.96 km
Transect # : 2	

Start Lat : S 19 : 22.591 Start Lon : E 26 : 48.467
 Finish Lat : S 18 : 59.775 Finish Lon : E 26 : 36.706
 Length : 47.01 km

Transect # : 3
 Start Lat : S 19 : 1.854 Start Lon : E 26 : 34.095
 Finish Lat : S 19 : 22.957 Finish Lon : E 26 : 44.973
 Length : 43.48 km

Transect # : 4
 Start Lat : S 19 : 23.612 Start Lon : E 26 : 41.628
 Finish Lat : S 19 : 2.987 Finish Lon : E 26 : 30.996
 Length : 42.50 km

Transect # : 5
 Start Lat : S 19 : 3.968 Start Lon : E 26 : 27.819
 Finish Lat : S 19 : 23.894 Finish Lon : E 26 : 38.091
 Length : 41.06 km

Transect # : 6
 Start Lat : S 19 : 24.336 Start Lon : E 26 : 34.636
 Finish Lat : S 19 : 6.381 Finish Lon : E 26 : 25.380
 Length : 37.00 km

Transect # : 7
 Start Lat : S 19 : 7.862 Start Lon : E 26 : 22.461
 Finish Lat : S 19 : 24.778 Finish Lon : E 26 : 31.180
 Length : 34.85 km

Dandari

Number of transects : 22
 Transect Bearing : 0.00 Degrees
 Transect Spacing : 3.40 km

Transect # : 1
 Start Lat : S 18 : 47.796 Start Lon : E 25 : 48.622
 Finish Lat : S 18 : 47.456 Finish Lon : E 25 : 48.622
 Length : 0.63 km

Transect # : 2
 Start Lat : S 18 : 47.400 Start Lon : E 25 : 50.558
 Finish Lat : S 18 : 50.776 Finish Lon : E 25 : 50.558
 Length : 6.25 km

Transect # : 3
 Start Lat : S 18 : 51.747 Start Lon : E 25 : 52.493
 Finish Lat : S 18 : 47.400 Finish Lon : E 25 : 52.493
 Length : 8.05 km

Transect # : 4
 Start Lat : S 18 : 48.537 Start Lon : E 25 : 54.429
 Finish Lat : S 18 : 53.343 Finish Lon : E 25 : 54.429
 Length : 8.90 km

Transect # : 5
 Start Lat : S 18 : 54.106 Start Lon : E 25 : 56.365
 Finish Lat : S 18 : 48.468 Finish Lon : E 25 : 56.365
 Length : 10.44 km

Transect # : 6
 Start Lat : S 18 : 48.094 Start Lon : E 25 : 58.300
 Finish Lat : S 18 : 56.999 Finish Lon : E 25 : 58.300
 Length : 16.49 km

Transect # : 7
 Start Lat : S 19 : 1.241 Start Lon : E 26 : 0.236
 Finish Lat : S 18 : 47.362 Finish Lon : E 26 : 0.236
 Length : 25.70 km

Transect # : 8
 Start Lat : S 18 : 47.051 Start Lon : E 26 : 2.171

Finish Lat : S 19 : 0.267 Finish Lon : E 26 : 2.171
 Length : 24.47 km

Transect # : 9
 Start Lat : S 18 : 59.647 Start Lon : E 26 : 4.107
 Finish Lat : S 18 : 46.709 Finish Lon : E 26 : 4.107
 Length : 23.96 km

Transect # : 10
 Start Lat : S 18 : 46.089 Start Lon : E 26 : 6.042
 Finish Lat : S 19 : 0.191 Finish Lon : E 26 : 6.042
 Length : 26.11 km

Transect # : 11
 Start Lat : S 18 : 59.647 Start Lon : E 26 : 7.978
 Finish Lat : S 18 : 44.561 Finish Lon : E 26 : 7.978
 Length : 27.94 km

Transect # : 12
 Start Lat : S 18 : 43.780 Start Lon : E 26 : 9.914
 Finish Lat : S 18 : 59.436 Finish Lon : E 26 : 9.914
 Length : 28.99 km

Transect # : 13
 Start Lat : S 18 : 59.186 Start Lon : E 26 : 11.849
 Finish Lat : S 18 : 43.441 Finish Lon : E 26 : 11.849
 Length : 29.16 km

Transect # : 14
 Start Lat : S 18 : 42.456 Start Lon : E 26 : 13.785
 Finish Lat : S 18 : 58.874 Finish Lon : E 26 : 13.785
 Length : 30.40 km

Transect # : 15
 Start Lat : S 18 : 58.739 Start Lon : E 26 : 15.721
 Finish Lat : S 18 : 41.846 Finish Lon : E 26 : 15.721
 Length : 31.28 km

Transect # : 16A
 Start Lat : S 18 : 42.295 Start Lon : E 26 : 17.656
 Finish Lat : S 18 : 42.312 Finish Lon : E 26 : 17.656
 Length : 0.03 km

Transect # : 16B
 Start Lat : S 18 : 46.626 Start Lon : E 26 : 17.656
 Finish Lat : S 18 : 59.252 Finish Lon : E 26 : 17.656
 Length : 23.38 km

Transect # : 17
 Start Lat : S 18 : 59.150 Start Lon : E 26 : 19.592
 Finish Lat : S 18 : 47.774 Finish Lon : E 26 : 19.592
 Length : 21.07 km

Transect # : 18
 Start Lat : S 18 : 48.794 Start Lon : E 26 : 21.527
 Finish Lat : S 18 : 58.236 Finish Lon : E 26 : 21.527
 Length : 17.48 km

Transect # : 19
 Start Lat : S 18 : 55.833 Start Lon : E 26 : 23.463
 Finish Lat : S 18 : 50.769 Finish Lon : E 26 : 23.463
 Length : 9.38 km

Transect # : 20
 Start Lat : S 18 : 51.559 Start Lon : E 26 : 25.398
 Finish Lat : S 18 : 54.716 Finish Lon : E 26 : 25.398
 Length : 5.85 km

Transect # : 21
 Start Lat : S 18 : 53.791 Start Lon : E 26 : 27.334
 Finish Lat : S 18 : 51.990 Finish Lon : E 26 : 27.334
 Length : 3.33 km

Transect # : 22
 Start Lat : S 18 : 52.308 Start Lon : E 26 : 29.270
 Finish Lat : S 18 : 52.503 Finish Lon : E 26 : 29.270
 Length : 0.36 km

Dzivanini

Number of transects : 13
 Transect Bearing : 90.00 Degrees
 Transect Spacing : 4.50 km

Transect # : 1
 Start Lat : S 19 : 21.778 Start Lon : E 26 : 54.641
 Finish Lat : S 19 : 21.778 Finish Lon : E 26 : 49.973
 Length : 8.16 km

Transect # : 2
 Start Lat : S 19 : 24.208 Start Lon : E 26 : 35.636
 Finish Lat : S 19 : 24.208 Finish Lon : E 26 : 53.073
 Length : 30.50 km

Transect # : 3
 Start Lat : S 19 : 26.638 Start Lon : E 26 : 51.953
 Finish Lat : S 19 : 26.638 Finish Lon : E 26 : 24.395
 Length : 48.19 km

Transect # : 4
 Start Lat : S 19 : 29.068 Start Lon : E 26 : 24.412
 Finish Lat : S 19 : 29.068 Finish Lon : E 26 : 51.056
 Length : 46.60 km

Transect # : 5
 Start Lat : S 19 : 31.498 Start Lon : E 26 : 50.143
 Finish Lat : S 19 : 31.498 Finish Lon : E 26 : 24.029
 Length : 45.67 km

Transect # : 6
 Start Lat : S 19 : 33.928 Start Lon : E 26 : 14.151
 Finish Lat : S 19 : 33.928 Finish Lon : E 26 : 49.231
 Length : 61.35 km

Transect # : 7
 Start Lat : S 19 : 36.358 Start Lon : E 26 : 48.318
 Finish Lat : S 19 : 36.358 Finish Lon : E 26 : 20.658
 Length : 48.37 km

Transect # : 8
 Start Lat : S 19 : 38.788 Start Lon : E 26 : 19.704
 Finish Lat : S 19 : 38.788 Finish Lon : E 26 : 47.405
 Length : 48.44 km

Transect # : 9
 Start Lat : S 19 : 41.219 Start Lon : E 26 : 46.492
 Finish Lat : S 19 : 41.219 Finish Lon : E 26 : 24.032
 Length : 39.28 km

Transect # : 10
 Start Lat : S 19 : 43.648 Start Lon : E 26 : 25.008
 Finish Lat : S 19 : 43.648 Finish Lon : E 26 : 45.579
 Length : 35.98 km

Transect # : 11
 Start Lat : S 19 : 46.078 Start Lon : E 26 : 44.666
 Finish Lat : S 19 : 46.078 Finish Lon : E 26 : 31.659
 Length : 22.75 km

Transect # : 12
 Start Lat : S 19 : 48.509 Start Lon : E 26 : 35.002
 Finish Lat : S 19 : 48.509 Finish Lon : E 26 : 43.753
 Length : 15.30 km

Transect # : 13

Start Lat : S 19 : 50.938 Start Lon : E 26 : 42.840
 Finish Lat : S 19 : 50.938 Finish Lon : E 26 : 35.970

Length : 12.01 km

Kazuma

Number of transects : 6
 Transect Bearing : 0.00 Degrees
 Transect Spacing : 5.30 km

Transect # : 1
 Start Lat : S 18 : 17.764 Start Lon : E 25 : 29.222
 Finish Lat : S 18 : 14.100 Finish Lon : E 25 : 29.222
 Length : 6.79 km

Transect # : 4
 Start Lat : S 18 : 12.606 Start Lon : E 25 : 38.258
 Finish Lat : S 18 : 26.821 Finish Lon : E 25 : 38.258
 Length : 26.32 km

Transect # : 2
 Start Lat : S 18 : 13.696 Start Lon : E 25 : 32.234
 Finish Lat : S 18 : 23.880 Finish Lon : E 25 : 32.234
 Length : 18.86 km

Transect # : 5
 Start Lat : S 18 : 24.482 Start Lon : E 25 : 41.270
 Finish Lat : S 18 : 13.092 Finish Lon : E 25 : 41.270
 Length : 21.09 km

Transect # : 3
 Start Lat : S 18 : 27.376 Start Lon : E 25 : 35.246
 Finish Lat : S 18 : 13.151 Finish Lon : E 25 : 35.246
 Length : 26.34 km

Transect # : 6
 Start Lat : S 18 : 16.878 Start Lon : E 25 : 44.282
 Finish Lat : S 18 : 21.600 Finish Lon : E 25 : 44.282
 Length : 8.75 km

Kazungula

Number of transects : 14
 Transect Bearing : 0.00 Degrees
 Transect Spacing : 2.40 km

Transect # : 1
 Start Lat : S 17 : 56.745 Start Lon : E 25 : 15.690
 Finish Lat : S 17 : 49.295 Finish Lon : E 25 : 15.690
 Length : 13.80 km

Finish Lat : S 17 : 58.049 Finish Lon : E 25 : 22.492
 Length : 14.73 km

Transect # : 2
 Start Lat : S 17 : 48.225 Start Lon : E 25 : 17.050
 Finish Lat : S 17 : 56.778 Finish Lon : E 25 : 17.050
 Length : 15.84 km

Transect # : 7
 Start Lat : S 17 : 58.185 Start Lon : E 25 : 23.852
 Finish Lat : S 17 : 50.925 Finish Lon : E 25 : 23.852
 Length : 13.44 km

Transect # : 3
 Start Lat : S 17 : 57.365 Start Lon : E 25 : 18.411
 Finish Lat : S 17 : 49.146 Finish Lon : E 25 : 18.411
 Length : 15.22 km

Transect # : 8
 Start Lat : S 17 : 50.766 Start Lon : E 25 : 25.213
 Finish Lat : S 17 : 58.685 Finish Lon : E 25 : 25.213
 Length : 14.66 km

Transect # : 4
 Start Lat : S 17 : 49.888 Start Lon : E 25 : 19.771
 Finish Lat : S 17 : 57.909 Finish Lon : E 25 : 19.771
 Length : 14.85 km

Transect # : 9
 Start Lat : S 17 : 59.524 Start Lon : E 25 : 26.573
 Finish Lat : S 17 : 50.780 Finish Lon : E 25 : 26.573
 Length : 16.19 km

Transect # : 5
 Start Lat : S 17 : 57.956 Start Lon : E 25 : 21.131
 Finish Lat : S 17 : 50.195 Finish Lon : E 25 : 21.131
 Length : 14.37 km

Transect # : 10
 Start Lat : S 17 : 50.679 Start Lon : E 25 : 27.933
 Finish Lat : S 17 : 58.178 Finish Lon : E 25 : 27.933
 Length : 13.89 km

Transect # : 6
 Start Lat : S 17 : 50.096 Start Lon : E 25 : 22.492

Transect # : 11
 Start Lat : S 17 : 57.874 Start Lon : E 25 : 29.294
 Finish Lat : S 17 : 51.151 Finish Lon : E 25 : 29.294

Length : 12.45 km

Transect # : 12

Start Lat : S 17 : 51.761 Start Lon : E 25 : 30.654
Finish Lat : S 17 : 57.829 Finish Lon : E 25 : 30.654
Length : 11.24 km

Transect # : 13

Start Lat : S 17 : 57.529 Start Lon : E 25 : 32.015
Finish Lat : S 17 : 53.247 Finish Lon : E 25 : 32.015
Length : 7.93 km

Transect # : 14

Start Lat : S 17 : 55.560 Start Lon : E 25 : 33.375
Finish Lat : S 17 : 57.203 Finish Lon : E 25 : 33.375
Length : 3.04 km

Main Camp

Number of transects : 23

Transect Bearing : 41.00 Degrees

Transect Spacing : 2.20 km

Transect # : 1A

Start Lat : S 18 : 44.309 Start Lon : E 26 : 42.891
Finish Lat : S 18 : 46.916 Finish Lon : E 26 : 40.500
Length : 6.40 km

Transect # : 1B

Start Lat : S 18 : 47.399 Start Lon : E 26 : 40.058
Finish Lat : S 18 : 48.243 Finish Lon : E 26 : 39.283
Length : 2.07 km

Transect # : 2A

Start Lat : S 18 : 50.883 Start Lon : E 26 : 38.523
Finish Lat : S 18 : 43.409 Finish Lon : E 26 : 45.376
Length : 18.34 km

Transect # : 2B

Start Lat : S 18 : 42.834 Start Lon : E 26 : 45.904
Finish Lat : S 18 : 40.801 Finish Lon : E 26 : 47.767
Length : 4.99 km

Transect # : 3

Start Lat : S 18 : 37.783 Start Lon : E 26 : 52.195
Finish Lat : S 18 : 50.823 Finish Lon : E 26 : 40.239
Length : 31.99 km

Transect # : 4

Start Lat : S 18 : 50.178 Start Lon : E 26 : 42.490
Finish Lat : S 18 : 38.543 Finish Lon : E 26 : 53.158
Length : 28.55 km

Transect # : 5

Start Lat : S 18 : 39.306 Start Lon : E 26 : 54.119
Finish Lat : S 18 : 49.595 Finish Lon : E 26 : 44.685
Length : 25.25 km

Transect # : 6

Start Lat : S 18 : 49.683 Start Lon : E 26 : 46.265
Finish Lat : S 18 : 40.069 Finish Lon : E 26 : 55.080
Length : 23.59 km

Transect # : 7

Start Lat : S 18 : 40.832 Start Lon : E 26 : 56.041

Finish Lat : S 18 : 49.650 Finish Lon : E 26 : 47.956
Length : 21.64 km

Transect # : 8

Start Lat : S 18 : 51.396 Start Lon : E 26 : 48.015
Finish Lat : S 18 : 41.595 Finish Lon : E 26 : 57.002
Length : 24.05 km

Transect # : 9

Start Lat : S 18 : 42.358 Start Lon : E 26 : 57.962
Finish Lat : S 18 : 52.422 Finish Lon : E 26 : 48.734
Length : 24.69 km

Transect # : 10

Start Lat : S 18 : 53.737 Start Lon : E 26 : 49.190
Finish Lat : S 18 : 43.121 Finish Lon : E 26 : 58.923
Length : 26.05 km

Transect # : 11

Start Lat : S 18 : 43.884 Start Lon : E 26 : 59.884
Finish Lat : S 18 : 54.950 Finish Lon : E 26 : 49.737
Length : 27.15 km

Transect # : 12

Start Lat : S 18 : 55.881 Start Lon : E 26 : 50.544
Finish Lat : S 18 : 44.647 Finish Lon : E 27 : 0.845
Length : 27.56 km

Transect # : 13

Start Lat : S 18 : 45.410 Start Lon : E 27 : 1.805
Finish Lat : S 18 : 57.125 Finish Lon : E 26 : 51.064
Length : 28.75 km

Transect # : 14

Start Lat : S 18 : 58.260 Start Lon : E 26 : 51.683
Finish Lat : S 18 : 46.173 Finish Lon : E 27 : 2.766
Length : 29.66 km

Transect # : 15

Start Lat : S 18 : 46.936 Start Lon : E 27 : 3.727
Finish Lat : S 18 : 59.046 Finish Lon : E 26 : 52.623
Length : 29.71 km

Transect # : 16
 Start Lat : S 18 : 59.373 Start Lon : E 26 : 53.984
 Finish Lat : S 18 : 47.699 Finish Lon : E 27 : 4.688
 Length : 28.64 km

Transect # : 17
 Start Lat : S 18 : 48.462 Start Lon : E 27 : 5.649
 Finish Lat : S 19 : 0.261 Finish Lon : E 26 : 54.829
 Length : 28.95 km

Transect # : 18
 Start Lat : S 19 : 1.341 Start Lon : E 26 : 55.500
 Finish Lat : S 18 : 49.225 Finish Lon : E 27 : 6.609
 Length : 29.73 km

Transect # : 19
 Start Lat : S 18 : 49.988 Start Lon : E 27 : 7.570
 Finish Lat : S 19 : 2.420 Finish Lon : E 26 : 56.171
 Length : 30.50 km

Transect # : 20
 Start Lat : S 19 : 3.065 Start Lon : E 26 : 57.240
 Finish Lat : S 18 : 50.751 Finish Lon : E 27 : 8.531
 Length : 30.22 km

Transect # : 21
 Start Lat : S 18 : 53.662 Start Lon : E 27 : 7.522
 Finish Lat : S 19 : 3.991 Finish Lon : E 26 : 58.051
 Length : 25.35 km

Transect # : 22
 Start Lat : S 19 : 4.852 Start Lon : E 26 : 58.922
 Finish Lat : S 18 : 57.369 Finish Lon : E 27 : 5.783
 Length : 18.36 km

Transect # : 23
 Start Lat : S 19 : 2.032 Start Lon : E 27 : 3.169
 Finish Lat : S 19 : 4.200 Finish Lon : E 27 : 1.180
 Length : 5.32 km

Maitengwe

Number of transects : 6
 Transect Bearing : 0.00 Degrees
 Transect Spacing : 9.20 km

Transect # : 1
 Start Lat : S 19 : 42.843 Start Lon : E 27 : 8.845
 Finish Lat : S 20 : 2.627 Finish Lon : E 27 : 8.845
 Length : 36.64 km

Transect # : 2
 Start Lat : S 20 : 1.073 Start Lon : E 27 : 3.572
 Finish Lat : S 19 : 42.267 Finish Lon : E 27 : 3.572
 Length : 34.83 km

Transect # : 3A
 Start Lat : S 19 : 40.341 Start Lon : E 26 : 58.299
 Finish Lat : S 19 : 44.717 Finish Lon : E 26 : 58.299
 Length : 8.10 km

Transect # : 3B
 Start Lat : S 19 : 48.642 Start Lon : E 26 : 58.299

Finish Lat : S 20 : 0.627 Finish Lon : E 26 : 58.299
 Length : 22.20 km

Transect # : 4
 Start Lat : S 19 : 58.430 Start Lon : E 26 : 53.027
 Finish Lat : S 19 : 49.078 Finish Lon : E 26 : 53.027
 Length : 17.32 km

Transect # : 5
 Start Lat : S 19 : 50.823 Start Lon : E 26 : 47.754
 Finish Lat : S 19 : 56.794 Finish Lon : E 26 : 47.754
 Length : 11.06 km

Transect # : 6
 Start Lat : S 19 : 54.566 Start Lon : E 26 : 42.481
 Finish Lat : S 19 : 52.862 Finish Lon : E 26 : 42.481
 Length : 3.16 km

Matetsi

Number of transects : 5
 Transect Bearing : -50.00 Degrees
 Transect Spacing : 7.30 km

Transect # : 1
 Start Lat : S 18 : 30.614 Start Lon : E 25 : 43.738
 Finish Lat : S 18 : 26.536 Finish Lon : E 25 : 38.624
 Length : 11.75 km

Transect # : 2
 Start Lat : S 18 : 23.998 Start Lon : E 25 : 41.894
 Finish Lat : S 18 : 28.818 Finish Lon : E 25 : 47.938

Length : 13.89 km

Transect # : 3

Start Lat : S 18 : 27.539 Start Lon : E 25 : 52.787
Finish Lat : S 18 : 21.600 Finish Lon : E 25 : 45.340
Length : 17.11 km

Transect # : 4

Start Lat : S 18 : 13.291 Start Lon : E 25 : 41.373
Finish Lat : S 18 : 24.300 Finish Lon : E 25 : 55.178
Length : 31.72 km

Transect # : 5

Start Lat : S 18 : 17.248 Start Lon : E 25 : 52.788
Finish Lat : S 18 : 10.760 Finish Lon : E 25 : 44.652
Length : 18.69 km

Mtoa

Number of transects : 14
Transect Bearing : 0.00 Degrees
Transect Spacing : 3.90 km

Transect # : 1

Start Lat : S 18 : 50.107 Start Lon : E 26 : 21.998
Finish Lat : S 18 : 48.201 Finish Lon : E 26 : 21.998
Length : 3.53 km

Transect # : 2

Start Lat : S 18 : 46.392 Start Lon : E 26 : 24.217
Finish Lat : S 18 : 51.076 Finish Lon : E 26 : 24.217
Length : 8.68 km

Transect # : 3

Start Lat : S 18 : 51.866 Start Lon : E 26 : 26.437
Finish Lat : S 18 : 45.968 Finish Lon : E 26 : 26.437
Length : 10.92 km

Transect # : 4

Start Lat : S 18 : 44.413 Start Lon : E 26 : 28.656
Finish Lat : S 18 : 52.162 Finish Lon : E 26 : 28.656
Length : 14.35 km

Transect # : 5

Start Lat : S 18 : 52.102 Start Lon : E 26 : 30.876
Finish Lat : S 18 : 43.425 Finish Lon : E 26 : 30.876
Length : 16.07 km

Transect # : 6

Start Lat : S 18 : 42.962 Start Lon : E 26 : 33.095
Finish Lat : S 18 : 51.523 Finish Lon : E 26 : 33.095
Length : 15.85 km

Transect # : 7

Start Lat : S 18 : 51.305 Start Lon : E 26 : 35.315
Finish Lat : S 18 : 41.645 Finish Lon : E 26 : 35.315
Length : 17.89 km

Transect # : 8

Start Lat : S 18 : 38.838 Start Lon : E 26 : 37.534
Finish Lat : S 18 : 51.300 Finish Lon : E 26 : 37.534
Length : 23.08 km

Transect # : 9

Start Lat : S 18 : 47.651 Start Lon : E 26 : 39.753
Finish Lat : S 18 : 35.491 Finish Lon : E 26 : 39.753
Length : 22.52 km

Transect # : 10

Start Lat : S 18 : 30.937 Start Lon : E 26 : 41.973
Finish Lat : S 18 : 45.027 Finish Lon : E 26 : 41.973
Length : 26.09 km

Transect # : 11

Start Lat : S 18 : 43.719 Start Lon : E 26 : 44.192
Finish Lat : S 18 : 31.842 Finish Lon : E 26 : 44.192
Length : 21.99 km

Transect # : 12

Start Lat : S 18 : 32.645 Start Lon : E 26 : 46.412
Finish Lat : S 18 : 41.316 Finish Lon : E 26 : 46.412
Length : 16.06 km

Transect # : 13

Start Lat : S 18 : 40.945 Start Lon : E 26 : 48.631
Finish Lat : S 18 : 35.113 Finish Lon : E 26 : 48.631
Length : 10.80 km

Transect # : 14

Start Lat : S 18 : 36.974 Start Lon : E 26 : 50.851
Finish Lat : S 18 : 38.137 Finish Lon : E 26 : 50.851
Length : 2.15 km

Ngamo

Number of transects : 21
Transect Bearing : -52.00 Degrees
Transect Spacing : 2.70 km

Transect # : 1

Start Lat : S 18 : 52.231 Start Lon : E 27 : 8.453

Finish Lat : S 19 : 6.348 Finish Lon : E 27 : 27.538
Length : 42.46 km

Transect # : 2
Start Lat : S 19 : 7.706 Start Lon : E 27 : 26.873
Finish Lat : S 18 : 53.427 Finish Lon : E 27 : 7.569
Length : 42.95 km

Transect # : 3
Start Lat : S 18 : 55.094 Start Lon : E 27 : 7.321
Finish Lat : S 19 : 9.777 Finish Lon : E 27 : 27.171
Length : 44.17 km

Transect # : 4
Start Lat : S 19 : 11.830 Start Lon : E 27 : 27.445
Finish Lat : S 18 : 56.245 Finish Lon : E 27 : 6.376
Length : 46.88 km

Transect # : 5
Start Lat : S 18 : 57.607 Start Lon : E 27 : 5.716
Finish Lat : S 19 : 12.905 Finish Lon : E 27 : 26.397
Length : 46.01 km

Transect # : 6
Start Lat : S 19 : 13.292 Start Lon : E 27 : 24.418
Finish Lat : S 18 : 58.742 Finish Lon : E 27 : 4.748
Length : 43.76 km

Transect # : 7
Start Lat : S 18 : 59.974 Start Lon : E 27 : 3.913
Finish Lat : S 19 : 13.261 Finish Lon : E 27 : 21.876
Length : 39.97 km

Transect # : 8
Start Lat : S 19 : 13.635 Start Lon : E 27 : 19.880
Finish Lat : S 19 : 0.992 Finish Lon : E 27 : 2.787
Length : 38.03 km

Transect # : 9
Start Lat : S 19 : 2.817 Start Lon : E 27 : 2.754
Finish Lat : S 19 : 14.262 Finish Lon : E 27 : 18.225
Length : 34.42 km

Transect # : 10
Start Lat : S 19 : 15.145 Start Lon : E 27 : 16.918
Finish Lat : S 19 : 3.876 Finish Lon : E 27 : 1.684
Length : 33.89 km

Transect # : 11
Start Lat : S 19 : 4.471 Start Lon : E 26 : 59.986
Finish Lat : S 19 : 16.118 Finish Lon : E 27 : 15.733

Ngamo Forest

Number of transects : 5
Transect Bearing : 41.00 Degrees
Transect Spacing : 7.60 km

Transect # : 1
Start Lat : S 18 : 59.766 Start Lon : E 27 : 19.976

Length : 35.03 km

Transect # : 12
Start Lat : S 19 : 17.103 Start Lon : E 27 : 14.563
Finish Lat : S 19 : 6.372 Finish Lon : E 27 : 0.055
Length : 32.28 km

Transect # : 13
Start Lat : S 19 : 8.425 Start Lon : E 27 : 0.330
Finish Lat : S 19 : 18.436 Finish Lon : E 27 : 13.864
Length : 30.11 km

Transect # : 14
Start Lat : S 19 : 19.174 Start Lon : E 27 : 12.360
Finish Lat : S 19 : 10.549 Finish Lon : E 27 : 0.700
Length : 25.94 km

Transect # : 15
Start Lat : S 19 : 12.979 Start Lon : E 27 : 1.484
Finish Lat : S 19 : 18.955 Finish Lon : E 27 : 9.562
Length : 17.97 km

Transect # : 16
Start Lat : S 19 : 18.903 Start Lon : E 27 : 6.991
Finish Lat : S 19 : 14.152 Finish Lon : E 27 : 0.568
Length : 14.29 km

Transect # : 17
Start Lat : S 19 : 15.639 Start Lon : E 27 : 0.077
Finish Lat : S 19 : 19.365 Finish Lon : E 27 : 5.114
Length : 11.21 km

Transect # : 18
Start Lat : S 19 : 19.650 Start Lon : E 27 : 2.998
Finish Lat : S 19 : 17.012 Finish Lon : E 26 : 59.431
Length : 7.94 km

Transect # : 19
Start Lat : S 19 : 17.844 Start Lon : E 26 : 58.055
Finish Lat : S 19 : 19.725 Finish Lon : E 27 : 0.598
Length : 5.66 km

Transect # : 20
Start Lat : S 19 : 20.191 Start Lon : E 26 : 58.727
Finish Lat : S 19 : 18.604 Finish Lon : E 26 : 56.581
Length : 4.77 km

Transect # : 21
Start Lat : S 19 : 19.583 Start Lon : E 26 : 55.404
Finish Lat : S 19 : 20.250 Finish Lon : E 26 : 56.305
Length : 2.01 km

Finish Lat : S 18 : 47.475 Finish Lon : E 27 : 31.253
Length : 30.16 km

Transect # : 2
 Start Lat : S 18 : 48.770 Start Lon : E 27 : 35.804
 Finish Lat : S 19 : 2.364 Finish Lon : E 27 : 23.332
 Length : 33.36 km

Transect # : 3
 Start Lat : S 19 : 4.962 Start Lon : E 27 : 26.687
 Finish Lat : S 18 : 51.806 Finish Lon : E 27 : 38.759
 Length : 32.28 km

Panda Masuie

Number of transects : 13
 Transect Bearing : 0.00 Degrees
 Transect Spacing : 4.20 km

Transect # : 1
 Start Lat : S 18 : 0.497 Start Lon : E 25 : 16.899
 Finish Lat : S 17 : 56.724 Finish Lon : E 25 : 16.899
 Length : 6.99 km

Transect # : 2
 Start Lat : S 17 : 57.793 Start Lon : E 25 : 19.281
 Finish Lat : S 18 : 4.734 Finish Lon : E 25 : 19.281
 Length : 12.85 km

Transect # : 3
 Start Lat : S 18 : 5.805 Start Lon : E 25 : 21.663
 Finish Lat : S 17 : 57.975 Finish Lon : E 25 : 21.663
 Length : 14.50 km

Transect # : 4
 Start Lat : S 17 : 58.218 Start Lon : E 25 : 24.045
 Finish Lat : S 18 : 7.936 Finish Lon : E 25 : 24.045
 Length : 18.00 km

Transect # : 5
 Start Lat : S 18 : 11.676 Start Lon : E 25 : 26.427
 Finish Lat : S 17 : 59.426 Finish Lon : E 25 : 26.427
 Length : 22.69 km

Transect # : 6
 Start Lat : S 17 : 57.890 Start Lon : E 25 : 28.809
 Finish Lat : S 18 : 14.100 Finish Lon : E 25 : 28.809
 Length : 30.02 km

Transect # : 7
 Start Lat : S 18 : 13.885 Start Lon : E 25 : 31.191
 Finish Lat : S 17 : 57.726 Finish Lon : E 25 : 31.191
 Length : 29.92 km

Transect # : 8
 Start Lat : S 17 : 57.156 Start Lon : E 25 : 33.573

Transect # : 4
 Start Lat : S 18 : 54.027 Start Lon : E 27 : 42.460
 Finish Lat : S 19 : 5.850 Finish Lon : E 27 : 31.612
 Length : 29.01 km

Transect # : 5
 Start Lat : S 19 : 5.850 Start Lon : E 27 : 37.352
 Finish Lat : S 18 : 57.561 Finish Lon : E 27 : 44.957
 Length : 20.34 km

Finish Lat : S 18 : 13.454 Finish Lon : E 25 : 33.573
 Length : 30.18 km

Transect # : 9
 Start Lat : S 18 : 13.023 Start Lon : E 25 : 35.955
 Finish Lat : S 17 : 59.854 Finish Lon : E 25 : 35.955
 Length : 24.39 km

Transect # : 10
 Start Lat : S 18 : 2.400 Start Lon : E 25 : 38.337
 Finish Lat : S 18 : 12.592 Finish Lon : E 25 : 38.337
 Length : 18.87 km

Transect # : 11A
 Start Lat : S 18 : 12.161 Start Lon : E 25 : 40.719
 Finish Lat : S 18 : 8.677 Finish Lon : E 25 : 40.719
 Length : 6.45 km

Transect # : 11B
 Start Lat : S 18 : 6.214 Start Lon : E 25 : 40.719
 Finish Lat : S 18 : 2.400 Finish Lon : E 25 : 40.719
 Length : 7.06 km

Transect # : 12A
 Start Lat : S 18 : 2.400 Start Lon : E 25 : 43.101
 Finish Lat : S 18 : 4.316 Finish Lon : E 25 : 43.101
 Length : 3.55 km

Transect # : 12B
 Start Lat : S 18 : 10.113 Start Lon : E 25 : 43.101
 Finish Lat : S 18 : 11.316 Finish Lon : E 25 : 43.101
 Length : 2.23 km

Transect # : 13
 Start Lat : S 18 : 10.255 Start Lon : E 25 : 45.482
 Finish Lat : S 18 : 9.558 Finish Lon : E 25 : 45.482
 Length : 1.29 km

Robins Camp

Number of transects : 13

Transect Bearing : 90.00 Degrees

Transect Spacing : 2.90 km

Transect # : 1

Start Lat : S 18 : 29.963 Start Lon : E 26 : 9.917

Finish Lat : S 18 : 29.963 Finish Lon : E 26 : 10.078

Length : 0.28 km

Transect # : 2

Start Lat : S 18 : 31.528 Start Lon : E 26 : 10.061

Finish Lat : S 18 : 31.528 Finish Lon : E 26 : 4.150

Length : 10.39 km

Transect # : 3

Start Lat : S 18 : 33.094 Start Lon : E 25 : 59.477

Finish Lat : S 18 : 33.094 Finish Lon : E 26 : 10.250

Length : 18.93 km

Transect # : 4

Start Lat : S 18 : 34.660 Start Lon : E 26 : 11.561

Finish Lat : S 18 : 34.660 Finish Lon : E 25 : 56.692

Length : 26.13 km

Transect # : 5

Start Lat : S 18 : 36.227 Start Lon : E 25 : 52.500

Finish Lat : S 18 : 36.227 Finish Lon : E 26 : 12.000

Length : 34.27 km

Transect # : 6

Start Lat : S 18 : 37.793 Start Lon : E 26 : 12.585

Finish Lat : S 18 : 37.793 Finish Lon : E 25 : 51.934

Length : 36.29 km

Transect # : 7

Start Lat : S 18 : 39.359 Start Lon : E 25 : 47.389

Finish Lat : S 18 : 39.359 Finish Lon : E 26 : 12.122

Length : 43.46 km

Transect # : 8

Start Lat : S 18 : 40.925 Start Lon : E 26 : 12.523

Finish Lat : S 18 : 40.925 Finish Lon : E 25 : 48.167

Length : 42.80 km

Transect # : 9

Start Lat : S 18 : 42.491 Start Lon : E 25 : 47.649

Finish Lat : S 18 : 42.491 Finish Lon : E 26 : 13.045

Length : 44.62 km

Transect # : 10

Start Lat : S 18 : 44.057 Start Lon : E 26 : 8.918

Finish Lat : S 18 : 44.057 Finish Lon : E 25 : 47.617

Length : 37.43 km

Transect # : 11

Start Lat : S 18 : 45.623 Start Lon : E 25 : 47.876

Finish Lat : S 18 : 45.623 Finish Lon : E 26 : 7.018

Length : 33.64 km

Transect # : 12

Start Lat : S 18 : 47.189 Start Lon : E 26 : 1.316

Finish Lat : S 18 : 47.189 Finish Lon : E 25 : 48.263

Length : 22.94 km

Transect # : 13

Start Lat : S 18 : 48.755 Start Lon : E 25 : 53.056

Finish Lat : S 18 : 48.755 Finish Lon : E 25 : 53.895

Length : 1.47 km

Rosslyn

Number of transects : 5

Transect Bearing : 90.00 Degrees

Transect Spacing : 4.40 km

Transect # : 1

Start Lat : S 18 : 28.057 Start Lon : E 25 : 53.912

Finish Lat : S 18 : 28.057 Finish Lon : E 25 : 49.103

Length : 8.45 km

Transect # : 2

Start Lat : S 18 : 30.434 Start Lon : E 25 : 44.463

Finish Lat : S 18 : 30.434 Finish Lon : E 25 : 55.387

Length : 19.19 km

Transect # : 3

Start Lat : S 18 : 32.809 Start Lon : E 25 : 54.501

Finish Lat : S 18 : 32.809 Finish Lon : E 25 : 40.504

Length : 24.60 km

Transect # : 4

Start Lat : S 18 : 35.185 Start Lon : E 25 : 42.738

Finish Lat : S 18 : 35.185 Finish Lon : E 25 : 53.629

Length : 19.14 km

Transect # : 5

Start Lat : S 18 : 37.561 Start Lon : E 25 : 52.055

Finish Lat : S 18 : 37.561 Finish Lon : E 25 : 46.749

Length : 9.32 km

Shakwanki

Number of transects : 13

Transect Bearing : 90.00 Degrees

Transect Spacing : 5.10 km

Transect # : 1A

Start Lat : S 18 : 59.657 Start Lon : E 26 : 18.944

Finish Lat : S 18 : 59.657 Finish Lon : E 26 : 7.924

Length : 19.30 km

Transect # : 1B

Start Lat : S 18 : 59.657 Start Lon : E 26 : 4.121

Finish Lat : S 18 : 59.657 Finish Lon : E 26 : 3.225

Length : 1.57 km

Transect # : 2

Start Lat : S 19 : 2.410 Start Lon : E 25 : 59.541

Finish Lat : S 19 : 2.410 Finish Lon : E 26 : 19.223

Length : 34.48 km

Transect # : 3

Start Lat : S 19 : 5.164 Start Lon : E 26 : 20.012

Finish Lat : S 19 : 5.164 Finish Lon : E 25 : 57.859

Length : 38.81 km

Transect # : 4

Start Lat : S 19 : 7.919 Start Lon : E 25 : 58.766

Finish Lat : S 19 : 7.919 Finish Lon : E 26 : 20.785

Length : 38.57 km

Transect # : 5

Start Lat : S 19 : 10.673 Start Lon : E 26 : 22.111

Finish Lat : S 19 : 10.673 Finish Lon : E 26 : 1.183

Length : 36.66 km

Transect # : 6

Start Lat : S 19 : 13.427 Start Lon : E 26 : 2.722

Finish Lat : S 19 : 13.427 Finish Lon : E 26 : 24.112

Length : 37.47 km

Transect # : 7

Start Lat : S 19 : 16.181 Start Lon : E 26 : 25.172

Finish Lat : S 19 : 16.181 Finish Lon : E 26 : 4.473

Length : 36.26 km

Transect # : 8

Start Lat : S 19 : 18.934 Start Lon : E 26 : 5.305

Finish Lat : S 19 : 18.934 Finish Lon : E 26 : 27.124

Length : 38.22 km

Transect # : 9

Start Lat : S 19 : 21.688 Start Lon : E 26 : 27.429

Finish Lat : S 19 : 21.688 Finish Lon : E 26 : 6.628

Length : 36.44 km

Transect # : 10

Start Lat : S 19 : 24.443 Start Lon : E 26 : 7.340

Finish Lat : S 19 : 24.443 Finish Lon : E 26 : 28.906

Length : 37.78 km

Transect # : 11

Start Lat : S 19 : 27.197 Start Lon : E 26 : 24.155

Finish Lat : S 19 : 27.197 Finish Lon : E 26 : 8.620

Length : 27.21 km

Transect # : 12

Start Lat : S 19 : 29.951 Start Lon : E 26 : 9.380

Finish Lat : S 19 : 29.951 Finish Lon : E 26 : 24.459

Length : 26.41 km

Transect # : 13

Start Lat : S 19 : 32.705 Start Lon : E 26 : 18.994

Finish Lat : S 19 : 32.705 Finish Lon : E 26 : 10.679

Length : 14.56 km

Shapi

Number of transects : 20
 Transect Bearing : 0.00 Degrees
 Transect Spacing : 2.80 km

Transect # : 1
 Start Lat : S 19 : 2.867 Start Lon : E 26 : 19.469
 Finish Lat : S 18 : 59.162 Finish Lon : E 26 : 19.469
 Length : 6.86 km

Transect # : 2
 Start Lat : S 18 : 58.301 Start Lon : E 26 : 21.065
 Finish Lat : S 19 : 8.591 Finish Lon : E 26 : 21.065
 Length : 19.06 km

Transect # : 3
 Start Lat : S 19 : 7.757 Start Lon : E 26 : 22.661
 Finish Lat : S 18 : 55.961 Finish Lon : E 26 : 22.661
 Length : 21.85 km

Transect # : 4
 Start Lat : S 18 : 55.172 Start Lon : E 26 : 24.257
 Finish Lat : S 19 : 6.754 Finish Lon : E 26 : 24.257
 Length : 21.45 km

Transect # : 5
 Start Lat : S 19 : 6.090 Start Lon : E 26 : 25.853
 Finish Lat : S 18 : 54.335 Finish Lon : E 26 : 25.853
 Length : 21.77 km

Transect # : 6
 Start Lat : S 18 : 53.730 Start Lon : E 26 : 27.449
 Finish Lat : S 19 : 4.168 Finish Lon : E 26 : 27.449
 Length : 19.33 km

Transect # : 7
 Start Lat : S 19 : 3.582 Start Lon : E 26 : 29.045
 Finish Lat : S 18 : 52.699 Finish Lon : E 26 : 29.045
 Length : 20.15 km

Transect # : 8
 Start Lat : S 18 : 52.143 Start Lon : E 26 : 30.641
 Finish Lat : S 19 : 3.274 Finish Lon : E 26 : 30.641
 Length : 20.61 km

Transect # : 9
 Start Lat : S 19 : 2.665 Start Lon : E 26 : 32.237
 Finish Lat : S 18 : 51.394 Finish Lon : E 26 : 32.237
 Length : 20.87 km

Transect # : 10
 Start Lat : S 18 : 51.579 Start Lon : E 26 : 33.833
 Finish Lat : S 19 : 2.133 Finish Lon : E 26 : 33.833
 Length : 19.55 km

Transect # : 11
 Start Lat : S 19 : 0.775 Start Lon : E 26 : 35.429
 Finish Lat : S 18 : 51.319 Finish Lon : E 26 : 35.429
 Length : 17.51 km

Transect # : 12
 Start Lat : S 18 : 51.104 Start Lon : E 26 : 37.024
 Finish Lat : S 18 : 59.504 Finish Lon : E 26 : 37.024
 Length : 15.56 km

Transect # : 13
 Start Lat : S 18 : 58.650 Start Lon : E 26 : 38.620
 Finish Lat : S 18 : 51.134 Finish Lon : E 26 : 38.620
 Length : 13.92 km

Transect # : 14
 Start Lat : S 18 : 50.839 Start Lon : E 26 : 40.216
 Finish Lat : S 18 : 58.405 Finish Lon : E 26 : 40.216
 Length : 14.01 km

Transect # : 15
 Start Lat : S 18 : 58.324 Start Lon : E 26 : 41.812
 Finish Lat : S 18 : 50.267 Finish Lon : E 26 : 41.812
 Length : 14.92 km

Transect # : 16
 Start Lat : S 18 : 50.029 Start Lon : E 26 : 43.408
 Finish Lat : S 18 : 58.224 Finish Lon : E 26 : 43.408
 Length : 15.18 km

Transect # : 17
 Start Lat : S 18 : 57.900 Start Lon : E 26 : 45.004
 Finish Lat : S 18 : 49.681 Finish Lon : E 26 : 45.004
 Length : 15.22 km

Transect # : 18
 Start Lat : S 18 : 49.650 Start Lon : E 26 : 46.600
 Finish Lat : S 18 : 57.900 Finish Lon : E 26 : 46.600
 Length : 15.28 km

Transect # : 19
 Start Lat : S 18 : 57.854 Start Lon : E 26 : 48.196
 Finish Lat : S 18 : 51.640 Finish Lon : E 26 : 48.196
 Length : 11.51 km

Transect # : 20
 Start Lat : S 18 : 54.996 Start Lon : E 26 : 49.792
 Finish Lat : S 18 : 57.803 Finish Lon : E 26 : 49.792
 Length : 5.20 km

Sikumi Forest

Number of transects : 8

Transect Bearing : 41.00 Degrees

Transect Spacing : 7.50 km

Transect # : 1

Start Lat : S 18 : 37.087 Start Lon : E 26 : 52.604

Finish Lat : S 18 : 32.335 Finish Lon : E 26 : 56.957

Length : 11.66 km

Transect # : 2

Start Lat : S 18 : 33.752 Start Lon : E 27 : 1.314

Finish Lat : S 18 : 40.275 Finish Lon : E 26 : 55.339

Length : 16.00 km

Transect # : 3

Start Lat : S 18 : 42.874 Start Lon : E 26 : 58.612

Finish Lat : S 18 : 36.288 Finish Lon : E 27 : 4.646

Length : 16.16 km

Transect # : 4

Start Lat : S 18 : 36.697 Start Lon : E 27 : 9.927

Finish Lat : S 18 : 45.474 Finish Lon : E 27 : 1.886

Length : 21.54 km

Transect # : 5

Start Lat : S 18 : 48.074 Start Lon : E 27 : 5.160

Finish Lat : S 18 : 39.680 Finish Lon : E 27 : 12.850

Length : 20.60 km

Transect # : 6

Start Lat : S 18 : 42.989 Start Lon : E 27 : 15.474

Finish Lat : S 18 : 50.674 Finish Lon : E 27 : 8.434

Length : 18.86 km

Transect # : 7

Start Lat : S 18 : 53.271 Start Lon : E 27 : 11.710

Finish Lat : S 18 : 44.545 Finish Lon : E 27 : 19.704

Length : 21.41 km

Transect # : 8

Start Lat : S 18 : 44.860 Start Lon : E 27 : 25.071

Finish Lat : S 18 : 55.868 Finish Lon : E 27 : 14.986

Length : 27.01 km

Sinamatella

Number of transects : 17

Transect Bearing : 0.00 Degrees

Transect Spacing : 3.30 km

Transect # : 1

Start Lat : S 18 : 33.533 Start Lon : E 26 : 10.900

Finish Lat : S 18 : 29.322 Finish Lon : E 26 : 10.900

Length : 7.80 km

Transect # : 2

Start Lat : S 18 : 27.502 Start Lon : E 26 : 12.777

Finish Lat : S 18 : 42.443 Finish Lon : E 26 : 12.777

Length : 27.67 km

Transect # : 3

Start Lat : S 18 : 41.692 Start Lon : E 26 : 14.653

Finish Lat : S 18 : 25.331 Finish Lon : E 26 : 14.653

Length : 30.30 km

Transect # : 4A

Start Lat : S 18 : 23.991 Start Lon : E 26 : 16.530

Finish Lat : S 18 : 41.789 Finish Lon : E 26 : 16.530

Length : 32.96 km

Transect # : 4B

Start Lat : S 18 : 44.368 Start Lon : E 26 : 16.530

Finish Lat : S 18 : 45.070 Finish Lon : E 26 : 16.530

Length : 1.30 km

Transect # : 5

Start Lat : S 18 : 47.400 Start Lon : E 26 : 18.407

Finish Lat : S 18 : 24.349 Finish Lon : E 26 : 18.407

Length : 42.69 km

Transect # : 6

Start Lat : S 18 : 27.756 Start Lon : E 26 : 20.284

Finish Lat : S 18 : 48.017 Finish Lon : E 26 : 20.284

Length : 37.52 km

Transect # : 7

Start Lat : S 18 : 48.136 Start Lon : E 26 : 22.160

Finish Lat : S 18 : 28.830 Finish Lon : E 26 : 22.160

Length : 35.75 km

Transect # : 8

Start Lat : S 18 : 28.422 Start Lon : E 26 : 24.037

Finish Lat : S 18 : 46.481 Finish Lon : E 26 : 24.037

Length : 33.44 km

Transect # : 9

Start Lat : S 18 : 45.911 Start Lon : E 26 : 25.914

Finish Lat : S 18 : 28.034 Finish Lon : E 26 : 25.914

Length : 33.10 km

Transect # : 10

Start Lat : S 18 : 27.284 Start Lon : E 26 : 27.791

Finish Lat : S 18 : 45.123 Finish Lon : E 26 : 27.791
Length : 33.04 km

Transect # : 11
Start Lat : S 18 : 43.602 Start Lon : E 26 : 29.668
Finish Lat : S 18 : 26.766 Finish Lon : E 26 : 29.668
Length : 31.18 km

Transect # : 12
Start Lat : S 18 : 27.007 Start Lon : E 26 : 31.544
Finish Lat : S 18 : 43.389 Finish Lon : E 26 : 31.544
Length : 30.34 km

Transect # : 13
Start Lat : S 18 : 42.900 Start Lon : E 26 : 33.421
Finish Lat : S 18 : 27.762 Finish Lon : E 26 : 33.421
Length : 28.03 km

Transect # : 14

Start Lat : S 18 : 28.578 Start Lon : E 26 : 35.298
Finish Lat : S 18 : 41.655 Finish Lon : E 26 : 35.298
Length : 24.22 km

Transect # : 15
Start Lat : S 18 : 39.162 Start Lon : E 26 : 37.175
Finish Lat : S 18 : 29.852 Finish Lon : E 26 : 37.175
Length : 17.24 km

Transect # : 16
Start Lat : S 18 : 30.744 Start Lon : E 26 : 39.051
Finish Lat : S 18 : 36.168 Finish Lon : E 26 : 39.051
Length : 10.04 km

Transect # : 17
Start Lat : S 18 : 32.463 Start Lon : E 26 : 40.928
Finish Lat : S 18 : 29.756 Finish Lon : E 26 : 40.928
Length : 5.01 km

Tsholotsho East

Number of transects : 8
Transect Bearing : 90.00 Degrees
Transect Spacing : 6.50 km

Transect # : 1
Start Lat : S 19 : 25.646 Start Lon : E 26 : 59.979
Finish Lat : S 19 : 25.646 Finish Lon : E 26 : 52.282
Length : 13.45 km

Transect # : 2
Start Lat : S 19 : 29.156 Start Lon : E 26 : 51.024
Finish Lat : S 19 : 29.156 Finish Lon : E 27 : 1.368
Length : 18.08 km

Transect # : 3
Start Lat : S 19 : 32.666 Start Lon : E 26 : 57.308
Finish Lat : S 19 : 32.666 Finish Lon : E 26 : 49.705
Length : 13.29 km

Transect # : 4
Start Lat : S 19 : 36.175 Start Lon : E 26 : 48.386
Finish Lat : S 19 : 36.175 Finish Lon : E 26 : 57.505
Length : 15.93 km

Transect # : 5
Start Lat : S 19 : 39.685 Start Lon : E 26 : 57.734
Finish Lat : S 19 : 39.685 Finish Lon : E 26 : 47.068
Length : 18.64 km

Transect # : 6
Start Lat : S 19 : 43.195 Start Lon : E 26 : 45.749
Finish Lat : S 19 : 43.195 Finish Lon : E 26 : 58.118
Length : 21.61 km

Transect # : 7
Start Lat : S 19 : 46.706 Start Lon : E 26 : 59.139
Finish Lat : S 19 : 46.706 Finish Lon : E 26 : 44.430
Length : 25.70 km

Transect # : 8
Start Lat : S 19 : 50.216 Start Lon : E 26 : 43.112
Finish Lat : S 19 : 50.216 Finish Lon : E 26 : 48.807
Length : 9.95 km

Tsholotsho North

Number of transects : 8
 Transect Bearing : 0.00 Degrees
 Transect Spacing : 10.00 km

Transect # : 1
 Start Lat : S 19 : 20.250 Start Lon : E 26 : 55.963
 Finish Lat : S 19 : 23.047 Finish Lon : E 26 : 55.963
 Length : 5.18 km

Transect # : 2
 Start Lat : S 19 : 24.441 Start Lon : E 27 : 1.669
 Finish Lat : S 19 : 19.717 Finish Lon : E 27 : 1.669
 Length : 8.75 km

Transect # : 3
 Start Lat : S 19 : 18.908 Start Lon : E 27 : 7.376
 Finish Lat : S 19 : 24.275 Finish Lon : E 27 : 7.376
 Length : 9.94 km

Transect # : 4
 Start Lat : S 19 : 25.142 Start Lon : E 27 : 13.083
 Finish Lat : S 19 : 19.105 Finish Lon : E 27 : 13.083
 Length : 11.18 km

Transect # : 5
 Start Lat : S 19 : 14.000 Start Lon : E 27 : 18.790
 Finish Lat : S 19 : 25.789 Finish Lon : E 27 : 18.790
 Length : 21.83 km

Transect # : 6
 Start Lat : S 19 : 22.298 Start Lon : E 27 : 24.497
 Finish Lat : S 19 : 13.259 Finish Lon : E 27 : 24.497
 Length : 16.74 km

Transect # : 7
 Start Lat : S 19 : 7.718 Start Lon : E 27 : 30.203
 Finish Lat : S 19 : 18.842 Finish Lon : E 27 : 30.203
 Length : 20.60 km

Transect # : 8
 Start Lat : S 19 : 12.595 Start Lon : E 27 : 35.910
 Finish Lat : S 19 : 12.217 Finish Lon : E 27 : 35.910
 Length : 0.70 km

Zambezi NP

Number of transects : 8
 Transect Bearing : 0.00 Degrees
 Transect Spacing : 4.00 km

Transect # : 1
 Start Lat : S 17 : 55.321 Start Lon : E 25 : 33.234
 Finish Lat : S 17 : 50.538 Finish Lon : E 25 : 33.234
 Length : 8.86 km

Transect # : 2
 Start Lat : S 17 : 50.828 Start Lon : E 25 : 35.502
 Finish Lat : S 17 : 59.104 Finish Lon : E 25 : 35.502
 Length : 15.33 km

Transect # : 3
 Start Lat : S 18 : 2.400 Start Lon : E 25 : 37.770
 Finish Lat : S 17 : 50.486 Finish Lon : E 25 : 37.770
 Length : 22.06 km

Transect # : 4
 Start Lat : S 17 : 49.246 Start Lon : E 25 : 40.038
 Finish Lat : S 18 : 2.402 Finish Lon : E 25 : 40.038
 Length : 24.36 km

Transect # : 5
 Start Lat : S 18 : 2.404 Start Lon : E 25 : 42.306
 Finish Lat : S 17 : 50.555 Finish Lon : E 25 : 42.306
 Length : 21.94 km

Transect # : 6
 Start Lat : S 17 : 51.082 Start Lon : E 25 : 44.574
 Finish Lat : S 18 : 2.406 Finish Lon : E 25 : 44.574
 Length : 20.97 km

Transect # : 7
 Start Lat : S 18 : 0.010 Start Lon : E 25 : 46.842
 Finish Lat : S 17 : 51.779 Finish Lon : E 25 : 46.842
 Length : 15.24 km

Transect # : 8
 Start Lat : S 17 : 53.855 Start Lon : E 25 : 49.110
 Finish Lat : S 17 : 54.205 Finish Lon : E 25 : 49.110
 Length : 0.65 km

Zanguja

Number of transects : 8

Transect Bearing : 29.00 Degrees

Transect Spacing : 4.70 km

Transect # : 1

Start Lat : S 18 : 21.053 Start Lon : E 25 : 54.539

Finish Lat : S 18 : 20.000 Finish Lon : E 25 : 55.154

Length : 2.23 km

Transect # : 2A

Start Lat : S 18 : 18.103 Start Lon : E 25 : 59.315

Finish Lat : S 18 : 25.417 Finish Lon : E 25 : 55.048

Length : 15.49 km

Transect # : 2B

Start Lat : S 18 : 26.775 Start Lon : E 25 : 54.255

Finish Lat : S 18 : 27.691 Finish Lon : E 25 : 53.721

Length : 1.94 km

Transect # : 3

Start Lat : S 18 : 30.266 Start Lon : E 25 : 55.273

Finish Lat : S 18 : 17.683 Finish Lon : E 26 : 2.615

Length : 26.64 km

Transect # : 4

Start Lat : S 18 : 17.951 Start Lon : E 26 : 5.513

Finish Lat : S 18 : 34.855 Finish Lon : E 25 : 55.650

Length : 35.79 km

Transect # : 5

Start Lat : S 18 : 32.890 Start Lon : E 25 : 59.851

Finish Lat : S 18 : 17.186 Finish Lon : E 26 : 9.015

Length : 33.25 km

Transect # : 6

Start Lat : S 18 : 19.496 Start Lon : E 26 : 10.721

Finish Lat : S 18 : 31.676 Finish Lon : E 26 : 3.614

Length : 25.79 km

Transect # : 7

Start Lat : S 18 : 30.683 Start Lon : E 26 : 7.248

Finish Lat : S 18 : 21.217 Finish Lon : E 26 : 12.772

Length : 20.04 km

Transect # : 8A

Start Lat : S 18 : 22.106 Start Lon : E 26 : 15.308

Finish Lat : S 18 : 27.387 Finish Lon : E 26 : 12.226

Length : 11.18 km

Transect # : 8B

Start Lat : S 18 : 28.928 Start Lon : E 26 : 11.327

Finish Lat : S 18 : 29.382 Finish Lon : E 26 : 11.062

Length : 0.96 km

Appendix 4. Transect Summaries.

Species codes:

Code	Species
Bbk	Bushbuck
Buff	Buffalo
Catt	Cattle
Croc	Crocodile
Dkr	Duiker
Donk	Donkey
ElC1	Elephant carcass, age category 1
ElC2	Elephant carcass, age category 2
ElC3	Elephant carcass, age category 3
Eld	Eland
EleF	Elephant cow
EleM	Elephant bull
Gems	Gemsbok
Ghb	Ground hornbill
Grf	Giraffe
Grys	Grysbok
Hipo	Hippo
Imp	Impala
Kudu	Kudu
Ost	Ostrich
PCmp	Poachers' camp
Rbk	Reedbuck
Roan	Roan antelope
Sab	Sable
Shoa	Sheep and/or goats
Tses	Tsessebe
UnCa	Carcass of unknown species
Wbck	Waterbuck
Wbst	Wildebeest
Whog	Warthog
Zeb	Zebra

Other abbreviations

Abbreviation	Meaning
n	number of transects sampled
N	possible number of transects in stratum
t	Student's <i>t</i> value, $P = 0.05$
T #	transect number
-	no animals seen in strips

Date of Survey : 17/09/01
 Stratum Name : Zambezi NP
 Stratum Locality : NW Matabeleland
 Base Line Length : 32 km
 Stratum Area : 543 km²
 Calibrated Strip Width at 300ft : 317 m
 N : 93 n : 8
 t : 2.365
 Pilot : J. Cadd
 Observer : F.Muroki, D.Chipesi
 Map overlay file : None

Transect summary table :

T #	EleM	EleF	Buff	Sab	Zeb	Wbck	Kudu	EIC2	EIC3	UnCa	Grf	Croc	Whog	Ghb
1	-	-	-	2	-	-	4	-	-	2	1	-	-	-
2	-	8	-	28	9	-	-	-	5	-	-	-	-	-
3	5	8	3	-	-	-	6	-	1	-	4	-	-	-
4	9	-	12	-	11	-	-	-	2	-	-	-	-	-
5	2	-	-	15	-	-	-	-	3	-	-	-	-	-
6	-	18	-	-	-	-	7	-	-	-	2	1	-	-
7	2	-	82	-	-	1	-	-	1	-	-	-	2	3
8	-	-	-	-	-	-	-	1	-	-	-	-	-	-

Sighting Totals

	EleM	EleF	Buff	Sab	Zeb	Wbck	Kudu	EIC2	EIC3	UnCa	Grf	Croc	Whog	Ghb
	18	34	97	45	20	1	17	1	12	2	7	1	2	3

Date of Survey : 17/09/01
 Stratum Name : Kazungula
 Stratum Locality : NW Matabeleland
 Base Line Length : 35.2 km
 Stratum Area : 446 km²
 Calibrated Strip Width at 300ft : 317 m
 N : 105 n : 14
 t : 2.16
 Pilot : J. Cadd
 Observer : F.Muroki, D.Chipesi
 Map overlay file : None

Transect summary table :

T #	EleM	EleF	Buff	Sab	Zeb	Wbck	Imp	Kudu	Hipo	EIC3	UnCa	Grf	Dkr	Whog	Croc	Ghb
1	4	-	-	-	-	-	12	1	-	2	1	2	1	-	-	-
2	2	32	-	2	-	6	8	2	-	-	2	2	-	2	1	-
3	-	-	54	2	-	5	-	-	-	1	-	-	-	-	-	-
4	-	-	-	3	18	1	-	-	-	-	-	1	-	2	-	2
5	2	-	2	21	13	-	-	2	-	-	-	-	-	2	-	-
6	4	4	200	-	-	-	8	-	6	1	-	8	-	2	1	-
7	-	43	-	-	-	-	-	-	-	-	1	-	-	-	-	-
8	-	46	-	10	-	1	7	-	-	1	1	-	-	-	-	-
9	-	83	-	10	-	-	-	5	-	2	-	-	-	-	-	-
10	11	13	2	-	-	-	-	2	-	1	-	-	-	2	-	-
11	5	-	-	-	-	-	5	-	6	-	-	-	-	-	1	-
12	2	-	-	-	-	-	-	1	4	1	1	-	-	-	1	-
13	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sighting Totals

	EleM	EleF	Buff	Sab	Zeb	Wbck	Imp	Kudu	Hipo	EIC3	UnCa	Grf	Dkr	Whog	Croc	Ghb
	30	224	258	48	31	13	40	13	16	9	6	13	1	10	4	2

Date of Survey : 19/09/01
 Stratum Locality : NW Matabeleland
 Stratum Area : 963 km²
 N : 167 n : 13
 Pilot : J. Cadd
 Map overlay file : None

Stratum Name : Panda Masuie
 Base Line Length : 54.2 km
 Calibrated Strip Width at 300ft : 317 m
 t : 2.179
 Observer : F.Muroki, D.Chipesi

Transect summary table :

T #	EleM	EleF	Sab	Zeb	Kudu	EIC3	UnCa	Eld	Ost	Grf
1	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	1	-	-
3	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	1	-	-	-	-
5	-	-	-	-	-	2	-	-	1	-
6	7	29	1	-	12	1	1	-	-	1
7	-	-	6	-	-	-	1	-	-	-
8	-	-	1	-	-	1	-	-	-	1
9	-	-	1	-	2	1	-	-	-	3
10	2	8	2	-	-	1	2	-	-	1
11	4	-	1	15	-	1	-	-	-	2
12	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-

Sighting Totals

	EleM	EleF	Sab	Zeb	Kudu	EIC3	UnCa	Eld	Ost	Grf
	13	37	12	15	14	8	4	1	1	8

Date of Survey : 19/09/01
 Stratum Locality : NW Matabeleland
 Stratum Area : 561 km²
 N : 100 n : 6
 Pilot : J. Cadd
 Map overlay file : None

Stratum Name : Kazuma
 Base Line Length : 32.2 km
 Calibrated Strip Width at 300ft : 317 m
 t : 2.571
 Observer : F.Muroki, D.Chipesi

Transect summary table :

T #	EleM	EleF	Buff	Sab	Zeb	Kudu	EIC3	UnCa	Wbst	Grf	Roan	Tses	Ost	Whog
1	7	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	2	-	1	1	-	-	-	-
3	-	-	-	7	-	-	-	2	-	-	3	5	-	-
4	-	14	-	4	-	1	-	1	-	-	-	-	1	-
5	-	-	4	-	-	7	-	-	-	-	-	-	-	3
6	-	9	-	-	3	6	-	-	-	-	-	-	-	-

Sighting Totals

	EleM	EleF	Buff	Sab	Zeb	Kudu	EIC3	UnCa	Wbst	Grf	Roan	Tses	Ost	Whog
	7	23	4	11	3	14	2	3	1	1	3	5	1	3

Date of Survey : 17/09/01
 Stratum Locality : NW Matabeleland
 Stratum Area : 703 km²
 N : 122 n : 5
 Pilot : J. Cadd
 Map overlay file : None

Stratum Name : Matetsi
 Base Line Length : 39.5 km
 Calibrated Strip Width at 300ft : 317 m
 t : 2.776
 Observer : F.Muroki, D.Chipesi

Transect summary table :

T #	EleF	Buff	Sab	Zeb	Wbck	Imp	Kudu	EIC3	UnCa	Ost	Whog	Eld
1	-	-	-	9	-	2	2	3	-	-	-	-
2	-	50	-	-	-	-	2	1	-	4	1	-
3	-	-	18	23	6	15	2	-	-	-	1	-
4	11	100	1	38	6	15	1	1	1	-	1	2
5	-	-	21	15	-	-	5	-	-	-	9	-

Sighting Totals

	EleF	Buff	Sab	Zeb	Wbck	Imp	Kudu	EIC3	UnCa	Ost	Whog	Eld
	11	150	40	85	12	32	12	5	1	4	12	2

Date of Survey : 17/09/01
 Stratum Locality : NW Matabeleland
 Stratum Area : 344 km²
 N : 68 n : 5
 Pilot : J. Cadd
 Map overlay file : None

Stratum Name : Rosslyn
 Base Line Length : 21.8 km
 Calibrated Strip Width at 300ft : 317 m
 t : 2.776
 Observer : F.Muroki, D.Chipesi

Transect summary table :

T #	Sab	Zeb	Wbck	Imp	Kudu	EIC3	UnCa	Grf	Whog	Croc	Dkr	Roan
1	1	13	-	2	1	1	-	2	6	-	-	-
2	22	-	14	-	12	1	1	3	11	1	-	-
3	1	-	-	2	-	2	-	3	-	-	-	-
4	-	-	-	-	2	-	1	-	-	-	1	-
5	-	11	-	9	-	-	-	-	-	-	-	8

Sighting Totals

	Sab	Zeb	Wbck	Imp	Kudu	EIC3	UnCa	Grf	Whog	Croc	Dkr	Roan
	24	24	14	13	15	4	2	8	17	1	1	8

Date of Survey : 19/09/01 Stratum Name : Zanguja
 Stratum Locality : NW Matabeleland Base Line Length : 37.2 km
 Stratum Area : 839 km² Calibrated Strip Width at 300ft : 317 m
 N : 115 n : 8 t : 2.365
 Pilot : J. Cadd Observer : F.Muroki, D.Chipesi
 Map overlay file : None

Transect summary table :

T #	EleM	EleF	Sab	Zeb	Imp	Kudu	Rhin	EIC3	Grf	Whog	Roan	Dkr	Eld	Croc	Wbck
1	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
2	-	-	1	1	13	2	-	-	3	1	-	-	-	-	-
3	-	-	-	2	-	4	-	1	4	5	-	-	-	-	-
4	4	-	-	7	-	4	-	-	-	-	4	1	-	-	-
5	-	-	1	16	9	9	-	1	-	1	-	-	-	-	2
6	3	10	-	11	11	-	-	-	2	-	-	-	-	-	-
7	2	-	-	3	19	1	1	-	2	-	-	-	-	-	-
8	1	-	1	2	-	-	-	-	-	-	-	-	1	1	-

Sighting Totals

	EleM	EleF	Sab	Zeb	Imp	Kudu	Rhin	EIC3	Grf	Whog	Roan	Dkr	Eld	Croc	Wbck
	10	10	3	42	52	20	1	2	13	7	4	1	1	1	2

Date of Survey : 20/09/01 Stratum Name : Robins
 Stratum Locality : NW Matabeleland Base Line Length : 35.8 km
 Stratum Area : 1029 km² Calibrated Strip Width at 300ft : 317 m
 N : 111 n : 13 t : 2.179
 Pilot : J. Cadd Observer : F.Muroki, D.Chipesi
 Map overlay file : None

Transect summary table :

T #	EleM	EleF	Buff	Sab	Zeb	Wbck	Imp	Kudu	EIC3	UnCa	Ghb	Croc	Grf	Whog	Ost	Rbk
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
3	5	3	-	-	7	-	9	5	1	-	-	-	-	-	-	-
4	-	8	13	-	3	-	31	4	-	-	5	-	-	-	-	-
5	1	45	6	-	-	-	-	9	1	-	-	1	-	-	-	-
6	-	56	-	-	4	3	-	-	1	-	-	-	-	-	-	-
7	4	12	3	-	1	16	52	5	2	-	-	-	3	-	-	-
8	6	48	-	-	-	-	5	-	2	-	-	-	-	2	-	-
9	1	51	-	10	4	-	-	-	2	-	-	-	11	1	3	1
10	-	71	-	-	-	-	-	-	1	1	-	-	1	-	4	-
11	2	117	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	1	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sighting Totals

	EleM	EleF	Buff	Sab	Zeb	Wbck	Imp	Kudu	EIC3	UnCa	Ghb	Croc	Grf	Whog	Ost	Rbk
	20	411	22	17	19	19	97	24	10	1	5	1	15	3	7	1

Date of Survey : 22/09/01
 Stratum Locality : NW Matabeleland
 Stratum Area : 1290 km²
 N : 222 n : 22
 Pilot : J. Cadd
 Map overlay file : None

Stratum Name : Dandari
 Base Line Length : 71.8 km
 Calibrated Strip Width at 300ft : 317 m
 t : 2.08
 Observer : F.Muroki, D.Chipesi

Transect summary table :

T #	EleM	EleF	Buff	Sab	Zeb	Imp	Kudu	EIC3	Whog	Grf	Dkr	Ghb
1	-	-	-	-	-	-	-	-	-	-	-	-
2	-	7	-	-	-	-	-	-	-	-	-	-
3	1	-	-	1	-	-	-	-	2	-	-	-
4	2	4	-	-	3	-	4	-	-	1	2	-
5	2	10	-	-	-	-	-	-	-	-	1	-
6	9	-	-	-	11	-	-	-	-	-	1	-
7	8	9	-	1	15	-	-	2	-	3	-	-
8	14	49	-	-	10	-	-	1	1	-	-	2
9	1	8	-	-	10	-	-	-	-	-	-	-
10	4	23	-	-	-	-	-	-	-	-	-	-
11	1	18	1	-	-	-	-	-	-	-	-	-
12	1	65	-	-	-	-	-	1	-	-	-	-
13	3	68	-	-	-	5	-	-	-	-	-	-
14	4	63	-	-	-	-	-	2	-	-	-	-
15	11	21	1	-	7	-	-	1	-	-	-	-
16	7	42	-	-	5	-	-	1	-	-	-	-
17	4	18	70	-	-	-	-	-	-	-	1	4
18	2	67	-	-	-	-	-	1	-	-	-	-
19	-	26	5	-	-	-	-	-	-	-	-	-
20	-	-	50	-	-	-	-	5	-	-	-	-
21	2	8	-	-	-	-	-	-	-	-	1	-
22	-	-	-	-	-	-	-	-	-	-	-	-

Sighting Totals

	EleM	EleF	Buff	Sab	Zeb	Imp	Kudu	EIC3	Whog	Grf	Dkr	Ghb
	76	506	127	2	61	5	4	14	3	4	6	6

Date of Survey : 13/09/01

Stratum Name : Shakwanki

Stratum Locality : NW Matabeleland

Base Line Length : 66.2 km

Stratum Area : 2143 km²

Calibrated Strip Width at 300ft : 317 m

N : 203 n : 13

t : 2.179

Pilot : J. Cadd

Observer : F.Muroki, D.Chipesi

Map overlay file : None

Transect summary table :

T #	EleM	EleF	Buff	Sab	Zeb	Imp	EIC1	EIC2	EIC3	UnCa	Whog	Dkr	Grf	Eld	Ghb	Gems
1	2	25	1	-	-	-	-	-	-	-	2	1	-	-	-	-
2	2	16	-	-	10	-	-	-	1	-	-	-	1	-	-	-
3	10	6	-	-	-	-	-	-	-	2	-	-	3	-	-	-
4	9	34	-	-	-	9	-	-	5	2	-	-	-	1	-	-
5	1	14	3	-	4	-	-	-	-	1	-	-	2	-	-	-
6	9	49	-	-	19	-	-	-	-	1	1	-	3	8	-	-
7	7	18	-	15	5	-	-	1	1	2	-	-	2	-	-	-
8	7	-	33	-	-	1	1	-	-	-	-	-	1	-	-	-
9	-	-	-	-	1	-	-	1	-	3	-	-	6	-	2	-
10	1	-	-	-	-	-	2	-	1	-	-	-	-	1	-	-
11	-	-	-	-	-	-	-	-	-	1	-	-	3	-	-	2
12	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-

Sighting Totals

	EleM	EleF	Buff	Sab	Zeb	Imp	EIC1	EIC2	EIC3	UnCa	Whog	Dkr	Grf	Eld	Ghb	Gems
	48	162	37	15	39	10	3	2	8	13	3	1	23	10	2	2

Date of Survey : 10/09/01

Stratum Name : Dzivanini

Stratum Locality : NW Matabeleland

Base Line Length : 61.1 km

Stratum Area : 2098 km²

Calibrated Strip Width at 300ft : 317 m

N : 189 n : 13

t : 2.179

Pilot : J. Cadd

Observer : F.Muroki, D.Chipesi

Map overlay file : None

Transect summary table :

T #	EleM	EleF	Buff	Sab	Zeb	Kudu	EIC2	EIC3	UnCa	Grf	Ost	Whog	Dkr	Gems	PCmp
1	6	-	-	-	-	-	-	1	-	-	-	-	-	-	-
2	11	9	-	-	3	1	-	-	-	1	-	-	-	-	-
3	11	68	-	-	-	-	-	1	-	8	2	1	-	-	-
4	13	31	-	-	13	1	-	1	1	-	-	1	-	-	-
5	11	7	-	1	6	-	1	1	2	7	-	-	1	-	-
6	8	28	-	-	-	-	-	-	-	1	-	-	2	-	-
7	4	2	1	-	-	-	-	-	-	-	-	-	-	2	-
8	8	94	-	-	3	-	-	1	1	2	-	7	2	-	-
9	3	33	1	-	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	5	-	-	-	2	-
11	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	5	11	-	-	-	-	-	-	-	-	-	-	-	-	1

Sighting Totals

	EleM	EleF	Buff	Sab	Zeb	Kudu	EIC2	EIC3	UnCa	Grf	Ost	Whog	Dkr	Gems	PCmp
	80	283	2	1	25	2	1	7	4	24	2	9	5	4	1

Date of Survey : 18/09/01
 Stratum Locality : NW Matabeleland
 Stratum Area : 1522 km²
 N : 171 n : 17
 Pilot : J. Cadd
 Map overlay file : None

Stratum Name : Sinamatella
 Base Line Length : 57.5 km
 Calibrated Strip Width at 300ft : 317 m
 t : 2.12
 Observer : F.Muroki, D.Chipesi

Transect summary table :

T #	EleM	EleF	Buff	Sab	Zeb	Imp	Kudu	EIC3	UnCa	Whog	Grf	Dkr	Ghb
1	-	-	-	-	-	5	4	-	-	1	-	-	-
2	6	30	-	-	-	19	-	-	1	-	6	-	-
3	2	73	-	-	4	10	3	-	-	-	-	-	-
4	2	-	-	-	7	24	15	-	1	-	5	-	-
5	6	15	-	-	5	39	-	1	4	9	5	-	-
6	18	-	-	-	9	33	6	-	-	-	4	-	-
7	14	42	-	-	4	1	1	1	1	3	-	1	6
8	9	124	1	-	-	12	2	-	1	4	-	-	-
9	11	42	-	-	-	6	1	-	1	-	6	-	-
10	1	-	6	-	-	16	-	-	-	-	-	-	-
11	-	-	-	7	3	1	6	-	-	-	12	-	2
12	2	9	4	-	3	-	-	-	-	-	-	-	-
13	5	79	-	-	-	-	1	-	1	-	-	-	-
14	1	14	-	-	-	-	4	-	-	-	-	-	4
15	2	48	-	-	-	-	1	-	-	-	-	-	-
16	-	-	15	-	-	-	-	-	-	-	-	-	-
17	1	-	-	-	-	-	1	-	-	-	-	-	-

Sighting Totals

	EleM	EleF	Buff	Sab	Zeb	Imp	Kudu	EIC3	UnCa	Whog	Grf	Dkr	Ghb
	80	476	26	7	35	166	45	2	10	17	38	1	12

Date of Survey : 13/09/01
 Stratum Locality : NW Matabeleland
 Stratum Area : 826 km²
 N : 162 n : 14
 Pilot : J. Cadd
 Map overlay file : None

Stratum Name : Mtoa
 Base Line Length : 53.2 km
 Calibrated Strip Width at 300ft : 317 m
 t : 2.16
 Observer : F.Muroki, D.Chipesi

Transect summary table :

T #	EleM	EleF	Buff	Sab	Zeb	Wbck	Imp	Rhin	EIC3	Grf	Whog	Ghb
1	12	-	1	-	-	-	5	-	-	1	-	-
2	10	-	-	-	-	-	-	-	-	-	-	-
3	10	11	-	-	-	-	-	-	-	-	-	-
4	11	81	-	1	-	-	-	-	1	2	-	-
5	3	31	-	1	-	-	-	-	-	-	-	-
6	6	24	-	-	-	4	-	-	-	-	-	-
7	5	38	-	-	4	-	-	1	-	-	-	-
8	14	25	60	1	-	-	-	-	-	-	-	-
9	1	28	-	-	-	-	1	-	-	3	-	4
10	5	14	-	-	-	-	-	-	-	1	2	2
11	11	33	-	3	5	-	-	-	-	2	-	-
12	-	3	-	-	-	-	-	-	1	-	-	-
13	6	5	-	2	1	-	-	-	-	6	-	-
14	-	-	-	-	-	-	-	-	-	-	-	-

Sighting Totals

	EleM	EleF	Buff	Sab	Zeb	Wbck	Imp	Rhin	EIC3	Grf	Whog	Ghb
	94	293	61	8	10	4	6	1	2	15	2	6

Date of Survey : 16/09/01

Stratum Name : Main Camp

Stratum Locality : NW Matabeleland

Base Line Length : 50.8 km

Stratum Area : 1261 km²

Calibrated Strip Width at 300ft : 317 m

N : 154 n : 23

t : 2.074

Pilot : J. Cadd

Observer : F.Muroki, D.Chipesi

Map overlay file : None

Transect summary table :

T #	EleM	EleF	Buff	Sab	Zeb	Imp	Kudu	EIC3	UnCa	Grf	Wbst	Croc	Dkr	Roan	Ghb
1	3	6	-	-	-	-	-	-	-	-	-	-	-	-	-
2	15	-	-	-	-	-	-	1	-	-	-	-	-	-	-
3	5	5	9	1	-	-	1	-	1	5	-	-	-	-	-
4	13	27	-	-	-	-	2	-	-	4	-	-	-	-	-
5	4	10	-	-	-	2	-	1	-	8	-	-	-	-	-
6	9	76	-	1	-	-	1	-	-	-	-	-	-	-	-
7	4	-	-	-	-	-	5	-	-	-	-	-	-	-	-
8	5	9	12	1	4	-	-	1	2	1	-	1	-	-	-
9	-	42	-	-	17	12	-	-	1	8	1	-	-	-	-
10	-	5	-	5	-	-	-	1	-	-	-	-	-	-	-
11	1	4	-	2	-	-	-	-	-	2	-	-	-	-	-
12	2	11	-	-	-	-	-	1	-	1	-	-	-	-	-
13	5	-	-	1	-	-	2	-	-	-	-	-	-	-	-
14	2	17	-	7	-	-	-	-	-	-	-	-	-	-	-
15	9	32	-	-	-	-	2	2	-	12	-	-	1	-	-
16	2	31	-	-	-	-	1	2	-	4	-	-	1	-	-
17	3	48	-	-	-	-	-	-	2	-	-	-	-	-	-
18	4	6	1	-	-	-	-	-	-	4	-	-	-	-	-
19	10	46	-	-	5	-	3	-	1	4	-	-	1	1	-
20	3	23	3	1	-	-	-	-	-	-	-	-	-	-	-
21	3	11	-	-	4	-	-	-	-	-	-	-	-	-	-
22	1	23	-	-	-	-	-	2	1	-	-	-	-	-	2
23	2	28	-	-	-	-	1	-	-	-	-	-	-	-	-

Sighting Totals

	EleM	EleF	Buff	Sab	Zeb	Imp	Kudu	EIC3	UnCa	Grf	Wbst	Croc	Dkr	Roan	Ghb
	105	460	25	19	30	14	18	11	8	53	1	1	3	1	2

Date of Survey : 15/09/01
 Stratum Locality : NW Matabeleland
 Stratum Area : 923 km²
 N : 176 n : 20
 Pilot : J. Cadd
 Map overlay file : None

Stratum Name : Shapi
 Base Line Length : 57.2 km
 Calibrated Strip Width at 300ft : 317 m
 t : 2.093
 Observer : F.Muroki, D.Chipesi

Transect summary table :

T #	EleM	EleF	Sab	Zeb	Imp	Kudu	EIC3	UnCa	Roan	Grf	Ghb	Dkr
1	1	5	-	-	-	-	-	-	-	-	-	-
2	3	85	-	-	-	-	-	-	-	-	-	-
3	7	54	-	-	-	-	-	1	1	-	-	-
4	1	19	-	-	-	-	1	-	-	-	-	-
5	8	51	-	-	-	1	2	-	-	-	-	-
6	-	11	5	-	-	-	-	1	-	1	-	-
7	1	14	8	-	-	-	2	-	-	-	-	-
8	4	4	-	-	-	-	-	1	-	1	1	-
9	2	75	-	-	-	-	1	-	-	-	-	-
10	7	13	-	1	-	-	-	-	-	7	-	-
11	1	53	-	-	-	-	-	-	-	-	-	-
12	9	7	-	-	-	-	1	-	-	-	-	-
13	4	8	-	-	1	-	-	-	-	3	-	-
14	9	-	-	-	-	-	-	-	-	2	-	-
15	6	-	-	2	10	-	1	-	-	4	-	1
16	7	8	-	-	-	-	-	-	-	-	-	-
17	7	41	-	-	-	-	-	-	-	1	-	1
18	7	-	-	-	-	-	-	-	-	-	-	-
19	5	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	1	-

Sighting Totals

	EleM	EleF	Sab	Zeb	Imp	Kudu	EIC3	UnCa	Roan	Grf	Ghb	Dkr
	89	448	13	3	11	1	8	3	1	19	2	2

Date of Survey : 12/09/01
 Stratum Locality : NW Matabeleland
 Stratum Area : 1723 km²
 N : 131 n : 7
 Pilot : J. Cadd
 Map overlay file : None

Stratum Name : Central B
 Base Line Length : 42 km
 Calibrated Strip Width at 300ft : 317 m
 t : 2.447
 Observer : F.Muroki, D.Chipesi

Transect summary table :

T #	EleM	EleF	EIC3	UnCa	Grf	Dkr	Eld	Gems
1	4	4	1	1	11	1	-	-
2	-	8	-	-	-	-	-	-
3	-	20	-	-	6	-	-	-
4	2	19	-	-	1	1	-	-
5	-	10	-	-	-	2	1	-
6	-	-	-	-	1	-	-	1
7	1	-	-	-	-	-	-	-

Sighting Totals

	EleM	EleF	EIC3	UnCa	Grf	Dkr	Eld	Gems
	7	61	1	1	19	4	1	1

Date of Survey : 12/09/01
 Stratum Locality : NW Matabeleland
 Stratum Area : 775 km²
 N : 137 n : 15
 Pilot : J. Cadd
 Map overlay file : None

Stratum Name : Central A
 Base Line Length : 44.8 km
 Calibrated Strip Width at 300ft : 317 m
 t : 2.145
 Observer : F.Muroki, D.Chipesi

Transect summary table :

T #	EleM	EleF	Zeb	Kudu	EIC3	UnCa	Grf	Gems	Dkr	Roan	Whog
1	2	-	-	-	-	-	-	-	-	-	-
2	-	10	-	-	-	-	1	-	-	-	-
3	-	-	-	-	1	-	-	-	-	-	-
4	-	-	-	-	1	-	1	-	-	-	-
5	2	10	-	-	-	1	-	-	-	-	-
6	-	11	-	-	-	-	-	-	-	-	-
7	5	-	-	-	-	-	-	2	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-
9	4	-	-	-	-	-	-	-	-	-	-
10	-	22	-	-	-	-	-	-	-	7	-
11	-	-	-	-	-	-	-	-	-	-	-
12	-	12	2	-	-	-	4	-	1	-	-
13	2	-	-	-	1	1	1	-	-	-	-
14	6	-	-	4	-	-	1	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	1

Sighting Totals

	EleM	EleF	Zeb	Kudu	EIC3	UnCa	Grf	Gems	Dkr	Roan	Whog
	21	65	2	4	3	2	8	2	1	7	1

Date of Survey : 11/09/01
 Stratum Locality : NW Matabeleland
 Stratum Area : 1629 km²
 N : 175 n : 21
 Pilot : J. Cadd
 Map overlay file : None

Stratum Name : Ngamo
 Base Line Length : 56.8 km
 Calibrated Strip Width at 300ft : 317 m
 t : 2.086
 Observer : F.Muroki, D.Chipesi

Transect summary table :

T #	EleM	EleF	Buff	Sab	Zeb	Imp	Kudu	EIC3	UnCa	Wbst	Eld	Grf	Ost	Dkr	Ghb
1	6	65	140	-	1	5	-	-	3	27	11	2	-	-	-
2	-	51	-	9	-	-	-	1	1	-	19	2	1	1	-
3	9	74	261	19	11	-	-	-	2	1	21	9	1	1	-
4	1	72	1	1	16	-	2	1	1	-	-	5	2	1	-
5	9	9	2	8	15	-	3	1	1	-	-	4	-	1	-
6	15	53	-	-	-	-	-	-	1	-	-	-	-	2	3
7	-	60	-	1	7	30	-	-	1	-	-	6	1	-	-
8	2	41	-	-	-	-	1	-	1	-	-	4	-	-	-
9	10	69	-	-	-	-	-	-	1	-	-	-	-	-	-
10	13	76	-	-	-	-	-	1	-	-	-	-	-	-	-
11	10	18	-	-	-	-	-	1	-	-	-	-	-	-	-
12	5	-	-	4	-	-	-	-	-	-	-	1	-	-	-
13	1	3	-	-	-	-	-	-	1	-	-	1	-	-	-
14	3	-	-	-	-	-	-	-	1	-	-	-	-	-	-
15	2	-	-	-	-	-	-	-	2	-	-	1	-	1	-
16	5	5	-	-	-	-	-	-	1	-	-	-	-	1	-
17	1	-	-	1	6	-	-	1	3	-	-	-	-	1	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	2	-	-	-	-	-	-	-	-	-	-	-	-	1	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sighting Totals

	EleM	EleF	Buff	Sab	Zeb	Imp	Kudu	EIC3	UnCa	Wbst	Eld	Grf	Ost	Dkr	Ghb
	94	596	404	43	56	35	6	6	20	28	51	35	5	10	3

Date of Survey : 09/09/01
 Stratum Locality : NW Matabeleland
 Stratum Area : 910 km²
 N : 177 n : 8
 Pilot : J.Cadd
 Map overlay file : None

Stratum Name : Tsholotsho East
 Base Line Length : 56.2 km
 Calibrated Strip Width at 300ft : 317 m
 t : 2.365
 Observer : F.Muroki, D.Chipesi

Transect summary table :

T #	EIC3	UnCa	Catt	Shoa	Dkr	Ghb
1	-	-	-	-	-	-
2	-	1	-	-	7	-
3	-	-	59	24	-	1
4	1	-	27	-	1	-
5	-	-	2	-	-	-
6	-	-	71	-	-	-
7	-	1	65	-	1	-
8	-	-	21	-	-	-

Sighting Totals

	EIC3	UnCa	Catt	Shoa	Dkr	Ghb
	1	2	245	24	9	1

Date of Survey : 09/09/01
 Stratum Locality : NW Matabeleland
 Stratum Area : 1224 km²
 N : 161 n : 6
 Pilot : J. Cadd
 Map overlay file : None

Stratum Name : Maitengwe
 Base Line Length : 51.2 km
 Calibrated Strip Width at 300ft : 317 m
 t : 2.571
 Observer : F.Muroki, D.Chipesi

Transect summary table :

T #	Kudu	EIC3	UnCa	Catt	Shoa	Donk	Wbst	Ghb
1	-	-	1	42	5	-	12	2
2	6	2	-	115	1	-	-	-
3	-	-	-	52	-	3	-	1
4	-	-	1	20	-	-	-	-
5	-	-	-	29	-	-	-	-
6	-	-	-	-	-	-	-	-

Sighting Totals

	Kudu	EIC3	UnCa	Catt	Shoa	Donk	Wbst	Ghb
	6	2	2	258	6	3	12	3

Date of Survey : 09/09/01
 Stratum Locality : NW Matabeleland
 Stratum Area : 976 km²
 N : 229 n : 8
 Pilot : J. Cadd
 Map overlay file : None

Stratum Name : Tsholotsho North
 Base Line Length : 73.2 km
 Calibrated Strip Width at 300ft : 317 m
 t : 2.365
 Observer : F.Muroki, D.Chipesi

Transect summary table :

T #	EleM	EIC3	UnCa	Catt	Shoa	Donk
1	-	1	1	-	-	-
2	1	-	-	-	-	-
3	-	1	-	-	-	-
4	1	-	-	23	54	17
5	-	1	-	24	23	15
6	-	-	-	56	21	19
7	-	-	-	71	21	6
8	-	-	-	44	15	1

Sighting Totals

	EleM	EIC3	UnCa	Catt	Shoa	Donk
	2	3	1	218	134	58

Date of Survey : 11/09/01
 Stratum Locality : NW Matabeleland
 Stratum Area : 1171 km²
 N : 134 n : 5
 Pilot : J. Cadd
 Map overlay file : None

Stratum Name : Ngamo Forest
 Base Line Length : 43.5 km
 Calibrated Strip Width at 300ft : 317 m
 t : 2.776
 Observer : F.Muroki, D.Chipesi

Transect summary table :

T #	EleM	EleF	Buff	Sab	UnCa	Catt	Ghb	Eld	Dkr
1	-	2	-	3	1	-	4	-	-
2	-	-	-	1	-	-	-	-	-
3	2	-	14	1	1	-	-	2	1
4	2	-	-	-	-	-	-	-	1
5	-	-	-	-	-	20	-	-	-

Sighting Totals

	EleM	EleF	Buff	Sab	UnCa	Catt	Ghb	Eld	Dkr
	4	2	14	5	2	20	4	2	2

Date of Survey : 10/09/01
 Stratum Locality : NW Matabeleland
 Stratum Area : 1173 km²
 N : 187 n : 8
 Pilot : J. Cadd
 Map overlay file : None

Stratum Name : Sikumi Forest
 Base Line Length : 60.2 km
 Calibrated Strip Width at 300ft : 317 m
 t : 2.365
 Observer : F.Muroki, D.Chipesi

Transect summary table :

T #	EleM	EleF	Sab	Kudu	EIC3	UnCa	Catt	Shoa	Grf	Dkr	Whog
1	4	9	1	-	1	-	-	-	-	-	-
2	1	-	-	-	-	-	-	-	8	-	-
3	-	-	16	2	-	-	-	-	-	-	-
4	2	-	-	-	-	-	-	-	-	-	-
5	-	-	6	3	2	-	-	-	-	-	-
6	-	-	40	1	-	1	-	-	-	1	-
7	1	-	2	-	-	-	1	12	-	-	2
8	-	-	19	-	-	-	18	-	-	-	-

Sighting Totals

	EleM	EleF	Sab	Kudu	EIC3	UnCa	Catt	Shoa	Grf	Dkr	Whog
	8	9	84	6	3	1	19	12	8	1	2