ANGOLA | BOTSWANA | NAMIBIA | ZAMBIA | ZIMBABWE

KAZA

AN AERIAL SURVEY OF ELEPHANTS AND OTHER LARGE HERBIVORES IN THE KAVANGO ZAMBEZI TRANSFRONTIER CONSERVATION AREA

VOLUME II: STRATUM REPORTS

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LIST OF STRATA

KAVANGO-ZAMBEZI TRANSFRONTIER CONSERVATION AREA
FIVE PARTNER STATES

- **ANGOLA**
  13 STRATA FORMING THE LUENGUE-LUIANA SUPERSTRATUM
- **BOTSWANA**
  62 + 6 (TRANSFRONTIER) STRATA FORMING THE NORTHERN BOTSWANA SUPERSTRATUM
- **NAMIBIA**
  20 + 6 (TRANSFRONTIER) STRATA FORMING 2 SUPERSTRATA:
  KHAUDUM - NYAE NYAE AND ZAMBEZI - KAVANGO
- **ZAMBIA**
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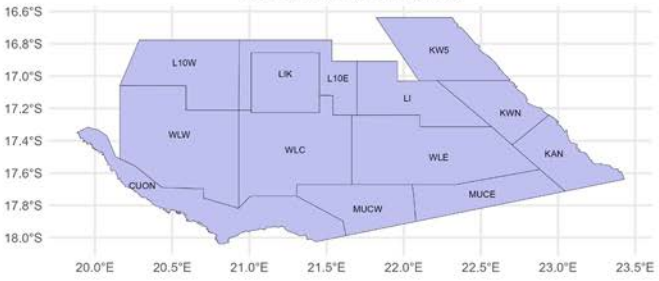
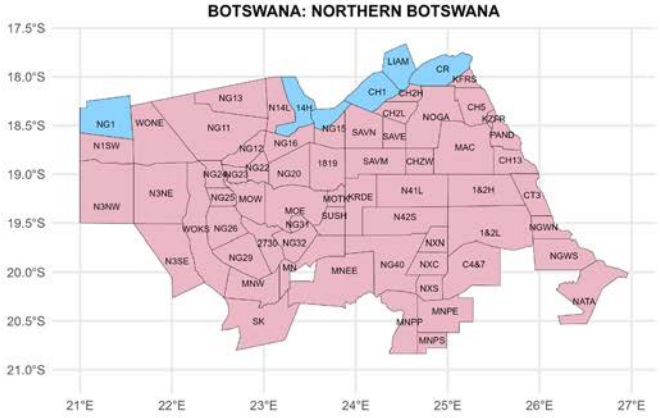
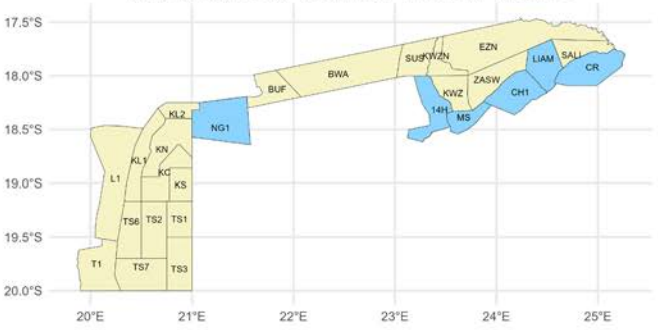
ANGOLA: LUENGUE-LUIANA



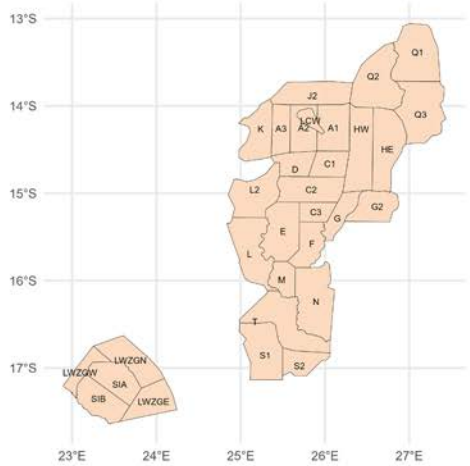
BOTSWANA: NORTHERN BOTSWANA



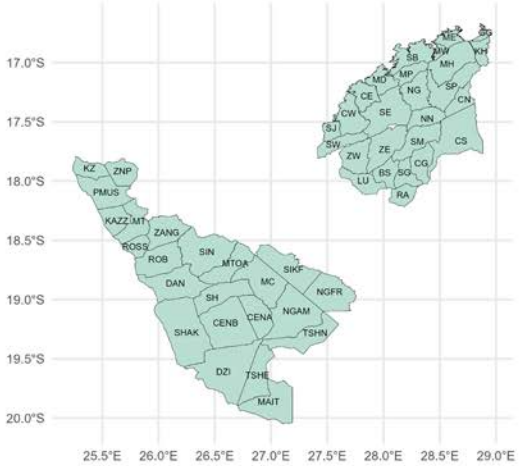
NAMIBIA: KHAUDUM - NYAE NYAE + ZAMBEZI - KAVANGO



ZAMBIA: KAFUE + SIOMA



ZIMBABWE: SEBUNGWE + NORTH-WEST MATABELELAND



STRATUM REPORT – INTERPRETATION GUIDE

STRATUM REPORT – INTERPRETATION GUIDE

1 A2 – A2

2 ZAMBIA – KAFUE

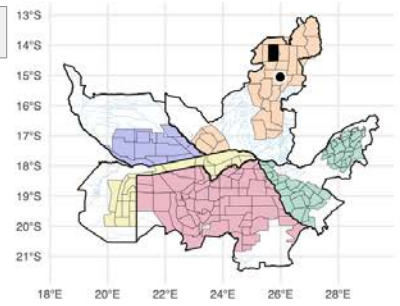
3 SURVEY DESIGN

COUNTRY: Zambia
SUPERSTRATUM: Kafue
STRATUM CODE: A2
STRATUM NAME: A2
■ STRATUM AREA: 2064.55 sqkm
• SURVEY BASE: Chunga
DISTANCE TO SURVEY BASE: 92 km

– TRANSECTS: 21 (700 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 10.2 %

– BASELINE DISTANCE: 60.66 km

4



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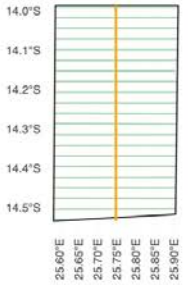
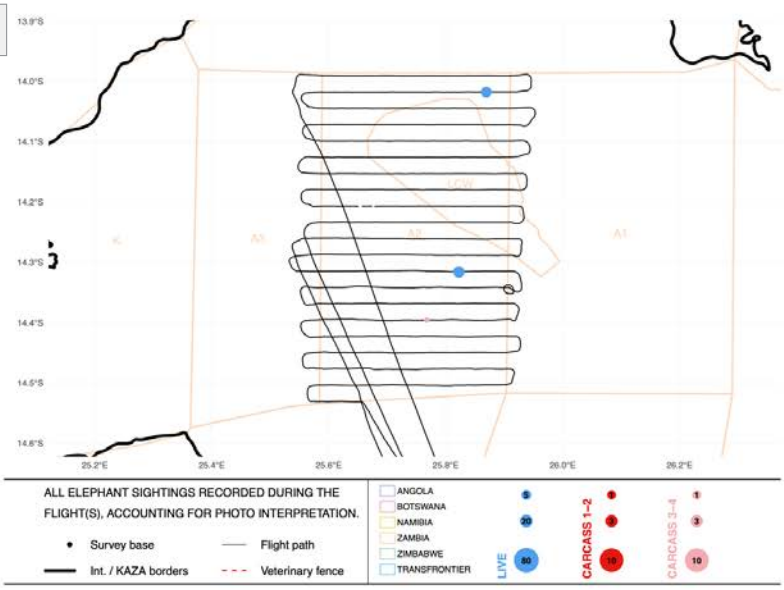


6 SURVEY IMPLEMENTATION

Number of flight(s): 2
Combined flying time: 7.4 h
Crew(s): C05, C07
KES2022_9JCMA20220827A 07:41–11:11
KES2022_9JMFZ20220827A 08:00–11:56

Actual sampling intensity: 10.1 %
Transect flying time: 4 h
Transects: 21 – 700 km – 90 °
Search effort: 1.16 min.sqkm

7



8 OBSERVER CONTRIBUTION

Crew(s):	C05		C07	
Side:	L	R	L	R
% sightings:	51	49	58	42
% individuals:	52	48	61	39

9 PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	46	36.96	76.47
Live elephant (>9):	1	100	100
Elephant carcass:	1	100	0
Live elephant (<10):	1	100	100

10 LIVE ELEPHANTS

IN SAMPLE:	**8 (1)**
Bulls:	0 (0)
Family:	8 (1)
NOT IN SAMPLE:	**10 (1)**
Outside search strip:	10
Off transect:	0

11 ELEPHANT CARCASSES

IN SAMPLE:	**1 (1)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	1 (1)
Category 4:	0 (0)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

12 OTHER SPECIES

Other wildlife species: 21
Other wildlife count: 1480
Domestic count: 0

13 ELEPHANT DATA ANALYSIS

t = 2.086, N = 203, w = 298

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	129	79	10	10
Variance of estimate	$Var\hat{Y}$	14206	5380	84	84
Standard error	$SE\hat{Y}$	119	73	9	9
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 249	± 153	± 19	± 19
Percentage of relative precision	$PRP\hat{Y}$	193 %	193 %	193 %	193 %
Density per sqkm	$\hat{R}$	0.062	0.038	0.005	0.005
Variance between transect counts	s^2_y	8.048	3.048	0.048	0.048
Variance between transect areas	s^2_a	3.204	3.204	3.204	3.204
Covariance between counts & areas	s_{ay}	0.246	0.152	0.004	0.004

14 CARCASS RATIOS

$CR_{1:4}$ = 11.1 %
$CR_{1:2}$ = 0 %

STRATUM REPORT – INTERPRETATION GUIDE

1	**Stratum Name – Stratum Code:**A stratum is a subdivision of the survey area in which elephant density is expected to be uniform and for which population estimates are calculated. A unique shorthand code is assigned to each stratum**.**
2	**Country – Superstratum:** The country in which the stratum is located and the superstratum which it is a part of. A unique colour code is assigned to each of the five partner countries. There are six transboundary strata across Botswana and Namibia (blue).
3	**Survey Design:**Information about sampling design, based on possible elephant density as per previous surveys.
4	**Stratum Location Map:** Map showing the KAZA TFCA and the survey strata. It highlights the location of the stratum within the KAZA TFCA, as well as the location of the survey base.
5	**Stratum Design Map:** Map showing the stratum, the designed transects (green lines) and the baseline (orange line).
6	**Survey Implementation:** Information regarding the implementation of the survey, including number of flights required to complete the stratum, flying time, crews involved, actual sampling intensity, and search effort. Combined (or total) flying time may differ significantly in cases where several strata were sample during the same flight.
7	**Stratum Observation Map:**Map showing *all* elephant sightings within the stratum; both live elephants and carcasses, displayed with proportional size symbols. This is including observations made off transect, and outside the search strip. It also shows the actual flight tracks.
8	**Observer Contribution:** The relative contribution of the rear seat observers, showing the percentage of sightings and individuals seen on each side, for each crew.
9	**Photo Interpretation:** Information on the use of photographs to improve the accuracy of observer data. It shows the number of photographs required as per the survey standards, the percentage of photos that were matched (i.e. taken and useable) and the percentage of those photographs that then led to corrections of the human observations (i.e. number of individuals and/or carcass category). No photograph was required for elephant sightings with less than 10 individuals, therefore, the figures under the dashed line provide the number of possible photographs that could have been taken (i.e. number of sightings), the percentage of photographs that were matched, and the percentage of those photographs that led to corrections.
10	**Live Elephants:** The number of live elephants counted, and in parentheses the number of encounters. Data for both in sample and not in sample (i.e. off transect or outside of the search strip) are presented.
11	**Elephant Carcasses:** The number of dead elephants counted for each of the four carcass categories, and in parentheses the number of encounters. Data for both in sample and not in sample (i.e. off transect or outside of the search strip) are presented.
12	**Other Species:** The number of other wildlife species encountered in sample, the total number of other wildlife individuals counted in sample, and the number of domestic individuals counted in sample.
13	**Elephant Data Analysis:** The statistical results of the population estimates for elephants and elephant carcasses. Population estimates are calculated using Jolly's method 2 for transect surveys and method 3 for block surveys. Variance, confidence interval and associated statistics are shown. Analyses were run twice, with **OBS** column showing the results for the observer-only data, while **FINAL** column presents the corrected data after photo interpretation. [t = Student's t for a two-tailed probability of 0.05 and *n*-1 degrees of freedom, N= number of sampling units (transects) possible in a stratum for the search strip (w), and w = mean combined search strip width.]
14	**Carcass Ratios:** Present an index of mortality during the several years preceding the survey. It is an expression of all elephant carcasses as a percentage of all elephants (i.e., live plus dead). $CR_{1:4}$ includes all four carcass categories. $CR_{1:2}$ includes only the carcasses from categories 1 and 2, which relates to elephant mortality in the survey year. Carcass ratios are calculated based on data accounting for photo interpretation.

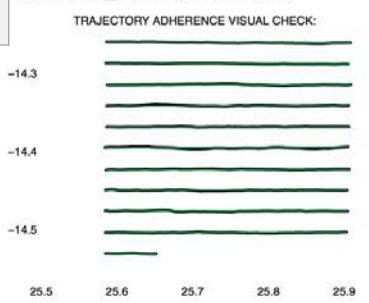
STRATUM REPORT – INTERPRETATION GUIDE

A2 – A2 ZAMBIA – KAFUE

15 **ADHERENCE TO FLIGHT PARAMETERS**

KES2022_ 9JCMA20220827A

16



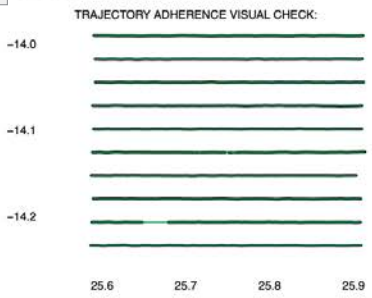
17

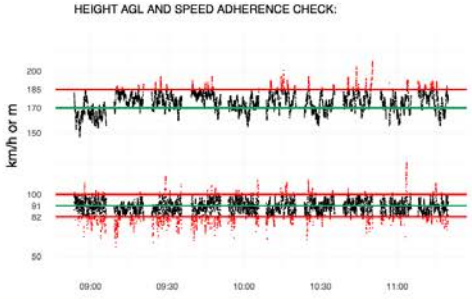
18

SPEED
Average: 172.7 km/h
Standard dev.: 15.7 km/h

HEIGHT AGL
Average: 87.7 m (287.9 ft)
Standard dev.: 8.6 m (28.1 ft)

19 **KES2022_ 9JMFZ20220827A**





SPEED
Average: 175.8 km/h
Standard dev.: 16 km/h

HEIGHT AGL
Average: 89.3 m (292.9 ft)
Standard dev.: 6.9 m (22.5 ft)

20

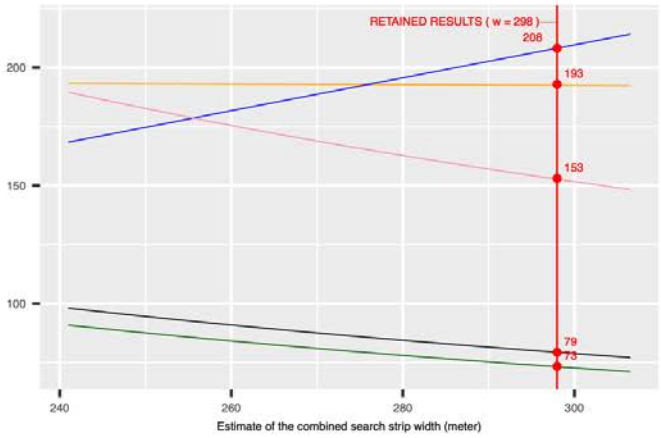
INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C05 – Left: [137 – 160]
C05 – Right: [132 – 159]

C07 – Left: [107 – 150]
C07 – Right: [94 – 154]

LIVE ELEPHANT ESTIMATE: [98 – 77]
CONFIDENCE INTERVAL: ± [190 – 148]
SAMPLE AREA: [168 – 214] sqkm
SE: [91 – 71]
PRP: [193 – 192] %



STRATUM REPORT – INTERPRETATION GUIDE

15 **Adherence to Flight Parameters:** This section deals with the performance of the pilots and the adherence to the targets set out in the survey standards. Data are shown for the portion of the survey flight while on transect. Data sources are from Laser Altimeter, or from GPS in the case of a laser altimeter failure.

16 **Trajectory Adherence Visual Check:**Graph overlaying transect lines (green) and actual flight tracks (black). It is used as a visual tool to assess the pilot's adherence to the flight plan.

17 **Height Above Ground Level and Speed Graph:**A single graph plotting both height and speed readings measured throughout the flight while on transects. The green lines are flight parameter targets, and the red lines are tolerance limits. Any reading going beyond these limits are showing in red on the graph. When on target, the readings are showing in black. No height data will be displayed in case of a laser altimeter failure.

18 **Height and Speed Statistics:** Speed and height readings are averaged across all transects and shown in green when on target. The standard deviation is also calculated to assess the adherence regularity across the flight. In case of laser altimeter failure, the 30-second interval height readings recorded by the Front Seat Observer throughout the flight were used. In the few cases where no height was recorded, subtraction of the Digital Elevation Model (DEM) data from the GPS pilot altitude data was used to deduct height information.

19 **Data for Additional Flights:** The same trajectory, speed and height data are shown for flights performed by other crews participating in the survey of the same stratum.

The Influence of Strip Width Estimates: The chart displays how various statistics (such as the estimated population of elephants, sample area, standard error, confidence interval, and percentage of relative precision) are affected by the range of potential strip widths (plotted on the x-axis), as estimated from the calibration flights.This was calculated for 30 strip width values lying between the minimum and maximum estimated widths. The values shown in red are those presented in the Elephant Data Analysis on page 1 of the stratum report (see section 13 of this interpretation guide) for the retained strip width values during the calibration exercise. For strata where more than one crew participated in the survey, the overall strip width for the stratum (shown on the x axis) was calculated as an average from both crews but each weighted by the length of transects flown.

20 It is important **not to confuse** the range of values calculated for the population estimate (black text on the left-hand side of the graph) with the confidence interval calculated with the Jolly 2 method (pink line on the graph). Taking the example provided in this guide for stratum A2, depending on the strip width estimate used, the elephant population estimate varies between 77 and 98 individuals, with a confidence interval ranging from±148to±190 respectively, according to the Jolly 2 method.

By increasing the estimated strip width, the sample area and therefore the sampling intensity increase, the Standard Error (SE) decreases. On the other hand, the number of elephants counted remains unchanged and therefore the Density and population Estimate also decrease, almost in proportion to the Standard Error. As a result, the Percentage of Relative Precision (PRP) remains almost constant.This graph does not appear for strata surveyed by crew C04 alone or by C08 alone, or when using the block sampling methodology.

STRATUM REPORT – INTERPRETATION GUIDE

A2 – A2 ZAMBIA – KAFUE

STRATUM CODE:	A2	**N:**	203	S_a^2:	3.204
STRATUM NAME:	A2	**w:**	298	**df:**	20

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)		

A table is presented with the results for all target species for each stratum. The table header provides the following information in addition to the stratum name and code:

- **N:** is the number of sampling units (transects) possible in a stratum, for the search strip (w).
- **w:** is mean combined search strip width.
- S_a^2**:** is the variance between transect areas.
- **df:** degrees of freedom [(n-1), where n is the number of transects]

Species are listed in alphabetical order of their common name. The meaning of column headings, from left to right:

- **Common Name:** is the common name of the species or carcass category for which the estimates have been derived.
- **Latin Name:** is the scientific name of the species or carcass category for which the estimates have been derived.
- **In Count:** the number of individuals seen inside the search strips or blocks.
- **Out Count:** the number of individuals seen outside the search strips or blocks (it includes individuals seen on turns and on transit to and from base).
- **Estimate:** is the estimated population for that species (or carcass category) in the stratum.
- **CI:** is the 95% confidence interval of the population estimate for the species.
- **Density:** is the calculated density per square kilometre for the species.
- **Variance:** is the variance of the population estimate.
- **Lower CL:** the lower limit of the range of the 95 % confidence interval of an estimate.
- **Upper CL:** the upper limit of the range of the 95 % confidence interval of an estimate.
- **PRP:** the Percentage Relative Precision is the CI expressed as a percentage of an estimate and is a measure of precision for the estimate.
- s_y^2**:** is the variance between transect counts.
- S_{ay}**:** is the covariance between transect counts and transect areas.

ANGOLA

CUON – Cuito Okavango North

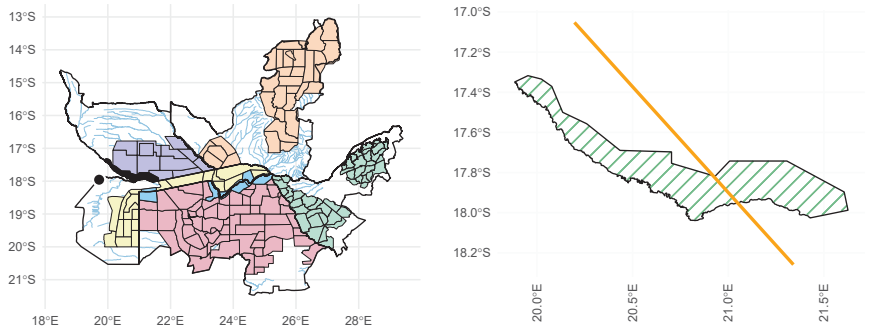
ANGOLA – LUENGUE–LUIANA

SURVEY DESIGN

COUNTRY: Angola
SUPERSTRATUM: Luengue–Luiana
STRATUM CODE: CUON
STRATUM NAME: Cuito Okavango North
■ STRATUM AREA: 3473.59 sqkm
• SURVEY BASE: Rundu
DISTANCE TO SURVEY BASE: 69 km

– TRANSECTS: 30 (587 km)
TRANSECT ORIENTATION: 46.5°
PLANNED SAMPLING INTENSITY: 5.1 %

– BASELINE DISTANCE: 180.46 km



SURVEY IMPLEMENTATION

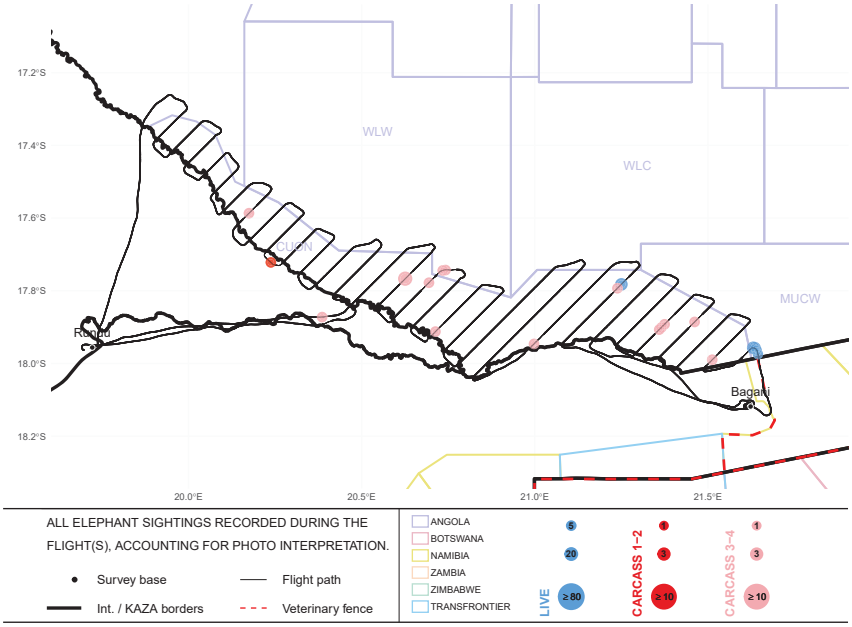
Number of flight(s): 3
Combined flying time: 7.2 h
Crew(s): C02
KES2022_V5LJB20221020B 15:25–17:57
KES2022_V5LJB20221021A 06:33–09:37
KES2022_V5LJB20221021B 15:32–17:09
Actual sampling intensity: 5.4 %
Transect flying time: 3.4 h
Transects: 30 – 587 km – 46.5°
Search effort: 1.09 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C02	
Side:	L	R
% sightings:	63	37
% individuals:	76	24

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	24	62.5	40
Live elephant (>9):	0		
Elephant carcass:	10	40	0
Live elephant (<10):	1	100	0



LIVE ELEPHANTS

IN SAMPLE:	**1 (1)**
Bulls:	0 (0)
Family:	1 (1)
NOT IN SAMPLE:	**47 (5)**
Outside search strip:	13
Off transect:	34

ELEPHANT CARCASSES

IN SAMPLE:	**12 (10)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	5 (3)
Category 4:	7 (7)
NOT IN SAMPLE:	**5 (5)**
Outside search strip:	1
Off transect:	4

OTHER SPECIES

Other wildlife species:	10
Other wildlife count:	170
Domestic count:	278

ELEPHANT DATA ANALYSIS

t = 2.045, N = 568, w = 318

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	19	19	224	224
Variance of estimate	$Var\hat{Y}$	327	327	5162	5162
Standard error	$SE\hat{Y}$	18	18	72	72
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 37	± 37	± 147	± 147
Percentage of relative precision	$PRP\hat{Y}$	198 %	198 %	66 %	66 %
Density per sqkm	$R\hat{Y}$	0.005	0.005	0.064	0.064
Variance between transect counts	s^2_y	0.033	0.033	0.524	0.524
Variance between transect areas	s^2_a	9.353	9.353	9.353	9.353
Covariance between counts & areas	s_{ay}	0.143	0.143	0.441	0.441

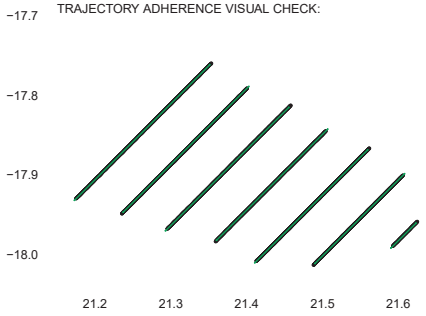
CARCASS RATIOS

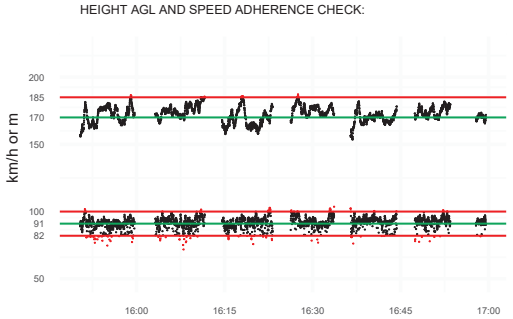
$CR_{1:4}$ = 92.3 %
$CR_{1:2}$ = 0 %

CUON – Cuito Okavango North — ANGOLA – LUENGUE-LUIANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20221021B

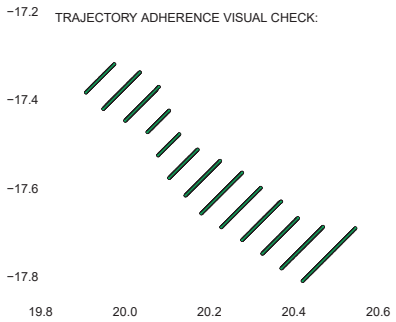


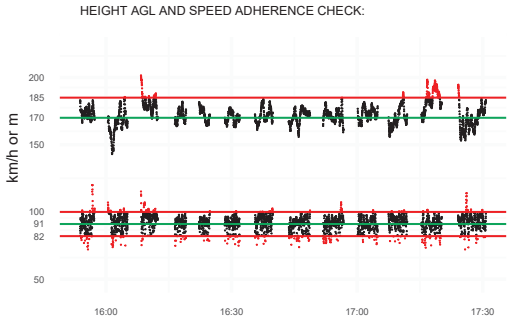


SPEED
Average: 172.2 km/h
Standard dev.: 5.9 km/h

HEIGHT AGL
Average: 91.8 m (301.1 ft)
Standard dev.: 4.1 m (13.4 ft)

KES2022_ V5LJB20221020B

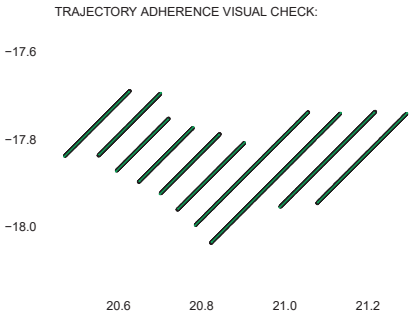


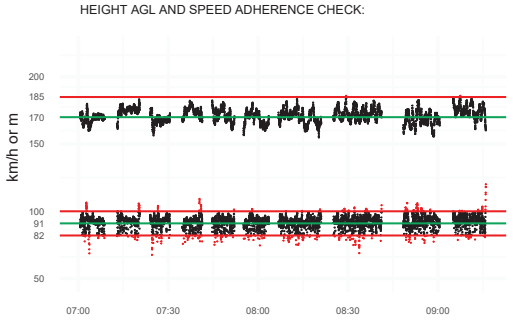


SPEED
Average: 172.4 km/h
Standard dev.: 8 km/h

HEIGHT AGL
Average: 92 m (301.8 ft)
Standard dev.: 5.6 m (18.4 ft)

KES2022_ V5LJB20221021A





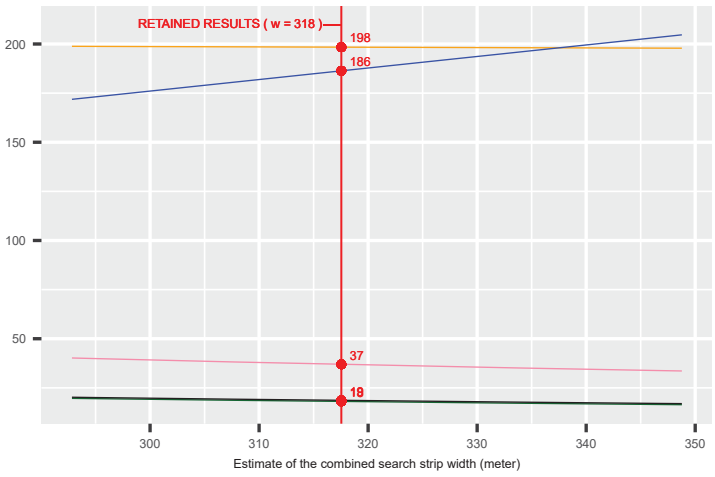
SPEED
Average: 171.2 km/h
Standard dev.: 5.2 km/h

HEIGHT AGL
Average: 91.9 m (301.5 ft)
Standard dev.: 4.6 m (15.1 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C02 – Left: [154 – 177]
C02 – Right: [134 – 185]



LIVE ELEPHANT ESTIMATE: [20 – 17]
CONFIDENCE INTERVAL: ± [40 – 34]
SAMPLE AREA: [172 – 205] sqkm
SE: [20 – 16]
PRP: [199 – 198] %

CUON – Cuito Okavango North — ANGOLA – LUENGUE–LUIANA

STRATUM CODE: CUON **N:** 568 S_a^2: 9.353
STRATUM NAME: Cuito Okavango North **w:** 318 **df:** 29

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
buffalo	Syncerus caffer	105	25	1957	3964	0.563	3756186	1938.09	0	5921	203	367.500	1.882
bushbuck	Tragelaphus scriptus	2	0	37	77	0.011	1416	37.63	0	114	206	0.133	-0.207
bushpig	Potamochoerus larvatus	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
cattle	Bos taurus	255	23	4753	3324	1.368	2641611	1625.30	1429	8077	70	337.707	35.140
donkey	Equus asinus	7	0	130	267	0.038	17095	130.75	0	398	205	1.633	-0.398
duiker	Sylvicapra grimmia	30	4	559	223	0.161	11897	109.07	336	782	40	1.655	2.270
eland	Tragelaphus oryx	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
elephant bulls	Loxodonta africana males	0	6	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
elephant family	Loxodonta africana family	1	41	19	37	0.005	327	18.08	0	56	198	0.033	0.143
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
elephant carcass two	Loxodonta africana carcass two	0	1	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
elephant carcass three	Loxodonta africana carcass three	5	0	93	120	0.027	3425	58.53	0	213	128	0.351	0.399
elephant carcass four	Loxodonta africana carcass four	7	4	130	106	0.038	2693	51.89	24	237	81	0.254	0.042
giraffe	Giraffa giraffa	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
grysbok	Raphicerus sharpei	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
hartebeest	Alcelaphus spp,	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
horse	Equus caballus	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
impala	Aepyceros melampus	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
klipspringer	Oreotragus oreotragus	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
kudu	Tragelaphus strepsiceros	5	0	93	133	0.027	4240	65.11	0	226	143	0.420	0.195
oribi	Ourebia ourebi	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
oryx	Oryx gazella	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
ostrich	Struthio camelus	2	3	37	75	0.011	1353	36.78	0	112	202	0.133	0.082
puku	Kobus vardonii	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
red lechwe	Kobus leche	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
reedbuck	Redunca arundinum	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
roan	Hippotragus equinus	3	45	56	115	0.016	3186	56.45	0	171	206	0.300	-0.311
sable	Hippotragus niger	15	2	280	496	0.080	58786	242.46	0	775	177	5.707	0.017
shoat	Capra hircus - Ovis aries	16	0	298	431	0.086	44443	210.82	0	729	145	4.395	0.618
sitatunga	Tragelaphus spekii	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
springbok	Antidorcas marsupialis	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
tsessebe	Damaliscus lunatus	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
warthog	Phacochoerus africanus	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
wildebeest	Connochaetes taurinus	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
zebra	Equus spp,	0	0	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
all elephants	Loxodonta africana all	1	47	19	37	0.005	327	18.08	0	56	198	0.033	0.143
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	1	0	0	0.000	0	0.00	0	0	NA	0.000	0.000
all elephant carcasses	Loxodonta africana carcass all	12	5	224	147	0.064	5162	71.84	77	371	66	0.524	0.441
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	12	4	224	147	0.064	5162	71.84	77	371	66	0.524	0.441

KAN – Kwando Angola

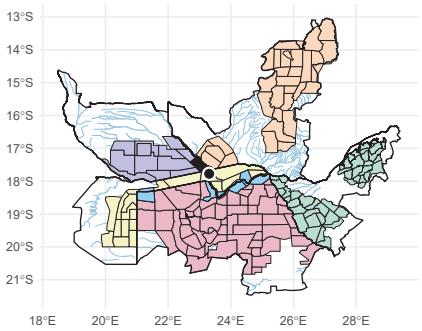
ANGOLA – LUENGUE–LUIANA

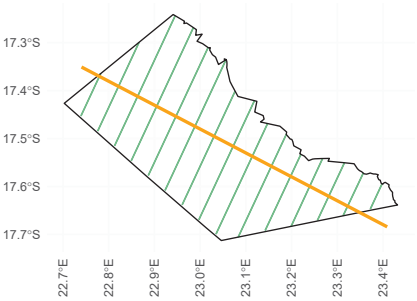
SURVEY DESIGN

COUNTRY: Angola
SUPERSTRATUM: Luengue–Luiana
STRATUM CODE: KAN
STRATUM NAME: Kwando Angola
■ STRATUM AREA: 1767.67 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 48 km

– TRANSECTS: 15 (356 km)
TRANSECT ORIENTATION: 26.5°
PLANNED SAMPLING INTENSITY: 6 %

– BASELINE DISTANCE: 80.03 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 4.3 h
Crew(s): C01
KES2022_V5IIM20221018A 06:41–10:58

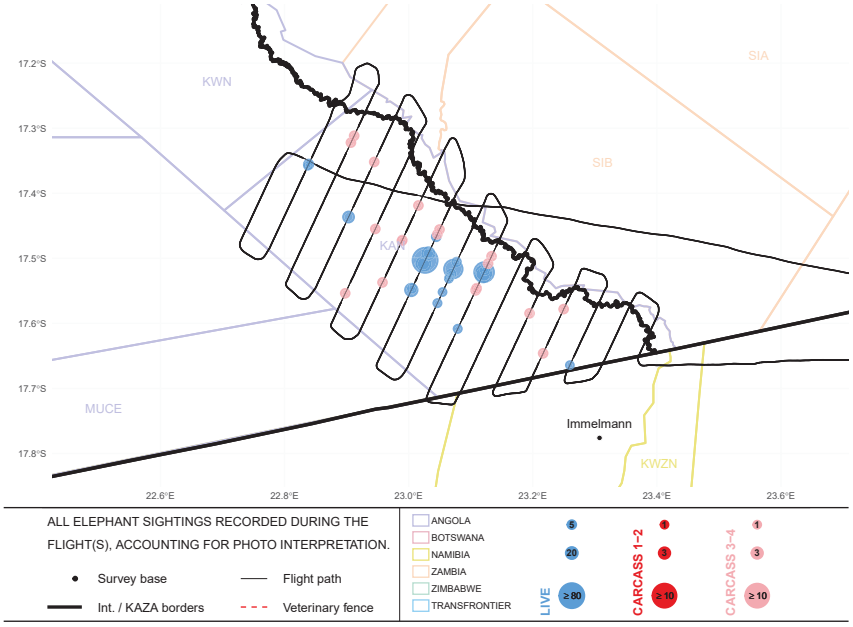
Actual sampling intensity: 6.4 %
Transect flying time: 2.1 h
Transects: 15 – 356 km – 26.5°
Search effort: 1.12 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	40	60
% individuals:	53	47

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	51	58.82	26.67
Live elephant (>9):	6	100	66.67
Elephant carcass:	18	88.89	12.5
Live elephant (<10):	8	50	0



LIVE ELEPHANTS

IN SAMPLE:	**271 (14)**
Bulls:	9 (5)
Family:	262 (9)
NOT IN SAMPLE:	**187 (11)**
Outside search strip:	187
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**18 (18)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	13 (13)
Category 4:	5 (5)
NOT IN SAMPLE:	**1 (1)**
Outside search strip:	1
Off transect:	0

OTHER SPECIES

Other wildlife species:	19
Other wildlife count:	683
Domestic count:	81

ELEPHANT DATA ANALYSIS

t = 2.145, N = 254, w = 315

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	4031	4267	252	283
Variance of estimate	$Var\hat{Y}$	7727443	8475551	6855	8508
Standard error	$SE\hat{Y}$	2780	2911	83	92
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 5962	± 6244	± 178	± 198
Percentage of relative precision	$PRP\hat{Y}$	148 %	146 %	70 %	70 %
Density per sqkm	$R\hat{Y}$	2.28	2.414	0.143	0.16
Variance between transect counts	s^2_y	2010.638	2205.638	2.067	2.6
Variance between transect areas	s^2_a	8.817	8.817	8.817	8.817
Covariance between counts & areas	s_{ay}	32.483	33.954	1.939	2.263

CARCASS RATIOS

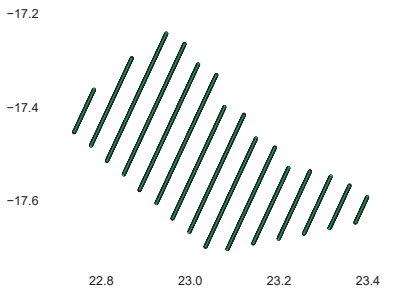
$CR_{1:4}$ = 6.2 %
$CR_{1:2}$ = 0 %

KAN – Kwando Angola — ANGOLA – LUENGUE-LUIANA

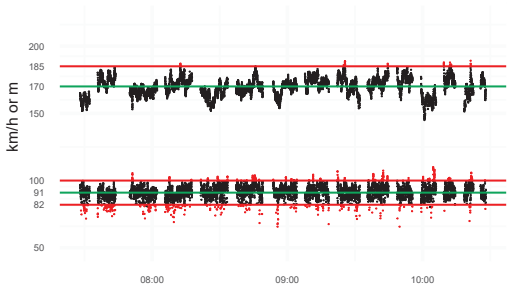
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20221018A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



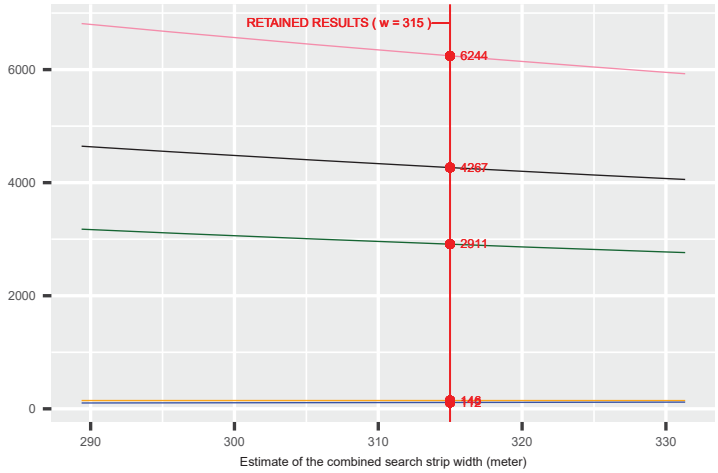
SPEED
Average: 169.6 km/h
Standard dev.: 6.8 km/h

HEIGHT AGL
Average: 91.4 m (299.9 ft)
Standard dev.: 4.8 m (15.9 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C01 – Left: [158 – 190]
C01 – Right: [119 – 160]



LIVE ELEPHANT ESTIMATE: [4645 – 4057]
CONFIDENCE INTERVAL: ± [6814 – 5926]
SAMPLE AREA: [103 – 118] sqkm
SE: [3177 – 2763]
PRP: [147 – 146] %

KAN – Kwando Angola — ANGOLA – LUENGUE–LUIANA

STRATUM CODE: KAN **N:** 254 S_a^2: 8,817
STRATUM NAME: Kwando Angola **w:** 315 **df:** 14

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	5	0	79	183	0,045	7313	85,52	0	262	233	1,667	-1,367
buffalo	Syncerus caffer	370	428	5826	9023	3,296	17697579	4206,85	0	14849	155	4765,667	74,474
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	79	32	1244	1665	0,704	602601	776,27	0	2909	134	149,638	3,686
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	1	0	16	37	0,009	293	17,10	0	52	233	0,067	-0,273
elephant bulls	Loxodonta africana males	9	7	142	277	0,080	16649	129,03	0	418	195	4,257	1,261
elephant family	Loxodonta africana family	262	180	4125	6281	2,334	8576914	2928,64	0	10407	152	2222,695	32,692
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	13	1	205	185	0,116	7420	86,14	20	389	90	2,124	1,769
elephant carcass four	Loxodonta africana carcass four	5	0	79	81	0,045	1435	37,89	0	160	103	0,381	0,494
giraffe	Giraffa giraffa	11	0	173	287	0,098	17849	133,60	0	460	165	4,638	1,607
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	6	0	94	182	0,053	7175	84,71	0	276	192	1,686	-0,572
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	32	0	504	404	0,285	35546	188,54	100	908	80	10,410	4,118
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	4	0	63	147	0,036	4680	68,41	0	210	233	1,067	-1,094
red lechwe	Kobus leche	55	0	866	2045	0,490	909124	953,48	0	2911	236	201,667	-21,157
reedbuck	Redunca arundinum	9	0	142	130	0,080	3697	60,80	11	272	92	0,971	0,718
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	98	53	1543	1087	0,873	256952	506,90	456	2630	70	80,695	13,722
shoat	Capra hircus - Ovis aries	2	0	31	69	0,018	1024	32,01	0	100	218	0,267	0,463
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	8	0	126	280	0,071	17097	130,76	0	406	223	4,267	0,626
warthog	Phacochoerus africanus	7	0	110	204	0,062	9091	95,35	0	315	186	2,410	1,594
waterbuck	Kobus ellipsiprymnus	9	0	142	330	0,080	23694	153,93	0	472	233	5,400	-2,461
wildebeest	Connochaetes taurinus	29	10	457	1017	0,258	224903	474,24	0	1474	223	52,067	-5,586
zebra	Equus spp,	27	0	425	717	0,241	111695	334,21	0	1142	169	26,886	-0,391
all elephants	Loxodonta africana all	271	187	4267	6244	2,414	8475551	2911,28	0	10511	146	2205,638	33,954
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	18	1	283	198	0,160	8508	92,24	86	481	70	2,600	2,263
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	18	1	283	198	0,160	8508	92,24	86	481	70	2,600	2,263

KW5 – Kwando 5km

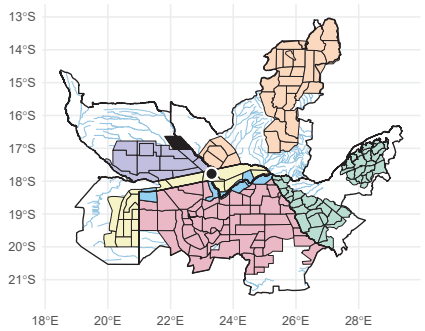
ANGOLA – LUENGUE–LUIANA

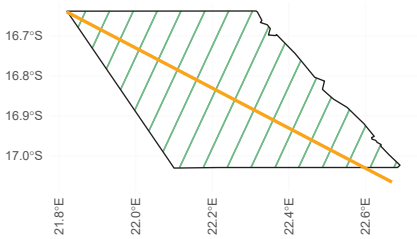
SURVEY DESIGN

COUNTRY: Angola
SUPERSTRATUM: Luengue–Luiana
STRATUM CODE: KW5
STRATUM NAME: Kwando 5km
■ STRATUM AREA: 2495.69 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 155 km

– TRANSECTS: 17 (419 km)
TRANSECT ORIENTATION: 26.6°
PLANNED SAMPLING INTENSITY: 5 %

– BASELINE DISTANCE: 101.95 km





SURVEY IMPLEMENTATION

Number of flight(s): 2
Combined flying time: 8.7 h
Crew(s): C02, C04
KES2022_V5LJB20221024A 06:27–11:12
KES2022_V5WOT20221024A 06:34–10:28

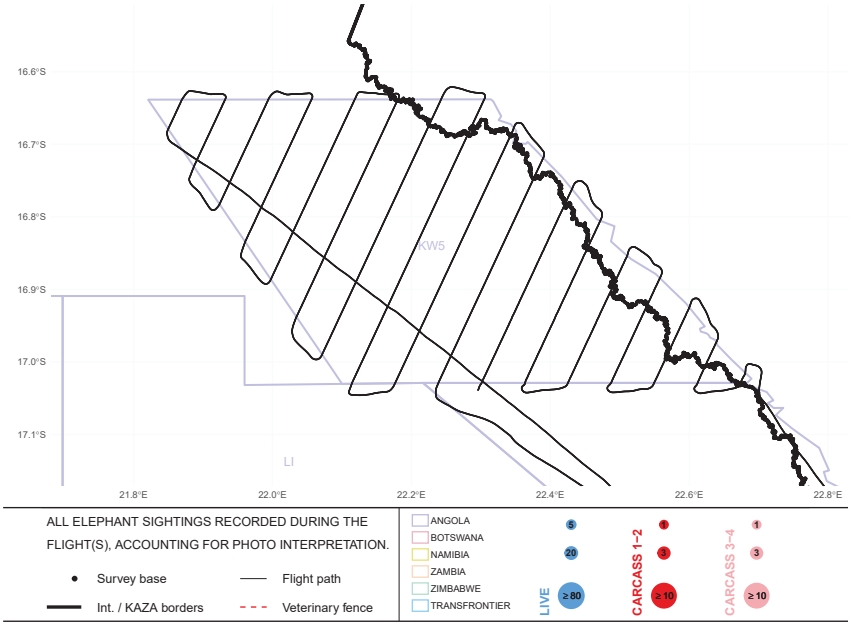
Actual sampling intensity: 5.2 %
Transect flying time: 2.4 h
Transects: 17 – 419 km – 26.6°
Search effort: 1.12 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C02		C04	
Side:	L	R	L	R
% sightings:	52	48	36	64
% individuals:	53	47	27	73

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	13	23.08	66.67
Live elephant (>9):	0		
Elephant carcass:	0		
Live elephant (<10):	0		



LIVE ELEPHANTS

IN SAMPLE:	**0 (0)**
Bulls:	0 (0)
Family:	0 (0)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**0 (0)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	0 (0)
Category 4:	0 (0)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

OTHER SPECIES

Other wildlife species:	10
Other wildlife count:	166
Domestic count:	246

ELEPHANT DATA ANALYSIS

t = 2.12, N = 330, w = 309

		LIVE OBS	LIVE FINAL	ALL CARCASSES OBS	ALL CARCASSES FINAL
Population estimate	$\hat{Y}$	–	–	–	–
Variance of estimate	$Var\hat{Y}$	–	–	–	–
Standard error	$SE\hat{Y}$	–	–	–	–
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	–	–	–	–
Percentage of relative precision	$PRP\hat{Y}$	–	–	–	–
Density per sqkm	$R\hat{Y}$	–	–	–	–
Variance between transect counts	s^2_y	–	–	–	–
Variance between transect areas	s^2_a	–	–	–	–
Covariance between counts & areas	s_{ay}	–	–	–	–

CARCASS RATIOS

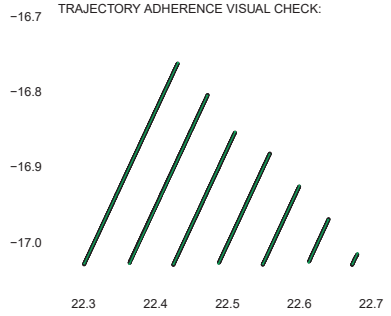
$CR_{1:4}$ = n/a
$CR_{1:2}$ = n/a

KW5 – Kwando 5km — ANGOLA – LUENGUE-LUIANA

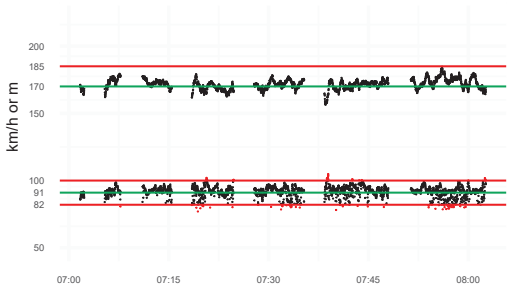
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20221024A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:

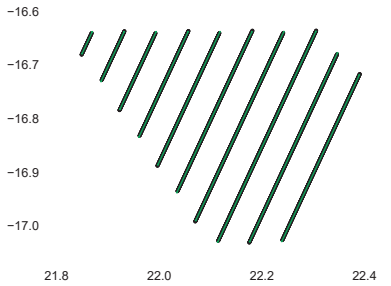


SPEED
Average: 171.7 km/h
Standard dev.: 3.8 km/h

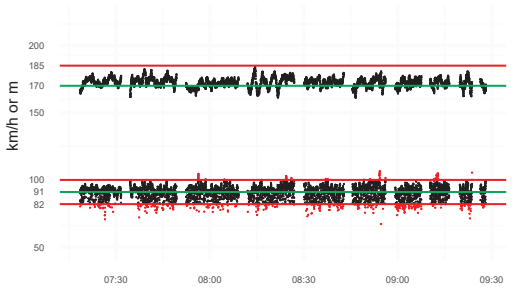
HEIGHT AGL
Average: 92 m (301.9 ft)
Standard dev.: 3.9 m (12.8 ft)

KES2022_ V5WOT20221024A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



SPEED
Average: 172.4 km/h
Standard dev.: 3.4 km/h

HEIGHT AGL
Average: 90.8 m (298 ft)
Standard dev.: 4.7 m (15.4 ft)

KW5 – Kwando 5km — ANGOLA – LUENGUE–LUIANA

STRATUM CODE: KW5 **N:** 330 S_a^2: 19,257
STRATUM NAME: Kwando 5km **w:** 309 **df:** 16

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	22	15	425	755	0,170	127005	356,38	0	1180	178	23,471	9,334
bushbuck	Tragelaphus scriptus	1	0	19	38	0,008	323	17,98	0	57	198	0,059	0,445
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	215	148	4149	3080	1,662	2111268	1453,02	1068	7229	74	359,493	19,872
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	23	1	444	247	0,178	13608	116,65	197	691	56	2,243	1,736
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant family	Loxodonta africana family	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass four	Loxodonta africana carcass four	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	7	0	135	172	0,054	6596	81,22	0	307	127	1,132	0,977
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	3	0	58	116	0,023	2995	54,73	0	174	200	0,529	1,034
roan	Hippotragus equinus	0	15	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	93	79	1794	2426	0,719	1309826	1144,48	0	4221	135	227,890	15,849
shoat	Capra hircus - Ovis aries	31	12	598	1015	0,240	229455	479,01	0	1614	170	37,779	2,530
sitatunga	Tragelaphus spekii	5	1	96	103	0,039	2374	48,73	0	200	107	0,346	-0,200
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000

KWN – Kwando North

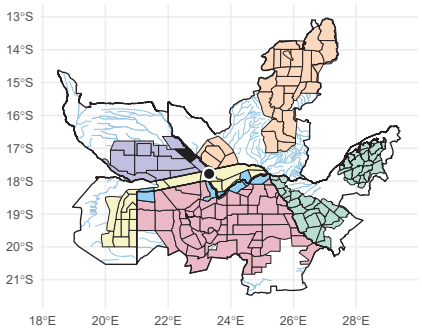
ANGOLA – LUENGUE–LUIANA

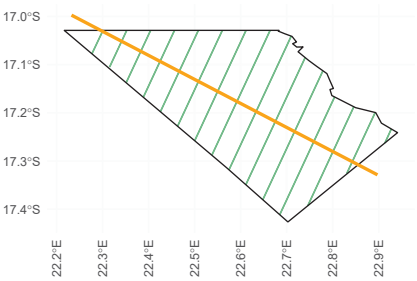
SURVEY DESIGN

COUNTRY: Angola
SUPERSTRATUM: Luengue–Luiana
STRATUM CODE: KWN
STRATUM NAME: Kwando North
■ STRATUM AREA: 1628.82 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 89 km

– TRANSECTS: 15 (325 km)
TRANSECT ORIENTATION: 26.5°
PLANNED SAMPLING INTENSITY: 6 %

– BASELINE DISTANCE: 79.68 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 4.8 h
Crew(s): C02
KES2022_V5LJB20221024A 06:27–11:12

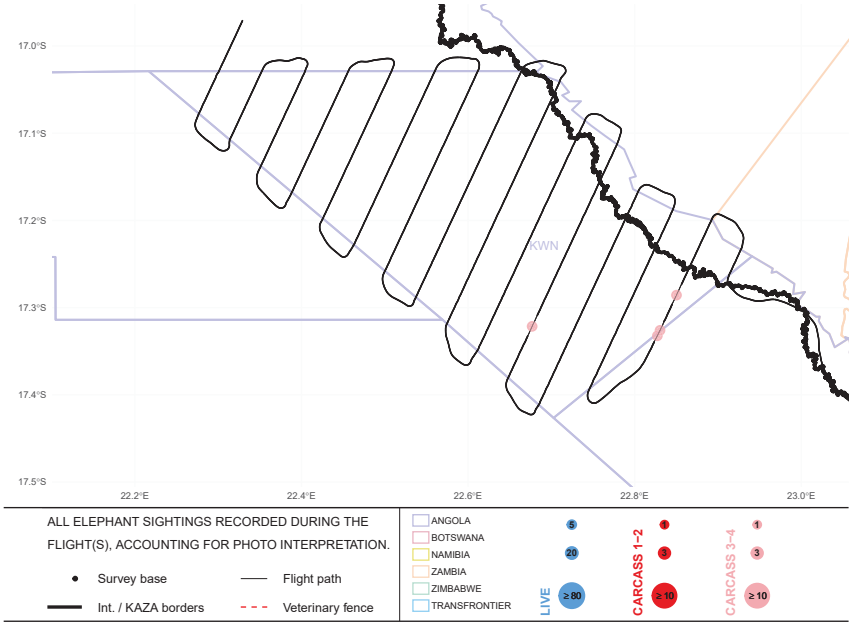
Actual sampling intensity: 6.3 %
Transect flying time: 1.9 h
Transects: 15 – 325 km – 26.5°
Search effort: 1.1 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C02	
Side:	L	R
% sightings:	61	39
% individuals:	55	45

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	20	25	20
Live elephant (>9):	0		
Elephant carcass:	4	50	0
Live elephant (<10):	0		



LIVE ELEPHANTS

IN SAMPLE:	**0 (0)**
Bulls:	0 (0)
Family:	0 (0)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**4 (4)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	0 (0)
Category 4:	4 (4)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

OTHER SPECIES

Other wildlife species:	12
Other wildlife count:	96
Domestic count:	341

ELEPHANT DATA ANALYSIS

t = 2.145, N = 251, w = 317

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	–	–	63	63
Variance of estimate	$\mathrm{Var}\hat{Y}$	–	–	2631	2631
Standard error	$\mathrm{SE}\hat{Y}$	–	–	51	51
95% confidence interval	$\mathrm{CI}_{\hat{Y}}^{95\%}$	–	–	± 110	± 110
Percentage of relative precision	$\mathrm{PRP}\hat{Y}$	–	–	174 %	174 %
Density per sqkm	$R\hat{Y}$	–	–	0.039	0.039
Variance between transect counts	s_y^2	–	–	0.638	0.638
Variance between transect areas	s_a^2	–	–	10.492	10.492
Covariance between counts & areas	s_{ay}	–	–	−0.15	−0.15

CARCASS RATIOS

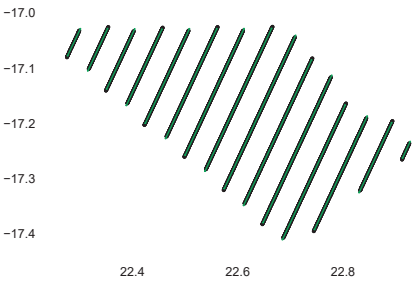
$CR_{1:4}$ = 100 %
$CR_{1:2}$ = n/a

KWN – Kwando North — ANGOLA – LUENGUE-LUIANA

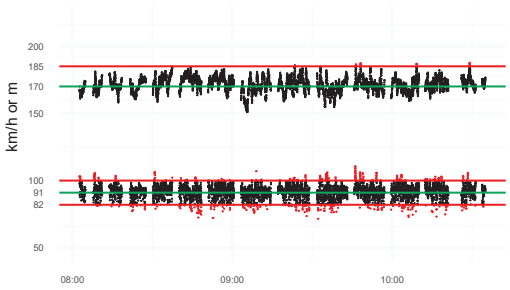
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20221024A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



SPEED
Average: 171.5 km/h
Standard dev.: 5.4 km/h

HEIGHT AGL
Average: 91.8 m (301.2 ft)
Standard dev.: 4.9 m (16 ft)

KWN – Kwando North — ANGOLA – LUENGUE–LUIANA

STRATUM CODE: KWN **N:** 251 S_a^2: 10,492
STRATUM NAME: Kwando North **w:** 317 ***df*:** 14

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	2	0	32	68	0,019	1011	31,80	0	100	216	0,267	0,380
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	334	229	5282	3054	3,243	2027029	1423,74	2228	8335	58	619,924	33,530
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	19	1	300	134	0,184	3875	62,25	167	434	44	1,352	1,976
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant family	Loxodonta africana family	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass four	Loxodonta africana carcass four	4	0	63	110	0,039	2631	51,29	0	173	174	0,638	-0,150
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	2	0	32	67	0,019	983	31,36	0	99	213	0,267	0,564
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	18	33	285	534	0,175	61937	248,87	0	818	188	17,029	4,808
sable	Hippotragus niger	39	5	617	1093	0,379	259790	509,70	0	1710	177	64,971	0,996
shoat	Capra hircus - Ovis aries	7	0	111	249	0,068	13515	116,26	0	360	225	3,267	-0,765
sitatunga	Tragelaphus spekii	3	0	47	104	0,029	2349	48,47	0	151	219	0,600	0,252
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	6	0	95	155	0,058	5222	72,26	0	250	163	1,257	-0,243
warthog	Phacochoerus africanus	0	2	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	4	0	63	110	0,039	2631	51,29	0	173	174	0,638	-0,150
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	4	0	63	110	0,039	2631	51,29	0	173	174	0,638	-0,150

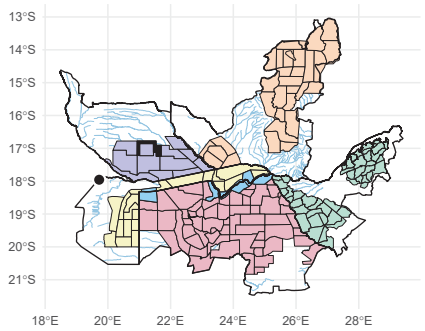
L10E – Lukiwa 10km East — ANGOLA – LUENGUE–LUIANA

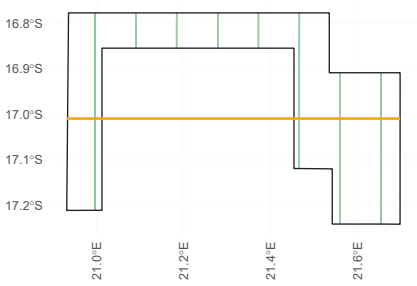
SURVEY DESIGN

COUNTRY: Angola
SUPERSTRATUM: Luengue–Luiana
STRATUM CODE: L10E
STRATUM NAME: Lukiwa 10km East
■ STRATUM AREA: 1764.46 sqkm
• SURVEY BASE: Rundu
DISTANCE TO SURVEY BASE: 223 km

– TRANSECTS: 8 (195 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 3.3 %

– BASELINE DISTANCE: 81.63 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 2.9 h
Crew(s): C01
KES2022_V5IIM20221022A 06:45–09:40

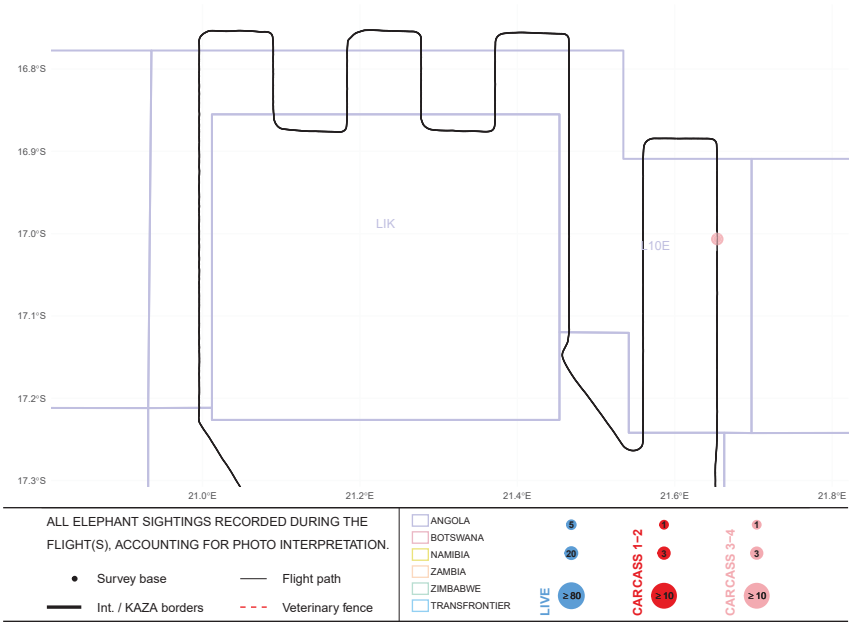
Actual sampling intensity: 3.4 %
Transect flying time: 1.1 h
Transects: 8 – 195 km – 0°
Search effort: 1.12 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	42	58
% individuals:	63	37

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	3	0	
Live elephant (>9):	0		
Elephant carcass:	0		
Live elephant (<10):	0		



LIVE ELEPHANTS

IN SAMPLE:	**0 (0)**
Bulls:	0 (0)
Family:	0 (0)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**0 (0)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	0 (0)
Category 4:	0 (0)
NOT IN SAMPLE:	**3 (2)**
Outside search strip:	2
Off transect:	1

OTHER SPECIES

Other wildlife species:	7
Other wildlife count:	55
Domestic count:	20

ELEPHANT DATA ANALYSIS

t = 2.365, N = 261, w = 312

		LIVE OBS	LIVE FINAL	ALL CARCASSES OBS	ALL CARCASSES FINAL
Population estimate	$\hat{Y}$	–	–	–	–
Variance of estimate	$Var\hat{Y}$	–	–	–	–
Standard error	$SE\hat{Y}$	–	–	–	–
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	–	–	–	–
Percentage of relative precision	$PRP\hat{Y}$	–	–	–	–
Density per sqkm	$R\hat{Y}$	–	–	–	–
Variance between transect counts	s^2_y	–	–	–	–
Variance between transect areas	s^2_a	–	–	–	–
Covariance between counts & areas	s_{ay}	–	–	–	–

CARCASS RATIOS

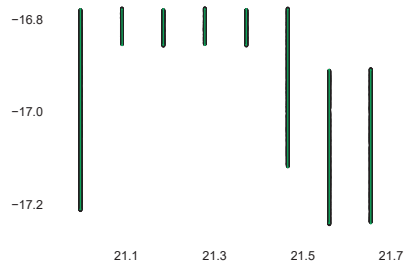
$CR_{1:4}$ = n/a
$CR_{1:2}$ = n/a

L10E – Lukiwa 10km East — ANGOLA – LUENGUE-LUIANA

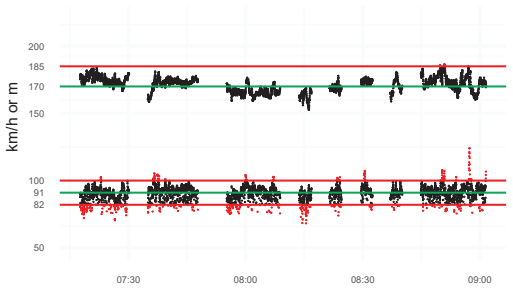
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20221022A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



SPEED
Average: 171.2 km/h
Standard dev.: 5.7 km/h

HEIGHT AGL
Average: 90.5 m (296.9 ft)
Standard dev.: 5.5 m (18 ft)

L10E – Likuwa 10km East — ANGOLA – LUENGUE–LUIANA

STRATUM CODE: L10E **N:** 262 S_a^2: 29,047
STRATUM NAME: Likuwa 10km East **w:** 312 **df:** 7

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	7	0	203	512	0,115	46905	216,58	0	715	252	6,125	3,728
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	5	0	145	366	0,082	23931	154,70	0	511	252	3,125	2,663
cattle	Bos taurus	20	0	581	1448	0,329	375014	612,38	0	2029	249	50,000	12,096
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	9	0	261	326	0,148	19061	138,06	0	588	125	2,982	4,465
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant family	Loxodonta africana family	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	0	3	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass four	Loxodonta africana carcass four	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	15	3	435	941	0,247	158296	397,86	0	1376	216	15,554	-3,546
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	12	1	348	406	0,197	29433	171,56	0	754	116	3,143	1,845
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	3	0	87	146	0,049	3813	61,75	0	233	168	0,554	1,670
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	0	3	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	0	3	0	0	0,000	0	0,00	0	0	NA	0,000	0,000

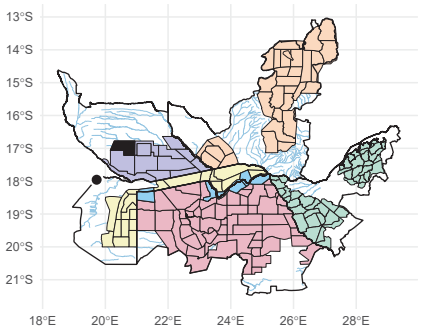
L10W – Lukiwa 10km West — ANGOLA – LUENGUE–LUIANA

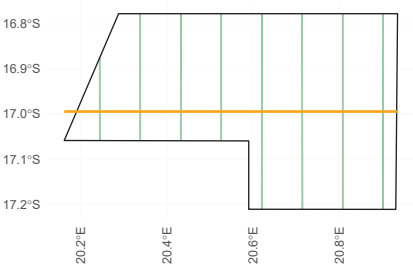
SURVEY DESIGN

COUNTRY: Angola
SUPERSTRATUM: Luengue–Luiana
STRATUM CODE: L10W
STRATUM NAME: Lukiwa 10km West
■ STRATUM AREA: 2971.12 sqkm
• SURVEY BASE: Rundu
DISTANCE TO SURVEY BASE: 147 km

– TRANSECTS: 8 (308 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 3.1 %

– BASELINE DISTANCE: 82.41 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 4 h
Crew(s): C01
KES2022_V5IIM20221019A 06:20–10:17

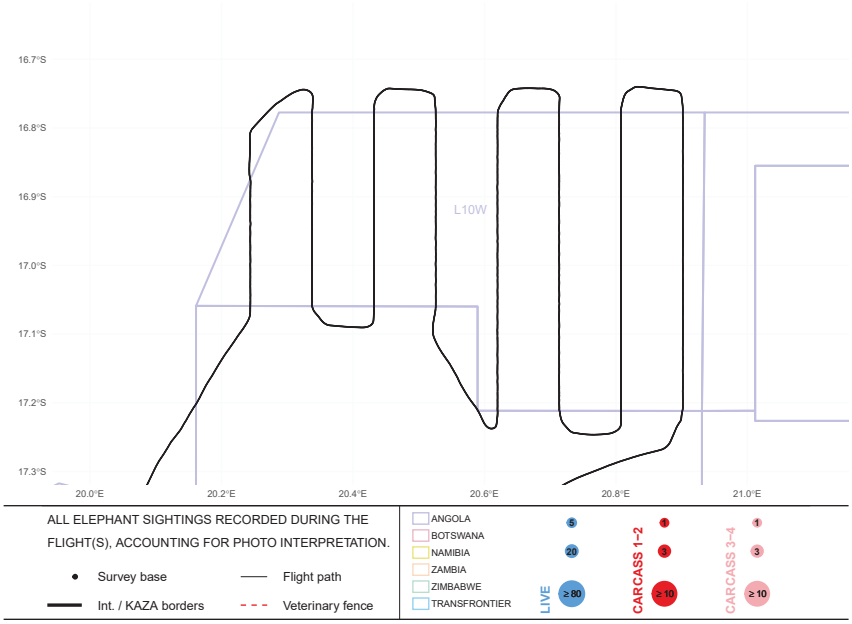
Actual sampling intensity: 3.3 %
Transect flying time: 1.8 h
Transects: 8 – 308 km – 0°
Search effort: 1.12 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	40	60
% individuals:	15	85

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	2	0	
Live elephant (>9):	0		
Elephant carcass:	0		
Live elephant (<10):	0		



LIVE ELEPHANTS

IN SAMPLE:	**0 (0)**
Bulls:	0 (0)
Family:	0 (0)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**0 (0)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	0 (0)
Category 4:	0 (0)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

OTHER SPECIES

Other wildlife species:	7
Other wildlife count:	58
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.365, N = 261, w = 316

		LIVE OBS	LIVE FINAL	ALL CARCASSES OBS	ALL CARCASSES FINAL
Population estimate	$\hat{Y}$	–	–	–	–
Variance of estimate	$\mathrm{Var}\hat{Y}$	–	–	–	–
Standard error	$\mathrm{SE}\hat{Y}$	–	–	–	–
95% confidence interval	$\mathrm{CI}_{\hat{Y}}^{95\%}$	–	–	–	–
Percentage of relative precision	$\mathrm{PRP}\hat{Y}$	–	–	–	–
Density per sqkm	$R\hat{Y}$	–	–	–	–
Variance between transect counts	s_y^2	–	–	–	–
Variance between transect areas	s_a^2	–	–	–	–
Covariance between counts & areas	s_{ay}	–	–	–	–

CARCASS RATIOS

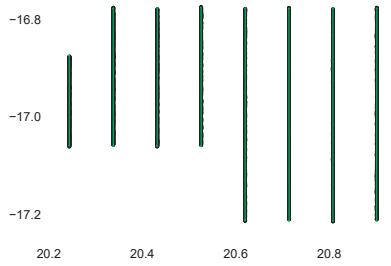
$CR_{1:4}$ = n/a
$CR_{1:2}$ = n/a

L10W – Lukiwa 10km West — ANGOLA – LUENGUE-LUIANA

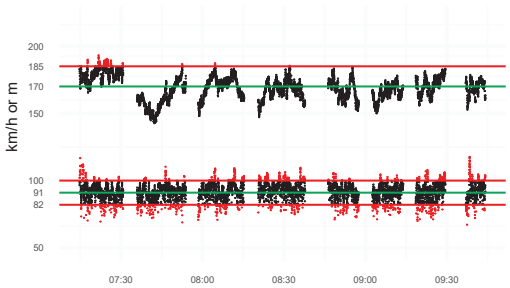
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20221019A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



SPEED
Average: 168.9 km/h
Standard dev.: 8.8 km/h

HEIGHT AGL
Average: 91.6 m (300.4 ft)
Standard dev.: 6.3 m (20.7 ft)

L10W – Likuwa 10km West — ANGOLA – LUENGUE–LUIANA

STRATUM CODE: L10W **N:** 261 S_a^2: 12,296
STRATUM NAME: Likuwa 10km West **w:** 316 df: 7

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	25	0	764	1960	0,257	687251	829,01	0	2725	256	78,125	-8,181
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	3	0	92	220	0,031	8656	93,04	0	312	240	1,125	1,448
eland	Tragelaphus oryx	2	0	61	157	0,021	4400	66,33	0	218	256	0,500	-0,658
elephant bulls	Loxodonta africana males	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant family	Loxodonta africana family	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass four	Loxodonta africana carcass four	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	2	0	61	157	0,021	4392	66,27	0	218	256	0,500	-0,636
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	1	1	31	78	0,010	1100	33,16	0	109	256	0,125	-0,329
sable	Hippotragus niger	22	7	673	1167	0,226	243492	493,45	0	1840	173	33,071	9,369
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000

LI – Likuwa

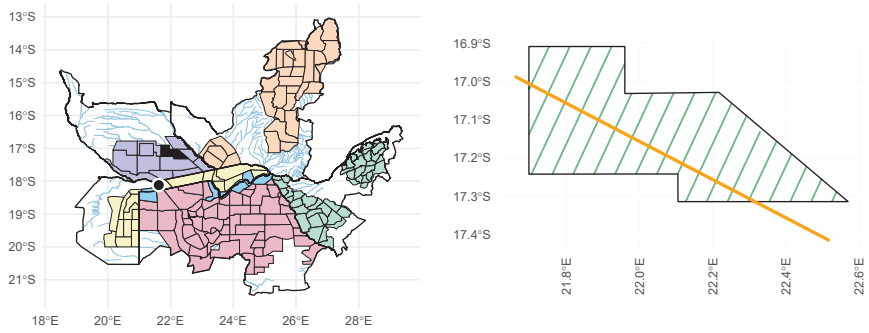
ANGOLA – LUENGUE–LUIANA

SURVEY DESIGN

COUNTRY: Angola
SUPERSTRATUM: Luengue–Luiana
STRATUM CODE: LI
STRATUM NAME: Likuwa
■ STRATUM AREA: 2354.99 sqkm
• SURVEY BASE: Bagani
DISTANCE TO SURVEY BASE: 117 km

– TRANSECTS: 18 (428 km)
TRANSECT ORIENTATION: 26.5°
PLANNED SAMPLING INTENSITY: 5.4 %

– BASELINE DISTANCE: 103.05 km



SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 4.7 h
Crew(s): C02
KES2022_V5LJB20221023A 06:17–10:56

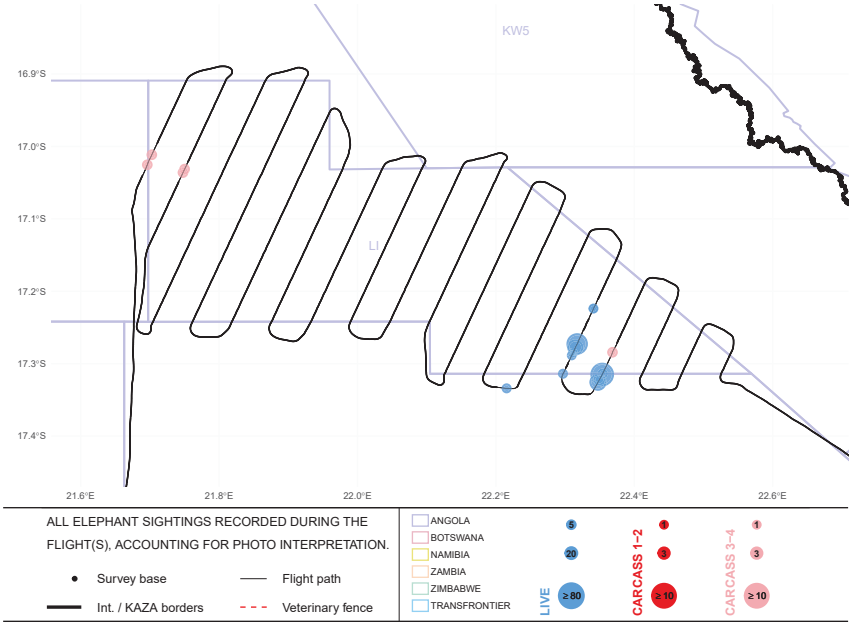
Actual sampling intensity: 5.7 %
Transect flying time: 2.5 h
Transects: 18 – 428 km – 26.5°
Search effort: 1.1 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C02	
Side:	L	R
% sightings:	57	43
% individuals:	62	38

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	18	38.89	28.57
Live elephant (>9):	1	100	0
Elephant carcass:	4	75	0
Live elephant (<10):	4	50	50



LIVE ELEPHANTS

IN SAMPLE:	**41 (5)**
Bulls:	5 (3)
Family:	36 (2)
NOT IN SAMPLE:	**174 (9)**
Outside search strip:	56
Off transect:	118

ELEPHANT CARCASSES

IN SAMPLE:	**4 (4)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	0 (0)
Category 4:	4 (4)
NOT IN SAMPLE:	**1 (1)**
Outside search strip:	0
Off transect:	1

OTHER SPECIES

Other wildlife species:	15
Other wildlife count:	265
Domestic count:	46

ELEPHANT DATA ANALYSIS

t = 2.11, N = 326, w = 316

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	698	716	70	70
Variance of estimate	$Var\hat{Y}$	515499	541597	1794	1794
Standard error	$SE\hat{Y}$	718	736	42	42
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 1515	± 1553	± 89	± 89
Percentage of relative precision	$PRP\hat{Y}$	217 %	217 %	128 %	128 %
Density per sqkm	$R\hat{Y}$	0.297	0.304	0.03	0.03
Variance between transect counts	s^2_y	88.889	93.389	0.301	0.301
Variance between transect areas	s^2_a	11.204	11.204	11.204	11.204
Covariance between counts & areas	s_{ay}	−3.708	−3.8	−0.167	−0.167

CARCASS RATIOS

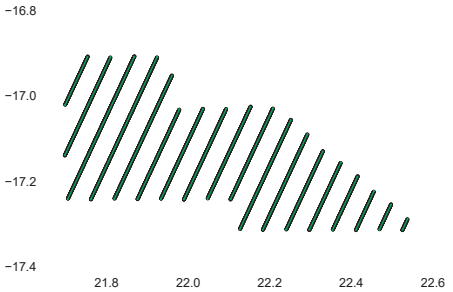
$CR_{1:4}$ = 8.9 %
$CR_{1:2}$ = 0 %

LI – Likuwa — ANGOLA – LUENGUE-LUIANA

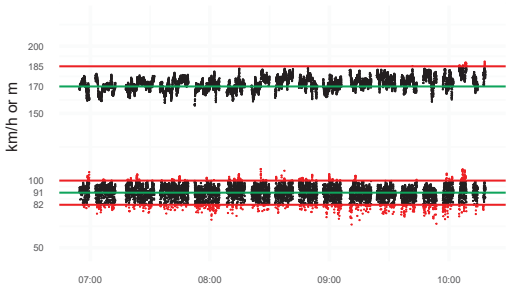
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20221023A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



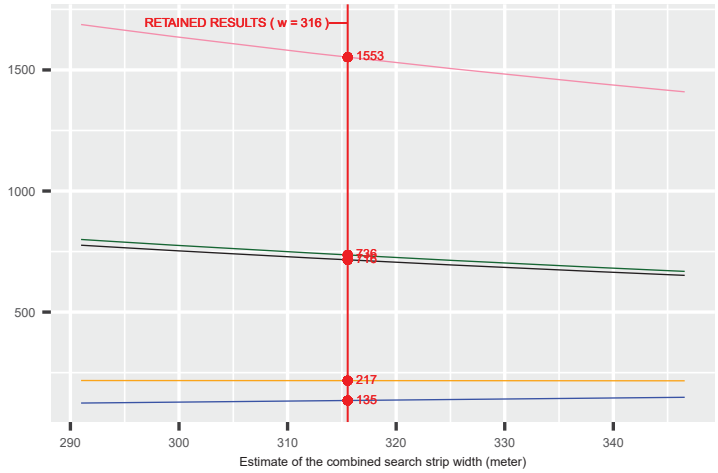
SPEED
Average: 172.2 km/h
Standard dev.: 4.8 km/h

HEIGHT AGL
Average: 91.3 m (299.6 ft)
Standard dev.: 5.3 m (17.5 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C02 – Left: [153 – 176]
C02 – Right: [133 – 184]



LIVE ELEPHANT ESTIMATE: [776 – 652]
CONFIDENCE INTERVAL: ± [1688 – 1410]
SAMPLE AREA: [124 – 148] sqkm
SE: [800 – 668]
PRP: [217 – 216] %

LI – Likuwa ANGOLA – LUENGUE–LUIANA

STRATUM CODE: LI **N:** 327 S_a^2: 11,204
STRATUM NAME: Likuwa **w:** 316 **df:** 17

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	15	0	262	558	0,111	69972	264,52	0	820	213	12,500	0,633
buffalo	Syncerus caffer	62	241	1082	2048	0,460	942056	970,60	0	3130	189	161,203	-5,102
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	46	80	803	802	0,341	144400	380,00	1	1605	100	27,673	4,670
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	36	3	628	213	0,267	10150	100,75	416	841	34	3,059	3,829
eland	Tragelaphus oryx	1	100	17	39	0,007	346	18,61	0	57	225	0,056	-0,383
elephant bulls	Loxodonta africana males	5	7	87	189	0,037	8055	89,75	0	277	217	1,389	-0,463
elephant family	Loxodonta africana family	36	167	628	1363	0,267	417555	646,18	0	1992	217	72,000	-3,337
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass four	Loxodonta africana carcass four	4	1	70	89	0,030	1794	42,36	0	159	128	0,301	-0,167
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	42	0	733	522	0,311	61157	247,30	211	1255	71	14,588	7,630
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	4	1	70	83	0,030	1555	39,43	0	153	119	0,301	0,554
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	26	7	454	327	0,193	24074	155,16	127	781	72	4,850	2,506
roan	Hippotragus equinus	32	16	559	504	0,237	57158	239,08	54	1063	90	10,771	2,514
sable	Hippotragus niger	38	67	663	473	0,282	50346	224,38	190	1137	71	10,575	4,388
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	2	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	4	0	70	143	0,030	4597	67,80	0	213	205	0,889	1,308
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	2	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	41	174	716	1553	0,304	541597	735,93	0	2268	217	93,389	-3,800
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	4	1	70	89	0,030	1794	42,36	0	159	128	0,301	-0,167
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	4	1	70	89	0,030	1794	42,36	0	159	128	0,301	-0,167

LIK – Likuwa Core

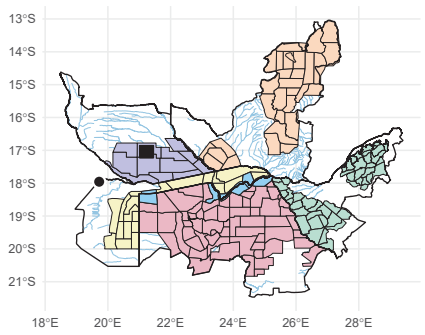
ANGOLA – LUENGUE–LUIANA

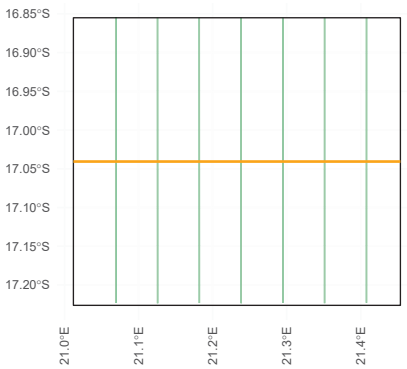
SURVEY DESIGN

COUNTRY: Angola
SUPERSTRATUM: Luengue–Luiana
STRATUM CODE: LIK
STRATUM NAME: Likuwa Core
■ STRATUM AREA: 1931.48 sqkm
• SURVEY BASE: Rundu
DISTANCE TO SURVEY BASE: 193 km

– TRANSECTS: 7 (289 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 4.5 %

– BASELINE DISTANCE: 47.01 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.7 h
Crew(s): C01
KES2022_V5IIM20221021A 06:21–10:05

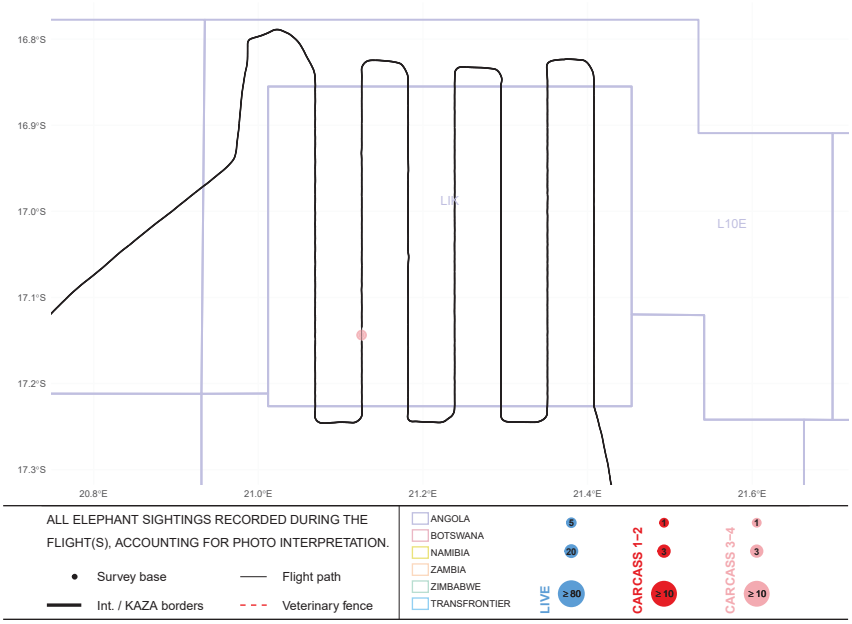
Actual sampling intensity: 4.7 %
Transect flying time: 1.7 h
Transects: 7 – 289 km – 0°
Search effort: 1.11 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	43	57
% individuals:	35	65

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	6	16.67	100
Live elephant (>9):	0		
Elephant carcass:	1	0	
Live elephant (<10):	0		



LIVE ELEPHANTS

IN SAMPLE:	**0 (0)**
Bulls:	0 (0)
Family:	0 (0)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**1 (1)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	1 (1)
Category 4:	0 (0)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

OTHER SPECIES

Other wildlife species:	9
Other wildlife count:	113
Domestic count:	36

ELEPHANT DATA ANALYSIS

t = 2.447, N = 150, w = 311

		LIVE OBS	LIVE FINAL	ALL CARCASSES OBS	ALL CARCASSES FINAL
Population estimate	$\hat{Y}$	–	–	21	21
Variance of estimate	$Var\hat{Y}$	–	–	442	442
Standard error	$SE\hat{Y}$	–	–	21	21
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	–	–	± 51	± 51
Percentage of relative precision	$PRP\hat{Y}$	–	–	240 %	240 %
Density per sqkm	$R\hat{Y}$	–	–	0.011	0.011
Variance between transect counts	s^2_y	–	–	0.143	0.143
Variance between transect areas	s^2_a	–	–	0.015	0.015
Covariance between counts & areas	s_{ay}	–	–	0.017	0.017

CARCASS RATIOS

$CR_{1:4}$ = 100 %
$CR_{1:2}$ = n/a

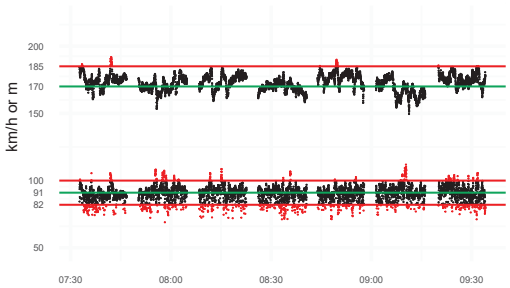
LIK – Likuwa Core — ANGOLA – LUENGUE-LUIANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20221021A

TRAJECTORY ADHERENCE VISUAL CHECK:

HEIGHT AGL AND SPEED ADHERENCE CHECK:



SPEED
Average: 172.6 km/h
Standard dev.: 5.9 km/h

HEIGHT AGL
Average: 90.4 m (296.5 ft)
Standard dev.: 5.5 m (17.9 ft)

LIK – Likuwa Core — ANGOLA – LUENGUE–LUIANA

STRATUM CODE: LIK **N:** 151 S_a^2: 0,015
STRATUM NAME: Likuwa Core **w:** 311 ***df*:** 6

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	33	45	708	1130	0,367	213168	461,70	0	1838	160	68,905	0,338
donkey	Equus asinus	3	0	64	155	0,033	3987	63,14	0	219	240	1,286	0,023
duiker	Sylvicapra grimmia	16	0	343	333	0,178	18470	135,90	11	676	97	5,905	-0,123
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant family	Loxodonta africana family	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	1	0	21	51	0,011	442	21,03	0	73	240	0,143	0,017
elephant carcass four	Loxodonta africana carcass four	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	17	28	365	417	0,189	29038	170,40	0	782	114	9,286	-0,176
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	25	1	537	880	0,278	129346	359,65	0	1417	164	41,286	-0,672
sable	Hippotragus niger	32	0	687	1648	0,356	453344	673,31	0	2334	240	146,286	0,382
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	3	0	64	155	0,033	3987	63,14	0	219	240	1,286	0,023
warthog	Phacochoerus africanus	3	0	64	155	0,033	4002	63,26	0	219	240	1,286	-0,050
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	1	0	21	51	0,011	442	21,03	0	73	240	0,143	0,017
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	1	0	21	51	0,011	442	21,03	0	73	240	0,143	0,017

MUCE – Mucusso Luiana East

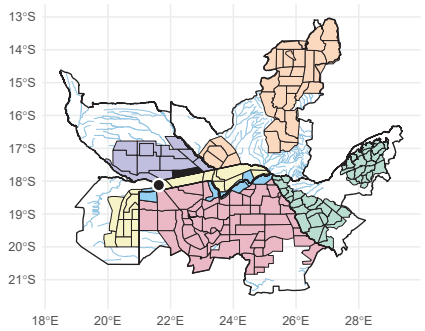
ANGOLA – LUENGUE–LUIANA

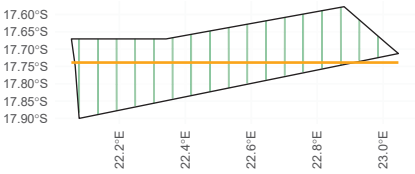
SURVEY DESIGN

COUNTRY: Angola
SUPERSTRATUM: Luengue–Luiana
STRATUM CODE: MUCE
STRATUM NAME: Mucusso Luiana East
■ STRATUM AREA: 1918.36 sqkm
• SURVEY BASE: Bagani
DISTANCE TO SURVEY BASE: 103 km

– TRANSECTS: 17 (329 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 5.2 %

– BASELINE DISTANCE: 105.16 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.6 h
Crew(s): C01
KES2022_V5IIM20221023A 06:29–10:07

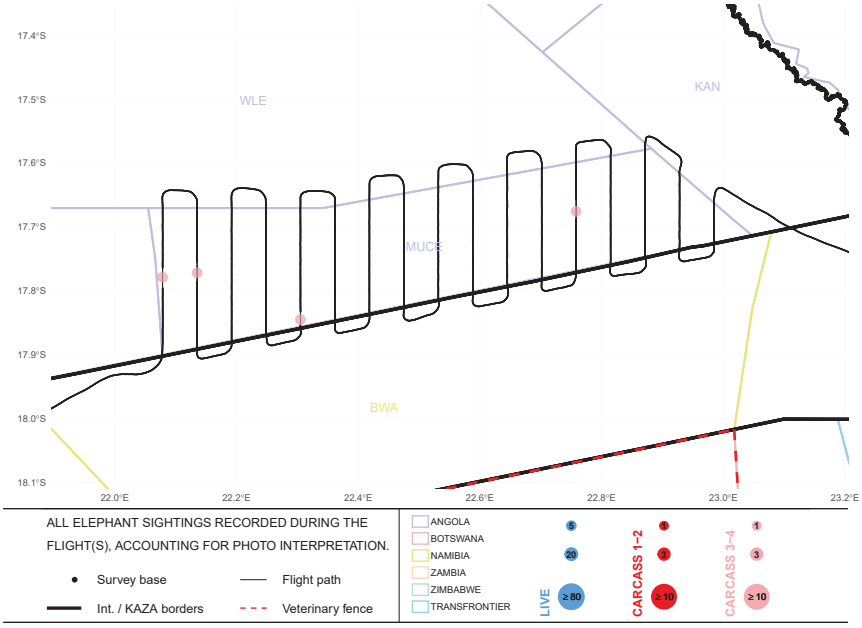
Actual sampling intensity: 5.4 %
Transect flying time: 1.9 h
Transects: 17 – 329 km – 0°
Search effort: 1.11 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	24	76
% individuals:	38	62

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	6	50	0
Live elephant (>9):	0		
Elephant carcass:	4	50	0
Live elephant (<10):	0		



LIVE ELEPHANTS

IN SAMPLE:	**0 (0)**
Bulls:	0 (0)
Family:	0 (0)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**4 (4)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	4 (4)
Category 4:	0 (0)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

OTHER SPECIES

Other wildlife species:	12
Other wildlife count:	92
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.12, N = 332, w = 317

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	–	–	74	74
Variance of estimate	$Var\hat{Y}$	–	–	1087	1087
Standard error	$SE\hat{Y}$	–	–	33	33
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	–	–	± 70	± 70
Percentage of relative precision	$PRP\hat{Y}$	–	–	95 %	95 %
Density per sqkm	$R\hat{Y}$	–	–	0.038	0.038
Variance between transect counts	s^2_y	–	–	0.191	0.191
Variance between transect areas	s^2_a	–	–	1.567	1.567
Covariance between counts & areas	s_{ay}	–	–	0.218	0.218

CARCASS RATIOS

$CR_{1:4}$ = 100 %
$CR_{1:2}$ = n/a

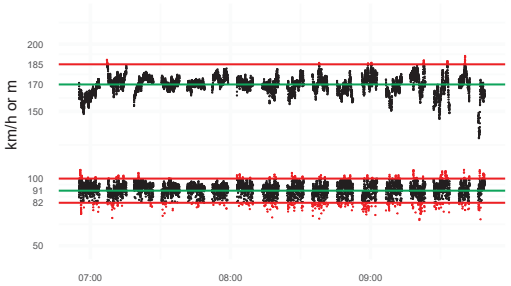
MUCE – Mucusso Luiana East — ANGOLA – LUENGUE-LUIANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20221023A

TRAJECTORY ADHERENCE VISUAL CHECK:

HEIGHT AGL AND SPEED ADHERENCE CHECK:



SPEED
Average: 169.6 km/h
Standard dev.: 6.8 km/h

HEIGHT AGL
Average: 91.9 m (301.5 ft)
Standard dev.: 4.9 m (16.2 ft)

MUCE – Mucusso Luiana East — ANGOLA – LUENGUE–LUIANA

STRATUM CODE: MUCE **N:** 332 S_a^2: 1,567
STRATUM NAME: Mucusso Luiana East **w:** 317 16

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	18	9	331	564	0,172	70838	266,15	0	895	171	12,059	1,713
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	27	1	496	240	0,259	12809	113,18	256	736	48	2,382	0,783
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant family	Loxodonta africana family	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	4	0	74	70	0,038	1087	32,98	4	143	95	0,191	0,218
elephant carcass four	Loxodonta africana carcass four	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
giraffe	Giraffa giraffa	2	0	37	80	0,019	1428	37,78	0	117	218	0,235	0,100
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	17	7	312	473	0,163	49839	223,25	0	786	151	8,250	0,584
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	1	0	18	40	0,010	363	19,04	0	59	220	0,059	0,001
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	3	15	55	119	0,029	3167	56,27	0	174	216	0,529	0,277
sable	Hippotragus niger	2	0	37	54	0,019	660	25,70	0	91	148	0,110	0,092
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	24	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	6	0	110	165	0,057	6088	78,02	0	276	150	0,993	0,072
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	4	0	74	70	0,038	1087	32,98	4	143	95	0,191	0,218
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	4	0	74	70	0,038	1087	32,98	4	143	95	0,191	0,218

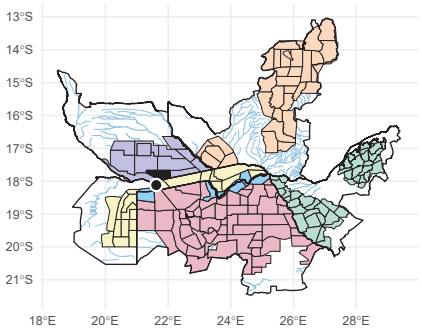
MUCW – Mucusso Luiana West — ANGOLA – LUENGUE–LUIANA

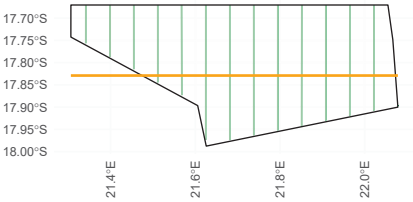
SURVEY DESIGN

COUNTRY: Angola
SUPERSTRATUM: Luengue–Luiana
STRATUM CODE: MUCW
STRATUM NAME: Mucusso Luiana West
■ STRATUM AREA: 2011.15 sqkm
• SURVEY BASE: Bagani
DISTANCE TO SURVEY BASE: 36 km

– TRANSECTS: 14 (332 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 5 %

– BASELINE DISTANCE: 81.82 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.2 h
Crew(s): C04
KES2022_V5WOT20221022A 06:37–09:52

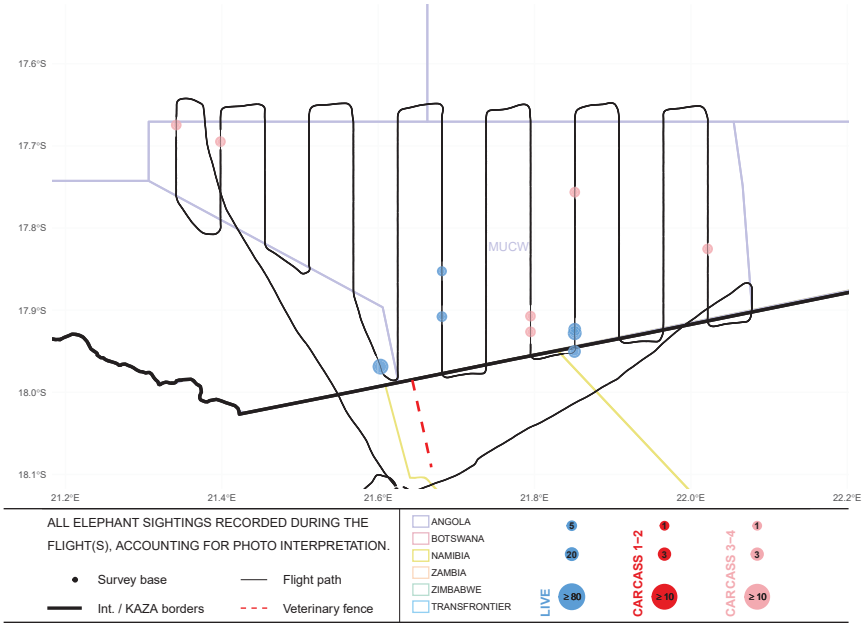
Actual sampling intensity: 5 %
Transect flying time: 1.9 h
Transects: 14 – 332 km – 0°
Search effort: 1.14 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C04	
Side:	L	R
% sightings:	59	41
% individuals:	66	34

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	12	41.67	0
Live elephant (>9):	2	50	0
Elephant carcass:	4	50	0
Live elephant (<10):	1	0	



LIVE ELEPHANTS

IN SAMPLE:	**32 (3)**
Bulls:	2 (1)
Family:	30 (2)
NOT IN SAMPLE:	**54 (4)**
Outside search strip:	10
Off transect:	44

ELEPHANT CARCASSES

IN SAMPLE:	**4 (4)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	2 (2)
Category 4:	2 (2)
NOT IN SAMPLE:	**2 (2)**
Outside search strip:	2
Off transect:	0

OTHER SPECIES

Other wildlife species:	11
Other wildlife count:	108
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.16, N = 269, w = 304

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	637	637	80	80
Variance of estimate	$Var\hat{Y}$	299975	299975	1273	1273
Standard error	$SE\hat{Y}$	548	548	36	36
95% confidence interval	$CI_{\hat{Y}}^{95\%}$	± 1183	± 1183	± 77	± 77
Percentage of relative precision	$PRP_{\hat{Y}}$	186 %	186 %	97 %	97 %
Density per sqkm	$R_{\hat{Y}}$	0.317	0.317	0.04	0.04
Variance between transect counts	s_y^2	63.912	63.912	0.22	0.22
Variance between transect areas	s_a^2	9.415	9.415	9.415	9.415
Covariance between counts & areas	s_{ay}	5.92	5.92	−0.313	−0.313

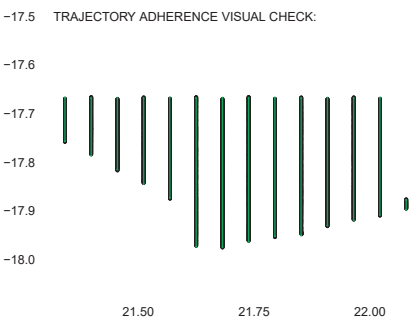
CARCASS RATIOS

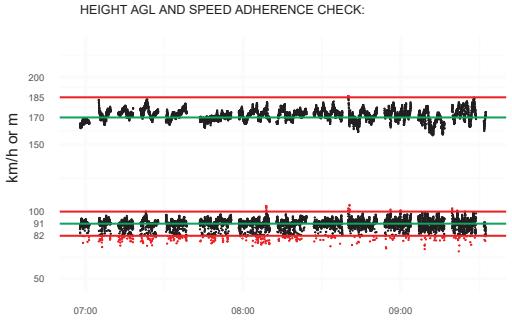
$CR_{1:4} = 11.1$ %
$CR_{1:2} = 0$ %

MUCW – Mucusso Luiana West — ANGOLA – LUENGUE-LUIANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20221022A





SPEED
Average: 171.7 km/h
Standard dev.: 4.3 km/h

HEIGHT AGL
Average: 90.6 m (297.1 ft)
Standard dev.: 3.9 m (12.7 ft)

MUCW – Mucusso Luiana West — ANGOLA – LUENGUE–LUIANA

STRATUM CODE: MUCW **N:** 269 S_a^2: 9,415
STRATUM NAME: Mucusso Luiana West **w:** 304 ***df*:** 13

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	37	64	737	939	0,366	189064	434,82	0	1676	127	43,786	8,919
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	5	0	100	201	0,050	8637	92,94	0	300	202	1,786	0,499
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	15	3	299	211	0,149	9515	97,55	88	510	71	2,225	1,665
eland	Tragelaphus oryx	11	0	219	454	0,109	44127	210,06	0	673	207	8,643	-1,074
elephant bulls	Loxodonta africana males	2	0	40	79	0,020	1327	36,43	0	119	198	0,286	0,481
elephant family	Loxodonta africana family	30	54	598	1191	0,297	303801	551,18	0	1788	199	64,286	5,439
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	2	1	40	56	0,020	677	26,02	0	96	141	0,132	-0,060
elephant carcass four	Loxodonta africana carcass four	2	1	40	58	0,020	715	26,73	0	98	145	0,132	-0,253
giraffe	Giraffa giraffa	3	0	60	127	0,030	3479	58,99	0	187	213	0,643	-0,969
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	15	0	299	437	0,149	40926	202,30	0	736	146	8,379	0,842
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	1	0	20	40	0,010	334	18,28	0	59	198	0,071	0,215
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	1	2	20	42	0,010	372	19,30	0	62	209	0,071	-0,177
sable	Hippotragus niger	9	14	179	276	0,089	16278	127,59	0	455	154	3,632	2,192
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	1	2	20	40	0,010	348	18,67	0	60	202	0,071	0,070
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	32	54	637	1183	0,317	299975	547,70	0	1821	186	63,912	5,920
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	4	2	80	77	0,040	1273	35,68	3	157	97	0,220	-0,313
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	4	2	80	77	0,040	1273	35,68	3	157	97	0,220	-0,313

WLC – Western Luiana Central

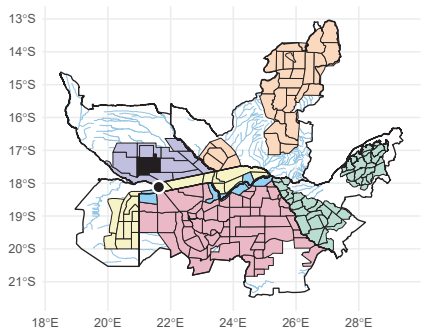
ANGOLA – LUENGUE–LUIANA

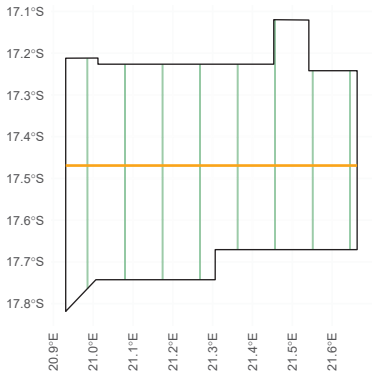
SURVEY DESIGN

COUNTRY: Angola
SUPERSTRATUM: Luengue–Luiana
STRATUM CODE: WLC
STR. NAME: Western Luiana Central
■ STRATUM AREA: 4275.57 sqkm
• SURVEY BASE: Bagani
DISTANCE TO SURVEY BASE: 81 km

– TRANSECTS: 8 (440 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 3.1 %

– BASELINE DISTANCE: 77.74 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.8 h
Crew(s): C02
KES2022_V5LJB20221022A 06:44–10:29

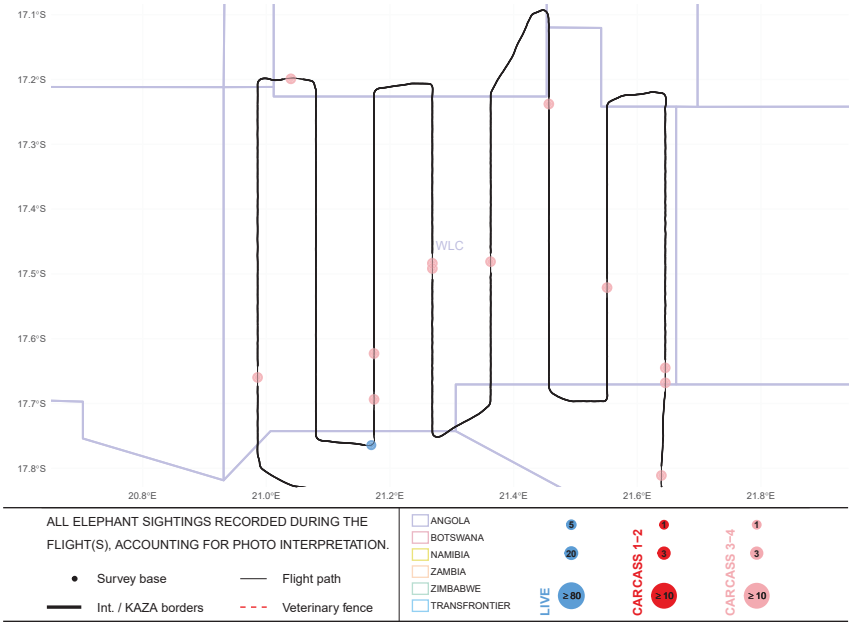
Actual sampling intensity: 3.2 %
Transect flying time: 2.5 h
Transects: 8 – 440 km – 0°
Search effort: 1.09 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C02	
Side:	L	R
% sightings:	51	49
% individuals:	51	49

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	15	26.67	0
Live elephant (>9):	0		
Elephant carcass:	8	50	0
Live elephant (<10):	0		



LIVE ELEPHANTS

IN SAMPLE:	**0 (0)**
Bulls:	0 (0)
Family:	0 (0)
NOT IN SAMPLE:	**2 (1)**
Outside search strip:	0
Off transect:	2

ELEPHANT CARCASSES

IN SAMPLE:	**8 (8)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	4 (4)
Category 4:	4 (4)
NOT IN SAMPLE:	**5 (5)**
Outside search strip:	2
Off transect:	3

OTHER SPECIES

Other wildlife species:	10
Other wildlife count:	179
Domestic count:	17

ELEPHANT DATA ANALYSIS

t = 2.365, N = 246, w = 316

		LIVE OBS	LIVE FINAL	ALL CARCASSES OBS	ALL CARCASSES FINAL
Population estimate	$\hat{Y}$	–	–	246	246
Variance of estimate	$\mathrm{Var}\hat{Y}$	–	–	4784	4784
Standard error	$\mathrm{SE}\hat{Y}$	–	–	69	69
95% confidence interval	$\mathrm{CI}_{\hat{Y}}^{95\%}$	–	–	± 164	± 164
Percentage of relative precision	$\mathrm{PRP}_{\hat{Y}}$	–	–	66 %	66 %
Density per sqkm	$R_{\hat{Y}}$	–	–	0.058	0.058
Variance between transect counts	s_y^2	–	–	0.571	0.571
Variance between transect areas	s_a^2	–	–	3.527	3.527
Covariance between counts & areas	s_{ay}	–	–	−0.599	−0.599

CARCASS RATIOS

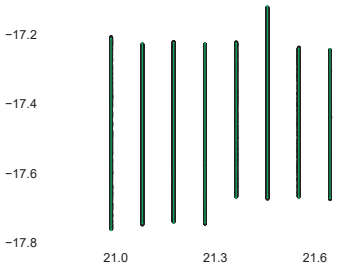
$CR_{1:4}$ = 100 %
$CR_{1:2}$ = n/a

WLC – Western Luiana Central — ANGOLA – LUENGUE-LUIANA

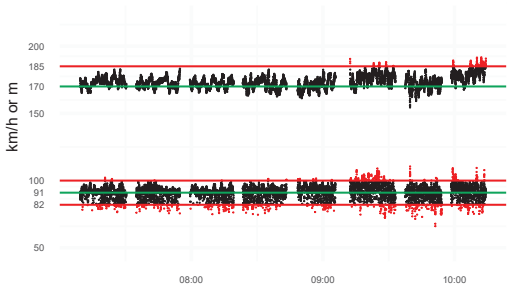
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20221022A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



SPEED
Average: 173.5 km/h
Standard dev.: 4.6 km/h

HEIGHT AGL
Average: 91.3 m (299.7 ft)
Standard dev.: 4.9 m (16.2 ft)

WLC – Western Luiana Central — ANGOLA – LUENGUE–LUIANA

STRATUM CODE: WLC **N:** 246 S_a^2: 3,527
STRATUM NAME: Western Luiana Central **w:** 316 ***df*:** 7

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	4	0	123	187	0,029	6270	79,18	0	310	152	0,857	0,091
cattle	Bos taurus	17	25	524	1113	0,122	221410	470,54	0	1636	213	31,554	5,801
donkey	Equus asinus	0	6	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	71	9	2187	934	0,511	156170	395,18	1252	3121	43	18,696	-1,635
eland	Tragelaphus oryx	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	0	2	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant family	Loxodonta africana family	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	4	1	123	154	0,029	4230	65,04	0	277	125	0,571	-0,040
elephant carcass four	Loxodonta africana carcass four	4	4	123	115	0,029	2354	48,51	8	238	93	0,286	-0,559
giraffe	Giraffa giraffa	4	1	123	285	0,029	14543	120,59	0	408	231	2,000	0,350
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	16	0	493	764	0,115	104336	323,01	0	1257	155	14,857	2,947
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	5	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	53	0	1632	1737	0,382	539335	734,39	0	3369	106	75,125	2,762
shoat	Capra hircus - Ovis aries	0	6	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	4	1	123	285	0,029	14543	120,59	0	408	231	2,000	0,350
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	0	2	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	8	5	246	164	0,058	4784	69,17	83	410	66	0,571	-0,599
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	8	5	246	164	0,058	4784	69,17	83	410	66	0,571	-0,599

WLE – Western Luiana East

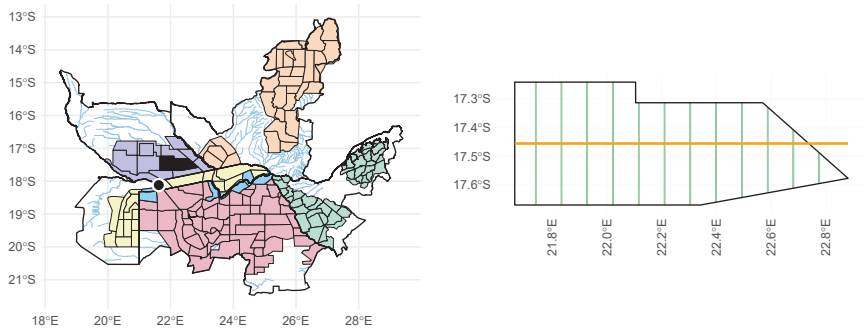
ANGOLA – LUENGUE–LUIANA

SURVEY DESIGN

COUNTRY: Angola
SUPERSTRATUM: Luengue–Luiana
STRATUM CODE: WLE
STRATUM NAME: Western Luiana East
■ STRATUM AREA: 4702.97 sqkm
• SURVEY BASE: Bagani
DISTANCE TO SURVEY BASE: 94 km

– TRANSECTS: 12 (453 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 2.9 %

– BASELINE DISTANCE: 129.45 km



SURVEY IMPLEMENTATION

Number of flight(s): 2
Combined flying time: 4.8 h
Crew(s): C04
KES2022_V5WOT20221021B 15:24–17:23
KES2022_V5WOT20221023A 06:27–09:13

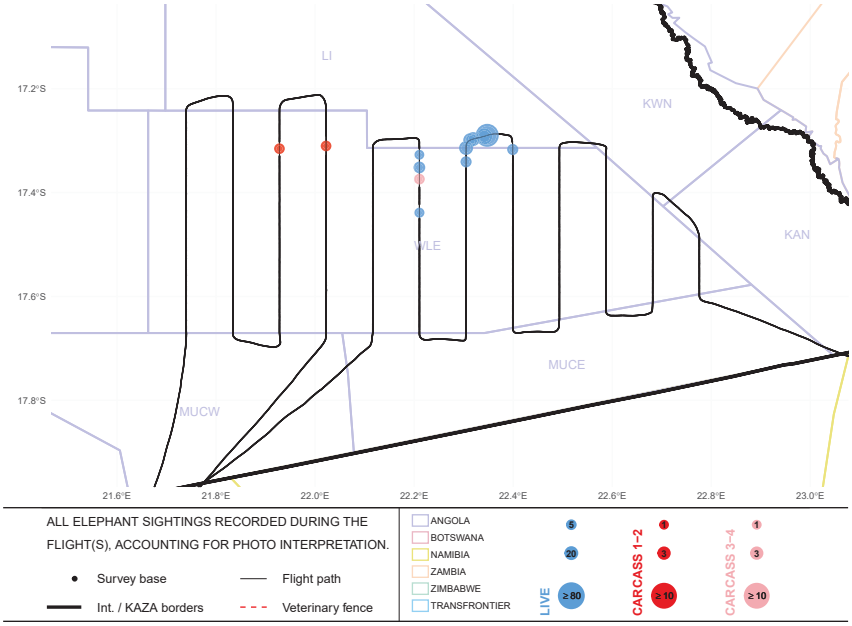
Actual sampling intensity: 2.9 %
Transect flying time: 2.6 h
Transects: 12 – 453 km – 0°
Search effort: 1.16 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C04	
Side:	L	R
% sightings:	35	65
% individuals:	29	71

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	13	38.46	20
Live elephant (>9):	0		
Elephant carcass:	2	0	
Live elephant (<10):	3	100	0



LIVE ELEPHANTS

IN SAMPLE:	**10 (3)**
Bulls:	1 (1)
Family:	9 (2)
NOT IN SAMPLE:	**169 (7)**
Outside search strip:	17
Off transect:	152

ELEPHANT CARCASSES

IN SAMPLE:	**2 (2)**
Category 1:	0 (0)
Category 2:	1 (1)
Category 3:	0 (0)
Category 4:	1 (1)
NOT IN SAMPLE:	**1 (1)**
Outside search strip:	1
Off transect:	0

OTHER SPECIES

Other wildlife species:	13
Other wildlife count:	216
Domestic count:	12

ELEPHANT DATA ANALYSIS

t = 2.201, N = 427, w = 303

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	343	343	69	69
Variance of estimate	$Var\hat{Y}$	66762	66762	2140	2140
Standard error	$SE\hat{Y}$	258	258	46	46
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 569	± 569	± 102	± 102
Percentage of relative precision	$PRP\hat{Y}$	166 %	166 %	148 %	148 %
Density per sqkm	$R\hat{Y}$	0.073	0.073	0.015	0.015
Variance between transect counts	s^2_y	4.515	4.515	0.152	0.152
Variance between transect areas	s^2_a	10.698	10.698	10.698	10.698
Covariance between counts & areas	s_{ay}	0.474	0.474	0.323	0.323

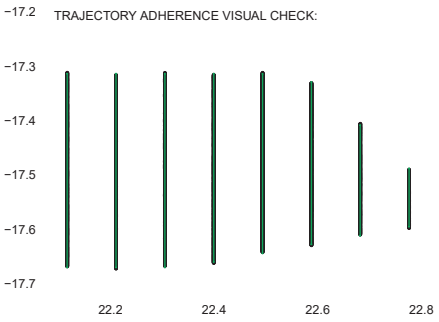
CARCASS RATIOS

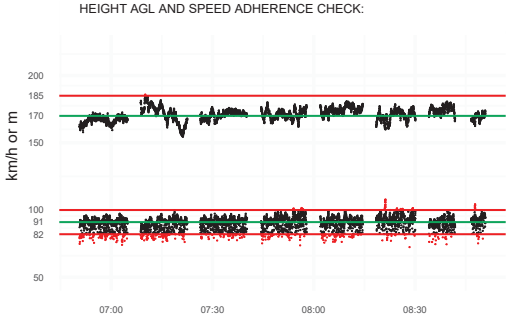
$CR_{1:4} = 16.7$ %
$CR_{1:2} = 9.1$ %

WLE – Western Luiana East — ANGOLA – LUENGUE-LUIANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20221023A

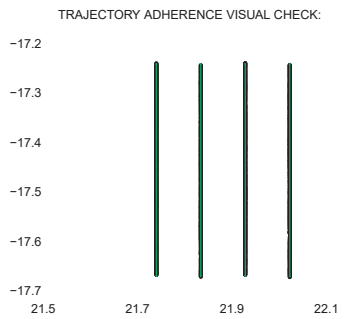


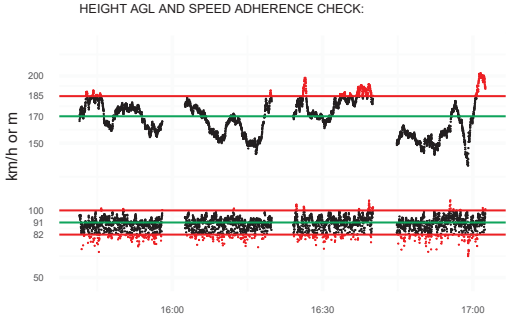


SPEED
Average: 170.9 km/h
Standard dev.: 4.6 km/h

HEIGHT AGL
Average: 90.4 m (296.6 ft)
Standard dev.: 4.6 m (15.1 ft)

KES2022_ V5WOT20221021B





SPEED
Average: 168.8 km/h
Standard dev.: 13.1 km/h

HEIGHT AGL
Average: 89.8 m (294.7 ft)
Standard dev.: 5.3 m (17.4 ft)

WLE – Western Luiana East — ANGOLA – LUENGUE–LUIANA

STRATUM CODE: WLE **N:** 428 S_a^2: 10,698
STRATUM NAME: Western Luiana East **w:** 303 ***df*:** 11

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	50	0	1717	3794	0,365	2971180	1723,71	0	5511	221	208,333	12,819
buffalo	Syncerus caffer	74	10	2541	3989	0,540	3284043	1812,19	0	6530	157	213,606	-4,414
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	1	0	34	78	0,007	1265	35,57	0	113	228	0,083	-0,098
cattle	Bos taurus	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	32	2	1099	518	0,234	55460	235,50	581	1617	47	2,606	-1,178
eland	Tragelaphus oryx	1	1	34	77	0,007	1236	35,16	0	112	225	0,083	0,035
elephant bulls	Loxodonta africana males	1	7	34	77	0,007	1235	35,15	0	112	225	0,083	0,039
elephant family	Loxodonta africana family	9	162	309	549	0,066	62176	249,35	0	858	178	4,205	0,435
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	1	1	34	76	0,007	1183	34,39	0	110	220	0,083	0,284
elephant carcass three	Loxodonta africana carcass three	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass four	Loxodonta africana carcass four	1	0	34	77	0,007	1235	35,15	0	112	225	0,083	0,039
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	6	0	206	192	0,044	7642	87,42	14	398	93	0,636	1,615
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	14	6	481	752	0,102	116801	341,76	0	1233	156	8,152	1,885
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	1	1	34	77	0,007	1235	35,15	0	112	225	0,083	0,039
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	2	4	69	152	0,015	4747	68,90	0	220	221	0,333	0,528
sable	Hippotragus niger	28	7	962	1999	0,204	825084	908,34	0	2961	208	55,697	1,209
shoat	Capra hircus - Ovis aries	12	0	412	910	0,088	170901	413,40	0	1322	221	12,000	3,169
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	3	0	103	163	0,022	5479	74,02	0	266	158	0,386	0,502
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	10	169	343	569	0,073	66762	258,38	0	912	166	4,515	0,474
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	1	1	34	76	0,007	1183	34,39	0	110	220	0,083	0,284
all elephant carcasses	Loxodonta africana carcass all	2	1	69	102	0,015	2140	46,26	0	171	148	0,152	0,323
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	1	0	34	77	0,007	1235	35,15	0	112	225	0,083	0,039

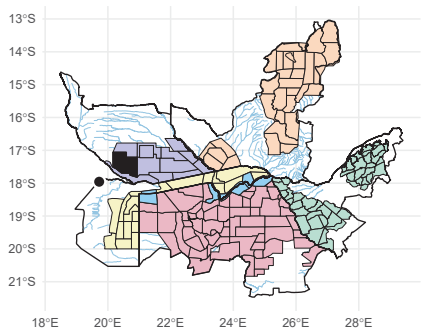
WLW – Western Luiana West — ANGOLA – LUENGUE–LUIANA

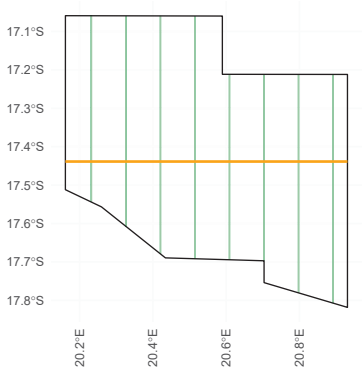
SURVEY DESIGN

COUNTRY: Angola
SUPERSTRATUM: Luengue–Luiana
STRATUM CODE: WLW
STRATUM NAME: Western Luiana West
■ STRATUM AREA: 5046.79 sqkm
• SURVEY BASE: Rundu
DISTANCE TO SURVEY BASE: 109 km

– TRANSECTS: 8 (491 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 2.9 %

– BASELINE DISTANCE: 81.78 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 4.7 h
Crew(s): C01
KES2022_V5IIM20221020A 06:24–11:05

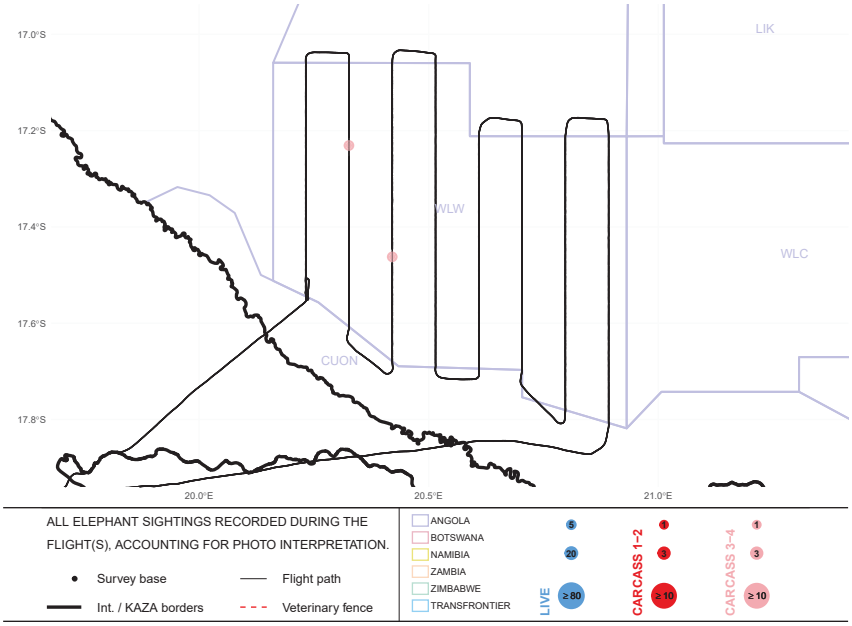
Actual sampling intensity: 3 %
Transect flying time: 2.9 h
Transects: 8 – 491 km – 0°
Search effort: 1.13 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	42	58
% individuals:	45	55

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	6	33.33	0
Live elephant (>9):	0		
Elephant carcass:	1	0	
Live elephant (<10):	0		



LIVE ELEPHANTS

IN SAMPLE:	**0 (0)**
Bulls:	0 (0)
Family:	0 (0)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**1 (1)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	1 (1)
Category 4:	0 (0)
NOT IN SAMPLE:	**1 (1)**
Outside search strip:	1
Off transect:	0

OTHER SPECIES

Other wildlife species:	10
Other wildlife count:	184
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.365, N = 264, w = 310

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	–	–	33	33
Variance of estimate	$\widehat{Var}_Y$	–	–	1058	1058
Standard error	$\widehat{SE}_Y$	–	–	33	33
95% confidence interval	$\widehat{CI}_Y^{95\%}$	–	–	± 77	± 77
Percentage of relative precision	$\widehat{PRP}_Y$	–	–	232 %	232 %
Density per sqkm	$\hat{R}_Y$	–	–	0.007	0.007
Variance between transect counts	s_y^2	–	–	0.125	0.125
Variance between transect areas	s_a^2	–	–	5.08	5.08
Covariance between counts & areas	s_{ay}	–	–	0.014	0.014

CARCASS RATIOS

$CR_{1:4}$ = 100 %
$CR_{1:2}$ = n/a

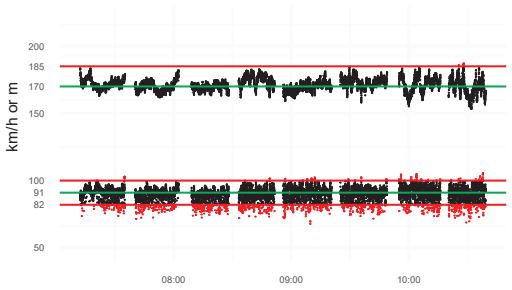
WLW – Western Luiana West — ANGOLA – LUENGUE-LUIANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20221020A

TRAJECTORY ADHERENCE VISUAL CHECK:

HEIGHT AGL AND SPEED ADHERENCE CHECK:



SPEED
Average: 171.2 km/h
Standard dev.: 4.7 km/h

HEIGHT AGL
Average: 89.8 m (294.7 ft)
Standard dev.: 5.1 m (16.7 ft)

WLW – Western Luiana West — ANGOLA – LUENGUE–LUIANA

STRATUM CODE: WLW **N:** 264 S_a^2: 5,080
STRATUM NAME: Western Luiana West **w:** 310 ***df*:** 7

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	4	0	133	314	0,026	17590	132,63	0	446	236	2,000	-1,427
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	12	0	398	320	0,079	18260	135,13	79	718	80	2,000	-0,799
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant family	Loxodonta africana family	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	1	1	33	77	0,007	1058	32,53	0	110	232	0,125	0,014
elephant carcass four	Loxodonta africana carcass four	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	19	0	630	1097	0,125	215168	463,86	0	1727	174	25,125	-0,888
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	2	0	66	157	0,013	4397	66,31	0	223	236	0,500	-0,713
sable	Hippotragus niger	82	53	2721	3840	0,539	2637737	1624,11	0	6561	141	311,357	1,053
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	1	0	33	75	0,007	1013	31,83	0	108	227	0,125	0,417
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	9	40	299	677	0,059	82077	286,49	0	976	227	10,125	3,750
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	1	1	33	77	0,007	1058	32,53	0	110	232	0,125	0,014
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	1	1	33	77	0,007	1058	32,53	0	110	232	0,125	0,014

BOTSWANA

1&2H – CT 1 and 2 high

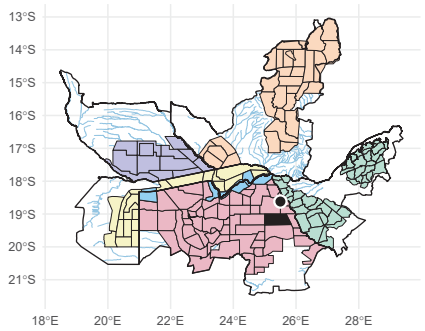
BOTSWANA – NORTHERN BOTSWANA

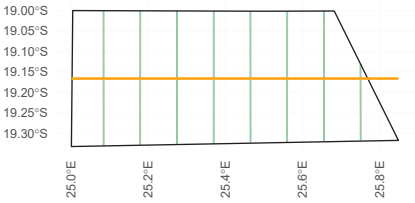
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: 1&2H
STRATUM NAME: CT 1 and 2 high
■ STRATUM AREA: 2888.25 sqkm
• SURVEY BASE: Pandamatenga
DISTANCE TO SURVEY BASE: 61 km

– TRANSECTS: 8 (275 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 2.9 %

– BASELINE DISTANCE: 89.13 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 2.8 h
Crew(s): C03
KES2022_V5WOT20220911A 07:02–09:51

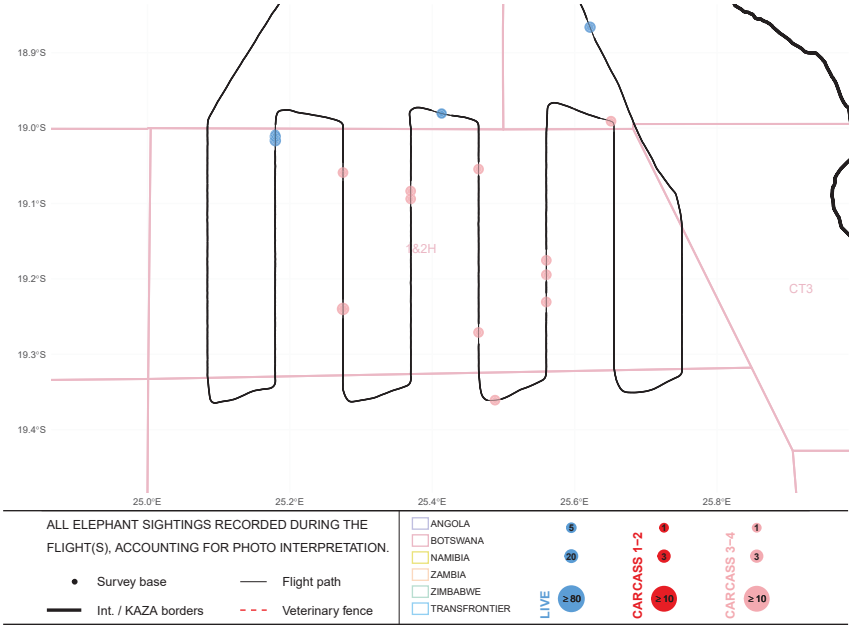
Actual sampling intensity: 2.9 %
Transect flying time: 1.6 h
Transects: 8 – 275 km – 0°
Search effort: 1.14 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C03	
Side:	L	R
% sightings:	20	80
% individuals:	10	90

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	13	0	
Live elephant (>9):	0		
Elephant carcass:	9	0	
Live elephant (<10):	2	0	



LIVE ELEPHANTS

IN SAMPLE:	**7 (2)**
Bulls:	1 (1)
Family:	6 (1)
NOT IN SAMPLE:	**41 (6)**
Outside search strip:	11
Off transect:	30

ELEPHANT CARCASSES

IN SAMPLE:	**9 (9)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	7 (7)
Category 4:	2 (2)
NOT IN SAMPLE:	**3 (3)**
Outside search strip:	1
Off transect:	2

OTHER SPECIES

Other wildlife species:	4
Other wildlife count:	14
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.365, N = 289, w = 307

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	239	239	307	307
Variance of estimate	$Var\hat{Y}$	61356	61356	14651	14651
Standard error	$SE\hat{Y}$	248	248	121	121
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 586	± 586	± 286	± 286
Percentage of relative precision	$PRP\hat{Y}$	245 %	245 %	93 %	93 %
Density per sqkm	$R\hat{Y}$	0.083	0.083	0.106	0.106
Variance between transect counts	s^2_y	6.125	6.125	1.554	1.554
Variance between transect areas	s^2_a	2.759	2.759	2.759	2.759
Covariance between counts & areas	s_{ay}	0.824	0.824	0.706	0.706

CARCASS RATIOS

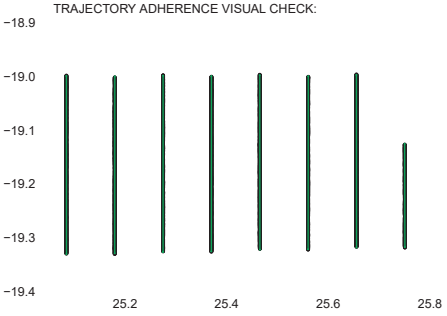
$CR_{1:4} = 56.2$ %
$CR_{1:2} = 0$ %

1&2H – CT 1 and 2 high — BOTSWANA – NORTHERN BOTSWANA

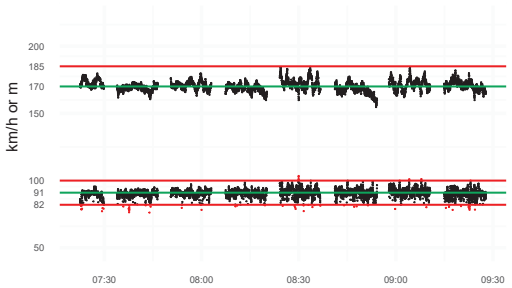
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20220911A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



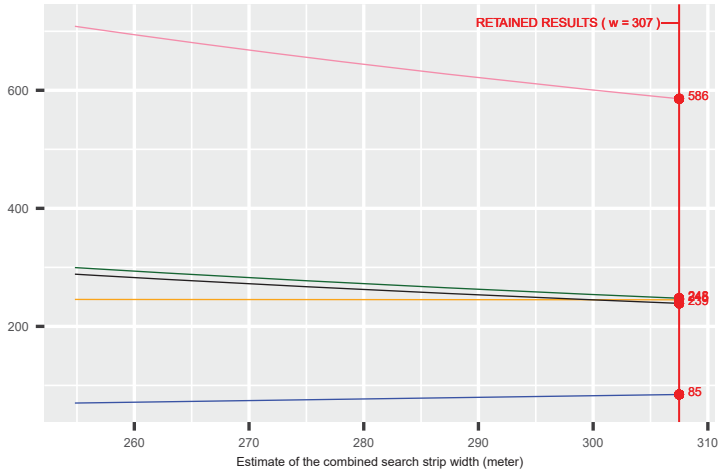
SPEED
Average: 170.3 km/h
Standard dev.: 3.8 km/h

HEIGHT AGL
Average: 90.5 m (296.9 ft)
Standard dev.: 3 m (10 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C03 – Left: [101 – 153]
C03 – Right: [142 – 170]



LIVE ELEPHANT ESTIMATE: [288 – 239]
CONFIDENCE INTERVAL: ± [709 – 586]
SAMPLE AREA: [70 – 85] sqkm
SE: [300 – 248]
PRP: [246 – 245] %

1&2H – CT 1 and 2 high — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: 1&2H **N:** 290 S_a^2: 2,759
STRATUM NAME: CT 1 and 2 high **w:** 307 ***df*:** 7

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	1	0	34	84	0,012	1257	35,46	0	118	246	0,125	0,096
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	1	1	34	84	0,012	1252	35,39	0	118	245	0,125	0,118
elephant family	Loxodonta africana family	6	40	205	502	0,071	45078	212,31	0	707	245	4,500	0,706
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	7	2	239	262	0,083	12233	110,60	0	501	109	1,268	0,537
elephant carcass four	Loxodonta africana carcass four	2	1	68	109	0,024	2123	46,07	0	177	160	0,214	0,169
giraffe	Giraffa giraffa	1	5	34	84	0,012	1259	35,48	0	118	246	0,125	0,091
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	11	0	376	925	0,130	153125	391,31	0	1301	246	15,125	0,687
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	1	0	34	84	0,012	1252	35,39	0	118	245	0,125	0,118
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	7	41	239	586	0,083	61356	247,70	0	825	245	6,125	0,824
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	9	3	307	286	0,106	14651	121,04	21	594	93	1,554	0,706
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	9	3	307	286	0,106	14651	121,04	21	594	93	1,554	0,706

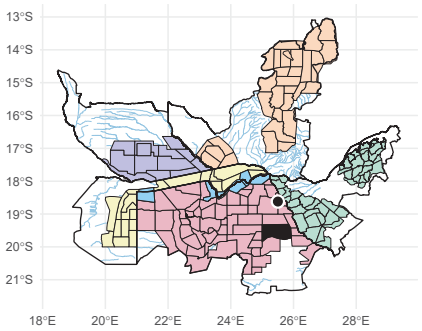
1&2L – CT 1 and 2 low — BOTSWANA – NORTHERN BOTSWANA

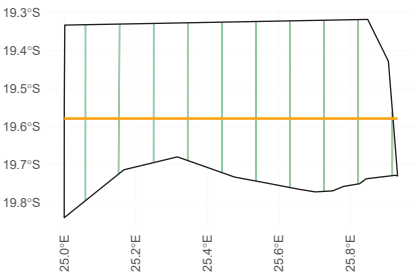
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: 1&2L
STRATUM NAME: CT 1 and 2 low
■ STRATUM AREA: 4377.95 sqkm
• SURVEY BASE: Pandamatenga
DISTANCE TO SURVEY BASE: 109 km

– TRANSECTS: 10 (437 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 3 %

– BASELINE DISTANCE: 97.85 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 4.2 h
Crew(s): C02
KES2022_V5LJB20220911A 06:47–10:59

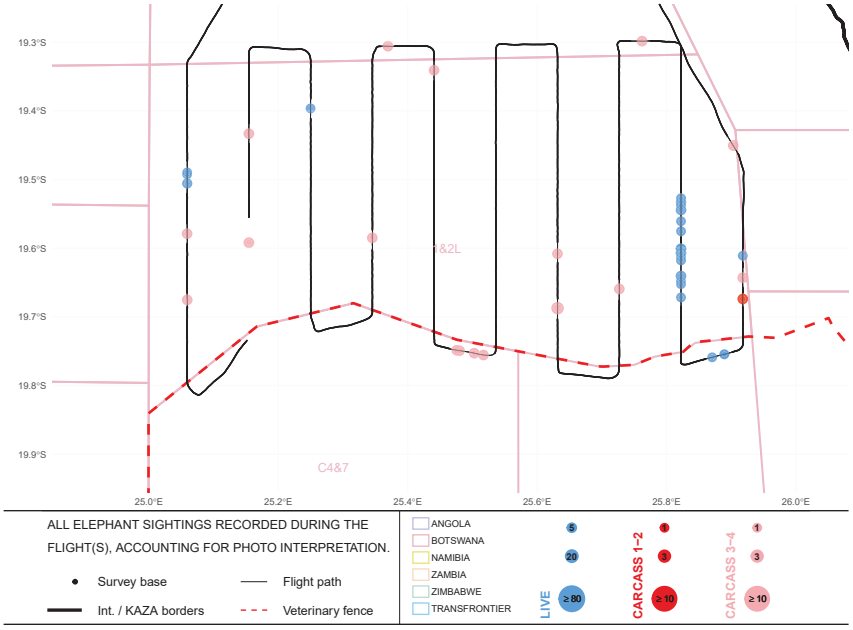
Actual sampling intensity: 3.2 %
Transect flying time: 2.5 h
Transects: 10 – 437 km – 0°
Search effort: 1.09 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C02	
Side:	L	R
% sightings:	52	48
% individuals:	55	45

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	32	21.88	0
Live elephant (>9):	0		
Elephant carcass:	10	30	0
Live elephant (<10):	9	44.44	0



LIVE ELEPHANTS

IN SAMPLE:	**11 (9)**
Bulls:	11 (9)
Family:	0 (0)
NOT IN SAMPLE:	**165 (41)**
Outside search strip:	38
Off transect:	127

ELEPHANT CARCASSES

IN SAMPLE:	**11 (10)**
Category 1:	0 (0)
Category 2:	1 (1)
Category 3:	1 (1)
Category 4:	9 (8)
NOT IN SAMPLE:	**13 (13)**
Outside search strip:	1
Off transect:	12

OTHER SPECIES

Other wildlife species:	5
Other wildlife count:	14
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.262, N = 307, w = 318

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	347	347	347	347
Variance of estimate	$Var\hat{Y}$	71373	71373	10005	10005
Standard error	$SE\hat{Y}$	267	267	100	100
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 604	± 604	± 226	± 226
Percentage of relative precision	$PRP\hat{Y}$	174 %	174 %	65 %	65 %
Density per sqkm	$R\hat{Y}$	0.079	0.079	0.079	0.079
Variance between transect counts	s^2_y	7.878	7.878	0.989	0.989
Variance between transect areas	s^2_a	8.586	8.586	8.586	8.586
Covariance between counts & areas	s_{ay}	0.928	0.928	−0.306	−0.306

CARCASS RATIOS

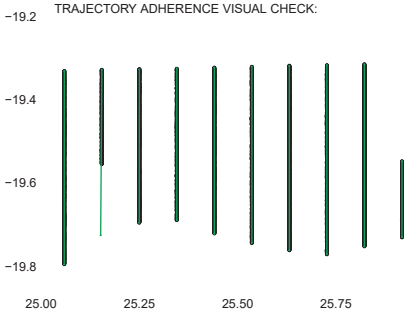
$CR_{1:4} = 50$ %
$CR_{1:2} = 8.3$ %

1&2L – CT 1 and 2 low — BOTSWANA – NORTHERN BOTSWANA

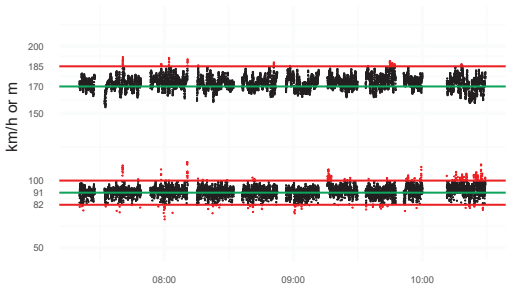
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20220911A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



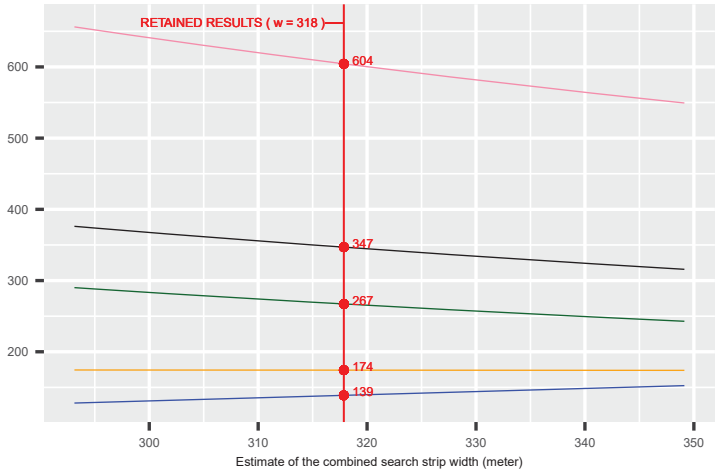
SPEED
Average: 172.7 km/h
Standard dev.: 4.8 km/h

HEIGHT AGL
Average: 92 m (301.7 ft)
Standard dev.: 3.9 m (12.6 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C02 – Left: [155 – 177]
C02 – Right: [134 – 185]



LIVE ELEPHANT ESTIMATE: [376 – 316]
CONFIDENCE INTERVAL: ± [656 – 549]
SAMPLE AREA: [128 – 152] sqkm
SE: [290 – 243]
PRP: [174 – 174] %

1&2L – CT 1 and 2 low — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: 1&2L **N:** 308 S_a^2: 8,586
STRATUM NAME: CT 1 and 2 low **w:** 318 ***df*:** 9

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	3	0	95	104	0,022	2106	45,90	0	198	110	0,233	0,176
eland	Tragelaphus oryx	0	7	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	11	61	347	604	0,079	71373	267,16	0	951	174	7,878	0,928
elephant family	Loxodonta africana family	0	104	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	1	0	32	73	0,007	1031	32,11	0	104	230	0,100	-0,836
elephant carcass three	Loxodonta africana carcass three	1	0	32	69	0,007	917	30,28	0	100	217	0,100	0,030
elephant carcass four	Loxodonta africana carcass four	9	13	284	212	0,065	8802	93,82	72	496	75	0,989	0,500
giraffe	Giraffa giraffa	2	5	63	137	0,014	3668	60,56	0	200	217	0,400	0,059
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	3	1	95	203	0,022	8068	89,82	0	298	215	0,900	0,557
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	1	1	32	68	0,007	906	30,11	0	100	216	0,100	0,110
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	11	165	347	604	0,079	71373	267,16	0	951	174	7,878	0,928
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	1	0	32	73	0,007	1031	32,11	0	104	230	0,100	-0,836
all elephant carcasses	Loxodonta africana carcass all	11	13	347	226	0,079	10005	100,03	121	573	65	0,989	-0,306
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	10	13	315	201	0,072	7858	88,64	115	516	64	0,889	0,530

14HBW – NG14 high Botswana

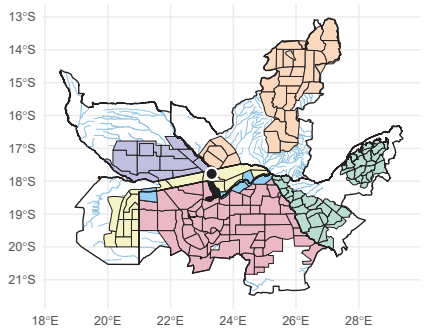
BOTSWANA – NORTHERN BOTSWANA

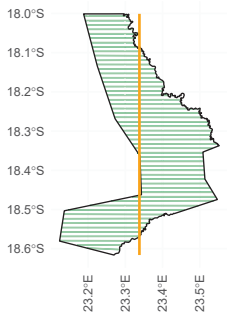
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: 14HBW
STRATUM NAME: NG14 high Botswana
■ STRATUM AREA: 1312.43 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 60 km

– TRANSECTS: 54 (1057 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 24.2 %

– BASELINE DISTANCE: 68.09 km





SURVEY IMPLEMENTATION

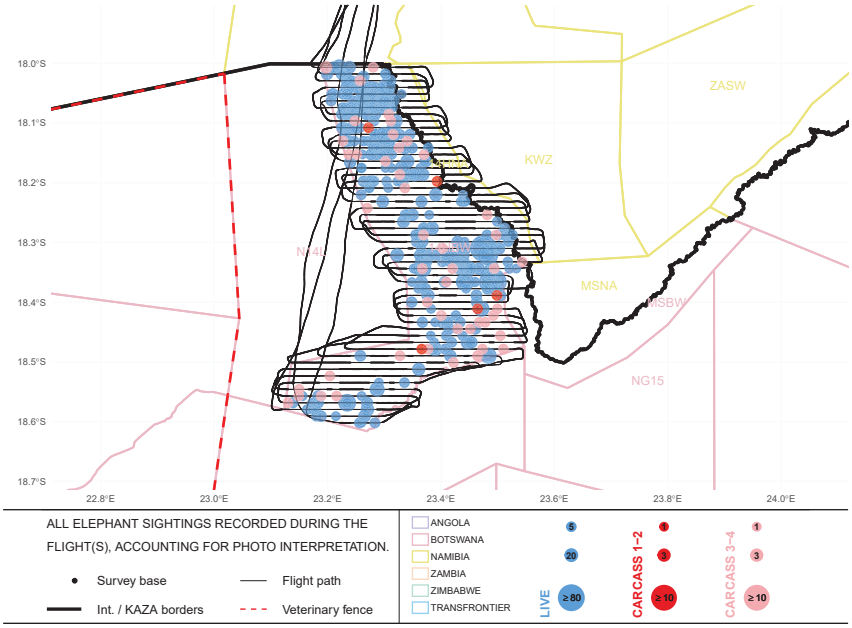
Number of flight(s): 3
Combined flying time: 11.4 h
Crew(s): C01, C02, C04
KES2022_V5IIM20221006A 06:45–10:46
KES2022_V5WOT20221007A 07:19–11:01
KES2022_V5LJB20221007A 06:50–10:30
Actual sampling intensity: 25.4 %
Transect flying time: 6.2 h
Transects: 54 – 1057 km – 0°
Search effort: 1.11 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01		C04		C02	
Side:	L	R	L	R	L	R
% sightings:	38	62	44	56	54	46
% individuals:	38	62	48	52	58	42

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	442	17.19	39.47
Live elephant (>9):	55	78.18	41.86
Elephant carcass:	44	13.64	16.67
Live elephant (<10):	127	3.94	60



LIVE ELEPHANTS

IN SAMPLE:	**1439 (180)**
Bulls:	106 (58)
Family:	1333 (122)
NOT IN SAMPLE:	**1732 (174)**
Outside search strip:	1663
Off transect:	69

ELEPHANT CARCASSES

IN SAMPLE:	**45 (44)**
Category 1:	1 (1)
Category 2:	3 (3)
Category 3:	12 (11)
Category 4:	29 (29)
NOT IN SAMPLE:	**8 (8)**
Outside search strip:	8
Off transect:	0

OTHER SPECIES

Other wildlife species:	20
Other wildlife count:	2804
Domestic count:	12

ELEPHANT DATA ANALYSIS

t = 2.014, N = 204, 221, 193, w = 321

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	5510	5672	177	177
Variance of estimate	$Var\hat{Y}$	785623	824069	702	702
Standard error	$SE\hat{Y}$	886	908	26	26
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 1784	± 1827	± 53	± 53
Percentage of relative precision	$PRP\hat{Y}$	32 %	32 %	30 %	30 %
Density per sqkm	$R\hat{Y}$	4.198	4.322	0.135	0.135
Variance between transect counts	s^2_y	820.063	855.402	0.821	0.821
Variance between transect areas	s^2_a	2.903	2.903	2.903	2.903
Covariance between counts & areas	s_{ay}	−10.452	−11.051	−0.019	−0.019

CARCASS RATIOS

$CR_{1:4}$ = 3 %
$CR_{1:2}$ = 0.3 %

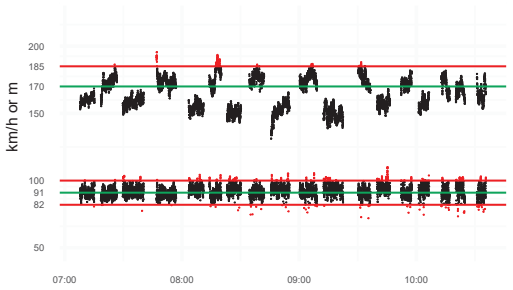
14HBW – NG14 high Botswana — BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20221006A

TRAJECTORY ADHERENCE VISUAL CHECK:

HEIGHT AGL AND SPEED ADHERENCE CHECK:



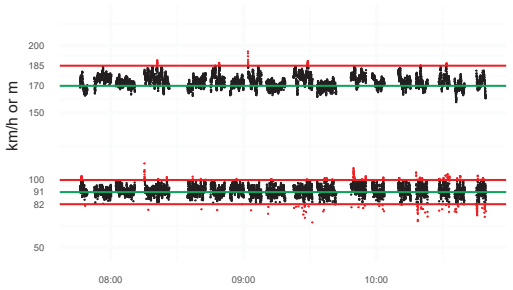
SPEED
Average: 164.2 km/h
Standard dev.: 11 km/h

HEIGHT AGL
Average: 92 m (301.9 ft)
Standard dev.: 4 m (13.3 ft)

KES2022_ V5WOT20221007A

TRAJECTORY ADHERENCE VISUAL CHECK:

HEIGHT AGL AND SPEED ADHERENCE CHECK:

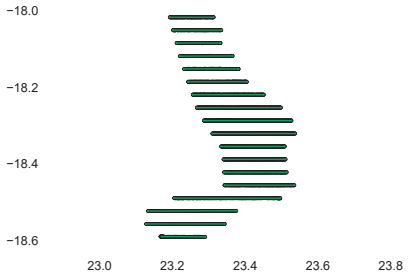


SPEED
Average: 173.1 km/h
Standard dev.: 4.6 km/h

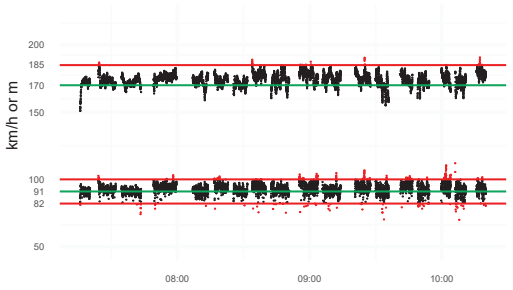
HEIGHT AGL
Average: 92 m (301.7 ft)
Standard dev.: 3.9 m (12.9 ft)

KES2022_ V5LJB20221007A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



SPEED
Average: 174.1 km/h
Standard dev.: 4.6 km/h

HEIGHT AGL
Average: 92.8 m (304.3 ft)
Standard dev.: 3.6 m (11.7 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

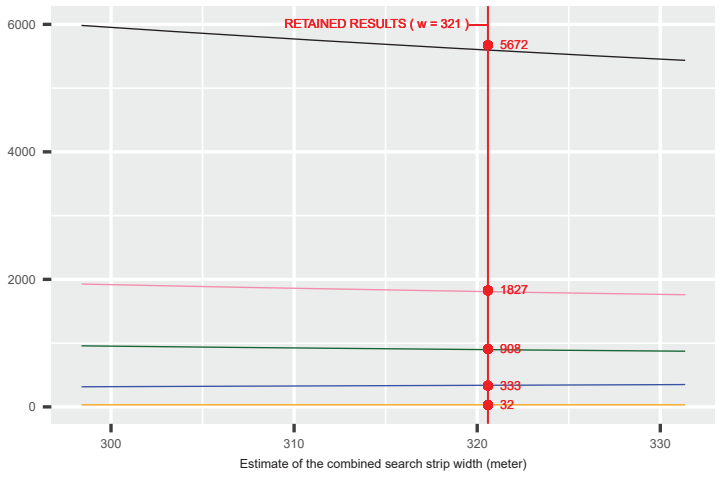
Range of search strip width estimates (m):

C01 – Left: [159 – 191]
C01 – Right: [120 – 161]

C02 – Left: [156 – 178]
C02 – Right: [135 – 187]

C04 – Left: [154 – 154]
C04 – Right: [155 – 155]

LIVE ELEPHANT ESTIMATE: [5983 – 5435]
CONFIDENCE INTERVAL: ± [1927 – 1759]
SAMPLE AREA: [315 – 350] sqkm
SE: [958 – 874]
PRP: [32 – 32] %



14HBW – NG14 high Botswana — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: 14HBW **N:** 136, 147, 129 S_a^2: 2,903
STRATUM NAME: NG14 high Botswana **w:** 321 ***df*:** 53

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	1	0	4	8	0,003	16	3,96	0	12	206	0,019	-0,021
buffalo	Syncerus caffer	716	200	2784	2878	2,122	1981794	1407,76	0	5663	103	2390,573	-23,836
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	12	0	49	101	0,037	2310	48,06	0	150	208	2,667	-0,512
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	6	1	23	33	0,018	247	15,71	0	56	141	0,327	0,263
elephant bulls	Loxodonta africana males	106	93	417	175	0,318	7572	87,02	242	592	42	8,150	-1,084
elephant family	Loxodonta africana family	1333	1639	5255	1779	4,004	782063	884,34	3475	7034	34	826,824	-9,967
elephant carcass one	Loxodonta africana carcass one	1	1	4	8	0,003	14	3,79	0	12	205	0,019	-0,009
elephant carcass two	Loxodonta africana carcass two	3	0	12	14	0,009	45	6,68	0	25	116	0,053	-0,063
elephant carcass three	Loxodonta africana carcass three	12	0	47	27	0,036	181	13,46	20	75	58	0,214	-0,152
elephant carcass four	Loxodonta africana carcass four	29	7	114	46	0,087	520	22,79	68	160	40	0,668	0,204
giraffe	Giraffa giraffa	66	15	259	140	0,197	4830	69,50	119	399	54	6,365	1,275
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	66	1	259	164	0,197	6636	81,46	95	422	63	8,403	0,428
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	193	19	753	417	0,574	42635	206,48	336	1171	55	57,645	2,150
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	35	5	139	106	0,106	2761	52,55	33	245	77	3,289	-0,125
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	13	4	51	50	0,039	612	24,74	0	101	99	0,790	0,146
puku	Kobus vardonii	19	0	77	138	0,059	4306	65,62	0	216	180	5,402	0,443
red lechwe	Kobus leche	840	0	3351	2942	2,553	1976816	1405,99	409	6294	88	2532,289	15,547
reedbuck	Redunca arundinum	4	0	15	33	0,012	242	15,57	0	48	213	0,296	-0,153
roan	Hippotragus equinus	22	5	86	62	0,065	929	30,49	23	148	73	1,227	0,215
sable	Hippotragus niger	164	40	640	356	0,487	30698	175,21	283	996	56	37,961	-1,102
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	59	1	232	194	0,177	9296	96,42	38	426	84	11,520	-0,271
warthog	Phacochoerus africanus	20	10	78	60	0,060	877	29,61	19	138	76	1,143	0,592
waterbuck	Kobus ellipsiprymnus	26	0	105	180	0,080	7240	85,09	0	285	170	9,047	0,373
wildebeest	Connochaetes taurinus	77	24	304	202	0,232	9926	99,63	103	506	66	11,910	-0,392
zebra	Equus spp,	466	41	1839	774	1,401	148234	385,01	1064	2613	42	168,011	-2,846
all elephants	Loxodonta africana all	1439	1732	5672	1827	4,322	824069	907,78	3845	7499	32	855,402	-11,051
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	4	1	16	15	0,012	59	7,68	0	31	99	0,070	-0,072
all elephant carcasses	Loxodonta africana carcass all	45	8	177	53	0,135	702	26,49	124	230	30	0,821	-0,019
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	41	7	161	53	0,123	690	26,26	108	214	33	0,828	0,053

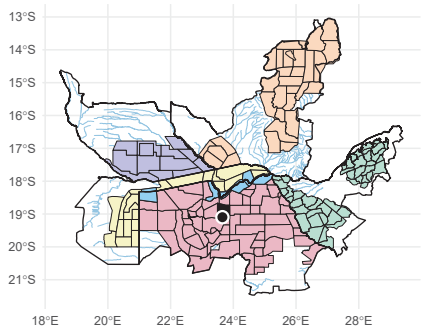
1819 – NG 18 NG 19 BOTSWANA – NORTHERN BOTSWANA

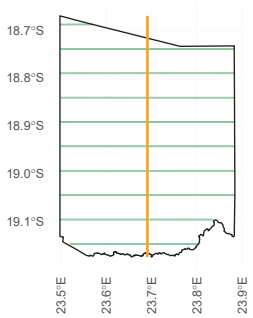
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: 1819
STRATUM NAME: NG 18 NG 19
■ STRATUM AREA: 1986.06 sqkm
• SURVEY BASE: Khwai
DISTANCE TO SURVEY BASE: 23 km

– TRANSECTS: 10 (358 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 5.4 %

– BASELINE DISTANCE: 55.73 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.8 h
Crew(s): C03
KES2022_V5WOT20220926A 06:42–10:32

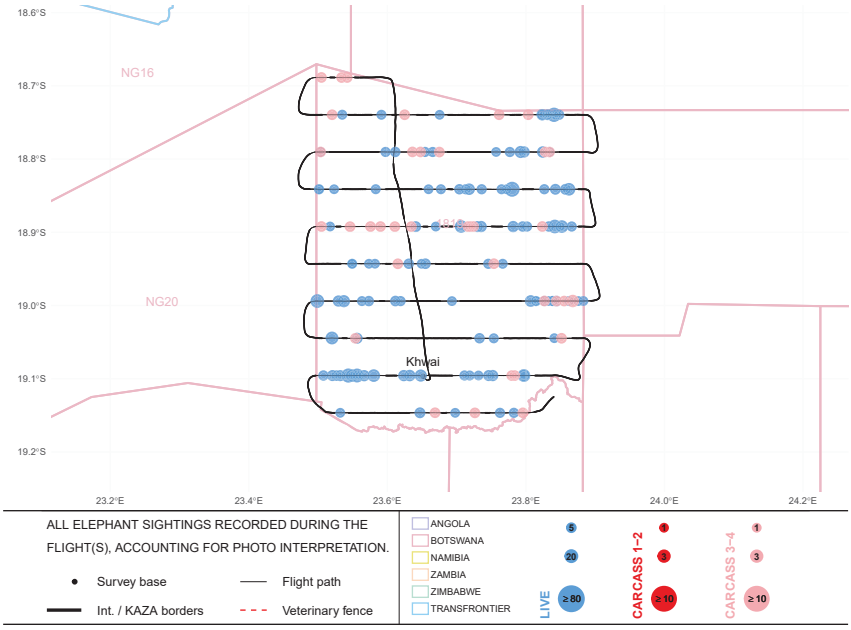
Actual sampling intensity: 5.7 %
Transect flying time: 2.1 h
Transects: 10 – 358 km – 90°
Search effort: 1.11 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C03	
Side:	L	R
% sightings:	55	45
% individuals:	58	42

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	152	0	
Live elephant (>9):	4	0	
Elephant carcass:	31	0	
Live elephant (<10):	55	0	



LIVE ELEPHANTS

IN SAMPLE:	**246 (59)**
Bulls:	88 (39)
Family:	158 (20)
NOT IN SAMPLE:	**372 (67)**
Outside search strip:	372
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**31 (31)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	17 (17)
Category 4:	14 (14)
NOT IN SAMPLE:	**6 (5)**
Outside search strip:	6
Off transect:	0

OTHER SPECIES

Other wildlife species:	15
Other wildlife count:	244
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.262, N = 177, w = 314

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	4351	4351	548	548
Variance of estimate	$Var\hat{Y}$	1682535	1682535	20411	20411
Standard error	$SE\hat{Y}$	1297	1297	143	143
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 2934	± 2934	± 323	± 323
Percentage of relative precision	$PRP\hat{Y}$	67 %	67 %	59 %	59 %
Density per sqkm	$R\hat{Y}$	2.191	2.191	0.276	0.276
Variance between transect counts	s^2_y	631.822	631.822	6.322	6.322
Variance between transect areas	s^2_a	10.044	10.044	10.044	10.044
Covariance between counts & areas	s_{ay}	26.221	26.221	0.42	0.42

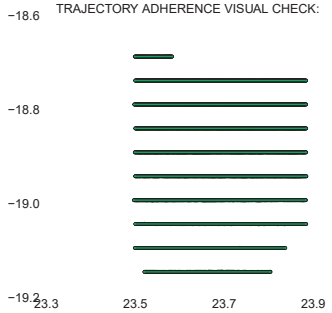
CARCASS RATIOS

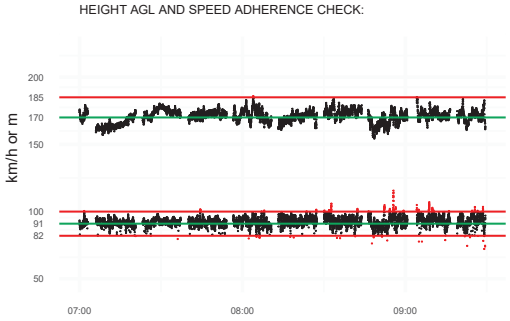
$CR_{1:4}$ = 11.2 %
$CR_{1:2}$ = 0 %

1819 – NG 18 NG 19 BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20220926A





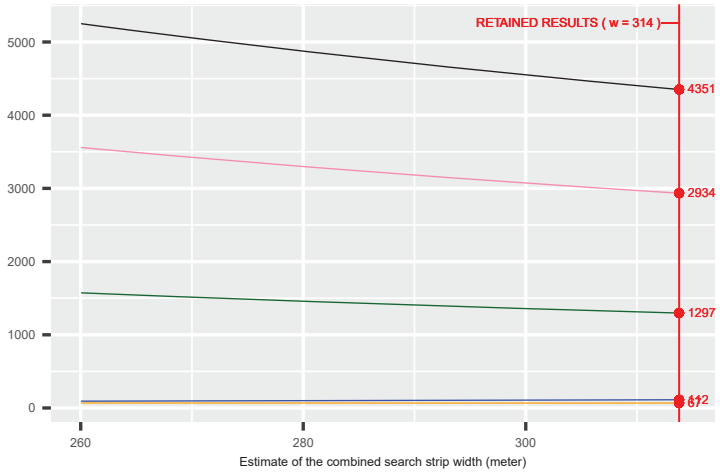
SPEED
Average: 170.8 km/h
Standard dev.: 4.7 km/h

HEIGHT AGL
Average: 92.3 m (303 ft)
Standard dev.: 3.5 m (11.4 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C03 – Left: [103 – 157]
C03 – Right: [145 – 174]



LIVE ELEPHANT ESTIMATE: [5250 – 4351]
CONFIDENCE INTERVAL: ± [3559 – 2934]
SAMPLE AREA: [93 – 112] sqkm
SE: [1573 – 1297]
PRP: [68 – 67] %

1819 – NG 18 NG 19 BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: 1819 **N:** 178 S_a^2: 10,044
STRATUM NAME: NG 18 NG 19 **w:** 314 ***df***: 9

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	88	15	1556	2258	0,784	996086	998,04	0	3814	145	351,067	14,459
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	4	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	88	107	1556	557	0,784	60667	246,31	999	2114	36	31,511	11,039
elephant family	Loxodonta africana family	158	265	2795	2643	1,407	1364900	1168,29	152	5437	95	481,289	15,181
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	17	1	301	292	0,151	16610	128,88	9	592	97	5,789	1,453
elephant carcass four	Loxodonta africana carcass four	14	5	248	143	0,125	4010	63,33	104	391	58	0,933	-1,033
giraffe	Giraffa giraffa	8	5	141	231	0,071	10424	102,10	0	372	163	3,511	0,427
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	24	2	424	915	0,214	163622	404,50	0	1340	216	52,489	-4,704
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	23	0	407	673	0,205	88531	297,54	0	1080	165	28,011	-3,183
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	2	0	35	77	0,018	1163	34,11	0	113	218	0,400	0,351
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	45	0	796	1795	0,401	629713	793,54	0	2591	226	202,500	-9,232
reedbuck	Redunca arundinum	4	0	71	160	0,036	4976	70,54	0	230	226	1,600	-0,821
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	6	0	106	153	0,053	4599	67,82	0	260	145	1,600	0,785
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	4	0	71	117	0,036	2680	51,77	0	188	166	0,933	0,644
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	11	0	195	439	0,098	37627	193,98	0	633	226	12,100	-2,257
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	25	18	442	502	0,223	49302	222,04	0	944	114	16,500	0,983
all elephants	Loxodonta africana all	246	372	4351	2934	2,191	1682535	1297,13	1417	7285	67	631,822	26,221
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	31	6	548	323	0,276	20411	142,87	225	871	59	6,322	0,420
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	31	6	548	323	0,276	20411	142,87	225	871	59	6,322	0,420

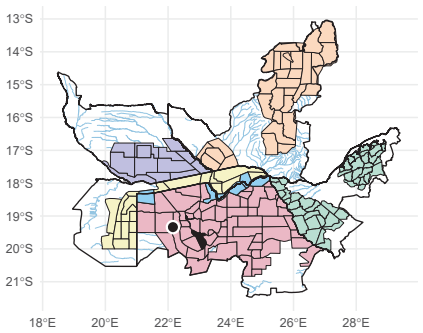
2730 – NG 27 NG 30 BOTSWANA – NORTHERN BOTSWANA

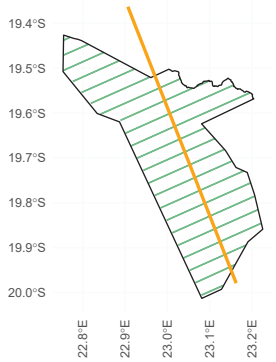
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: 2730
STRATUM NAME: NG 27 NG 30
■ STRATUM AREA: 1346.18 sqkm
• SURVEY BASE: Gumare
DISTANCE TO SURVEY BASE: 101 km

– TRANSECTS: 22 (404 km)
TRANSECT ORIENTATION: 67.4°
PLANNED SAMPLING INTENSITY: 9 %

– BASELINE DISTANCE: 73.3 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 4.5 h
Crew(s): C01
KES2022_V5IIM20220922A 06:41–11:11

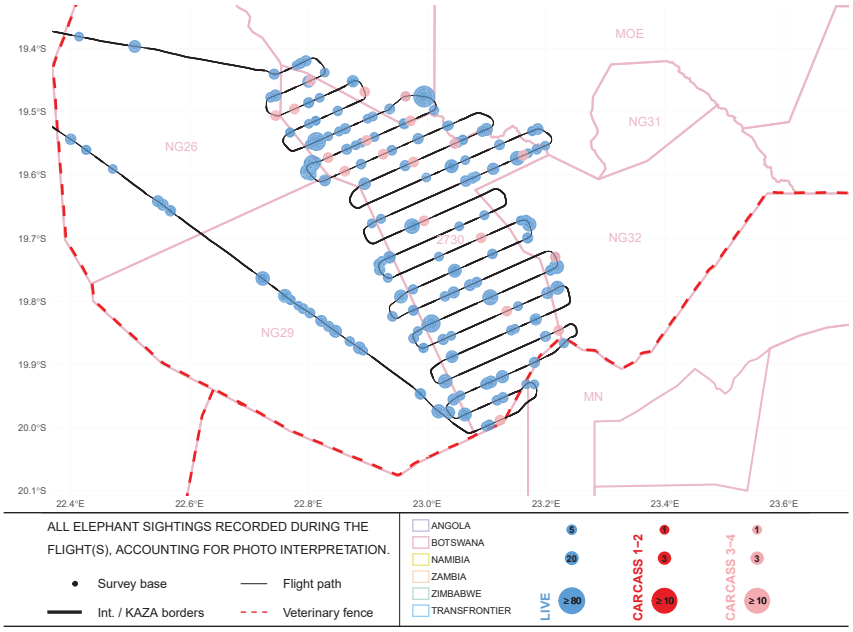
Actual sampling intensity: 9.6 %
Transect flying time: 2.4 h
Transects: 22 – 404 km – 67.4°
Search effort: 1.1 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	45	55
% individuals:	51	49

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	220	25.91	31.58
Live elephant (>9):	10	90	44.44
Elephant carcass:	15	53.33	0
Live elephant (<10):	34	41.18	14.29



LIVE ELEPHANTS

IN SAMPLE:	**282 (44)**
Bulls:	56 (24)
Family:	226 (20)
NOT IN SAMPLE:	**1133 (156)**
Outside search strip:	350
Off transect:	783

ELEPHANT CARCASSES

IN SAMPLE:	**15 (15)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	2 (2)
Category 4:	13 (13)
NOT IN SAMPLE:	**4 (4)**
Outside search strip:	0
Off transect:	4

OTHER SPECIES

Other wildlife species:	20
Other wildlife count:	3186
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.08, N = 228, w = 321

		LIVE OBS	LIVE FINAL	ALL CARCASSES OBS	ALL CARCASSES FINAL
Population estimate	$\hat{Y}$	2774	2930	156	156
Variance of estimate	$Var\hat{Y}$	403262	465130	1493	1493
Standard error	$SE\hat{Y}$	635	682	39	39
95% confidence interval	$CI_{\hat{Y}}^{95\%}$	± 1321	± 1418	± 80	± 80
Percentage of relative precision	$PRP\hat{Y}$	48 %	48 %	52 %	52 %
Density per sqkm	$R\hat{Y}$	2.06	2.176	0.116	0.116
Variance between transect counts	s_y^2	233.457	268.727	0.703	0.703
Variance between transect areas	s_a^2	5.721	5.721	5.721	5.721
Covariance between counts & areas	s_{ay}	16.936	18.158	0.365	0.365

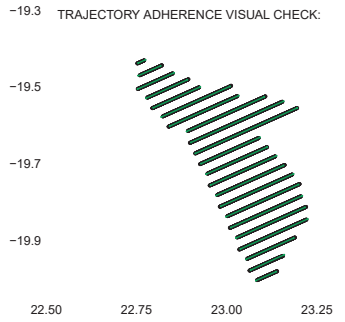
CARCASS RATIOS

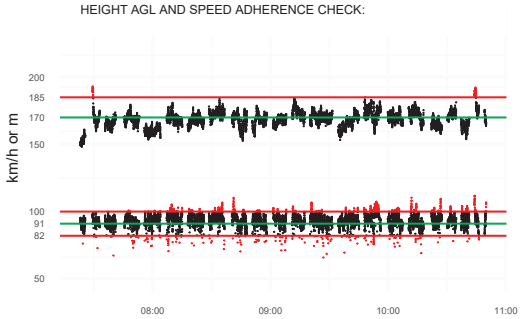
$CR_{1:4} = 5.1$ %
$CR_{1:2} = 0$ %

2730 – NG 27 NG 30 BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20220922A





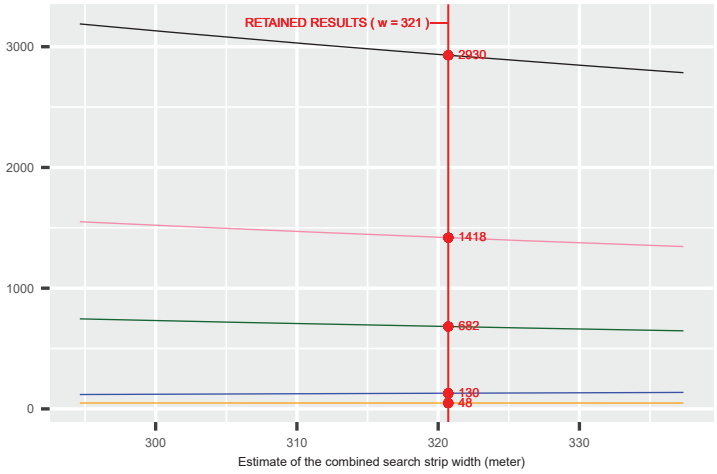
SPEED
Average: 168.5 km/h
Standard dev.: 5.9 km/h

HEIGHT AGL
Average: 93 m (305.2 ft)
Standard dev.: 4.7 m (15.5 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C01 – Left: [161 – 193]
C01 – Right: [121 – 163]



LIVE ELEPHANT ESTIMATE: [3189 – 2785]
CONFIDENCE INTERVAL: ± [1551 – 1345]
SAMPLE AREA: [119 – 136] sqkm
SE: [746 – 647]
PRP: [49 – 48] %

2730 – NG 27 NG 30 BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: 2730 **N:** 229 S_a^2: 5,721
STRATUM NAME: NG 27 NG 30 **w:** 321 ***df***: 21

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	35	0	364	464	0,270	49738	223,02	0	827	128	23,682	1,698
buffalo	Syncerus caffer	78	768	810	708	0,602	115789	340,28	103	1518	87	62,926	9,164
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	56	142	582	532	0,432	65429	255,79	50	1114	91	31,879	2,837
elephant family	Loxodonta africana family	226	991	2348	1353	1,744	423540	650,80	994	3701	58	233,446	15,321
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	2	0	21	29	0,015	193	13,90	0	50	139	0,087	-0,067
elephant carcass four	Loxodonta africana carcass four	13	4	135	75	0,100	1298	36,03	60	210	55	0,634	0,432
giraffe	Giraffa giraffa	20	19	208	155	0,154	5525	74,33	53	362	74	2,658	0,709
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	42	4	436	304	0,324	21394	146,27	132	740	70	11,801	3,749
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	1266	160	13152	4695	9,770	5097089	2257,67	8457	17847	36	2518,450	35,252
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	7	0	73	72	0,054	1200	34,65	1	145	99	0,608	0,606
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	1	1	10	20	0,008	91	9,55	0	30	191	0,045	0,212
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	1189	125	12352	7484	9,175	12950187	3598,64	4868	19836	61	6128,998	31,321
reedbuck	Redunca arundinum	17	0	177	117	0,131	3169	56,29	60	294	66	1,613	0,893
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	59	34	613	775	0,455	138925	372,73	0	1388	126	65,370	1,983
warthog	Phacochoerus africanus	81	4	841	344	0,625	27387	165,49	497	1186	41	16,608	4,862
waterbuck	Kobus ellipsiprymnus	5	0	52	102	0,039	2413	49,12	0	154	197	1,136	0,261
wildebeest	Connochaetes taurinus	82	80	852	677	0,633	106042	325,64	175	1529	79	54,398	5,740
zebra	Equus spp,	276	243	2867	1634	2,130	617702	785,94	1233	4502	57	396,831	31,664
all elephants	Loxodonta africana all	282	1133	2930	1418	2,176	465130	682,00	1511	4348	48	268,727	18,158
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	15	4	156	80	0,116	1493	38,64	75	236	52	0,703	0,365
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	15	4	156	80	0,116	1493	38,64	75	236	52	0,703	0,365

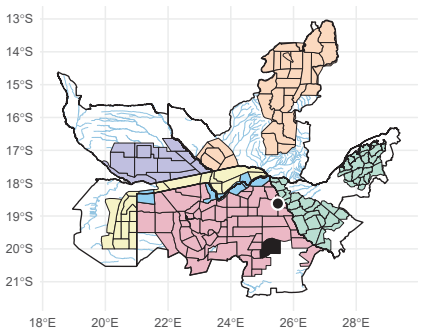
C4&7 – CT 4 and 7 BOTSWANA – NORTHERN BOTSWANA

SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: C4&7
STRATUM NAME: CT 4 and 7
■ STRATUM AREA: 3083.65 sqkm
• SURVEY BASE: Pandamatenga
DISTANCE TO SURVEY BASE: 146 km

– TRANSECTS: 7 (317 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 3.1 %

– BASELINE DISTANCE: 66.17 km



SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.7 h
Crew(s): C01
KES2022_V5IIM20220915A 06:19–10:00

Actual sampling intensity: 3.3 %
Transect flying time: 1.9 h
Transects: 7 – 317 km – 0°
Search effort: 1.11 min/sqkm

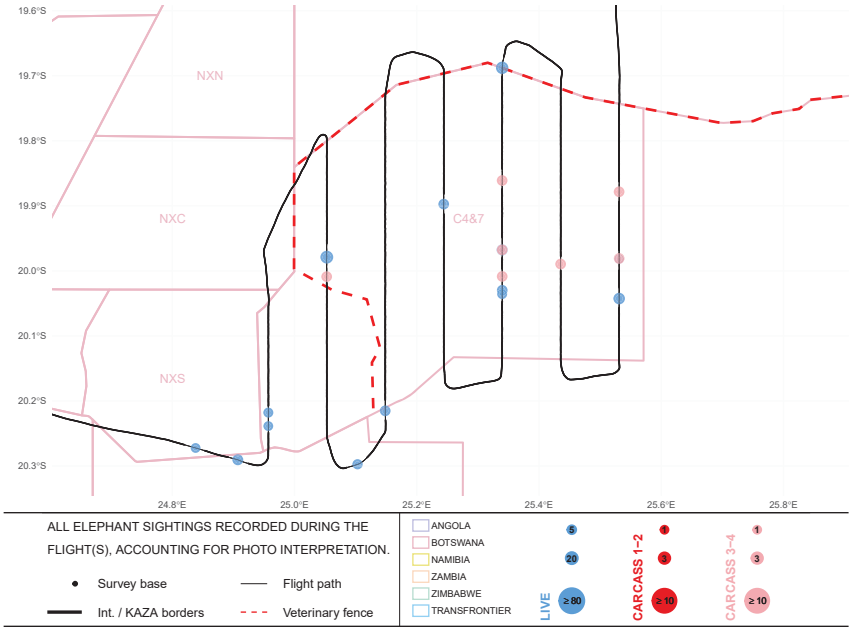
OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	48	52
% individuals:	51	49

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	20	15	33.33
Live elephant (>9):	0		
Elephant carcass:	4	50	50
Live elephant (<10):	8	0	

Undetected live elephant: 2
Undetected elephant carcass: 1



LIVE ELEPHANTS

IN SAMPLE:	**51 (10)**
Bulls:	10 (4)
Family:	41 (6)
NOT IN SAMPLE:	**39 (12)**
Outside search strip:	14
Off transect:	25

ELEPHANT CARCASSES

IN SAMPLE:	**5 (5)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	4 (4)
Category 4:	1 (1)
NOT IN SAMPLE:	**2 (2)**
Outside search strip:	2
Off transect:	0

OTHER SPECIES

Other wildlife species:	4
Other wildlife count:	16
Domestic count:	132

ELEPHANT DATA ANALYSIS

t = 2.447, N = 206, w = 321

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	1002	1548	121	152
Variance of estimate	$Var\hat{Y}$	157275	462622	1631	3173
Standard error	$SE\hat{Y}$	397	680	40	56
95% confidence interval	$CI_{\hat{Y}}^{95\%}$	± 970	± 1664	± 99	± 138
Percentage of relative precision	$PRP\hat{Y}$	97 %	108 %	81 %	91 %
Density per sqkm	$R\hat{Y}$	0.325	0.502	0.039	0.049
Variance between transect counts	s_y^2	26.571	83.571	0.286	0.571
Variance between transect areas	s_a^2	9.76	9.76	9.76	9.76
Covariance between counts & areas	s_{ay}	1.262	7.227	0.295	0.557

CARCASS RATIOS

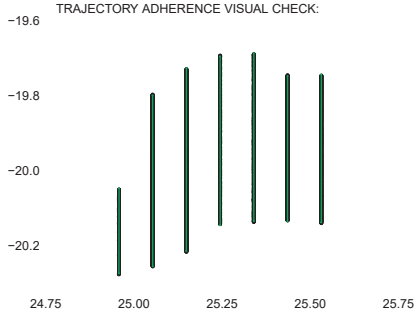
$CR_{1:4}$ = 8.9 %
$CR_{1:2}$ = 0 %

C4&7 – CT 4 and 7 BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20220915A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:

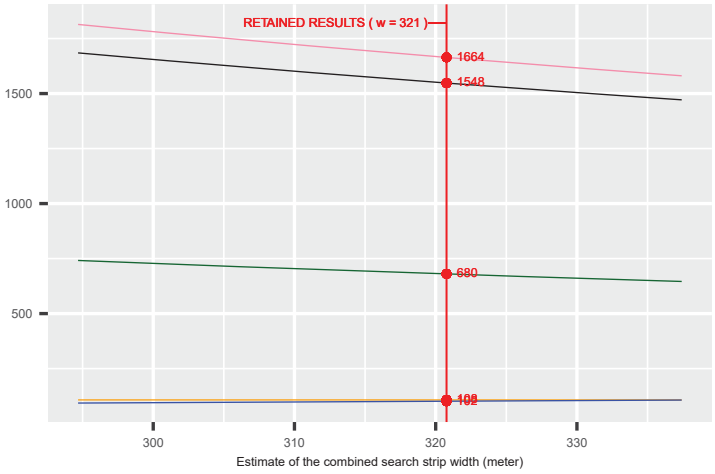
SPEED
Average: 167.9 km/h
Standard dev.: 6.2 km/h

HEIGHT AGL
Average: 93.1 m (305.3 ft)
Standard dev.: 3.9 m (12.8 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C01 – Left: [161 – 193]
C01 – Right: [121 – 163]



LIVE ELEPHANT ESTIMATE: [1685 – 1471]
CONFIDENCE INTERVAL: ± [1814 – 1581]
SAMPLE AREA: [93 – 107] sqkm
SE: [741 – 646]
PRP: [108 – 107] %

C4&7 – CT 4 and 7 BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: C4&7 **N:** 206 S_a^2: 9,760
STRATUM NAME: CT 4 and 7 **w:** 321 ***df*:** 6

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	120	5	3642	4155	1,181	2883057	1697,96	0	7797	114	537,476	25,469
donkey	Equus asinus	3	0	91	215	0,030	7723	87,88	0	306	236	1,286	-0,353
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	10	26	303	378	0,098	23881	154,54	0	682	125	3,952	-0,100
elephant family	Loxodonta africana family	41	13	1244	1658	0,404	458964	677,47	0	2902	133	82,476	7,326
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	4	1	121	147	0,039	3596	59,97	0	268	121	0,619	0,277
elephant carcass four	Loxodonta africana carcass four	1	1	30	70	0,010	812	28,50	0	100	230	0,143	0,280
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	1	0	30	72	0,010	858	29,29	0	102	236	0,143	-0,118
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	1	0	30	72	0,010	859	29,32	0	102	236	0,143	-0,130
ostrich	Struthio camelus	12	0	364	861	0,118	123766	351,80	0	1225	236	20,571	-1,556
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	8	0	243	559	0,079	52108	228,27	0	801	230	9,143	2,098
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	2	0	61	140	0,020	3257	57,07	0	200	230	0,571	0,524
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	51	39	1548	1664	0,502	462622	680,16	0	3212	108	83,571	7,227
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	5	2	152	138	0,049	3173	56,33	14	290	91	0,571	0,557
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	5	2	152	138	0,049	3173	56,33	14	290	91	0,571	0,557

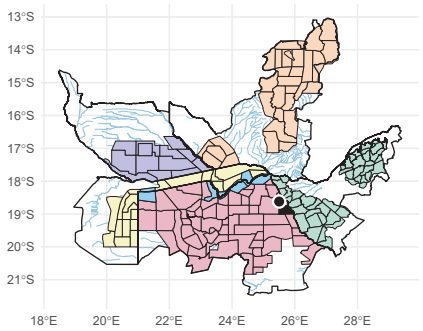
CH13 – CH 13 BOTSWANA – NORTHERN BOTSWANA

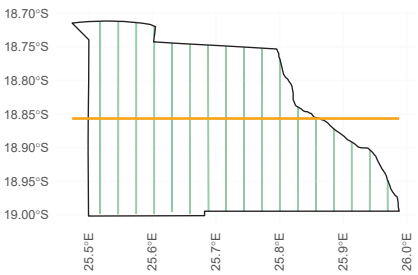
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: CH13
STRATUM NAME: CH 13
■ STRATUM AREA: 1177.1 sqkm
• SURVEY BASE: Pandamatenga
DISTANCE TO SURVEY BASE: 32 km

– TRANSECTS: 17 (401 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 10.2 %

– BASELINE DISTANCE: 54.15 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 4.5 h
Crew(s): C01
KES2022_V5IIM20220911A 06:00–10:32

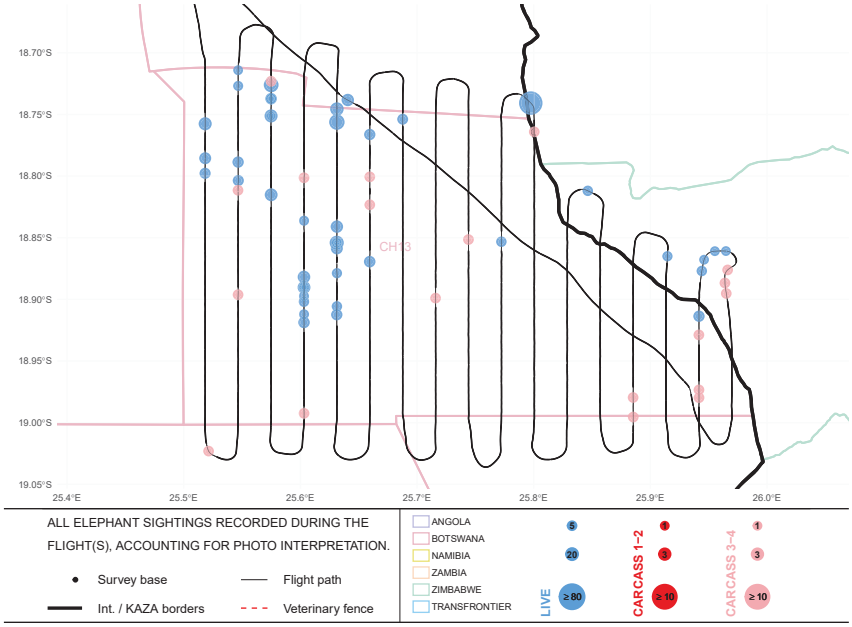
Actual sampling intensity: 10.8 %
Transect flying time: 2.3 h
Transects: 17 – 401 km – 0°
Search effort: 1.11 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	33	67
% individuals:	43	57

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	55	23.64	15.38
Live elephant (>9):	5	100	40
Elephant carcass:	11	27.27	0
Live elephant (<10):	13	30.77	0



LIVE ELEPHANTS

IN SAMPLE:	**130 (18)**
Bulls:	26 (9)
Family:	104 (9)
NOT IN SAMPLE:	**290 (33)**
Outside search strip:	199
Off transect:	91

ELEPHANT CARCASSES

IN SAMPLE:	**11 (11)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	6 (6)
Category 4:	5 (5)
NOT IN SAMPLE:	**8 (8)**
Outside search strip:	4
Off transect:	4

OTHER SPECIES

Other wildlife species:	11
Other wildlife count:	46
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.12, N = 170, w = 317

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	1167	1204	102	102
Variance of estimate	$\mathrm{Var}\hat{Y}$	366122	408845	858	858
Standard error	$\mathrm{SE}\hat{Y}$	605	639	29	29
95% confidence interval	$\mathrm{CI}_{\hat{Y}}^{95\%}$	± 1283	± 1355	± 62	± 62
Percentage of relative precision	$\mathrm{PRP}_{\hat{Y}}$	110 %	113 %	61 %	61 %
Density per sqkm	$R_{\hat{Y}}$	0.992	1.023	0.087	0.087
Variance between transect counts	s_y^2	254.632	283.368	0.618	0.618
Variance between transect areas	s_a^2	7.222	7.222	7.222	7.222
Covariance between counts & areas	s_{ay}	12.568	12.944	0.674	0.674

CARCASS RATIOS

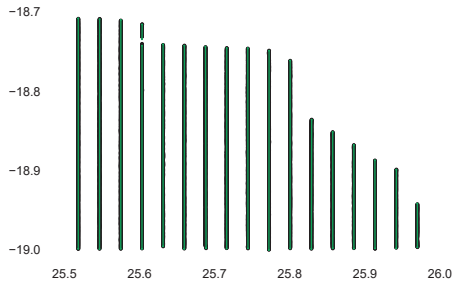
$CR_{1:4} = 7.8\ \%$
$CR_{1:2} = 0\ \%$

CH13 – CH 13 BOTSWANA – NORTHERN BOTSWANA

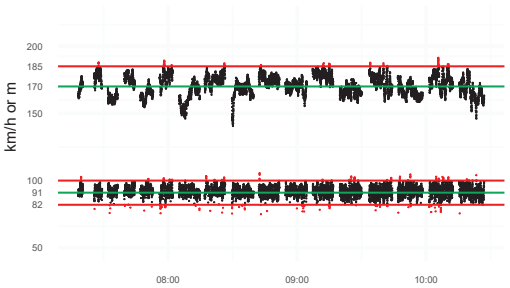
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20220911A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



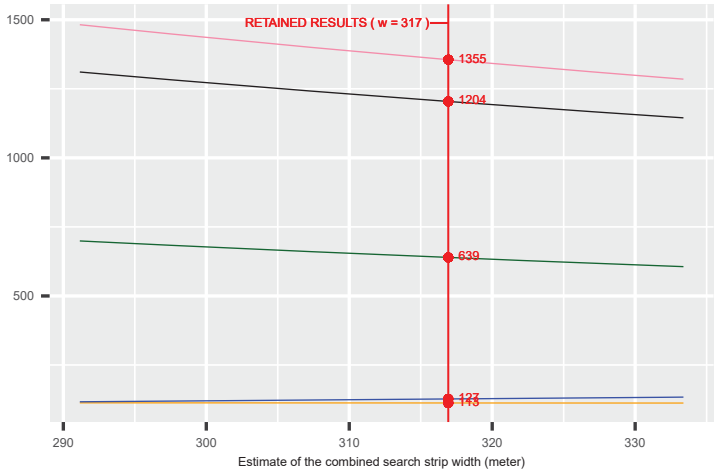
SPEED
Average: 170.5 km/h
Standard dev.: 7.4 km/h

HEIGHT AGL
Average: 92 m (301.7 ft)
Standard dev.: 3.7 m (12.1 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C01 – Left: [159 – 191]
C01 – Right: [120 – 161]



LIVE ELEPHANT ESTIMATE: [1311 – 1145]
CONFIDENCE INTERVAL: ± [1482 – 1285]
SAMPLE AREA: [117 – 134] sqkm
SE: [699 – 606]
PRP: [113 – 112] %

CH13 – CH 13 BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: CH13 **N:** 171 S_a^2: 7,222
STRATUM NAME: CH 13 **w:** 317 ***df*:** 16

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	10	10	93	199	0,079	8839	94,02	0	292	215	5,882	1,334
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	1	30	9	20	0,008	89	9,45	0	29	216	0,059	0,094
elephant bulls	Loxodonta africana males	26	53	241	210	0,205	9818	99,09	31	451	87	6,140	0,224
elephant family	Loxodonta africana family	104	237	963	1249	0,818	346902	588,98	0	2212	130	240,360	12,720
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	6	6	56	59	0,047	762	27,61	0	114	105	0,493	0,167
elephant carcass four	Loxodonta africana carcass four	5	2	46	47	0,039	490	22,13	0	93	101	0,346	0,507
giraffe	Giraffa giraffa	8	0	74	86	0,063	1653	40,66	0	160	116	1,140	0,785
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	5	5	46	101	0,039	2258	47,52	0	147	217	1,471	0,269
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	5	0	46	99	0,039	2187	46,77	0	145	214	1,471	0,852
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	15	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	1	0	9	20	0,008	88	9,36	0	29	214	0,059	0,169
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	15	0	139	301	0,118	20104	141,79	0	440	216	13,235	1,409
all elephants	Loxodonta africana all	130	290	1204	1355	1,023	408845	639,41	0	2560	113	283,368	12,944
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	11	8	102	62	0,087	858	29,29	40	164	61	0,618	0,674
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	11	8	102	62	0,087	858	29,29	40	164	61	0,618	0,674

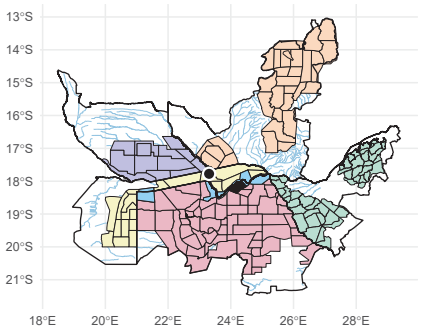
CH1BW – CH1 Botswana — BOTSWANA – NORTHERN BOTSWANA

SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: CH1BW
STRATUM NAME: CH1 Botswana
■ STRATUM AREA: 1305.3 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 107 km

– TRANSECTS: 17 (431 km)
TRANSECT ORIENTATION: 136°
PLANNED SAMPLING INTENSITY: 9.9 %

– BASELINE DISTANCE: 53.96 km



SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 4.9 h
Crew(s): C01
KES2022_V5IIM20221004A 06:26–11:20

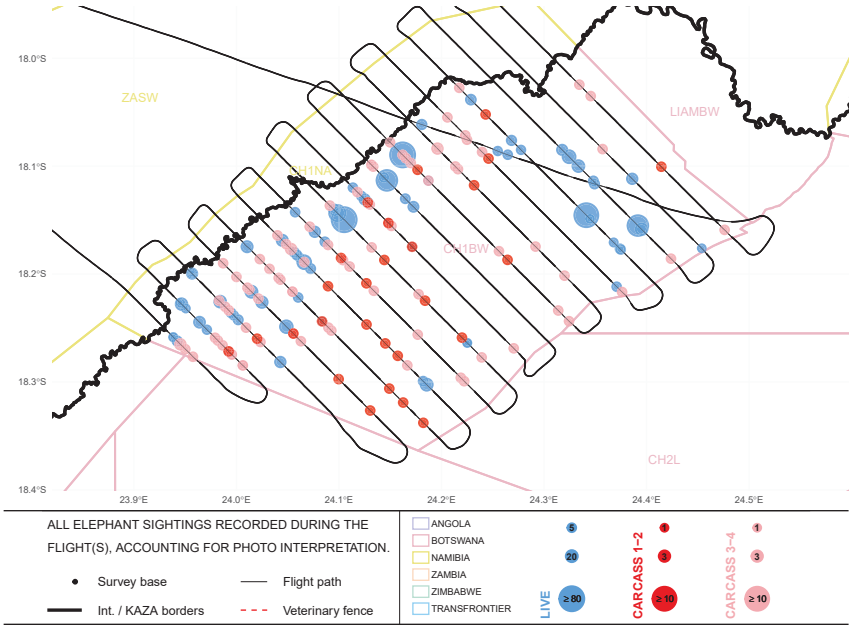
Actual sampling intensity: 10.6 %
Transect flying time: 2.5 h
Transects: 17 – 431 km – 136°
Search effort: 1.11 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	39	61
% individuals:	39	61

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	205	47.8	14.29
Live elephant (>9):	9	77.78	14.29
Elephant carcass:	101	66.34	0
Live elephant (<10):	37	27.03	40



LIVE ELEPHANTS

IN SAMPLE:	**348 (46)**
Bulls:	28 (11)
Family:	320 (35)
NOT IN SAMPLE:	**743 (34)**
Outside search strip:	719
Off transect:	24

ELEPHANT CARCASSES

IN SAMPLE:	**104 (101)**
Category 1:	15 (15)
Category 2:	9 (9)
Category 3:	60 (57)
Category 4:	20 (20)
NOT IN SAMPLE:	**7 (7)**
Outside search strip:	6
Off transect:	1

OTHER SPECIES

Other wildlife species:	17
Other wildlife count:	647
Domestic count:	484

ELEPHANT DATA ANALYSIS

t = 2.12, N = 168, w = 320

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	3230	3296	985	985
Variance of estimate	$Var\hat{Y}$	466616	461393	17765	17765
Standard error	$SE\hat{Y}$	683	679	133	133
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 1448	± 1440	± 283	± 283
Percentage of relative precision	$PRP\hat{Y}$	45 %	44 %	29 %	29 %
Density per sqkm	$R\hat{Y}$	2.474	2.525	0.755	0.755
Variance between transect counts	s^2_y	297.309	296.015	10.735	10.735
Variance between transect areas	s^2_a	4.393	4.393	4.393	4.393
Covariance between counts & areas	s_{ay}	2.771	3.368	0.938	0.938

CARCASS RATIOS

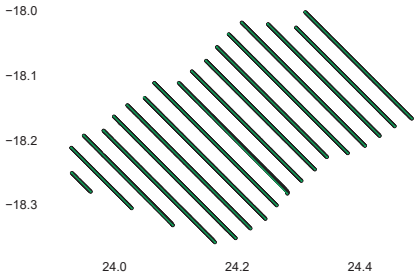
$CR_{1:4} = 23\ \%$
$CR_{1:2} = 6.5\ \%$

CH1BW – CH1 Botswana — BOTSWANA – NORTHERN BOTSWANA

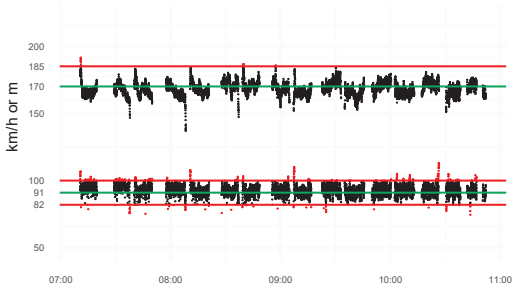
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20221004A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



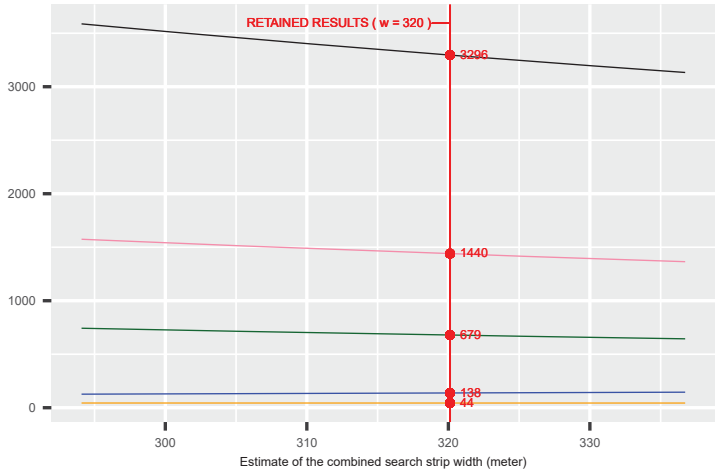
SPEED
Average: 168.3 km/h
Standard dev.: 5.1 km/h

HEIGHT AGL
Average: 92.9 m (304.8 ft)
Standard dev.: 3.8 m (12.6 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C01 – Left: [161 – 193]
C01 – Right: [121 – 162]



LIVE ELEPHANT ESTIMATE: [3588 – 3133]
CONFIDENCE INTERVAL: ± [1575 – 1365]
SAMPLE AREA: [127 – 145] sqkm
SE: [743 – 644]
PRP: [44 – 44] %

CH1BW – CH1 Botswana — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: CH1BW **N:** 194 S_a^2: 4,393
STRATUM NAME: CH1 Botswana **w:** 320 ***df*:** 16

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	145	86	1373	2026	1,052	913251	955,64	0	3399	148	540,515	-29,612
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	484	154	4584	4541	3,512	4588769	2142,14	43	9125	99	2922,390	-10,941
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	4	0	38	61	0,029	830	28,82	0	99	161	0,566	0,298
elephant bulls		28	30	265	195	0,203	8424	91,78	71	460	73	5,118	-0,754
elephant family	Loxodonta africana family	320	713	3031	1426	2,322	452649	672,79	1604	4457	47	296,654	4,122
elephant carcass one	Loxodonta africana carcass one	15	1	142	72	0,109	1146	33,86	70	214	51	0,860	0,687
elephant carcass two	Loxodonta africana carcass two	9	2	85	56	0,065	710	26,64	29	142	66	0,515	0,468
elephant carcass three	Loxodonta africana carcass three	60	3	568	191	0,435	8124	90,14	377	759	34	4,015	-0,642
elephant carcass four	Loxodonta africana carcass four	20	1	189	92	0,145	1877	43,32	98	281	48	1,279	0,425
giraffe	Giraffa giraffa	11	1	104	127	0,080	3594	59,95	0	231	122	2,493	0,810
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	8	0	76	164	0,058	5978	77,32	0	240	216	3,765	-1,710
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	35	0	331	384	0,254	32867	181,29	0	716	116	23,059	2,898
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	11	11	104	133	0,080	3944	62,81	0	237	128	2,618	0,131
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	19	0	180	362	0,138	29194	170,86	0	542	201	18,985	-1,295
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	32	0	303	358	0,232	28532	168,91	0	661	118	19,860	2,394
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	2	0	19	40	0,015	349	18,68	0	59	209	0,235	0,138
warthog	Phacochoerus africanus	17	0	161	131	0,123	3805	61,69	30	292	81	2,625	0,647
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	36	0	341	519	0,261	59858	244,66	0	860	152	40,235	1,350
zebra	Equus spp,	276	26	2614	2765	2,003	1701421	1304,39	0	5379	106	1193,066	19,609
all elephants	Loxodonta africana all	348	743	3296	1440	2,525	461393	679,26	1856	4736	44	296,015	3,368
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	24	3	227	96	0,174	2049	45,26	131	323	42	1,632	1,155
all elephant carcasses	Loxodonta africana carcass all	104	7	985	283	0,755	17765	133,29	702	1268	29	10,735	0,938
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	80	4	758	224	0,580	11200	105,83	533	982	30	5,721	-0,217

CH2H – CH 2 high

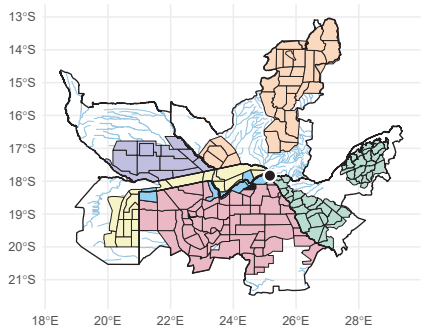
BOTSWANA – NORTHERN BOTSWANA

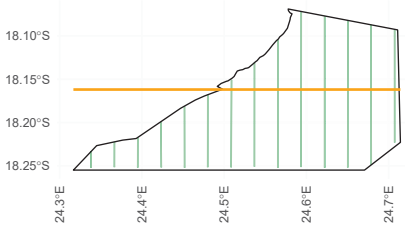
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: CH2H
STRATUM NAME: CH 2 high
■ STRATUM AREA: 493.69 sqkm
• SURVEY BASE: Kasane
DISTANCE TO SURVEY BASE: 70 km

– TRANSECTS: 14 (166 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 10.1 %

– BASELINE DISTANCE: 42.07 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.9 h
Crew(s): C01
KES2022_V5IIM20221001A 07:21–11:16

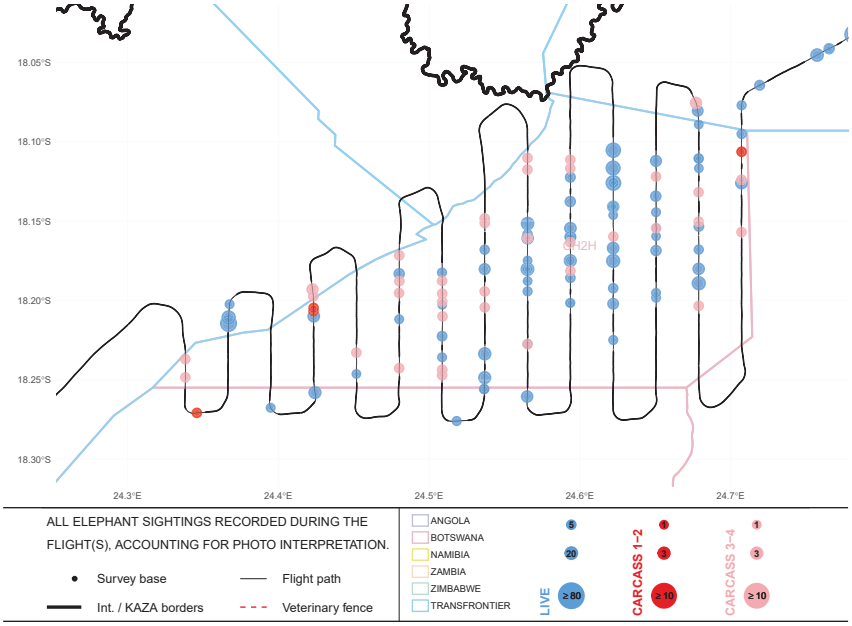
Actual sampling intensity: 10.8 %
Transect flying time: 1 h
Transects: 14 – 166 km – 0°
Search effort: 1.11 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	39	61
% individuals:	37	63

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	102	12.75	15.38
Live elephant (>9):	9	33.33	33.33
Elephant carcass:	37	10.81	0
Live elephant (<10):	26	23.08	16.67



LIVE ELEPHANTS

IN SAMPLE:	**225 (35)**
Bulls:	40 (14)
Family:	185 (21)
NOT IN SAMPLE:	**589 (58)**
Outside search strip:	308
Off transect:	281

ELEPHANT CARCASSES

IN SAMPLE:	**37 (37)**
Category 1:	0 (0)
Category 2:	3 (3)
Category 3:	19 (19)
Category 4:	15 (15)
NOT IN SAMPLE:	**6 (4)**
Outside search strip:	1
Off transect:	5

OTHER SPECIES

Other wildlife species:	2
Other wildlife count:	4
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.16, N = 131, w = 320

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	2041	2087	343	343
Variance of estimate	$Var\hat{Y}$	149902	158105	3334	3334
Standard error	$SE\hat{Y}$	387	398	58	58
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 836	± 859	± 125	± 125
Percentage of relative precision	$PRP\hat{Y}$	41 %	41 %	36 %	36 %
Density per sqkm	$R\hat{Y}$	4.134	4.227	0.695	0.695
Variance between transect counts	s^2_y	316.22	332.841	3.016	3.016
Variance between transect areas	s^2_a	4.341	4.341	4.341	4.341
Covariance between counts & areas	s_{ay}	30.742	31.546	1.499	1.499

CARCASS RATIOS

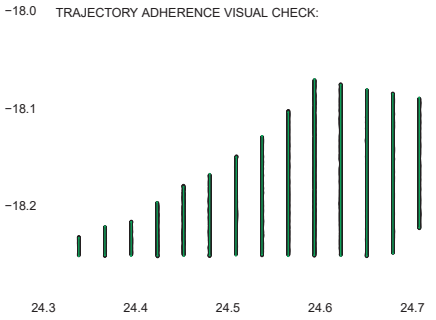
$CR_{1:4}$ = 14.1 %
$CR_{1:2}$ = 1.3 %

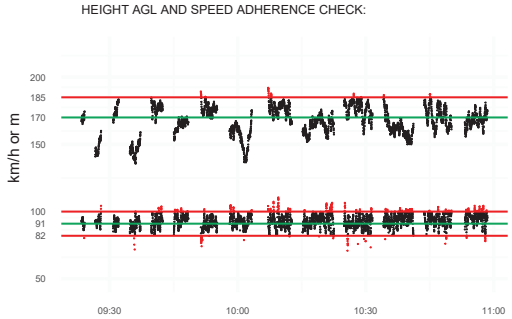
CH2H – CH 2 high

BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20221001A





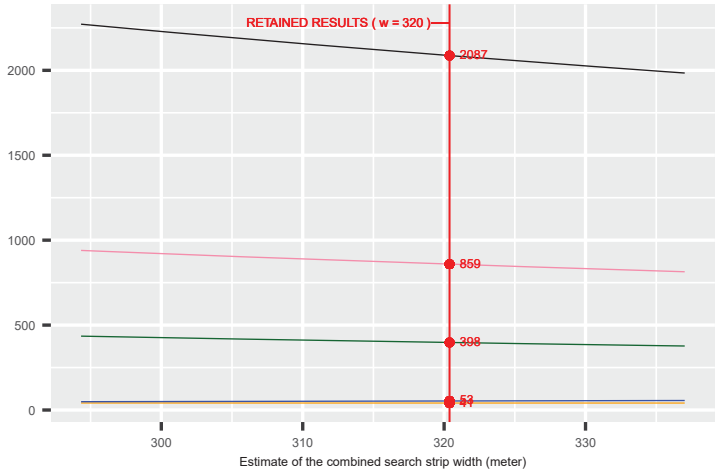
SPEED
Average: 167.3 km/h
Standard dev.: 10.6 km/h

HEIGHT AGL
Average: 93 m (305.1 ft)
Standard dev.: 4.9 m (16.1 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C01 – Left: [161 – 193]
C01 – Right: [121 – 162]



LIVE ELEPHANT ESTIMATE: [2272 – 1984]
CONFIDENCE INTERVAL: ± [940 – 814]
SAMPLE AREA: [49 – 56] sqkm
SE: [435 – 377]
PRP: [41 – 41] %

CH2H – CH 2 high — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: CH2H **N:** 131 S_a^2: 4,341
STRATUM NAME: CH 2 high **w:** 320 ***df***: 13

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	3	121	28	56	0,056	680	26,08	0	84	202	0,643	0,342
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	40	59	371	390	0,752	32521	180,34	0	761	105	33,824	4,469
elephant family	Loxodonta africana family	185	530	1716	733	3,476	115201	339,41	983	2449	43	240,489	27,076
elephant carcass one	Loxodonta africana carcass one	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	3	0	28	44	0,056	410	20,24	0	72	157	0,335	-0,208
elephant carcass three	Loxodonta africana carcass three	19	5	176	121	0,357	3121	55,86	56	297	68	2,863	0,812
elephant carcass four	Loxodonta africana carcass four	15	0	139	59	0,282	749	27,37	80	198	42	0,841	0,895
giraffe	Giraffa giraffa	1	0	9	19	0,019	74	8,58	0	28	200	0,071	0,161
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	225	589	2087	859	4,227	158105	397,62	1228	2946	41	332,841	31,546
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	3	1	28	44	0,056	410	20,24	0	72	157	0,335	-0,208
all elephant carcasses	Loxodonta africana carcass all	37	6	343	125	0,695	3334	57,74	218	468	36	3,016	1,499
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	34	5	315	116	0,639	2886	53,73	199	431	37	3,033	1,707

CH2L – CH 2 low

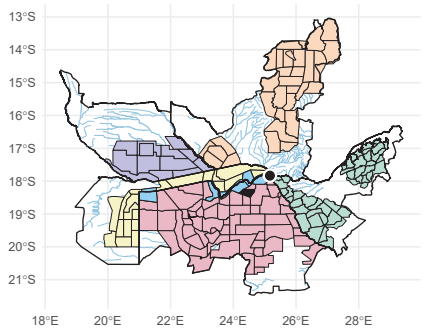
BOTSWANA – NORTHERN BOTSWANA

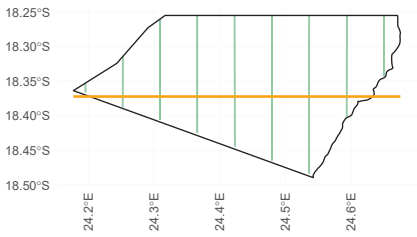
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: CH2L
STRATUM NAME: CH 2 low
■ STRATUM AREA: 849.3 sqkm
• SURVEY BASE: Kasane
DISTANCE TO SURVEY BASE: 99 km

– TRANSECTS: 9 (143 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 5.1 %

– BASELINE DISTANCE: 52.62 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.9 h
Crew(s): C01
KES2022_V5IIM20221001A 07:21–11:16

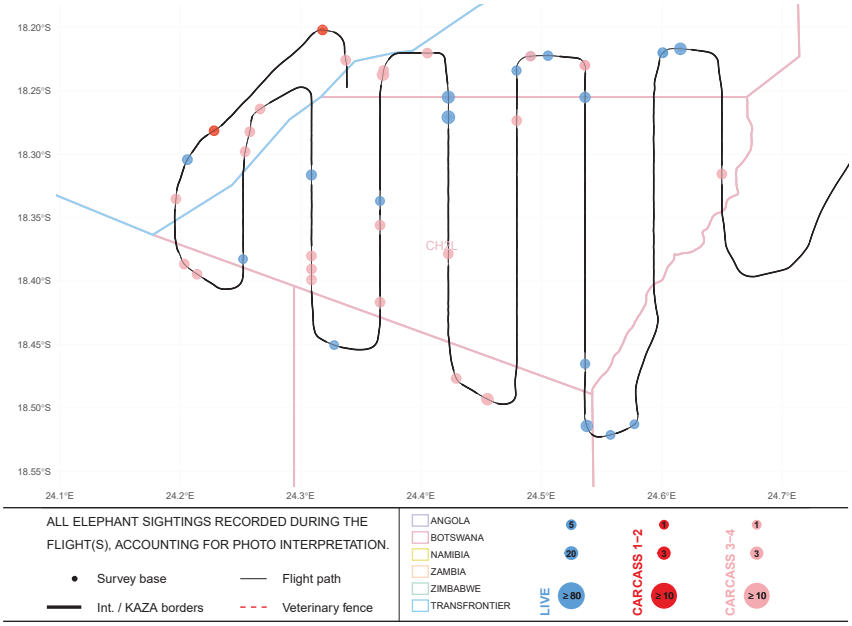
Actual sampling intensity: 5.4 %
Transect flying time: 0.9 h
Transects: 9 – 143 km – 0°
Search effort: 1.14 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	27	73
% individuals:	29	71

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	14	14.29	50
Live elephant (>9):	0		
Elephant carcass:	6	33.33	50
Live elephant (<10):	3	33.33	100



LIVE ELEPHANTS

IN SAMPLE:	**21 (3)**
Bulls:	0 (0)
Family:	21 (3)
NOT IN SAMPLE:	**106 (20)**
Outside search strip:	35
Off transect:	71

ELEPHANT CARCASSES

IN SAMPLE:	**6 (6)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	4 (4)
Category 4:	2 (2)
NOT IN SAMPLE:	**21 (19)**
Outside search strip:	2
Off transect:	19

OTHER SPECIES

Other wildlife species:	2
Other wildlife count:	3
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.306, N = 163, w = 321

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	369	387	92	111
Variance of estimate	$Var\hat{Y}$	24388	27113	1264	1365
Standard error	$SE\hat{Y}$	156	165	36	37
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 360	± 380	± 82	± 85
Percentage of relative precision	$PRP\hat{Y}$	98 %	98 %	89 %	77 %
Density per sqkm	$R\hat{Y}$	0.434	0.456	0.109	0.13
Variance between transect counts	s^2_y	11.444	12.5	0.528	0.5
Variance between transect areas	s^2_a	6.326	6.326	6.326	6.326
Covariance between counts & areas	s_{ay}	4.577	4.59	0.706	0.47

CARCASS RATIOS

$CR_{1:4}$ = 22.2 %
$CR_{1:2}$ = 0 %

CH2L – CH 2 low

BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20221001A

TRAJECTORY ADHERENCE VISUAL CHECK:

HEIGHT AGL AND SPEED ADHERENCE CHECK:

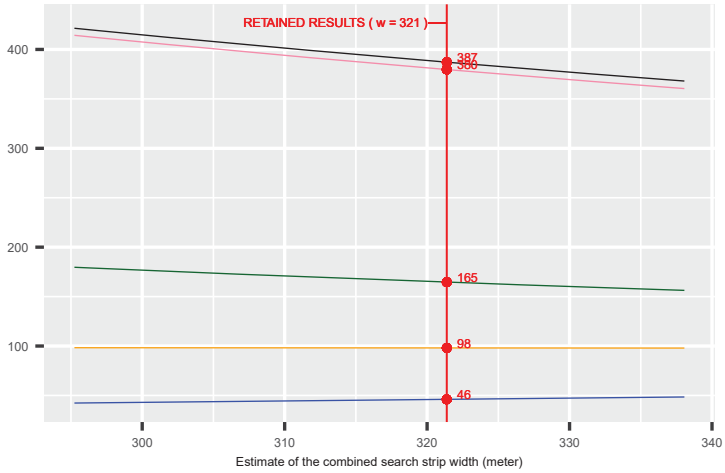
SPEED
Average: 163.6 km/h
Standard dev.: 9.4 km/h

HEIGHT AGL
Average: 93.2 m (305.9 ft)
Standard dev.: 4.2 m (13.7 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C01 – Left: [161 – 194]
C01 – Right: [122 – 163]



LIVE ELEPHANT ESTIMATE: [421 – 368]
CONFIDENCE INTERVAL: ± [414 – 360]
SAMPLE AREA: [42 – 48] sqkm
SE: [180 – 156]
PRP: [98 – 98] %

CH2L – CH 2 low — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: CH2L **N:** 164 S_a^2: 6,326
STRATUM NAME: CH 2 low **w:** 321 ***df*:** 8

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	1	0	18	39	0,022	283	16,82	0	57	210	0,111	0,314
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	0	48	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant family	Loxodonta africana family	21	58	387	380	0,456	27113	164,66	7	767	98	12,500	4,590
elephant carcass one	Loxodonta africana carcass one	0	2	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	4	11	74	84	0,087	1340	36,60	0	158	114	0,528	0,573
elephant carcass four	Loxodonta africana carcass four	2	8	37	57	0,043	606	24,62	0	94	154	0,194	-0,103
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	2	0	37	79	0,043	1170	34,20	0	116	214	0,444	0,471
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	21	106	387	380	0,456	27113	164,66	7	767	98	12,500	4,590
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	2	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	6	21	111	85	0,130	1365	36,95	25	196	77	0,500	0,470
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	6	19	111	85	0,130	1365	36,95	25	196	77	0,500	0,470

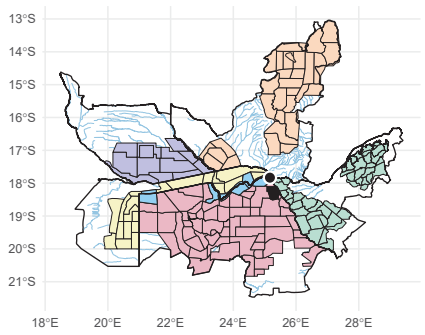
CH5 – CH 5 BOTSWANA – NORTHERN BOTSWANA

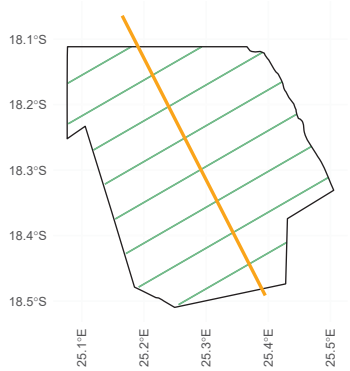
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: CH5
STRATUM NAME: CH 5
■ STRATUM AREA: 1427.64 sqkm
• SURVEY BASE: Kasane
DISTANCE TO SURVEY BASE: 55 km

– TRANSECTS: 8 (240 km)
TRANSECT ORIENTATION: 61.7°
PLANNED SAMPLING INTENSITY: 5 %

– BASELINE DISTANCE: 53.18 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.8 h
Crew(s): C03
KES2022_V5WOT20220910A 07:56–11:44

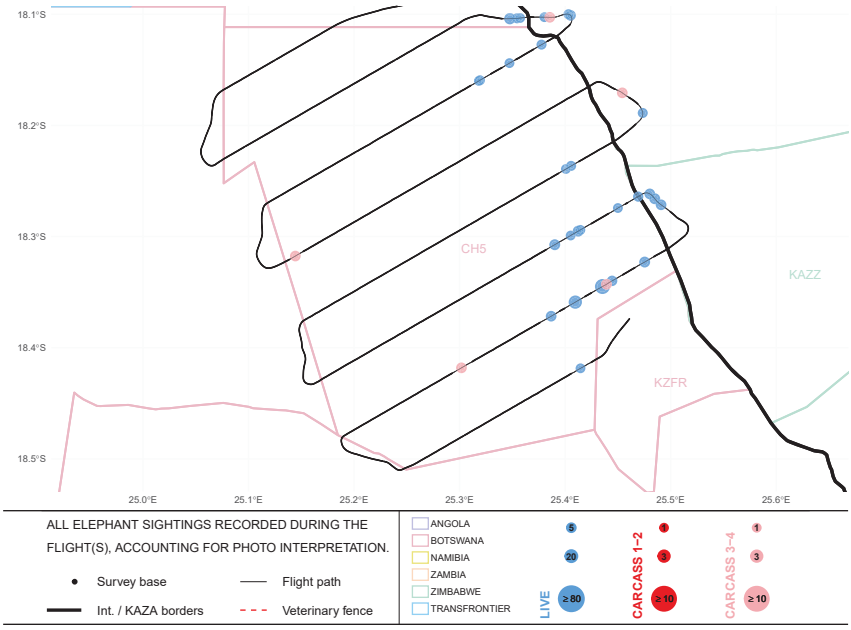
Actual sampling intensity: 5.2 %
Transect flying time: 1.4 h
Transects: 8 – 240 km – 61.7°
Search effort: 1.13 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C03	
Side:	L	R
% sightings:	60	40
% individuals:	59	41

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	23	0	
Live elephant (>9):	1	0	
Elephant carcass:	2	0	
Live elephant (<10):	6	0	



LIVE ELEPHANTS

IN SAMPLE:	**29 (7)**
Bulls:	3 (2)
Family:	26 (5)
NOT IN SAMPLE:	**94 (24)**
Outside search strip:	57
Off transect:	37

ELEPHANT CARCASSES

IN SAMPLE:	**2 (2)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	1 (1)
Category 4:	1 (1)
NOT IN SAMPLE:	**3 (3)**
Outside search strip:	1
Off transect:	2

OTHER SPECIES

Other wildlife species:	7
Other wildlife count:	49
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.365, N = 170, w = 312

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	553	553	38	38
Variance of estimate	$Var\hat{Y}$	122214	122214	654	654
Standard error	$SE\hat{Y}$	350	350	26	26
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 827	± 827	± 60	± 60
Percentage of relative precision	$PRP_{\hat{Y}}$	149 %	149 %	159 %	159 %
Density per sqkm	$R_{\hat{Y}}$	0.388	0.388	0.027	0.027
Variance between transect counts	s^2_y	41.125	41.125	0.214	0.214
Variance between transect areas	s^2_a	7.529	7.529	7.529	7.529
Covariance between counts & areas	s_{ay}	9.031	9.031	0.578	0.578

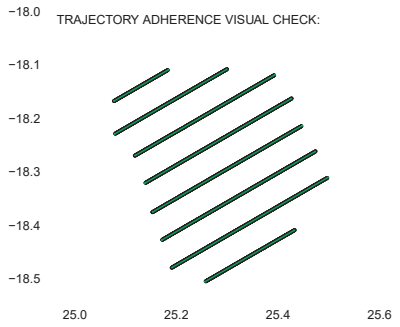
CARCASS RATIOS

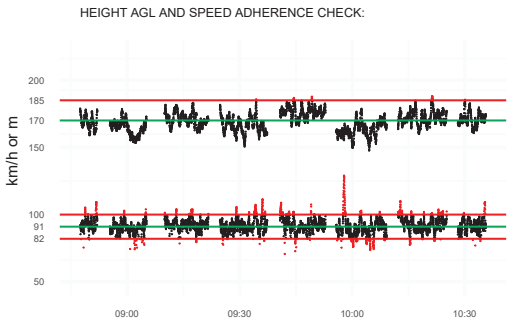
$CR_{1:4} = 6.5$ %
$CR_{1:2} = 0$ %

CH5 – CH 5 BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20220910A





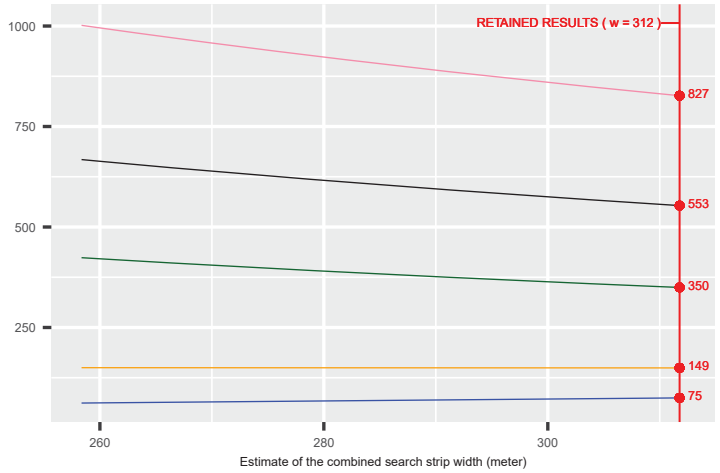
SPEED
Average: 169 km/h
Standard dev.: 6.9 km/h

HEIGHT AGL
Average: 91.7 m (301 ft)
Standard dev.: 5.6 m (18.2 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C03 – Left: [103 – 156]
C03 – Right: [144 – 173]



LIVE ELEPHANT ESTIMATE: [668 – 553]
CONFIDENCE INTERVAL: ± [1002 – 827]
SAMPLE AREA: [62 – 75] sqkm
SE: [424 – 350]
PRP: [150 – 149] %

CH5 – CH 5 BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: CH5 **N:** 171 S_a^2: 7,529
STRATUM NAME: CH 5 **w:** 312 ***df*:** 7

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	15	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	3	0	57	143	0,040	3650	60,41	0	200	250	1,125	1,050
elephant bulls	Loxodonta africana males	3	20	57	100	0,040	1790	42,31	0	157	175	0,554	0,614
elephant family	Loxodonta africana family	26	74	496	834	0,347	124259	352,50	0	1330	168	40,786	8,416
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	1	1	19	48	0,013	406	20,14	0	67	250	0,125	0,350
elephant carcass four	Loxodonta africana carcass four	1	2	19	48	0,013	417	20,42	0	67	253	0,125	0,228
giraffe	Giraffa giraffa	1	3	19	51	0,013	473	21,76	0	71	270	0,125	-0,383
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	32	0	611	1555	0,428	432340	657,53	0	2165	255	128,000	5,444
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	8	2	153	188	0,107	6296	79,35	0	340	123	2,000	1,262
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	21	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	2	0	38	96	0,027	1650	40,62	0	134	252	0,500	0,548
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	3	15	57	143	0,040	3650	60,41	0	200	250	1,125	1,050
all elephants	Loxodonta africana all	29	94	553	827	0,388	122214	349,59	0	1380	149	41,125	9,031
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	2	3	38	60	0,027	654	25,58	0	99	159	0,214	0,578
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	2	3	38	60	0,027	654	25,58	0	99	159	0,214	0,578

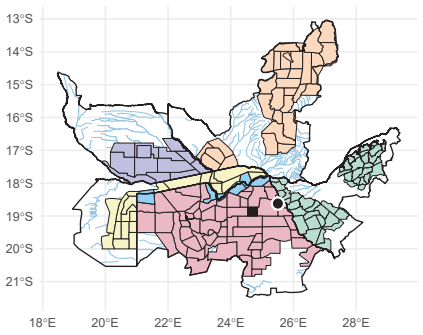
CHZW – Chinamba Low — BOTSWANA – NORTHERN BOTSWANA

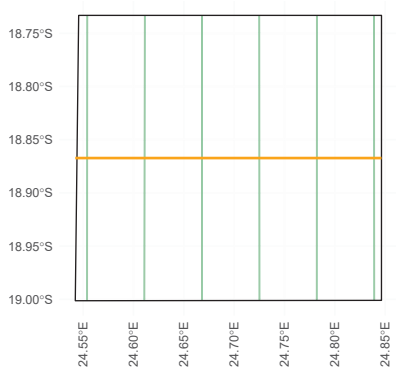
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: CHZW
STRATUM NAME: Chinamba Low
■ STRATUM AREA: 945.28 sqkm
• SURVEY BASE: Pandamatenga
DISTANCE TO SURVEY BASE: 89 km

– TRANSECTS: 6 (179 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 5.7 %

– BASELINE DISTANCE: 32.05 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 2.2 h
Crew(s): C02
KES2022_V5LJB20220911B 15:30–17:41

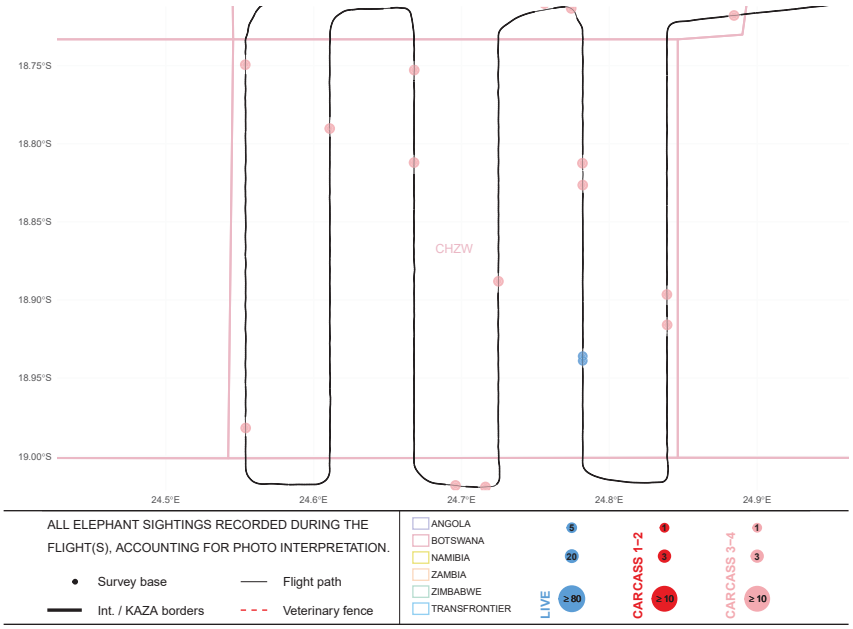
Actual sampling intensity: 6.1 %
Transect flying time: 1 h
Transects: 6 – 179 km – 0°
Search effort: 1.08 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C02	
Side:	L	R
% sightings:	57	43
% individuals:	68	32

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	12	41.67	0
Live elephant (>9):	0		
Elephant carcass:	9	55.56	20
Live elephant (<10):	2	0	



LIVE ELEPHANTS

IN SAMPLE:	**2 (2)**
Bulls:	2 (2)
Family:	0 (0)
NOT IN SAMPLE:	**32 (9)**
Outside search strip:	0
Off transect:	32

ELEPHANT CARCASSES

IN SAMPLE:	**9 (9)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	1 (1)
Category 4:	8 (8)
NOT IN SAMPLE:	**18 (17)**
Outside search strip:	1
Off transect:	17

OTHER SPECIES

Other wildlife species:	1
Other wildlife count:	8
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.571, N = 100, w = 319

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	33	33	149	149
Variance of estimate	$\mathrm{Var}\hat{Y}$	1053	1053	1124	1124
Standard error	$\mathrm{SE}\hat{Y}$	32	32	34	34
95% confidence interval	$\mathrm{CI}_{\hat{Y}}^{95\%}$	± 83	± 83	± 86	± 86
Percentage of relative precision	$\mathrm{PRP}_{\hat{Y}}$	252 %	252 %	58 %	58 %
Density per sqkm	$R_{\hat{Y}}$	0.035	0.035	0.157	0.157
Variance between transect counts	s_y^2	0.667	0.667	0.7	0.7
Variance between transect areas	s_a^2	0.01	0.01	0.01	0.01
Covariance between counts & areas	s_{ay}	−0.012	−0.012	−0.039	−0.039

CARCASS RATIOS

$CR_{1:4} = 81.8\ \%$
$CR_{1:2} = 0\ \%$

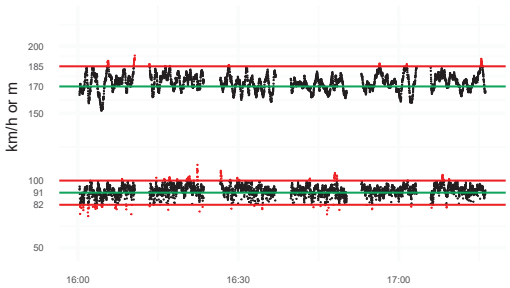
CHZW – Chinamba Low — BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20220911B

TRAJECTORY ADHERENCE VISUAL CHECK:

HEIGHT AGL AND SPEED ADHERENCE CHECK:



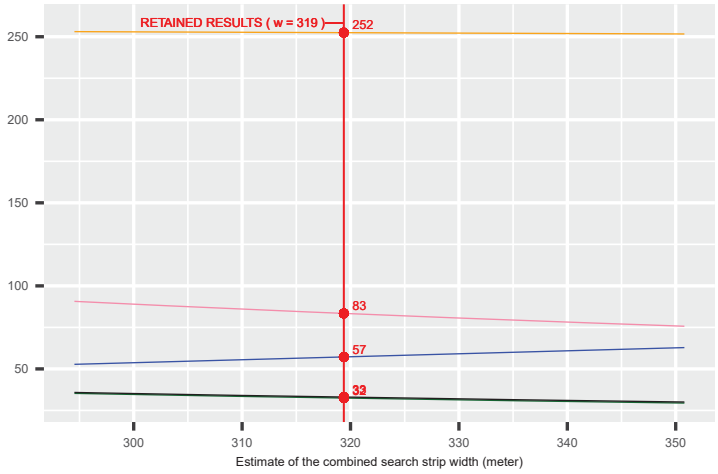
SPEED
Average: 172.9 km/h
Standard dev.: 6 km/h

HEIGHT AGL
Average: 92.4 m (303.2 ft)
Standard dev.: 4.2 m (13.8 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C02 – Left: [155 – 178]
C02 – Right: [135 – 186]



LIVE ELEPHANT ESTIMATE: [36 – 30]
CONFIDENCE INTERVAL: ± [91 – 76]
SAMPLE AREA: [53 – 63] sqkm
SE: [35 – 29]
PRP: [253 – 252] %

CHZW – Chinamba Low — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: CHZW **N:** 100 S_a^2: 0,010
STRATUM NAME: Chinamba Low **w:** 319 ***df*:** 5

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	2	26	33	83	0,035	1053	32,45	0	116	252	0,667	-0,012
elephant family	Loxodonta africana family	0	6	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	1	0	17	42	0,017	263	16,23	0	58	252	0,167	-0,008
elephant carcass four	Loxodonta africana carcass four	8	18	132	106	0,140	1697	41,19	26	238	80	1,067	-0,031
giraffe	Giraffa giraffa	8	11	132	247	0,140	9236	96,10	0	379	187	5,867	0,042
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	3	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	2	32	33	83	0,035	1053	32,45	0	116	252	0,667	-0,012
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	9	18	149	86	0,157	1124	33,52	63	235	58	0,700	-0,039
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	9	18	149	86	0,157	1124	33,52	63	235	58	0,700	-0,039

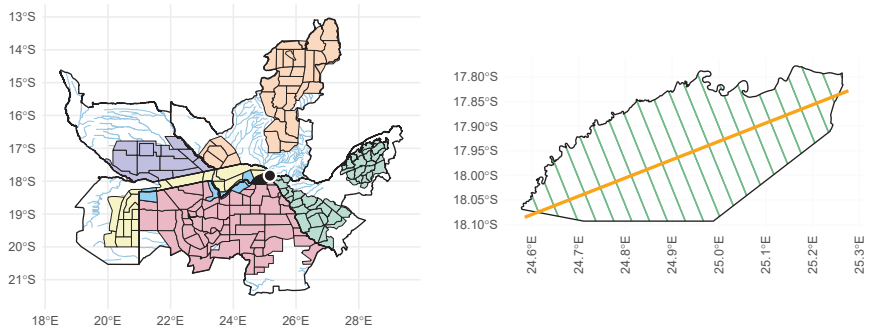
CRBW – Chobe River NE Botswana — BOTSWANA – NORTHERN BOTSWANA

SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: CRBW
STR. NAME: Chobe River NE Botswana
■ STRATUM AREA: 1519.74 sqkm
• SURVEY BASE: Kasane
DISTANCE TO SURVEY BASE: 26 km

– TRANSECTS: 21 (407 km)
TRANSECT ORIENTATION: 159.6°
PLANNED SAMPLING INTENSITY: 8 %

– BASELINE DISTANCE: 78.57 km



SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 4.2 h
Crew(s): C02
KES2022_V5LJB20221001A 07:09–11:19

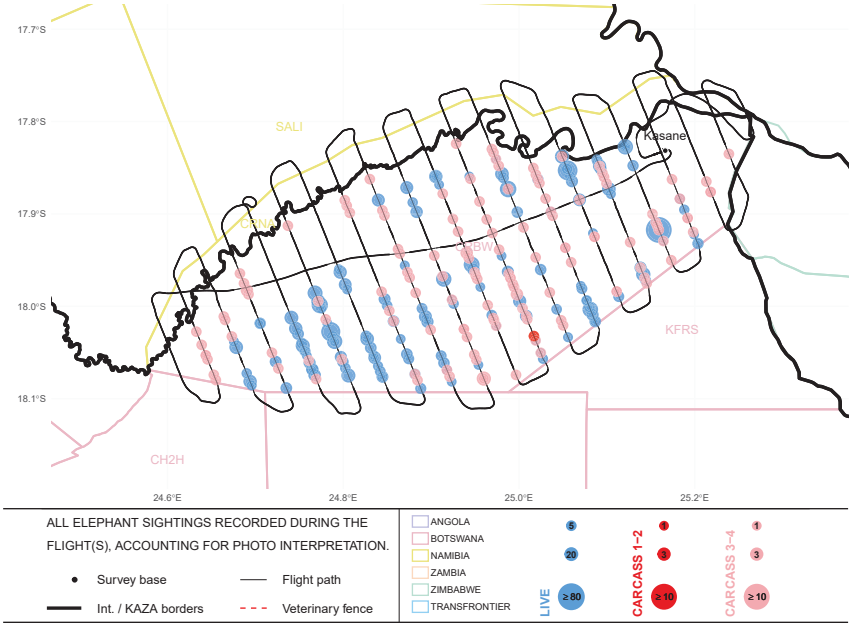
Actual sampling intensity: 8.6 %
Transect flying time: 2.3 h
Transects: 21 – 407 km – 0°
Search effort: 1.08 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C02	
Side:	L	R
% sightings:	50	50
% individuals:	66	34

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	306	9.48	13.79
Live elephant (>9):	25	12	33.33
Elephant carcass:	98	15.31	0
Live elephant (<10):	49	20.41	20



LIVE ELEPHANTS

IN SAMPLE:	**606 (74)**
Bulls:	27 (17)
Family:	579 (57)
NOT IN SAMPLE:	**843 (94)**
Outside search strip:	843
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**99 (98)**
Category 1:	0 (0)
Category 2:	1 (1)
Category 3:	4 (4)
Category 4:	94 (93)
NOT IN SAMPLE:	**40 (37)**
Outside search strip:	40
Off transect:	0

OTHER SPECIES

Other wildlife species:	16
Other wildlife count:	637
Domestic count:	109

ELEPHANT DATA ANALYSIS

t = 2.086, N = 245, w = 320

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	7049	7072	1155	1155
Variance of estimate	$Var\hat{Y}$	2072345	2138200	30026	30026
Standard error	$SE\hat{Y}$	1440	1462	173	173
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 3003	± 3050	± 361	± 361
Percentage of relative precision	$PRP_{\hat{Y}}$	43 %	43 %	31 %	31 %
Density per sqkm	$R_{\hat{Y}}$	4.638	4.653	0.76	0.76
Variance between transect counts	s^2_y	798.99	826.129	14.014	14.014
Variance between transect areas	s^2_a	15.508	15.508	15.508	15.508
Covariance between counts & areas	s_{ay}	36.888	37.221	7.58	7.58

CARCASS RATIOS

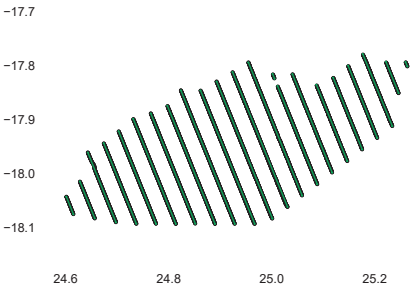
$CR_{1:4}$ = 14 %
$CR_{1:2}$ = 0.2 %

CRBW – Chobe River NE Botswana — BOTSWANA – NORTHERN BOTSWANA

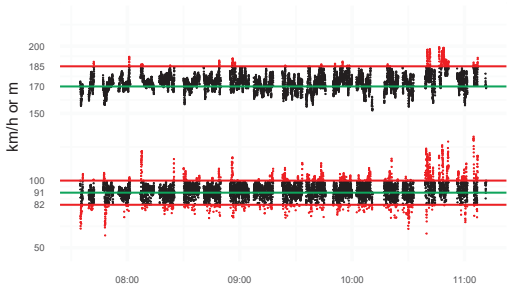
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20221001A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



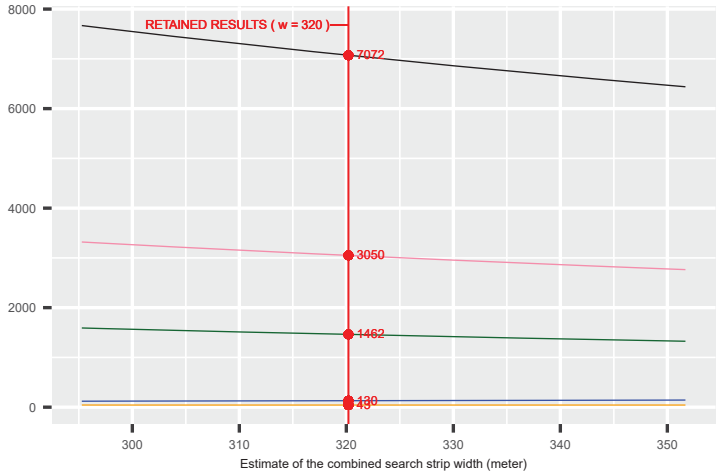
SPEED
Average: 173.3 km/h
Standard dev.: 6.3 km/h

HEIGHT AGL
Average: 92.6 m (303.9 ft)
Standard dev.: 6.7 m (21.9 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C02 – Left: [156 – 178]
C02 – Right: [135 – 187]



LIVE ELEPHANT ESTIMATE: [7669 – 6439]
CONFIDENCE INTERVAL: ± [3320 – 2764]
SAMPLE AREA: [120 – 143] sqkm
SE: [1591 – 1325]
PRP: [43 – 43] %

CRBW – Chobe River NE Botswana — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: CRBW **N:** 227 S_a^2: 15,508
STRATUM NAME: Chobe River NE Botswana **w:** 320 ***df*:** 20

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	24	0	280,1	393	0,184	35457	188,30	0	673	140	17,329	11,752
buffalo	Syncerus caffer	76	300	886,9	1266	0,584	368214	606,81	0	2153	143	145,448	8,815
bushbuck	Tragelaphus scriptus	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	94	0	1097,0	1208	0,722	335174	578,94	0	2305	110	102,362	-12,051
donkey	Equus asinus	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	17	0	198,4	399	0,131	36529	191,13	0	597	201	13,762	0,358
elephant bulls	Loxodonta africana males	27	32	315,1	143	0,207	4681	68,42	172	458	45	2,114	2,401
elephant family	Loxodonta africana family	579	811	6757,0	3016	4,446	2090356	1445,81	3741	9773	45	800,357	34,820
elephant carcass one	Loxodonta africana carcass one	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	1	0	11,7	23	0,008	121	10,99	0	35	196	0,048	0,162
elephant carcass three	Loxodonta africana carcass three	4	1	46,7	41	0,031	395	19,87	5	88	89	0,162	0,423
elephant carcass four	Loxodonta africana carcass four	94	39	1097,0	328	0,722	24758	157,35	769	1425	30	11,462	6,995
giraffe	Giraffa giraffa	10	2	116,7	122	0,077	3440	58,65	0	239	105	1,262	0,269
grysbok	Raphicerus sharpei	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	17	0	198,4	303	0,131	21113	145,30	0	501	153	7,162	-2,399
horse	Equus caballus	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	303	45	3536,0	1453	2,327	485170	696,54	2083	4989	41	289,557	40,499
klipspringer	Oreotragus oreotragus	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	3	0	35,0	69	0,023	1086	32,95	0	104	196	0,429	0,490
oribi	Ourebia ourebi	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	1	0	11,7	23	0,008	120	10,96	0	35	196	0,048	0,176
sable	Hippotragus niger	10	0	116,7	146	0,077	4913	70,09	0	263	125	1,662	-0,784
shoat	Capra hircus - Ovis aries	15	0	175,1	357	0,115	29221	170,94	0	532	204	10,714	-0,977
sitatunga	Tragelaphus spekii	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	6	0	70,0	140	0,046	4525	67,27	0	210	200	1,714	0,231
waterbuck	Kobus ellipsiprymnus	8	0	93,4	166	0,061	6323	79,52	0	259	178	2,348	-0,045
wildebeest	Connochaetes taurinus	0	0	0,0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	47	18	548,5	678	0,361	105569	324,91	0	1226	124	41,490	4,496
all elephants	Loxodonta africana all	606	843	7072,1	3050	4,653	2138200	1462,26	4022	10122	43	826,129	37,221
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	1	0	11,7	23	0,008	121	10,99	0	35	196	0,048	0,162
all elephant carcasses	Loxodonta africana carcass all	99	40	1155,3	361	0,760	30026	173,28	794	1517	31	14,014	7,580
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	98	40	1143,7	349	0,753	27925	167,11	795	1492	30	13,033	7,418

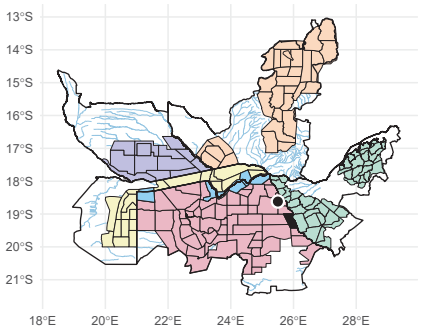
CT3 – CT 3 BOTSWANA – NORTHERN BOTSWANA

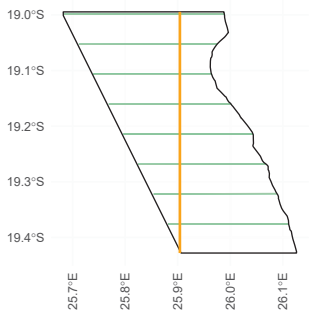
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: CT3
STRATUM NAME: CT 3
■ STRATUM AREA: 1235.58 sqkm
• SURVEY BASE: Pandamatenga
DISTANCE TO SURVEY BASE: 79 km

– TRANSECTS: 8 (210 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 5.1 %

– BASELINE DISTANCE: 47.99 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 2.3 h
Crew(s): C02
KES2022_V5LJB20220910B 15:45–18:04

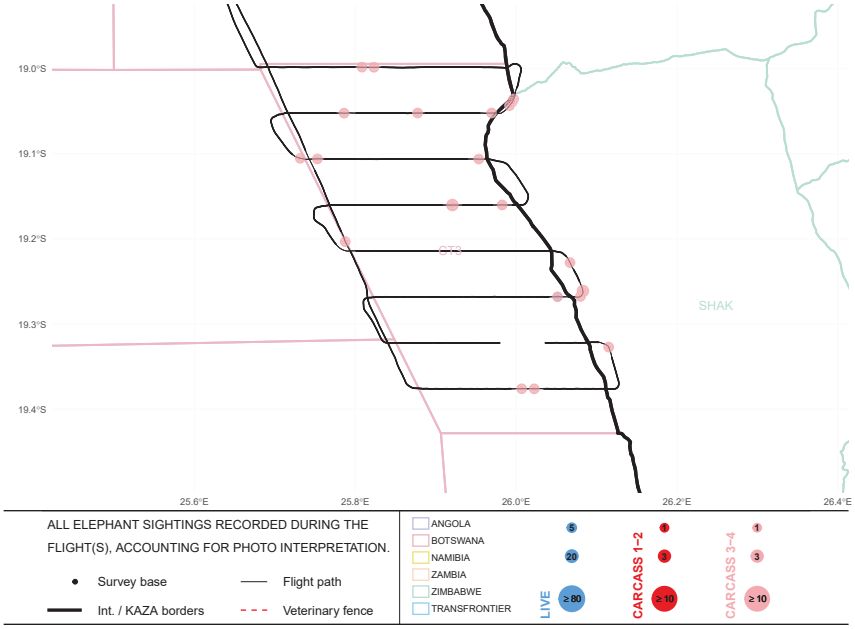
Actual sampling intensity: 5.3 %
Transect flying time: 1.2 h
Transects: 8 – 210 km – 90°
Search effort: 1.12 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C02	
Side:	L	R
% sightings:	57	43
% individuals:	65	35

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	13	30.77	0
Live elephant (>9):	0		
Elephant carcass:	9	44.44	0
Live elephant (<10):	0		



LIVE ELEPHANTS

IN SAMPLE:	**0 (0)**
Bulls:	0 (0)
Family:	0 (0)
NOT IN SAMPLE:	**91 (9)**
Outside search strip:	1
Off transect:	90

ELEPHANT CARCASSES

IN SAMPLE:	**10 (9)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	0 (0)
Category 4:	10 (9)
NOT IN SAMPLE:	**13 (12)**
Outside search strip:	3
Off transect:	10

OTHER SPECIES

Other wildlife species:	5
Other wildlife count:	14
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.365, N = 155, w = 309

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	–	–	190	190
Variance of estimate	$\mathrm{Var}\hat{Y}$	–	–	5200	5200
Standard error	$\mathrm{SE}\hat{Y}$	–	–	72	72
95% confidence interval	$\mathrm{CI}_{\hat{Y}}^{95\%}$	–	–	± 171	± 171
Percentage of relative precision	$\mathrm{PRP}_{\hat{Y}}$	–	–	90 %	90 %
Density per sqkm	$R_{\hat{Y}}$	–	–	0.154	0.154
Variance between transect counts	s_y^2	–	–	1.929	1.929
Variance between transect areas	s_a^2	–	–	0.738	0.738
Covariance between counts & areas	s_{ay}	–	–	0.433	0.433

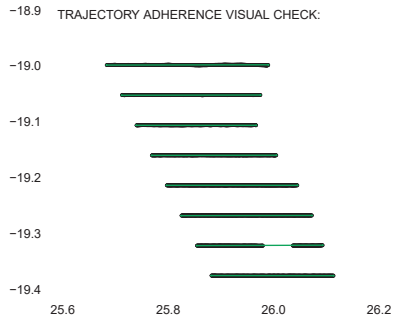
CARCASS RATIOS

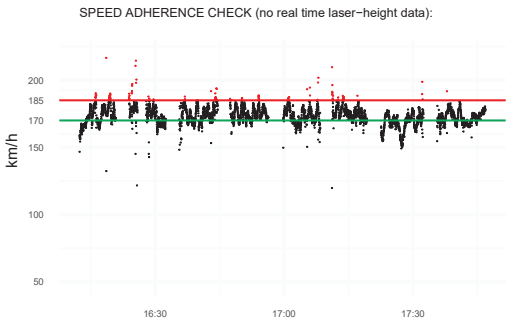
$CR_{1:4}$ = 100 %
$CR_{1:2}$ = n/a

CT3 – CT 3 BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20220910B





SPEED
Average: 173.2 km/h
Standard dev.: 7.2 km/h

HEIGHT AGL
Average: 89.3 m (292.9 ft)
Standard dev.: 5.8 m (19.2 ft)

Due to a technical problem, the laser did not automatically record the height data continuously. This information was therefore derived from the altitude data recorded by the aircraft's GPS and the 30−meter NASA Shuttle Radar Topography Mission (SRTM) elevation data (i.e. topography data).

CT3 – CT 3 BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: CT3 **N:** 156 S_a^2: 0,738
STRATUM NAME: CT 3 **w:** 309 ***df*:** 7

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	0	16	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant family	Loxodonta africana family	0	75	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass four	Loxodonta africana carcass four	10	13	190	171	0,154	5200	72,11	20	361	90	1,929	0,433
giraffe	Giraffa giraffa	4	5	76	136	0,062	3288	57,34	0	212	178	1,143	-0,002
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	2	0	38	90	0,031	1450	38,08	0	128	237	0,500	-0,076
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	4	0	76	179	0,062	5723	75,65	0	255	235	2,000	0,066
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	0	91	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	10	13	190	171	0,154	5200	72,11	20	361	90	1,929	0,433
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	10	13	190	171	0,154	5200	72,11	20	361	90	1,929	0,433

KFRS – Kasane FR South

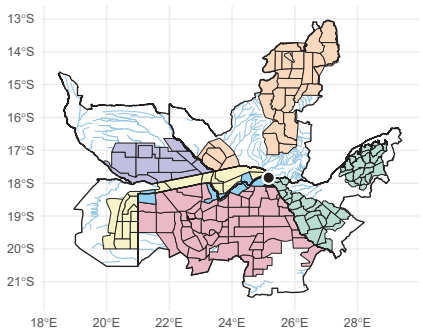
BOTSWANA – NORTHERN BOTSWANA

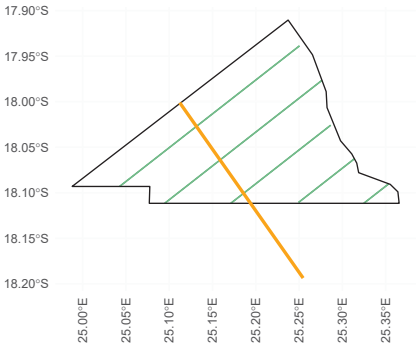
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: KFRS
STRATUM NAME: Kasane FR South
■ STRATUM AREA: 432.77 sqkm
• SURVEY BASE: Kasane
DISTANCE TO SURVEY BASE: 21 km

– TRANSECTS: 5 (81 km)
TRANSECT ORIENTATION: 53.5°
PLANNED SAMPLING INTENSITY: 5.6 %

– BASELINE DISTANCE: 26.11 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.8 h
Crew(s): C03
KES2022_V5WOT20220910A 07:56–11:44

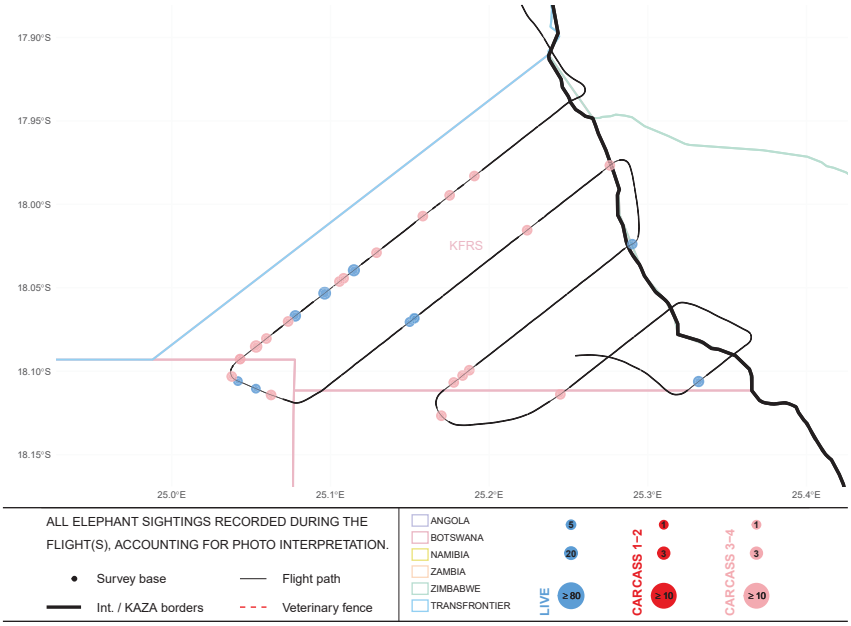
Actual sampling intensity: 5.7 %
Transect flying time: 0.5 h
Transects: 5 – 81 km – 53.5°
Search effort: 1.14 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C03	
Side:	L	R
% sightings:	48	52
% individuals:	52	48

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	23	0	
Live elephant (>9):	0		
Elephant carcass:	14	0	
Live elephant (<10):	2	0	



LIVE ELEPHANTS

IN SAMPLE:	**7 (2)**
Bulls:	0 (0)
Family:	7 (2)
NOT IN SAMPLE:	**51 (8)**
Outside search strip:	45
Off transect:	6

ELEPHANT CARCASSES

IN SAMPLE:	**15 (14)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	8 (7)
Category 4:	7 (7)
NOT IN SAMPLE:	**6 (6)**
Outside search strip:	2
Off transect:	4

OTHER SPECIES

Other wildlife species:	2
Other wildlife count:	7
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.776, N = 85, w = 306

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	122	122	262	262
Variance of estimate	$\mathrm{Var}\hat{Y}$	10998	10998	16713	16713
Standard error	$\mathrm{SE}\hat{Y}$	105	105	129	129
95% confidence interval	$\mathrm{CI}_{\hat{Y}}^{95\%}$	± 291	± 291	± 359	± 359
Percentage of relative precision	$\mathrm{PRP}_{\hat{Y}}$	238 %	238 %	137 %	137 %
Density per sqkm	$R_{\hat{Y}}$	0.282	0.282	0.605	0.605
Variance between transect counts	s_y^2	9.8	9.8	21.5	21.5
Variance between transect areas	s_a^2	10.015	10.015	10.015	10.015
Covariance between counts & areas	s_{ay}	4.518	4.518	10.692	10.692

CARCASS RATIOS

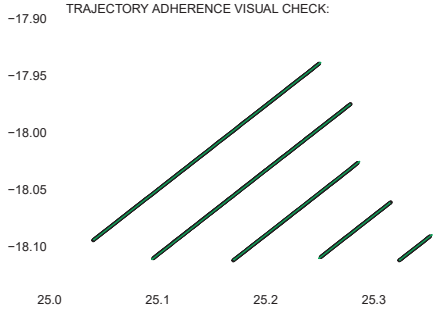
$CR_{1:4} = 68.2\ \%$
$CR_{1:2} = 0\ \%$

KFRS – Kasane FR South — BOTSWANA – NORTHERN BOTSWANA

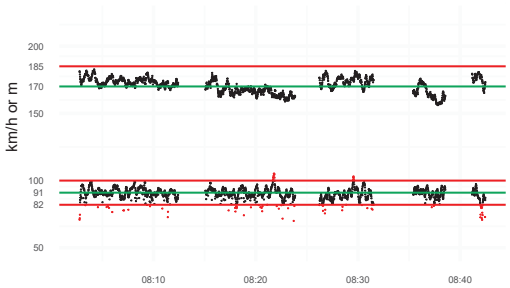
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20220910A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



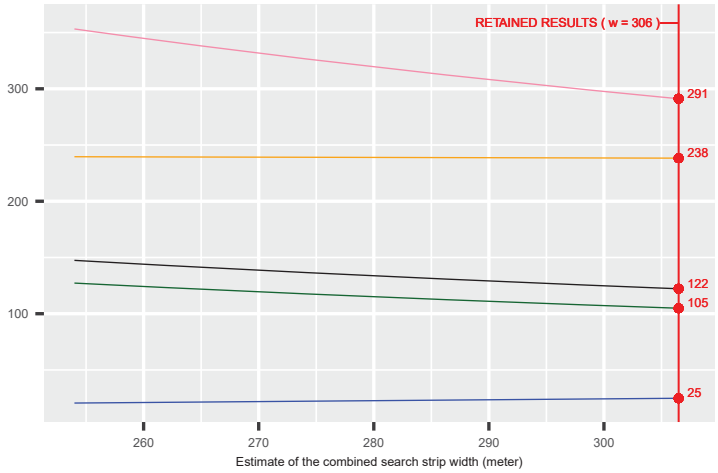
SPEED
Average: 170.7 km/h
Standard dev.: 5.5 km/h

HEIGHT AGL
Average: 90.2 m (296 ft)
Standard dev.: 4.4 m (14.3 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C03 – Left: [101 – 153]
C03 – Right: [142 – 170]



LIVE ELEPHANT ESTIMATE: [147 – 122]
CONFIDENCE INTERVAL: ± [353 – 291]
SAMPLE AREA: [21 – 25] sqkm
SE: [127 – 105]
PRP: [240 – 238] %

KFRS – Kasane Forest Reserve South BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: KFRS **N:** 85 S_a^2: 10,015
STRATUM NAME: Kasane Forest Reserve South **w:** 306 ***df*:** 4

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	1	0	17	39	0,040	193	13,89	0	56	221	0,200	0,930
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	0	2	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant family	Loxodonta africana family	7	49	122	291	0,282	10998	104,87	0	413	238	9,800	4,518
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	8	3	140	188	0,323	4598	67,81	0	328	135	6,300	6,165
elephant carcass four	Loxodonta africana carcass four	7	3	122	179	0,282	4157	64,48	0	301	147	4,800	4,527
giraffe	Giraffa giraffa	6	0	105	120	0,242	1860	43,13	0	224	114	3,200	5,012
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	7	51	122	291	0,282	10998	104,87	0	413	238	9,800	4,518
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	15	6	262	359	0,605	16713	129,28	0	621	137	21,500	10,692
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	15	6	262	359	0,605	16713	129,28	0	621	137	21,500	10,692

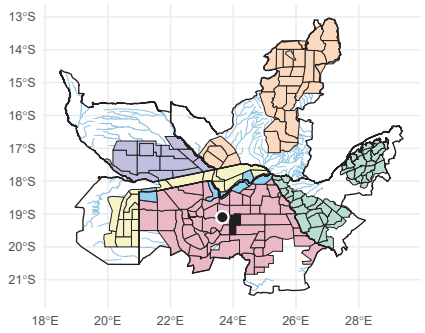
KRDE – Khwai River Delta Ext. BOTSWANA – NORTHERN BOTSWANA

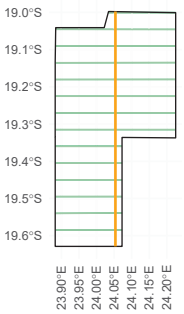
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: KRDE
STR. NAME: Khwai River Delta Extended
■ STRATUM AREA: 1921.31 sqkm
• SURVEY BASE: Khwai
DISTANCE TO SURVEY BASE: 45 km

– TRANSECTS: 14 (393 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 6.1 %

– BASELINE DISTANCE: 69.84 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.5 h
Crew(s): C02
KES2022_V5LJB20220927A 06:40–10:08

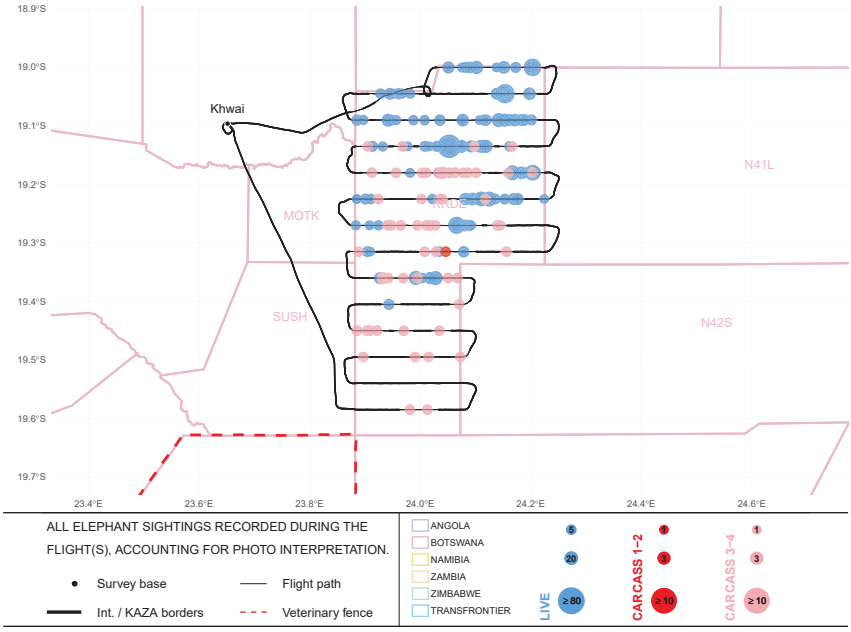
Actual sampling intensity: 6.6 %
Transect flying time: 2.3 h
Transects: 14 – 393 km – 90°
Search effort: 1.08 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C02	
Side:	L	R
% sightings:	54	46
% individuals:	69	31

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	186	4.3	62.5
Live elephant (>9):	7	71.43	60
Elephant carcass:	41	0	
Live elephant (<10):	31	0	



LIVE ELEPHANTS

IN SAMPLE:	**225 (38)**
Bulls:	47 (22)
Family:	178 (16)
NOT IN SAMPLE:	**931 (100)**
Outside search strip:	931
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**42 (41)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	1 (1)
Category 4:	41 (40)
NOT IN SAMPLE:	**17 (16)**
Outside search strip:	17
Off transect:	0

OTHER SPECIES

Other wildlife species:	18
Other wildlife count:	404
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.16, N = 218, w = 320

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	3298	3435	641	641
Variance of estimate	$Var\hat{Y}$	1195104	1157716	26058	26058
Standard error	$SE\hat{Y}$	1093	1076	161	161
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 2362	± 2324	± 349	± 349
Percentage of relative precision	$PRP\hat{Y}$	72 %	68 %	54 %	54 %
Density per sqkm	$R\hat{Y}$	1.716	1.788	0.334	0.334
Variance between transect counts	s^2_y	460.879	459.302	9.077	9.077
Variance between transect areas	s^2_a	7.36	7.36	7.36	7.36
Covariance between counts & areas	s_{ay}	31.261	33.368	2.569	2.569

CARCASS RATIOS

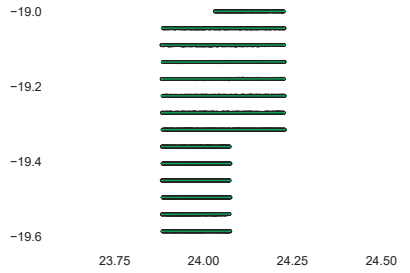
$CR_{1:4}$ = 15.7 %
$CR_{1:2}$ = 0 %

KRDE – Khwai River Delta Ext. BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20220927A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:

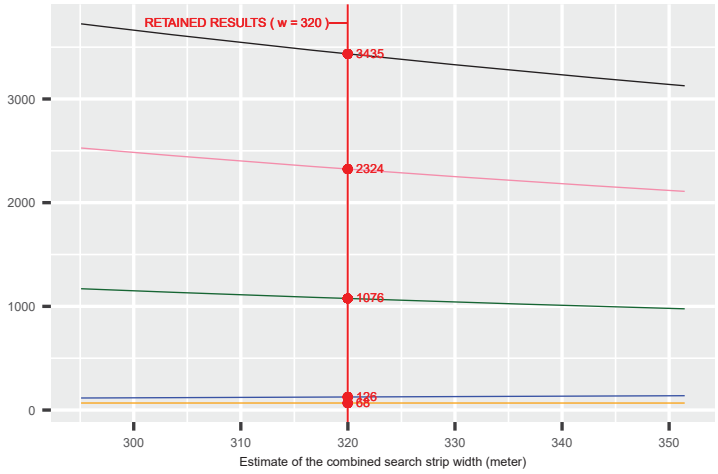
SPEED
Average: 172.9 km/h
Standard dev.: 5.8 km/h

HEIGHT AGL
Average: 92.6 m (303.8 ft)
Standard dev.: 4 m (13.1 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C02 – Left: [156 – 178]
C02 – Right: [135 – 187]



LIVE ELEPHANT ESTIMATE: [3725 – 3127]
CONFIDENCE INTERVAL: ± [2527 – 2109]
SAMPLE AREA: [116 – 138] sqkm
SE: [1170 – 976]
PRP: [68 – 67] %

KRDE – Khwai River Delta Ext. BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: KRDE **N:** 218 S_a^2: 7,360
STRATUM NAME: Khwai River Delta Extended **w:** 320 ***df*:** 13

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	197	270	3008	5679	1,565	6909167	2628,53	0	8686	189	2271,456	38,354
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	2	0	31	47	0,016	467	21,60	0	77	153	0,132	-0,403
eland	Tragelaphus oryx	1	0	15	33	0,008	239	15,45	0	49	219	0,071	-0,193
elephant bulls	Loxodonta africana males	47	102	718	474	0,373	48040	219,18	244	1191	66	19,478	7,257
elephant family	Loxodonta africana family	178	829	2718	2155	1,414	995137	997,57	562	4873	79	371,604	26,112
elephant carcass one	Loxodonta africana carcass one	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	1	1	15	33	0,008	239	15,47	0	49	219	0,071	-0,204
elephant carcass four	Loxodonta africana carcass four	41	15	626	344	0,326	25379	159,31	282	970	55	8,995	2,773
giraffe	Giraffa giraffa	28	0	427	294	0,222	18462	135,88	134	721	69	6,462	2,312
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	2	0	31	64	0,016	876	29,60	0	94	209	0,286	0,390
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	107	0	1634	2484	0,850	1322354	1149,94	0	4118	152	447,786	22,288
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	5	0	76	109	0,040	2541	50,41	0	185	143	0,863	0,962
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	11	1	168	188	0,087	7535	86,80	0	355	112	2,489	1,026
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	4	0	61	128	0,032	3488	59,06	0	189	209	1,143	0,867
roan	Hippotragus equinus	1	0	15	32	0,008	219	14,81	0	47	210	0,071	0,189
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	6	0	92	192	0,048	7899	88,88	0	284	210	2,571	1,133
warthog	Phacochoerus africanus	8	0	122	137	0,064	4009	63,32	0	259	112	1,341	0,878
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	8	0	122	256	0,064	14022	118,42	0	378	209	4,571	1,560
zebra	Equus spp,	10	3	153	232	0,079	11505	107,26	0	384	152	3,912	2,177
all elephants	Loxodonta africana all	225	931	3435	2324	1,788	1157716	1075,97	1111	5760	68	459,302	33,368
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	42	17	641	349	0,334	26058	161,43	292	990	54	9,077	2,569
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	42	16	641	349	0,334	26058	161,43	292	990	54	9,077	2,569

KZFR – Kazuma FR

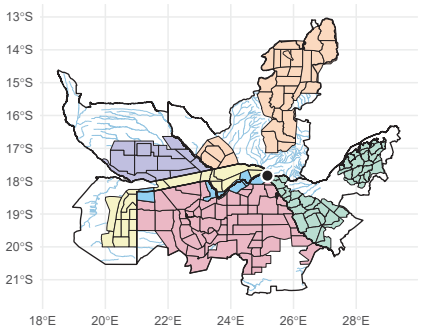
BOTSWANA – NORTHERN BOTSWANA

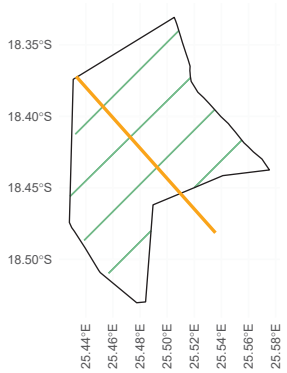
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: KZFR
STRATUM NAME: Kazuma FR
■ STRATUM AREA: 168.49 sqkm
• SURVEY BASE: Kasane
DISTANCE TO SURVEY BASE: 75 km

– TRANSECTS: 4 (51 km)
TRANSECT ORIENTATION: 46.8°
PLANNED SAMPLING INTENSITY: 9 %

– BASELINE DISTANCE: 16.25 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.8 h
Crew(s): C03
KES2022_V5WOT20220910A 07:56–11:44

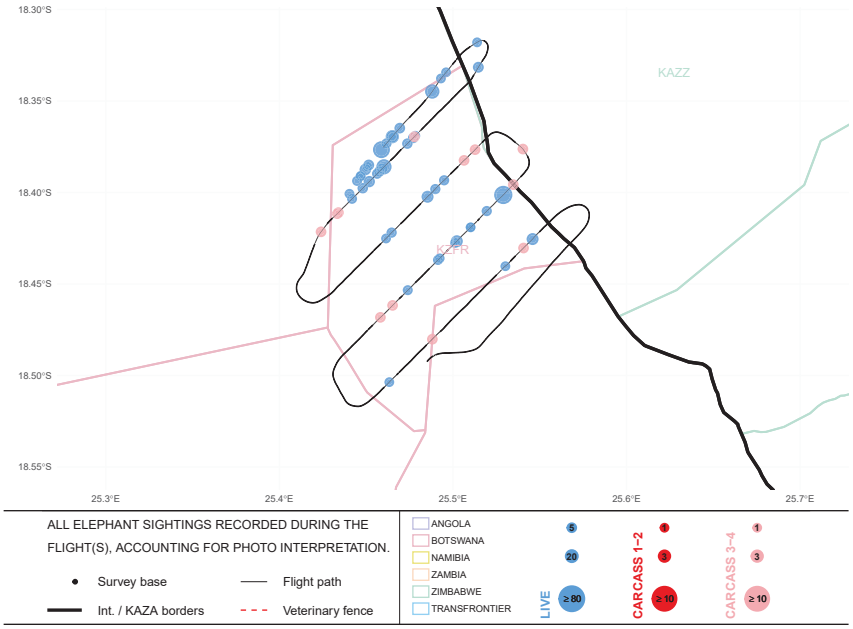
Actual sampling intensity: 9.4 %
Transect flying time: 0.3 h
Transects: 4 – 51 km – 46.8°
Search effort: 1.09 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C03	
Side:	L	R
% sightings:	27	73
% individuals:	18	82

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	40	0	
Live elephant (>9):	2	0	
Elephant carcass:	8	0	
Live elephant (<10):	8	0	



LIVE ELEPHANTS

IN SAMPLE:	**87 (10)**
Bulls:	10 (5)
Family:	77 (5)
NOT IN SAMPLE:	**198 (35)**
Outside search strip:	75
Off transect:	123

ELEPHANT CARCASSES

IN SAMPLE:	**8 (8)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	8 (8)
Category 4:	0 (0)
NOT IN SAMPLE:	**4 (4)**
Outside search strip:	2
Off transect:	2

OTHER SPECIES

Other wildlife species:	5
Other wildlife count:	64
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 3.182, N = 51, w = 314

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	921	921	85	85
Variance of estimate	$Var\hat{Y}$	360217	360217	395	395
Standard error	$SE\hat{Y}$	600	600	20	20
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 1910	± 1910	± 63	± 63
Percentage of relative precision	$PRP\hat{Y}$	207 %	207 %	75 %	75 %
Density per sqkm	$R\hat{Y}$	5.468	5.468	0.503	0.503
Variance between transect counts	s^2_y	632.25	632.25	0.667	0.667
Variance between transect areas	s^2_a	0.479	0.479	0.479	0.479
Covariance between counts & areas	s_{ay}	5.857	5.857	0.148	0.148

CARCASS RATIOS

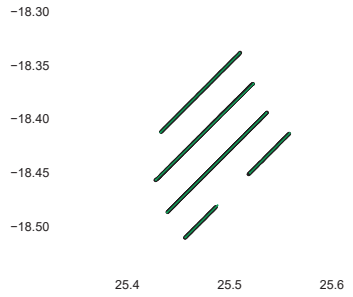
$CR_{1:4} = 8.4$ %
$CR_{1:2} = 0$ %

KZFR – Kazuma FR — BOTSWANA – NORTHERN BOTSWANA

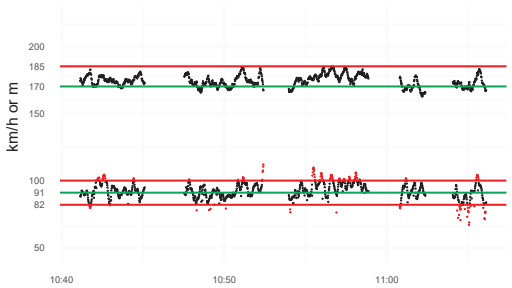
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20220910A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



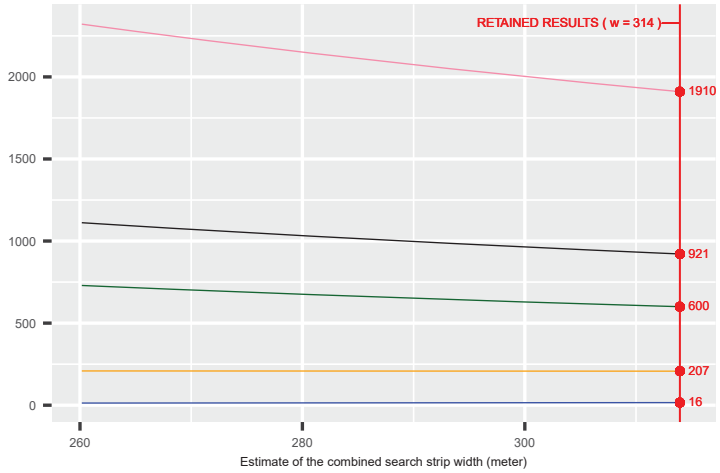
SPEED
Average: 174.2 km/h
Standard dev.: 4.4 km/h

HEIGHT AGL
Average: 92.4 m (303 ft)
Standard dev.: 6.1 m (20.1 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C03 – Left: [103 – 157]
C03 – Right: [145 – 174]



LIVE ELEPHANT ESTIMATE: [1112 – 921]
CONFIDENCE INTERVAL: ± [2321 – 1910]
SAMPLE AREA: [13 – 16] sqkm
SE: [729 – 600]
PRP: [209 – 207] %

KZFR – Kazuma FR — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: KZFR **N:** 52 S_a^2: 0,479
STRATUM NAME: Kazuma Forest Reserve **w:** 314 ***df*:** 3

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	13	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	24	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	10	26	106	266	0,628	6993	83,62	0	372	251	11,000	-0,095
elephant family	Loxodonta africana family	77	172	815	1690	4,839	281896	530,94	0	2505	207	502,250	5,952
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	8	4	85	63	0,503	395	19,87	21	148	75	0,667	0,148
elephant carcass four	Loxodonta africana carcass four	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
giraffe	Giraffa giraffa	9	3	95	295	0,566	8608	92,78	0	391	310	14,917	1,016
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	9	0	95	124	0,566	1524	39,04	0	220	130	2,917	0,535
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	19	41	201	419	1,194	17318	131,60	0	620	208	32,250	2,063
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	27	0	286	1034	1,697	105535	324,86	0	1320	362	182,250	3,820
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	87	198	921	1910	5,468	360217	600,18	0	2831	207	632,250	5,857
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	8	4	85	63	0,503	395	19,87	21	148	75	0,667	0,148
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	8	4	85	63	0,503	395	19,87	21	148	75	0,667	0,148

LIAMBW – Liambezi Botswana

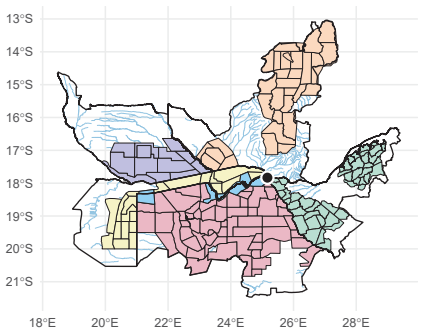
BOTSWANA – NORTHERN BOTSWANA

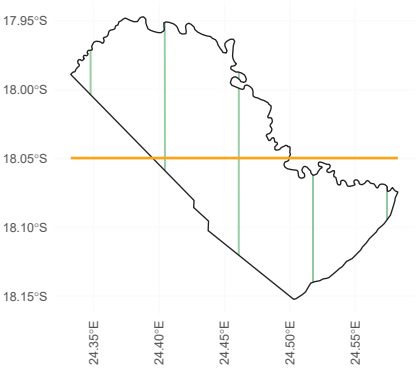
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: LIAMBW
STRATUM NAME: Liambezi Botswana
■ STRATUM AREA: 249.24 sqkm
• SURVEY BASE: Kasane
DISTANCE TO SURVEY BASE: 80 km

– TRANSECTS: 5 (41 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 4.9 %

– BASELINE DISTANCE: 26.46 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.8 h
Crew(s): C03
KES2022_V5WOT20221001A 07:25–11:10

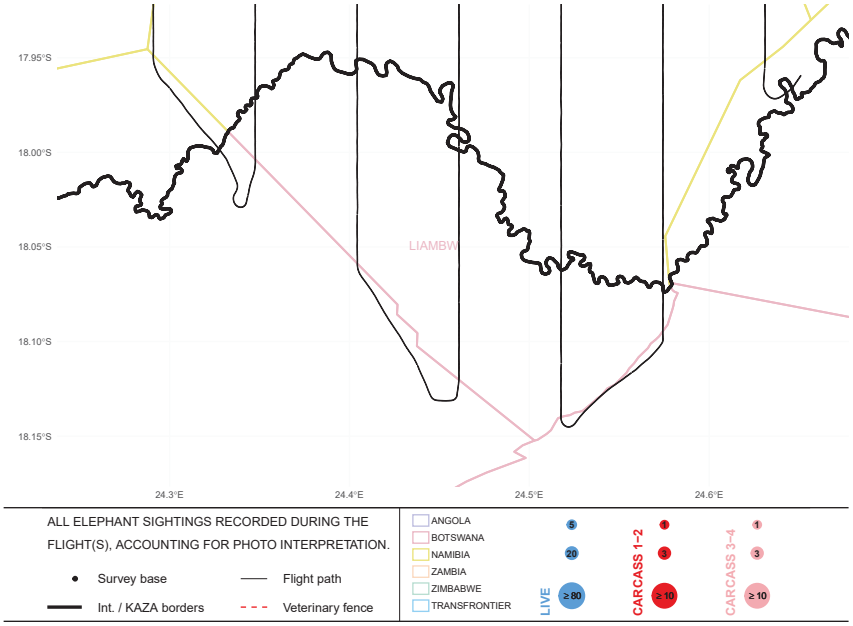
Actual sampling intensity: 5.2 %
Transect flying time: 0.2 h
Transects: 5 – 41 km – 0°
Search effort: 1.1 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C03
Side:	L R
% sightings:	
% individuals:	

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	0		
Live elephant (>9):	0		
Elephant carcass:	0		
Live elephant (<10):	0		



LIVE ELEPHANTS

IN SAMPLE:	**0 (0)**
Bulls:	0 (0)
Family:	0 (0)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**0 (0)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	0 (0)
Category 4:	0 (0)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

OTHER SPECIES

Other wildlife species:	0
Other wildlife count:	0
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.776, N = 83, w = 316

		LIVE OBS	LIVE FINAL	ALL CARCASSES OBS	ALL CARCASSES FINAL
Population estimate	$\hat{Y}$	–	–	–	–
Variance of estimate	$Var\hat{Y}$	–	–	–	–
Standard error	$SE\hat{Y}$	–	–	–	–
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	–	–	–	–
Percentage of relative precision	$PRP\hat{Y}$	–	–	–	–
Density per sqkm	$R\hat{Y}$	–	–	–	–
Variance between transect counts	s^2_y	–	–	–	–
Variance between transect areas	s^2_a	–	–	–	–
Covariance between counts & areas	s_{ay}	–	–	–	–

CARCASS RATIOS

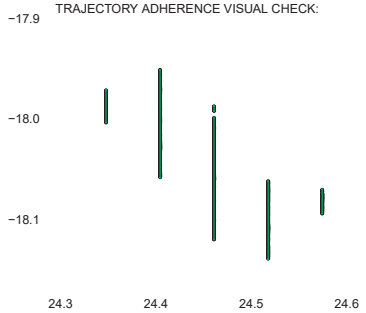
$CR_{1:4}$ = n/a
$CR_{1:2}$ = n/a

LIAMBW – Liambezi Botswana — BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20221001A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:

SPEED
Average: 172.4 km/h
Standard dev.: 6.5 km/h

HEIGHT AGL
Average: 92.9 m (304.9 ft)
Standard dev.: 4.2 m (13.7 ft)

LIAMBW – Liambezi Botswana — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: LIAMBW **N:** 84 S_a^2: 2,484
STRATUM NAME: Liambezi Botswana **w:** 316 ***df***: 4

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant family	Loxodonta africana family	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass four	Loxodonta africana carcass four	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	72	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000

MAC – Maikaelelo Complex

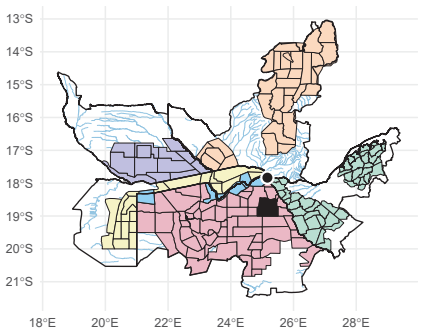
BOTSWANA – NORTHERN BOTSWANA

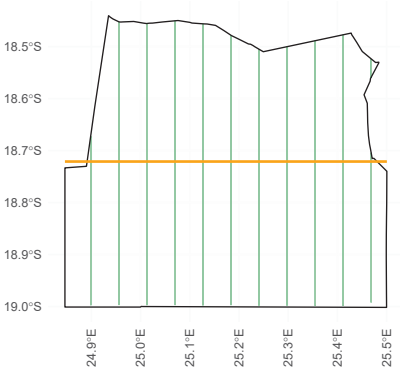
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: MAC
STRATUM NAME: Maikaelelo Complex
■ STRATUM AREA: 3722.5 sqkm
• SURVEY BASE: Kasane
DISTANCE TO SURVEY BASE: 99 km

– TRANSECTS: 11 (600 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 4.8 %

– BASELINE DISTANCE: 68.99 km





SURVEY IMPLEMENTATION

Number of flight(s): 2
Combined flying time: 8.3 h
Crew(s): C02, C03
KES2022_V5LJB20220910A 07:25–11:57
KES2022_V5WOT20220910A 07:56–11:44

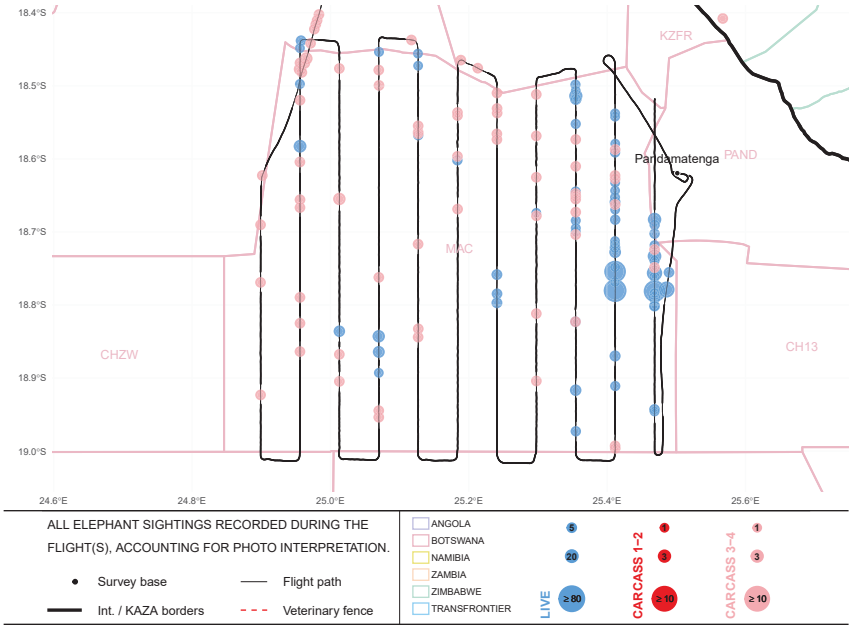
Actual sampling intensity: 5.2 %
Transect flying time: 3.4 h
Transects: 11 – 600 km – 0°
Search effort: 1.08 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C02		C03	
Side:	L	R	L	R
% sightings:	62	38	50	50
% individuals:	75	25	44	56

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	121	0	
Live elephant (>9):	3	0	
Elephant carcass:	50	0	
Live elephant (<10):	19	0	



LIVE ELEPHANTS

IN SAMPLE:	**89 (22)**
Bulls:	27 (14)
Family:	62 (8)
NOT IN SAMPLE:	**441 (49)**
Outside search strip:	378
Off transect:	63

ELEPHANT CARCASSES

IN SAMPLE:	**51 (50)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	1 (1)
Category 4:	50 (49)
NOT IN SAMPLE:	**44 (38)**
Outside search strip:	9
Off transect:	35

OTHER SPECIES

Other wildlife species:	11
Other wildlife count:	99
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.228, N = 215, w = 320

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	1725	1725	989	989
Variance of estimate	$\mathrm{Var}\hat{Y}$	350164	350164	9370	9370
Standard error	$\mathrm{SE}\hat{Y}$	592	592	97	97
95% confidence interval	$\mathrm{CI}_{\hat{Y}}^{95\%}$	± 1318	± 1318	± 216	± 216
Percentage of relative precision	$\mathrm{PRP}_{\hat{Y}}$	76 %	76 %	22 %	22 %
Density per sqkm	$R_{\hat{Y}}$	0.463	0.463	0.266	0.266
Variance between transect counts	s_y^2	84.491	84.491	3.455	3.455
Variance between transect areas	s_a^2	8.914	8.914	8.914	8.914
Covariance between counts & areas	s_{ay}	−0.888	−0.888	3.293	3.293

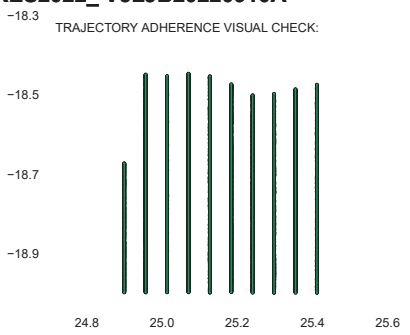
CARCASS RATIOS

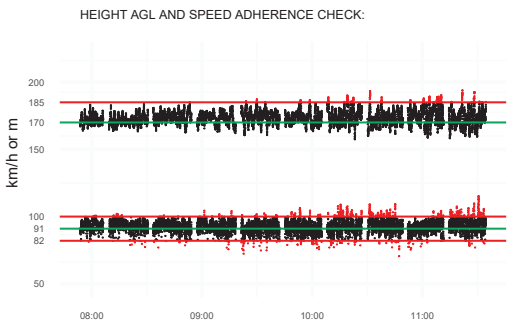
$CR_{1:4} = 36.4\ \%$
$CR_{1:2} = 0\ \%$

MAC – Maikaelelo Complex — BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20220910A

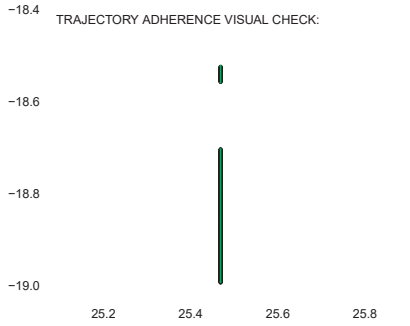


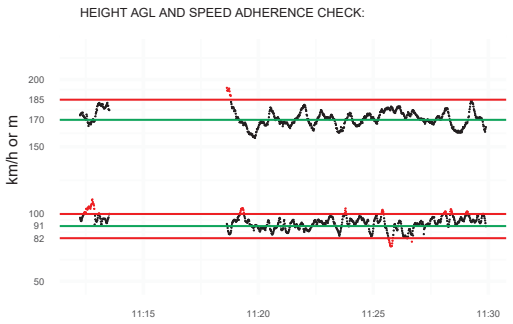


SPEED
Average: 173.4 km/h
Standard dev.: 5 km/h

HEIGHT AGL
Average: 92.6 m (303.8 ft)
Standard dev.: 4.4 m (14.5 ft)

KES2022_ V5WOT20220910A





SPEED
Average: 171.2 km/h
Standard dev.: 6 km/h

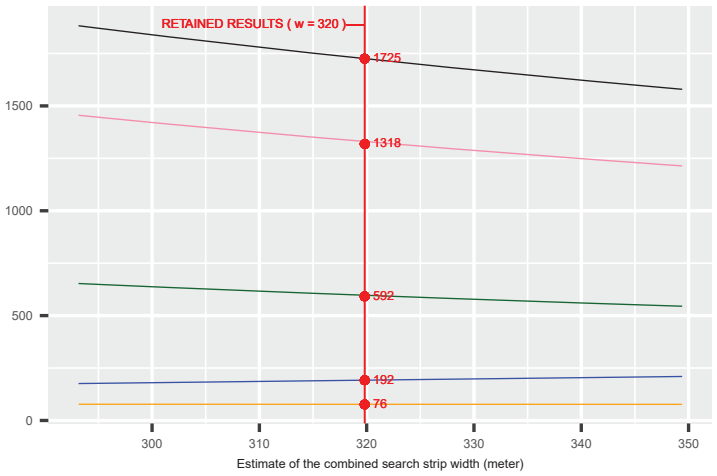
HEIGHT AGL
Average: 93.4 m (306.5 ft)
Standard dev.: 5.2 m (17.2 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C02 – Left: [156 – 178]
C02 – Right: [135 – 187]

C03 – Left: [105 – 158]
C03 – Right: [147 – 176]



LIVE ELEPHANT ESTIMATE: [1882 – 1579]
CONFIDENCE INTERVAL: ± [1455 – 1214]
SAMPLE AREA: [176 – 210] sqkm
SE: [653 – 545]
PRP: [77 – 77] %

MAC – Maikaelelo Complex — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: MAC **N:** 216 S_a^2: 8,914
STRATUM NAME: Maikaelelo Complex **w:** 320 ***df*:** 10

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	5	0	97	68	0,026	940	30,66	29	165	70	0,273	0,857
eland	Tragelaphus oryx	3	0	58	132	0,016	3519	59,32	0	190	227	0,818	-1,802
elephant bulls	Loxodonta africana males	27	89	523	558	0,141	62680	250,36	0	1081	107	14,873	-2,010
elephant family	Loxodonta africana family	62	352	1202	1158	0,323	270002	519,62	44	2360	96	67,055	1,121
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	1	0	19	44	0,005	391	19,77	0	63	227	0,091	-0,601
elephant carcass four	Loxodonta africana carcass four	50	44	969	230	0,260	10636	103,13	739	1199	24	4,073	3,893
giraffe	Giraffa giraffa	37	4	717	452	0,193	41138	202,82	265	1169	63	9,855	-0,162
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	3	0	58	91	0,016	1660	40,74	0	149	156	0,418	0,222
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	4	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	13	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	12	0	233	258	0,062	13405	115,78	0	491	111	3,491	1,492
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	31	6	601	783	0,161	123561	351,51	0	1384	130	31,364	2,527
all elephants	Loxodonta africana all	89	441	1725	1318	0,463	350164	591,75	407	3044	76	84,491	-0,888
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	51	44	989	216	0,266	9370	96,80	773	1204	22	3,455	3,293
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	51	44	989	216	0,266	9370	96,80	773	1204	22	3,455	3,293

MN – Maun

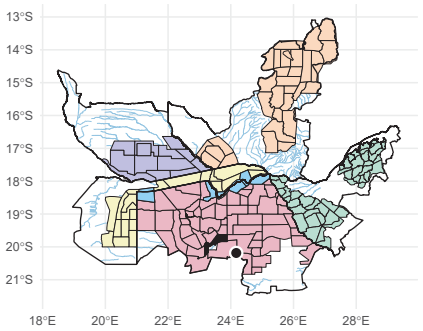
BOTSWANA – NORTHERN BOTSWANA

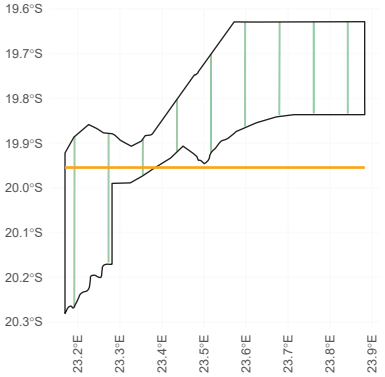
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: MN
STRATUM NAME: Maun
■ STRATUM AREA: 1694.26 sqkm
• SURVEY BASE: Matopi
DISTANCE TO SURVEY BASE: 97 km

– TRANSECTS: 9 (218 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 3.9 %

– BASELINE DISTANCE: 74.65 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3 h
Crew(s): C01
KES2022_V5IIM20220918A 06:11–09:10

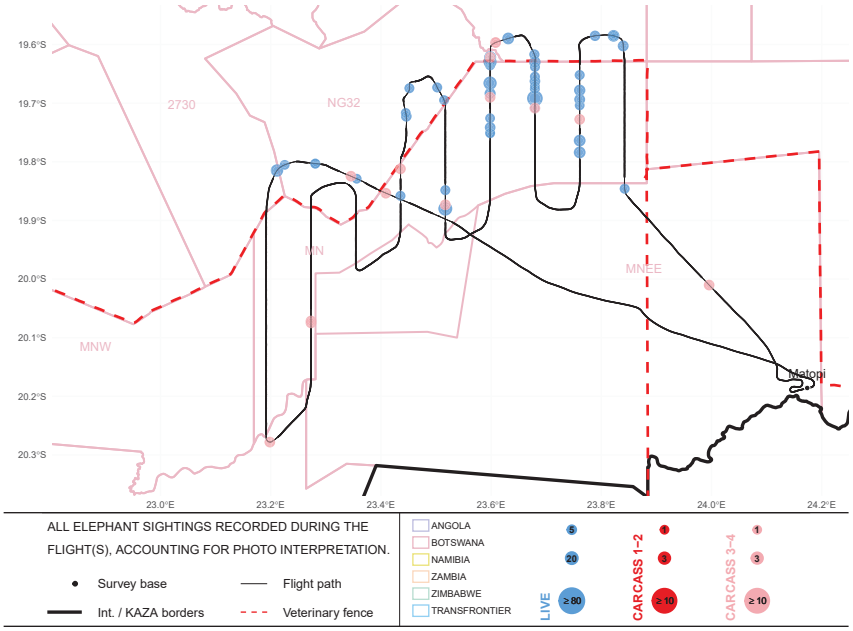
Actual sampling intensity: 4.1 %
Transect flying time: 1.3 h
Transects: 9 – 218 km – 0°
Search effort: 1.13 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	48	52
% individuals:	67	33

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	60	26.67	43.75
Live elephant (>9):	3	100	66.67
Elephant carcass:	5	100	60
Live elephant (<10):	14	7.14	0



LIVE ELEPHANTS

IN SAMPLE:	**86 (17)**
Bulls:	17 (9)
Family:	69 (8)
NOT IN SAMPLE:	**161 (34)**
Outside search strip:	80
Off transect:	81

ELEPHANT CARCASSES

IN SAMPLE:	**5 (5)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	2 (2)
Category 4:	3 (3)
NOT IN SAMPLE:	**9 (9)**
Outside search strip:	2
Off transect:	7

OTHER SPECIES

Other wildlife species:	8
Other wildlife count:	87
Domestic count:	875

ELEPHANT DATA ANALYSIS

t = 2.306, N = 234, w = 318

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	2219	2097	98	122
Variance of estimate	$Var\hat{Y}$	993363	972836	1937	2058
Standard error	$SE\hat{Y}$	997	986	44	45
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 2298	± 2274	± 101	± 105
Percentage of relative precision	$PRP\hat{Y}$	104 %	108 %	104 %	86 %
Density per sqkm	$R\hat{Y}$	1.31	1.238	0.058	0.072
Variance between transect counts	s^2_y	156.611	155.778	0.278	0.278
Variance between transect areas	s^2_a	9.563	9.563	9.563	9.563
Covariance between counts & areas	s_{ay}	1.622	2.08	−0.17	−0.155

CARCASS RATIOS

$CR_{1:4} = 5.5$ %
$CR_{1:2} = 0$ %

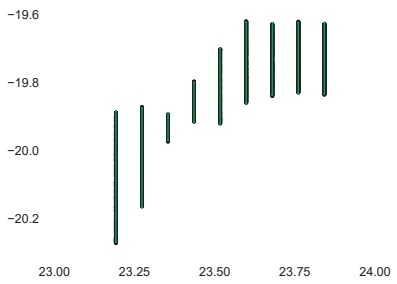
MN – Maun

BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20220918A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:

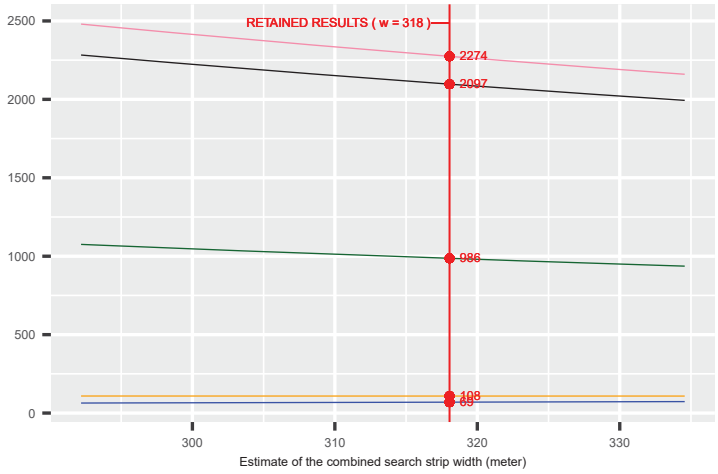
SPEED
Average: 165.4 km/h
Standard dev.: 12.2 km/h

HEIGHT AGL
Average: 92.3 m (302.8 ft)
Standard dev.: 4 m (13.2 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C01 – Left: [159 – 192]
C01 – Right: [120 – 161]



LIVE ELEPHANT ESTIMATE: [2283 – 1994]
CONFIDENCE INTERVAL: ± [2480 – 2160]
SAMPLE AREA: [64 – 73] sqkm
SE: [1075 – 937]
PRP: [109 – 108] %

MN – Maun

BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: MN **N:** 235 S_a^2: 9,563
STRATUM NAME: Maun **w:** 318 ***df*:** 8

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	76	10	1853	4451	1,094	3725884	1930,26	0	6304	240	623,028	0,667
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	659	99	16069	14162	9,485	37718647	6141,55	1907	30232	88	5287,444	-13,732
donkey	Equus asinus	61	2	1487	1065	0,878	213382	461,93	422	2553	72	32,944	2,314
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	17	40	415	591	0,245	65695	256,31	0	1006	143	10,611	0,045
elephant family	Loxodonta africana family	69	121	1683	1786	0,993	599727	774,42	0	3468	106	96,500	2,034
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	2	6	49	76	0,029	1077	32,81	0	124	155	0,194	0,337
elephant carcass four	Loxodonta africana carcass four	3	3	73	99	0,043	1827	42,74	0	172	135	0,250	-0,493
giraffe	Giraffa giraffa	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	1	0	24	59	0,014	663	25,75	0	84	244	0,111	0,015
horse	Equus caballus	8	5	195	322	0,115	19528	139,74	0	517	165	2,861	-1,432
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	3	2	73	162	0,043	4909	70,06	0	235	221	1,000	2,129
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	4	4	98	156	0,058	4574	67,63	0	254	160	1,028	2,452
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	147	0	3585	4249	2,116	3395146	1842,59	0	7834	119	483,000	-12,056
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	2	0	49	119	0,029	2668	51,65	0	168	244	0,444	-0,016
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	86	161	2097	2274	1,238	972836	986,32	0	4372	108	155,778	2,080
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	5	9	122	105	0,072	2058	45,37	17	227	86	0,278	-0,155
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	5	9	122	105	0,072	2058	45,37	17	227	86	0,278	-0,155

MNEE – Maun East Extended

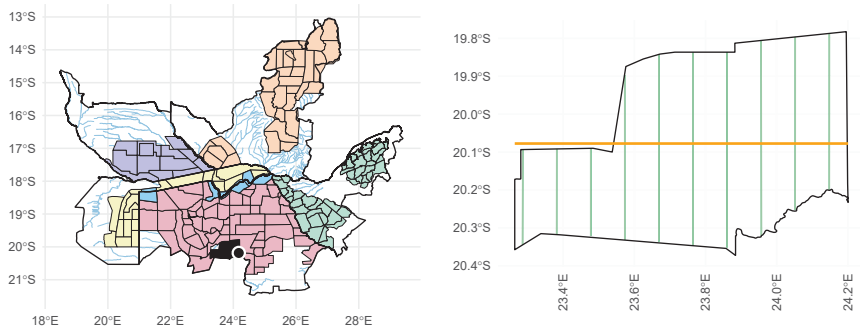
BOTSWANA – NORTHERN BOTSWANA

SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: MNEE
STRATUM NAME: Maun East Extended
■ STRATUM AREA: 4349.46 sqkm
• SURVEY BASE: Matopi
DISTANCE TO SURVEY BASE: 38 km

– TRANSECTS: 10 (454 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 3.1 %

– BASELINE DISTANCE: 97.91 km



SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.9 h
Crew(s): C03
KES2022_V5WOT20220917A 06:27–10:19

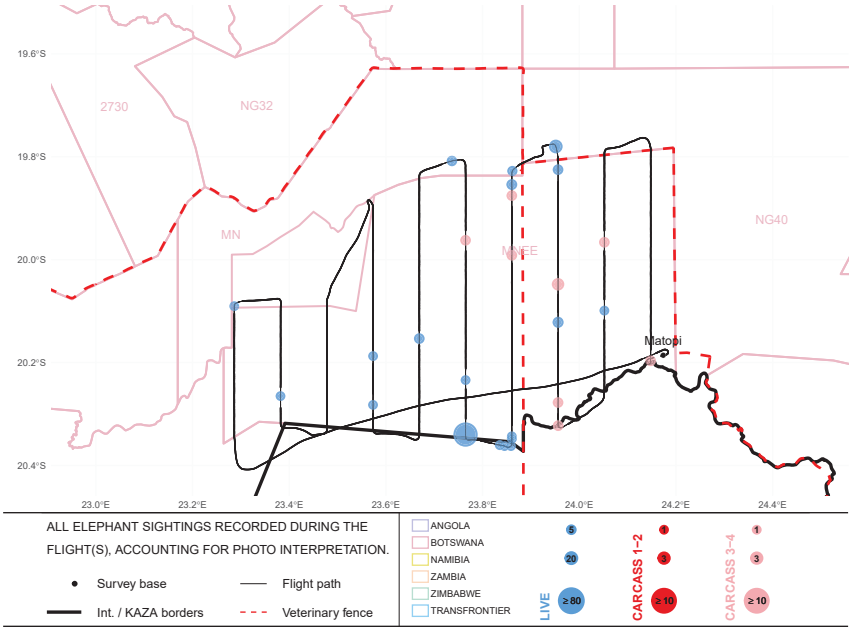
Actual sampling intensity: 3.3 %
Transect flying time: 2.6 h
Transects: 10 – 454 km – 0°
Search effort: 1.09 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C03	
Side:	L	R
% sightings:	38	62
% individuals:	32	68

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	52	36.54	31.58
Live elephant (>9):	1	100	100
Elephant carcass:	7	42.86	0
Live elephant (<10):	8	62.5	0



LIVE ELEPHANTS

IN SAMPLE:	**58 (9)**
Bulls:	5 (5)
Family:	53 (4)
NOT IN SAMPLE:	**72 (12)**
Outside search strip:	42
Off transect:	30

ELEPHANT CARCASSES

IN SAMPLE:	**8 (7)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	5 (4)
Category 4:	3 (3)
NOT IN SAMPLE:	**1 (1)**
Outside search strip:	1
Off transect:	0

OTHER SPECIES

Other wildlife species:	10
Other wildlife count:	32
Domestic count:	1348

ELEPHANT DATA ANALYSIS

t = 2.262, N = 310, w = 315

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	1519	1762	243	243
Variance of estimate	$Var\hat{Y}$	733476	1186467	11689	11689
Standard error	$SE\hat{Y}$	856	1089	108	108
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 1937	± 2464	± 245	± 245
Percentage of relative precision	$PRP\hat{Y}$	128 %	140 %	101 %	101 %
Density per sqkm	$R\hat{Y}$	0.349	0.405	0.056	0.056
Variance between transect counts	s^2_y	89.333	141.956	1.511	1.511
Variance between transect areas	s^2_a	18.644	18.644	18.644	18.644
Covariance between counts & areas	s_{ay}	18.55	21.959	2.827	2.827

CARCASS RATIOS

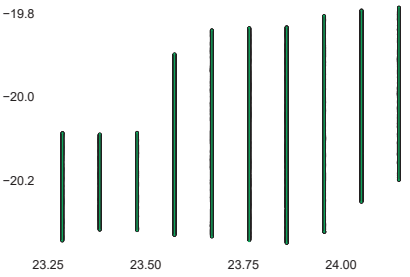
$CR_{1:4}$ = 12.1 %
$CR_{1:2}$ = 0 %

MNEE – Maun East Extended — BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20220917A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:

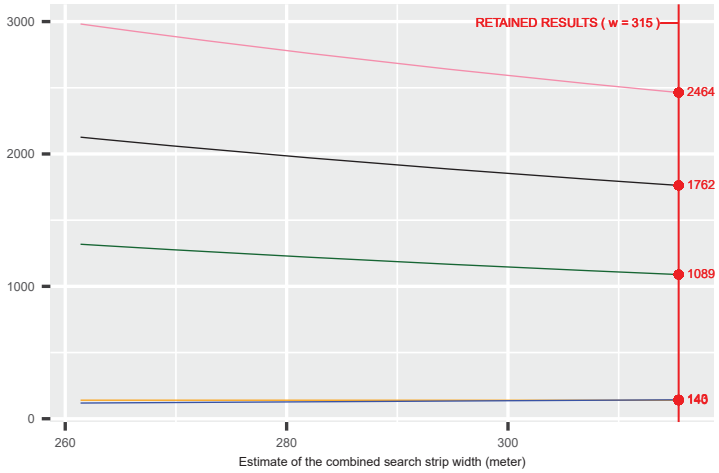
SPEED
Average: 173.4 km/h
Standard dev.: 5.6 km/h

HEIGHT AGL
Average: 92.8 m (304.6 ft)
Standard dev.: 4.2 m (13.7 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C03 – Left: [104 – 157]
C03 – Right: [146 – 175]



LIVE ELEPHANT ESTIMATE: [2127 – 1762]
CONFIDENCE INTERVAL: ± [2982 – 2464]
SAMPLE AREA: [119 – 143] sqkm
SE: [1318 – 1089]
PRP: [140 – 140] %

MNEE – Maun East Extended — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: MNEE **N:** 310 S_a^2: 18,644
STRATUM NAME: Maun East Extended **w:** 315 ***df***: 9

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	723	52	21970	15833	5,051	48983956	6998,85	6138	37803	72	5939,344	115,086
donkey	Equus asinus	51	7	1550	1194	0,356	278758	527,98	355	2744	77	24,100	-4,804
duiker	Sylvicapra grimmia	1	0	30	67	0,007	886	29,77	0	98	222	0,100	0,419
eland	Tragelaphus oryx	1	0	30	68	0,007	897	29,95	0	98	223	0,100	0,338
elephant bulls	Loxodonta africana males	5	22	152	124	0,035	3021	54,96	28	276	82	0,278	-0,335
elephant family	Loxodonta africana family	53	50	1611	2431	0,370	1154892	1074,66	0	4042	151	137,789	22,294
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	5	0	152	199	0,035	7770	88,15	0	351	131	0,944	1,918
elephant carcass four	Loxodonta africana carcass four	3	1	91	99	0,021	1897	43,56	0	190	108	0,233	0,908
giraffe	Giraffa giraffa	0	2	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	14	17	425	796	0,098	123724	351,74	0	1221	187	14,267	6,025
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	9	9	273	655	0,063	83789	289,46	0	928	239	8,100	-6,446
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	3	0	91	96	0,021	1818	42,64	0	188	106	0,233	1,110
ostrich	Struthio camelus	7	4	213	249	0,049	12152	110,24	0	462	117	1,344	0,879
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	541	50	16440	15732	3,780	48366011	6954,57	707	32172	96	4196,544	-95,672
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	7	6	213	471	0,049	43437	208,42	0	684	222	4,900	2,934
zebra	Equus spp,	3	0	91	208	0,021	8431	91,82	0	299	228	0,900	0,099
all elephants	Loxodonta africana all	58	72	1762	2464	0,405	1186467	1089,25	0	4227	140	141,956	21,959
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	8	1	243	245	0,056	11689	108,12	0	488	101	1,511	2,827
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	8	1	243	245	0,056	11689	108,12	0	488	101	1,511	2,827

MNPE – Mak. Pan NP East

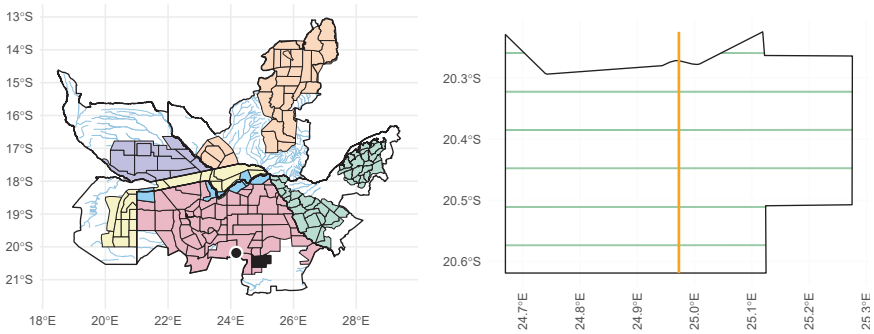
BOTSWANA – NORTHERN BOTSWANA

SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: MNPE
STR. NAME: Makgadikgadi Pans NP East
■ STRATUM AREA: 2249.46 sqkm
• SURVEY BASE: Matopi
DISTANCE TO SURVEY BASE: 87 km

– TRANSECTS: 6 (296 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 3.9 %

– BASELINE DISTANCE: 43.69 km



SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 4.3 h
Crew(s): C01
KES2022_V5IIM20220916A 06:32–10:51

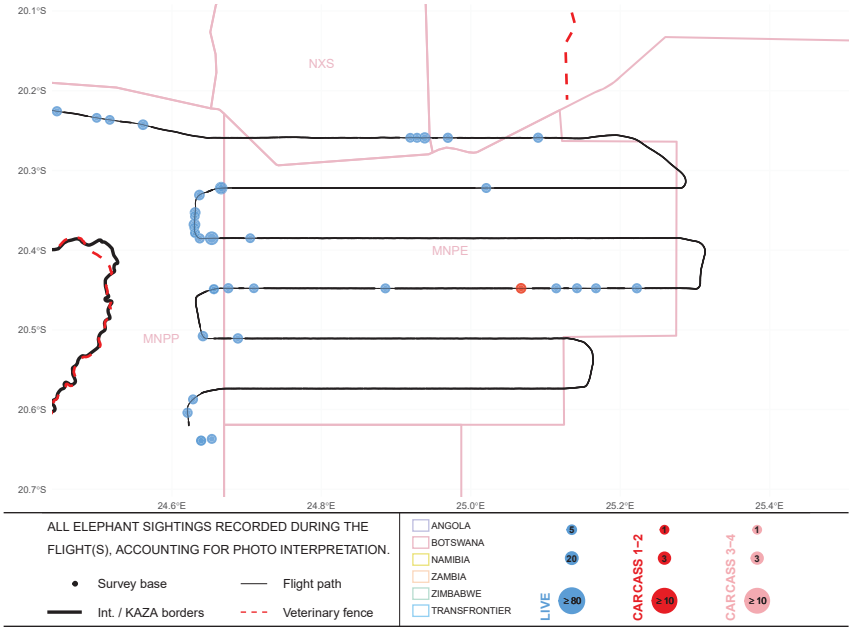
Actual sampling intensity: 4.2 %
Transect flying time: 1.8 h
Transects: 6 – 296 km – 90°
Search effort: 1.14 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	38	62
% individuals:	32	68

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	20	50	40
Live elephant (>9):	0		
Elephant carcass:	1	100	0
Live elephant (<10):	6	83.33	20



LIVE ELEPHANTS

IN SAMPLE:	**12 (6)**
Bulls:	12 (6)
Family:	0 (0)
NOT IN SAMPLE:	**151 (42)**
Outside search strip:	13
Off transect:	138

ELEPHANT CARCASSES

IN SAMPLE:	**1 (1)**
Category 1:	0 (0)
Category 2:	1 (1)
Category 3:	0 (0)
Category 4:	0 (0)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

OTHER SPECIES

Other wildlife species:	6
Other wildlife count:	711
Domestic count:	62

ELEPHANT DATA ANALYSIS

t = 2.571, N = 137, w = 318

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	263	287	24	24
Variance of estimate	$Var\hat{Y}$	25027	31353	456	456
Standard error	$SE\hat{Y}$	158	177	21	21
95% confidence interval	$CI_{\hat{Y}}^{95\%}$	± 407	± 455	± 55	± 55
Percentage of relative precision	$PRP_{\hat{Y}}$	154 %	158 %	229 %	229 %
Density per sqkm	$R_{\hat{Y}}$	0.117	0.128	0.011	0.011
Variance between transect counts	s_y^2	7.767	10	0.167	0.167
Variance between transect areas	s_a^2	41.18	41.18	41.18	41.18
Covariance between counts & areas	s_{ay}	0.076	1.006	0.93	0.93

CARCASS RATIOS

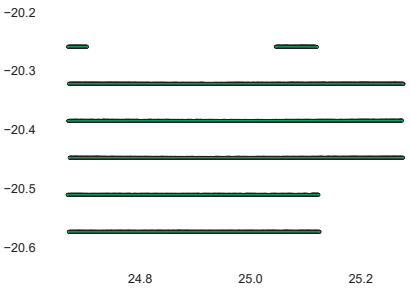
$CR_{1:4}$ = 7.7 %
$CR_{1:2}$ = 7.7 %

MNPE – Mak. Pan NP East — BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20220916A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:

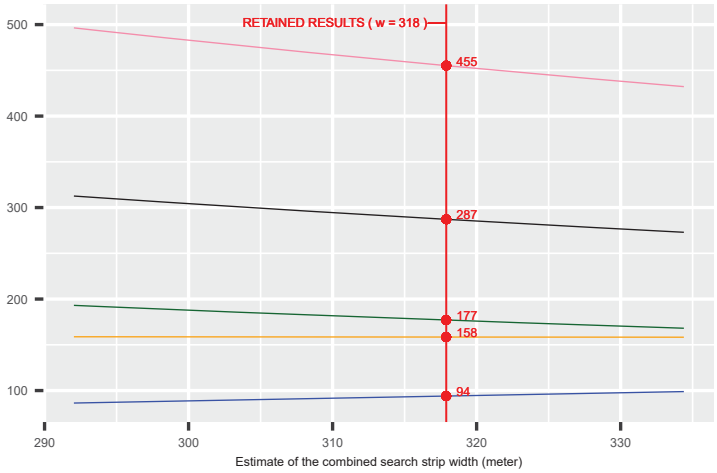
SPEED
Average: 164.5 km/h
Standard dev.: 8.2 km/h

HEIGHT AGL
Average: 92.3 m (302.8 ft)
Standard dev.: 4 m (13.3 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C01 – Left: [159 – 192]
C01 – Right: [120 – 161]



LIVE ELEPHANT ESTIMATE: [313 – 273]
CONFIDENCE INTERVAL: ± [496 – 432]
SAMPLE AREA: [86 – 99] sqkm
SE: [193 – 168]
PRP: [159 – 158] %

MNPE – Mak. Pan NP East — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: MNPE **N:** 137 S_a^2: 41,180
STRATUM NAME: Makgadikgadi Pans NP East **w:** 318 ***df***: 5

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	14	19	335	522	0,149	41247	203,09	0	857	156	16,667	13,023
donkey	Equus asinus	3	2	72	165	0,032	4106	64,08	0	237	229	1,500	2,791
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	12	83	287	455	0,128	31353	177,07	0	742	158	10,000	1,006
elephant family	Loxodonta africana family	0	68	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	1	0	24	55	0,011	456	21,36	0	79	229	0,167	0,930
elephant carcass three	Loxodonta africana carcass three	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass four	Loxodonta africana carcass four	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	13	11	311	714	0,138	77099	277,67	0	1025	229	28,167	12,094
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	46	11	1101	1144	0,489	198047	445,02	0	2245	104	97,067	42,039
ostrich	Struthio camelus	26	15	622	493	0,277	36716	191,61	130	1115	79	16,267	13,055
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	32	40	766	1757	0,340	467154	683,49	0	2523	229	170,667	29,771
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	1	0	24	59	0,011	526	22,93	0	83	246	0,167	-0,153
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	234	423	5600	8178	2,489	10120682	3181,30	0	13778	146	3740,400	127,325
zebra	Equus spp,	402	139	9620	19130	4,277	55378986	7441,71	0	28750	199	17718,400	9,003
all elephants	Loxodonta africana all	12	151	287	455	0,128	31353	177,07	0	742	158	10,000	1,006
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	1	0	24	55	0,011	456	21,36	0	79	229	0,167	0,930
all elephant carcasses	Loxodonta africana carcass all	1	0	24	55	0,011	456	21,36	0	79	229	0,167	0,930
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000

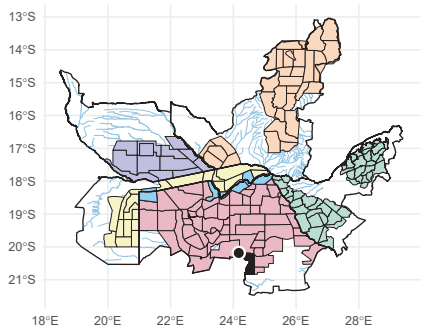
MNPP – Mak NP and Pan — BOTSWANA – NORTHERN BOTSWANA

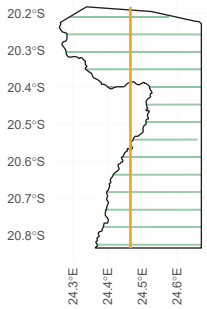
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: MNPP
STRATUM NAME: Mak NP and Pan
■ STRATUM AREA: 1974.81 sqkm
• SURVEY BASE: Matopi
DISTANCE TO SURVEY BASE: 56 km

– TRANSECTS: 15 (385 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 5.8 %

– BASELINE DISTANCE: 72.06 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.9 h
Crew(s): C01
KES2022_V5IIM20220917A 06:42–10:36

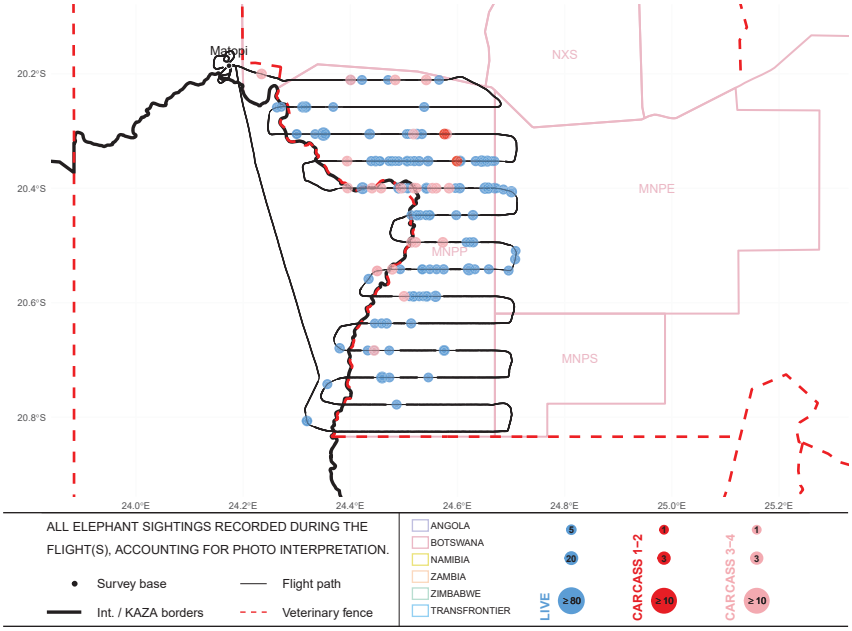
Actual sampling intensity: 6.2 %
Transect flying time: 2.3 h
Transects: 15 – 385 km – 90°
Search effort: 1.13 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	43	57
% individuals:	47	53

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	143	30.07	6.98
Live elephant (>9):	1	100	0
Elephant carcass:	15	33.33	40
Live elephant (<10):	42	50	0



LIVE ELEPHANTS

IN SAMPLE:	**123 (43)**
Bulls:	61 (32)
Family:	62 (11)
NOT IN SAMPLE:	**247 (81)**
Outside search strip:	195
Off transect:	52

ELEPHANT CARCASSES

IN SAMPLE:	**15 (15)**
Category 1:	0 (0)
Category 2:	1 (1)
Category 3:	10 (10)
Category 4:	4 (4)
NOT IN SAMPLE:	**11 (11)**
Outside search strip:	4
Off transect:	7

OTHER SPECIES

Other wildlife species:	9
Other wildlife count:	1514
Domestic count:	173

ELEPHANT DATA ANALYSIS

t = 2.145, N = 225, w = 319

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	1980	1980	225	241
Variance of estimate	$Var\hat{Y}$	276757	276757	6499	8340
Standard error	$SE\hat{Y}$	526	526	81	91
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 1128	± 1128	± 173	± 196
Percentage of relative precision	$PRP\hat{Y}$	57 %	57 %	77 %	81 %
Density per sqkm	$R\hat{Y}$	1.003	1.003	0.114	0.122
Variance between transect counts	s^2_y	74.171	74.171	1.924	2.429
Variance between transect areas	s^2_a	10.588	10.588	10.588	10.588
Covariance between counts & areas	s_{ay}	−1.151	−1.151	0.07	−0.158

CARCASS RATIOS

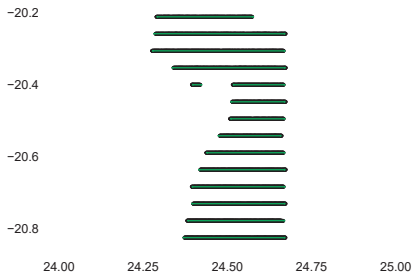
$CR_{1:4} = 10.9$ %
$CR_{1:2} = 0.8$ %

MNPP – Mak NP and Pan — BOTSWANA – NORTHERN BOTSWANA

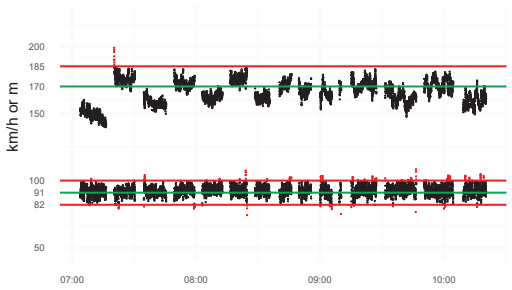
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20220917A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



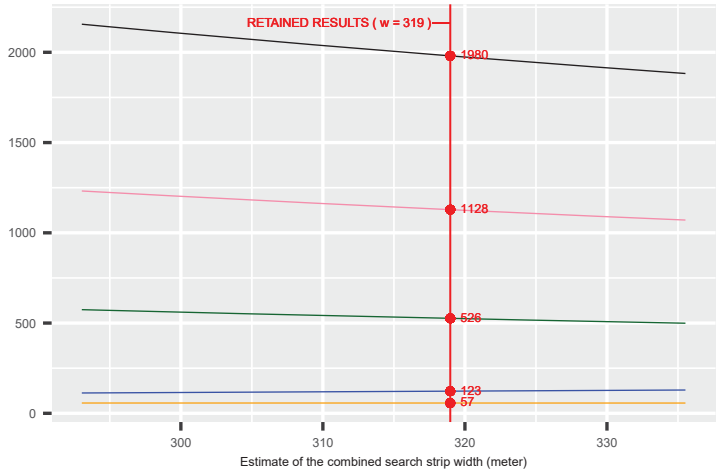
SPEED
Average: 165.3 km/h
Standard dev.: 8.7 km/h

HEIGHT AGL
Average: 92.5 m (303.6 ft)
Standard dev.: 3.6 m (11.9 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C01 – Left: [160 – 192]
C01 – Right: [121 – 162]



LIVE ELEPHANT ESTIMATE: [2156 – 1883]
CONFIDENCE INTERVAL: ± [1232 – 1071]
SAMPLE AREA: [113 – 129] sqkm
SE: [574 – 499]
PRP: [57 – 57] %

MNPP – Mak NP and Pan — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: MNPP **N:** 226 S_a^2: 10,588
STRATUM NAME: Makgadikgadi Pans NP and Pan **w:** 319 ***df*:** 14

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	164	40	2640	3196	1,337	2220624	1490,18	0	5836	121	560,781	-44,637
donkey	Equus asinus	3	0	48	93	0,024	1885	43,42	0	141	193	0,600	0,263
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	61	177	982	556	0,497	67224	259,28	426	1538	57	17,352	-1,198
elephant family	Loxodonta africana family	62	70	998	797	0,505	138164	371,70	201	1795	80	40,838	0,048
elephant carcass one	Loxodonta africana carcass one	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	1	0	16	30	0,008	196	14,00	0	46	186	0,067	0,350
elephant carcass three	Loxodonta africana carcass three	10	7	161	146	0,082	4621	67,98	15	307	91	1,381	-0,021
elephant carcass four	Loxodonta africana carcass four	4	3	64	61	0,033	802	28,32	4	125	94	0,210	-0,487
giraffe	Giraffa giraffa	37	21	596	486	0,302	51444	226,81	109	1082	82	16,410	1,952
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	5	0	80	161	0,041	5621	74,97	0	241	200	1,667	-1,047
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	4	8	64	100	0,033	2187	46,77	0	165	156	0,638	-0,602
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	51	6	821	639	0,416	88858	298,09	182	1460	78	23,257	-3,470
ostrich	Struthio camelus	15	3	241	161	0,122	5640	75,10	80	403	67	1,857	0,981
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	73	82	1175	1659	0,595	598322	773,51	0	2834	141	177,552	-5,926
zebra	Equus spp,	1330	1149	21413	22153	10,843	106682216	10328,71	0	43566	103	31056,238	-59,178
all elephants	Loxodonta africana all	123	247	1980	1128	1,003	276757	526,08	852	3109	57	74,171	-1,151
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	1	1	16	30	0,008	196	14,00	0	46	186	0,067	0,350
all elephant carcasses	Loxodonta africana carcass all	15	11	241	196	0,122	8340	91,33	46	437	81	2,429	-0,158
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	14	10	225	190	0,114	7825	88,46	36	415	84	2,210	-0,508

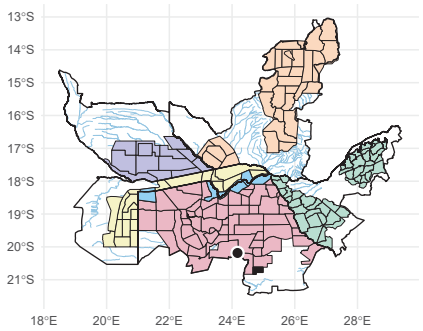
MNPS – Mak. Pan NP South — BOTSWANA – NORTHERN BOTSWANA

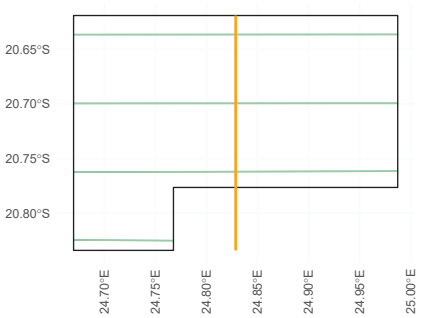
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: MNPS
STR. NAME: Makgadikgadi Pans NP South
■ STRATUM AREA: 641.48 sqkm
• SURVEY BASE: Matopi
DISTANCE TO SURVEY BASE: 89 km

– TRANSECTS: 4 (109 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 5.1 %

– BASELINE DISTANCE: 23.82 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 4.3 h
Crew(s): C01
KES2022_V5IIM20220916A 06:32–10:51

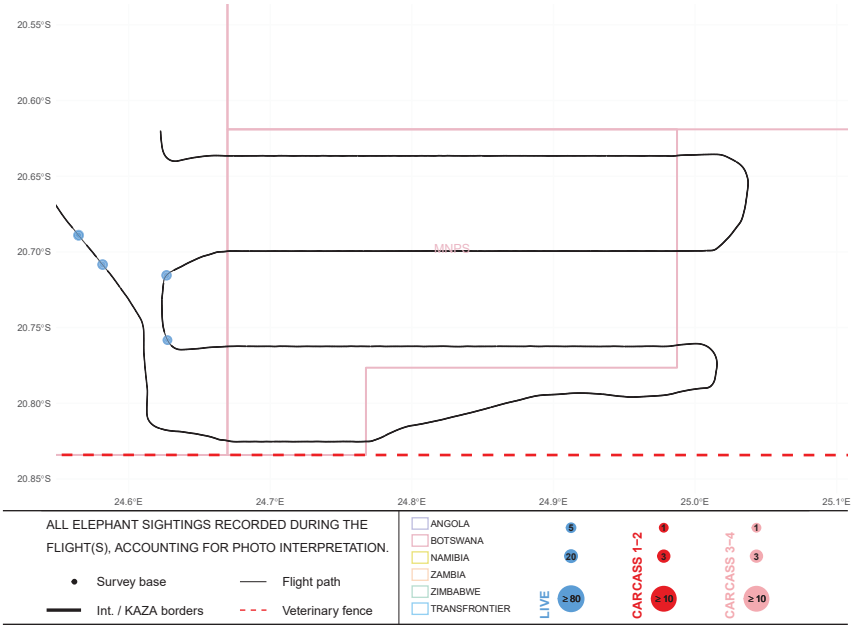
Actual sampling intensity: 5.4 %
Transect flying time: 0.7 h
Transects: 4 – 109 km – 90°
Search effort: 1.14 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01
Side:	L R
% sightings:	33 67
% individuals:	33 67

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	0		
Live elephant (>9):	0		
Elephant carcass:	0		
Live elephant (<10):	0		



LIVE ELEPHANTS

IN SAMPLE:	**0 (0)**
Bulls:	0 (0)
Family:	0 (0)
NOT IN SAMPLE:	**23 (7)**
Outside search strip:	0
Off transect:	23

ELEPHANT CARCASSES

IN SAMPLE:	**0 (0)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	0 (0)
Category 4:	0 (0)
NOT IN SAMPLE:	**1 (1)**
Outside search strip:	0
Off transect:	1

OTHER SPECIES

Other wildlife species:	3
Other wildlife count:	4
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 3.182, N = 75, w = 315

		LIVE OBS	LIVE FINAL	ALL CARCASSES OBS	ALL CARCASSES FINAL
Population estimate	$\hat{Y}$	–	–	–	–
Variance of estimate	$\mathrm{Var}\hat{Y}$	–	–	–	–
Standard error	$\mathrm{SE}\hat{Y}$	–	–	–	–
95% confidence interval	$\mathrm{CI}_{\hat{Y}}^{95\%}$	–	–	–	–
Percentage of relative precision	$\mathrm{PRP}_{\hat{Y}}$	–	–	–	–
Density per sqkm	$R_{\hat{Y}}$	–	–	–	–
Variance between transect counts	s_y^2	–	–	–	–
Variance between transect areas	s_a^2	–	–	–	–
Covariance between counts & areas	s_{ay}	–	–	–	–

CARCASS RATIOS

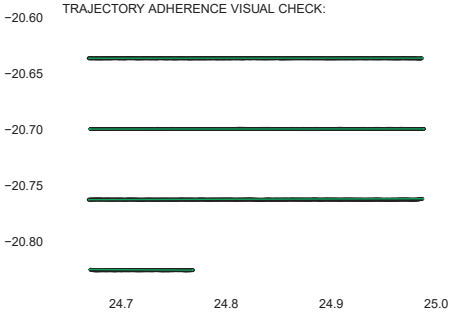
$CR_{1:4}$ = n/a
$CR_{1:2}$ = n/a

MNPS – Mak. Pan NP South — BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20220916A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:

SPEED

Average:	165.8 km/h
Standard dev.:	8.7 km/h

HEIGHT AGL

Average:	91.6 m	(300.4 ft)
Standard dev.:	3.4 m	(11.1 ft)

MNPS – Mak. Pan NP South — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: MNPS **N:** 76 S_a^2: 13,268
STRATUM NAME: Makgadikgadi Pans NP South **w:** 315 ***df*:** 3

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	30	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	0	17	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant family	Loxodonta africana family	0	6	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass four	Loxodonta africana carcass four	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	2	0	37	57	0,058	319	17,87	0	94	153	0,333	1,219
ostrich	Struthio camelus	1	5	19	56	0,029	310	17,60	0	75	301	0,250	0,548
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	0	23	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000

MNW – Maun West

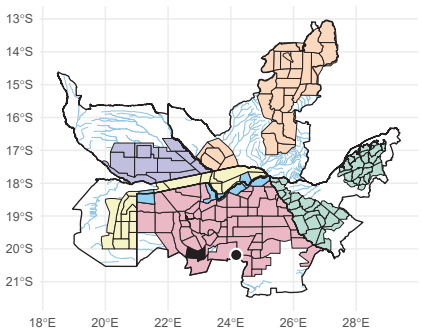
BOTSWANA – NORTHERN BOTSWANA

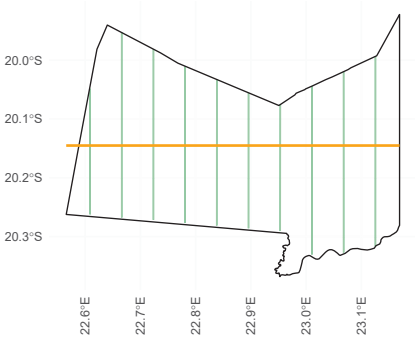
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: MNW
STRATUM NAME: Maun West
■ STRATUM AREA: 1903.37 sqkm
• SURVEY BASE: Matopi
DISTANCE TO SURVEY BASE: 135 km

– TRANSECTS: 10 (303 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 4.8 %

– BASELINE DISTANCE: 63.13 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.5 h
Crew(s): C01
KES2022_V5IIM20220919A 06:17–09:50

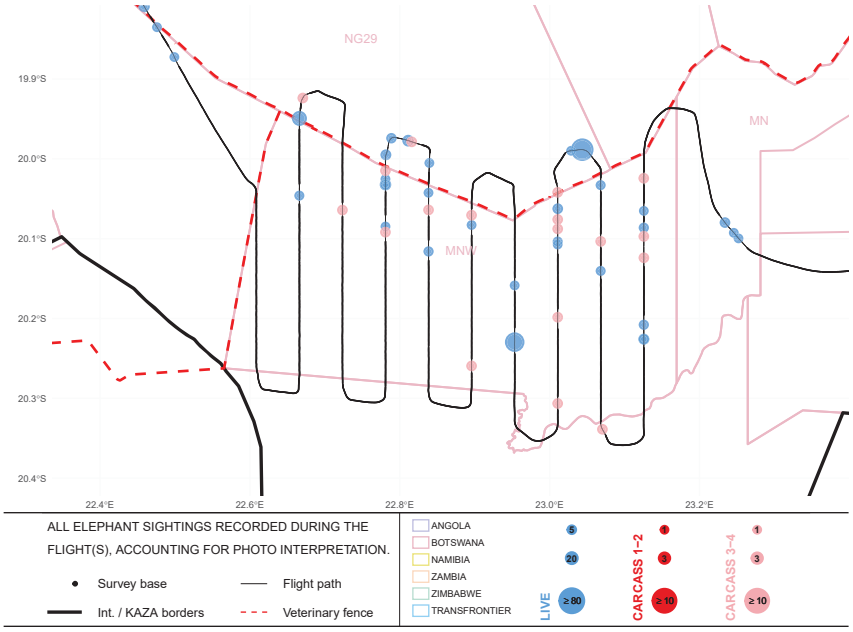
Actual sampling intensity: 5 %
Transect flying time: 1.8 h
Transects: 10 – 303 km – 0°
Search effort: 1.14 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	44	56
% individuals:	68	32

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	60	0	
Live elephant (>9):	2	0	
Elephant carcass:	15	0	
Live elephant (<10):	10	0	



LIVE ELEPHANTS

IN SAMPLE:	**68 (12)**
Bulls:	13 (9)
Family:	55 (3)
NOT IN SAMPLE:	**186 (30)**
Outside search strip:	54
Off transect:	132

ELEPHANT CARCASSES

IN SAMPLE:	**15 (15)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	11 (11)
Category 4:	4 (4)
NOT IN SAMPLE:	**5 (5)**
Outside search strip:	0
Off transect:	5

OTHER SPECIES

Other wildlife species:	6
Other wildlife count:	66
Domestic count:	773

ELEPHANT DATA ANALYSIS

t = 2.262, N = 199, w = 316

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	1350	1350	298	298
Variance of estimate	$\mathrm{Var}\hat{Y}$	334133	334133	8793	8793
Standard error	$\mathrm{SE}\hat{Y}$	578	578	94	94
95% confidence interval	$\mathrm{CI}_{\hat{Y}}^{95\%}$	± 1308	± 1308	± 212	± 212
Percentage of relative precision	$\mathrm{PRP}_{\hat{Y}}$	97 %	97 %	71 %	71 %
Density per sqkm	$R_{\hat{Y}}$	0.709	0.709	0.156	0.156
Variance between transect counts	s_y^2	88.844	88.844	2.5	2.5
Variance between transect areas	s_a^2	2.233	2.233	2.233	2.233
Covariance between counts & areas	s_{ay}	1.207	1.207	0.742	0.742

CARCASS RATIOS

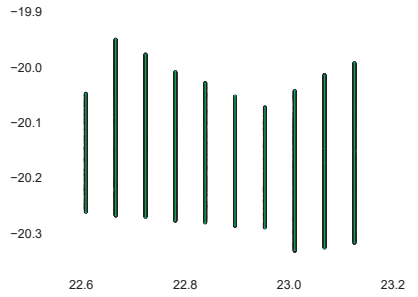
$CR_{1:4} = 18.1\ \%$
$CR_{1:2} = 0\ \%$

MNW – Maun West — BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20220919A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:

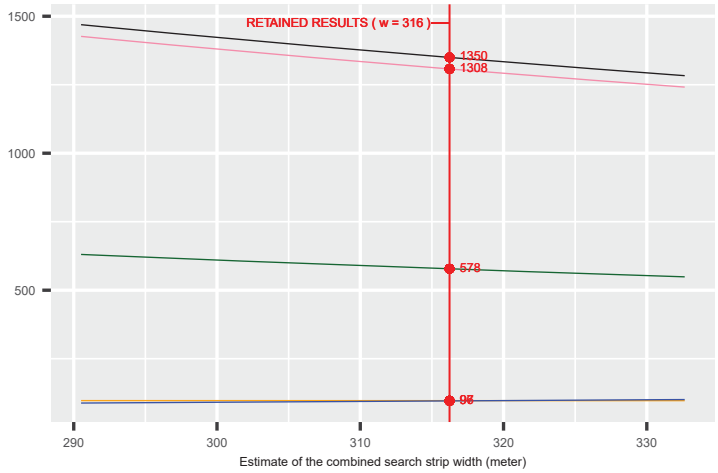
SPEED
Average: 165.1 km/h
Standard dev.: 9.9 km/h

HEIGHT AGL
Average: 91.8 m (301.1 ft)
Standard dev.: 3.6 m (12 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C01 – Left: [159 – 191]
C01 – Right: [120 – 160]



LIVE ELEPHANT ESTIMATE: [1469 – 1283]
CONFIDENCE INTERVAL: ± [1426 – 1241]
SAMPLE AREA: [88 – 101] sqkm
SE: [631 – 549]
PRP: [97 – 97] %

MNW – Maun West

BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: MNW **N:** 200 S_a^2: 2,233
STRATUM NAME: Maun West **w:** 316 ***df***: 9

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	638	137	12663	12506	6,653	30561318	5528,23	158	25169	99	9076,178	82,877
donkey	Equus asinus	6	2	119	184	0,063	6588	81,17	0	303	154	1,822	0,726
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	13	35	258	230	0,136	10355	101,76	28	488	89	2,900	0,760
elephant family	Loxodonta africana family	55	151	1092	1350	0,574	356089	596,73	0	2442	124	93,833	0,447
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	11	3	218	160	0,115	4991	70,65	59	378	73	1,433	0,629
elephant carcass four	Loxodonta africana carcass four	4	2	79	97	0,042	1830	42,78	0	176	122	0,489	0,113
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	9	3	179	272	0,094	14481	120,34	0	451	152	4,100	1,571
impala	Aepyceros melampus	47	4	933	1455	0,490	413845	643,31	0	2388	156	116,011	7,383
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	3	0	60	129	0,031	3263	57,12	0	189	217	0,900	0,644
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	10	10	198	171	0,104	5713	75,58	28	369	86	1,556	0,340
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	120	50	2382	2333	1,251	1063208	1031,12	49	4714	98	323,333	18,381
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	3	0	60	133	0,031	3477	58,97	0	193	224	0,900	-0,259
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	68	186	1350	1308	0,709	334133	578,04	42	2657	97	88,844	1,207
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	15	5	298	212	0,156	8793	93,77	86	510	71	2,500	0,742
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	15	5	298	212	0,156	8793	93,77	86	510	71	2,500	0,742

MOE – Moremi East

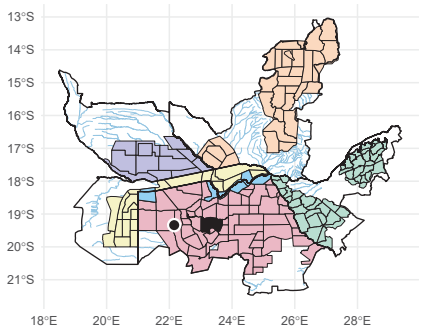
BOTSWANA – NORTHERN BOTSWANA

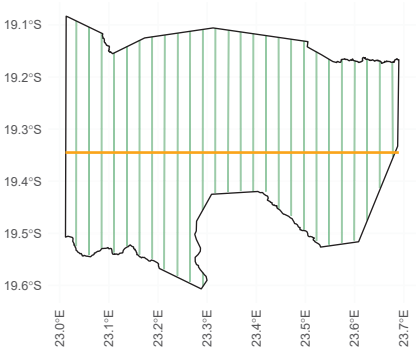
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: MOE
STRATUM NAME: Moremi East
■ STRATUM AREA: 2863.72 sqkm
• SURVEY BASE: Gumare
DISTANCE TO SURVEY BASE: 125 km

– TRANSECTS: 26 (1052 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 11 %

– BASELINE DISTANCE: 71.27 km





SURVEY IMPLEMENTATION

Number of flight(s): 3
Combined flying time: 9 h
Crew(s): C02, C03
KES2022_V5LJB20220925B 15:37–17:44
KES2022_V5WOT20220925B 15:37–17:40
KES2022_V5LJB20220925A 06:31–11:21
Actual sampling intensity: 11.7 %
Transect flying time: 6 h
Transects: 26 – 1052 km – 0°
Search effort: 1.07 min/sqkm

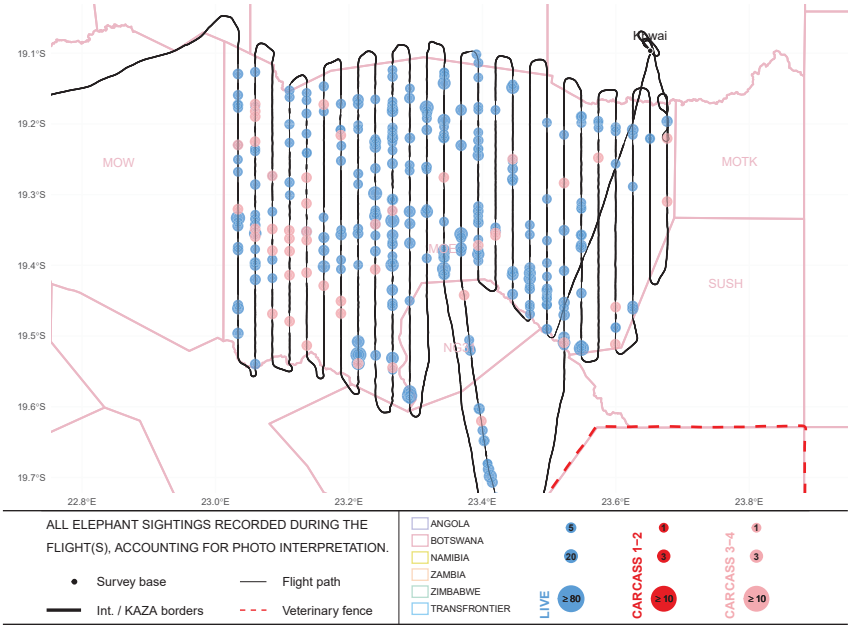
OBSERVER CONTRIBUTION

Crew(s):	C02		C03	
Side:	L	R	L	R
% sightings:	**58**	**42**	42	58
% individuals:	**59**	**41**	39	61

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	455	8.35	13.16
Live elephant (>9):	21	61.9	30.77
Elephant carcass:	38	55.26	0
Live elephant (<10):	156	1.92	0

Undetected live elephant: 1
Undetected elephant carcass: 0



LIVE ELEPHANTS

IN SAMPLE:	**753 (178)**
Bulls:	139 (89)
Family:	614 (89)
NOT IN SAMPLE:	**685 (133)**
Outside search strip:	597
Off transect:	88

ELEPHANT CARCASSES

IN SAMPLE:	**38 (38)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	4 (4)
Category 4:	34 (34)
NOT IN SAMPLE:	**11 (11)**
Outside search strip:	7
Off transect:	4

OTHER SPECIES

Other wildlife species:	25
Other wildlife count:	4492
Domestic count:	1

ELEPHANT DATA ANALYSIS

t = 2.06, N = 223, w = 319

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	6348	6416	324	324
Variance of estimate	$\mathrm{Var}\hat{Y}$	708379	722744	4100	4100
Standard error	$\mathrm{SE}\hat{Y}$	842	850	64	64
95% confidence interval	$\mathrm{CI}^{95\%}_{\hat{Y}}$	± 1733	± 1751	± 132	± 132
Percentage of relative precision	$\mathrm{PRP}_{\hat{Y}}$	27 %	27 %	41 %	41 %
Density per sqkm	$R_{\hat{Y}}$	2.217	2.24	0.113	0.113
Variance between transect counts	s^2_y	482.315	494.278	2.658	2.658
Variance between transect areas	s^2_a	6.389	6.389	6.389	6.389
Covariance between counts & areas	s_{ay}	21.444	22.143	1.402	1.402

CARCASS RATIOS

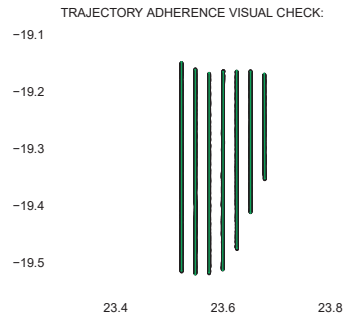
$CR_{1:4} = 4.8$ %
$CR_{1:2} = 0$ %

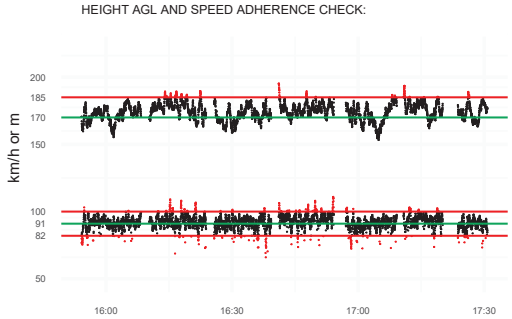
MOE – Moremi East

BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20220925B

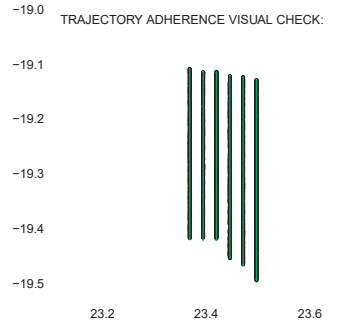


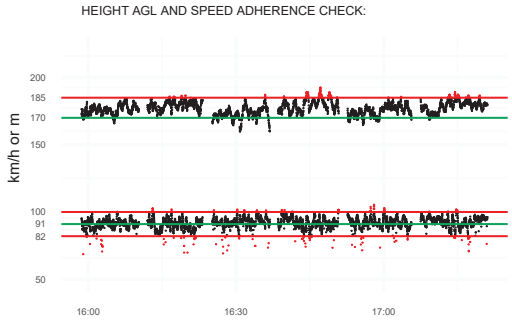


SPEED
Average: 174.1 km/h
Standard dev.: 6.5 km/h

HEIGHT AGL
Average: 92 m (301.7 ft)
Standard dev.: 4.8 m (15.6 ft)

KES2022_ V5WOT20220925B

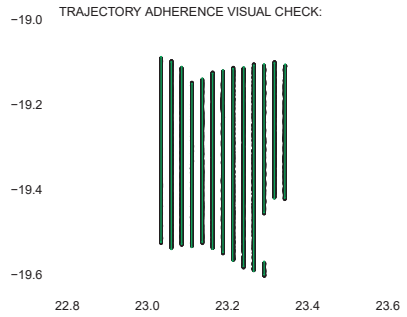


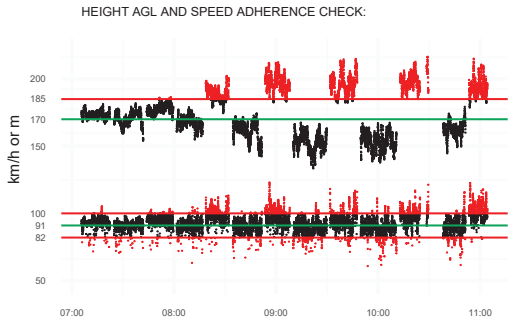


SPEED
Average: 177 km/h
Standard dev.: 4.7 km/h

HEIGHT AGL
Average: 91.8 m (301.2 ft)
Standard dev.: 4.2 m (13.9 ft)

KES2022_ V5LJB20220925A





SPEED
Average: 174.3 km/h
Standard dev.: 17.1 km/h

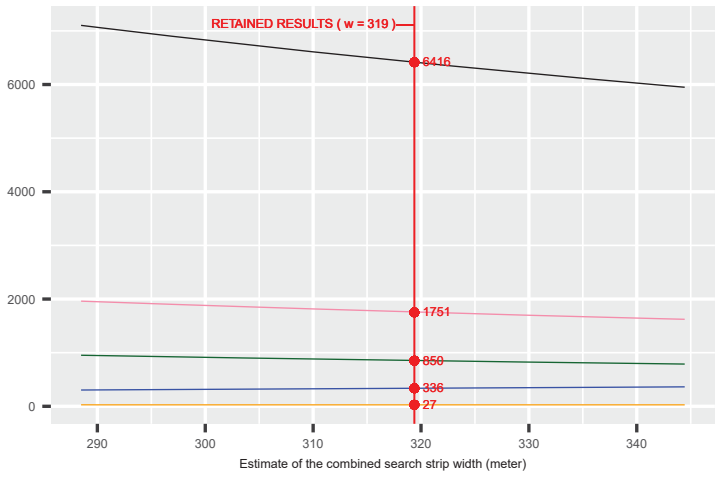
HEIGHT AGL
Average: 93.1 m (305.4 ft)
Standard dev.: 6.6 m (21.5 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C02 – Left: [156 – 179]
C02 – Right: [136 – 187]

C03 – Left: [103 – 156]
C03 – Right: [144 – 173]



LIVE ELEPHANT ESTIMATE: [7103 – 5949]
CONFIDENCE INTERVAL: ± [1961 – 1622]
SAMPLE AREA: [304 – 362] sqkm
SE: [952 – 788]
PRP: [28 – 27] %

MOE – Moremi East

BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: MOE **N:** 223 S_a^2: 6,389
STRATUM NAME: Moremi East **w:** 319 **df:** 25

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	75	0	639	419	0,223	41428	203,54	220	1058	66	26,746	5,783
buffalo	Syncerus caffer	545	1096	4644	7101	1,622	11886072	3447,62	0	11744	153	6884,198	-38,064
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	1	0	9	16	0,003	64	8,01	0	25	194	0,038	0,108
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	139	107	1184	361	0,414	30671	175,13	824	1545	30	21,195	5,032
elephant family	Loxodonta africana family	614	578	5232	1571	1,827	581965	762,87	3660	6803	30	385,126	17,111
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	4	4	34	39	0,012	357	18,90	0	73	114	0,215	0,214
elephant carcass four	Loxodonta africana carcass four	34	7	290	119	0,101	3328	57,69	171	409	41	2,142	1,188
giraffe	Giraffa giraffa	84	26	716	397	0,250	37099	192,61	319	1112	55	22,585	2,118
grysbok	Raphicerus sharpei	6	0	51	100	0,018	2350	48,48	0	151	195	1,385	-0,063
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	220	3	1875	789	0,655	146892	383,26	1085	2664	42	69,698	-10,980
horse	Equus caballus	1	0	9	17	0,003	66	8,13	0	25	196	0,038	-0,083
impala	Aepyceros melampus	957	18	8154	3101	2,847	2267291	1505,75	5053	11255	38	1641,762	62,098
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	18	2	153	94	0,054	2094	45,76	59	248	61	1,182	-0,349
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	4	1	34	39	0,012	357	18,90	0	73	114	0,215	0,214
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	2011	76	17135	4361	5,983	4483040	2117,32	12774	21496	25	3101,355	56,882
reedbuck	Redunca arundinum	20	0	170	105	0,060	2620	51,19	65	276	62	1,545	0,156
roan	Hippotragus equinus	0	2	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	5	0	43	83	0,015	1632	40,40	0	126	195	0,962	-0,052
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	1	0	9	16	0,003	64	8,00	0	25	193	0,038	0,123
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	48	41	409	321	0,143	24226	155,65	88	730	78	14,935	2,621
warthog	Phacochoerus africanus	41	0	349	176	0,122	7306	85,48	173	525	50	3,934	-1,184
waterbuck	Kobus ellipsiprymnus	17	0	145	167	0,051	6542	80,88	0	311	115	3,835	-0,144
wildebeest	Connochaetes taurinus	42	9	358	523	0,125	64458	253,89	0	881	146	37,046	-3,792
zebra	Equus spp,	316	59	2692	1244	0,940	364982	604,14	1448	3937	46	202,055	-4,251
all elephants	Loxodonta africana all	753	685	6416	1751	2,240	722744	850,14	4665	8167	27	494,278	22,143
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	38	11	324	132	0,113	4100	64,03	192	456	41	2,658	1,402
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	38	11	324	132	0,113	4100	64,03	192	456	41	2,658	1,402

MOTK – Moremi To Khwai

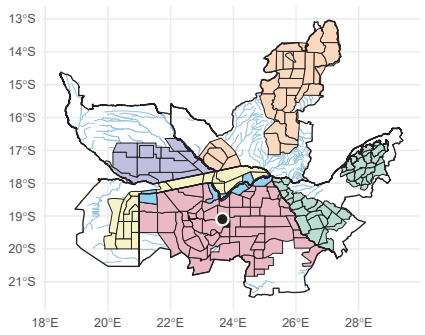
BOTSWANA – NORTHERN BOTSWANA

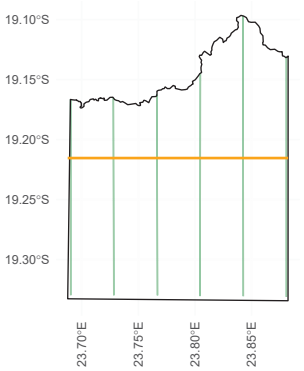
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: MOTK
STRATUM NAME: Moremi To Khwai
■ STRATUM AREA: 424.98 sqkm
• SURVEY BASE: Khwai
DISTANCE TO SURVEY BASE: 22 km

– TRANSECTS: 6 (126 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 8.9 %

– BASELINE DISTANCE: 20.46 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.8 h
Crew(s): C03
KES2022_V5WOT20220926A 06:42–10:32

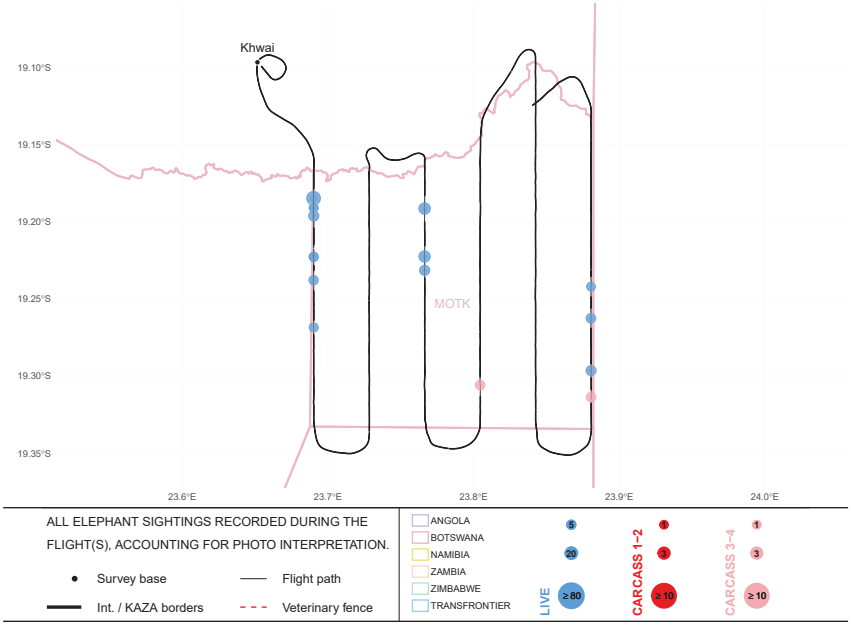
Actual sampling intensity: 9.4 %
Transect flying time: 0.7 h
Transects: 6 – 126 km – 0°
Search effort: 1.08 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C03	
Side:	L	R
% sightings:	38	62
% individuals:	39	61

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	16	0	
Live elephant (>9):	1	0	
Elephant carcass:	2	0	
Live elephant (<10):	8	0	



LIVE ELEPHANTS

IN SAMPLE:	**52 (9)**
Bulls:	5 (2)
Family:	47 (7)
NOT IN SAMPLE:	**47 (8)**
Outside search strip:	47
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**2 (2)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	0 (0)
Category 4:	2 (2)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

OTHER SPECIES

Other wildlife species:	6
Other wildlife count:	32
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.571, N = 64, w = 318

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	553	553	21	21
Variance of estimate	$Var\hat{Y}$	91112	91112	163	163
Standard error	$SE\hat{Y}$	302	302	13	13
95% confidence interval	$CI_{\hat{Y}}^{95\%}$	± 776	± 776	± 33	± 33
Percentage of relative precision	$PRP\hat{Y}$	140 %	140 %	154 %	154 %
Density per sqkm	$R\hat{Y}$	1.302	1.302	0.05	0.05
Variance between transect counts	s_y^2	127.067	127.067	0.267	0.267
Variance between transect areas	s_a^2	1.054	1.054	1.054	1.054
Covariance between counts & areas	s_{ay}	−6.355	−6.355	0.09	0.09

CARCASS RATIOS

$CR_{1:4} = 3.7$ %
$CR_{1:2} = 0$ %

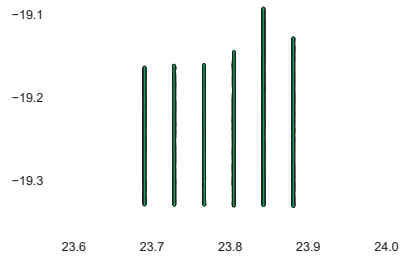
MOTK – Moremi To Khwai

BOTSWANA – NORTHERN BOTSWANA

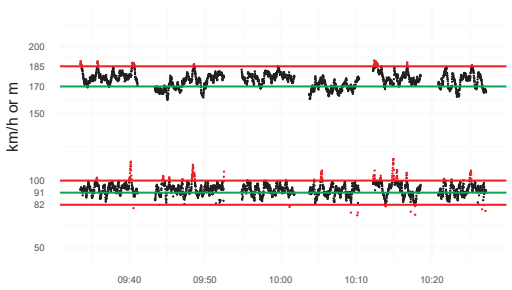
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20220926A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



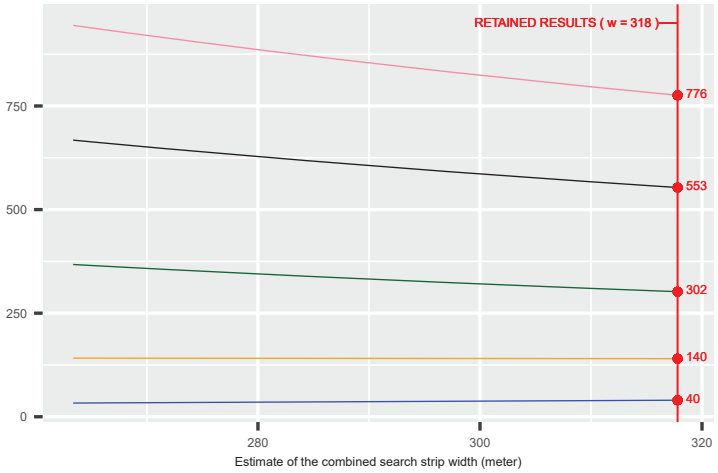
SPEED
Average: 174.6 km/h
Standard dev.: 5.3 km/h

HEIGHT AGL
Average: 93.5 m (306.8 ft)
Standard dev.: 4.7 m (15.5 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C03 – Left: [105 – 159]
C03 – Right: [147 – 176]



LIVE ELEPHANT ESTIMATE: [668 – 553]
CONFIDENCE INTERVAL: ± [945 – 776]
SAMPLE AREA: [33 – 40] sqkm
SE: [367 – 302]
PRP: [141 – 140] %

MOTK – Moremi To Khwai

BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: MOTK **N:** 64 S_a^2: 1,054
STRATUM NAME: Moremi to Khwai **w:** 318 **df:** 5

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	2	51	21	53	0,050	422	20,55	0	74	248	0,667	-0,044
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	5	10	53	135	0,125	2751	52,45	0	188	253	4,167	-0,824
elephant family	Loxodonta africana family	47	37	500	678	1,177	69582	263,78	0	1178	136	96,567	-5,531
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass four	Loxodonta africana carcass four	2	0	21	33	0,050	163	12,77	0	54	154	0,267	0,090
giraffe	Giraffa giraffa	11	0	117	285	0,275	12260	110,73	0	402	243	20,167	1,237
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	3	0	32	49	0,075	364	19,08	0	81	154	0,700	0,832
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	1	0	11	27	0,025	110	10,47	0	38	253	0,167	-0,150
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	9	0	96	147	0,225	3281	57,28	0	243	154	5,500	0,705
all elephants	Loxodonta africana all	52	47	553	776	1,302	91112	301,85	0	1329	140	127,067	-6,355
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	2	0	21	33	0,050	163	12,77	0	54	154	0,267	0,090
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	2	0	21	33	0,050	163	12,77	0	54	154	0,267	0,090

MOW – Moremi West

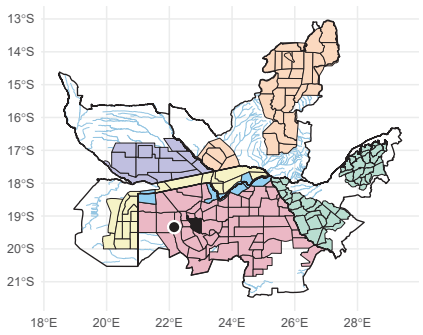
BOTSWANA – NORTHERN BOTSWANA

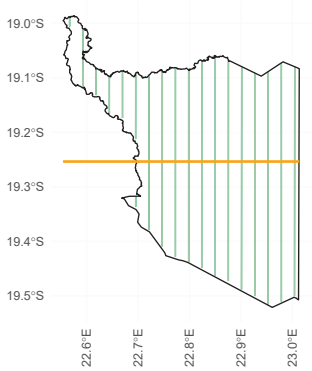
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: MOW
STRATUM NAME: Moremi West
■ STRATUM AREA: 1542.54 sqkm
• SURVEY BASE: Gumare
DISTANCE TO SURVEY BASE: 74 km

– TRANSECTS: 18 (570 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 11.1 %

– BASELINE DISTANCE: 48.23 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 5.1 h
Crew(s): C03
KES2022_V5WOT20220925A 06:33–11:40

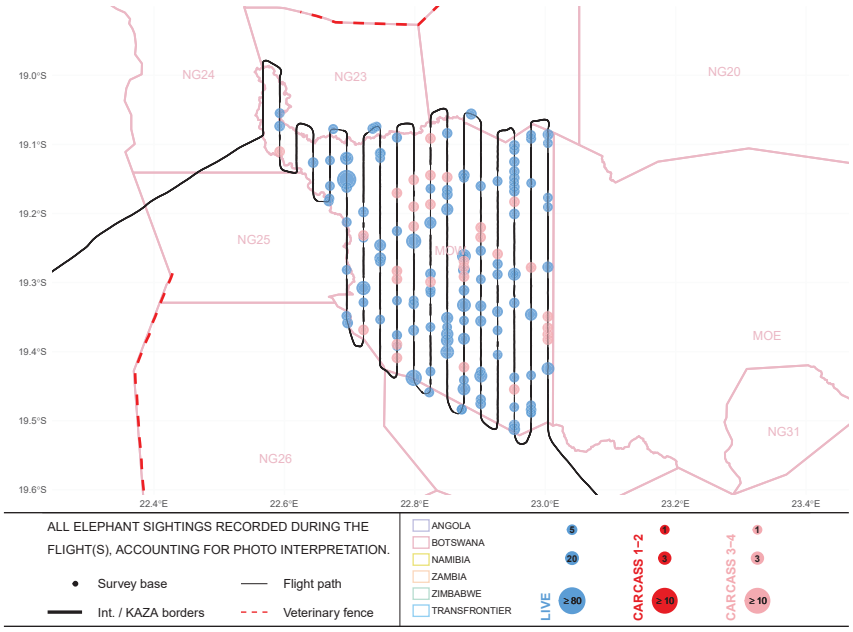
Actual sampling intensity: 11.6 %
Transect flying time: 3.3 h
Transects: 18 – 570 km – 0°
Search effort: 1.12 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C03	
Side:	L	R
% sightings:	42	58
% individuals:	43	57

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	247	13.36	15.15
Live elephant (>9):	15	86.67	23.08
Elephant carcass:	29	44.83	7.69
Live elephant (<10):	71	2.82	0



LIVE ELEPHANTS

IN SAMPLE:	**440 (86)**
Bulls:	55 (35)
Family:	385 (51)
NOT IN SAMPLE:	**225 (37)**
Outside search strip:	187
Off transect:	38

ELEPHANT CARCASSES

IN SAMPLE:	**29 (29)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	14 (14)
Category 4:	15 (15)
NOT IN SAMPLE:	**1 (1)**
Outside search strip:	1
Off transect:	0

OTHER SPECIES

Other wildlife species:	17
Other wildlife count:	3399
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.11, N = 153, w = 315

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	3602	3782	249	249
Variance of estimate	$\mathrm{Var}\hat{Y}$	223182	301435	1666	1666
Standard error	$\mathrm{SE}\hat{Y}$	472	549	41	41
95% confidence interval	$\mathrm{CI}_{\hat{Y}}^{95\%}$	± 997	± 1158	± 86	± 86
Percentage of relative precision	$\mathrm{PRP}_{\hat{Y}}$	28 %	31 %	35 %	35 %
Density per sqkm	$R_{\hat{Y}}$	2.335	2.452	0.162	0.162
Variance between transect counts	s_y^2	398.918	483.908	2.487	2.487
Variance between transect areas	s_a^2	29.876	29.876	29.876	29.876
Covariance between counts & areas	s_{ay}	78.807	81.935	5.634	5.634

CARCASS RATIOS

$CR_{1:4} = 6.2\ \%$
$CR_{1:2} = 0\ \%$

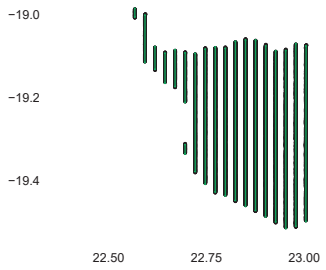
MOW – Moremi West

BOTSWANA – NORTHERN BOTSWANA

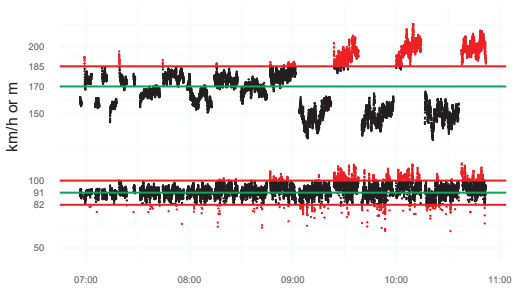
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20220925A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



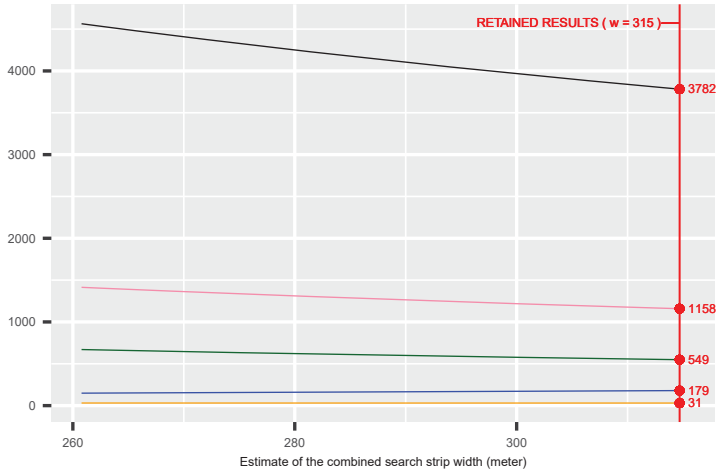
SPEED
Average: 170.1 km/h
Standard dev.: 18.1 km/h

HEIGHT AGL
Average: 92.4 m (303.3 ft)
Standard dev.: 5 m (16.4 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C03 − Left: [104 − 157]
C03 − Right: [145 − 174]



LIVE ELEPHANT ESTIMATE: [4564 − 3782]
CONFIDENCE INTERVAL: ± [1414 − 1158]
SAMPLE AREA: [149 − 179] sqkm
SE: [670 − 549]
PRP: [31 − 31] %

MOW – Moremi West — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: MOW **N:** 153 S_a^2: 29,876
STRATUM NAME: Moremi West **w:** 315 **df:** 17

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	6	0	52	101	0,033	2309	48,05	0	153	197	2,000	0,434
buffalo	Syncerus caffer	222	254	1908	1189	1,237	317625	563,58	719	3097	62	285,529	22,421
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	55	26	473	217	0,307	10603	102,97	256	690	46	12,879	10,570
elephant family	Loxodonta africana family	385	199	3310	1281	2,146	368440	606,99	2029	4590	39	488,605	71,366
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	14	0	120	55	0,078	676	26,00	65	175	46	0,771	2,346
elephant carcass four	Loxodonta africana carcass four	15	1	129	79	0,084	1403	37,45	50	208	61	1,559	3,289
giraffe	Giraffa giraffa	46	3	395	312	0,256	21938	148,12	83	708	79	19,908	5,508
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	65	0	559	241	0,362	13051	114,24	318	800	43	9,899	3,433
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	655	22	5631	2284	3,650	1171767	1082,48	3347	7914	41	1631,899	138,701
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	6	0	52	49	0,033	529	23,00	3	100	94	0,471	0,671
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	4	0	34	51	0,022	585	24,19	0	85	148	0,536	0,962
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	2120	80	18224	3645	11,814	2984117	1727,46	14579	21869	20	5623,124	304,807
reedbuck	Redunca arundinum	27	0	232	182	0,150	7456	86,35	50	414	78	7,088	4,289
roan	Hippotragus equinus	3	0	26	51	0,017	577	24,02	0	76	197	0,500	0,217
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	1	0	9	17	0,006	62	7,86	0	25	193	0,056	0,253
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	12	13	103	96	0,067	2085	45,67	7	200	93	2,118	3,294
warthog	Phacochoerus africanus	105	0	903	439	0,585	43330	208,16	463	1342	49	49,912	19,243
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	100	18	860	681	0,557	104221	322,83	179	1541	79	100,497	17,302
all elephants	Loxodonta africana all	440	225	3782	1158	2,452	301435	549,03	2624	4941	31	483,908	81,935
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	29	1	249	86	0,162	1666	40,81	163	335	35	2,487	5,634
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	29	1	249	86	0,162	1666	40,81	163	335	35	2,487	5,634

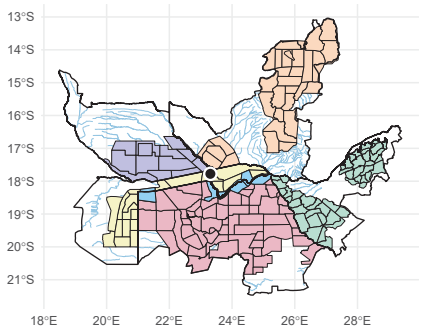
MSBW – Mamili South Botswana — BOTSWANA – NORTHERN BOTSWANA

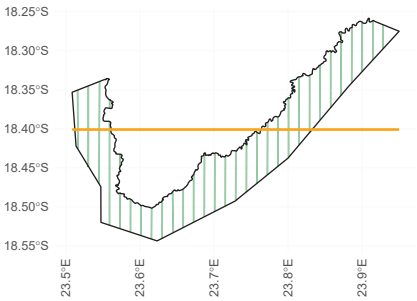
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: MSBW
STRATUM NAME: Mamili South Botswana
■ STRATUM AREA: 345.67 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 87 km

– TRANSECTS: 30 (230 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 19.9 %

– BASELINE DISTANCE: 46.63 km





SURVEY IMPLEMENTATION

Number of flight(s): 2
Combined flying time: 5.4 h
Crew(s): C01, C04
KES2022_V5IIM20221004B 15:17–17:55
KES2022_V5WOT20221004B 15:15–18:03

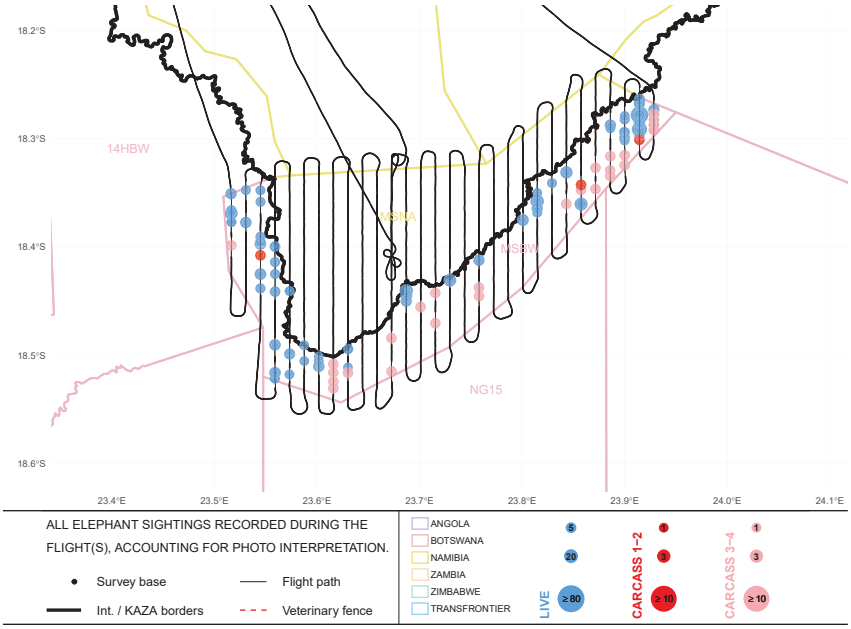
Actual sampling intensity: 21 %
Transect flying time: 1.3 h
Transects: 30 – 230 km – 0°
Search effort: 1.1 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01		C04	
Side:	L	R	L	R
% sightings:	39	61	43	57
% individuals:	36	64	32	68

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	148	19.59	10.34
Live elephant (>9):	8	50	25
Elephant carcass:	30	76.67	0
Live elephant (<10):	56	0	



LIVE ELEPHANTS

IN SAMPLE:	**302 (64)**
Bulls:	70 (32)
Family:	232 (32)
NOT IN SAMPLE:	**163 (23)**
Outside search strip:	155
Off transect:	8

ELEPHANT CARCASSES

IN SAMPLE:	**30 (30)**
Category 1:	0 (0)
Category 2:	3 (3)
Category 3:	3 (3)
Category 4:	24 (24)
NOT IN SAMPLE:	**1 (1)**
Outside search strip:	1
Off transect:	0

OTHER SPECIES

Other wildlife species:	18
Other wildlife count:	1149
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.045, N = 147, w = 316

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	1435	1440	143	143
Variance of estimate	$\mathrm{Var}\hat{Y}$	78806	78897	1153	1153
Standard error	$\mathrm{SE}\hat{Y}$	281	281	34	34
95% confidence interval	$\mathrm{CI}_{\hat{Y}}^{95\%}$	± 574	± 574	± 69	± 69
Percentage of relative precision	$\mathrm{PRP}_{\hat{Y}}$	40 %	40 %	49 %	49 %
Density per sqkm	$R_{\hat{Y}}$	4.151	4.165	0.414	0.414
Variance between transect counts	s_y^2	150.999	151.168	1.586	1.586
Variance between transect areas	s_a^2	0.747	0.747	0.747	0.747
Covariance between counts & areas	s_{ay}	3.375	3.375	−0.33	−0.33

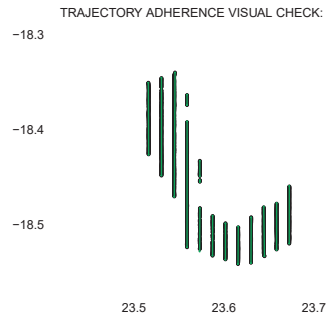
CARCASS RATIOS

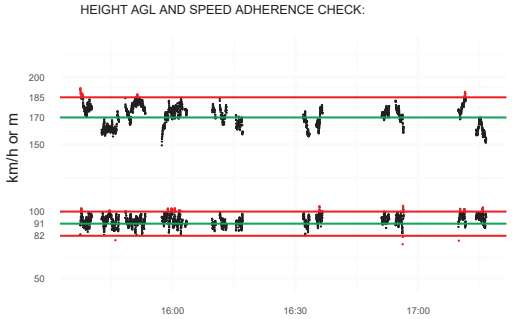
$CR_{1:4} = 9\ \%$
$CR_{1:2} = 1\ \%$

MSBW – Mamili South Botswana — BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20221004B

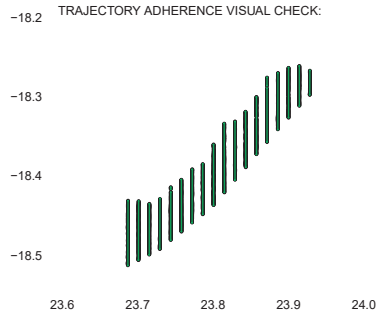


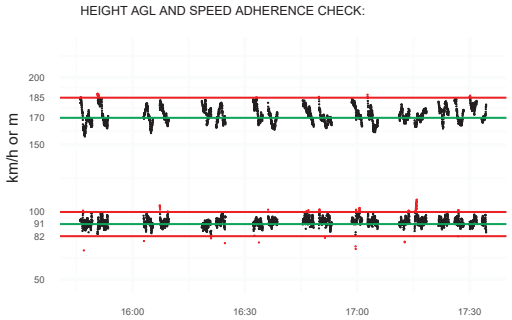


SPEED
Average: 171 km/h
Standard dev.: 8.1 km/h

HEIGHT AGL
Average: 93.5 m (306.9 ft)
Standard dev.: 4 m (13 ft)

KES2022_ V5WOT20221004B





SPEED
Average: 172.2 km/h
Standard dev.: 6 km/h

HEIGHT AGL
Average: 92.7 m (304 ft)
Standard dev.: 3.3 m (10.8 ft)

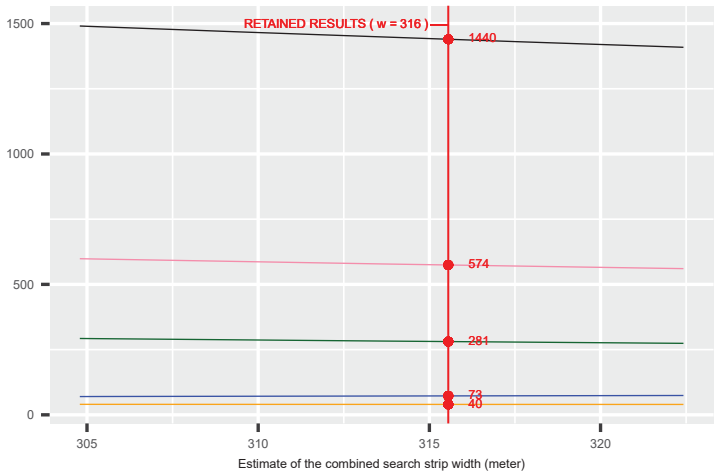
INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C01 – Left: [162 – 194]
C01 – Right: [122 – 163]

C04 – Left: [155 – 155]
C04 – Right: [156 – 156]

LIVE ELEPHANT ESTIMATE: [1491 – 1409]
CONFIDENCE INTERVAL: ± [598 – 560]
SAMPLE AREA: [70 – 74] sqkm
SE: [293 – 274]
PRP: [40 – 40] %



MSBW – Mamili South Botswana BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: MSBW **N:** 148 S_a^2: 0,747
STRATUM NAME: Mamili South Botswana **w:** 316 **df:** 29

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	49	29	234	299	0,676	21425	146,37	0	533	128	37,344	0,557
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	70	22	334	196	0,965	9158	95,70	138	529	59	19,126	2,090
elephant family	Loxodonta africana family	232	141	1106	525	3,200	65954	256,81	581	1631	47	114,271	1,285
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	3	0	14	15	0,041	52	7,22	0	29	103	0,093	0,056
elephant carcass three	Loxodonta africana carcass three	3	1	14	15	0,041	56	7,51	0	30	107	0,093	-0,035
elephant carcass four	Loxodonta africana carcass four	24	0	114	67	0,331	1078	32,84	47	182	59	1,545	-0,351
giraffe	Giraffa giraffa	10	3	48	39	0,138	359	18,95	9	86	81	0,644	0,141
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	45	12	215	95	0,621	2160	46,48	119	310	44	5,017	1,274
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	104	4	496	301	1,434	21624	147,05	195	797	61	40,257	1,575
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	2	0	10	13	0,028	38	6,19	0	22	133	0,064	-0,020
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	1	0	5	9	0,014	20	4,42	0	14	190	0,033	-0,007
puku	Kobus vardonii	5	0	24	38	0,069	339	18,40	0	61	158	0,557	-0,165
red lechwe	Kobus leche	791	77	3771	3045	10,909	2216426	1488,77	726	6816	81	4777,826	47,944
reedbuck	Redunca arundinum	4	0	19	28	0,055	184	13,56	0	47	145	0,326	0,107
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	10	24	48	57	0,138	789	28,09	0	105	121	1,333	-0,046
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	1	0	5	9	0,014	19	4,40	0	14	189	0,033	0,006
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	20	1	95	69	0,276	1126	33,56	27	164	72	2,161	0,501
waterbuck	Kobus ellipsiprymnus	3	0	14	26	0,041	161	12,69	0	40	182	0,300	0,284
wildebeest	Connochaetes taurinus	36	2	172	223	0,496	11937	109,26	0	395	130	20,510	0,119
zebra	Equus spp,	15	11	72	104	0,207	2576	50,75	0	175	145	4,466	0,139
all elephants	Loxodonta africana all	302	163	1440	574	4,165	78897	280,89	865	2014	40	151,168	3,375
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	3	0	14	15	0,041	52	7,22	0	29	103	0,093	0,056
all elephant carcasses	Loxodonta africana carcass all	30	1	143	69	0,414	1153	33,95	74	212	49	1,586	-0,330
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	27	1	129	68	0,372	1121	33,48	60	197	53	1,541	-0,386

N14L – NG 14 low

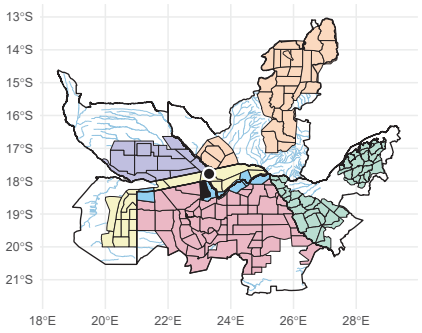
BOTSWANA – NORTHERN BOTSWANA

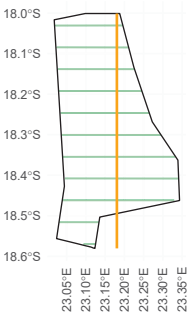
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: N14L
STRATUM NAME: NG 14 low
■ STRATUM AREA: 1448.08 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 61 km

– TRANSECTS: 11 (242 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 5 %

– BASELINE DISTANCE: 64.14 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 2.8 h
Crew(s): C01
KES2022_V5IIM20221003B 15:40–18:28

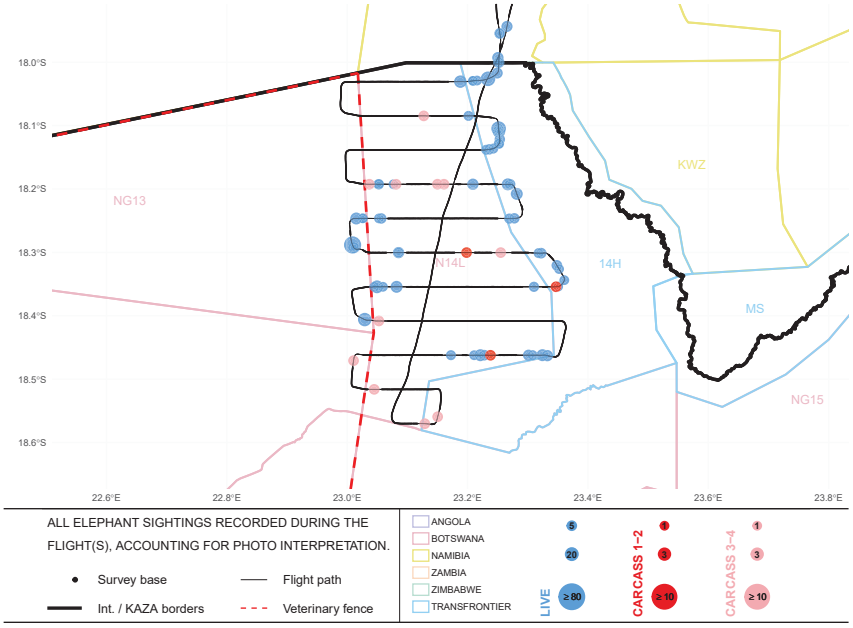
Actual sampling intensity: 5.3 %
Transect flying time: 1.4 h
Transects: 11 – 242 km – 90°
Search effort: 1.12 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	49	51
% individuals:	49	51

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	34	11.76	0
Live elephant (>9):	3	66.67	0
Elephant carcass:	7	28.57	0
Live elephant (<10):	8	0	



LIVE ELEPHANTS

IN SAMPLE:	**56 (11)**
Bulls:	6 (5)
Family:	50 (6)
NOT IN SAMPLE:	**350 (55)**
Outside search strip:	60
Off transect:	290

ELEPHANT CARCASSES

IN SAMPLE:	**7 (7)**
Category 1:	0 (0)
Category 2:	1 (1)
Category 3:	1 (1)
Category 4:	5 (5)
NOT IN SAMPLE:	**8 (8)**
Outside search strip:	3
Off transect:	5

OTHER SPECIES

Other wildlife species:	11
Other wildlife count:	68
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.228, N = 203, w = 315

		LIVE OBS	LIVE FINAL	ALL CARCASSES OBS	ALL CARCASSES FINAL
Population estimate	$\hat{Y}$	1062	1062	133	133
Variance of estimate	$Var\hat{Y}$	106719	106719	3736	3736
Standard error	$SE\hat{Y}$	327	327	61	61
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 728	± 728	± 136	± 136
Percentage of relative precision	$PRP\hat{Y}$	69 %	69 %	103 %	103 %
Density per sqkm	$R\hat{Y}$	0.733	0.733	0.092	0.092
Variance between transect counts	s^2_y	34.491	34.491	1.055	1.055
Variance between transect areas	s^2_a	7.799	7.799	7.799	7.799
Covariance between counts & areas	s_{ay}	5.969	5.969	0.394	0.394

CARCASS RATIOS

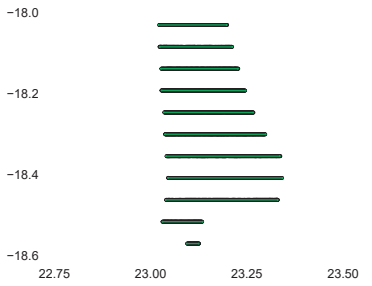
$CR_{1:4} = 11.1$ %
$CR_{1:2} = 1.8$ %

N14L – NG 14 low — BOTSWANA – NORTHERN BOTSWANA

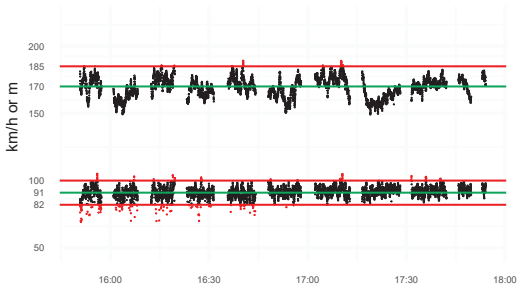
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20221003B

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



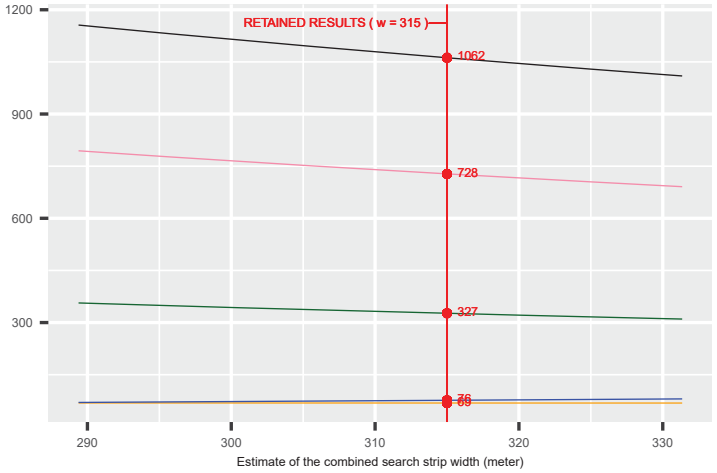
SPEED
Average: 169.2 km/h
Standard dev.: 7.4 km/h

HEIGHT AGL
Average: 91.4 m (299.9 ft)
Standard dev.: 4.1 m (13.4 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C01 – Left: [158 – 190]
C01 – Right: [119 – 160]



LIVE ELEPHANT ESTIMATE: [1156 – 1010]
CONFIDENCE INTERVAL: ± [794 – 691]
SAMPLE AREA: [70 – 80] sqkm
SE: [356 – 310]
PRP: [69 – 68] %

N14L – NG 14 low — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: N14L **N:** 204 S_a^2: 7,799
STRATUM NAME: NG 14 low **w:** 315 **df:** 10

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	4	38	76	155	0,052	4842	69,59	0	231	204	1,455	1,125
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	4	1	76	161	0,052	5227	72,30	0	237	212	1,455	0,096
elephant bulls	Loxodonta africana males	6	58	114	88	0,079	1567	39,58	26	202	78	0,473	0,518
elephant family	Loxodonta africana family	50	292	948	708	0,655	100829	317,54	241	1656	75	32,073	5,451
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	1	2	19	39	0,013	312	17,67	0	58	208	0,091	0,180
elephant carcass three	Loxodonta africana carcass three	1	2	19	39	0,013	301	17,34	0	58	204	0,091	0,304
elephant carcass four	Loxodonta africana carcass four	5	4	95	127	0,065	3273	57,21	0	222	134	0,873	-0,090
giraffe	Giraffa giraffa	1	11	19	39	0,013	303	17,40	0	58	204	0,091	0,281
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	4	1	76	164	0,052	5430	73,69	0	240	216	1,455	-0,447
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	1	0	19	41	0,013	336	18,33	0	60	215	0,091	-0,075
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	1	0	19	41	0,013	336	18,33	0	60	215	0,091	-0,075
sable	Hippotragus niger	22	43	417	496	0,288	49504	222,49	0	913	119	13,000	-0,410
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	4	0	76	169	0,052	5772	75,98	0	245	223	1,455	-1,365
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	22	9	417	488	0,288	48043	219,19	0	906	117	16,600	6,548
all elephants	Loxodonta africana all	56	350	1062	728	0,733	106719	326,68	334	1790	69	34,491	5,969
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	1	2	19	39	0,013	312	17,67	0	58	208	0,091	0,180
all elephant carcasses	Loxodonta africana carcass all	7	8	133	136	0,092	3736	61,13	0	269	103	1,055	0,394
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	6	6	114	125	0,079	3164	56,25	0	239	110	0,873	0,214

N1SW – NG 1 South–West

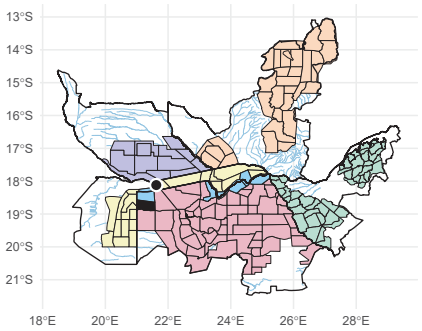
BOTSWANA – NORTHERN BOTSWANA

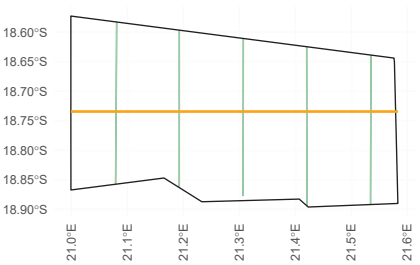
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: N1SW
STRATUM NAME: NG 1 South–West
■ STRATUM AREA: 1819.71 sqkm
• SURVEY BASE: Bagani
DISTANCE TO SURVEY BASE: 74 km

– TRANSECTS: 5 (149 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 2.5 %

– BASELINE DISTANCE: 61.62 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 2.2 h
Crew(s): C01
KES2022_V5IIM20221010B 14:52–17:07

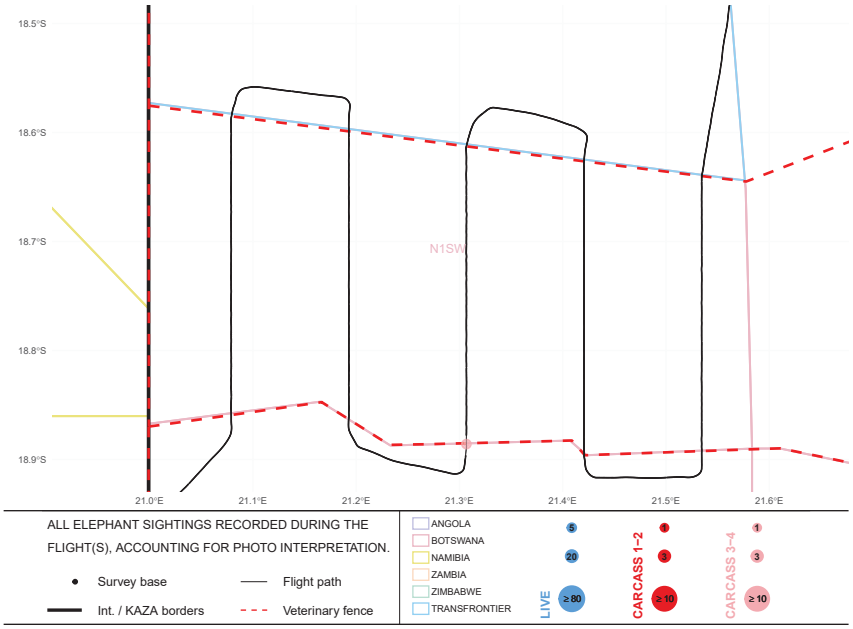
Actual sampling intensity: 2.6 %
Transect flying time: 0.9 h
Transects: 5 – 149 km – 0°
Search effort: 1.13 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	32	68
% individuals:	32	68

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	1	0	
Live elephant (>9):	0		
Elephant carcass:	0		
Live elephant (<10):	0		



LIVE ELEPHANTS

IN SAMPLE:	**0 (0)**
Bulls:	0 (0)
Family:	0 (0)
NOT IN SAMPLE:	**6 (1)**
Outside search strip:	0
Off transect:	6

ELEPHANT CARCASSES

IN SAMPLE:	**0 (0)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	0 (0)
Category 4:	0 (0)
NOT IN SAMPLE:	**1 (1)**
Outside search strip:	0
Off transect:	1

OTHER SPECIES

Other wildlife species:	2
Other wildlife count:	3
Domestic count:	110

ELEPHANT DATA ANALYSIS

t = 2.776, N = 196, w = 314

		LIVE OBS	LIVE FINAL	ALL CARCASSES OBS	ALL CARCASSES FINAL
Population estimate	$\hat{Y}$	–	–	–	–
Variance of estimate	$Var\hat{Y}$	–	–	–	–
Standard error	$SE\hat{Y}$	–	–	–	–
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	–	–	–	–
Percentage of relative precision	$PRP\hat{Y}$	–	–	–	–
Density per sqkm	$R\hat{Y}$	–	–	–	–
Variance between transect counts	s^2_y	–	–	–	–
Variance between transect areas	s^2_a	–	–	–	–
Covariance between counts & areas	s_{ay}	–	–	–	–

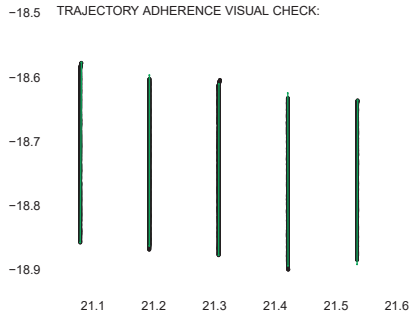
CARCASS RATIOS

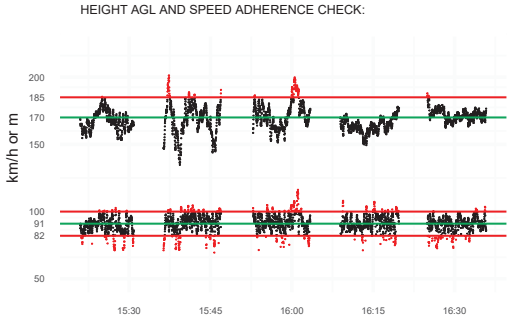
$CR_{1:4}$ = n/a
$CR_{1:2}$ = n/a

N1SW – NG 1 South-West — BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20221010B





SPEED
Average: 168.7 km/h
Standard dev.: 8.9 km/h

HEIGHT AGL
Average: 91.1 m (299 ft)
Standard dev.: 6.3 m (20.8 ft)

N1SW – NG 1 South–West BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: N1SW **N:** 196 S_a^2: 0,139
STRATUM NAME: NG 1 South-West **w:** 314 **df:** 4

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	86	29	3349	1054	1,840	144213	379,75	2295	4404	31	24,200	1,482
donkey	Equus asinus	4	0	156	199	0,086	5138	71,68	0	355	128	0,700	0,095
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	0	6	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant family	Loxodonta africana family	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass four	Loxodonta africana carcass four	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	1	0	39	106	0,021	1471	38,35	0	145	273	0,200	0,095
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	20	0	779	1376	0,428	245697	495,68	0	2155	177	32,000	-0,837
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	0	6	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000

N3NE – NG 3 North–East

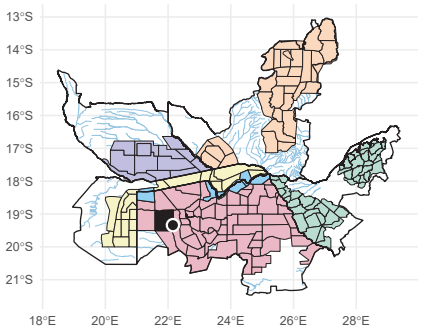
BOTSWANA – NORTHERN BOTSWANA

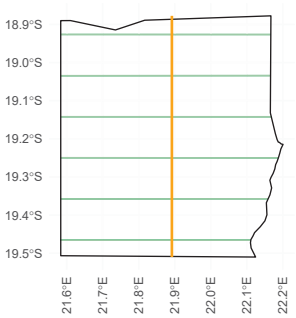
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: N3NE
STRATUM NAME: NG 3 North–East
■ STRATUM AREA: 4167.27 sqkm
• SURVEY BASE: Gumare
DISTANCE TO SURVEY BASE: 33 km

– TRANSECTS: 6 (364 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 2.6 %

– BASELINE DISTANCE: 70.02 km





SURVEY IMPLEMENTATION

Number of flight(s): 2
Combined flying time: 3.6 h
Crew(s): C01, C02
KES2022_V5LJB20220922B 15:42–17:36
KES2022_V5IIM20220922B 15:45–17:30

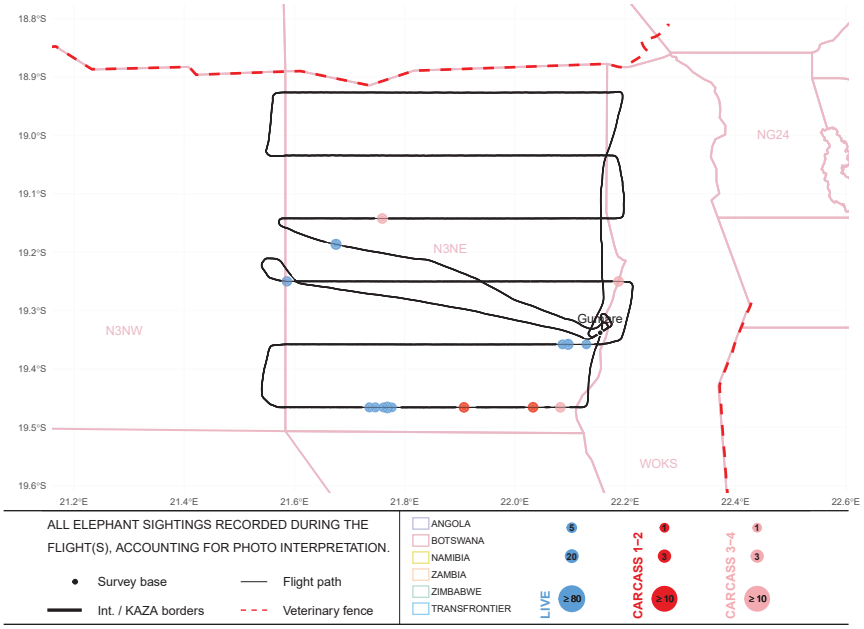
Actual sampling intensity: 2.8 %
Transect flying time: 2.1 h
Transects: 6 – 364 km – 90°
Search effort: 1.1 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C02		C01	
Side:	L	R	L	R
% sightings:	53	47	33	67
% individuals:	45	55	37	63

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	14	21.43	0
Live elephant (>9):	0		
Elephant carcass:	5	60	0
Live elephant (<10):	6	0	



LIVE ELEPHANTS

IN SAMPLE:	**13 (6)**
Bulls:	13 (6)
Family:	0 (0)
NOT IN SAMPLE:	**24 (5)**
Outside search strip:	17
Off transect:	7

ELEPHANT CARCASSES

IN SAMPLE:	**5 (5)**
Category 1:	0 (0)
Category 2:	2 (2)
Category 3:	1 (1)
Category 4:	2 (2)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

OTHER SPECIES

Other wildlife species:	6
Other wildlife count:	10
Domestic count:	38

ELEPHANT DATA ANALYSIS

t = 2.571, N = 218, w = 321

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	465	465	179	179
Variance of estimate	$Var\hat{Y}$	85095	85095	11043	11043
Standard error	$SE\hat{Y}$	292	292	105	105
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 750	± 750	± 270	± 270
Percentage of relative precision	$PRP_{\hat{Y}}$	161 %	161 %	151 %	151 %
Density per sqkm	$R_{\hat{Y}}$	0.111	0.111	0.043	0.043
Variance between transect counts	s^2_y	10.567	10.567	1.367	1.367
Variance between transect areas	s^2_a	1.002	1.002	1.002	1.002
Covariance between counts & areas	s_{ay}	−1.977	−1.977	−0.718	−0.718

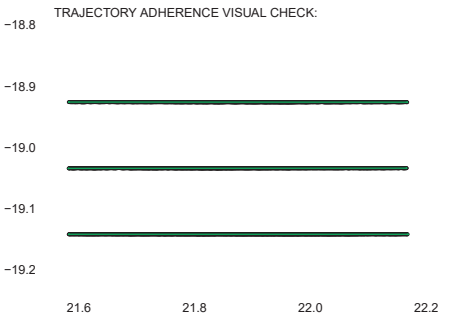
CARCASS RATIOS

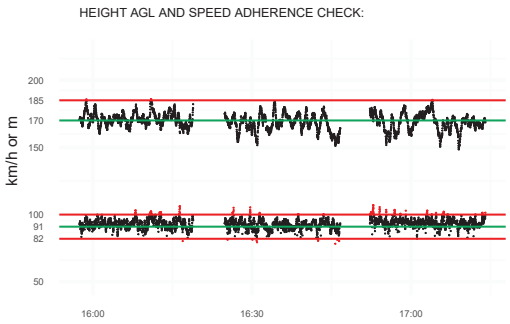
$CR_{1:4} = 27.8$ %
$CR_{1:2} = 13.3$ %

N3NE – NG 3 North–East — BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20220922B

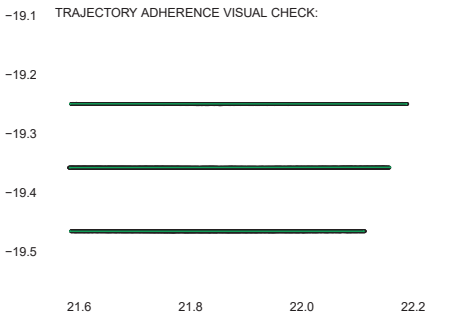


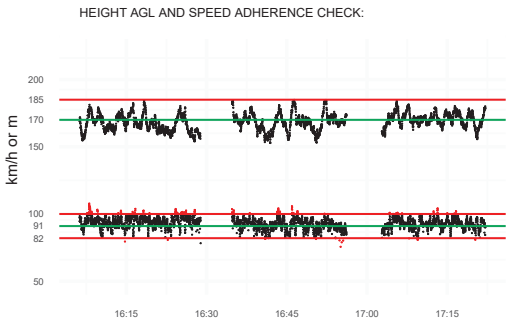


SPEED
Average: 169.2 km/h
Standard dev.: 6.1 km/h

HEIGHT AGL
Average: 93 m (305.2 ft)
Standard dev.: 3.6 m (11.7 ft)

KES2022_ V5IIM20220922B





SPEED
Average: 168.6 km/h
Standard dev.: 6.3 km/h

HEIGHT AGL
Average: 92.9 m (304.7 ft)
Standard dev.: 4.3 m (14 ft)

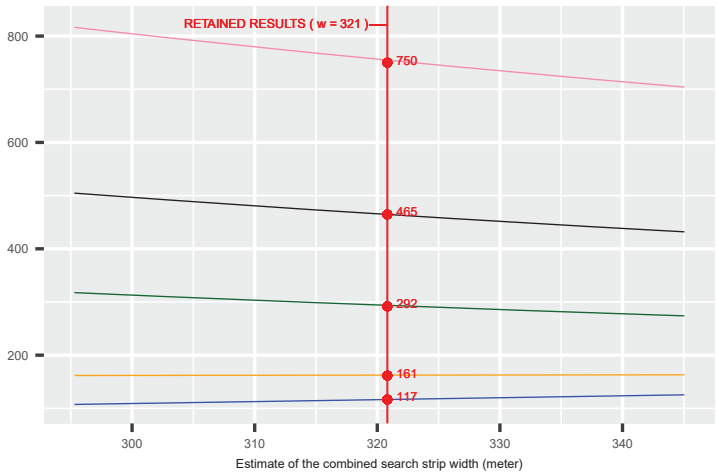
INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C01 – Left: [161 – 193]
C01 – Right: [121 – 162]

C02 – Left: [156 – 179]
C02 – Right: [136 – 187]

LIVE ELEPHANT ESTIMATE: [505 – 432]
CONFIDENCE INTERVAL: ± [816 – 704]
SAMPLE AREA: [107 – 125] sqkm
SE: [318 – 274]
PRP: [162 – 163] %



N3NE – NG 3 North–East BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: N3NE **N:** 218 S_a^2: 1,002
STRATUM NAME: NG 3 North-East **w:** 321 **df:** 5

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	35	15	1251	2103	0,300	669074	817,97	0	3353	168	87,367	1,351
donkey	Equus asinus	3	0	107	277	0,026	11573	107,58	0	384	258	1,500	0,037
duiker	Sylvicapra grimmia	5	0	179	299	0,043	13511	116,24	0	477	167	1,767	0,219
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	13	24	465	750	0,111	85095	291,71	0	1214	161	10,567	-1,977
elephant family	Loxodonta africana family	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	2	0	71	188	0,017	5338	73,06	0	259	263	0,667	-0,708
elephant carcass three	Loxodonta africana carcass three	1	0	36	92	0,009	1273	35,67	0	127	257	0,167	0,114
elephant carcass four	Loxodonta africana carcass four	2	0	71	118	0,017	2094	45,76	0	189	165	0,267	-0,123
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	1	1	36	91	0,009	1257	35,45	0	127	255	0,167	0,231
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	1	0	36	94	0,009	1334	36,53	0	130	263	0,167	-0,354
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	1	0	36	92	0,009	1273	35,67	0	127	257	0,167	0,114
zebra	Equus spp,	0	4	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	13	24	465	750	0,111	85095	291,71	0	1214	161	10,567	-1,977
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	2	0	71	188	0,017	5338	73,06	0	259	263	0,667	-0,708
all elephant carcasses	Loxodonta africana carcass all	5	0	179	270	0,043	11043	105,08	0	449	151	1,367	-0,718
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	3	0	107	124	0,026	2326	48,22	0	231	116	0,300	-0,010

N3NW – NG3 North–West

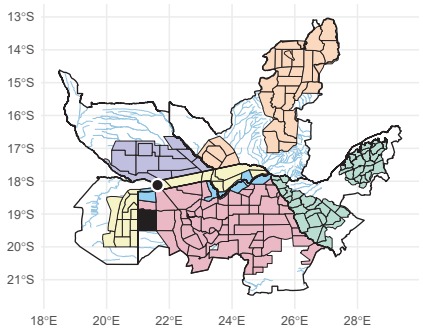
BOTSWANA – NORTHERN BOTSWANA

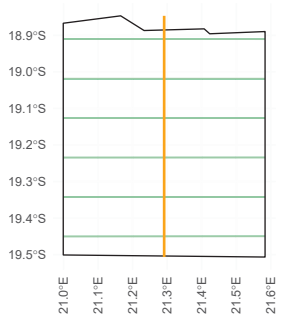
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: N3NW
STRATUM NAME: NG3 North–West
■ STRATUM AREA: 4261.63 sqkm
• SURVEY BASE: Bagani
DISTANCE TO SURVEY BASE: 139 km

– TRANSECTS: 6 (369 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 2.6 %

– BASELINE DISTANCE: 73.01 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.4 h
Crew(s): C04
KES2022_V5WOT20221011A 06:36–10:00

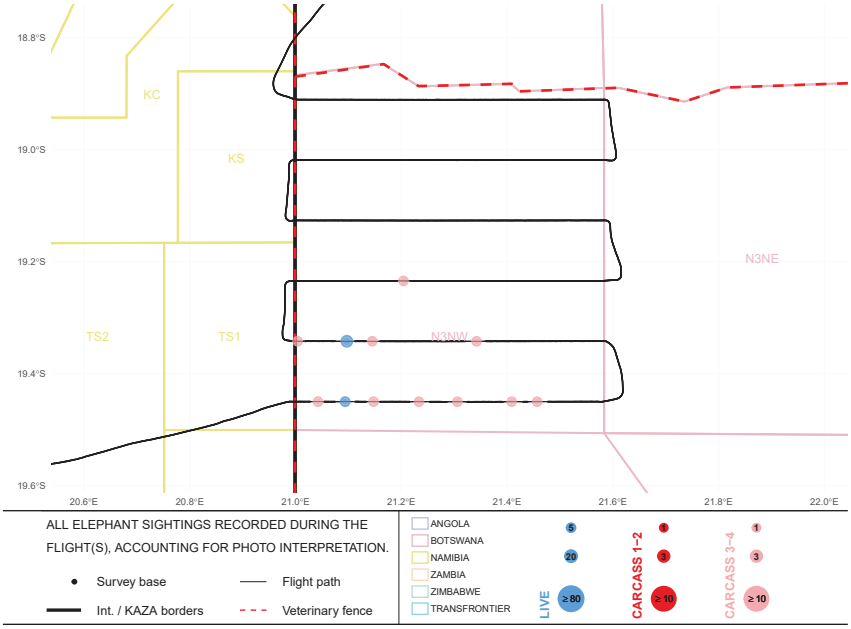
Actual sampling intensity: 2.7 %
Transect flying time: 2.1 h
Transects: 6 – 369 km – 90°
Search effort: 1.12 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C04	
Side:	L	R
% sightings:	48	52
% individuals:	10	90

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	14	0	
Live elephant (>9):	0		
Elephant carcass:	10	0	
Live elephant (<10):	0		



LIVE ELEPHANTS

IN SAMPLE:	**0 (0)**
Bulls:	0 (0)
Family:	0 (0)
NOT IN SAMPLE:	**21 (2)**
Outside search strip:	21
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**10 (10)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	0 (0)
Category 4:	10 (10)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

OTHER SPECIES

Other wildlife species:	6
Other wildlife count:	8
Domestic count:	119

ELEPHANT DATA ANALYSIS

t = 2.571, N = 235, w = 309

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	–	–	374	374
Variance of estimate	$\mathrm{Var}\hat{Y}$	–	–	52159	52159
Standard error	$\mathrm{SE}\hat{Y}$	–	–	228	228
95% confidence interval	$\mathrm{CI}^{95\%}_{\hat{Y}}$	–	–	± 587	± 587
Percentage of relative precision	$\mathrm{PRP}_{\hat{Y}}$	–	–	157 %	157 %
Density per sqkm	$R_{\hat{Y}}$	–	–	0.088	0.088
Variance between transect counts	s^2_y	–	–	5.867	5.867
Variance between transect areas	s^2_a	–	–	0.091	0.091
Covariance between counts & areas	s_{ay}	–	–	0.56	0.56

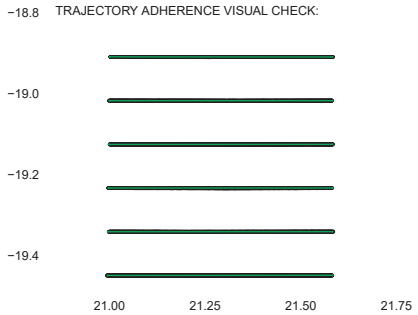
CARCASS RATIOS

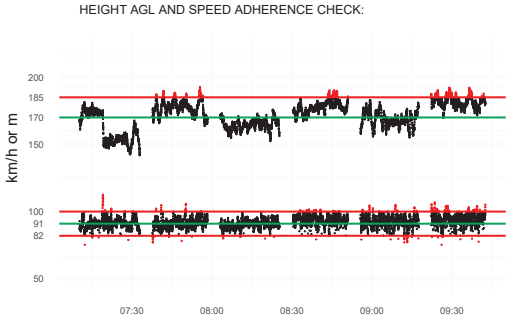
$CR_{1:4}$ = 100 %
$CR_{1:2}$ = n/a

N3NW – NG3 North-West — BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20221011A





SPEED
Average: 171.5 km/h
Standard dev.: 9.8 km/h

HEIGHT AGL
Average: 92.2 m (302.4 ft)
Standard dev.: 4 m (13.3 ft)

N3NW – NG3 North–West BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: N3NW **N:** 236 S_a^2: 0,091
STRATUM NAME: NG 3 North-West **w:** 309 **df:** 5

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	1	0	37	100	0,009	1513	38,89	0	137	268	0,167	-0,037
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	111	39	4146	10861	0,973	17850836	4225,02	0	15007	262	1966,300	-4,143
donkey	Equus asinus	2	0	75	200	0,018	6051	77,79	0	275	268	0,667	-0,074
duiker	Sylvicapra grimmia	2	0	75	199	0,018	6020	77,59	0	274	267	0,667	0,023
eland	Tragelaphus oryx	1	0	37	100	0,009	1518	38,96	0	138	268	0,167	-0,069
elephant bulls	Loxodonta africana males	0	6	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant family	Loxodonta africana family	0	15	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass four	Loxodonta africana carcass four	10	0	374	587	0,088	52159	228,38	0	961	157	5,867	0,560
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	6	0	224	600	0,053	54508	233,47	0	824	268	6,000	-0,274
impala	Aepyceros melampus	1	0	37	100	0,009	1518	38,96	0	138	268	0,167	-0,069
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	3	0	112	300	0,026	13615	116,68	0	412	268	1,500	-0,112
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	0	21	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	10	0	374	587	0,088	52159	228,38	0	961	157	5,867	0,560
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	10	0	374	587	0,088	52159	228,38	0	961	157	5,867	0,560

N3SE – NG 3 South–East

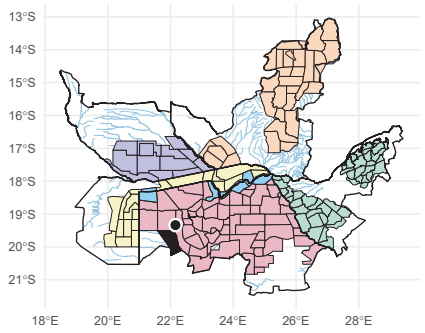
BOTSWANA – NORTHERN BOTSWANA

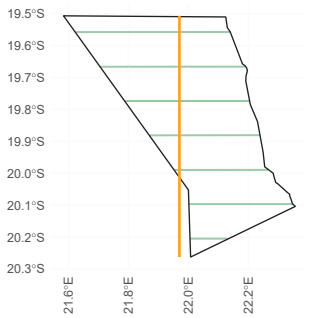
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: N3SE
STRATUM NAME: NG 3 South–East
■ STRATUM AREA: 3167.72 sqkm
• SURVEY BASE: Gumare
DISTANCE TO SURVEY BASE: 62 km

– TRANSECTS: 7 (270 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 2.6 %

– BASELINE DISTANCE: 83.74 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3 h
Crew(s): C02
KES2022_V5LJB20220922A 06:43–09:40

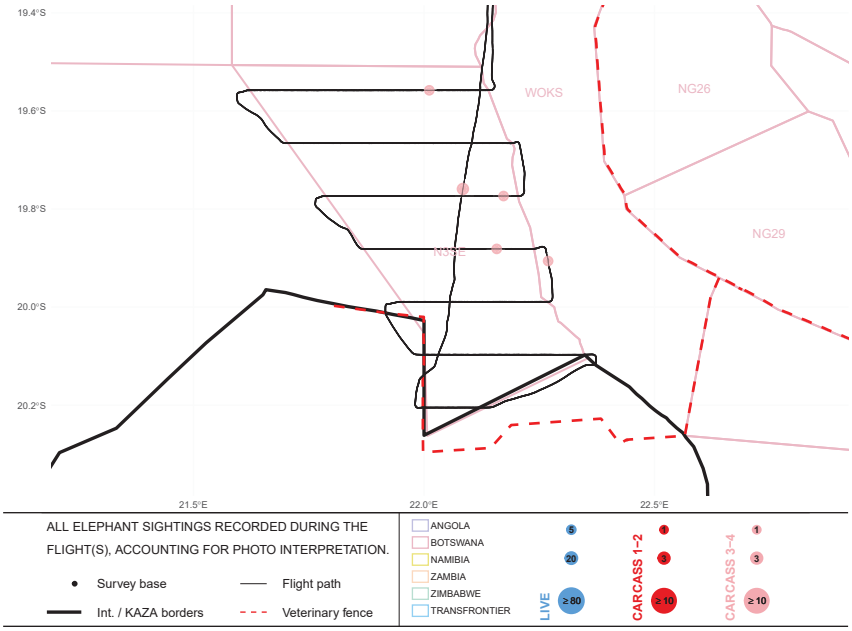
Actual sampling intensity: 2.7 %
Transect flying time: 1.6 h
Transects: 7 – 270 km – 90°
Search effort: 1.1 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C02	
Side:	L	R
% sightings:	61	39
% individuals:	66	34

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	9	66.67	66.67
Live elephant (>9):	0		
Elephant carcass:	3	33.33	0
Live elephant (<10):	0		



LIVE ELEPHANTS

IN SAMPLE:	**0 (0)**
Bulls:	0 (0)
Family:	0 (0)
NOT IN SAMPLE:	**1 (1)**
Outside search strip:	0
Off transect:	1

ELEPHANT CARCASSES

IN SAMPLE:	**3 (3)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	1 (1)
Category 4:	2 (2)
NOT IN SAMPLE:	**3 (2)**
Outside search strip:	0
Off transect:	3

OTHER SPECIES

Other wildlife species:	7
Other wildlife count:	46
Domestic count:	213

ELEPHANT DATA ANALYSIS

t = 2.447, N = 263, w = 318

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	–	–	111	111
Variance of estimate	$Var\hat{Y}$	–	–	2240	2240
Standard error	$SE\hat{Y}$	–	–	47	47
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	–	–	± 116	± 116
Percentage of relative precision	$PRP\hat{Y}$	–	–	105 %	105 %
Density per sqkm	$R\hat{Y}$	–	–	0.035	0.035
Variance between transect counts	s^2_y	–	–	0.286	0.286
Variance between transect areas	s^2_a	–	–	18.476	18.476
Covariance between counts & areas	s_{ay}	–	–	1.093	1.093

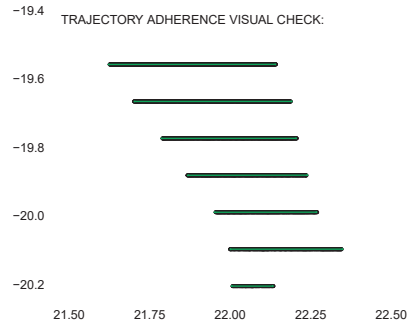
CARCASS RATIOS

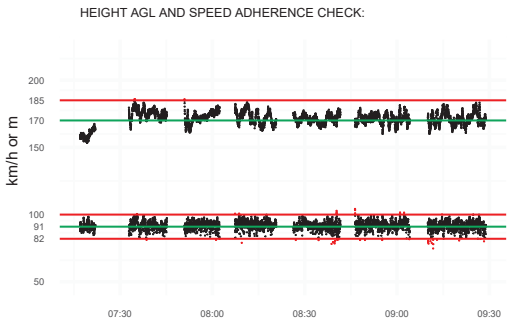
$CR_{1:4}$ = 100 %
$CR_{1:2}$ = n/a

N3SE – NG 3 South-East — BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20220922A





SPEED
Average: 171.4 km/h
Standard dev.: 5.1 km/h

HEIGHT AGL
Average: 91.9 m (301.6 ft)
Standard dev.: 3.1 m (10.2 ft)

N3SE – NG 3 South–East BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: N3SE **N:** 264 S_a^2: 18,476
STRATUM NAME: NG 3 South-East **w:** 318 **df:** 6

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	132	12	4870	4856	1,537	3937666	1984,36	14	9726	100	426,143	20,226
donkey	Equus asinus	11	2	406	408	0,128	27870	166,94	0	814	101	3,619	4,048
duiker	Sylvicapra grimmia	3	0	111	175	0,035	5089	71,34	0	285	158	0,619	1,643
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant family	Loxodonta africana family	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	1	2	37	90	0,012	1346	36,69	0	127	243	0,143	0,259
elephant carcass four	Loxodonta africana carcass four	2	1	74	110	0,023	2022	44,96	0	184	149	0,238	0,834
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	8	4	295	444	0,093	32928	181,46	0	739	150	3,476	1,223
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	3	7	111	198	0,035	6579	81,11	0	309	179	0,619	-0,564
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	3	4	111	179	0,035	5378	73,33	0	290	162	0,619	1,215
ostrich	Struthio camelus	21	8	775	894	0,245	133395	365,23	0	1668	115	12,000	-1,438
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	62	0	2287	2724	0,722	1239089	1113,14	0	5011	119	153,476	24,125
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	3	0	111	260	0,035	11284	106,23	0	371	235	1,286	2,006
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	2	0	74	171	0,023	4889	69,92	0	245	232	0,571	1,617
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	3	3	111	116	0,035	2240	47,33	0	226	105	0,286	1,093
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	3	3	111	116	0,035	2240	47,33	0	226	105	0,286	1,093

N41L – NG 41 Low

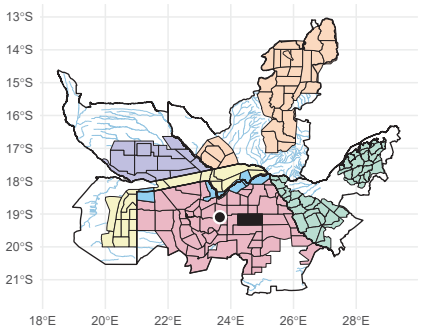
BOTSWANA – NORTHERN BOTSWANA

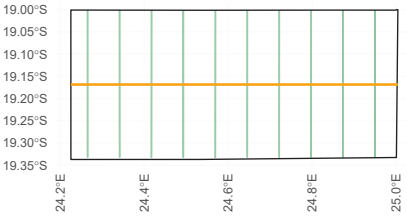
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: N41L
STRATUM NAME: NG 41 Low
■ STRATUM AREA: 3031.71 sqkm
• SURVEY BASE: Khwai
DISTANCE TO SURVEY BASE: 102 km

– TRANSECTS: 10 (370 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 3.7 %

– BASELINE DISTANCE: 81.99 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.9 h
Crew(s): C03
KES2022_V5WOT20220930A 06:41–10:34

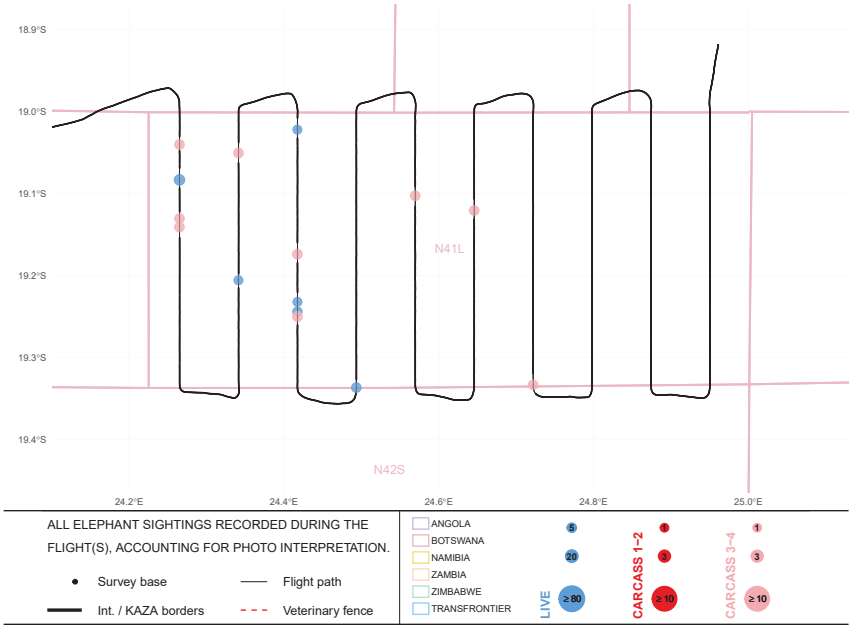
Actual sampling intensity: 3.8 %
Transect flying time: 2.1 h
Transects: 10 – 370 km – 0°
Search effort: 1.1 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C03	
Side:	L	R
% sightings:	25	75
% individuals:	17	83

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	15	0	
Live elephant (>9):	0		
Elephant carcass:	6	0	
Live elephant (<10):	4	0	



LIVE ELEPHANTS

IN SAMPLE:	**14 (4)**
Bulls:	5 (3)
Family:	9 (1)
NOT IN SAMPLE:	**56 (10)**
Outside search strip:	10
Off transect:	46

ELEPHANT CARCASSES

IN SAMPLE:	**6 (6)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	2 (2)
Category 4:	4 (4)
NOT IN SAMPLE:	**3 (3)**
Outside search strip:	3
Off transect:	0

OTHER SPECIES

Other wildlife species:	5
Other wildlife count:	16
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.262, N = 261, w = 313

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	366	366	157	157
Variance of estimate	$\mathrm{Var}\hat{Y}$	57471	57471	3221	3221
Standard error	$\mathrm{SE}\hat{Y}$	240	240	57	57
95% confidence interval	$\mathrm{CI}_{\hat{Y}}^{95\%}$	± 542	± 542	± 128	± 128
Percentage of relative precision	$\mathrm{PRP}_{\hat{Y}}$	148 %	148 %	82 %	82 %
Density per sqkm	$R_{\hat{Y}}$	0.121	0.121	0.052	0.052
Variance between transect counts	s_y^2	8.711	8.711	0.489	0.489
Variance between transect areas	s_a^2	0.004	0.004	0.004	0.004
Covariance between counts & areas	s_{ay}	−0.01	−0.01	0.005	0.005

CARCASS RATIOS

$CR_{1:4} = 30\ \%$
$CR_{1:2} = 0\ \%$

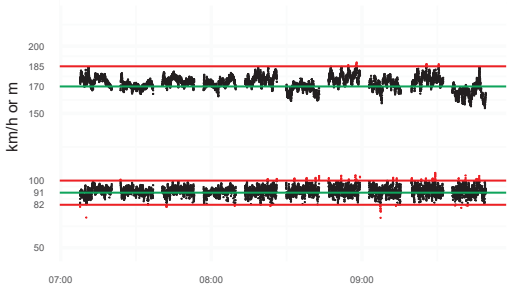
N41L – NG 41 Low — BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20220930A

TRAJECTORY ADHERENCE VISUAL CHECK:

HEIGHT AGL AND SPEED ADHERENCE CHECK:



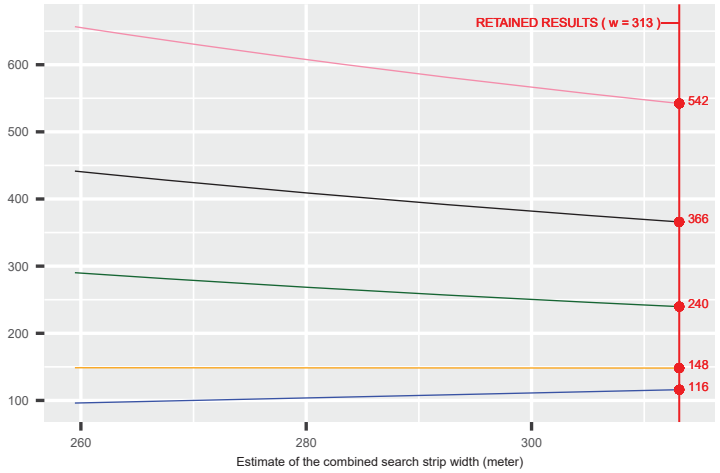
SPEED
Average: 172.4 km/h
Standard dev.: 5 km/h

HEIGHT AGL
Average: 92.2 m (302.3 ft)
Standard dev.: 3.3 m (10.8 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C03 – Left: [103 – 156]
C03 – Right: [145 – 173]



LIVE ELEPHANT ESTIMATE: [442 – 366]
CONFIDENCE INTERVAL: ± [657 – 542]
SAMPLE AREA: [96 – 116] sqkm
SE: [290 – 240]
PRP: [149 – 148] %

N41L – NG 41 low — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: N41L **N:** 262 S_a^2: 0,004
STRATUM NAME: NG 41 low **w:** 313 **df:** 9

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	6	0	157	232	0,052	10563	102,78	0	389	148	1,600	-0,014
eland	Tragelaphus oryx	1	0	26	58	0,009	659	25,68	0	84	222	0,100	0,001
elephant bulls	Loxodonta africana males	5	21	131	233	0,043	10618	103,05	0	364	178	1,611	0,014
elephant family	Loxodonta africana family	9	35	235	523	0,078	53449	231,19	0	758	222	8,100	-0,024
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	2	0	52	77	0,017	1171	34,22	0	130	148	0,178	0,006
elephant carcass four	Loxodonta africana carcass four	4	3	105	128	0,034	3225	56,79	0	233	123	0,489	-0,001
giraffe	Giraffa giraffa	7	3	183	347	0,060	23505	153,31	0	530	190	3,567	0,025
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	1	0	26	58	0,009	660	25,69	0	84	222	0,100	-0,004
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	1	0	26	58	0,009	660	25,69	0	84	222	0,100	-0,003
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	14	56	366	542	0,121	57471	239,73	0	908	148	8,711	-0,010
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	6	3	157	128	0,052	3221	56,75	28	285	82	0,489	0,005
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	6	3	157	128	0,052	3221	56,75	28	285	82	0,489	0,005

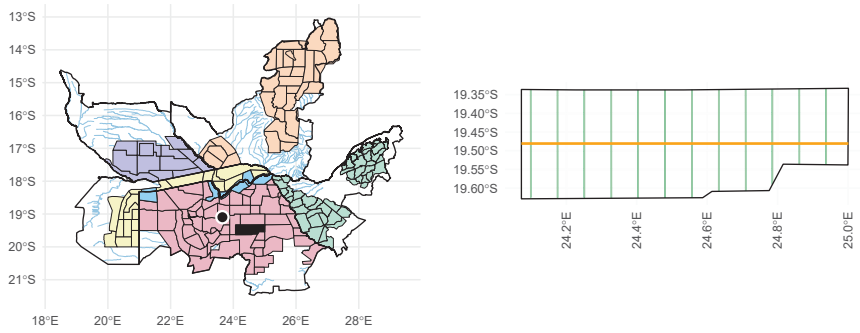
N42S – NG 42 South — BOTSWANA – NORTHERN BOTSWANA

SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: N42S
STRATUM NAME: NG 42 South
■ STRATUM AREA: 2881.5 sqkm
• SURVEY BASE: Khwai
DISTANCE TO SURVEY BASE: 100 km

– TRANSECTS: 12 (364 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 3.8 %

– BASELINE DISTANCE: 97.49 km



SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 4 h
Crew(s): C03
KES2022_V5WOT20220929A 06:45–10:42

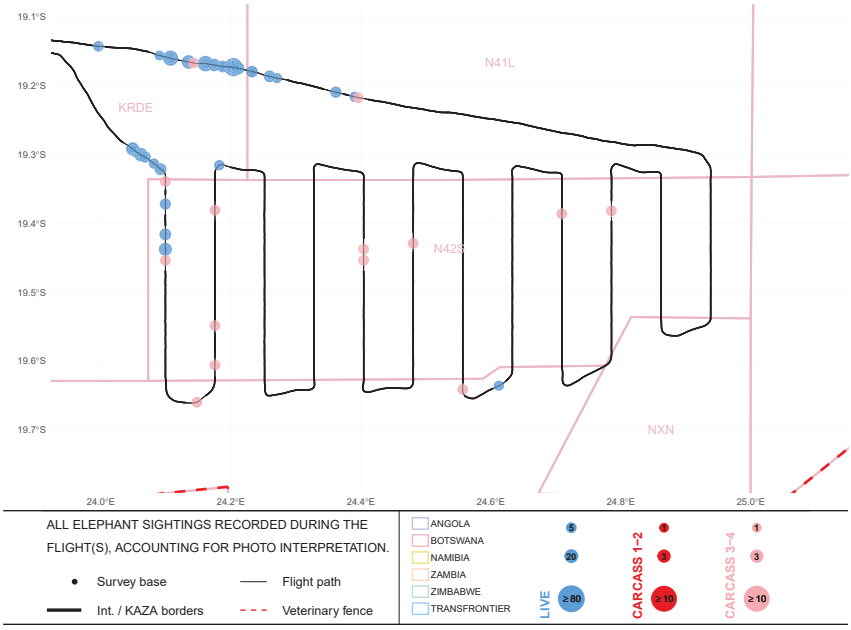
Actual sampling intensity: 3.9 %
Transect flying time: 2.1 h
Transects: 12 – 364 km – 0°
Search effort: 1.11 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C03	
Side:	L	R
% sightings:	58	42
% individuals:	54	46

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	13	0	
Live elephant (>9):	0		
Elephant carcass:	10	0	
Live elephant (<10):	0		



LIVE ELEPHANTS

IN SAMPLE:	**0 (0)**
Bulls:	0 (0)
Family:	0 (0)
NOT IN SAMPLE:	**359 (36)**
Outside search strip:	33
Off transect:	326

ELEPHANT CARCASSES

IN SAMPLE:	**10 (10)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	4 (4)
Category 4:	6 (6)
NOT IN SAMPLE:	**5 (5)**
Outside search strip:	0
Off transect:	5

OTHER SPECIES

Other wildlife species:	4
Other wildlife count:	4
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.201, N = 312, w = 312

		LIVE OBS	LIVE FINAL	ALL CARCASSES OBS	ALL CARCASSES FINAL
Population estimate	$\hat{Y}$	–	–	254	254
Variance of estimate	$Var\hat{Y}$	–	–	7683	7683
Standard error	$SE\hat{Y}$	–	–	88	88
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	–	–	± 193	± 193
Percentage of relative precision	$PRP\hat{Y}$	–	–	76 %	76 %
Density per sqkm	$R\hat{Y}$	–	–	0.088	0.088
Variance between transect counts	s^2_y	–	–	1.061	1.061
Variance between transect areas	s^2_a	–	–	1.45	1.45
Covariance between counts & areas	s_{ay}	–	–	0.498	0.498

CARCASS RATIOS

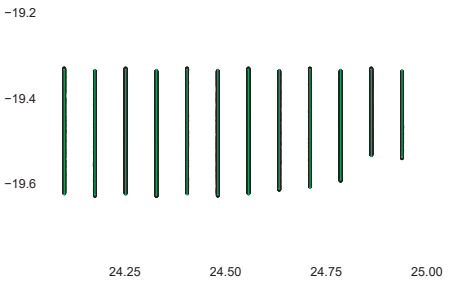
$CR_{1:4}$ = 100 %
$CR_{1:2}$ = n/a

N42S – NG 42 South — BOTSWANA – NORTHERN BOTSWANA

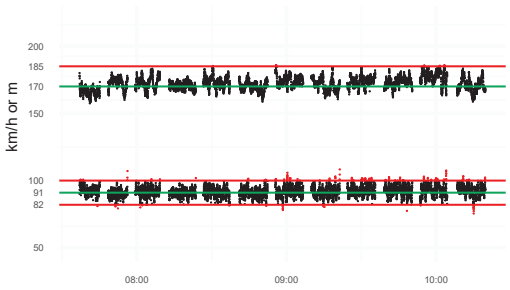
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20220929A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



SPEED
Average: 172.3 km/h
Standard dev.: 4.8 km/h

HEIGHT AGL
Average: 91.9 m (301.5 ft)
Standard dev.: 3.8 m (12.3 ft)

N42S – NG 42 South — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: N42S **N:** 312 S_a^2: 1,450
STRATUM NAME: NG 42 South **w:** 312 **df:** 11

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	1	0	25	58	0,009	683	26,14	0	83	227	0,083	-0,231
eland	Tragelaphus oryx	0	3	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	0	58	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant family	Loxodonta africana family	0	301	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	4	3	101	94	0,035	1831	42,79	7	196	93	0,242	0,138
elephant carcass four	Loxodonta africana carcass four	6	2	152	151	0,053	4702	68,57	1	303	99	0,636	0,361
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	2	0	51	111	0,018	2564	50,64	0	162	220	0,333	0,152
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	0	359	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	10	5	254	193	0,088	7683	87,65	61	447	76	1,061	0,498
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	10	5	254	193	0,088	7683	87,65	61	447	76	1,061	0,498

NATA – Nata

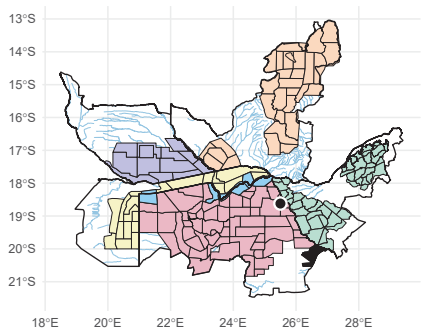
BOTSWANA – NORTHERN BOTSWANA

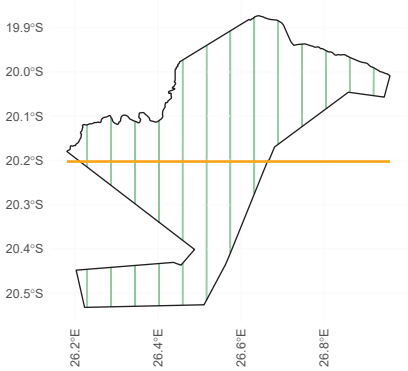
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NATA
STRATUM NAME: Nata
■ STRATUM AREA: 2482.4 sqkm
• SURVEY BASE: Pandamatenga
DISTANCE TO SURVEY BASE: 213 km

– TRANSECTS: 13 (417 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 5 %

– BASELINE DISTANCE: 81.29 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 4.7 h
Crew(s): C03
KES2022_V5WOT20220915A 06:18–11:00

Actual sampling intensity: 5.3 %
Transect flying time: 2.4 h
Transects: 13 – 417 km – 0°
Search effort: 1.09 min/sqkm

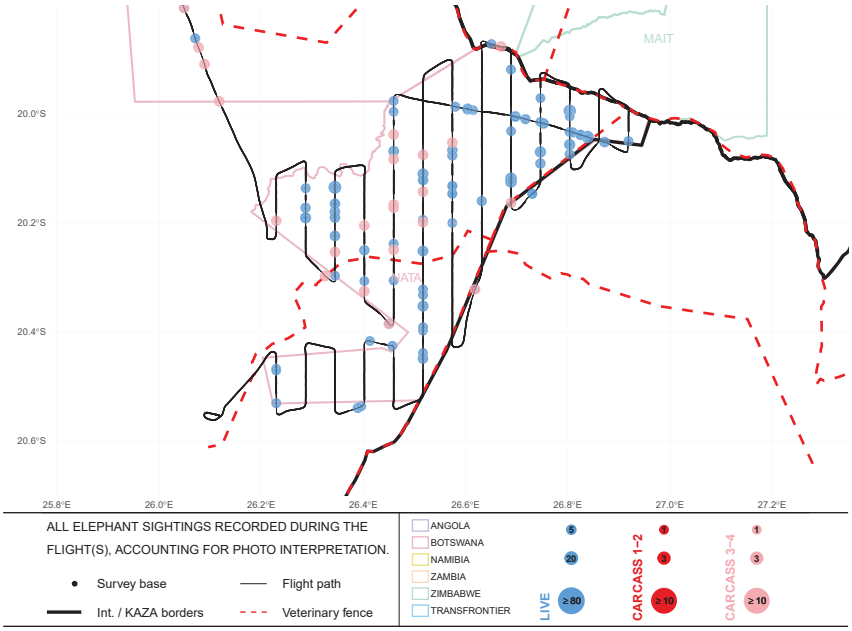
OBSERVER CONTRIBUTION

Crew(s):	C03	
Side:	L	R
% sightings:	38	62
% individuals:	32	68

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	79	10.13	0
Live elephant (>9):	2	0	
Elephant carcass:	9	33.33	0
Live elephant (<10):	9	33.33	0

Undetected live elephant: 0
Undetected elephant carcass: 1



LIVE ELEPHANTS

IN SAMPLE:	**49 (11)**
Bulls:	10 (7)
Family:	39 (4)
NOT IN SAMPLE:	**261 (85)**
Outside search strip:	156
Off transect:	105

ELEPHANT CARCASSES

IN SAMPLE:	**10 (10)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	3 (3)
Category 4:	7 (7)
NOT IN SAMPLE:	**12 (12)**
Outside search strip:	4
Off transect:	8

OTHER SPECIES

Other wildlife species:	6
Other wildlife count:	8
Domestic count:	333

ELEPHANT DATA ANALYSIS

t = 2.179, N = 257, w = 316

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	923	923	170	188
Variance of estimate	$Var\hat{Y}$	176165	176165	6061	6209
Standard error	$SE\hat{Y}$	420	420	78	79
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 914	± 914	± 170	± 172
Percentage of relative precision	$PRP\hat{Y}$	99 %	99 %	100 %	91 %
Density per sqkm	$R\hat{Y}$	0.372	0.372	0.068	0.076
Variance between transect counts	s^2_y	26.526	26.526	1.231	1.192
Variance between transect areas	s^2_a	33.844	33.844	33.844	33.844
Covariance between counts & areas	s_{ay}	−7.017	−7.017	0.992	0.681

CARCASS RATIOS

$CR_{1:4}$ = 16.9 %
$CR_{1:2}$ = 0 %

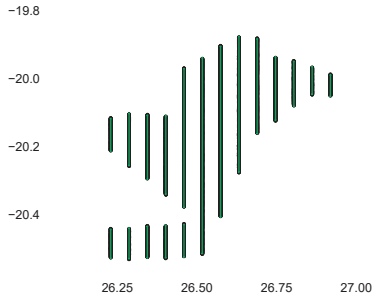
NATA – Nata

BOTSWANA – NORTHERN BOTSWANA

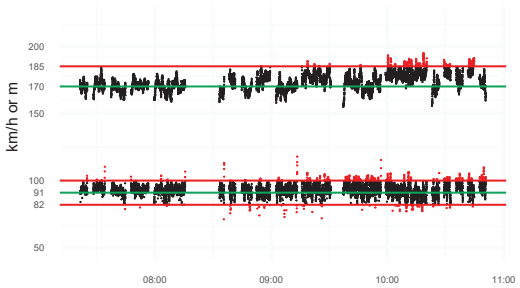
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20220915A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



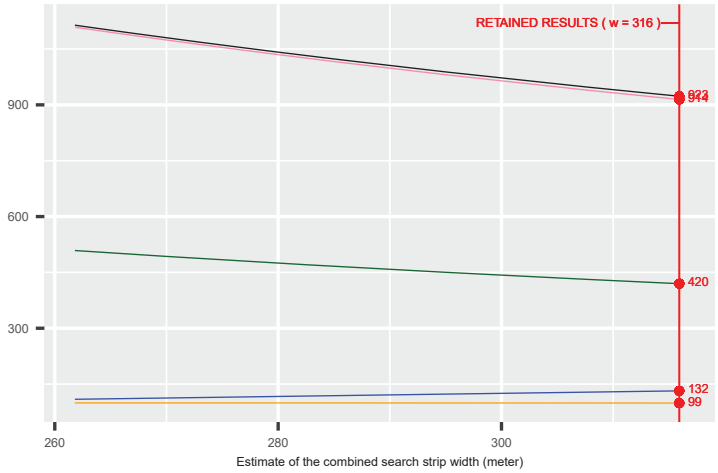
SPEED
Average: 173.4 km/h
Standard dev.: 6.2 km/h

HEIGHT AGL
Average: 93 m (305.1 ft)
Standard dev.: 4.2 m (13.7 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C03 – Left: [104 – 158]
C03 – Right: [146 – 175]



LIVE ELEPHANT ESTIMATE: [1114 – 923]
CONFIDENCE INTERVAL: ± [1109 – 914]
SAMPLE AREA: [109 – 132] sqkm
SE: [509 – 420]
PRP: [100 – 99] %

NATA – Nata

BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: NATA **N:** 257 S_a^2: 33,844
STRATUM NAME: Nata **w:** 316 **df:** 12

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	266	178	5012	4209	2,019	3732229	1931,90	802	9221	84	530,103	-25,675
donkey	Equus asinus	2	4	38	88	0,015	1616	40,20	0	125	232	0,308	-0,615
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	10	180	188	184	0,076	7098	84,25	5	372	97	1,026	-1,628
elephant family	Loxodonta africana family	39	81	735	837	0,296	147454	384,00	0	1571	114	24,333	-5,389
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	3	8	57	69	0,023	999	31,61	0	125	122	0,192	0,072
elephant carcass four	Loxodonta africana carcass four	7	4	132	136	0,053	3869	62,20	0	267	103	0,769	0,609
giraffe	Giraffa giraffa	0	4	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	7	0	132	193	0,053	7825	88,46	0	325	146	1,769	2,324
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	5	0	94	183	0,038	7059	84,02	0	277	194	1,256	-2,036
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	14	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	2	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	58	26	1093	2365	0,440	1178071	1085,39	0	3458	216	231,269	-6,543
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	49	261	923	914	0,372	176165	419,72	9	1838	99	26,526	-7,017
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	10	12	188	172	0,076	6209	78,80	17	360	91	1,192	0,681
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	10	12	188	172	0,076	6209	78,80	17	360	91	1,192	0,681

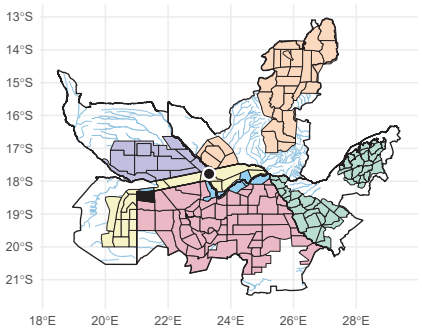
NG1BW – NG 1 Botswana — BOTSWANA – NORTHERN BOTSWANA

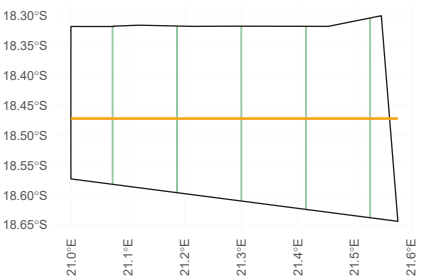
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NG1BW
STRATUM NAME: NG 1 Botswana
■ STRATUM AREA: 1923.35 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 228 km

– TRANSECTS: 5 (164 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 2.6 %

– BASELINE DISTANCE: 60.98 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 2.8 h
Crew(s): C04
KES2022_V5WOT20221009A 06:29–09:16

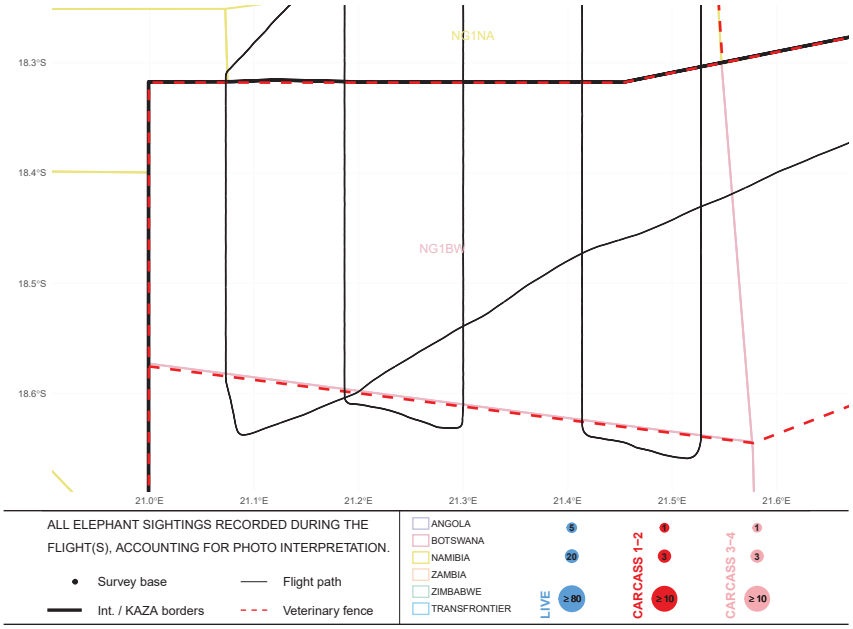
Actual sampling intensity: 2.6 %
Transect flying time: 0.9 h
Transects: 5 – 164 km – 0°
Search effort: 1.12 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C04	
Side:	L	R
% sightings:	45	55
% individuals:	47	53

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	3	0	
Live elephant (>9):	0		
Elephant carcass:	0		
Live elephant (<10):	0		



LIVE ELEPHANTS

IN SAMPLE:	**0 (0)**
Bulls:	0 (0)
Family:	0 (0)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**0 (0)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	0 (0)
Category 4:	0 (0)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

OTHER SPECIES

Other wildlife species:	4
Other wildlife count:	10
Domestic count:	149

ELEPHANT DATA ANALYSIS

t = 2.776, N = 198, w = 307

		LIVE OBS	LIVE FINAL	ALL CARCASSES OBS	ALL CARCASSES FINAL
Population estimate	$\hat{Y}$	–	–	–	–
Variance of estimate	$Var\hat{Y}$	–	–	–	–
Standard error	$SE\hat{Y}$	–	–	–	–
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	–	–	–	–
Percentage of relative precision	$PRP\hat{Y}$	–	–	–	–
Density per sqkm	$R\hat{Y}$	–	–	–	–
Variance between transect counts	s^2_y	–	–	–	–
Variance between transect areas	s^2_a	–	–	–	–
Covariance between counts & areas	s_{ay}	–	–	–	–

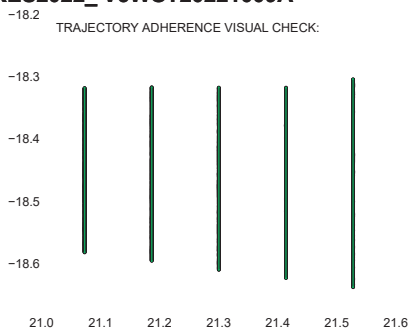
CARCASS RATIOS

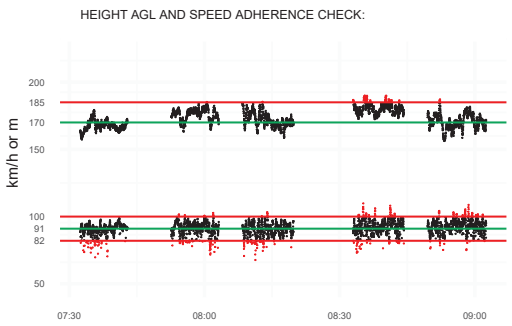
$CR_{1:4}$ = n/a
$CR_{1:2}$ = n/a

NG1BW – NG 1 Botswana — BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20221009A





SPEED
Average: 173.2 km/h
Standard dev.: 6.4 km/h

HEIGHT AGL
Average: 91.4 m (299.7 ft)
Standard dev.: 5.2 m (17 ft)

NG1BW – NG 1 Botswana — BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: NG1BW **N:** 199 S_a^2: 1,053
STRATUM NAME: NG 1 Botswana **w:** 307 **df:** 4

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	2	0	76	225	0,040	6543	80,89	0	301	294	0,800	-0,590
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	42	13	1603	1459	0,834	276273	525,62	144	3063	91	36,300	0,723
donkey	Equus asinus	19	0	725	975	0,377	123444	351,35	0	1701	134	16,200	0,453
duiker	Sylvicapra grimmia	2	1	76	225	0,040	6543	80,89	0	301	294	0,800	-0,590
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant family	Loxodonta africana family	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass four	Loxodonta africana carcass four	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	18	0	687	1975	0,357	506103	711,41	0	2662	287	64,800	-0,973
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	5	0	191	561	0,099	40897	202,23	0	752	294	5,000	-1,476
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	1	0	38	105	0,020	1432	37,84	0	143	275	0,200	0,372
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	70	0	2672	4906	1,389	3122075	1766,94	0	7578	184	380,000	-8,215
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000

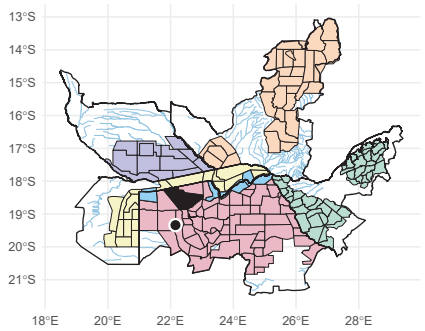
NG11 – NG 11 BOTSWANA – NORTHERN BOTSWANA

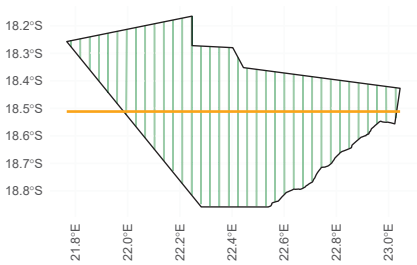
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NG11
STRATUM NAME: NG 11
■ STRATUM AREA: 5416.65 sqkm
• SURVEY BASE: Gumare
DISTANCE TO SURVEY BASE: 98 km

– TRANSECTS: 36 (1468 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 8.1 %

– BASELINE DISTANCE: 134.91 km





SURVEY IMPLEMENTATION

Number of flight(s): 3
Combined flying time: 12.7 h
Crew(s): C01, C02, C03
KES2022_V5IIM20220923A 06:50–10:44
KES2022_V5LJB20220923A 06:35–11:11
KES2022_V5WOT20220923A 06:42–10:52
Actual sampling intensity: 8.5 %
Transect flying time: 8.4 h
Transects: 36 – 1456 km – 0°
Search effort: 1.1 min/sqkm

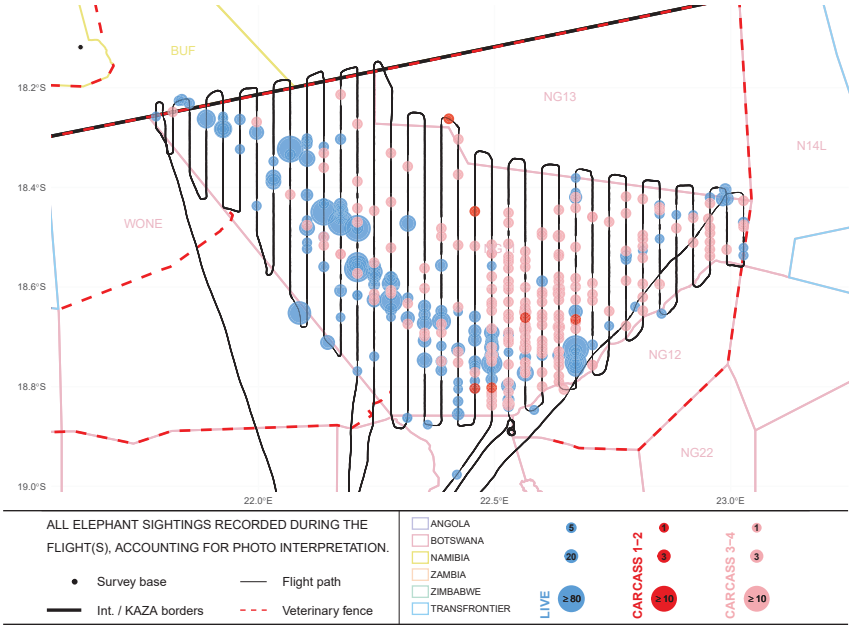
OBSERVER CONTRIBUTION

Crew(s):	C01		C02		C03	
Side:	L	R	L	R	L	R
% sightings:	39	61	58	42	38	62
% individuals:	59	41	77	23	34	66

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	414	18.84	11.54
Live elephant (>9):	28	14.29	75
Elephant carcass:	147	42.86	3.17
Live elephant (<10):	37	18.92	14.29

Undetected live elephant: 1
Undetected elephant carcass: 1



LIVE ELEPHANTS

IN SAMPLE:	**741 (66)**
Bulls:	31 (13)
Family:	710 (53)
NOT IN SAMPLE:	**1909 (119)**
Outside search strip:	1744
Off transect:	165

ELEPHANT CARCASSES

IN SAMPLE:	**154 (148)**
Category 1:	0 (0)
Category 2:	5 (5)
Category 3:	85 (80)
Category 4:	64 (63)
NOT IN SAMPLE:	**58 (56)**
Outside search strip:	54
Off transect:	4

OTHER SPECIES

Other wildlife species:	17
Other wildlife count:	289
Domestic count:	1995

ELEPHANT DATA ANALYSIS

t = 2.03, N = 426, w = 316

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	8652	8711	1810	1810
Variance of estimate	$Var\hat{Y}$	3975667	4282321	116631	116408
Standard error	$SE\hat{Y}$	1994	2069	342	341
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 4048	± 4201	± 693	± 693
Percentage of relative precision	$PRP\hat{Y}$	47 %	48 %	38 %	38 %
Density per sqkm	$R\hat{Y}$	1.597	1.608	0.334	0.334
Variance between transect counts	s^2_y	1002.597	1065.45	30.092	30.035
Variance between transect areas	s^2_a	39.625	39.625	39.625	39.625
Covariance between counts & areas	s_{ay}	76.196	75.021	13.885	13.871

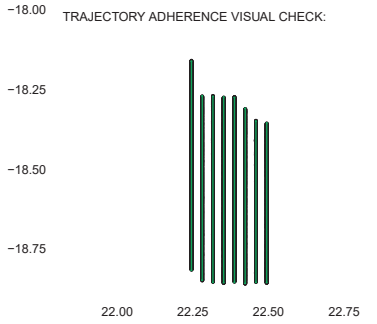
CARCASS RATIOS

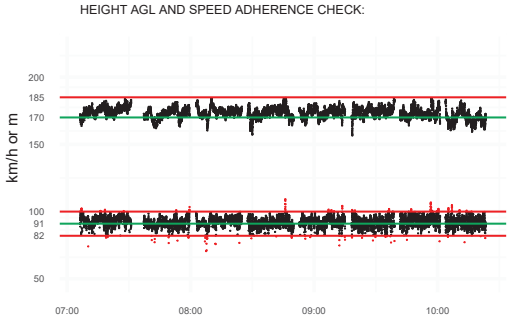
$CR_{1:4} = 17.2\ \%$
$CR_{1:2} = 0.7\ \%$

NG11 – NG 11 BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20220923A

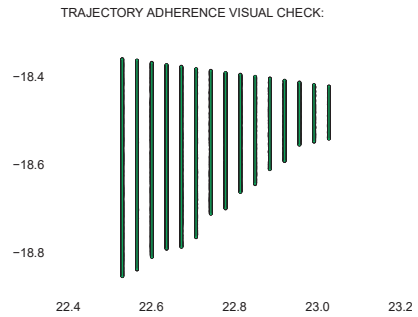


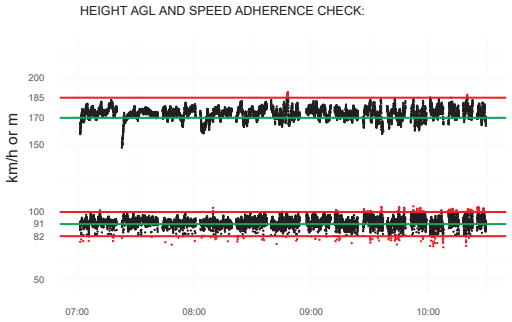


SPEED
Average: 173.3 km/h
Standard dev.: 4.1 km/h

HEIGHT AGL
Average: 92.2 m (302.4 ft)
Standard dev.: 3.6 m (11.7 ft)

KES2022_ V5LJB20220923A

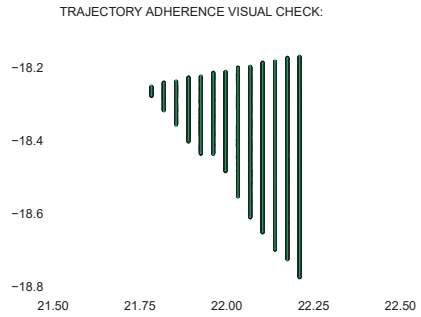


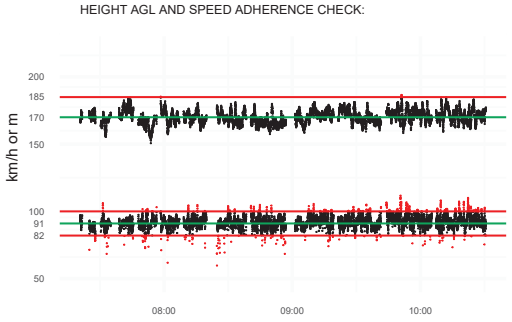


SPEED
Average: 173.3 km/h
Standard dev.: 4.3 km/h

HEIGHT AGL
Average: 92.2 m (302.6 ft)
Standard dev.: 3.5 m (11.4 ft)

KES2022_ V5WOT20220923A





SPEED
Average: 170.1 km/h
Standard dev.: 4.9 km/h

HEIGHT AGL
Average: 92 m (301.8 ft)
Standard dev.: 4.5 m (14.7 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

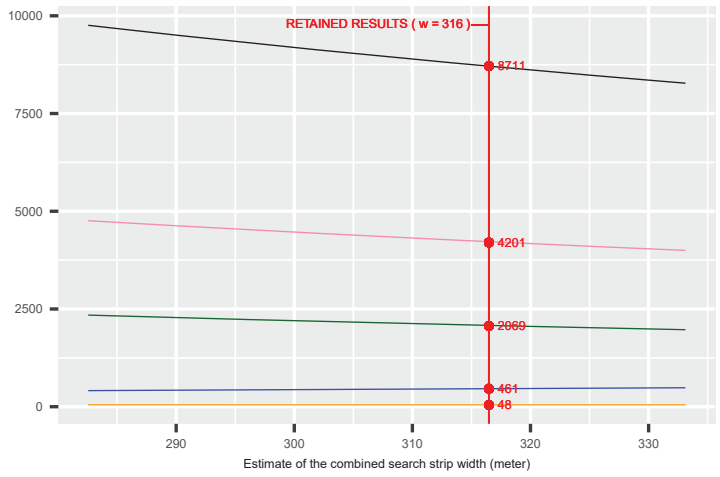
Range of search strip width estimates (m):

C01 – Left: [159 – 191]
C01 – Right: [120 – 161]

C02 – Left: [155 – 177]
C02 – Right: [135 – 186]

C03 – Left: [103 – 156]
C03 – Right: [144 – 173]

LIVE ELEPHANT ESTIMATE: [9757 – 8276]
CONFIDENCE INTERVAL: ± [4758 – 3999]
SAMPLE AREA: [411 – 485] sqkm
SE: [2344 – 1970]
PRP: [49 – 48] %



NG11 – NG 11 BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: NG11 **N:** 426 S_a^2: 39,625
STRATUM NAME: NG 11 **w:** 316 **df:** 35

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	1	142	12	23	0,002	128	11,32	0	35	196	0,028	0,051
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	6	0	71	116	0,013	3275	57,23	0	187	165	0,714	0,472
cattle	Bos taurus	1555	247	18280	6652	3,375	10737591	3276,83	11627	24932	36	2542,847	99,365
donkey	Equus asinus	296	2	3480	1937	0,642	910623	954,27	1542	5417	56	168,921	-9,164
duiker	Sylvicapra grimmia	5	2	59	47	0,011	543	23,30	11	106	80	0,123	0,469
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	31	107	364	239	0,067	13839	117,64	126	603	66	3,152	2,500
elephant family	Loxodonta africana family	710	1802	8346	4178	1,541	4235798	2058,11	4168	12524	50	1045,978	72,521
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	5	1	59	57	0,011	793	28,15	2	116	97	0,180	0,615
elephant carcass three	Loxodonta africana carcass three	85	28	999	517	0,184	64850	254,66	482	1516	52	15,780	8,391
elephant carcass four	Loxodonta africana carcass four	64	29	752	251	0,139	15273	123,59	501	1003	33	3,892	4,865
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	90	8	1058	599	0,195	87135	295,19	459	1657	57	18,371	2,632
horse	Equus caballus	12	0	141	141	0,026	4822	69,44	0	282	100	0,971	-0,867
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	4	5	47	63	0,009	977	31,26	0	110	135	0,216	0,428
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	6	0	71	69	0,013	1161	34,08	1	140	98	0,257	0,484
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	4	0	47	62	0,009	928	30,46	0	109	132	0,216	1,039
reedbuck	Redunca arundinum	6	0	71	76	0,013	1398	37,38	0	146	108	0,314	0,713
roan	Hippotragus equinus	12	2	141	251	0,026	15303	123,71	0	392	178	3,371	1,669
sable	Hippotragus niger	28	16	329	505	0,061	61760	248,52	0	834	153	12,749	-3,855
shoat	Capra hircus - Ovis aries	132	0	1552	1080	0,286	283045	532,02	472	2632	70	69,829	20,654
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	10	0	118	164	0,022	6552	80,94	0	282	140	1,406	0,167
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	30	52	353	381	0,065	35151	187,49	0	733	108	7,686	1,901
all elephants	Loxodonta africana all	741	1909	8711	4201	1,608	4282321	2069,38	4510	12912	48	1065,450	75,021
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	5	1	59	57	0,011	793	28,15	2	116	97	0,180	0,615
all elephant carcasses	Loxodonta africana carcass all	154	58	1810	693	0,334	116408	341,19	1118	2503	38	30,035	13,871
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	149	57	1752	681	0,323	112663	335,65	1070	2433	39	28,809	13,257

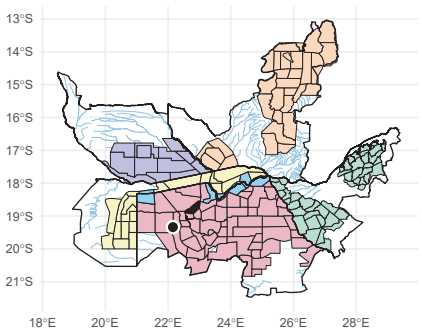
NG12 – NG 12 BOTSWANA – NORTHERN BOTSWANA

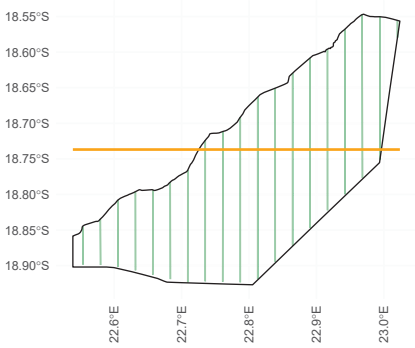
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NG12
STRATUM NAME: NG 12
■ STRATUM AREA: 999.21 sqkm
• SURVEY BASE: Gumare
DISTANCE TO SURVEY BASE: 100 km

– TRANSECTS: 19 (369 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 11.1 %

– BASELINE DISTANCE: 51.16 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.7 h
Crew(s): C03
KES2022_V5WOT20220924A 06:25–10:06

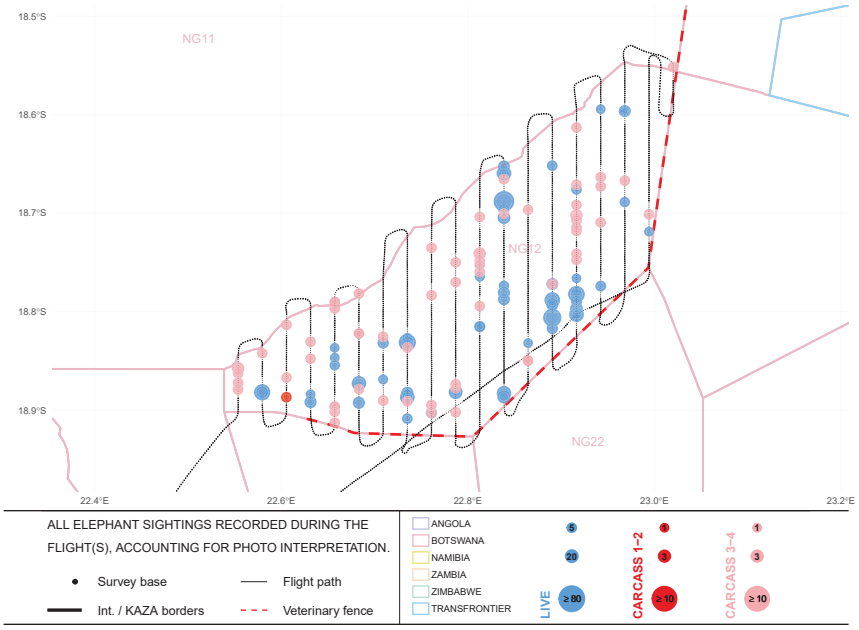
Actual sampling intensity: 11.4 %
Transect flying time: 2.2 h
Transects: 19 – 369 km – 0°
Search effort: 1.13 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C03	
Side:	L	R
% sightings:	39	61
% individuals:	42	58

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	176	25	20.45
Live elephant (>9):	17	52.94	55.56
Elephant carcass:	58	50	13.79
Live elephant (<10):	29	6.9	0



LIVE ELEPHANTS

IN SAMPLE:	**439 (46)**
Bulls:	24 (15)
Family:	415 (31)
NOT IN SAMPLE:	**244 (24)**
Outside search strip:	244
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**60 (58)**
Category 1:	1 (1)
Category 2:	0 (0)
Category 3:	38 (37)
Category 4:	21 (20)
NOT IN SAMPLE:	**4 (3)**
Outside search strip:	3
Off transect:	1

OTHER SPECIES

Other wildlife species:	20
Other wildlife count:	1021
Domestic count:	933

ELEPHANT DATA ANALYSIS

t = 2.101, N = 165, w = 310

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	3592	3836	524	524
Variance of estimate	$Var\hat{Y}$	720534	877167	7702	7702
Standard error	$SE\hat{Y}$	849	937	88	88
95% confidence interval	$CI_{\hat{Y}}^{95\%}$	± 1783	± 1968	± 184	± 184
Percentage of relative precision	$PRP_{\hat{Y}}$	50 %	51 %	35 %	35 %
Density per sqkm	$R_{\hat{Y}}$	3.595	3.839	0.525	0.525
Variance between transect counts	s_y^2	643.023	783.877	5.14	5.14
Variance between transect areas	s_a^2	6.409	6.409	6.409	6.409
Covariance between counts & areas	s_{ay}	22.172	24.585	0.81	0.81

CARCASS RATIOS

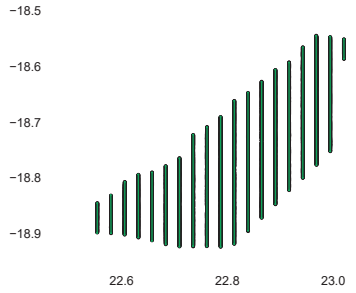
$CR_{1:4} = 12$ %
$CR_{1:2} = 0.2$ %

NG12 – NG 12 BOTSWANA – NORTHERN BOTSWANA

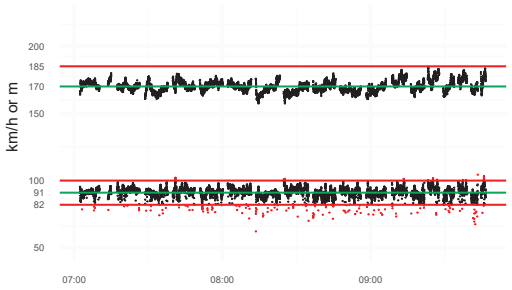
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20220924A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



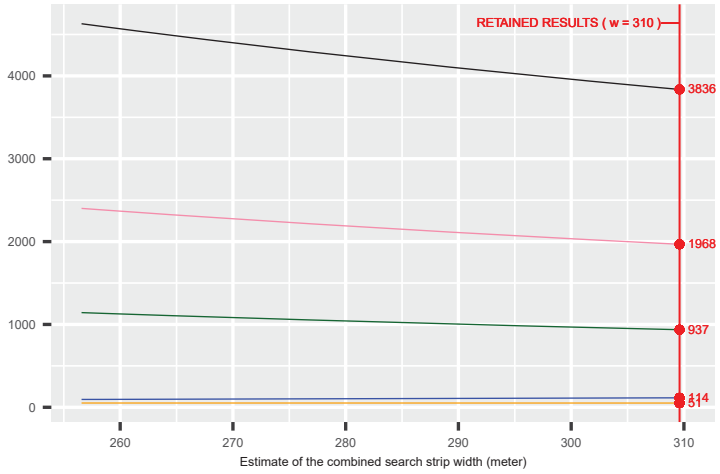
SPEED
Average: 170 km/h
Standard dev.: 4 km/h

HEIGHT AGL
Average: 91.1 m (298.9 ft)
Standard dev.: 3.7 m (12.1 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C03 – Left: [102 – 154]
C03 – Right: [143 – 171]



LIVE ELEPHANT ESTIMATE: [4630 – 3836]
CONFIDENCE INTERVAL: ± [2401 – 1968]
SAMPLE AREA: [95 – 114] sqkm
SE: [1143 – 937]
PRP: [52 – 51] %

NG12 – NG 12 BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: NG12 **N:** 165 S_a^2: 6,409
STRATUM NAME: NG 12 **w:** 310 **df:** 18

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	4	0	35	68	0,035	1054	32,47	0	103	195	0,842	0,302
buffalo	Syncerus caffer	290	108	2534	1838	2,536	765051	874,67	697	4372	73	641,982	16,122
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	6	0	52	102	0,052	2344	48,42	0	154	194	1,895	0,661
cattle	Bos taurus	856	34	7481	4018	7,487	3658005	1912,59	3462	11499	54	1914,275	-40,218
donkey	Equus asinus	33	0	288	243	0,289	13411	115,81	45	532	84	9,760	-0,431
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	24	22	210	132	0,210	3919	62,60	78	341	63	3,427	1,497
elephant family	Loxodonta africana family	415	222	3627	1957	3,630	867786	931,55	1670	5584	54	765,363	23,088
elephant carcass one	Loxodonta africana carcass one	1	0	9	18	0,009	71	8,42	0	26	202	0,053	-0,149
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	38	3	332	170	0,332	6566	81,03	162	502	51	5,333	1,323
elephant carcass four	Loxodonta africana carcass four	21	1	184	112	0,184	2833	53,23	72	295	61	1,877	-0,364
giraffe	Giraffa giraffa	7	2	61	67	0,061	1005	31,70	0	128	109	0,801	0,287
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	54	5	472	343	0,472	26726	163,48	128	815	73	19,474	-0,113
horse	Equus caballus	12	3	105	114	0,105	2964	54,44	0	219	109	2,579	1,522
impala	Aepyceros melampus	13	0	114	130	0,114	3818	61,79	0	243	114	3,117	0,871
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	6	0	52	73	0,052	1211	34,81	0	126	139	1,006	0,678
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	8	4	70	86	0,070	1690	41,11	0	156	124	1,257	-0,285
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	55	0	481	423	0,481	40547	201,36	58	904	88	27,988	-2,499
reedbuck	Redunca arundinum	8	0	70	62	0,070	873	29,55	8	132	89	0,702	0,332
roan	Hippotragus equinus	1	0	9	17	0,009	65	8,05	0	26	194	0,053	0,122
sable	Hippotragus niger	10	0	87	118	0,087	3143	56,07	0	205	135	2,596	0,998
shoat	Capra hircus - Ovis aries	32	0	280	436	0,280	43021	207,42	0	715	156	33,339	0,038
sitatunga	Tragelaphus spekii	1	0	9	17	0,009	64	8,03	0	26	193	0,053	0,139
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	21	25	184	243	0,184	13381	115,68	0	427	132	10,988	1,865
warthog	Phacochoerus africanus	19	0	166	151	0,166	5192	72,06	15	317	91	4,222	0,956
waterbuck	Kobus ellipsiprymnus	12	0	105	136	0,105	4215	64,92	0	241	130	3,579	1,601
wildebeest	Connochaetes taurinus	35	0	306	607	0,306	83495	288,95	0	913	198	64,474	-0,920
zebra	Equus spp,	460	80	4020	2539	4,023	1460458	1208,49	1481	6559	63	1459,842	51,634
all elephants	Loxodonta africana all	439	244	3836	1968	3,839	877167	936,57	1869	5804	51	783,877	24,585
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	1	0	9	18	0,009	71	8,42	0	26	202	0,053	-0,149
all elephant carcasses	Loxodonta africana carcass all	60	4	524	184	0,525	7702	87,76	340	709	35	5,140	0,810
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	59	4	516	182	0,516	7540	86,83	333	698	35	5,211	0,959

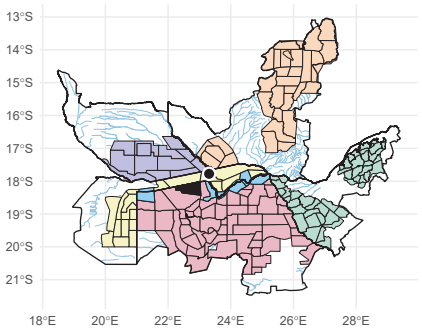
NG13 – NG 13 BOTSWANA – NORTHERN BOTSWANA

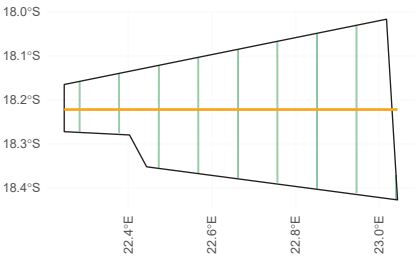
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NG13
STRATUM NAME: NG 13
■ STRATUM AREA: 2504.07 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 86 km

– TRANSECTS: 9 (243 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 2.9 %

– BASELINE DISTANCE: 84.35 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 2.7 h
Crew(s): C02
KES2022_V5LJB20221009A 07:04–09:45

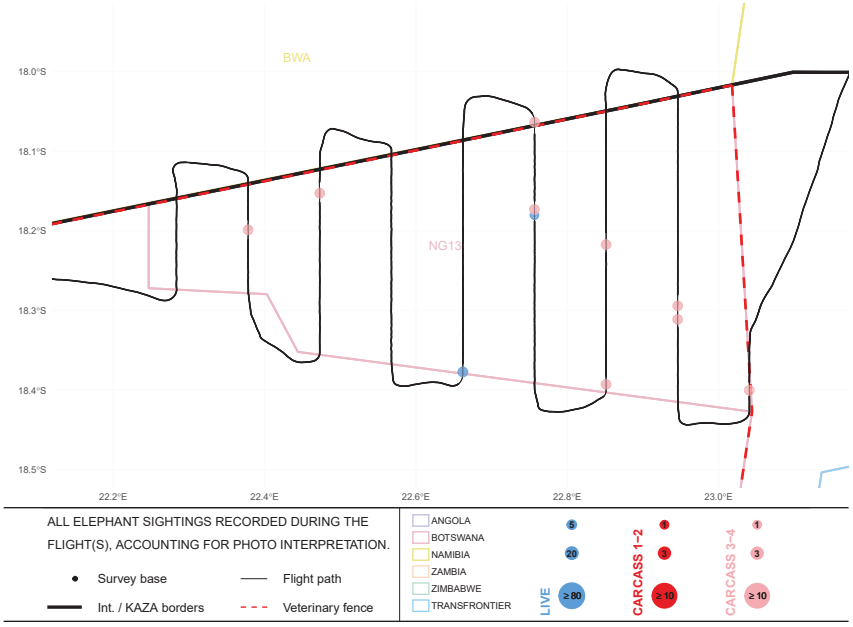
Actual sampling intensity: 3.1 %
Transect flying time: 1.4 h
Transects: 9 – 243 km – 0°
Search effort: 1.09 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C02	
Side:	L	R
% sightings:	58	42
% individuals:	80	20

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	12	41.67	0
Live elephant (>9):	0		
Elephant carcass:	8	62.5	20
Live elephant (<10):	1	0	



LIVE ELEPHANTS

IN SAMPLE:	**1 (1)**
Bulls:	1 (1)
Family:	0 (0)
NOT IN SAMPLE:	**6 (1)**
Outside search strip:	6
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**8 (8)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	1 (1)
Category 4:	7 (7)
NOT IN SAMPLE:	**1 (1)**
Outside search strip:	1
Off transect:	0

OTHER SPECIES

Other wildlife species:	8
Other wildlife count:	33
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.306, N = 264, w = 319

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	32	32	259	259
Variance of estimate	$Var\hat{Y}$	787	787	3941	3941
Standard error	$SE\hat{Y}$	28	28	63	63
95% confidence interval	$CI_{\hat{Y}}^{95\%}$	± 65	± 65	± 145	± 145
Percentage of relative precision	$PRP\hat{Y}$	200 %	200 %	56 %	56 %
Density per sqkm	$R\hat{Y}$	0.013	0.013	0.103	0.103
Variance between transect counts	s_y^2	0.111	0.111	0.861	0.861
Variance between transect areas	s_a^2	14.899	14.899	14.899	14.899
Covariance between counts & areas	s_{ay}	0.347	0.347	2.403	2.403

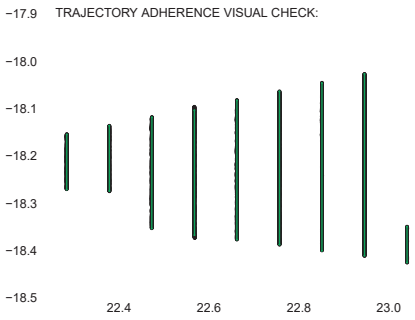
CARCASS RATIOS

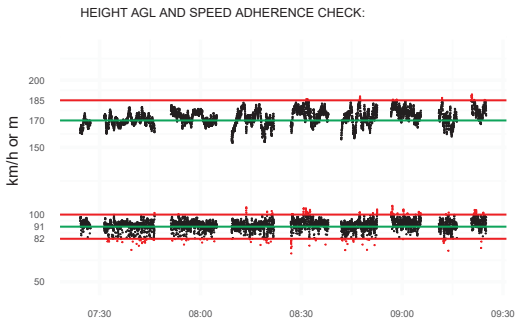
$CR_{1:4} = 88.9\ \%$
$CR_{1:2} = 0\ \%$

NG13 – NG 13 BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20221009A





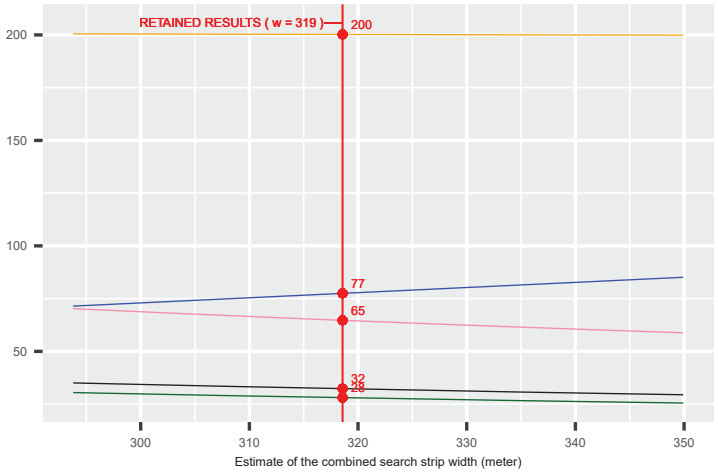
SPEED
Average: 172.3 km/h
Standard dev.: 5.5 km/h

HEIGHT AGL
Average: 92.2 m (302.4 ft)
Standard dev.: 3.8 m (12.5 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C02 – Left: [155 – 177]
C02 – Right: [134 – 186]



LIVE ELEPHANT ESTIMATE: [35 – 29]
CONFIDENCE INTERVAL: ± [70 – 59]
SAMPLE AREA: [71 – 85] sqkm
SE: [30 – 26]
PRP: [200 – 200] %

NG13 – NG 13 BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: NG13 **N:** 265 S_a^2: 14,899
STRATUM NAME: NG 13 **w:** 319 **df:** 8

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	4	0	129	112	0,052	2366	48,64	17	241	87	0,278	0,030
eland	Tragelaphus oryx	7	0	226	510	0,090	48891	221,11	0	736	225	5,444	-5,156
elephant bulls	Loxodonta africana males	1	0	32	65	0,013	787	28,06	0	97	200	0,111	0,347
elephant family	Loxodonta africana family	0	6	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	1	0	32	64	0,013	760	27,56	0	96	197	0,111	0,489
elephant carcass four	Loxodonta africana carcass four	7	1	226	137	0,090	3539	59,49	89	363	61	0,694	1,913
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	2	0	65	125	0,026	2947	54,28	0	190	194	0,444	1,216
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	2	0	65	134	0,026	3356	57,93	0	198	207	0,444	0,162
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	1	0	32	73	0,013	998	31,59	0	105	225	0,111	-0,737
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	11	0	355	801	0,142	120732	347,46	0	1157	225	13,444	-8,102
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	5	0	162	328	0,065	20176	142,04	0	489	203	2,778	1,227
all elephants	Loxodonta africana all	1	6	32	65	0,013	787	28,06	0	97	200	0,111	0,347
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	8	1	259	145	0,103	3941	62,78	114	403	56	0,861	2,403
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	8	1	259	145	0,103	3941	62,78	114	403	56	0,861	2,403

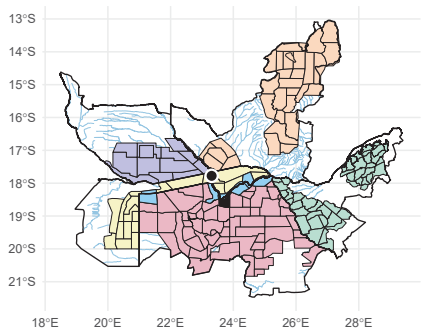
NG15 – NG 15 BOTSWANA – NORTHERN BOTSWANA

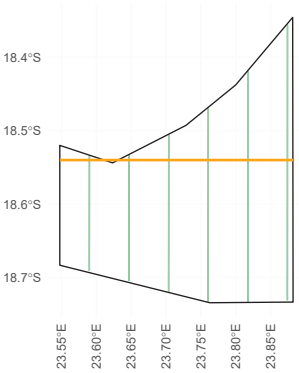
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NG15
STRATUM NAME: NG 15
■ STRATUM AREA: 932.32 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 97 km

– TRANSECTS: 6 (167 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 5.4 %

– BASELINE DISTANCE: 35.35 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 2.3 h
Crew(s): C04
KES2022_V5WOT20221003B 15:45–18:04

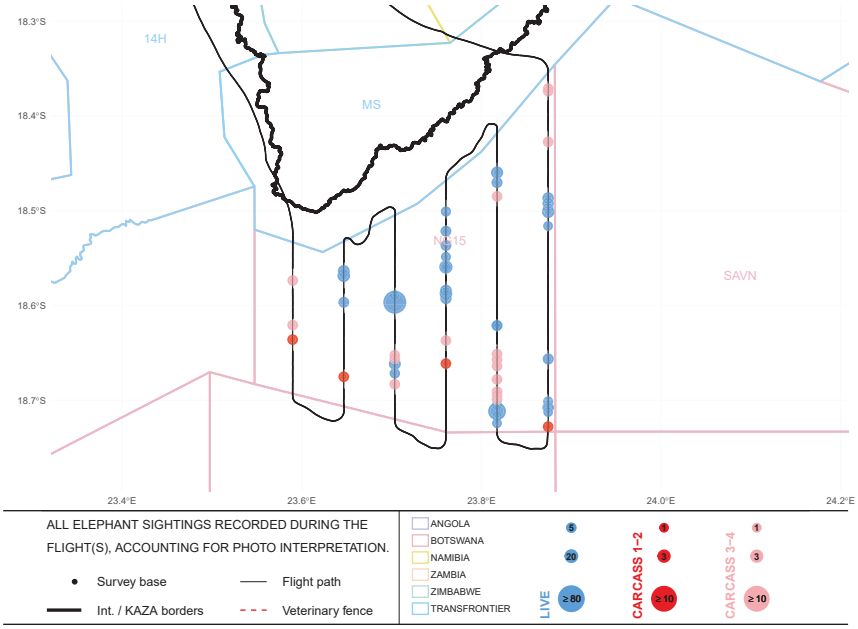
Actual sampling intensity: 5.5 %
Transect flying time: 1 h
Transects: 6 – 167 km – 0°
Search effort: 1.11 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C04	
Side:	L	R
% sightings:	38	62
% individuals:	19	81

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	60	15	0
Live elephant (>9):	4	50	0
Elephant carcass:	15	40	16.67
Live elephant (<10):	20	5	0



LIVE ELEPHANTS

IN SAMPLE:	**142 (24)**
Bulls:	9 (7)
Family:	133 (17)
NOT IN SAMPLE:	**175 (15)**
Outside search strip:	175
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**15 (15)**
Category 1:	0 (0)
Category 2:	3 (3)
Category 3:	5 (5)
Category 4:	7 (7)
NOT IN SAMPLE:	**6 (6)**
Outside search strip:	6
Off transect:	0

OTHER SPECIES

Other wildlife species:	8
Other wildlife count:	136
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.571, N = 114, w = 309

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	2569	2569	271	271
Variance of estimate	$Var\hat{Y}$	557270	557270	3058	3058
Standard error	$SE\hat{Y}$	747	747	55	55
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 1919	± 1919	± 142	± 142
Percentage of relative precision	$PRP\hat{Y}$	75 %	75 %	52 %	52 %
Density per sqkm	$R\hat{Y}$	2.756	2.756	0.291	0.291
Variance between transect counts	s^2_y	451.867	451.867	1.1	1.1
Variance between transect areas	s^2_a	8.598	8.598	8.598	8.598
Covariance between counts & areas	s_{ay}	44.885	44.885	0.598	0.598

CARCASS RATIOS

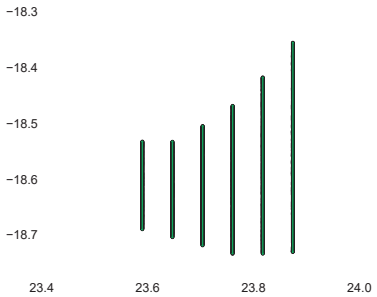
$CR_{1:4} = 9.6$ %
$CR_{1:2} = 2.1$ %

NG15 – NG 15 BOTSWANA – NORTHERN BOTSWANA

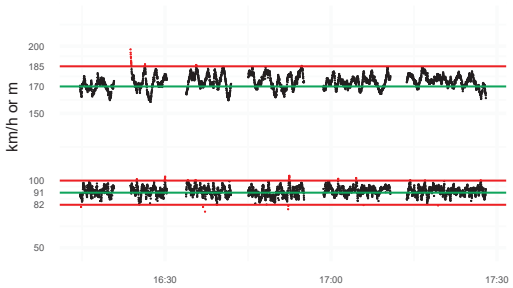
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20221003B

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



SPEED
Average: 173.4 km/h
Standard dev.: 5 km/h

HEIGHT AGL
Average: 92.1 m (302.2 ft)
Standard dev.: 3.3 m (10.8 ft)

NG15 – NG 15 BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: NG15 **N:** 114 S_a^2: 8,598
STRATUM NAME: NG 15 **w:** 309 **df:** 5

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	23	112	416	563	0,446	47979	219,04	0	979	135	30,567	10,140
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	9	5	163	180	0,175	4930	70,22	0	343	111	3,900	5,083
elephant family	Loxodonta africana family	133	170	2406	1923	2,581	559342	747,89	484	4329	80	418,967	39,802
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	3	1	54	79	0,058	942	30,69	0	133	145	0,300	-1,089
elephant carcass three	Loxodonta africana carcass three	5	1	90	92	0,097	1280	35,77	0	182	102	0,567	0,145
elephant carcass four	Loxodonta africana carcass four	7	4	127	98	0,136	1459	38,20	28	225	78	0,967	1,542
giraffe	Giraffa giraffa	7	7	127	173	0,136	4545	67,42	0	300	137	2,567	1,932
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	8	0	145	332	0,155	16714	129,28	0	477	230	7,867	-0,056
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	3	0	54	109	0,058	1792	42,33	0	163	200	0,700	-1,188
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	37	7	669	952	0,718	137018	370,16	0	1621	142	78,167	11,328
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
waterbuck	Kobus ellipsiprymnus	5	0	90	238	0,097	8608	92,78	0	329	264	4,167	0,414
wildebeest	Connochaetes taurinus	22	0	398	1049	0,427	166655	408,23	0	1447	264	80,667	1,821
zebra	Equus spp,	31	8	561	745	0,602	84005	289,84	0	1306	133	35,767	-1,487
all elephants	Loxodonta africana all	142	175	2569	1919	2,756	557270	746,51	650	4488	75	451,867	44,885
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	3	1	54	79	0,058	942	30,69	0	133	145	0,300	-1,089
all elephant carcasses	Loxodonta africana carcass all	15	6	271	142	0,291	3058	55,30	129	414	52	1,100	0,598
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	12	5	217	151	0,233	3472	58,92	66	369	70	2,000	1,686

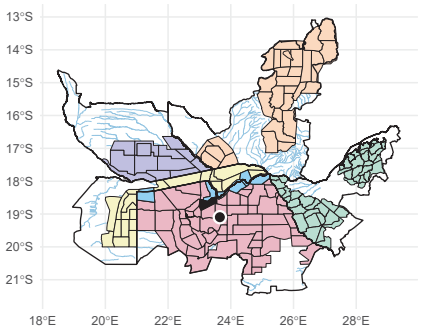
NG16 – NG 16 BOTSWANA – NORTHERN BOTSWANA

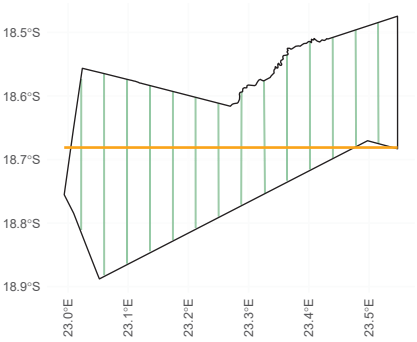
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NG16
STRATUM NAME: NG 16
■ STRATUM AREA: 1383.06 sqkm
• SURVEY BASE: Khwai
DISTANCE TO SURVEY BASE: 63 km

– TRANSECTS: 14 (343 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 7.4 %

– BASELINE DISTANCE: 58.42 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 3.2 h
Crew(s): C02
KES2022_V5LJB20220926A 06:40–09:53

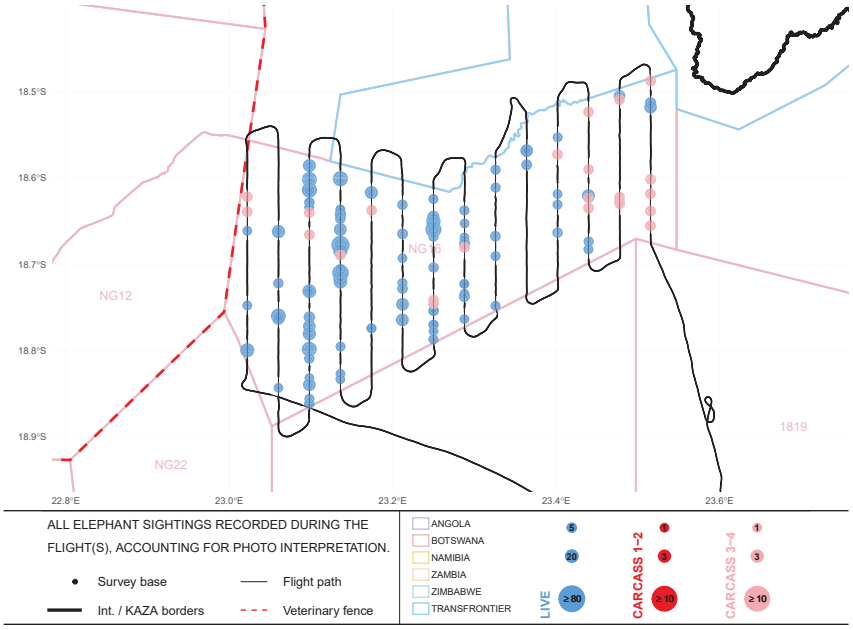
Actual sampling intensity: 8 %
Transect flying time: 2 h
Transects: 14 – 343 km – 0°
Search effort: 1.06 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C02	
Side:	L	R
% sightings:	56	44
% individuals:	69	31

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	138	13.04	27.78
Live elephant (>9):	15	86.67	38.46
Elephant carcass:	15	26.67	0
Live elephant (<10):	41	2.44	0



LIVE ELEPHANTS

IN SAMPLE:	**380 (56)**
Bulls:	64 (31)
Family:	316 (25)
NOT IN SAMPLE:	**449 (64)**
Outside search strip:	449
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**15 (15)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	1 (1)
Category 4:	14 (14)
NOT IN SAMPLE:	**8 (8)**
Outside search strip:	8
Off transect:	0

OTHER SPECIES

Other wildlife species:	19
Other wildlife count:	665
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.16, N = 182, w = 321

		LIVE OBS	LIVE FINAL	ALL CARCASSES OBS	ALL CARCASSES FINAL
Population estimate	$\hat{Y}$	4666	4780	189	189
Variance of estimate	$Var\hat{Y}$	1291561	1295079	4966	4966
Standard error	$SE\hat{Y}$	1136	1138	70	70
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 2455	± 2459	± 152	± 152
Percentage of relative precision	$PRP\hat{Y}$	53 %	51 %	81 %	81 %
Density per sqkm	$R\hat{Y}$	3.374	3.456	0.136	0.136
Variance between transect counts	s^2_y	705.038	708.132	2.071	2.071
Variance between transect areas	s^2_a	2.49	2.49	2.49	2.49
Covariance between counts & areas	s_{ay}	21.226	21.139	−0.555	−0.555

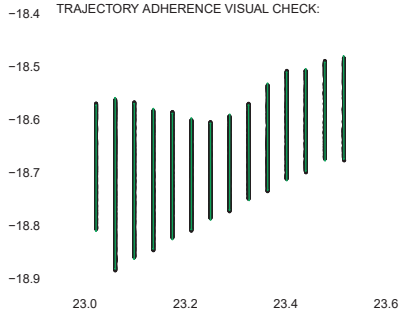
CARCASS RATIOS

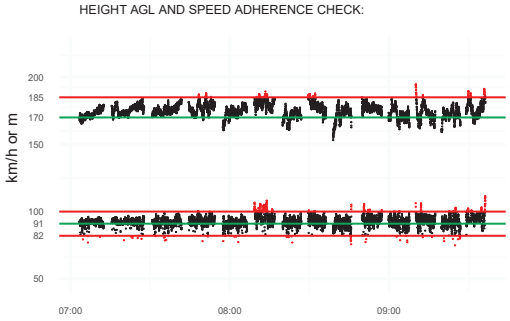
$CR_{1:4} = 3.8$ %
$CR_{1:2} = 0$ %

NG16 – NG 16 BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20220926A





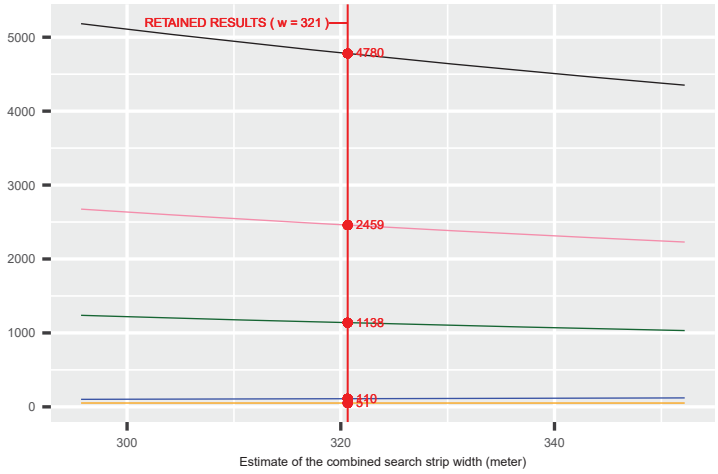
SPEED
Average: 174.9 km/h
Standard dev.: 5 km/h

HEIGHT AGL
Average: 92.8 m (304.4 ft)
Standard dev.: 3.7 m (12.1 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C02 – Left: [156 – 179]
C02 – Right: [135 – 187]



LIVE ELEPHANT ESTIMATE: [5183 – 4352]
CONFIDENCE INTERVAL: ± [2675 – 2229]
SAMPLE AREA: [101 – 121] sqkm
SE: [1238 – 1032]
PRP: [52 – 51] %

NG16 – NG 16 BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: NG16 **N:** 182 S_a^2: 2,490
STRATUM NAME: NG 16 **w:** 321 **df:** 13

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	1	0	13	27	0,009	161	12,68	0	40	218	0,071	-0,100
buffalo	Syncerus caffer	321	2	4037	7813	2,919	13080693	3616,72	0	11851	194	5936,687	-3,260
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	1	0	13	27	0,009	155	12,46	0	39	214	0,071	0,039
eland	Tragelaphus oryx	9	0	113	166	0,082	5908	76,86	0	279	147	2,709	0,159
elephant bulls	Loxodonta africana males	64	78	805	590	0,582	74629	273,18	215	1395	73	32,110	-0,985
elephant family	Loxodonta africana family	316	371	3975	2287	2,874	1120465	1058,52	1688	6261	58	618,571	22,124
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	1	0	13	27	0,009	161	12,68	0	40	218	0,071	-0,100
elephant carcass four	Loxodonta africana carcass four	14	8	176	143	0,127	4382	66,20	33	319	81	1,846	-0,455
giraffe	Giraffa giraffa	29	2	365	255	0,264	13981	118,24	109	620	70	7,148	1,769
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	9	0	113	214	0,082	9795	98,97	0	327	189	4,555	0,587
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	27	0	340	406	0,246	35323	187,94	0	746	120	15,610	-0,774
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	5	0	63	87	0,045	1613	40,16	0	150	138	0,709	-0,253
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	1	0	13	27	0,009	161	12,68	0	40	218	0,071	-0,100
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	85	0	1069	2315	0,773	1148517	1071,69	0	3384	217	516,071	-4,677
reedbuck	Redunca arundinum	2	0	25	54	0,018	634	25,18	0	80	216	0,286	-0,090
roan	Hippotragus equinus	6	0	75	75	0,055	1203	34,68	1	150	99	0,571	0,267
sable	Hippotragus niger	27	5	340	455	0,246	44307	210,49	0	794	134	21,302	2,458
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	27	0	340	547	0,246	64093	253,17	0	887	161	31,456	4,724
warthog	Phacochoerus africanus	4	0	50	82	0,036	1433	37,85	0	132	163	0,681	0,412
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	13	0	164	247	0,118	13123	114,56	0	411	151	5,918	-0,187
zebra	Equus spp,	95	0	1195	673	0,864	97140	311,67	522	1868	56	56,181	7,902
all elephants	Loxodonta africana all	380	449	4780	2459	3,456	1295079	1138,02	2321	7238	51	708,132	21,139
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	15	8	189	152	0,136	4966	70,47	36	341	81	2,071	-0,555
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	15	8	189	152	0,136	4966	70,47	36	341	81	2,071	-0,555

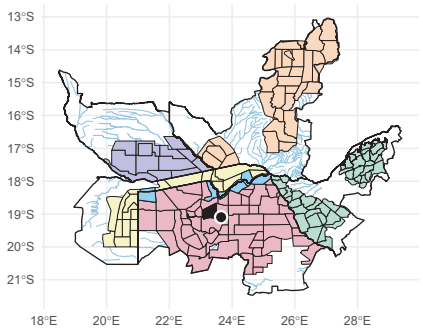
NG20 – NG 20 BOTSWANA – NORTHERN BOTSWANA

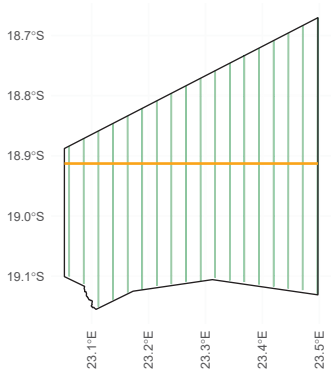
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NG20
STRATUM NAME: NG 20
■ STRATUM AREA: 1774.62 sqkm
• SURVEY BASE: Khwai
DISTANCE TO SURVEY BASE: 41 km

– TRANSECTS: 18 (686 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 11.6 %

– BASELINE DISTANCE: 46.93 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 5.4 h
Crew(s): C03
KES2022_V5WOT20220927A 06:00–11:23

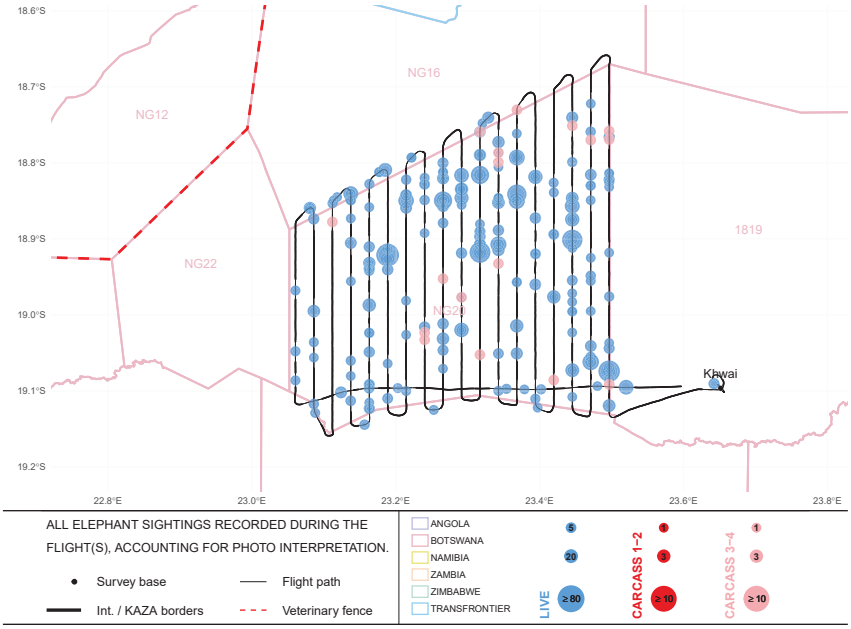
Actual sampling intensity: 12.1 %
Transect flying time: 4 h
Transects: 18 – 686 km – 0°
Search effort: 1.11 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C03	
Side:	L	R
% sightings:	43	57
% individuals:	44	56

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	220	15.91	48.57
Live elephant (>9):	23	86.96	30
Elephant carcass:	17	0	
Live elephant (<10):	92	0	



LIVE ELEPHANTS

IN SAMPLE:	**737 (115)**
Bulls:	112 (56)
Family:	625 (59)
NOT IN SAMPLE:	**969 (132)**
Outside search strip:	798
Off transect:	171

ELEPHANT CARCASSES

IN SAMPLE:	**17 (17)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	2 (2)
Category 4:	15 (15)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

OTHER SPECIES

Other wildlife species:	26
Other wildlife count:	1143
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.11, N = 149, w = 314

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	6075	6075	140	140
Variance of estimate	$Var\hat{Y}$	982578	923928	906	906
Standard error	$SE\hat{Y}$	991	961	30	30
95% confidence interval	$CI_{\hat{Y}}^{95\%}$	± 2091	± 2028	± 64	± 64
Percentage of relative precision	$PRP_{\hat{Y}}$	34 %	33 %	45 %	45 %
Density per sqkm	$R_{\hat{Y}}$	3.423	3.423	0.079	0.079
Variance between transect counts	s_y^2	908.526	875.114	0.997	0.997
Variance between transect areas	s_a^2	5.783	5.783	5.783	5.783
Covariance between counts & areas	s_{ay}	11.387	14.339	1.295	1.295

CARCASS RATIOS

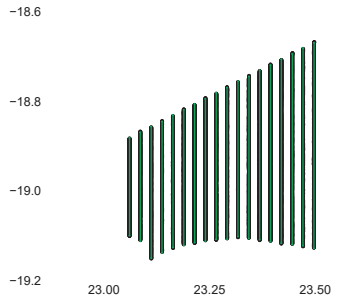
$CR_{1:4}$ = 2.3 %
$CR_{1:2}$ = 0 %

NG20 – NG 20 BOTSWANA – NORTHERN BOTSWANA

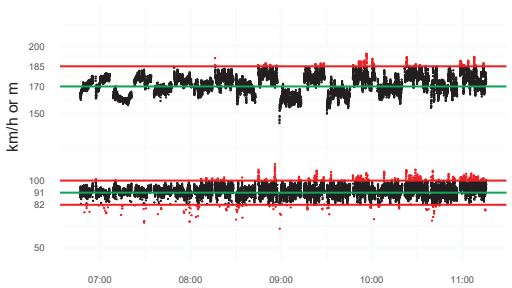
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20220927A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



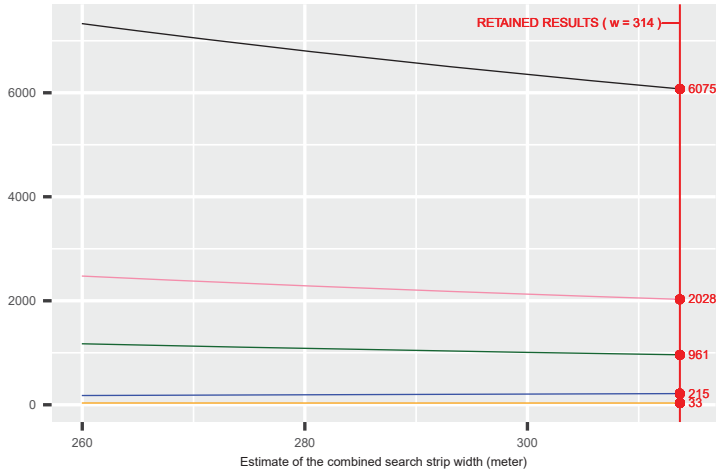
SPEED
Average: 171.5 km/h
Standard dev.: 7 km/h

HEIGHT AGL
Average: 92.3 m (302.8 ft)
Standard dev.: 4 m (13.2 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C03 − Left: [103 − 156]
C03 − Right: [145 − 174]



LIVE ELEPHANT ESTIMATE: [7331 − 6075]
CONFIDENCE INTERVAL: ± [2476 − 2028]
SAMPLE AREA: [178 − 215] sqkm
SE: [1173 − 961]
PRP: [34 − 33] %

NG20 – NG 20 BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: NG20 **N:** 150 S_a^2: 5,783
STRATUM NAME: NG 20 **w:** 314 **df:** 17

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	14	1	115	162	0,065	5908	76,86	0	278	141	5,242	-1,037
buffalo	Syncerus caffer	155	566	1278	1298	0,720	378325	615,08	0	2575	102	328,252	-10,166
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	1	0	8	16	0,005	61	7,81	0	25	200	0,056	-0,002
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	1	0	8	16	0,005	59	7,68	0	24	196	0,056	0,196
eland	Tragelaphus oryx	1	8	8	16	0,005	59	7,71	0	25	197	0,056	0,138
elephant bulls	Loxodonta africana males	112	126	923	432	0,520	41859	204,60	492	1355	47	43,124	6,170
elephant family	Loxodonta africana family	625	843	5152	1928	2,903	834863	913,71	3224	7079	37	761,977	8,169
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	2	0	16	22	0,009	109	10,42	0	38	133	0,105	0,309
elephant carcass four	Loxodonta africana carcass four	15	0	124	50	0,070	556	23,58	74	173	40	0,618	0,986
giraffe	Giraffa giraffa	45	33	371	267	0,209	16016	126,56	104	638	72	13,912	-1,145
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	35	8	288	202	0,163	9142	95,61	87	490	70	8,056	-0,460
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	135	20	1113	1274	0,627	364438	603,69	0	2386	114	327,794	-2,489
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	7	0	58	66	0,033	982	31,34	0	124	115	0,840	-0,799
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	1	1	8	17	0,005	62	7,85	0	25	201	0,056	-0,070
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	458	0	3775	3254	2,127	2378622	1542,28	521	7029	86	1907,320	-56,688
reedbuck	Redunca arundinum	8	0	66	62	0,037	870	29,50	4	128	94	0,732	-0,749
roan	Hippotragus equinus	1	0	8	16	0,005	58	7,63	0	24	195	0,056	0,266
sable	Hippotragus niger	9	13	74	64	0,042	906	30,11	11	138	86	0,853	0,411
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	2	0	16	23	0,009	121	11,02	0	40	141	0,105	-0,317
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	21	18	173	149	0,098	5003	70,73	24	322	86	4,265	-1,302
warthog	Phacochoerus africanus	12	1	99	101	0,056	2296	47,92	0	200	102	2,235	1,379
waterbuck	Kobus ellipsiprymnus	12	0	99	201	0,056	9081	95,30	0	300	203	8,000	-2,553
wildebeest	Connochaetes taurinus	32	5	264	416	0,149	38950	197,36	0	680	158	34,889	-1,996
zebra	Equus spp,	153	22	1261	1034	0,711	240310	490,21	227	2295	82	204,618	-8,560
all elephants	Loxodonta africana all	737	969	6075	2028	3,423	923928	961,21	4047	8103	33	875,114	14,339
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	17	0	140	64	0,079	906	30,10	77	204	45	0,997	1,295
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	17	0	140	64	0,079	906	30,10	77	204	45	0,997	1,295

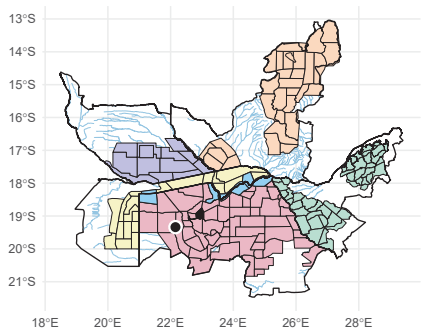
NG22 – NG 22 BOTSWANA – NORTHERN BOTSWANA

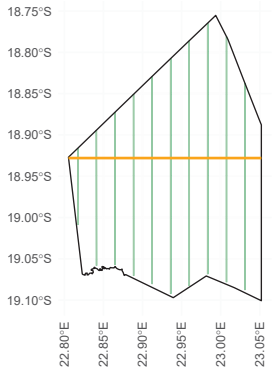
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NG22
STRATUM NAME: NG 22
■ STRATUM AREA: 684.21 sqkm
• SURVEY BASE: Gumare
DISTANCE TO SURVEY BASE: 93 km

– TRANSECTS: 10 (264 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 11.6 %

– BASELINE DISTANCE: 26.01 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 2.8 h
Crew(s): C02
KES2022_V5LJB20220924B 15:11–17:57

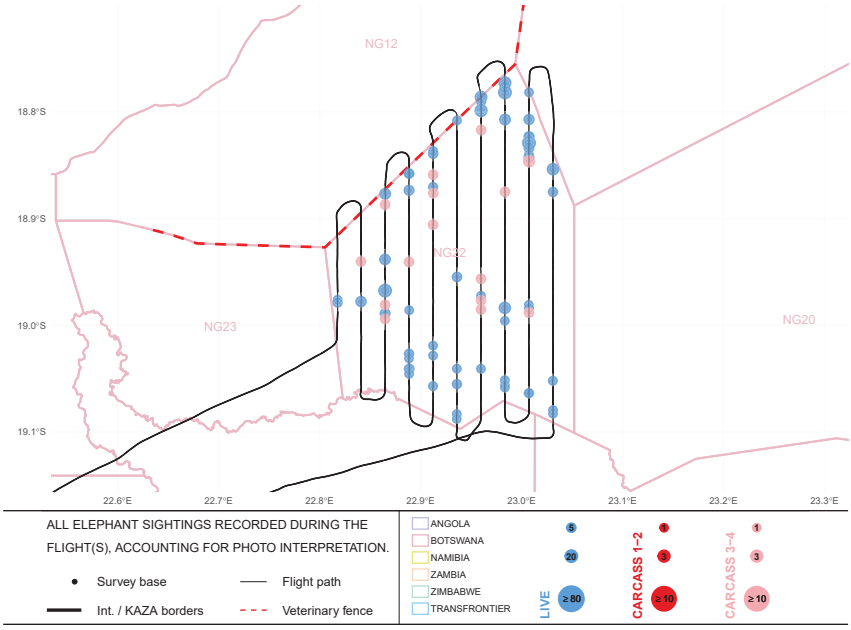
Actual sampling intensity: 12.4 %
Transect flying time: 1.5 h
Transects: 10 – 264 km – 0°
Search effort: 1.09 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C02	
Side:	L	R
% sightings:	55	45
% individuals:	57	43

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	100	32	46.88
Live elephant (>9):	4	100	75
Elephant carcass:	10	100	0
Live elephant (<10):	38	18.42	28.57



LIVE ELEPHANTS

IN SAMPLE:	**174 (42)**
Bulls:	37 (24)
Family:	137 (18)
NOT IN SAMPLE:	**148 (21)**
Outside search strip:	148
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**10 (10)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	0 (0)
Category 4:	10 (10)
NOT IN SAMPLE:	**6 (5)**
Outside search strip:	6
Off transect:	0

OTHER SPECIES

Other wildlife species:	23
Other wildlife count:	1144
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.262, N = 81, w = 321

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	1323	1404	81	81
Variance of estimate	$Var\hat{Y}$	122613	146064	667	667
Standard error	$SE\hat{Y}$	350	382	26	26
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 792	± 865	± 58	± 58
Percentage of relative precision	$PRP\hat{Y}$	60 %	62 %	72 %	72 %
Density per sqkm	$R\hat{Y}$	1.934	2.052	0.118	0.118
Variance between transect counts	s^2_y	257.156	300.489	1.333	1.333
Variance between transect areas	s^2_a	6.214	6.214	6.214	6.214
Covariance between counts & areas	s_{ay}	17.469	17.817	1.107	1.107

CARCASS RATIOS

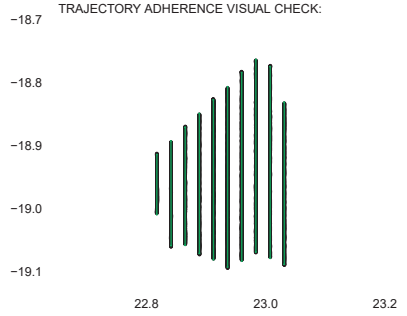
$CR_{1:4} = 5.4$ %
$CR_{1:2} = 0$ %

NG22 – NG 22 BOTSWANA – NORTHERN BOTSWANA

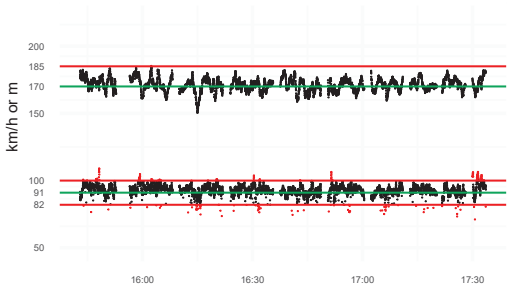
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20220924B

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



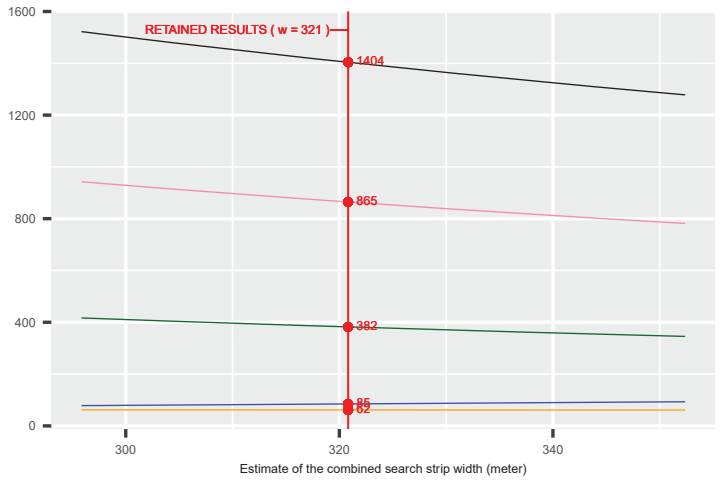
SPEED
Average: 171.2 km/h
Standard dev.: 4.8 km/h

HEIGHT AGL
Average: 92.8 m (304.6 ft)
Standard dev.: 3.8 m (12.5 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C02 – Left: [156 – 179]
C02 – Right: [135 – 187]



LIVE ELEPHANT ESTIMATE: [1522 – 1278]
CONFIDENCE INTERVAL: ± [943 – 782]
SAMPLE AREA: [78 – 93] sqkm
SE: [417 – 346]
PRP: [62 – 61] %

NG22 – NG 22 BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: NG22 **N:** 81 S_a^2: 6,214
STRATUM NAME: NG 22 **w:** 321 **df:** 9

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	17	0	137	217	0,200	9187	95,85	0	354	158	13,344	-5,867
buffalo	Syncerus caffer	112	3	904	1281	1,321	320700	566,30	0	2185	142	565,511	7,452
bushbuck	Tragelaphus scriptus	2	0	16	33	0,024	217	14,73	0	49	207	0,400	0,565
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	37	35	299	137	0,436	3668	60,56	162	436	46	7,344	2,476
elephant family	Loxodonta africana family	137	113	1105	785	1,615	120468	347,09	320	1890	71	242,456	15,341
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass four	Loxodonta africana carcass four	10	6	81	58	0,118	667	25,84	22	139	72	1,333	1,107
giraffe	Giraffa giraffa	26	0	210	141	0,307	3888	62,35	69	351	67	8,044	3,067
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	34	0	274	199	0,401	7729	87,91	75	473	72	10,711	-2,127
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	58	0	468	476	0,684	44195	210,23	0	944	102	83,733	7,257
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	2	1	16	33	0,024	219	14,81	0	50	208	0,400	0,487
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	1	0	8	18	0,012	62	7,88	0	26	221	0,100	-0,294
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	754	0	6083	2372	8,891	1099688	1048,66	3711	8456	39	1468,933	2,889
reedbuck	Redunca arundinum	1	0	8	17	0,012	57	7,54	0	25	212	0,100	0,089
roan	Hippotragus equinus	8	0	65	137	0,094	3642	60,35	0	201	212	6,400	0,710
sable	Hippotragus niger	15	10	121	199	0,177	7739	87,97	0	320	164	13,833	1,681
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	5	0	40	33	0,059	218	14,77	7	74	83	0,500	1,212
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	16	0	129	190	0,189	7048	83,95	0	319	147	12,267	0,673
warthog	Phacochoerus africanus	27	0	218	167	0,318	5449	73,82	51	385	77	9,567	1,160
waterbuck	Kobus ellipsiprymnus	6	0	48	82	0,071	1320	36,33	0	131	170	2,489	1,615
wildebeest	Connochaetes taurinus	6	0	48	110	0,071	2362	48,60	0	158	227	3,600	-3,314
zebra	Equus spp,	42	8	339	347	0,495	23534	153,41	0	686	102	38,622	-0,710
all elephants	Loxodonta africana all	174	148	1404	865	2,052	146064	382,18	539	2268	62	300,489	17,817
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	10	6	81	58	0,118	667	25,84	22	139	72	1,333	1,107
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	10	6	81	58	0,118	667	25,84	22	139	72	1,333	1,107

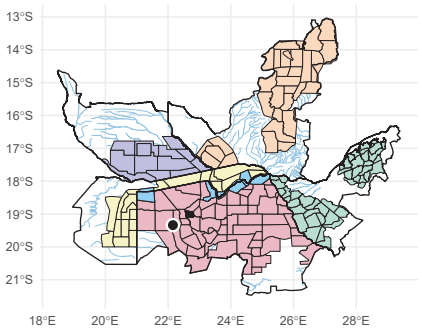
NG23 – NG 23 BOTSWANA – NORTHERN BOTSWANA

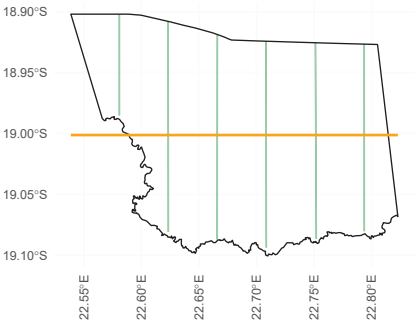
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NG23
STRATUM NAME: NG 23
■ STRATUM AREA: 467.71 sqkm
• SURVEY BASE: Gumare
DISTANCE TO SURVEY BASE: 69 km

– TRANSECTS: 6 (103 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 6.6 %

– BASELINE DISTANCE: 29.93 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 2.3 h
Crew(s): C02
KES2022_V5LJB20220923B 15:36–17:55

Actual sampling intensity: 7 %
Transect flying time: 0.6 h
Transects: 6 – 103 km – 0°
Search effort: 1.09 min/sqkm

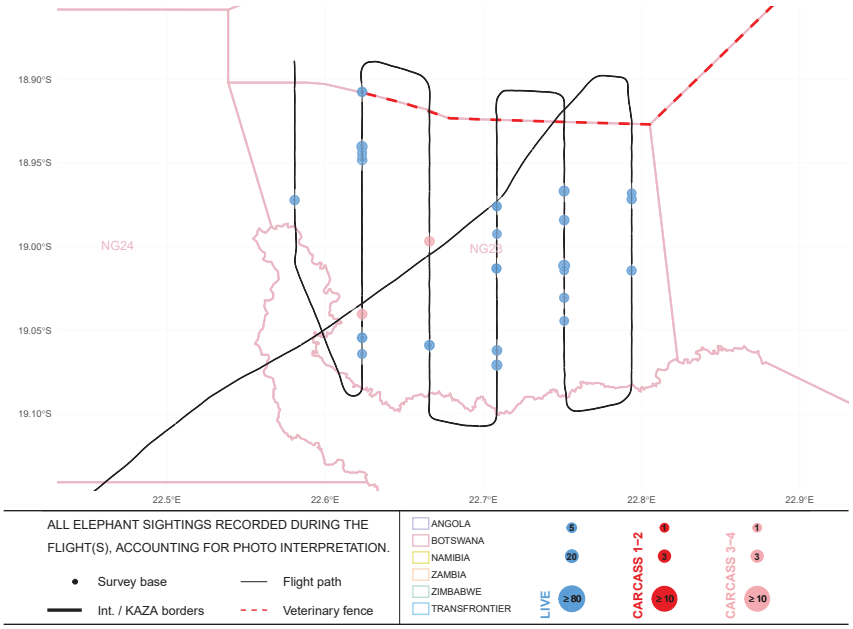
OBSERVER CONTRIBUTION

Crew(s):	C02	
Side:	L	R
% sightings:	56	44
% individuals:	63	37

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	61	44.26	33.33
Live elephant (>9):	1	100	100
Elephant carcass:	1	100	100
Live elephant (<10):	20	95	15.79

Undetected live elephant: 1
Undetected elephant carcass: 0



LIVE ELEPHANTS

IN SAMPLE:	**76 (21)**
Bulls:	21 (12)
Family:	55 (9)
NOT IN SAMPLE:	**25 (7)**
Outside search strip:	25
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**1 (1)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	1 (1)
Category 4:	0 (0)
NOT IN SAMPLE:	**1 (1)**
Outside search strip:	1
Off transect:	0

OTHER SPECIES

Other wildlife species:	16
Other wildlife count:	1032
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.571, N = 94, w = 318

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	867	1080	14	14
Variance of estimate	$Var\hat{Y}$	60597	112920	219	219
Standard error	$SE\hat{Y}$	246	336	15	15
95% confidence interval	$CI_{\hat{Y}}^{95\%}$	± 633	± 864	± 38	± 38
Percentage of relative precision	$PRP_{\hat{Y}}$	73 %	80 %	268 %	268 %
Density per sqkm	$R_{\hat{Y}}$	1.853	2.309	0.03	0.03
Variance between transect counts	s_y^2	65.767	114.267	0.167	0.167
Variance between transect areas	s_a^2	1.537	1.537	1.537	1.537
Covariance between counts & areas	s_{ay}	7.327	8.809	0.16	0.16

CARCASS RATIOS

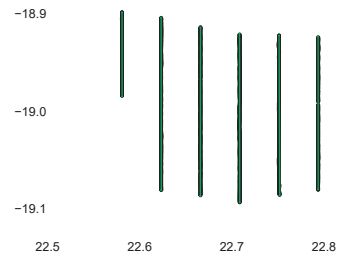
$CR_{1:4}$ = 1.3 %
$CR_{1:2}$ = 0 %

NG23 – NG 23 BOTSWANA – NORTHERN BOTSWANA

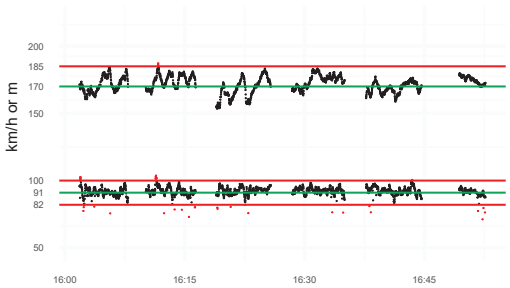
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20220923B

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



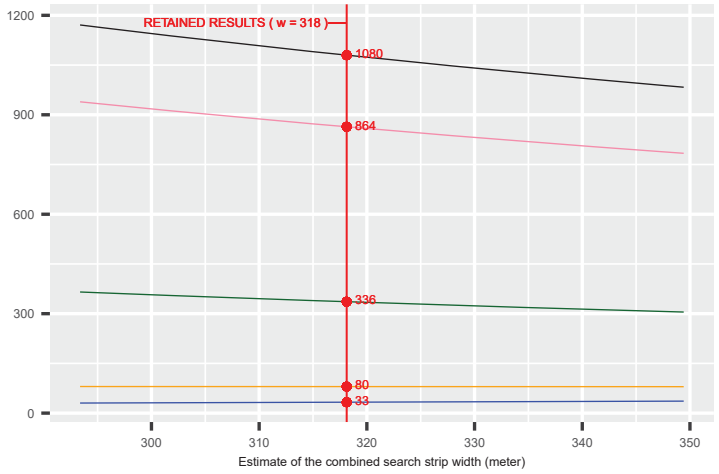
SPEED
Average: 171.7 km/h
Standard dev.: 6.1 km/h

HEIGHT AGL
Average: 92.1 m (302 ft)
Standard dev.: 3.2 m (10.5 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C02 – Left: [155 – 177]
C02 – Right: [134 – 186]



LIVE ELEPHANT ESTIMATE: [1171 – 983]
CONFIDENCE INTERVAL: ± [939 – 784]
SAMPLE AREA: [30 – 36] sqkm
SE: [365 – 305]
PRP: [80 – 80] %

NG23 – NG 23 BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: NG23 **N:** 94 S_a^2: 1,537
STRATUM NAME: NG 23 **w:** 318 **df:** 5

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	2	0	28	78	0,061	927	30,44	0	107	275	0,667	0,010
buffalo	Syncerus caffer	52	0	739	1976	1,580	591156	768,87	0	2715	268	450,667	8,338
bushbuck	Tragelaphus scriptus	5	0	71	91	0,152	1243	35,26	0	162	128	0,967	0,334
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	21	5	298	276	0,638	11520	107,33	22	574	92	11,100	2,651
elephant family	Loxodonta africana family	55	20	781	615	1,671	57271	239,31	166	1397	79	57,767	6,158
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	1	1	14	38	0,030	219	14,79	0	52	268	0,167	0,160
elephant carcass four	Loxodonta africana carcass four	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
giraffe	Giraffa giraffa	2	0	28	55	0,061	458	21,40	0	83	194	0,267	-0,488
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	27	6	384	482	0,820	35210	187,64	0	866	126	30,700	3,799
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	1	0	14	39	0,030	227	15,06	0	53	272	0,167	0,064
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	1	0	14	39	0,030	232	15,22	0	53	275	0,167	0,005
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	5	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	812	47	11537	11342	24,667	19467485	4412,20	195	22879	98	18363,067	105,372
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	5	0	71	190	0,152	5466	73,93	0	261	268	4,167	0,802
warthog	Phacochoerus africanus	70	1	995	604	2,126	55268	235,09	390	1599	61	63,867	7,239
waterbuck	Kobus ellipsiprymnus	8	0	114	259	0,243	10123	100,62	0	372	228	5,867	-2,828
wildebeest	Connochaetes taurinus	27	0	384	678	0,820	69526	263,68	0	1061	177	51,100	1,084
zebra	Equus spp,	8	0	114	187	0,243	5310	72,87	0	301	165	4,267	1,053
all elephants	Loxodonta africana all	76	25	1080	864	2,309	112920	336,04	216	1944	80	114,267	8,809
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	1	1	14	38	0,030	219	14,79	0	52	268	0,167	0,160
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	1	1	14	38	0,030	219	14,79	0	52	268	0,167	0,160

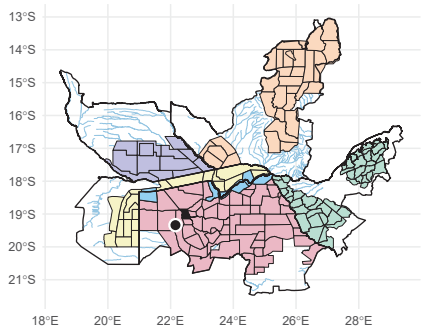
NG24 – NG 24 BOTSWANA – NORTHERN BOTSWANA

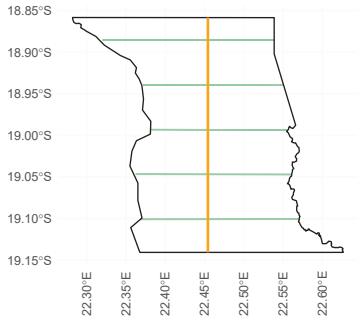
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NG24
STRATUM NAME: NG 24
■ STRATUM AREA: 671.97 sqkm
• SURVEY BASE: Gumare
DISTANCE TO SURVEY BASE: 50 km

– TRANSECTS: 5 (103 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 4.6 %

– BASELINE DISTANCE: 31.29 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 2.3 h
Crew(s): C02
KES2022_V5LJB20220923B 15:36–17:55

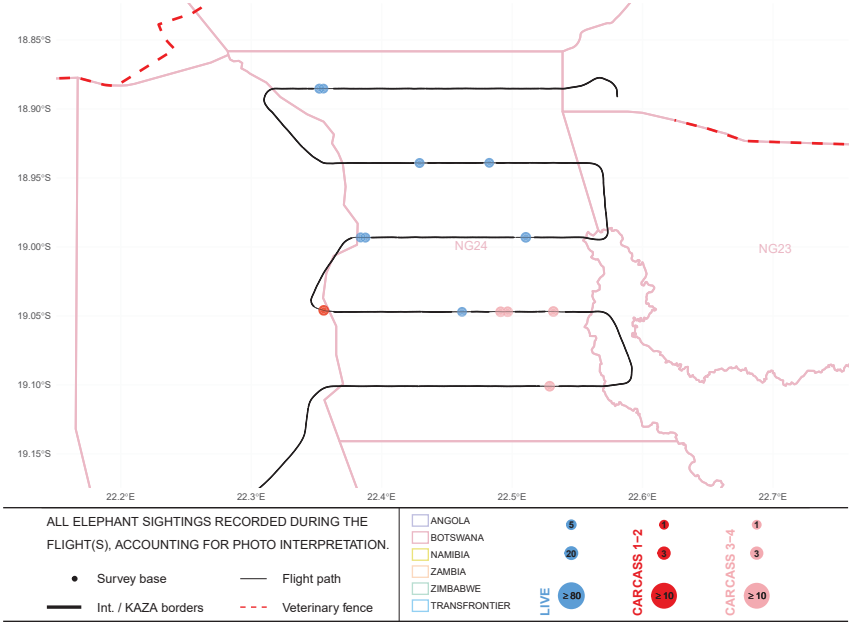
Actual sampling intensity: 4.9 %
Transect flying time: 0.6 h
Transects: 5 – 103 km – 90°
Search effort: 1.08 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C02	
Side:	L	R
% sightings:	55	45
% individuals:	50	50

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	15	66.67	10
Live elephant (>9):	0		
Elephant carcass:	4	50	50
Live elephant (<10):	8	87.5	14.29



LIVE ELEPHANTS

IN SAMPLE:	**16 (8)**
Bulls:	16 (8)
Family:	0 (0)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**4 (4)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	2 (2)
Category 4:	2 (2)
NOT IN SAMPLE:	**1 (1)**
Outside search strip:	0
Off transect:	1

OTHER SPECIES

Other wildlife species:	6
Other wildlife count:	96
Domestic count:	60

ELEPHANT DATA ANALYSIS

t = 2.776, N = 98, w = 319

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	306	327	82	82
Variance of estimate	$Var\hat{Y}$	19348	24711	3048	3048
Standard error	$SE\hat{Y}$	139	157	55	55
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 386	± 436	± 153	± 153
Percentage of relative precision	$PRP\hat{Y}$	126 %	134 %	188 %	188 %
Density per sqkm	$R\hat{Y}$	0.456	0.486	0.121	0.121
Variance between transect counts	s^2_y	9.5	12.2	1.7	1.7
Variance between transect areas	s^2_a	0.37	0.37	0.37	0.37
Covariance between counts & areas	s_{ay}	−1.125	−1.289	0.146	0.146

CARCASS RATIOS

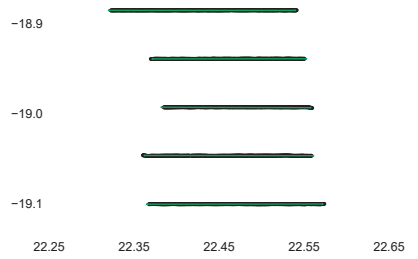
$CR_{1:4}$ = 20 %
$CR_{1:2}$ = 0 %

NG24 – NG 24 BOTSWANA – NORTHERN BOTSWANA

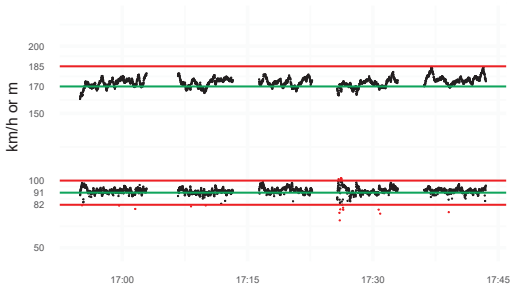
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20220923B

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



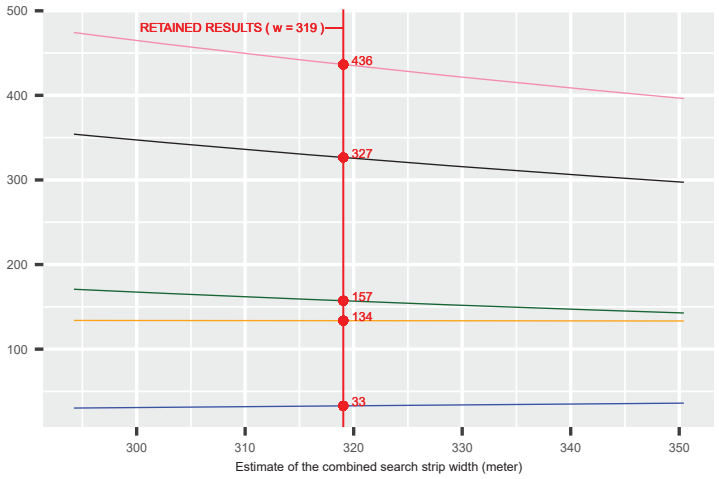
SPEED
Average: 173.1 km/h
Standard dev.: 3.3 km/h

HEIGHT AGL
Average: 92.3 m (302.9 ft)
Standard dev.: 2.5 m (8 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C02 – Left: [155 – 178]
C02 – Right: [135 – 186]



LIVE ELEPHANT ESTIMATE: [354 – 297]
CONFIDENCE INTERVAL: ± [474 – 396]
SAMPLE AREA: [30 – 36] sqkm
SE: [171 – 143]
PRP: [134 – 133] %

NG24 – NG 24 BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: NG24 **N:** 98 S_a^2: 0,370
STRATUM NAME: NG 24 **w:** 319 **df:** 4

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	2	0	41	105	0,061	1423	37,73	0	146	257	0,800	0,177
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	46	0	939	1398	1,397	253696	503,68	0	2337	149	148,700	3,727
donkey	Equus asinus	14	0	286	434	0,425	24475	156,44	0	720	152	14,700	1,595
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	16	0	327	436	0,486	24711	157,20	0	763	134	12,200	-1,289
elephant family	Loxodonta africana family	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass one	Loxodonta africana carcass one	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	2	0	41	64	0,061	526	22,94	0	105	156	0,300	0,107
elephant carcass four	Loxodonta africana carcass four	2	0	41	106	0,061	1454	38,13	0	147	259	0,800	0,038
giraffe	Giraffa giraffa	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	27	1	551	705	0,820	64405	253,78	0	1256	128	38,300	1,987
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	56	9	1143	1392	1,701	251203	501,20	0	2535	122	134,700	-0,550
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	2	0	41	109	0,061	1535	39,18	0	150	267	0,800	-0,329
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephants	Loxodonta africana all	16	0	327	436	0,486	24711	157,20	0	763	134	12,200	-1,289
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	4	1	82	153	0,121	3048	55,21	0	235	188	1,700	0,146
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	4	0	82	153	0,121	3048	55,21	0	235	188	1,700	0,146

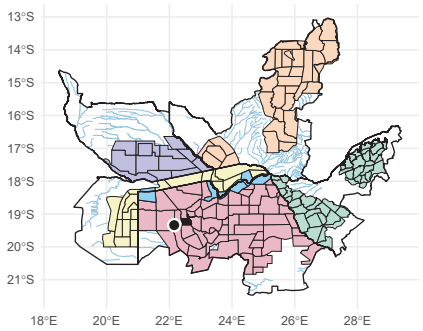
NG25 – NG 25 BOTSWANA – NORTHERN BOTSWANA

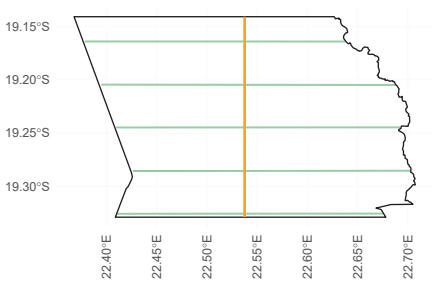
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NG25
STRATUM NAME: NG 25
■ STRATUM AREA: 616.56 sqkm
• SURVEY BASE: Gumare
DISTANCE TO SURVEY BASE: 43 km

– TRANSECTS: 5 (147 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 7.1 %

– BASELINE DISTANCE: 20.85 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 1.5 h
Crew(s): C03
KES2022_V5WOT20220923B 15:42–17:11

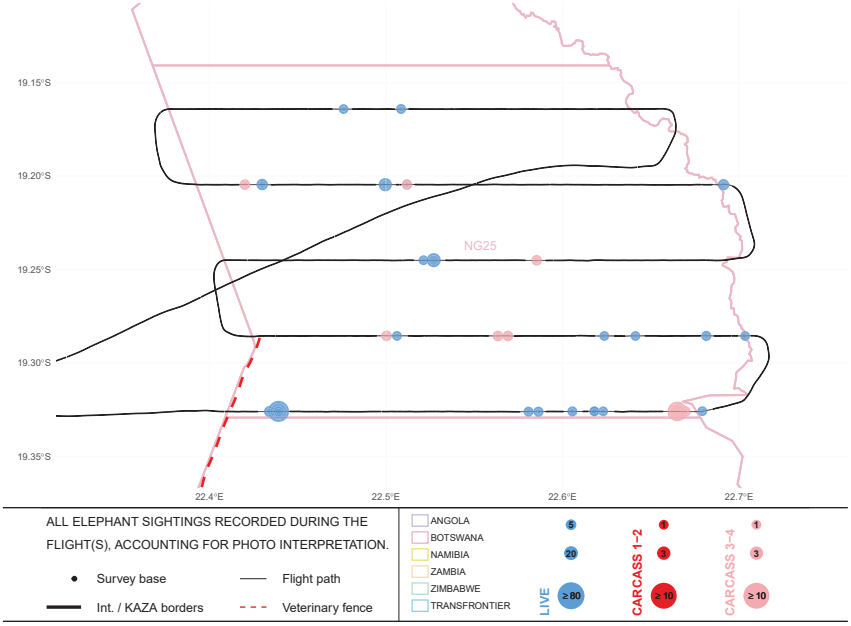
Actual sampling intensity: 7.3 %
Transect flying time: 0.8 h
Transects: 5 – 147 km – 90°
Search effort: 1.12 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C03	
Side:	L	R
% sightings:	40	60
% individuals:	34	66

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	61	57.38	51.43
Live elephant (>9):	3	0	
Elephant carcass:	5	80	25
Live elephant (<10):	19	26.32	40



LIVE ELEPHANTS

IN SAMPLE:	**139 (22)**
Bulls:	20 (14)
Family:	119 (8)
NOT IN SAMPLE:	**5 (4)**
Outside search strip:	5
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**5 (5)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	1 (1)
Category 4:	4 (4)
NOT IN SAMPLE:	**8 (3)**
Outside search strip:	8
Off transect:	0

OTHER SPECIES

Other wildlife species:	17
Other wildlife count:	997
Domestic count:	28

ELEPHANT DATA ANALYSIS

t = 2.776, N = 68, w = 306

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	1864	1906	69	69
Variance of estimate	$Var\hat{Y}$	688384	684563	380	380
Standard error	$SE\hat{Y}$	830	827	19	19
95% confidence interval	$CI_{\hat{Y}}^{95\%}$	± 2304	± 2297	± 54	± 54
Percentage of relative precision	$PRP_{\hat{Y}}$	124 %	121 %	79 %	79 %
Density per sqkm	$R_{\hat{Y}}$	3.024	3.091	0.111	0.111
Variance between transect counts	s_y^2	805.7	803.2	0.5	0.5
Variance between transect areas	s_a^2	0.167	0.167	0.167	0.167
Covariance between counts & areas	s_{ay}	1.013	1.317	0.271	0.271

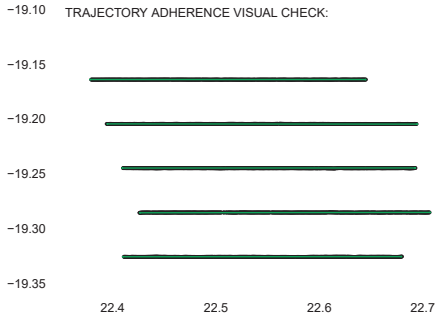
CARCASS RATIOS

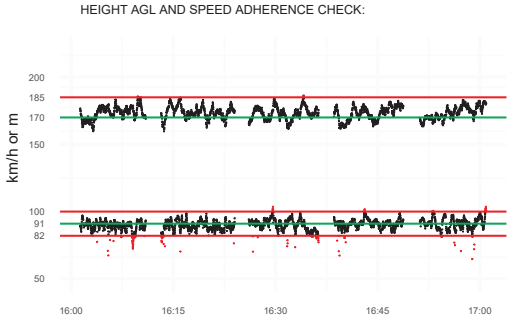
$CR_{1:4} = 3.5$ %
$CR_{1:2} = 0$ %

NG25 – NG 25 BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5WOT20220923B





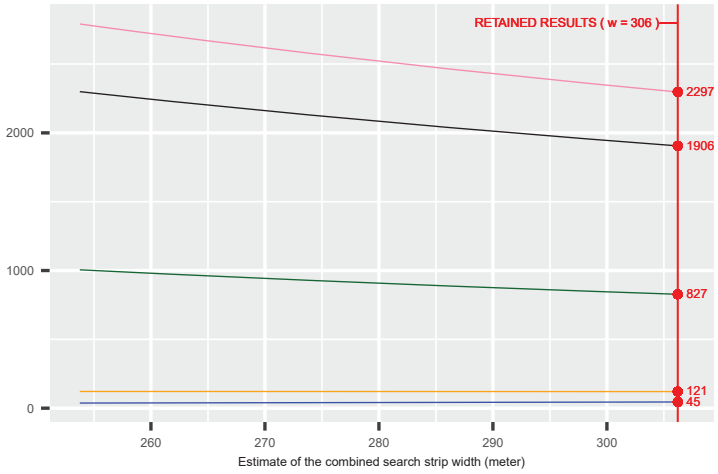
SPEED
Average: 173.3 km/h
Standard dev.: 4.8 km/h

HEIGHT AGL
Average: 90.1 m (295.7 ft)
Standard dev.: 4.2 m (13.6 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C03 – Left: [101 – 153]
C03 – Right: [142 – 170]



LIVE ELEPHANT ESTIMATE: [2299 – 1906]
CONFIDENCE INTERVAL: ± [2791 – 2297]
SAMPLE AREA: [37 – 45] sqkm
SE: [1005 – 827]
PRP: [121 – 121] %

NG25 – NG 25 BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: NG25 **N:** 68 S_a^2: 0,167
STRATUM NAME: NG 25 **w:** 306 **df:** 4

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	38	17	521	826	0,845	88546	297,57	0	1347	159	101,300	-0,962
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	2	0	27	73	0,044	683	26,14	0	100	265	0,800	0,055
cattle	Bos taurus	18	0	247	665	0,400	57323	239,42	0	912	269	64,800	-2,352
donkey	Equus asinus	10	0	137	369	0,222	17692	133,01	0	506	269	20,000	-1,307
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	20	5	274	331	0,445	14221	119,25	0	605	121	16,500	-0,018
elephant family	Loxodonta africana family	119	0	1631	2071	2,646	556226	745,81	0	3702	127	653,200	1,335
elephant carcass one	Loxodonta africana carcass one	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	1	0	14	36	0,022	167	12,91	0	50	261	0,200	0,140
elephant carcass four	Loxodonta africana carcass four	4	8	55	34	0,089	153	12,37	20	89	63	0,200	0,131
giraffe	Giraffa giraffa	21	14	288	763	0,467	75430	274,65	0	1050	265	88,200	0,487
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	29	0	398	420	0,645	22900	151,33	0	818	106	27,200	0,481
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	1	0	14	37	0,022	174	13,20	0	50	267	0,200	-0,061
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	4	0	55	91	0,089	1065	32,64	0	145	165	1,200	-0,215
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	5	0	69	183	0,111	4356	66,00	0	252	267	5,000	-0,303
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	805	0	11036	8813	17,899	10075780	3174,24	2223	19849	80	12545,500	24,398
reedbuck	Redunca arundinum	12	0	165	218	0,267	6187	78,66	0	383	133	7,300	0,210
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	5	0	69	56	0,111	401	20,03	13	124	81	0,500	0,158
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	0	3	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
warthog	Phacochoerus africanus	3	0	41	71	0,067	653	25,56	0	112	173	0,800	0,304
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
zebra	Equus spp,	55	15	754	1699	1,223	374278	611,78	0	2453	225	437,000	0,689
all elephants	Loxodonta africana all	139	5	1906	2297	3,091	684563	827,38	0	4203	121	803,200	1,317
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	5	8	69	54	0,111	380	19,48	14	123	79	0,500	0,271
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	5	8	69	54	0,111	380	19,48	14	123	79	0,500	0,271

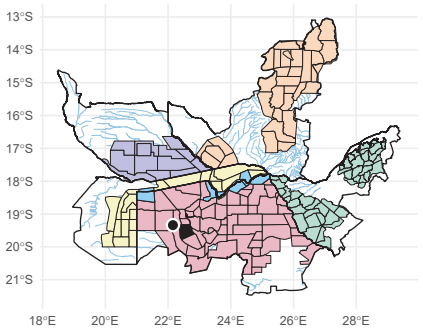
NG26 – NG 26 BOTSWANA – NORTHERN BOTSWANA

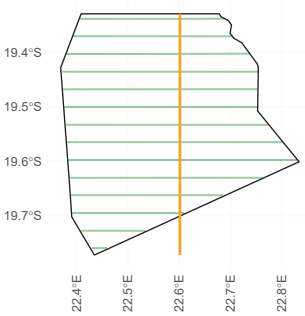
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NG26
STRATUM NAME: NG 26
■ STRATUM AREA: 1652.07 sqkm
• SURVEY BASE: Gumare
DISTANCE TO SURVEY BASE: 51 km

– TRANSECTS: 14 (464 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 8.4 %

– BASELINE DISTANCE: 49.06 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 4.1 h
Crew(s): C01
KES2022_V5IIM20220924A 06:45–10:50

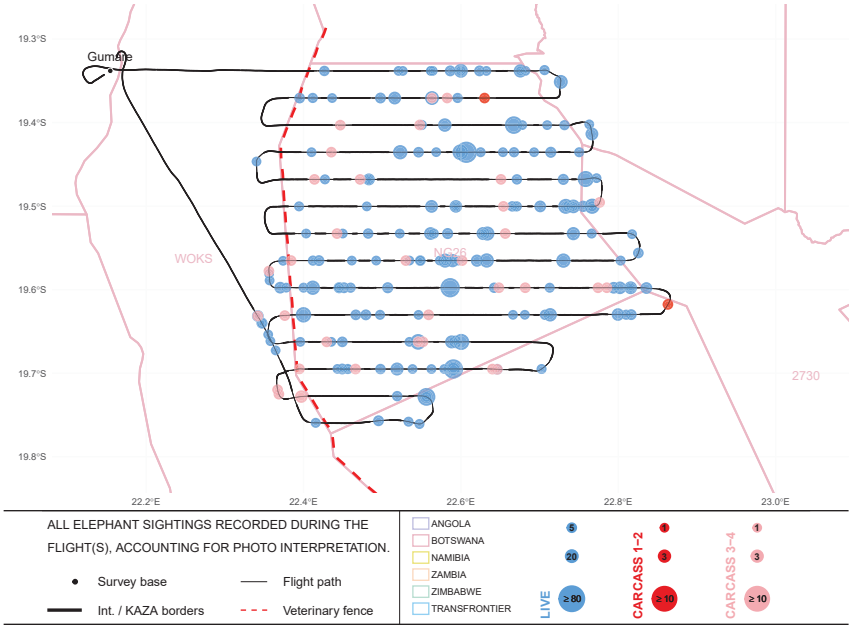
Actual sampling intensity: 8.9 %
Transect flying time: 2.8 h
Transects: 14 – 464 km – 90°
Search effort: 1.14 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C01	
Side:	L	R
% sightings:	44	56
% individuals:	48	52

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	204	22.06	33.33
Live elephant (>9):	18	88.89	37.5
Elephant carcass:	24	70.83	5.88
Live elephant (<10):	60	0	



LIVE ELEPHANTS

IN SAMPLE:	**564 (78)**
Bulls:	57 (41)
Family:	507 (37)
NOT IN SAMPLE:	**739 (102)**
Outside search strip:	500
Off transect:	239

ELEPHANT CARCASSES

IN SAMPLE:	**24 (24)**
Category 1:	1 (1)
Category 2:	0 (0)
Category 3:	3 (3)
Category 4:	20 (20)
NOT IN SAMPLE:	**12 (11)**
Outside search strip:	1
Off transect:	11

OTHER SPECIES

Other wildlife species:	22
Other wildlife count:	1690
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.16, N = 154, w = 317

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	6568	6321	269	269
Variance of estimate	$Var\hat{Y}$	1651156	1442351	1881	1881
Standard error	$SE\hat{Y}$	1285	1201	43	43
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 2776	± 2595	± 94	± 94
Percentage of relative precision	$PRP\hat{Y}$	42 %	41 %	35 %	35 %
Density per sqkm	$R\hat{Y}$	3.975	3.826	0.163	0.163
Variance between transect counts	s^2_y	1630.132	1440.681	1.758	1.758
Variance between transect areas	s^2_a	16.035	16.035	16.035	16.035
Covariance between counts & areas	s_{ay}	103.015	97.428	2.981	2.981

CARCASS RATIOS

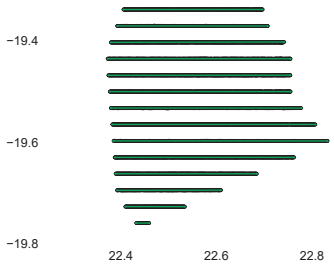
$CR_{1:4} = 4.1$ %
$CR_{1:2} = 0.2$ %

NG26 – NG 26 BOTSWANA – NORTHERN BOTSWANA

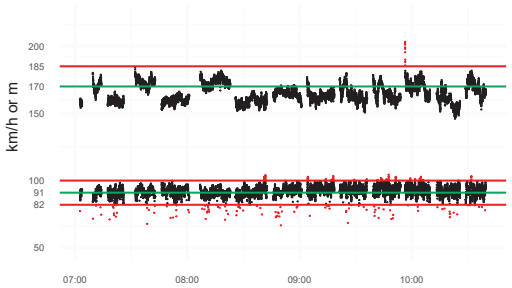
ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5IIM20220924A

TRAJECTORY ADHERENCE VISUAL CHECK:



HEIGHT AGL AND SPEED ADHERENCE CHECK:



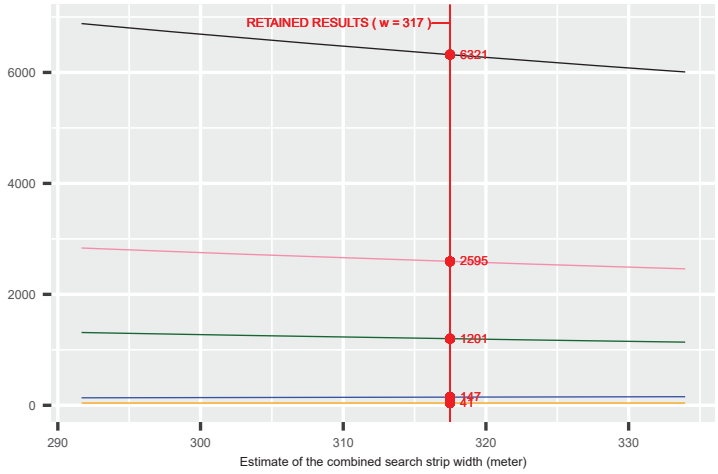
SPEED
Average: 164.9 km/h
Standard dev.: 6.7 km/h

HEIGHT AGL
Average: 92.1 m (302.2 ft)
Standard dev.: 3.7 m (12.1 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C01 – Left: [159 – 191]
C01 – Right: [120 – 161]



LIVE ELEPHANT ESTIMATE: [6881 – 6009]
CONFIDENCE INTERVAL: ± [2836 – 2460]
SAMPLE AREA: [135 – 155] sqkm
SE: [1313 – 1139]
PRP: [41 – 41] %

NG26 – NG 26 BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: NG26 **N:** 155 S_a^2: 16,035
STRATUM NAME: NG 26 **w:** 317 **df:** 13

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	33	0	370	347	0,224	25846	160,77	23	717	94	13,940	-4,287
buffalo	Syncerus caffer	297	872	3329	3517	2,015	2649523	1627,74	0	6845	106	1706,951	15,863
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	57	116	639	231	0,387	11466	107,08	408	870	36	9,764	6,167
elephant family	Loxodonta africana family	507	623	5682	2521	3,440	1362030	1167,06	3161	8204	44	1316,181	91,261
elephant carcass one	Loxodonta africana carcass one	1	1	11	23	0,007	112	10,58	0	34	204	0,071	-0,004
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	3	7	34	49	0,020	511	22,61	0	82	145	0,335	0,299
elephant carcass four	Loxodonta africana carcass four	20	4	224	81	0,136	1407	37,50	143	305	36	1,341	2,687
giraffe	Giraffa giraffa	28	3	314	276	0,190	16362	127,92	37	590	88	8,769	-3,161
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	3	5	34	48	0,020	490	22,15	0	81	142	0,335	0,629
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	98	16	1098	825	0,665	145838	381,89	273	1923	75	90,308	2,538
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	23	0	258	220	0,156	10394	101,95	38	478	85	6,555	0,783
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	8	3	90	85	0,054	1565	39,56	4	175	95	1,033	0,659
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	659	124	7386	4979	4,471	5312378	2304,86	2407	12365	67	3635,764	59,433
reedbuck	Redunca arundinum	5	0	56	112	0,034	2705	52,01	0	168	201	1,786	0,888
roan	Hippotragus equinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	45	41	504	258	0,305	14288	119,53	246	763	51	12,335	7,564
warthog	Phacochoerus africanus	41	3	460	259	0,278	14384	119,93	200	719	56	8,995	1,729
waterbuck	Kobus ellipsiprymnus	3	2	34	68	0,020	979	31,29	0	101	201	0,643	0,454
wildebeest	Connochaetes taurinus	205	71	2298	2399	1,391	1233607	1110,68	0	4697	104	828,863	23,218
zebra	Equus spp,	213	85	2387	1484	1,445	472062	687,07	903	3872	62	302,027	10,787
all elephants	Loxodonta africana all	564	739	6321	2595	3,826	1442351	1200,98	3727	8916	41	1440,681	97,428
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	1	1	11	23	0,007	112	10,58	0	34	204	0,071	-0,004
all elephant carcasses	Loxodonta africana carcass all	24	12	269	94	0,163	1881	43,37	175	363	35	1,758	2,981
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	23	11	258	89	0,156	1692	41,13	169	347	34	1,632	2,985

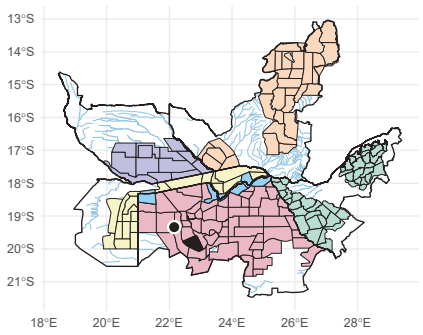
NG29 – NG 29 BOTSWANA – NORTHERN BOTSWANA

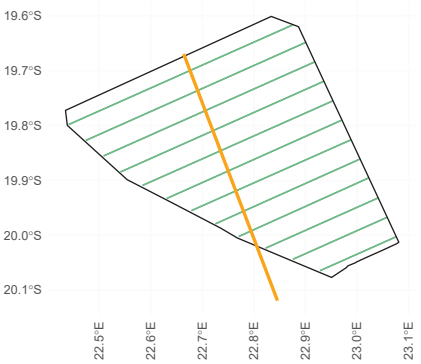
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NG29
STRATUM NAME: NG 29
■ STRATUM AREA: 1921.43 sqkm
• SURVEY BASE: Gumare
DISTANCE TO SURVEY BASE: 84 km

– TRANSECTS: 12 (436 km)
TRANSECT ORIENTATION: 68°
PLANNED SAMPLING INTENSITY: 6.8 %

– BASELINE DISTANCE: 53.32 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 4 h
Crew(s): C02
KES2022_V5LJB20220924A 06:21–10:21

Actual sampling intensity: 7.2 %
Transect flying time: 2.5 h
Transects: 12 – 436 km – 68°
Search effort: 1.09 min/sqkm

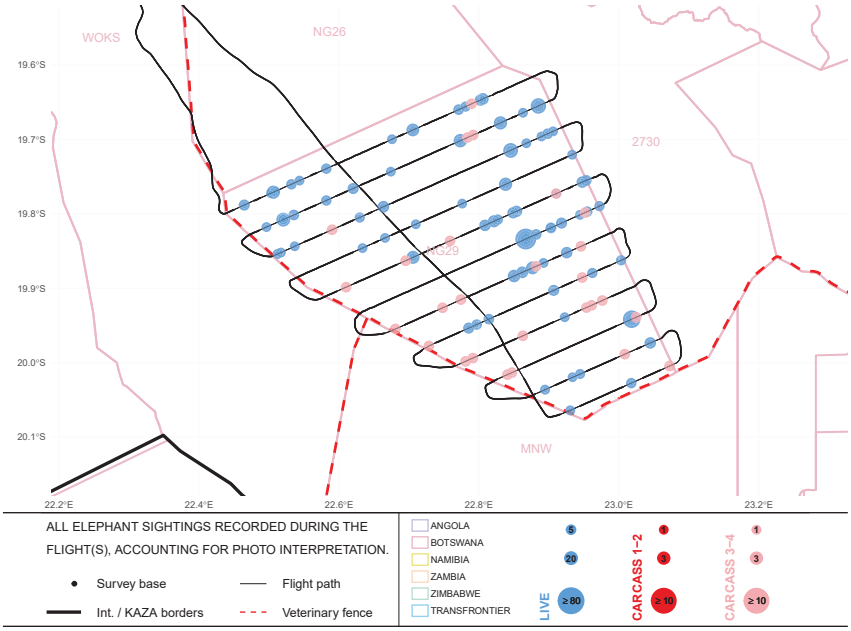
OBSERVER CONTRIBUTION

Crew(s):	C02	
Side:	L	R
% sightings:	59	41
% individuals:	70	30

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	143	27.27	17.95
Live elephant (>9):	8	100	37.5
Elephant carcass:	27	88.89	0
Live elephant (<10):	34	14.71	40

Undetected live elephant: 1
Undetected elephant carcass: 0



LIVE ELEPHANTS

IN SAMPLE:	**245 (42)**
Bulls:	23 (17)
Family:	222 (25)
NOT IN SAMPLE:	**306 (43)**
Outside search strip:	306
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**27 (27)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	3 (3)
Category 4:	24 (24)
NOT IN SAMPLE:	**1 (1)**
Outside search strip:	0
Off transect:	1

OTHER SPECIES

Other wildlife species:	17
Other wildlife count:	1118
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.201, N = 167, w = 319

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	2958	3387	373	373
Variance of estimate	$Var\hat{Y}$	547446	774688	9527	9527
Standard error	$SE\hat{Y}$	740	880	98	98
95% confidence interval	$CI_{\hat{Y}}^{95\%}$	± 1628	± 1937	± 215	± 215
Percentage of relative precision	$PRP_{\hat{Y}}$	55 %	57 %	58 %	58 %
Density per sqkm	$R_{\hat{Y}}$	1.54	1.763	0.194	0.194
Variance between transect counts	s_y^2	350.697	473.538	3.477	3.477
Variance between transect areas	s_a^2	13.349	13.349	13.349	13.349
Covariance between counts & areas	s_{ay}	41.841	44.333	−1.108	−1.108

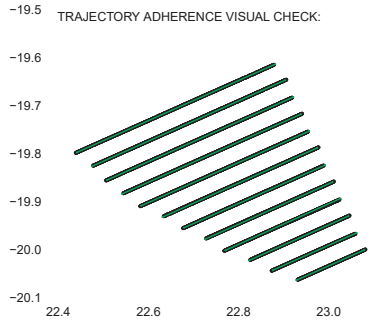
CARCASS RATIOS

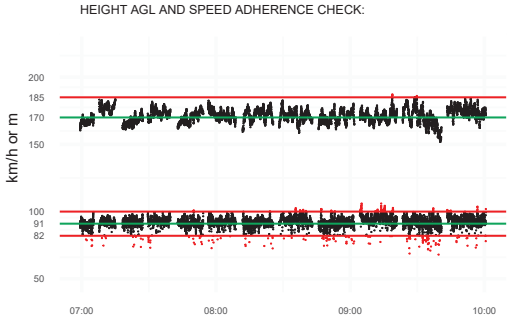
$CR_{1:4} = 9.9$ %
$CR_{1:2} = 0$ %

NG29 – NG 29 BOTSWANA – NORTHERN BOTSWANA

ADHERENCE TO FLIGHT PARAMETERS

KES2022_ V5LJB20220924A





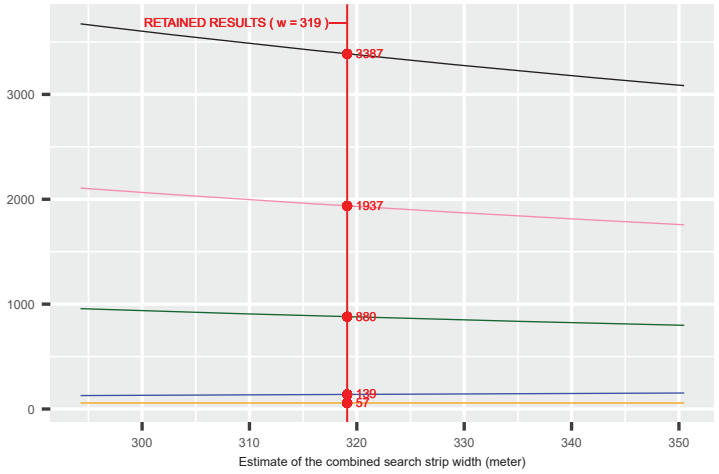
SPEED
Average: 171.2 km/h
Standard dev.: 4.9 km/h

HEIGHT AGL
Average: 92.3 m (302.9 ft)
Standard dev.: 3.8 m (12.3 ft)

INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C02 – Left: [155 – 178]
C02 – Right: [135 – 186]



LIVE ELEPHANT ESTIMATE: [3673 – 3084]
CONFIDENCE INTERVAL: ± [2107 – 1757]
SAMPLE AREA: [128 – 153] sqkm
SE: [957 – 798]
PRP: [57 – 57] %

NG29 – NG 29 BOTSWANA – NORTHERN BOTSWANA

STRATUM CODE: NG29 **N:** 167 S_a^2: 13,349
STRATUM NAME: NG 26 **w:** 319 **df:** 11

COMMON NAME	LATIN NAME	IN COUNT	OUT COUNT	ESTIMATE	CI	DENSITY	VARIANCE	SE	LOWER CL	UPPER CL	PRP (%)	S_y^2	S_{ay}
baboon	Papio spp,	0	4	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
buffalo	Syncerus caffer	132	199	1825	1979	0,950	808113	898,95	0	3803	108	386,182	12,648
bushbuck	Tragelaphus scriptus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
bushpig	Potamochoerus larvatus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
cattle	Bos taurus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
donkey	Equus asinus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
duiker	Sylvicapra grimmia	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
eland	Tragelaphus oryx	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant bulls	Loxodonta africana males	23	37	318	169	0,165	5900	76,81	149	487	53	3,538	3,539
elephant family	Loxodonta africana family	222	269	3069	1907	1,597	750382	866,25	1162	4976	62	443,727	40,794
elephant carcass one	Loxodonta africana carcass one	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass two	Loxodonta africana carcass two	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
elephant carcass three	Loxodonta africana carcass three	3	0	41	48	0,022	478	21,87	0	90	116	0,205	-0,248
elephant carcass four	Loxodonta africana carcass four	24	0	332	204	0,173	8568	92,56	128	536	61	3,273	-0,859
giraffe	Giraffa giraffa	22	14	304	454	0,158	42598	206,39	0	758	149	20,879	4,700
grysbok	Raphicerus sharpei	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hartebeest	Alcelaphus spp,	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
hippopotamus	Hippopotamus amphibius	5	5	69	106	0,036	2333	48,31	0	175	154	0,992	-0,984
horse	Equus caballus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
impala	Aepyceros melampus	538	37	7438	3059	3,871	1931298	1389,71	4379	10496	41	840,515	18,889
klipspringer	Oreotragus oreotragus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
kudu	Tragelaphus strepsiceros	12	18	166	118	0,086	2867	53,54	48	284	71	0,909	-1,847
oribi	Ourebia ourebi	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
oryx	Oryx gazella	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
ostrich	Struthio camelus	4	0	55	122	0,029	3065	55,36	0	177	220	1,333	-1,298
puku	Kobus vardonii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
red lechwe	Kobus leche	170	37	2350	1202	1,223	298081	545,97	1149	3552	51	177,061	24,120
reedbuck	Redunca arundinum	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
roan	Hippotragus equinus	1	0	14	29	0,007	168	12,97	0	42	206	0,083	0,427
sable	Hippotragus niger	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
shoat	Capra hircus - Ovis aries	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
sitatunga	Tragelaphus spekii	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
springbok	Antidorcas marsupialis	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
tsessebe	Damaliscus lunatus	82	19	1134	540	0,590	60303	245,57	593	1674	48	41,788	15,688
warthog	Phacochoerus africanus	22	0	304	470	0,158	45600	213,54	0	774	155	23,424	8,351
waterbuck	Kobus ellipsiprymnus	0	0	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
wildebeest	Connochaetes taurinus	31	16	429	443	0,223	40497	201,24	0	871	103	17,174	-2,049
zebra	Equus spp,	83	32	1147	1027	0,597	217807	466,70	120	2175	90	97,720	1,360
all elephants	Loxodonta africana all	245	306	3387	1937	1,763	774688	880,16	1450	5324	57	473,538	44,333
C1-2 elephant carcasses	Loxodonta africana carcass 1-2	0	1	0	0	0,000	0	0,00	0	0	NA	0,000	0,000
all elephant carcasses	Loxodonta africana carcass all	27	1	373	215	0,194	9527	97,60	158	588	58	3,477	-1,108
C3-4 elephant carcasses	Loxodonta africana carcass 3-4	27	0	373	215	0,194	9527	97,60	158	588	58	3,477	-1,108

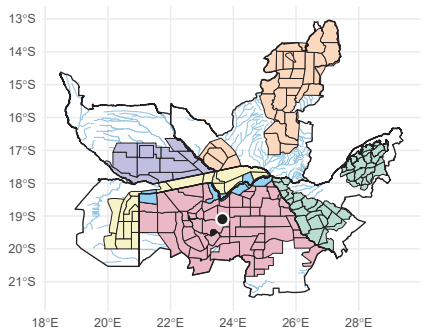
NG31 – NG 31 BOTSWANA – NORTHERN BOTSWANA

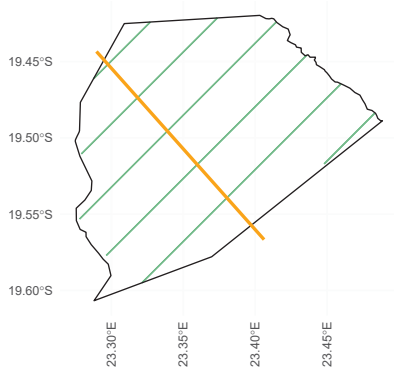
SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NG31
STRATUM NAME: NG 31
■ STRATUM AREA: 286.77 sqkm
• SURVEY BASE: Khwai
DISTANCE TO SURVEY BASE: 55 km

– TRANSECTS: 6 (90 km)
TRANSECT ORIENTATION: 46.6°
PLANNED SAMPLING INTENSITY: 9.4 %

– BASELINE DISTANCE: 18.33 km





SURVEY IMPLEMENTATION

Number of flight(s): 1
Combined flying time: 4.6 h
Crew(s): C02
KES2022_V5LJB20220930A 06:34–11:12

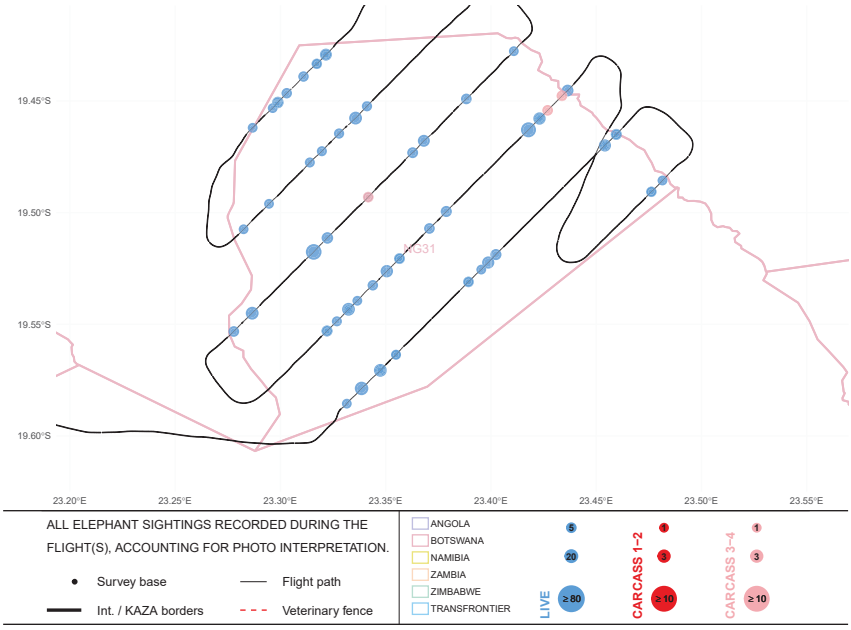
Actual sampling intensity: 10.1 %
Transect flying time: 0.5 h
Transects: 6 – 90 km – 46.6°
Search effort: 1.08 min/sqkm

OBSERVER CONTRIBUTION

Crew(s):	C02	
Side:	L	R
% sightings:	55	45
% individuals:	56	44

PHOTO INTERPRETATION

	Photo	Match (%)	Corr. (%)
All species (>9):	76	0	
Live elephant (>9):	5	0	
Elephant carcass:	3	0	
Live elephant (<10):	31	0	



LIVE ELEPHANTS

IN SAMPLE:	**172 (36)**
Bulls:	37 (19)
Family:	135 (17)
NOT IN SAMPLE:	**205 (31)**
Outside search strip:	205
Off transect:	0

ELEPHANT CARCASSES

IN SAMPLE:	**3 (3)**
Category 1:	0 (0)
Category 2:	0 (0)
Category 3:	0 (0)
Category 4:	3 (3)
NOT IN SAMPLE:	**0 (0)**
Outside search strip:	0
Off transect:	0

OTHER SPECIES

Other wildlife species:	14
Other wildlife count:	379
Domestic count:	0

ELEPHANT DATA ANALYSIS

t = 2.571, N = 56, w = 322

		LIVE		ALL CARCASSES	
		OBS	FINAL	OBS	FINAL
Population estimate	$\hat{Y}$	1707	1707	30	30
Variance of estimate	$Var\hat{Y}$	191352	191352	248	248
Standard error	$SE\hat{Y}$	437	437	16	16
95% confidence interval	$CI^{95\%}_{\hat{Y}}$	± 1124	± 1124	± 40	± 40
Percentage of relative precision	$PRP\hat{Y}$	66 %	66 %	136 %	136 %
Density per sqkm	$R\hat{Y}$	5.954	5.954	0.104	0.104
Variance between transect counts	s^2_y	685.467	685.467	0.7	0.7
Variance between transect areas	s^2_a	5.548	5.548	5.548	5.548
Covariance between counts & areas	s_{ay}	40.849	40.849	1.193	1.193

CARCASS RATIOS

$CR_{1:4}$ = 1.7 %
$CR_{1:2}$ = 0 %