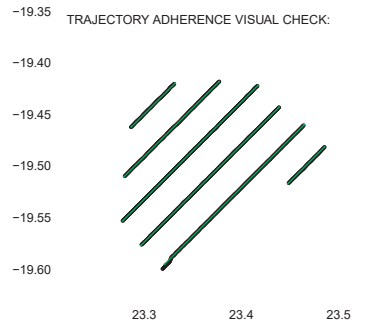
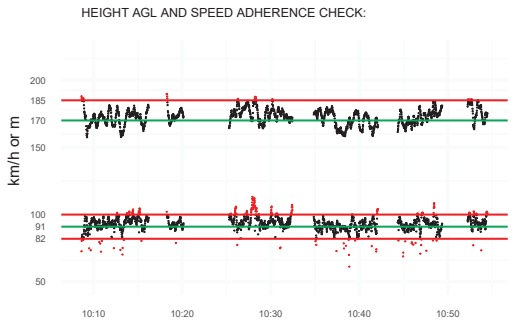
## NG31 – NG 31 BOTSWANA – NORTHERN BOTSWANA

### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5LJB20220930A



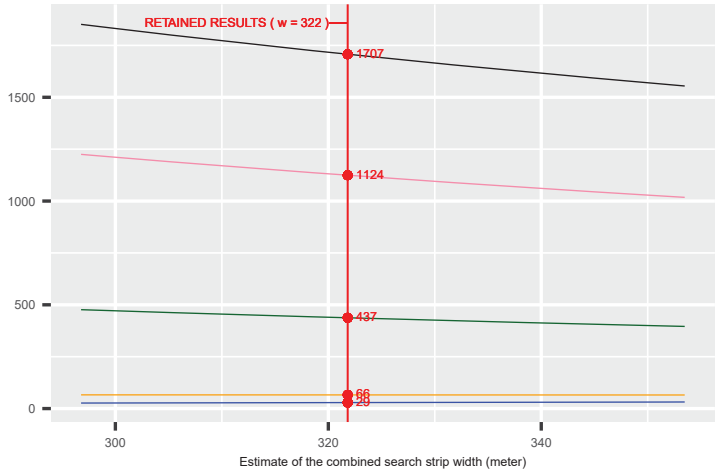

SPEED
Average: 172.6 km/h
Standard dev.: 6 km/h

HEIGHT AGL
Average: 93.1 m (305.5 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: [156 – 179]
C02 – Right: [136 – 188]




**LIVE ELEPHANT ESTIMATE: [ 1851 – 1554 ]**
CONFIDENCE INTERVAL: ± [ 1225 – 1018 ]
SAMPLE AREA: [ 27 – 32 ] sqkm
SE: [ 477 – 396 ]
PRP: [ 66 – 65 ] %

## NG31 – NG 31 BOTSWANA – NORTHERN BOTSWANA

**STRATUM CODE:** NG31 **N:** 57 $S_a^2$: 5,548
**STRATUM NAME:** NG 31 **w:** 322 **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, | 23 | 0 | 228 | 340 | 0,796 | 17536 | 132,42 | 0 | 569 | 149 | 37,767 | 3,151 |
| buffalo | Syncerus caffer | 15 | 0 | 149 | 219 | 0,519 | 7226 | 85,01 | 0 | 367 | 147 | 19,900 | 6,213 |
| 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 | 37 | 18 | 367 | 313 | 1,281 | 14854 | 121,88 | 54 | 681 | 85 | 29,767 | 3,181 |
| elephant family | Loxodonta africana family | 135 | 187 | 1340 | 989 | 4,673 | 148070 | 384,80 | 351 | 2329 | 74 | 537,100 | 37,667 |
| 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 | 3 | 0 | 30 | 40 | 0,104 | 248 | 15,74 | 0 | 70 | 136 | 0,700 | 1,193 |
| giraffe | Giraffa giraffa | 6 | 0 | 60 | 88 | 0,208 | 1183 | 34,39 | 0 | 148 | 148 | 1,600 | -1,459 |
| 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 | 14 | 4 | 139 | 155 | 0,485 | 3653 | 60,44 | 0 | 294 | 112 | 11,467 | 5,380 |
| horse | Equus caballus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 131 | 0 | 1300 | 671 | 4,535 | 68148 | 261,05 | 629 | 1971 | 52 | 287,767 | 28,770 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 3 | 0 | 30 | 66 | 0,104 | 654 | 25,57 | 0 | 96 | 221 | 1,500 | 0,998 |
| 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 | 104 | 1 | 1032 | 1291 | 3,600 | 252390 | 502,38 | 0 | 2324 | 125 | 615,867 | 23,030 |
| reedbuck | Redunca arundinum | 5 | 0 | 50 | 70 | 0,173 | 731 | 27,04 | 0 | 119 | 140 | 1,767 | 1,215 |
| 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 | 7 | 0 | 69 | 151 | 0,242 | 3437 | 58,62 | 0 | 220 | 217 | 8,167 | 2,859 |
| warthog | Phacochoerus africanus | 13 | 0 | 129 | 124 | 0,450 | 2319 | 48,15 | 5 | 253 | 96 | 3,767 | 0,105 |
| waterbuck | Kobus ellipsiprymnus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| wildebeest | Connochaetes taurinus | 15 | 0 | 149 | 241 | 0,519 | 8814 | 93,88 | 0 | 390 | 162 | 15,100 | -1,571 |
| zebra | Equus spp, | 38 | 0 | 377 | 494 | 1,315 | 36969 | 192,27 | 0 | 871 | 131 | 106,267 | 14,982 |
| all elephants | Loxodonta africana all | 172 | 205 | 1707 | 1124 | 5,954 | 191352 | 437,44 | 583 | 2832 | 66 | 685,467 | 40,849 |
| 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 | 0 | 30 | 40 | 0,104 | 248 | 15,74 | 0 | 70 | 136 | 0,700 | 1,193 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 3 | 0 | 30 | 40 | 0,104 | 248 | 15,74 | 0 | 70 | 136 | 0,700 | 1,193 |

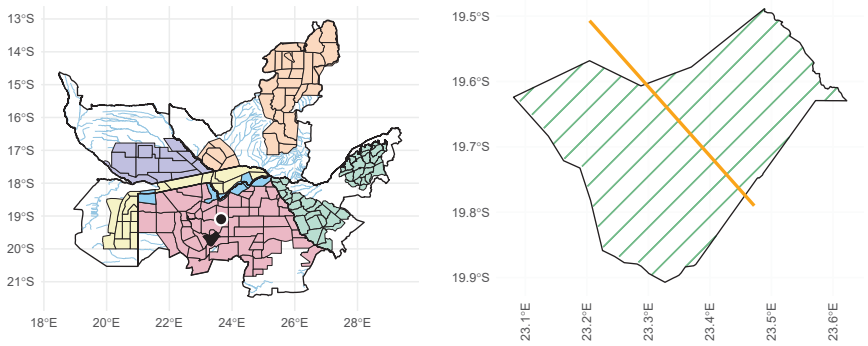
# NG32 – NG 32 BOTSWANA – NORTHERN BOTSWANA

## SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NG32
STRATUM NAME: NG 32
■ STRATUM AREA: 1232.68 sqkm
• SURVEY BASE: Khwai
DISTANCE TO SURVEY BASE: 75 km

– TRANSECTS: 14 (408 km)
TRANSECT ORIENTATION: 46.6°
PLANNED SAMPLING INTENSITY: 9.9 %

– BASELINE DISTANCE: 42.06 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.6 h
Crew(s): C02
KES2022_V5LJB20220930A 06:34–11:12

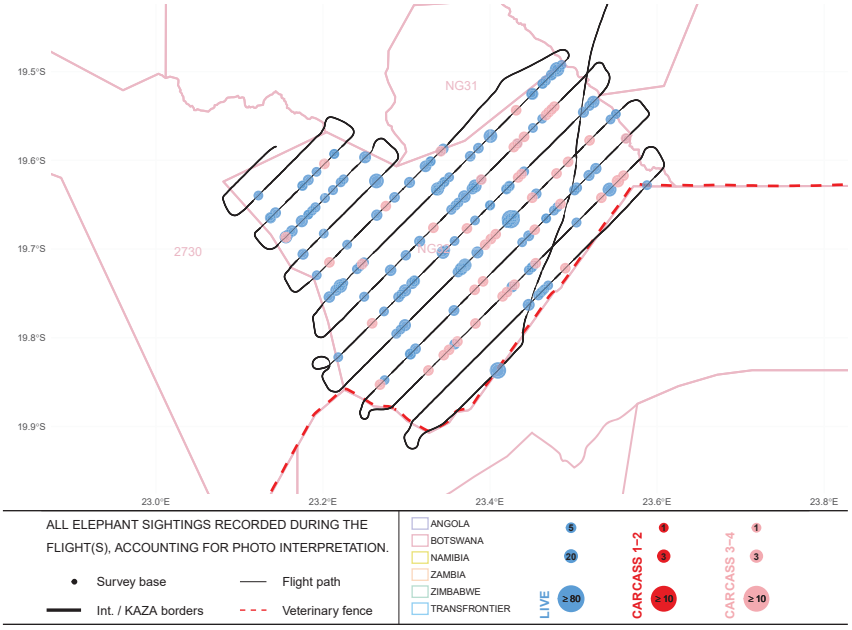
Actual sampling intensity: 10.6 %
Transect flying time: 2.4 h
Transects: 14 – 408 km – 46.6°
Search effort: 1.08 min/sqkm

## OBSERVER CONTRIBUTION

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

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 275 | 0 | |
| Live elephant (>9): | 8 | 0 | |
| Elephant carcass: | 37 | 0 | |
| Live elephant (<10): | 67 | 0 | |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **355 (75)** |
| Bulls: | 83 (36) |
| Family: | 272 (39) |
| **NOT IN SAMPLE:** | **513 (88)** |
| Outside search strip: | 513 |
| Off transect: | 0 |



## ELEPHANT CARCASSES

| | |
|---|---|
| **IN SAMPLE:** | **37 (37)** |
| Category 1: | 0 (0) |
| Category 2: | 0 (0) |
| Category 3: | 1 (1) |
| Category 4: | 36 (36) |
| **NOT IN SAMPLE:** | **10 (9)** |
| Outside search strip: | 10 |
| Off transect: | 0 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 17 |
| Other wildlife count: | 1988 |
| Domestic count: | 27 |

## ELEPHANT DATA ANALYSIS

t = 2.16, N = 131, w = 321

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 3346 | 3346 | 349 | 349 |
| Variance of estimate | $Var\hat{Y}$ | 407643 | 407643 | 5951 | 5951 |
| Standard error | $SE\hat{Y}$ | 638 | 638 | 77 | 77 |
| 95% confidence interval | $CI_{\hat{Y}}^{95\%}$ | ± 1379 | ± 1379 | ± 167 | ± 167 |
| Percentage of relative precision | $PRP_{\hat{Y}}$ | 41 % | 41 % | 48 % | 48 % |
| Density per sqkm | $R_{\hat{Y}}$ | 2.714 | 2.714 | 0.283 | 0.283 |
| Variance between transect counts | $s_y^2$ | 545.786 | 545.786 | 10.093 | 10.093 |
| Variance between transect areas | $s_a^2$ | 27.886 | 27.886 | 27.886 | 27.886 |
| Covariance between counts & areas | $s_{ay}$ | 70.048 | 70.048 | 12.211 | 12.211 |

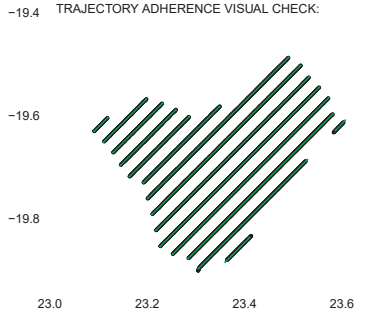
## CARCASS RATIOS

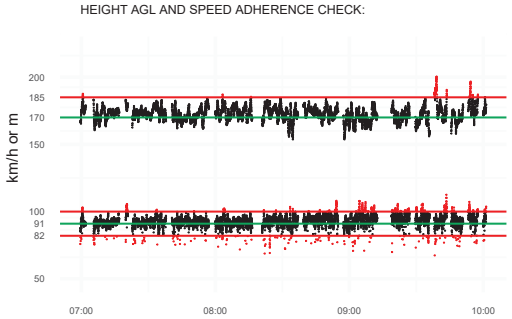
$CR_{1:4}$ = 9.4 %
$CR_{1:2}$ = 0 %

## NG32 – NG 32 BOTSWANA – NORTHERN BOTSWANA

### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5LJB20220930A



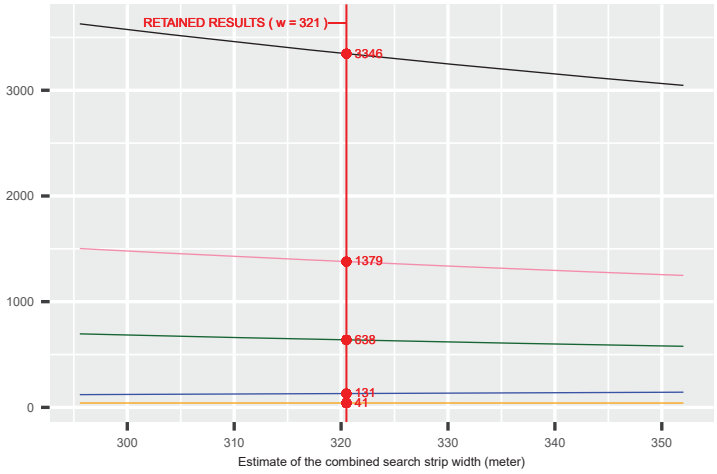

SPEED
Average: 172.7 km/h
Standard dev.: 5.4 km/h

HEIGHT AGL
Average: 92.7 m (304.3 ft)
Standard dev.: 4.3 m (14.1 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: [ 3628 – 3046 ]**
CONFIDENCE INTERVAL: ± [ 1503 – 1248 ]
SAMPLE AREA: [ 121 – 144 ] sqkm
SE: [ 696 – 578 ]
PRP: [ 41 – 41 ] %

## NG32 – NG 32 BOTSWANA – NORTHERN BOTSWANA

**STRATUM CODE:** NG32 **N:** 131 $S_a^2$: 27,886
**STRATUM NAME:** NG 32 **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, | 89 | 0 | 839 | 762 | 0,681 | 124366 | 352,66 | 77 | 1601 | 91 | 116,093 | 11,630 |
| buffalo | Syncerus caffer | 90 | 0 | 848 | 612 | 0,688 | 80302 | 283,38 | 236 | 1460 | 72 | 92,571 | 23,758 |
| 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 | 26 | 0 | 245 | 531 | 0,199 | 60374 | 245,71 | 0 | 776 | 217 | 48,286 | -13,971 |
| 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 | 83 | 90 | 782 | 638 | 0,635 | 87245 | 295,37 | 144 | 1420 | 82 | 61,918 | -4,923 |
| elephant family | Loxodonta africana family | 272 | 423 | 2564 | 1341 | 2,080 | 385062 | 620,53 | 1223 | 3904 | 52 | 541,648 | 74,971 |
| 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 | 9 | 18 | 0,008 | 73 | 8,54 | 0 | 28 | 196 | 0,071 | 0,439 |
| elephant carcass four | Loxodonta africana carcass four | 36 | 10 | 339 | 167 | 0,275 | 5971 | 77,27 | 172 | 506 | 49 | 9,802 | 11,773 |
| giraffe | Giraffa giraffa | 60 | 7 | 566 | 344 | 0,459 | 25353 | 159,23 | 222 | 910 | 61 | 34,374 | 18,713 |
| 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 | 82 | 0 | 773 | 460 | 0,627 | 45321 | 212,89 | 313 | 1233 | 60 | 57,055 | 21,351 |
| horse | Equus caballus | 1 | 0 | 9 | 19 | 0,008 | 73 | 8,57 | 0 | 28 | 196 | 0,071 | 0,411 |
| impala | Aepyceros melampus | 609 | 0 | 5740 | 3117 | 4,656 | 2081646 | 1442,79 | 2623 | 8857 | 54 | 3361,346 | 222,443 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 29 | 0 | 273 | 254 | 0,222 | 13778 | 117,38 | 20 | 527 | 93 | 16,379 | 11,751 |
| 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 | 7 | 0 | 66 | 47 | 0,054 | 474 | 21,78 | 19 | 113 | 71 | 0,577 | 2,102 |
| puku | Kobus vardonii | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| red lechwe | Kobus leche | 351 | 4 | 3308 | 1730 | 2,684 | 641613 | 801,01 | 1578 | 5039 | 52 | 520,533 | 25,615 |
| reedbuck | Redunca arundinum | 15 | 0 | 141 | 102 | 0,115 | 2218 | 47,10 | 40 | 243 | 72 | 2,379 | 3,172 |
| 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 | 35 | 1 | 330 | 299 | 0,268 | 19104 | 138,22 | 31 | 628 | 91 | 20,115 | 8,831 |
| warthog | Phacochoerus africanus | 61 | 2 | 575 | 288 | 0,466 | 17733 | 133,17 | 287 | 863 | 50 | 24,247 | 15,196 |
| waterbuck | Kobus ellipsiprymnus | 70 | 1 | 660 | 697 | 0,535 | 104173 | 322,76 | 0 | 1357 | 106 | 107,385 | 19,217 |
| wildebeest | Connochaetes taurinus | 99 | 0 | 933 | 564 | 0,757 | 68045 | 260,86 | 370 | 1497 | 60 | 91,918 | 30,366 |
| zebra | Equus spp, | 346 | 4 | 3261 | 1413 | 2,646 | 427895 | 654,14 | 1848 | 4674 | 43 | 431,912 | 44,921 |
| all elephants | Loxodonta africana all | 355 | 513 | 3346 | 1379 | 2,714 | 407643 | 638,47 | 1967 | 4725 | 41 | 545,786 | 70,048 |
| 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 | 37 | 10 | 349 | 167 | 0,283 | 5951 | 77,14 | 182 | 515 | 48 | 10,093 | 12,211 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 37 | 10 | 349 | 167 | 0,283 | 5951 | 77,14 | 182 | 515 | 48 | 10,093 | 12,211 |

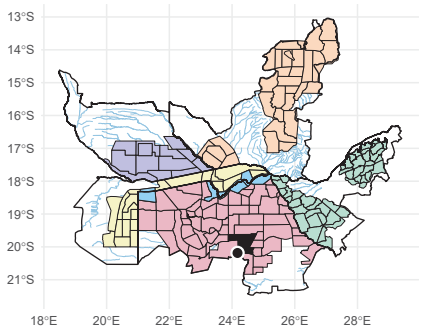
# NG40 – NG 40 BOTSWANA – NORTHERN BOTSWANA

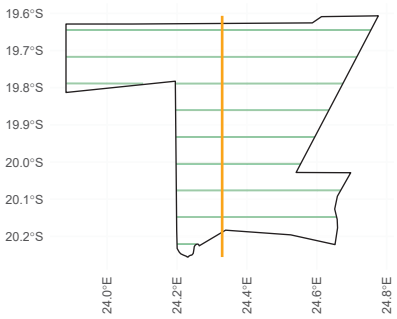
## SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NG40
STRATUM NAME: NG 40
■ STRATUM AREA: 3732.12 sqkm
• SURVEY BASE: Matopi
DISTANCE TO SURVEY BASE: 38 km

– TRANSECTS: 9 (479 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 3.9 %

– BASELINE DISTANCE: 71.85 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4 h
Crew(s): C02
KES2022_V5LJB20220917A 06:56–10:54

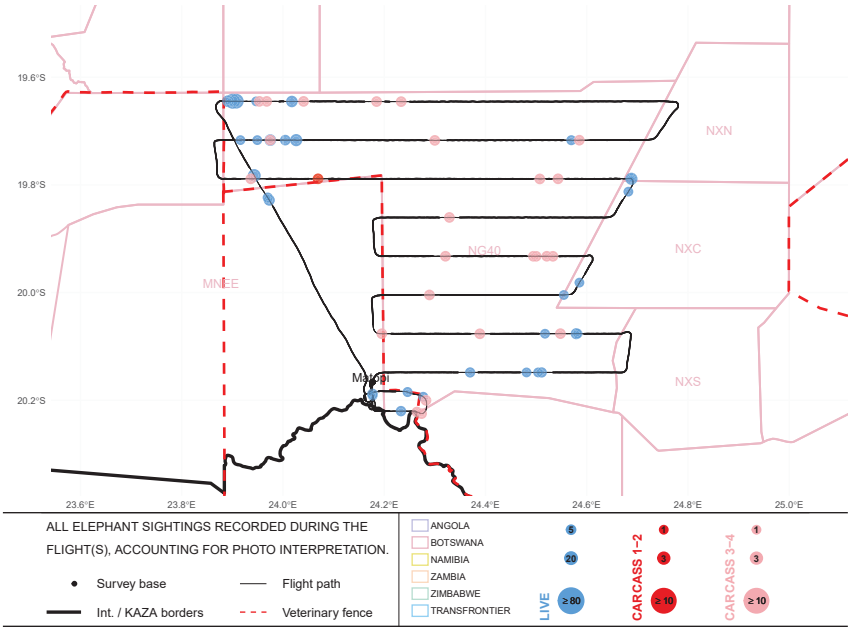
Actual sampling intensity: 4.1 %
Transect flying time: 2.8 h
Transects: 9 – 479 km – 90°
Search effort: 1.08 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C02 | |
| Side: | L | R |
| % sightings: | 62 | 38 |
| % individuals: | 62 | 38 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 42 | 38.1 | 6.25 |
| Live elephant (>9): | 1 | 0 | |
| Elephant carcass: | 19 | 68.42 | 0 |
| Live elephant (<10): | 5 | 60 | 33.33 |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **22 (6)** |
| Bulls: | 5 (4) |
| Family: | 17 (2) |
| **NOT IN SAMPLE:** | **160 (28)** |
| Outside search strip: | 100 |
| Off transect: | 60 |

## ELEPHANT CARCASSES



| | |
|---|---|
| **IN SAMPLE:** | **19 (19)** |
| Category 1: | 1 (1) |
| Category 2: | 0 (0) |
| Category 3: | 0 (0) |
| Category 4: | 18 (18) |
| **NOT IN SAMPLE:** | **6 (6)** |
| Outside search strip: | 2 |
| Off transect: | 4 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 9 |
| Other wildlife count: | 71 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 2.306, N = 222, w = 323

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 506 | 531 | 458 | 458 |
| Variance of estimate | $Var\hat{Y}$ | 64520 | 68915 | 11425 | 11425 |
| Standard error | $SE\hat{Y}$ | 254 | 263 | 107 | 107 |
| 95% confidence interval | $CI_{\hat{Y}}^{95\%}$ | ± 586 | ± 605 | ± 246 | ± 246 |
| Percentage of relative precision | $PRP_{\hat{Y}}$ | 116 % | 114 % | 54 % | 54 % |
| Density per sqkm | $R_{\hat{Y}}$ | 0.136 | 0.142 | 0.123 | 0.123 |
| Variance between transect counts | $s_y^2$ | 15.75 | 17.028 | 2.611 | 2.611 |
| Variance between transect areas | $s_a^2$ | 93.806 | 93.806 | 93.806 | 93.806 |
| Covariance between counts & areas | $s_{ay}$ | 19.323 | 20.601 | 7.57 | 7.57 |

## CARCASS RATIOS

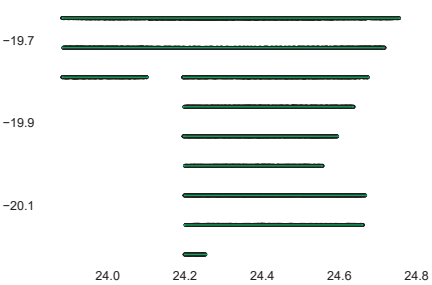
$CR_{1:4} = 46.3$ %
$CR_{1:2} = 4.3$ %

## NG40 – NG 40 BOTSWANA – NORTHERN BOTSWANA

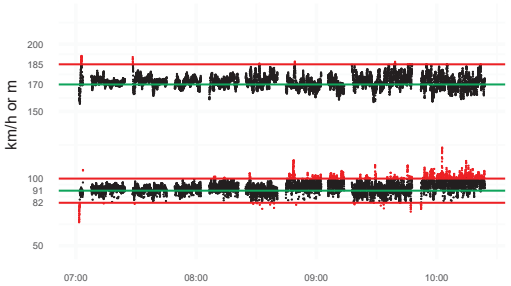
### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5LJB20220917A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



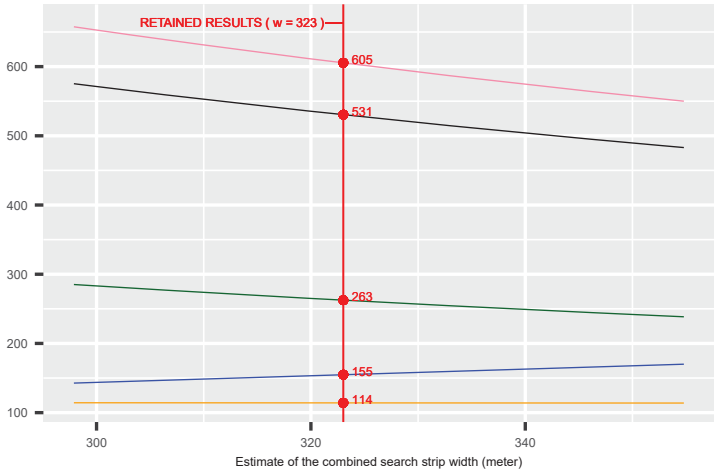

SPEED
Average: 172 km/h
Standard dev.: 4.5 km/h

HEIGHT AGL
Average: 93.5 m (306.7 ft)
Standard dev.: 4.3 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):

C02 – Left: [157 – 180]
C02 – Right: [136 – 188]




**LIVE ELEPHANT ESTIMATE: [ 575 – 483 ]**
CONFIDENCE INTERVAL: ± [ 658 – 550 ]
SAMPLE AREA: [ 143 – 170 ] sqkm
SE: [ 285 – 239 ]
PRP: [ 114 – 114 ] %

## NG40 – NG 40 BOTSWANA – NORTHERN BOTSWANA

**STRATUM CODE:** NG40 **N:** 222 $S_a^2$: 93,806
**STRATUM NAME:** NG 40 **w:** 323 **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 | 24 | 53 | 0,006 | 520 | 22,80 | 0 | 77 | 218 | 0,111 | 1,277 |
| eland | Tragelaphus oryx | 19 | 10 | 458 | 996 | 0,123 | 186604 | 431,98 | 0 | 1454 | 217 | 40,111 | 25,024 |
| elephant bulls | Loxodonta africana males | 5 | 46 | 121 | 142 | 0,032 | 3815 | 61,76 | 0 | 263 | 118 | 0,528 | -1,511 |
| elephant family | Loxodonta africana family | 17 | 114 | 410 | 553 | 0,110 | 57411 | 239,61 | 0 | 962 | 135 | 14,611 | 22,112 |
| elephant carcass one | Loxodonta africana carcass one | 1 | 0 | 24 | 60 | 0,006 | 688 | 26,23 | 0 | 85 | 251 | 0,111 | -1,197 |
| 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 | 18 | 5 | 434 | 236 | 0,116 | 10441 | 102,18 | 198 | 670 | 54 | 2,750 | 8,767 |
| giraffe | Giraffa giraffa | 19 | 36 | 458 | 457 | 0,123 | 39218 | 198,04 | 2 | 915 | 100 | 6,361 | 1,381 |
| 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 | 1 | 121 | 262 | 0,032 | 12923 | 113,68 | 0 | 383 | 217 | 2,778 | 6,585 |
| oribi | Ourebia ourebi | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| oryx | Oryx gazella | 8 | 7 | 193 | 421 | 0,052 | 33256 | 182,36 | 0 | 613 | 218 | 7,111 | 10,219 |
| ostrich | Struthio camelus | 1 | 1 | 24 | 58 | 0,006 | 623 | 24,96 | 0 | 82 | 239 | 0,111 | -0,236 |
| 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, | 8 | 11 | 193 | 410 | 0,052 | 31545 | 177,61 | 0 | 602 | 212 | 7,111 | 13,356 |
| all elephants | Loxodonta africana all | 22 | 160 | 531 | 605 | 0,142 | 68915 | 262,52 | 0 | 1136 | 114 | 17,028 | 20,601 |
| C1-2 elephant carcasses | Loxodonta africana carcass 1-2 | 1 | 0 | 24 | 60 | 0,006 | 688 | 26,23 | 0 | 85 | 251 | 0,111 | -1,197 |
| all elephant carcasses | Loxodonta africana carcass all | 19 | 6 | 458 | 246 | 0,123 | 11425 | 106,89 | 212 | 705 | 54 | 2,611 | 7,570 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 18 | 6 | 434 | 236 | 0,116 | 10441 | 102,18 | 198 | 670 | 54 | 2,750 | 8,767 |

# NGWN – Ngwasha North

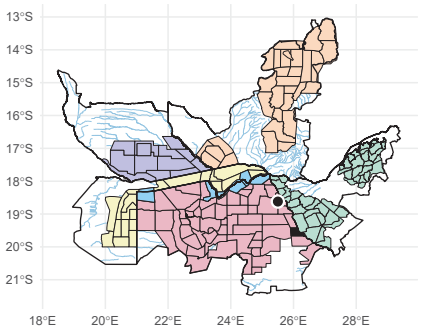
# BOTSWANA – NORTHERN BOTSWANA

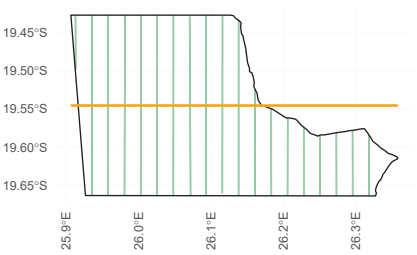
## SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NGWN
STRATUM NAME: Ngwasha North
■ STRATUM AREA: 841.91 sqkm
• SURVEY BASE: Pandamatenga
DISTANCE TO SURVEY BASE: 117 km

– TRANSECTS: 19 (353 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 12.6 %

– BASELINE DISTANCE: 47.42 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.4 h
Crew(s): C03
KES2022_V5WOT20220913A 06:28–10:50

Actual sampling intensity: 13.1 %
Transect flying time: 2.1 h
Transects: 19 – 353 km – 0°
Search effort: 1.13 min/sqkm

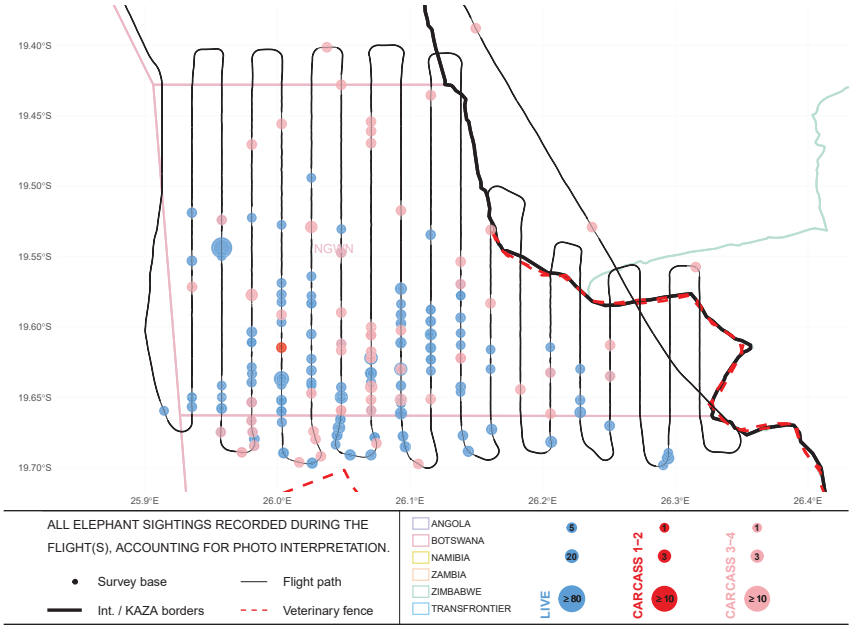
## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C03 | |
| Side: | L | R |
| % sightings: | 50 | 50 |
| % individuals: | 56 | 44 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 154 | 12.99 | 0 |
| Live elephant (>9): | 2 | 0 | |
| Elephant carcass: | 29 | 44.83 | 23.08 |
| Live elephant (<10): | 48 | 16.67 | 0 |

Undetected live elephant: 1
Undetected elephant carcass: 0






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **170 (51)** |
| Bulls: | 46 (31) |
| Family: | 124 (20) |
| **NOT IN SAMPLE:** | **650 (122)** |
| Outside search strip: | 295 |
| Off transect: | 355 |



## ELEPHANT CARCASSES

| | |
|---|---|
| **IN SAMPLE:** | **29 (29)** |
| Category 1: | 0 (0) |
| Category 2: | 1 (1) |
| Category 3: | 18 (18) |
| Category 4: | 10 (10) |
| **NOT IN SAMPLE:** | **43 (42)** |
| Outside search strip: | 23 |
| Off transect: | 20 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 7 |
| Other wildlife count: | 74 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 2.101, N = 151, w = 313

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 1263 | 1294 | 213 | 221 |
| Variance of estimate | $\mathrm{Var}\hat{Y}$ | 103011 | 102308 | 2004 | 2031 |
| Standard error | $\mathrm{SE}\hat{Y}$ | 321 | 320 | 45 | 45 |
| 95% confidence interval | $\mathrm{CI}_{\hat{Y}}^{95\%}$ | ± 674 | ± 672 | ± 94 | ± 95 |
| Percentage of relative precision | $\mathrm{PRP}_{\hat{Y}}$ | 53 % | 52 % | 44 % | 43 % |
| Density per sqkm | $R_{\hat{Y}}$ | 1.501 | 1.537 | 0.253 | 0.262 |
| Variance between transect counts | $s_y^2$ | 131.427 | 132.83 | 2.819 | 2.93 |
| Variance between transect areas | $s_a^2$ | 6.532 | 6.532 | 6.532 | 6.532 |
| Covariance between counts & areas | $s_{ay}$ | 16.203 | 16.728 | 2.647 | 2.778 |

## CARCASS RATIOS

$CR_{1:4} = 14.6\ \%$
$CR_{1:2} = 0.6\ \%$

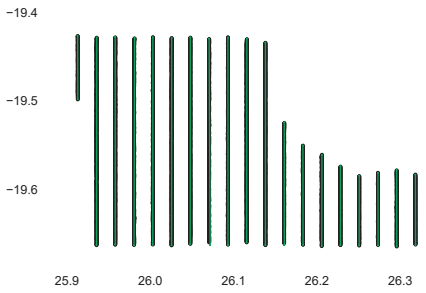
## NGWN – Ngwasha North

## BOTSWANA – NORTHERN BOTSWANA

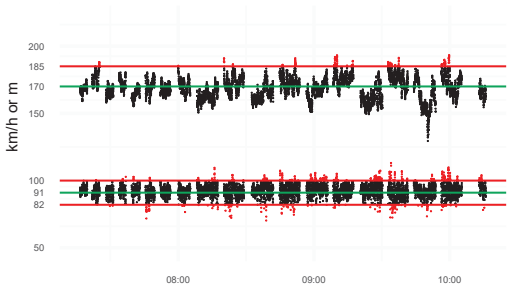
### ADHERENCE TO FLIGHT PARAMETERS

**KES2022_ V5WOT20220913A**

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



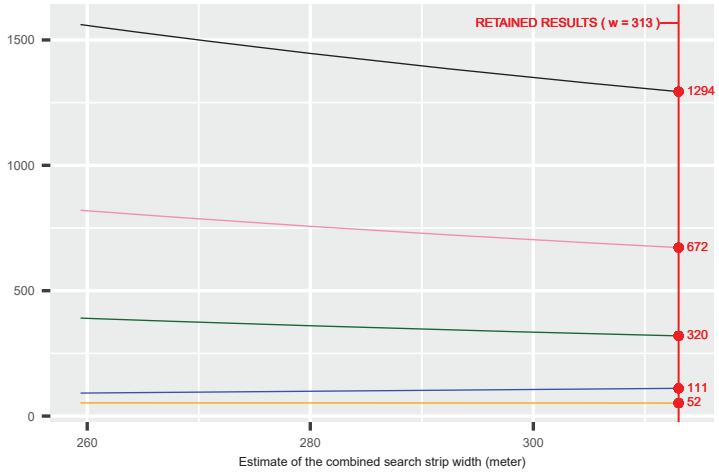

SPEED
Average: 168.7 km/h
Standard dev.: 8.1 km/h

HEIGHT AGL
Average: 92.1 m (302.3 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):

C03 – Left: [103 – 156]
C03 – Right: [145 – 173]




**LIVE ELEPHANT ESTIMATE: [ 1561 – 1294 ]**
CONFIDENCE INTERVAL: ± [ 821 – 672 ]
SAMPLE AREA: [ 92 – 111 ] sqkm
SE: [ 391 – 320 ]
PRP: [ 53 – 52 ] %

## NGWN – Ngwasha North — BOTSWANA – NORTHERN BOTSWANA

**STRATUM CODE:** NGWN **N:** 151 $S_a^2$: 6,532
**STRATUM NAME:** Ngwasha North **w:** 313 **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, | 0 | 4 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| buffalo | Syncerus caffer | 0 | 15 | 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 | 46 | 34 | 0,054 | 260 | 16,12 | 12 | 80 | 74 | 0,228 | 0,013 |
| eland | Tragelaphus oryx | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| elephant bulls | Loxodonta africana males | 46 | 228 | 350 | 148 | 0,416 | 4955 | 70,39 | 202 | 498 | 42 | 7,368 | 4,578 |
| elephant family | Loxodonta africana family | 124 | 422 | 944 | 622 | 1,121 | 87695 | 296,13 | 322 | 1566 | 66 | 102,041 | 12,150 |
| 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 | 8 | 15 | 0,009 | 54 | 7,32 | 0 | 23 | 202 | 0,053 | 0,134 |
| elephant carcass three | Loxodonta africana carcass three | 18 | 29 | 137 | 70 | 0,163 | 1103 | 33,20 | 67 | 207 | 51 | 1,497 | 1,925 |
| elephant carcass four | Loxodonta africana carcass four | 10 | 14 | 76 | 54 | 0,090 | 667 | 25,82 | 22 | 130 | 71 | 0,708 | 0,719 |
| giraffe | Giraffa giraffa | 39 | 34 | 297 | 270 | 0,353 | 16540 | 128,61 | 27 | 567 | 91 | 16,164 | 1,872 |
| 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 | 27 | 0 | 206 | 269 | 0,244 | 16345 | 127,85 | 0 | 474 | 131 | 16,702 | 3,317 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 0 | 3 | 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 | 170 | 650 | 1294 | 672 | 1,537 | 102308 | 319,86 | 622 | 1966 | 52 | 132,830 | 16,728 |
| C1-2 elephant carcasses | Loxodonta africana carcass 1-2 | 1 | 0 | 8 | 15 | 0,009 | 54 | 7,32 | 0 | 23 | 202 | 0,053 | 0,134 |
| all elephant carcasses | Loxodonta africana carcass all | 29 | 43 | 221 | 95 | 0,262 | 2031 | 45,06 | 126 | 315 | 43 | 2,930 | 2,778 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 28 | 43 | 213 | 94 | 0,253 | 2006 | 44,79 | 119 | 307 | 44 | 2,819 | 2,644 |

# NGWS – Ngwasha South

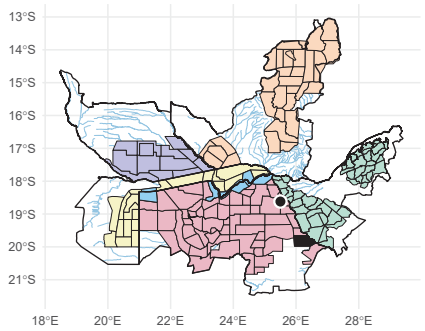
# BOTSWANA – NORTHERN BOTSWANA

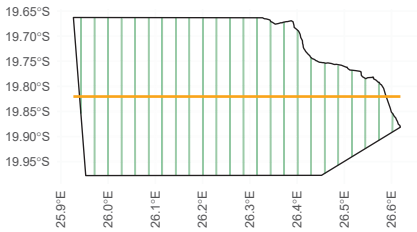
## SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NGWS
STRATUM NAME: Ngwasha South
■ STRATUM AREA: 2095.62 sqkm
• SURVEY BASE: Pandamatenga
DISTANCE TO SURVEY BASE: 156 km

– TRANSECTS: 24 (703 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 10.1 %

– BASELINE DISTANCE: 72.54 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 2**
Combined flying time: 8.1 h
Crew(s): C01, C03
KES2022_V5WOT20220912A 06:08–09:52
KES2022_V5IIM20220912A 06:13–10:35

Actual sampling intensity: 10.6 %
Transect flying time: 4.2 h
Transects: 24 – 703 km – 0°
Search effort: 1.12 min/sqkm

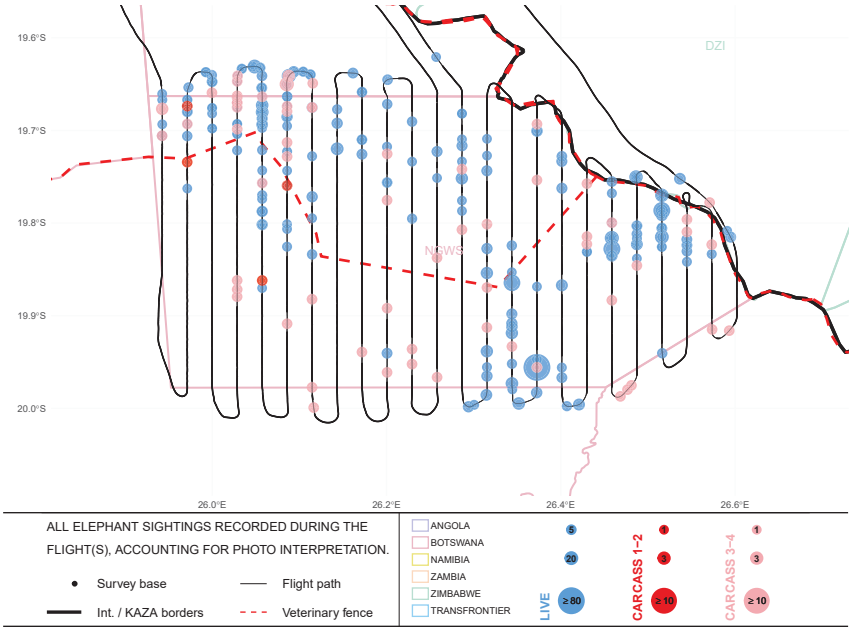
## OBSERVER CONTRIBUTION

| Crew(s): | C03 | | C01 | |
|---|---|---|---|---|
| Side: | L | R | L | R |
| % sightings: | 43 | 57 | 44 | 56 |
| % individuals: | 40 | 60 | 43 | 57 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 215 | 33.49 | 15.28 |
| Live elephant (>9): | 8 | 37.5 | 0 |
| Elephant carcass: | 45 | 60 | 18.52 |
| Live elephant (<10): | 83 | 50.6 | 19.05 |

Undetected live elephant: 1
Undetected elephant carcass: 1




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **383 (92)** |
| Bulls: | 93 (53) |
| Family: | 290 (39) |
| **NOT IN SAMPLE:** | **901 (161)** |
| Outside search strip: | 515 |
| Off transect: | 386 |

## ELEPHANT CARCASSES



| | |
|---|---|
| **IN SAMPLE:** | **47 (46)** |
| Category 1: | 0 (0) |
| Category 2: | 2 (2) |
| Category 3: | 22 (22) |
| Category 4: | 23 (22) |
| **NOT IN SAMPLE:** | **24 (21)** |
| Outside search strip: | 7 |
| Off transect: | 17 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 11 |
| Other wildlife count: | 101 |
| Domestic count: | 260 |

## ELEPHANT DATA ANALYSIS

t = 2.069, N = 229, w = 316

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 3480 | 3612 | 406 | 443 |
| Variance of estimate | $Var\hat{Y}$ | 476765 | 556099 | 3886 | 5947 |
| Standard error | $SE\hat{Y}$ | 690 | 746 | 62 | 77 |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 1428 | ± 1543 | ± 129 | ± 160 |
| Percentage of relative precision | $PRP\hat{Y}$ | 41 % | 43 % | 32 % | 36 % |
| Density per sqkm | $R\hat{Y}$ | 1.66 | 1.723 | 0.193 | 0.211 |
| Variance between transect counts | $s^2_y$ | 254.679 | 294.737 | 2.172 | 3.346 |
| Variance between transect areas | $s^2_a$ | 8.261 | 8.261 | 8.261 | 8.261 |
| Covariance between counts & areas | $s_{ay}$ | 10.44 | 10.471 | 1.299 | 1.625 |

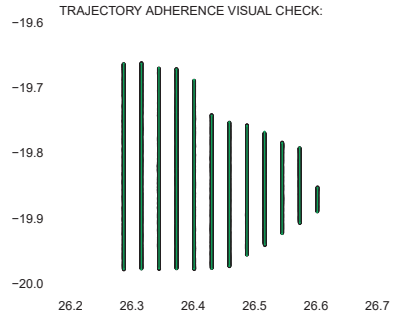
## CARCASS RATIOS

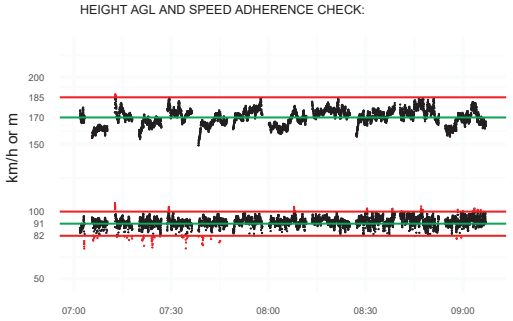
$CR_{1:4} = 10.9$ %
$CR_{1:2} = 0.5$ %

## NGWS – Ngwasha South — BOTSWANA – NORTHERN BOTSWANA

### ADHERENCE TO FLIGHT PARAMETERS

#### KES2022_ V5WOT20220912A

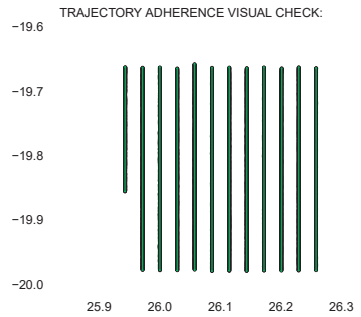


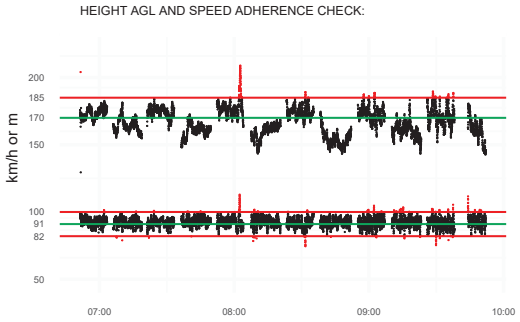




SPEED
Average: 170.1 km/h
Standard dev.: 5.8 km/h

HEIGHT AGL
Average: 92.2 m (302.5 ft)
Standard dev.: 3.4 m (11.2 ft)

#### KES2022_ V5IIM20220912A




SPEED
Average: 166.8 km/h
Standard dev.: 9.5 km/h

HEIGHT AGL
Average: 92.3 m (303 ft)
Standard dev.: 3.5 m (11.6 ft)

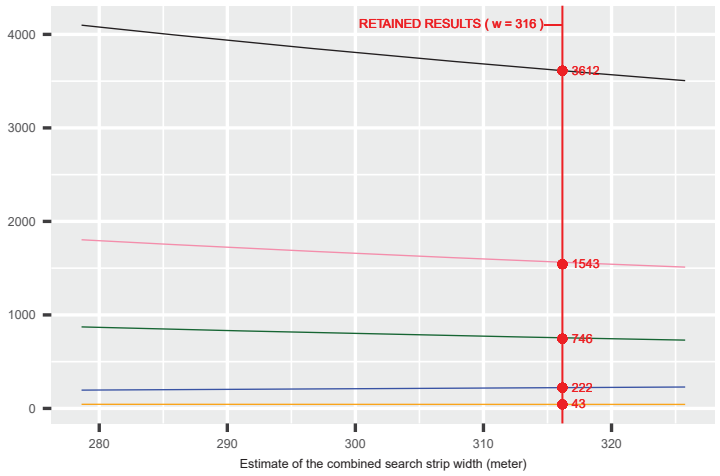
INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C01 – Left: [160 – 192]
C01 – Right: [121 – 161]

C03 – Left: [103 – 156]
C03 – Right: [145 – 173]

**LIVE ELEPHANT ESTIMATE: [ 4098 – 3506 ]**
CONFIDENCE INTERVAL: ± [ 1804 – 1511 ]
SAMPLE AREA: [ 196 – 229 ] sqkm
SE: [ 872 – 731 ]
PRP: [ 44 – 43 ] %



## NGWS – Ngwasha South — BOTSWANA – NORTHERN BOTSWANA

**STRATUM CODE:** NGWS **N:** 229 $S_a^2$: 8,261
**STRATUM NAME:** Ngwasha South **w:** 316 **df:** 23

| 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 | 13 | 52 | 123 | 146 | 0,058 | 4965 | 70,46 | 0 | 268 | 119 | 2,607 | 0,913 |
| 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 | 189 | 115 | 1782 | 1538 | 0,850 | 552995 | 743,64 | 244 | 3321 | 86 | 275,418 | -0,123 |
| donkey | Equus asinus | 1 | 0 | 9 | 19 | 0,004 | 85 | 9,20 | 0 | 28 | 202 | 0,042 | -0,144 |
| duiker | Sylvicapra grimmia | 3 | 0 | 28 | 41 | 0,013 | 393 | 19,84 | 0 | 69 | 145 | 0,201 | 0,083 |
| eland | Tragelaphus oryx | 2 | 20 | 19 | 37 | 0,009 | 324 | 18,00 | 0 | 56 | 197 | 0,167 | 0,130 |
| elephant bulls | Loxodonta africana males | 93 | 156 | 877 | 609 | 0,418 | 86696 | 294,44 | 268 | 1486 | 69 | 45,592 | 3,453 |
| elephant family | Loxodonta africana family | 290 | 745 | 2735 | 1298 | 1,305 | 393616 | 627,39 | 1437 | 4033 | 47 | 204,688 | 7,017 |
| 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 | 2 | 1 | 19 | 26 | 0,009 | 152 | 12,34 | 0 | 44 | 135 | 0,080 | 0,156 |
| elephant carcass three | Loxodonta africana carcass three | 22 | 16 | 207 | 110 | 0,099 | 2829 | 53,19 | 97 | 318 | 53 | 1,384 | 0,122 |
| elephant carcass four | Loxodonta africana carcass four | 23 | 6 | 217 | 106 | 0,103 | 2611 | 51,10 | 111 | 323 | 49 | 1,520 | 1,347 |
| giraffe | Giraffa giraffa | 12 | 16 | 113 | 96 | 0,054 | 2141 | 46,27 | 17 | 209 | 85 | 1,130 | 0,595 |
| 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 | 2 | 0 | 19 | 37 | 0,009 | 323 | 17,96 | 0 | 56 | 197 | 0,167 | 0,169 |
| impala | Aepyceros melampus | 20 | 0 | 189 | 292 | 0,090 | 19922 | 141,14 | 0 | 481 | 155 | 10,145 | 0,372 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 12 | 0 | 113 | 107 | 0,054 | 2668 | 51,65 | 6 | 220 | 94 | 1,391 | 0,525 |
| oribi | Ourebia ourebi | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| oryx | Oryx gazella | 4 | 6 | 38 | 51 | 0,018 | 607 | 24,63 | 0 | 89 | 135 | 0,319 | 0,350 |
| ostrich | Struthio camelus | 9 | 7 | 85 | 64 | 0,040 | 957 | 30,93 | 21 | 149 | 75 | 0,505 | 0,392 |
| 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 | 9 | 19 | 0,004 | 82 | 9,03 | 0 | 28 | 198 | 0,042 | 0,036 |
| shoat | Capra hircus - Ovis aries | 68 | 0 | 641 | 1263 | 0,306 | 372975 | 610,72 | 0 | 1905 | 197 | 192,667 | 5,734 |
| 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, | 22 | 7 | 207 | 298 | 0,099 | 20802 | 144,23 | 0 | 506 | 144 | 10,862 | 1,770 |
| all elephants | Loxodonta africana all | 383 | 901 | 3612 | 1543 | 1,723 | 556099 | 745,72 | 2069 | 5154 | 43 | 294,737 | 10,471 |
| C1-2 elephant carcasses | Loxodonta africana carcass 1-2 | 2 | 2 | 19 | 26 | 0,009 | 152 | 12,34 | 0 | 44 | 135 | 0,080 | 0,156 |
| all elephant carcasses | Loxodonta africana carcass all | 47 | 24 | 443 | 160 | 0,211 | 5947 | 77,11 | 284 | 603 | 36 | 3,346 | 1,625 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 45 | 22 | 424 | 158 | 0,202 | 5868 | 76,61 | 266 | 583 | 37 | 3,245 | 1,469 |

# NOGA – Nogatsaa

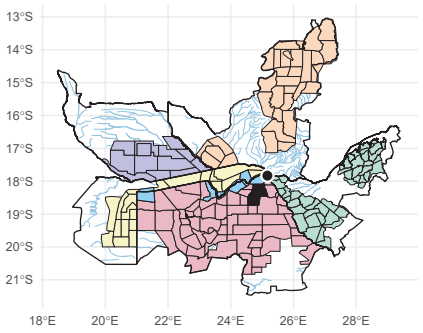
# BOTSWANA – NORTHERN BOTSWANA

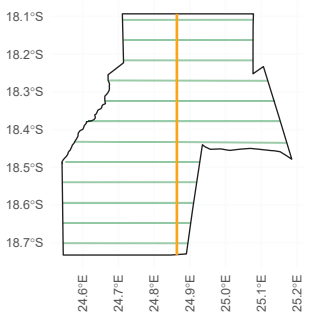
## SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NOGA
STRATUM NAME: Nogatsaa
■ STRATUM AREA: 3090.97 sqkm
• SURVEY BASE: Kasane
DISTANCE TO SURVEY BASE: 71 km

– TRANSECTS: 12 (526 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 5.1 %

– BASELINE DISTANCE: 70.86 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.6 h
Crew(s): C01
KES2022_V5IIM20220910A 07:35–12:12

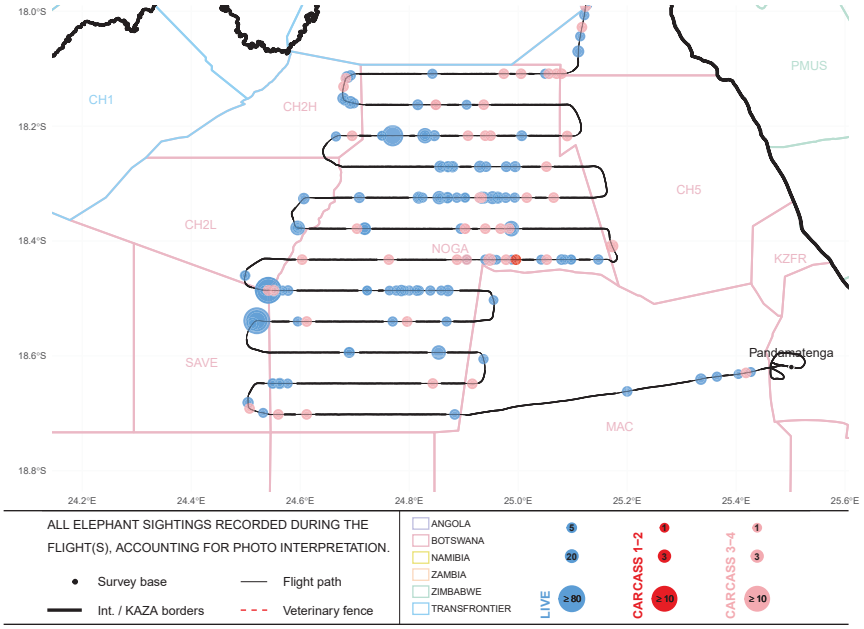
Actual sampling intensity: 5.5 %
Transect flying time: 3.1 h
Transects: 12 – 526 km – 90°
Search effort: 1.11 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C01 | |
| Side: | L | R |
| % sightings: | 37 | 63 |
| % individuals: | 53 | 47 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 122 | 0 | |
| Live elephant (>9): | 9 | 0 | |
| Elephant carcass: | 33 | 0 | |
| Live elephant (<10): | 40 | 0 | |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **320 (49)** |
| Bulls: | 22 (15) |
| Family: | 298 (34) |
| **NOT IN SAMPLE:** | **940 (82)** |
| Outside search strip: | 252 |
| Off transect: | 688 |



## ELEPHANT CARCASSES

| | |
|---|---|
| **IN SAMPLE:** | **34 (33)** |
| Category 1: | 0 (0) |
| Category 2: | 0 (0) |
| Category 3: | 8 (8) |
| Category 4: | 26 (25) |
| **NOT IN SAMPLE:** | **19 (17)** |
| Outside search strip: | 2 |
| Off transect: | 17 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 10 |
| Other wildlife count: | 31 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 2.201, N = 220, w = 321

| | | LIVE OBS | LIVE FINAL | ALL CARCASSES OBS | ALL CARCASSES FINAL |
|---|---|---|---|---|---|
| Population estimate | $\hat{Y}$ | 5853 | 5853 | 622 | 622 |
| Variance of estimate | $Var\hat{Y}$ | 3725815 | 3725815 | 13080 | 13080 |
| Standard error | $SE\hat{Y}$ | 1930 | 1930 | 114 | 114 |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 4248 | ± 4248 | ± 252 | ± 252 |
| Percentage of relative precision | $PRP_{\hat{Y}}$ | 73 % | 73 % | 40 % | 40 % |
| Density per sqkm | $R_{\hat{Y}}$ | 1.894 | 1.894 | 0.201 | 0.201 |
| Variance between transect counts | $s^2_y$ | 951.515 | 951.515 | 5.242 | 5.242 |
| Variance between transect areas | $s^2_a$ | 8.089 | 8.089 | 8.089 | 8.089 |
| Covariance between counts & areas | $s_{ay}$ | 2.27 | 2.27 | 5.362 | 5.362 |

## CARCASS RATIOS

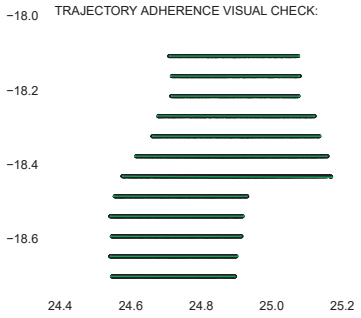
$CR_{1:4} = 9.6$ %
$CR_{1:2} = 0$ %

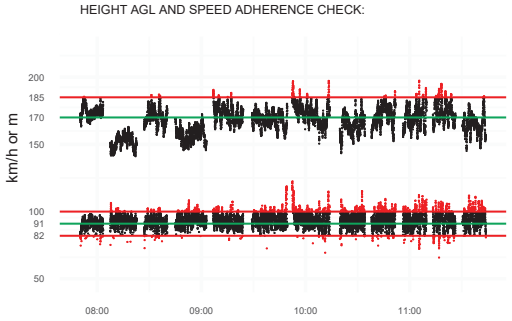
## NOGA – Nogatsaa

## BOTSWANA – NORTHERN BOTSWANA

### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5IIM20220910A



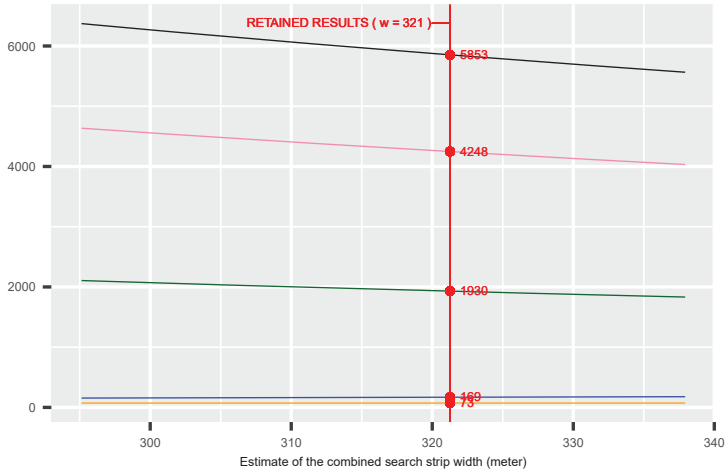

SPEED
Average: 167.7 km/h
Standard dev.: 9.5 km/h

HEIGHT AGL
Average: 93.2 m (305.8 ft)
Standard dev.: 5.3 m (17.4 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: [161 – 194]
C01 – Right: [122 – 163]




**LIVE ELEPHANT ESTIMATE: [ 6371 – 5564 ]**
CONFIDENCE INTERVAL: ± [ 4635 – 4033 ]
SAMPLE AREA: [ 155 – 178 ] sqkm
SE: [ 2106 – 1832 ]
PRP: [ 73 – 72 ] %

## NOGA – Nogatsaa — BOTSWANA – NORTHERN BOTSWANA

**STRATUM CODE:** NOGA **N:** 221 $S_a^2$: 8,089
**STRATUM NAME:** Nogatsaa **w:** 321 **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 | 7 | 1 | 128 | 156 | 0,041 | 5023 | 70,87 | 0 | 284 | 122 | 1,356 | 0,721 |
| 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 | 0 | 18 | 40 | 0,006 | 326 | 18,05 | 0 | 58 | 217 | 0,083 | -0,117 |
| elephant bulls | Loxodonta africana males | 22 | 86 | 402 | 390 | 0,130 | 31385 | 177,16 | 12 | 792 | 97 | 9,606 | 5,976 |
| elephant family | Loxodonta africana family | 298 | 854 | 5451 | 4274 | 1,763 | 3770065 | 1941,67 | 1177 | 9724 | 78 | 945,242 | -3,705 |
| 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 | 8 | 1 | 146 | 113 | 0,047 | 2617 | 51,16 | 34 | 259 | 77 | 0,788 | 1,302 |
| elephant carcass four | Loxodonta africana carcass four | 26 | 17 | 476 | 193 | 0,154 | 7677 | 87,62 | 283 | 668 | 41 | 3,061 | 4,061 |
| giraffe | Giraffa giraffa | 6 | 6 | 110 | 136 | 0,036 | 3813 | 61,75 | 0 | 246 | 124 | 1,000 | 0,219 |
| 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 | 6 | 0 | 110 | 233 | 0,036 | 11252 | 106,07 | 0 | 343 | 213 | 3,000 | 1,056 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 2 | 0 | 37 | 76 | 0,012 | 1207 | 34,74 | 0 | 113 | 209 | 0,333 | 0,829 |
| 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 | 1 | 0 | 18 | 40 | 0,006 | 326 | 18,05 | 0 | 58 | 217 | 0,083 | -0,114 |
| 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 | 6 | 0 | 110 | 170 | 0,036 | 5992 | 77,41 | 0 | 280 | 155 | 1,545 | -0,103 |
| 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 | 15 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| all elephants | Loxodonta africana all | 320 | 940 | 5853 | 4248 | 1,894 | 3725815 | 1930,24 | 1605 | 10102 | 73 | 951,515 | 2,270 |
| 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 | 34 | 19 | 622 | 252 | 0,201 | 13080 | 114,37 | 370 | 874 | 40 | 5,242 | 5,362 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 34 | 18 | 622 | 252 | 0,201 | 13080 | 114,37 | 370 | 874 | 40 | 5,242 | 5,362 |

# NXC – Nxai Pan Centre

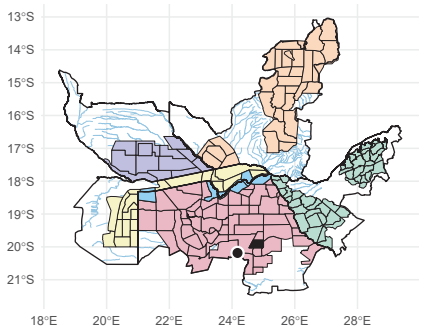
# BOTSWANA – NORTHERN BOTSWANA

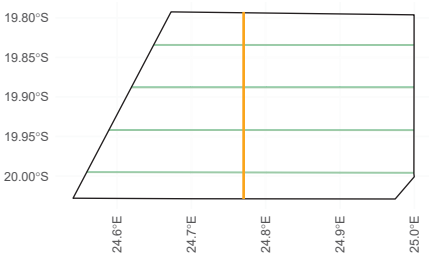
## SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NXC
STRATUM NAME: Nxai Pan Centre
■ STRATUM AREA: 1064.72 sqkm
• SURVEY BASE: Matopi
DISTANCE TO SURVEY BASE: 72 km

– TRANSECTS: 4 (165 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 4.7 %

– BASELINE DISTANCE: 26.19 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.2 h
Crew(s): C03
KES2022_V5WOT20220916A 06:22–10:35

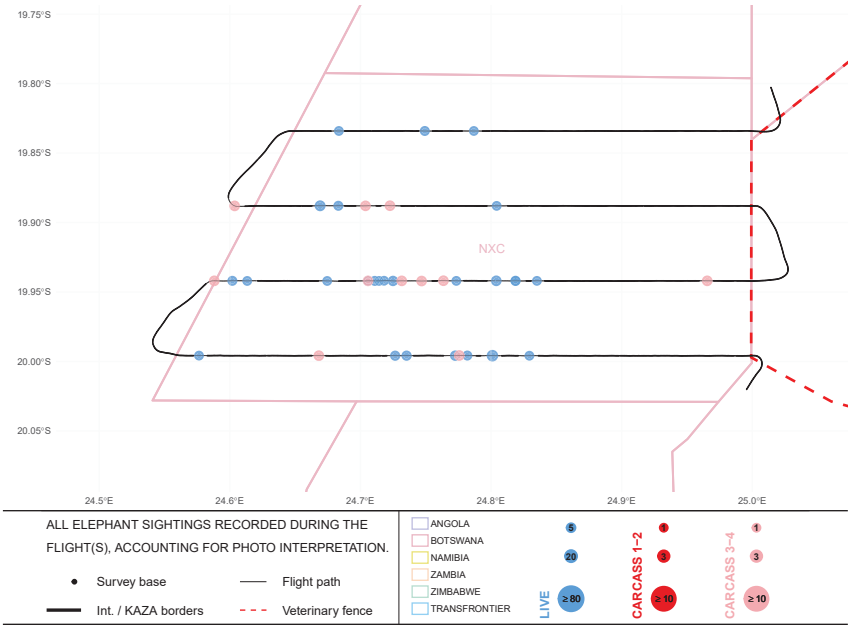
Actual sampling intensity: 4.9 %
Transect flying time: 1 h
Transects: 4 – 165 km – 90°
Search effort: 1.12 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C03 | |
| Side: | L | R |
| % sightings: | 40 | 60 |
| % individuals: | 29 | 71 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 36 | 19.44 | 0 |
| Live elephant (>9): | 0 | | |
| Elephant carcass: | 7 | 71.43 | 0 |
| Live elephant (<10): | 9 | 22.22 | 0 |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **15 (9)** |
| Bulls: | 8 (7) |
| Family: | 7 (2) |
| **NOT IN SAMPLE:** | **47 (21)** |
| Outside search strip: | 47 |
| Off transect: | 0 |



## ELEPHANT CARCASSES

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

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 6 |
| Other wildlife count: | 28 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 3.182, N = 83, w = 312

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 309 | 309 | 144 | 144 |
| Variance of estimate | $Var\hat{Y}$ | 22719 | 22719 | 4131 | 4131 |
| Standard error | $SE\hat{Y}$ | 151 | 151 | 64 | 64 |
| 95% confidence interval | $CI_{\hat{Y}}^{95\%}$ | ± 480 | ± 480 | ± 205 | ± 205 |
| Percentage of relative precision | $PRP_{\hat{Y}}$ | 155 % | 155 % | 142 % | 142 % |
| Density per sqkm | $R_{\hat{Y}}$ | 0.29 | 0.29 | 0.136 | 0.136 |
| Variance between transect counts | $s_y^2$ | 14.917 | 14.917 | 2.917 | 2.917 |
| Variance between transect areas | $s_a^2$ | 1.884 | 1.884 | 1.884 | 1.884 |
| Covariance between counts & areas | $s_{ay}$ | 2.612 | 2.612 | 1.794 | 1.794 |

## CARCASS RATIOS

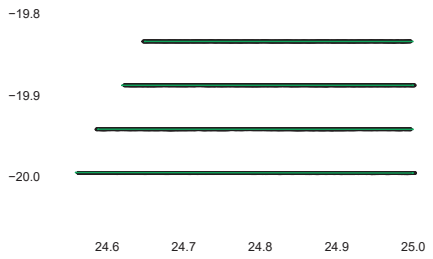
$CR_{1:4} = 31.8$ %
$CR_{1:2} = 0$ %

## NXC – Nxai Pan Centre — BOTSWANA – NORTHERN BOTSWANA

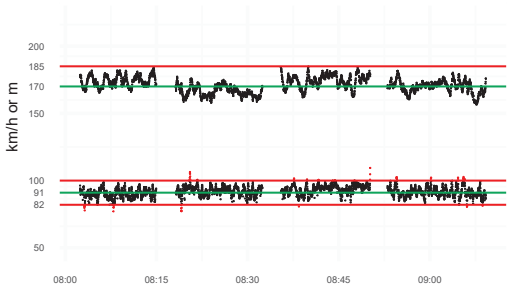
### ADHERENCE TO FLIGHT PARAMETERS

**KES2022_ V5WOT20220916A**

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



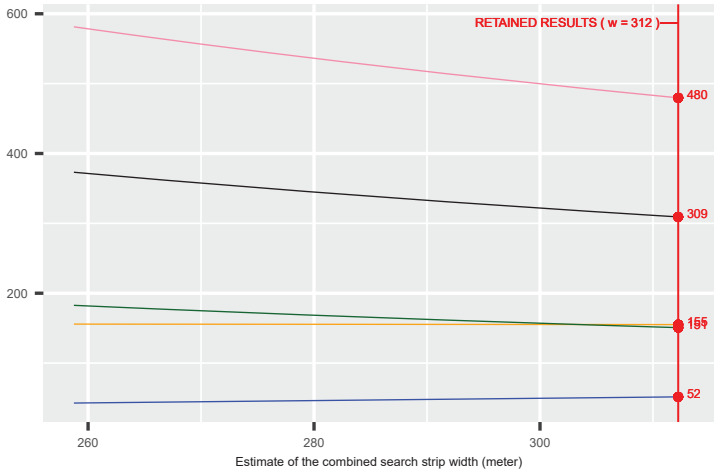

SPEED
Average: 171 km/h
Standard dev.: 5.5 km/h

HEIGHT AGL
Average: 91.9 m (301.5 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):

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




**LIVE ELEPHANT ESTIMATE: [ 373 – 309 ]**
CONFIDENCE INTERVAL: ± [ 581 – 480 ]
SAMPLE AREA: [ 43 – 52 ] sqkm
SE: [ 183 – 151 ]
PRP: [ 156 – 155 ] %

## NXC – Nxai Pan Centre — BOTSWANA – NORTHERN BOTSWANA

**STRATUM CODE:** NXC **N:** 84 $S_a^2$: 1,884
**STRATUM NAME:** Nwai Pan Centre **w:** 312 **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 | 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 | 21 | 63 | 0,019 | 390 | 19,75 | 0 | 83 | 305 | 0,250 | 0,466 |
| eland | Tragelaphus oryx | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| elephant bulls | Loxodonta africana males | 8 | 36 | 165 | 352 | 0,155 | 12211 | 110,50 | 0 | 517 | 213 | 8,000 | 2,447 |
| elephant family | Loxodonta africana family | 7 | 11 | 144 | 268 | 0,136 | 7104 | 84,29 | 0 | 413 | 186 | 4,250 | 0,166 |
| 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 | 2 | 82 | 180 | 0,077 | 3212 | 56,68 | 0 | 263 | 219 | 2,000 | 0,610 |
| elephant carcass four | Loxodonta africana carcass four | 3 | 2 | 62 | 115 | 0,058 | 1316 | 36,28 | 0 | 177 | 187 | 0,917 | 1,184 |
| giraffe | Giraffa giraffa | 8 | 2 | 165 | 418 | 0,155 | 17243 | 131,31 | 0 | 583 | 253 | 11,333 | 3,513 |
| 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 | 4 | 1 | 82 | 195 | 0,077 | 3749 | 61,23 | 0 | 277 | 236 | 2,000 | -1,459 |
| ostrich | Struthio camelus | 3 | 2 | 62 | 192 | 0,058 | 3633 | 60,28 | 0 | 254 | 310 | 2,250 | 0,758 |
| 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 | 10 | 0 | 206 | 660 | 0,194 | 42970 | 207,29 | 0 | 866 | 320 | 25,000 | -1,480 |
| 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 | 10 | 41 | 132 | 0,039 | 1719 | 41,46 | 0 | 173 | 320 | 1,000 | -0,296 |
| zebra | Equus spp, | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| all elephants | Loxodonta africana all | 15 | 47 | 309 | 480 | 0,290 | 22719 | 150,73 | 0 | 789 | 155 | 14,917 | 2,612 |
| 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 | 7 | 4 | 144 | 205 | 0,136 | 4131 | 64,27 | 0 | 349 | 142 | 2,917 | 1,794 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 7 | 4 | 144 | 205 | 0,136 | 4131 | 64,27 | 0 | 349 | 142 | 2,917 | 1,794 |

# NXN – Nxai Pan North

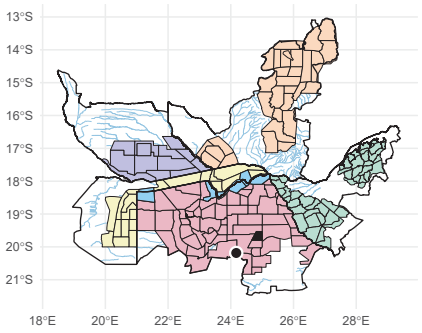
# BOTSWANA – NORTHERN BOTSWANA

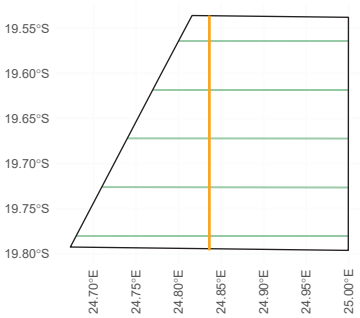
## SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NXN
STRATUM NAME: Nxai Pan North
■ STRATUM AREA: 765.55 sqkm
• SURVEY BASE: Matopi
DISTANCE TO SURVEY BASE: 90 km

– TRANSECTS: 5 (136 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 5.3 %

– BASELINE DISTANCE: 28.79 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.2 h
Crew(s): C03
KES2022_V5WOT20220916A 06:22–10:35

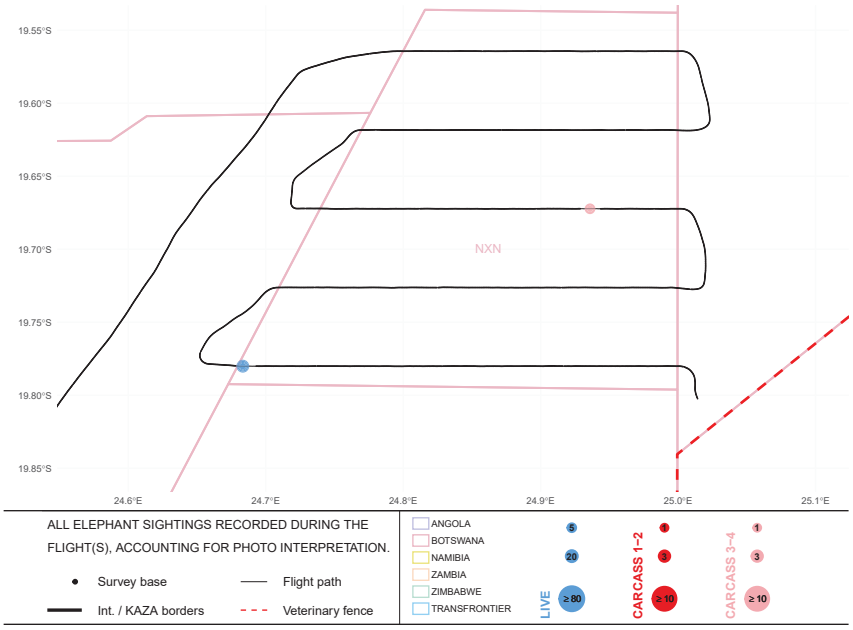
Actual sampling intensity: 5.5 %
Transect flying time: 0.8 h
Transects: 5 – 136 km – 90°
Search effort: 1.14 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C03 | |
| Side: | L | R |
| % sightings: | 57 | 43 |
| % individuals: | 32 | 68 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 3 | 33.33 | 0 |
| Live elephant (>9): | 0 | | |
| Elephant carcass: | 1 | 0 | |
| Live elephant (<10): | 1 | 100 | 0 |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **9 (1)** |
| Bulls: | 9 (1) |
| Family: | 0 (0) |
| **NOT IN SAMPLE:** | **12 (2)** |
| Outside search strip: | 12 |
| 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: | 4 |
| Other wildlife count: | 11 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 2.776, N = 92, w = 310

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 164 | 164 | 18 | 18 |
| Variance of estimate | $Var\hat{Y}$ | 23657 | 23657 | 330 | 330 |
| Standard error | $SE\hat{Y}$ | 154 | 154 | 18 | 18 |
| 95% confidence interval | $CI_{\hat{Y}}^{95\%}$ | ± 427 | ± 427 | ± 50 | ± 50 |
| Percentage of relative precision | $PRP_{\hat{Y}}$ | 261 % | 261 % | 278 % | 278 % |
| Density per sqkm | $R_{\hat{Y}}$ | 0.214 | 0.214 | 0.024 | 0.024 |
| Variance between transect counts | $s_y^2$ | 16.2 | 16.2 | 0.2 | 0.2 |
| Variance between transect areas | $s_a^2$ | 2.426 | 2.426 | 2.426 | 2.426 |
| Covariance between counts & areas | $s_{ay}$ | 4.306 | 4.306 | −0.01 | −0.01 |

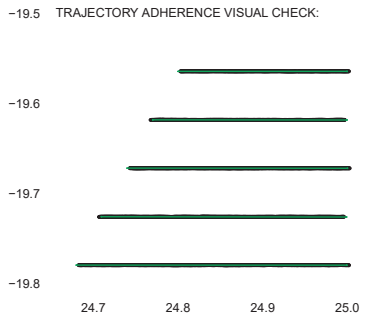
## CARCASS RATIOS

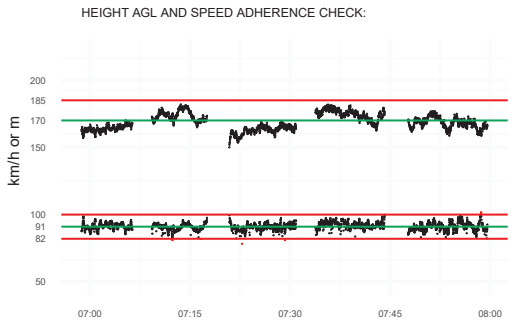
$CR_{1:4}$ = 10 %
$CR_{1:2}$ = 0 %

## NXN – Nxai Pan North — BOTSWANA – NORTHERN BOTSWANA

### ADHERENCE TO FLIGHT PARAMETERS

**KES2022_ V5WOT20220916A**



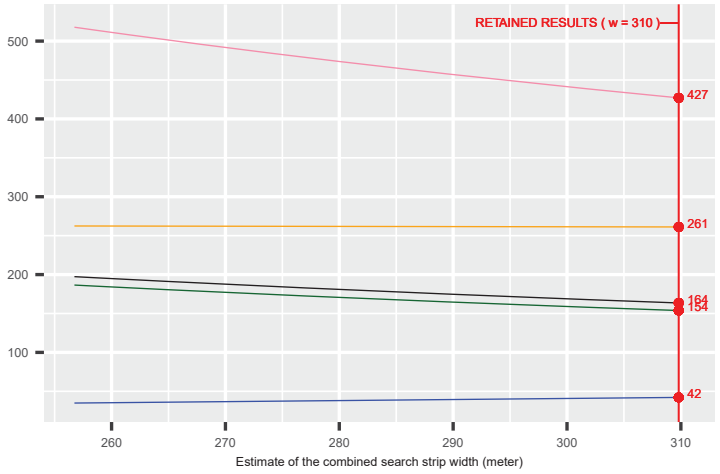

SPEED
Average: 168.6 km/h
Standard dev.: 5.9 km/h

HEIGHT AGL
Average: 91.2 m (299.1 ft)
Standard dev.: 2.8 m (9.1 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 – 155]
C03 – Right: [143 – 172]




**LIVE ELEPHANT ESTIMATE: [ 197 – 164 ]**
CONFIDENCE INTERVAL: ± [ 518 – 427 ]
SAMPLE AREA: [ 35 – 42 ] sqkm
SE: [ 187 – 154 ]
PRP: [ 262 – 261 ] %

## NXN – Nxai Pan North — BOTSWANA – NORTHERN BOTSWANA

**STRATUM CODE:** NXN **N:** 93 $S_a^2$: 2,426
**STRATUM NAME:** Nxai Pan North **w:** 310 **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 | 9 | 6 | 164 | 427 | 0,214 | 23657 | 153,81 | 0 | 591 | 261 | 16,200 | 4,306 |
| 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 | 18 | 50 | 0,024 | 330 | 18,16 | 0 | 69 | 278 | 0,200 | -0,010 |
| 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 | 7 | 12 | 127 | 286 | 0,166 | 10595 | 102,93 | 0 | 413 | 225 | 6,800 | 1,161 |
| 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 | 1 | 0 | 18 | 49 | 0,024 | 308 | 17,55 | 0 | 67 | 268 | 0,200 | 0,274 |
| oribi | Ourebia ourebi | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| oryx | Oryx gazella | 2 | 0 | 36 | 97 | 0,047 | 1232 | 35,09 | 0 | 134 | 268 | 0,800 | 0,549 |
| 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 | 9 | 12 | 164 | 427 | 0,214 | 23657 | 153,81 | 0 | 591 | 261 | 16,200 | 4,306 |
| 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 | 18 | 50 | 0,024 | 330 | 18,16 | 0 | 69 | 278 | 0,200 | -0,010 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 1 | 0 | 18 | 50 | 0,024 | 330 | 18,16 | 0 | 69 | 278 | 0,200 | -0,010 |

# NXS – Nxai Pan South

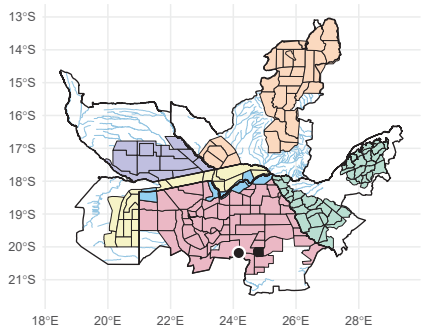
# BOTSWANA – NORTHERN BOTSWANA

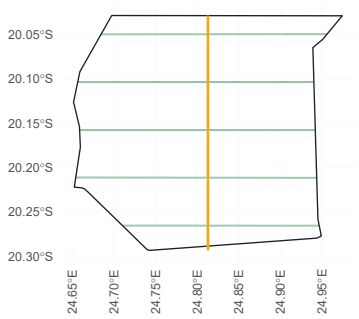
## SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NXS
STRATUM NAME: Nxai Pan South
■ STRATUM AREA: 814.15 sqkm
• SURVEY BASE: Matopi
DISTANCE TO SURVEY BASE: 66 km

– TRANSECTS: 5 (142 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 5.2 %

– BASELINE DISTANCE: 29.32 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.2 h
Crew(s): C03
KES2022_V5WOT20220916A 06:22–10:35

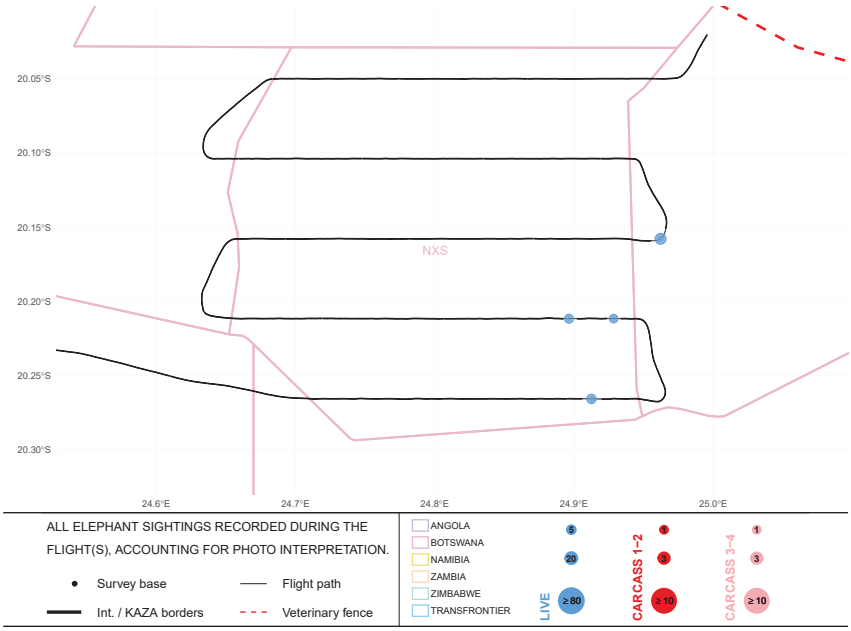
Actual sampling intensity: 5.5 %
Transect flying time: 0.8 h
Transects: 5 – 142 km – 90°
Search effort: 1.1 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C03 | |
| Side: | L | R |
| % sightings: | 50 | 50 |
| % individuals: | 58 | 42 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 3 | 33.33 | 0 |
| Live elephant (>9): | 0 | | |
| Elephant carcass: | 0 | | |
| Live elephant (<10): | 2 | 50 | 0 |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **2 (2)** |
| Bulls: | 2 (2) |
| Family: | 0 (0) |
| **NOT IN SAMPLE:** | **19 (3)** |
| Outside search strip: | 7 |
| Off transect: | 12 |



## 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: | 5 |
| Other wildlife count: | 10 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 2.776, N = 93, w = 315

| | | LIVE OBS | LIVE FINAL | ALL CARCASSES OBS | ALL CARCASSES FINAL |
|---|---|---|---|---|---|
| Population estimate | $\hat{Y}$ | 36 | 36 | – | – |
| Variance of estimate | $\mathrm{Var}\hat{Y}$ | 508 | 508 | – | – |
| Standard error | $\mathrm{SE}\hat{Y}$ | 23 | 23 | – | – |
| 95% confidence interval | $\mathrm{CI}_{\hat{Y}}^{95\%}$ | ± 63 | ± 63 | – | – |
| Percentage of relative precision | $\mathrm{PRP}_{\hat{Y}}$ | 172 % | 172 % | – | – |
| Density per sqkm | $R_{\hat{Y}}$ | 0.045 | 0.045 | – | – |
| Variance between transect counts | $s_y^2$ | 0.3 | 0.3 | – | – |
| Variance between transect areas | $s_a^2$ | 0.499 | 0.499 | – | – |
| Covariance between counts & areas | $s_{ay}$ | −0.091 | −0.091 | – | – |

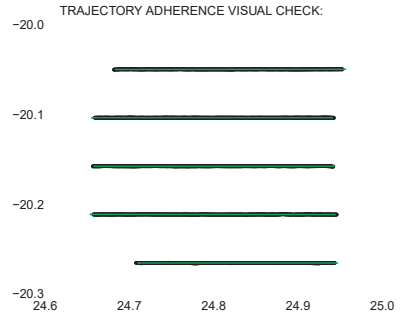
## CARCASS RATIOS

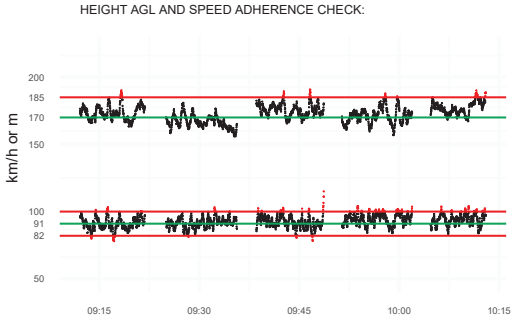
$CR_{1:4} = 0$ %
$CR_{1:2} = 0$ %

## NXS – Nxai Pan South — BOTSWANA – NORTHERN BOTSWANA

### ADHERENCE TO FLIGHT PARAMETERS

**KES2022_ V5WOT20220916A**



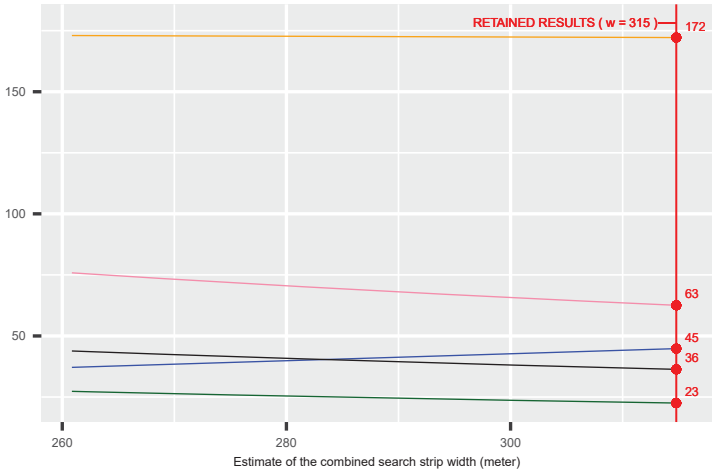

SPEED
Average: 172.6 km/h
Standard dev.: 6.2 km/h

HEIGHT AGL
Average: 92.6 m (303.9 ft)
Standard dev.: 4.6 m (14.9 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: [ 44 – 36 ]**
CONFIDENCE INTERVAL: ± [ 76 – 63 ]
SAMPLE AREA: [ 37 – 45 ] sqkm
SE: [ 27 – 23 ]
PRP: [ 173 – 172 ] %

## NXS – Nxai Pan South — BOTSWANA – NORTHERN BOTSWANA

**STRATUM CODE:** NXS **N:** 93 $S_a^2$: 0,499
**STRATUM NAME:** Nxai Pan South **w:** 315 **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 | 2 | 1 | 36 | 60 | 0,045 | 475 | 21,78 | 0 | 97 | 166 | 0,300 | 0,135 |
| 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 | 7 | 36 | 63 | 0,045 | 508 | 22,53 | 0 | 99 | 172 | 0,300 | -0,091 |
| elephant family | Loxodonta africana family | 0 | 12 | 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 | 2 | 0 | 36 | 101 | 0,045 | 1331 | 36,48 | 0 | 138 | 279 | 0,800 | -0,103 |
| 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 | 54 | 150 | 0,067 | 2914 | 53,98 | 0 | 204 | 275 | 1,800 | 0,208 |
| oribi | Ourebia ourebi | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| oryx | Oryx gazella | 0 | 3 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| ostrich | Struthio camelus | 3 | 3 | 54 | 102 | 0,067 | 1348 | 36,72 | 0 | 156 | 187 | 0,800 | -0,139 |
| 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 | 2 | 19 | 36 | 63 | 0,045 | 508 | 22,53 | 0 | 99 | 172 | 0,300 | -0,091 |
| 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 |

# PAND – Pandamatenga Farms

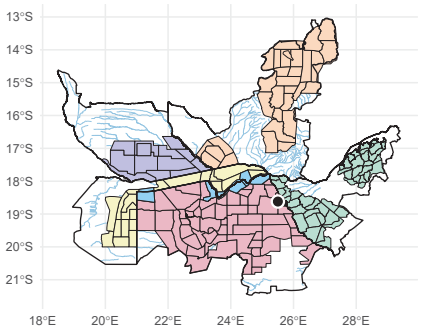
# BOTSWANA – NORTHERN BOTSWANA

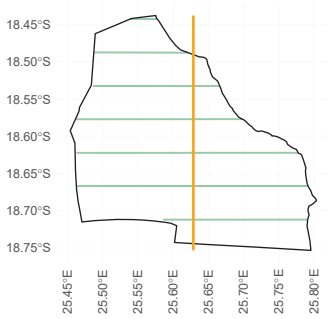
## SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: PAND
STRATUM NAME: Pandamatenga Farms
■ STRATUM AREA: 820.24 sqkm
• SURVEY BASE: Pandamatenga
DISTANCE TO SURVEY BASE: 10 km

– TRANSECTS: 7 (154 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 5.6 %

– BASELINE DISTANCE: 34.96 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 1.6 h
Crew(s): C03
KES2022_V5WOT20220910B 16:30–18:05

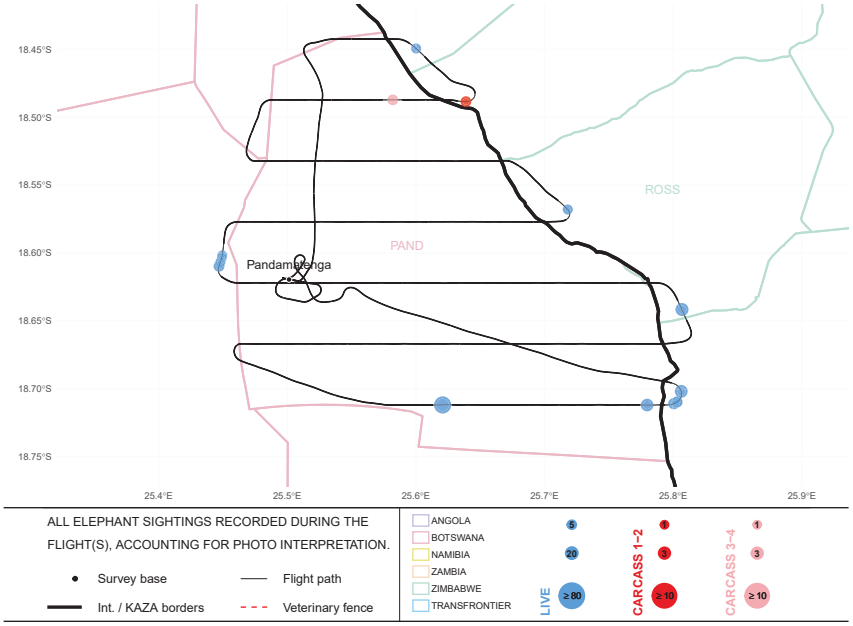
Actual sampling intensity: 5.7 %
Transect flying time: 0.9 h
Transects: 7 – 154 km – 90°
Search effort: 1.13 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C03 | |
| Side: | L | R |
| % sightings: | 20 | 80 |
| % individuals: | 15 | 85 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 5 | 20 | 0 |
| Live elephant (>9): | 2 | 0 | |
| Elephant carcass: | 1 | 100 | 0 |
| Live elephant (<10): | 0 | | |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **49 (2)** |
| Bulls: | 0 (0) |
| Family: | 49 (2) |
| **NOT IN SAMPLE:** | **66 (11)** |
| Outside search strip: | 0 |
| Off transect: | 66 |



## 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: | 0 |
| Off transect: | 1 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 5 |
| Other wildlife count: | 93 |
| Domestic count: | 25 |

## ELEPHANT DATA ANALYSIS

t = 2.447, N = 114, w = 306

| | | LIVE OBS | LIVE FINAL | ALL CARCASSES OBS | ALL CARCASSES FINAL |
|---|---|---|---|---|---|
| Population estimate | $\hat{Y}$ | 855 | 855 | 17 | 17 |
| Variance of estimate | $\mathrm{Var}\hat{Y}$ | 619153 | 619153 | 291 | 291 |
| Standard error | $\mathrm{SE}\hat{Y}$ | 787 | 787 | 17 | 17 |
| 95% confidence interval | $\mathrm{CI}_{\hat{Y}}^{95\%}$ | ± 1925 | ± 1925 | ± 42 | ± 42 |
| Percentage of relative precision | $\mathrm{PRP}_{\hat{Y}}$ | 225 % | 225 % | 239 % | 239 % |
| Density per sqkm | $R_{\hat{Y}}$ | 1.043 | 1.043 | 0.021 | 0.021 |
| Variance between transect counts | $s_y^2$ | 343 | 343 | 0.143 | 0.143 |
| Variance between transect areas | $s_a^2$ | 11.342 | 11.342 | 11.342 | 11.342 |
| Covariance between counts & areas | $s_{ay}$ | 0.684 | 0.684 | −0.432 | −0.432 |

## CARCASS RATIOS

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

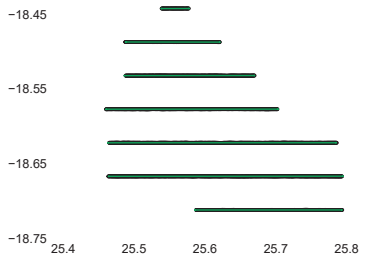
## PAND – Pandamatenga Farms

## BOTSWANA – NORTHERN BOTSWANA

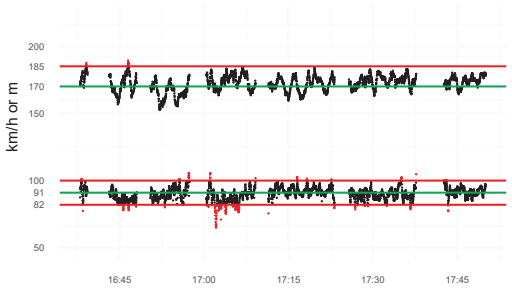
### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5WOT20220910B

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



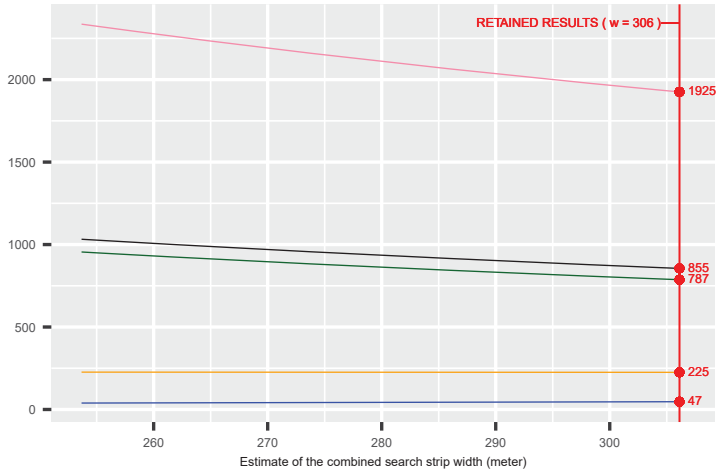

SPEED
Average: 172.2 km/h
Standard dev.: 6 km/h

HEIGHT AGL
Average: 90.1 m (295.6 ft)
Standard dev.: 4.8 m (15.7 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: [101 – 153]
C03 – Right: [141 – 169]




**LIVE ELEPHANT ESTIMATE: [ 1032 – 855 ]**
CONFIDENCE INTERVAL: ± [ 2336 – 1925 ]
SAMPLE AREA: [ 39 – 47 ] sqkm
SE: [ 955 – 787 ]
PRP: [ 226 – 225 ] %

## PAND – Pandamatenga Farms BOTSWANA – NORTHERN BOTSWANA

**STRATUM CODE:** PAND **N:** 114 $S_a^2$: 11,342
**STRATUM NAME:** Pandamatenga Farms **w:** 306 **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 | 0 | 5 | 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 | 0,021 | 258 | 16,06 | 0 | 57 | 225 | 0,143 | 0,014 |
| 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 | 8 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| elephant family | Loxodonta africana family | 49 | 58 | 855 | 1925 | 1,043 | 619153 | 786,86 | 0 | 2781 | 225 | 343,000 | 0,684 |
| 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 | 1 | 0 | 17 | 42 | 0,021 | 291 | 17,06 | 0 | 59 | 239 | 0,143 | -0,432 |
| 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 | 3 | 0 | 52 | 116 | 0,064 | 2233 | 47,26 | 0 | 168 | 221 | 1,286 | 0,434 |
| 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 | 35 | 71 | 0,043 | 840 | 28,99 | 0 | 106 | 203 | 0,571 | 1,312 |
| 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 | 9 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| shoat | Capra hircus - Ovis aries | 25 | 0 | 436 | 887 | 0,532 | 131286 | 362,33 | 0 | 1323 | 203 | 89,286 | 16,403 |
| 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 | 5 | 0 | 87 | 132 | 0,106 | 2931 | 54,14 | 0 | 220 | 152 | 2,238 | 3,249 |
| 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, | 82 | 39 | 1431 | 2912 | 1,745 | 1416415 | 1190,13 | 0 | 4343 | 203 | 960,571 | 53,149 |
| all elephants | Loxodonta africana all | 49 | 66 | 855 | 1925 | 1,043 | 619153 | 786,86 | 0 | 2781 | 225 | 343,000 | 0,684 |
| 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 | 1 | 1 | 17 | 42 | 0,021 | 291 | 17,06 | 0 | 59 | 239 | 0,143 | -0,432 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 1 | 0 | 17 | 42 | 0,021 | 291 | 17,06 | 0 | 59 | 239 | 0,143 | -0,432 |

# SAVE – Savuti East

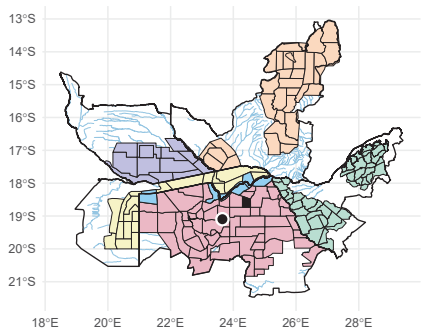
# BOTSWANA – NORTHERN BOTSWANA

## SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: SAVE
STRATUM NAME: Savuti East
■ STRATUM AREA: 834.14 sqkm
• SURVEY BASE: Khwai
DISTANCE TO SURVEY BASE: 97 km

– TRANSECTS: 5 (160 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 5.8 %

– BASELINE DISTANCE: 26.5 km







## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.4 h
Crew(s): C01
KES2022_V5IIM20220930A 06:42–11:05

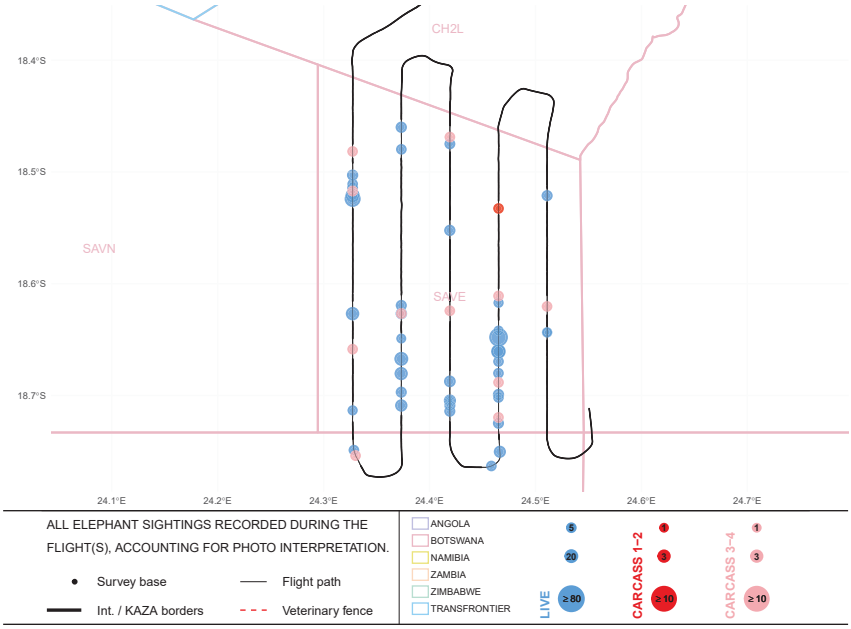
Actual sampling intensity: 6.1 %
Transect flying time: 1 h
Transects: 5 – 160 km – 0°
Search effort: 1.13 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C01 | |
| Side: | L | R |
| % sightings: | 54 | 46 |
| % individuals: | 57 | 43 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 47 | 23.4 | 0 |
| Live elephant (>9): | 3 | 66.67 | 0 |
| Elephant carcass: | 11 | 27.27 | 0 |
| Live elephant (<10): | 14 | 42.86 | 0 |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **113 (17)** |
| Bulls: | 8 (3) |
| Family: | 105 (14) |
| **NOT IN SAMPLE:** | **332 (35)** |
| Outside search strip: | 253 |
| Off transect: | 79 |



## ELEPHANT CARCASSES

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

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 10 |
| Other wildlife count: | 30 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 2.776, N = 83, w = 318

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 1848 | 1848 | 180 | 180 |
| Variance of estimate | $Var\hat{Y}$ | 384295 | 384295 | 2182 | 2182 |
| Standard error | $SE\hat{Y}$ | 620 | 620 | 47 | 47 |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 1721 | ± 1721 | ± 130 | ± 130 |
| Percentage of relative precision | $PRP\hat{Y}$ | 93 % | 93 % | 72 % | 72 % |
| Density per sqkm | $R\hat{Y}$ | 2.216 | 2.216 | 0.216 | 0.216 |
| Variance between transect counts | $s^2_y$ | 280.8 | 280.8 | 1.7 | 1.7 |
| Variance between transect areas | $s^2_a$ | 0.991 | 0.991 | 0.991 | 0.991 |
| Covariance between counts & areas | $s_{ay}$ | −2.003 | −2.003 | 0.17 | 0.17 |

## CARCASS RATIOS

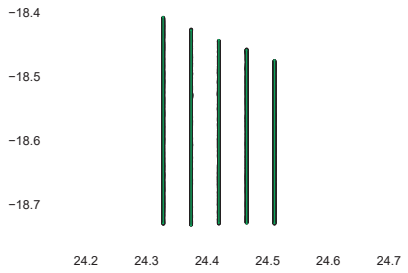
$CR_{1:4} = 8.9\ \%$
$CR_{1:2} = 0.9\ \%$

## SAVE – Savuti East — BOTSWANA – NORTHERN BOTSWANA

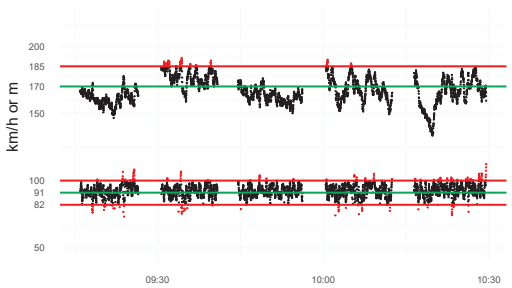
### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5IIM20220930A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



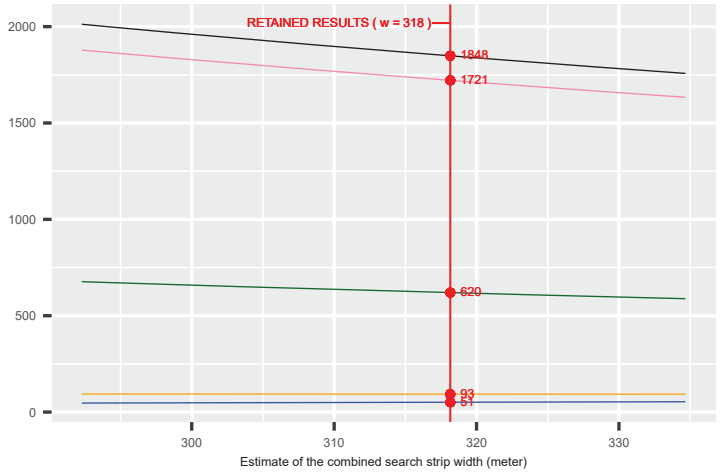

SPEED
Average: 166.7 km/h
Standard dev.: 9.6 km/h

HEIGHT AGL
Average: 92.3 m (302.9 ft)
Standard dev.: 4.7 m (15.4 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: [160 – 192]
C01 – Right: [120 – 161]




**LIVE ELEPHANT ESTIMATE: [ 2012 – 1757 ]**
CONFIDENCE INTERVAL: ± [ 1878 – 1634 ]
SAMPLE AREA: [ 47 – 54 ] sqkm
SE: [ 677 – 588 ]
PRP: [ 93 – 93 ] %

## SAVE – Savuti East — BOTSWANA – NORTHERN BOTSWANA

**STRATUM CODE:** SAVE **N:** 83 $S_a^2$: 0,991
**STRATUM NAME:** Savuti East **w:** 318 **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 | 1 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| elephant bulls | Loxodonta africana males | 8 | 37 | 131 | 268 | 0,157 | 9303 | 96,45 | 0 | 399 | 205 | 6,800 | -0,974 |
| elephant family | Loxodonta africana family | 105 | 295 | 1718 | 1462 | 2,059 | 277171 | 526,47 | 256 | 3179 | 85 | 204,000 | -1,029 |
| 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 | 16 | 46 | 0,020 | 269 | 16,42 | 0 | 62 | 279 | 0,200 | -0,157 |
| elephant carcass three | Loxodonta africana carcass three | 6 | 1 | 98 | 121 | 0,118 | 1897 | 43,55 | 0 | 219 | 123 | 1,700 | 1,104 |
| elephant carcass four | Loxodonta africana carcass four | 4 | 0 | 65 | 136 | 0,078 | 2385 | 48,84 | 0 | 201 | 207 | 1,700 | -0,776 |
| giraffe | Giraffa giraffa | 2 | 4 | 33 | 52 | 0,039 | 345 | 18,56 | 0 | 84 | 158 | 0,300 | 0,477 |
| 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 | 0 | 82 | 231 | 0,098 | 6926 | 83,22 | 0 | 313 | 282 | 5,000 | -1,523 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 1 | 0 | 16 | 46 | 0,020 | 269 | 16,42 | 0 | 62 | 279 | 0,200 | -0,157 |
| 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 | 16 | 43 | 0,020 | 245 | 15,64 | 0 | 60 | 265 | 0,200 | 0,329 |
| 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 | 1 | 0 | 16 | 44 | 0,020 | 254 | 15,93 | 0 | 61 | 270 | 0,200 | 0,149 |
| warthog | Phacochoerus africanus | 2 | 0 | 33 | 90 | 0,039 | 1049 | 32,39 | 0 | 123 | 275 | 0,800 | -0,031 |
| waterbuck | Kobus ellipsiprymnus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| wildebeest | Connochaetes taurinus | 8 | 0 | 131 | 360 | 0,157 | 16782 | 129,55 | 0 | 491 | 275 | 12,800 | -0,123 |
| zebra | Equus spp, | 8 | 0 | 131 | 360 | 0,157 | 16782 | 129,55 | 0 | 491 | 275 | 12,800 | -0,123 |
| all elephants | Loxodonta africana all | 113 | 332 | 1848 | 1721 | 2,216 | 384295 | 619,92 | 127 | 3570 | 93 | 280,800 | -2,003 |
| C1-2 elephant carcasses | Loxodonta africana carcass 1-2 | 1 | 0 | 16 | 46 | 0,020 | 269 | 16,42 | 0 | 62 | 279 | 0,200 | -0,157 |
| all elephant carcasses | Loxodonta africana carcass all | 11 | 1 | 180 | 130 | 0,216 | 2182 | 46,72 | 50 | 310 | 72 | 1,700 | 0,170 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 10 | 1 | 164 | 96 | 0,196 | 1187 | 34,45 | 68 | 259 | 58 | 1,000 | 0,327 |

# SAVM – Savuti Marsh

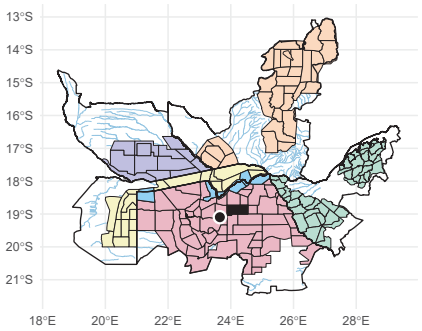
# BOTSWANA – NORTHERN BOTSWANA

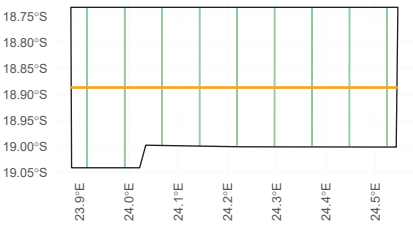
## SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: SAVM
STRATUM NAME: Savuti Marsh
■ STRATUM AREA: 2128.47 sqkm
• SURVEY BASE: Khwai
DISTANCE TO SURVEY BASE: 64 km

– TRANSECTS: 9 (277 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 3.9 %

– BASELINE DISTANCE: 69.89 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.4 h
Crew(s): C01
KES2022_V5IIM20220930A 06:42–11:05

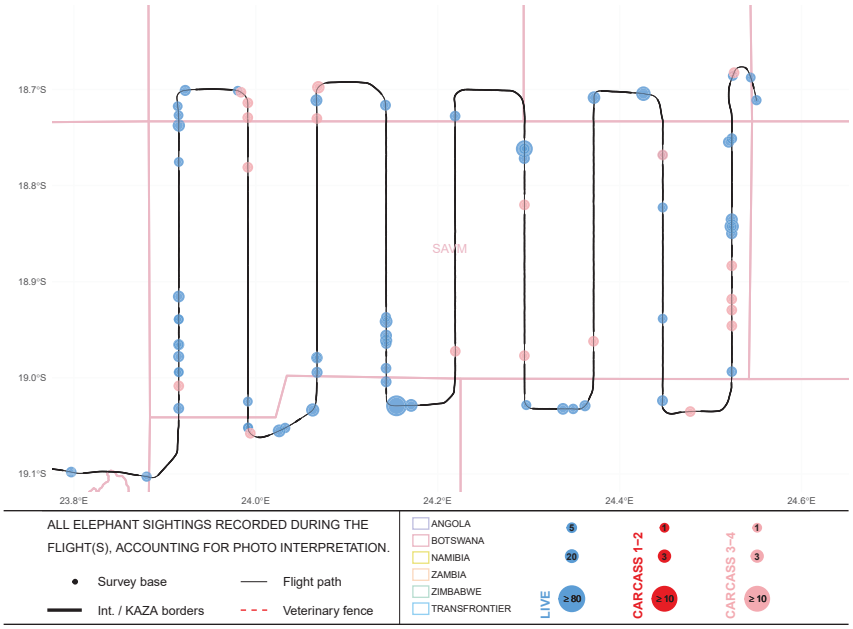
Actual sampling intensity: 4.1 %
Transect flying time: 1.6 h
Transects: 9 – 277 km – 0°
Search effort: 1.11 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C01 | |
| Side: | L | R |
| % sightings: | 44 | 56 |
| % individuals: | 47 | 53 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 48 | 45.83 | 0 |
| Live elephant (>9): | 3 | 100 | 0 |
| Elephant carcass: | 12 | 83.33 | 30 |
| Live elephant (<10): | 19 | 47.37 | 0 |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **100 (22)** |
| Bulls: | 29 (12) |
| Family: | 71 (10) |
| **NOT IN SAMPLE:** | **371 (49)** |
| Outside search strip: | 132 |
| Off transect: | 239 |



## ELEPHANT CARCASSES

| | |
|---|---|
| **IN SAMPLE:** | **12 (12)** |
| Category 1: | 0 (0) |
| Category 2: | 0 (0) |
| Category 3: | 5 (5) |
| Category 4: | 7 (7) |
| **NOT IN SAMPLE:** | **8 (7)** |
| Outside search strip: | 0 |
| Off transect: | 8 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 9 |
| Other wildlife count: | 68 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 2.306, N = 220, w = 317

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 2425 | 2425 | 291 | 291 |
| Variance of estimate | $\mathrm{Var}\hat{Y}$ | 856295 | 856295 | 6708 | 6708 |
| Standard error | $\mathrm{SE}\hat{Y}$ | 925 | 925 | 82 | 82 |
| 95% confidence interval | $\mathrm{CI}_{\hat{Y}}^{95\%}$ | ± 2134 | ± 2134 | ± 189 | ± 189 |
| Percentage of relative precision | $\mathrm{PRP}_{\hat{Y}}$ | 88 % | 88 % | 65 % | 65 % |
| Density per sqkm | $R_{\hat{Y}}$ | 1.139 | 1.139 | 0.137 | 0.137 |
| Variance between transect counts | $s_y^2$ | 168.361 | 168.361 | 1.25 | 1.25 |
| Variance between transect areas | $s_a^2$ | 0.411 | 0.411 | 0.411 | 0.411 |
| Covariance between counts & areas | $s_{ay}$ | 1.709 | 1.709 | −0.128 | −0.128 |

## CARCASS RATIOS

$CR_{1:4} = 10.7\ \%$
$CR_{1:2} = 0\ \%$

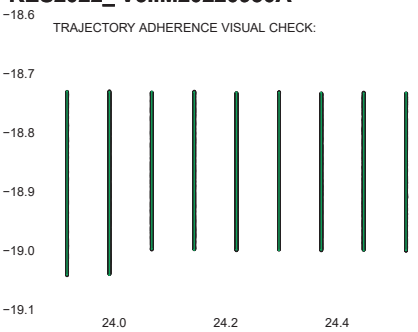
## SAVM – Savuti Marsh

## BOTSWANA – NORTHERN BOTSWANA

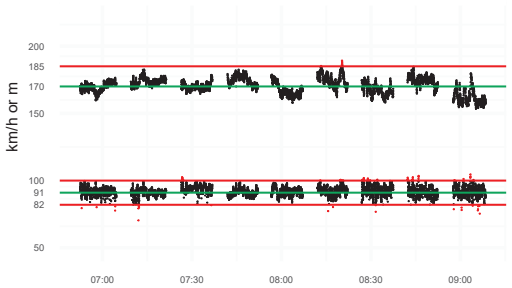
### ADHERENCE TO FLIGHT PARAMETERS

**KES2022_ V5IIM20220930A**

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



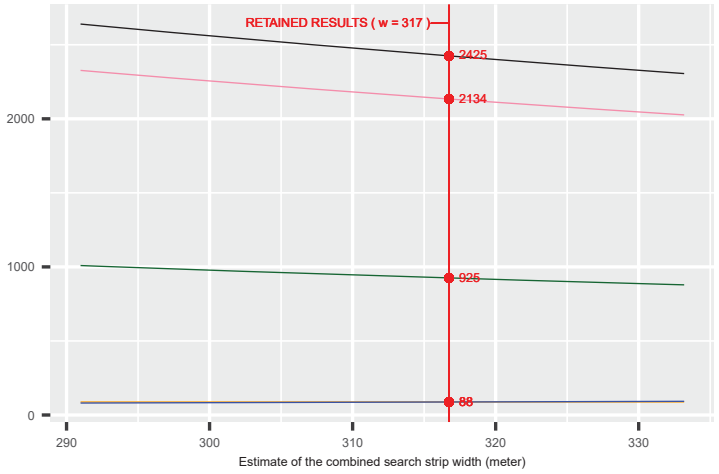

SPEED
Average: 170.3 km/h
Standard dev.: 6 km/h

HEIGHT AGL
Average: 91.9 m (301.5 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):

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




**LIVE ELEPHANT ESTIMATE: [ 2640 – 2305 ]**
CONFIDENCE INTERVAL: ± [ 2327 – 2026 ]
SAMPLE AREA: [ 81 – 92 ] sqkm
SE: [ 1009 – 879 ]
PRP: [ 88 – 88 ] %

## SAVM – Savuti Marsh — BOTSWANA – NORTHERN BOTSWANA

**STRATUM CODE:** SAVM **N:** 221 $S_a^2$: 0,411
**STRATUM NAME:** Savuti Marsh **w:** 317 **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 | 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 | 29 | 75 | 703 | 667 | 0,330 | 83544 | 289,04 | 37 | 1370 | 95 | 16,194 | 0,214 |
| elephant family | Loxodonta africana family | 71 | 296 | 1722 | 1580 | 0,809 | 469460 | 685,17 | 142 | 3302 | 92 | 92,611 | 1,496 |
| 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 | 5 | 121 | 169 | 0,057 | 5355 | 73,18 | 0 | 290 | 139 | 1,028 | -0,024 |
| elephant carcass four | Loxodonta africana carcass four | 7 | 3 | 170 | 113 | 0,080 | 2406 | 49,05 | 57 | 283 | 67 | 0,444 | -0,104 |
| giraffe | Giraffa giraffa | 4 | 1 | 97 | 164 | 0,046 | 5065 | 71,17 | 0 | 261 | 169 | 1,028 | 0,579 |
| 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 | 45 | 0 | 1091 | 1717 | 0,513 | 554148 | 744,41 | 0 | 2808 | 157 | 104,500 | -2,117 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 1 | 0 | 24 | 55 | 0,011 | 578 | 24,05 | 0 | 80 | 229 | 0,111 | -0,013 |
| oribi | Ourebia ourebi | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| oryx | Oryx gazella | 0 | 1 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| ostrich | Struthio camelus | 3 | 1 | 73 | 167 | 0,034 | 5239 | 72,38 | 0 | 240 | 229 | 1,000 | -0,133 |
| 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 | 7 | 1 | 170 | 203 | 0,080 | 7770 | 88,15 | 0 | 373 | 120 | 1,444 | -0,315 |
| warthog | Phacochoerus africanus | 3 | 2 | 73 | 116 | 0,034 | 2523 | 50,23 | 0 | 189 | 159 | 0,500 | 0,209 |
| waterbuck | Kobus ellipsiprymnus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| wildebeest | Connochaetes taurinus | 1 | 0 | 24 | 56 | 0,011 | 582 | 24,13 | 0 | 80 | 229 | 0,111 | -0,044 |
| zebra | Equus spp, | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| all elephants | Loxodonta africana all | 100 | 371 | 2425 | 2134 | 1,139 | 856295 | 925,36 | 291 | 4559 | 88 | 168,361 | 1,709 |
| 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 | 12 | 8 | 291 | 189 | 0,137 | 6708 | 81,90 | 102 | 480 | 65 | 1,250 | -0,128 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 12 | 8 | 291 | 189 | 0,137 | 6708 | 81,90 | 102 | 480 | 65 | 1,250 | -0,128 |

## SAVN – Savuti North

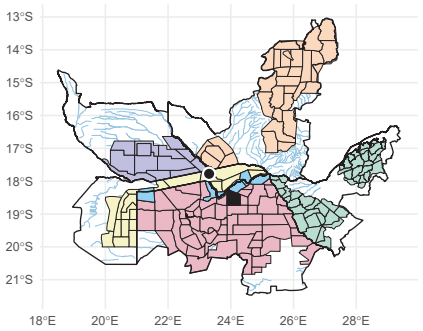
## BOTSWANA – NORTHERN BOTSWANA

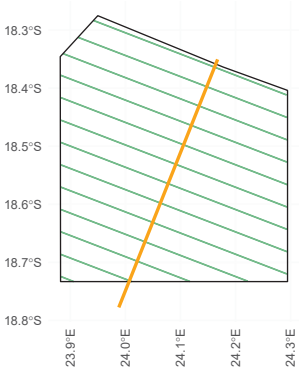
### SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: SAVN
STRATUM NAME: Savuti North
■ STRATUM AREA: 1914.03 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 120 km

– TRANSECTS: 13 (489 km)
TRANSECT ORIENTATION: 112.8°
PLANNED SAMPLING INTENSITY: 7.7 %

– BASELINE DISTANCE: 50.93 km




### SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.5 h
Crew(s): C04
KES2022_V5WOT20221004A 06:31–11:01

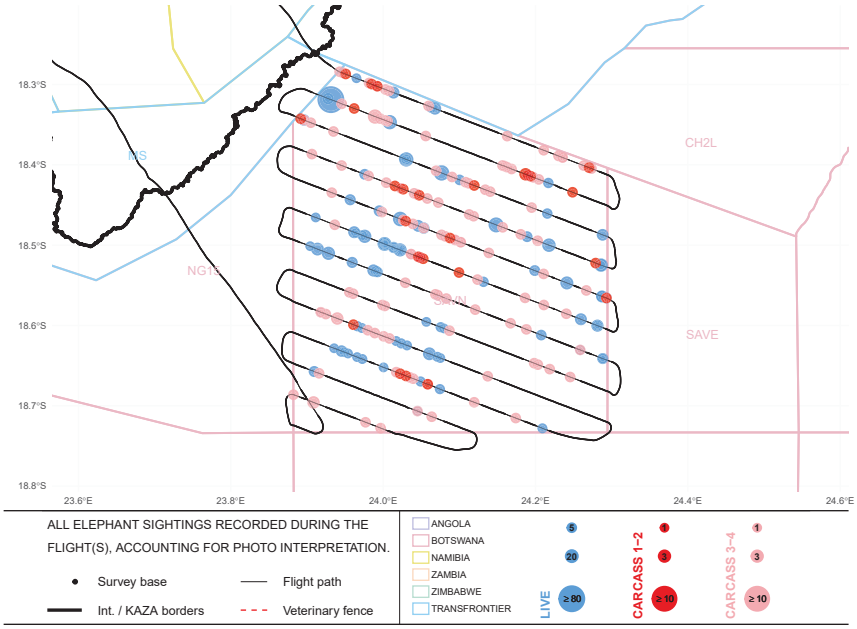
Actual sampling intensity: 7.9 %
Transect flying time: 2.8 h
Transects: 13 – 489 km – 112.8°
Search effort: 1.12 min/sqkm

### OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C04 | |
| Side: | L | R |
| % sightings: | 35 | 65 |
| % individuals: | 26 | 74 |

### PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 233 | 41.2 | 8.33 |
| Live elephant (>9): | 19 | 68.42 | 30.77 |
| Elephant carcass: | 115 | 59.13 | 47.06 |
| Live elephant (<10): | 42 | 40.48 | 17.65 |






### LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **450 (60)** |
| Bulls: | 34 (21) |
| Family: | 416 (39) |
| **NOT IN SAMPLE:** | **313 (31)** |
| Outside search strip: | 313 |
| Off transect: | 0 |



### ELEPHANT CARCASSES

| | |
|---|---|
| **IN SAMPLE:** | **117 (115)** |
| Category 1: | 3 (3) |
| Category 2: | 18 (17) |
| Category 3: | 47 (46) |
| Category 4: | 49 (49) |
| **NOT IN SAMPLE:** | **28 (25)** |
| Outside search strip: | 28 |
| Off transect: | 0 |

### OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 14 |
| Other wildlife count: | 482 |
| Domestic count: | 0 |

### ELEPHANT DATA ANALYSIS

t = 2.179, N = 165, w = 309

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 5476 | 5705 | 1420 | 1483 |
| Variance of estimate | $Var\hat{Y}$ | 2513659 | 2494954 | 19640 | 19552 |
| Standard error | $SE\hat{Y}$ | 1585 | 1580 | 140 | 140 |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 3454 | ± 3442 | ± 305 | ± 305 |
| Percentage of relative precision | $PRP\hat{Y}$ | 63 % | 60 % | 22 % | 21 % |
| Density per sqkm | $R\hat{Y}$ | 2.861 | 2.98 | 0.742 | 0.775 |
| Variance between transect counts | $s^2_y$ | 1605.192 | 1617.09 | 25.256 | 25.5 |
| Variance between transect areas | $s^2_a$ | 19.455 | 19.455 | 19.455 | 19.455 |
| Covariance between counts & areas | $s_{ay}$ | 80.858 | 83.518 | 17.384 | 17.458 |

### CARCASS RATIOS

$CR_{1:4} = 20.6\ \%$
$CR_{1:2} = 4.5\ \%$

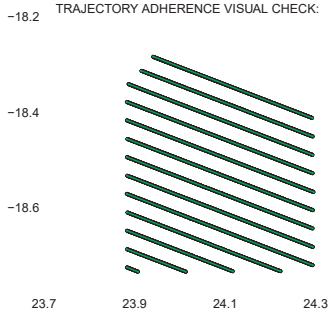
## SAVN – Savuti North

## BOTSWANA – NORTHERN BOTSWANA

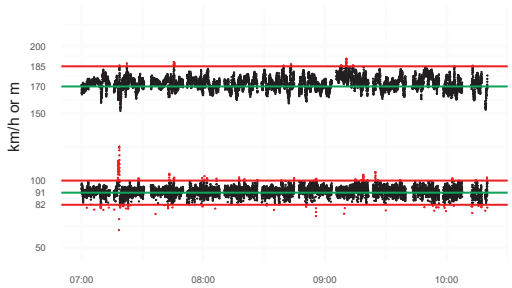
### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5WOT20221004A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:




SPEED
Average: 172.4 km/h
Standard dev.: 4.7 km/h

HEIGHT AGL
Average: 91.9 m (301.6 ft)
Standard dev.: 3.8 m (12.5 ft)

## SAVN – Savuti North — BOTSWANA – NORTHERN BOTSWANA

**STRATUM CODE:** SAVN **N:** 165 $S_a^2$: 19,455
**STRATUM NAME:** Savuti North **w:** 309 **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 | 61 | 17 | 773 | 1412 | 0,404 | 419696 | 647,84 | 0 | 2185 | 183 | 220,731 | 8,116 |
| 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 | 134 | 10 | 1699 | 2731 | 0,888 | 1570692 | 1253,27 | 0 | 4429 | 161 | 845,231 | 26,556 |
| elephant bulls | Loxodonta africana males | 34 | 16 | 431 | 419 | 0,225 | 36925 | 192,16 | 12 | 850 | 97 | 19,756 | 3,598 |
| elephant family | Loxodonta africana family | 416 | 297 | 5274 | 3504 | 2,755 | 2585818 | 1608,05 | 1770 | 8777 | 66 | 1631,833 | 79,920 |
| elephant carcass one | Loxodonta africana carcass one | 3 | 0 | 38 | 56 | 0,020 | 664 | 25,77 | 0 | 94 | 148 | 0,359 | 0,569 |
| elephant carcass two | Loxodonta africana carcass two | 18 | 6 | 228 | 117 | 0,119 | 2881 | 53,67 | 111 | 345 | 51 | 1,923 | 2,968 |
| elephant carcass three | Loxodonta africana carcass three | 47 | 12 | 596 | 144 | 0,311 | 4345 | 65,92 | 452 | 739 | 24 | 5,590 | 8,392 |
| elephant carcass four | Loxodonta africana carcass four | 49 | 10 | 621 | 199 | 0,325 | 8341 | 91,33 | 422 | 820 | 32 | 5,859 | 5,529 |
| giraffe | Giraffa giraffa | 26 | 2 | 330 | 268 | 0,172 | 15088 | 122,83 | 62 | 597 | 81 | 8,333 | 3,184 |
| 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 | 55 | 1 | 697 | 669 | 0,364 | 94283 | 307,06 | 28 | 1366 | 96 | 44,692 | -2,131 |
| 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 | 13 | 26 | 0,007 | 145 | 12,02 | 0 | 39 | 207 | 0,077 | 0,222 |
| ostrich | Struthio camelus | 9 | 2 | 114 | 107 | 0,060 | 2391 | 48,90 | 8 | 221 | 93 | 1,397 | 1,914 |
| 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 | 25 | 52 | 0,013 | 579 | 24,06 | 0 | 78 | 207 | 0,308 | 0,424 |
| sable | Hippotragus niger | 20 | 1 | 254 | 419 | 0,132 | 37065 | 192,52 | 0 | 673 | 165 | 19,269 | 1,570 |
| 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 | 14 | 0 | 177 | 230 | 0,093 | 11120 | 105,45 | 0 | 407 | 129 | 6,077 | 2,618 |
| waterbuck | Kobus ellipsiprymnus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| wildebeest | Connochaetes taurinus | 58 | 70 | 735 | 1148 | 0,384 | 277578 | 526,86 | 0 | 1883 | 156 | 144,269 | 4,413 |
| zebra | Equus spp, | 46 | 26 | 583 | 593 | 0,305 | 74145 | 272,30 | 0 | 1176 | 102 | 42,436 | 9,591 |
| all elephants | Loxodonta africana all | 450 | 313 | 5705 | 3442 | 2,980 | 2494954 | 1579,54 | 2263 | 9146 | 60 | 1617,090 | 83,518 |
| C1-2 elephant carcasses | Loxodonta africana carcass 1-2 | 21 | 6 | 266 | 129 | 0,139 | 3506 | 59,21 | 137 | 395 | 48 | 2,423 | 3,537 |
| all elephant carcasses | Loxodonta africana carcass all | 117 | 28 | 1483 | 305 | 0,775 | 19552 | 139,83 | 1179 | 1788 | 21 | 25,500 | 17,458 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 96 | 22 | 1217 | 239 | 0,636 | 12074 | 109,88 | 978 | 1456 | 20 | 16,090 | 13,921 |

# SK – Seh&kwe

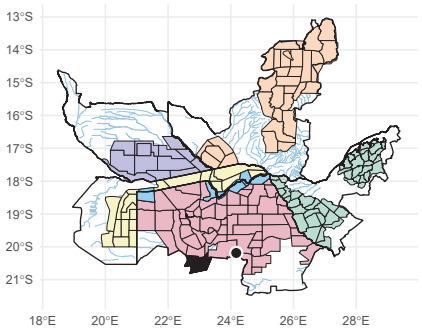
# BOTSWANA – NORTHERN BOTSWANA

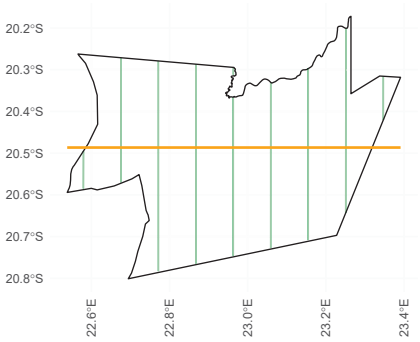
## SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: SK
STRATUM NAME: Seh&kwe
■ STRATUM AREA: 3469.73 sqkm
• SURVEY BASE: Matopi
DISTANCE TO SURVEY BASE: 133 km

– TRANSECTS: 9 (352 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 3 %

– BASELINE DISTANCE: 89.01 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4 h
Crew(s): C02
KES2022_V5LJB20220918A 06:00–10:03

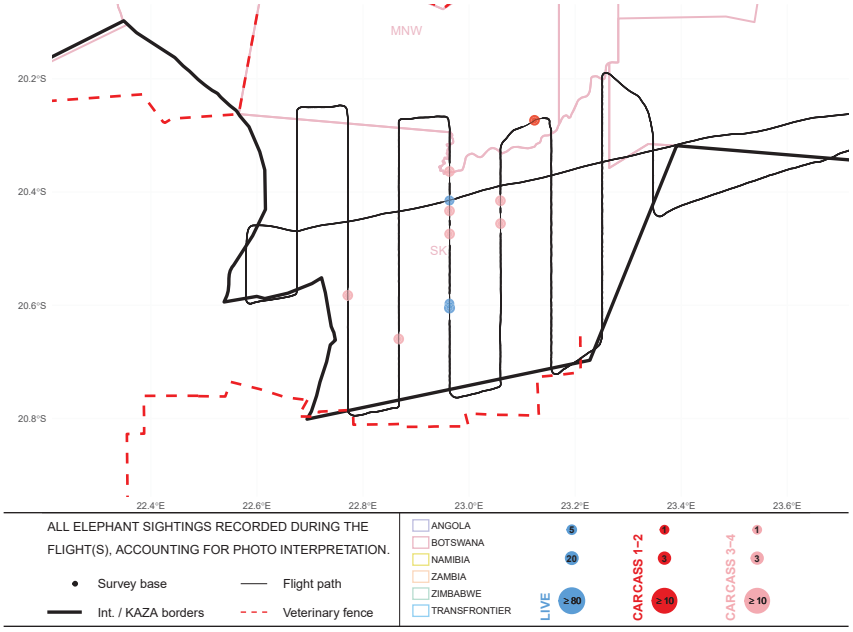
Actual sampling intensity: 3.2 %
Transect flying time: 2 h
Transects: 9 – 352 km – 0°
Search effort: 1.08 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C02 | |
| Side: | L | R |
| % sightings: | 50 | 50 |
| % individuals: | 53 | 47 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 29 | 65.52 | 36.84 |
| Live elephant (>9): | 0 | | |
| Elephant carcass: | 6 | 33.33 | 0 |
| Live elephant (<10): | 1 | 100 | 0 |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **2 (1)** |
| Bulls: | 2 (1) |
| Family: | 0 (0) |
| **NOT IN SAMPLE:** | **29 (8)** |
| Outside search strip: | 8 |
| Off transect: | 21 |



## ELEPHANT CARCASSES

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

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 7 |
| Other wildlife count: | 66 |
| Domestic count: | 823 |

## ELEPHANT DATA ANALYSIS

t = 2.306, N = 277, w = 320

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 62 | 62 | 185 | 185 |
| Variance of estimate | $Var\hat{Y}$ | 3599 | 3599 | 9336 | 9336 |
| Standard error | $SE\hat{Y}$ | 60 | 60 | 97 | 97 |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 138 | ± 138 | ± 223 | ± 223 |
| Percentage of relative precision | $PRP_{\hat{Y}}$ | 225 % | 225 % | 121 % | 121 % |
| Density per sqkm | $R_{\hat{Y}}$ | 0.018 | 0.018 | 0.053 | 0.053 |
| Variance between transect counts | $s^2_y$ | 0.444 | 0.444 | 1.25 | 1.25 |
| Variance between transect areas | $s^2_a$ | 29.974 | 29.974 | 29.974 | 29.974 |
| Covariance between counts & areas | $s_{ay}$ | 0.569 | 0.569 | 1.972 | 1.972 |

## CARCASS RATIOS

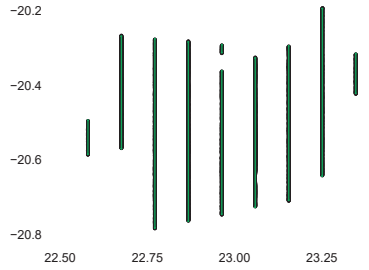
$CR_{1:4} = 75$ %
$CR_{1:2} = 0$ %

## SK – Seh&kwe — BOTSWANA – NORTHERN BOTSWANA

### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5LJB20220918A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



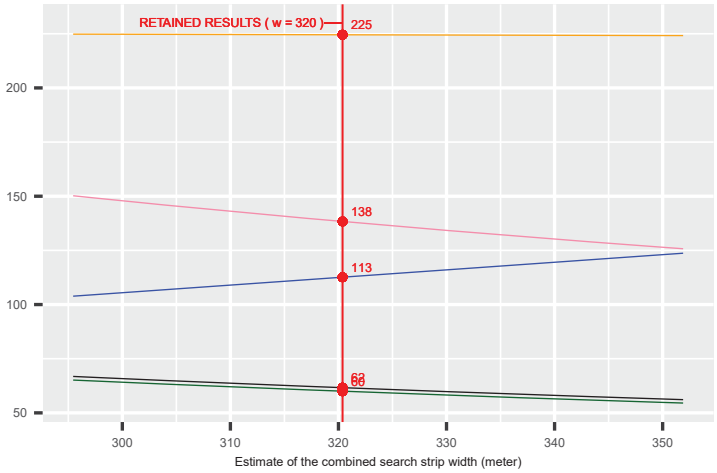

SPEED
Average: 173.2 km/h
Standard dev.: 5.3 km/h

HEIGHT AGL
Average: 92.7 m (304.1 ft)
Standard dev.: 4.3 m (14.2 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]




**LIVE ELEPHANT ESTIMATE: [ 67 – 56 ]**
CONFIDENCE INTERVAL: ± [ 150 – 126 ]
SAMPLE AREA: [ 104 – 124 ] sqkm
SE: [ 65 – 55 ]
PRP: [ 225 – 224 ] %

## SK – Seh&kwe — BOTSWANA – NORTHERN BOTSWANA

**STRATUM CODE:** SK **N:** 278 $S_a^2$: 29,974
**STRATUM NAME:** She&kwe **w:** 320 **df:** 8

| | 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 | 538 | 99 | 16575 | 11308 | 4,777 | 24047147 | 4903,79 | 5267 | 27883 | 68 | 4311,944 | 219,626 |
| donkey | Equus asinus | 7 | 7 | 216 | 254 | 0,062 | 12091 | 109,96 | 0 | 469 | 118 | 0,944 | -3,191 |
| duiker | Sylvicapra grimmia | 5 | 0 | 154 | 142 | 0,044 | 3786 | 61,53 | 12 | 296 | 92 | 0,528 | 1,471 |
| 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 | 20 | 62 | 138 | 0,018 | 3599 | 59,99 | 0 | 200 | 225 | 0,444 | 0,569 |
| elephant family | Loxodonta africana family | 0 | 9 | 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 | 3 | 0 | 92 | 96 | 0,027 | 1719 | 41,46 | 0 | 188 | 103 | 0,250 | 1,203 |
| elephant carcass four | Loxodonta africana carcass four | 3 | 2 | 92 | 146 | 0,027 | 3986 | 63,13 | 0 | 238 | 158 | 0,500 | 0,769 |
| 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 | 47 | 18 | 1448 | 1417 | 0,417 | 377478 | 614,39 | 31 | 2865 | 98 | 55,194 | 17,887 |
| 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 | 30 | 4 | 924 | 862 | 0,266 | 139619 | 373,66 | 63 | 1786 | 93 | 17,500 | 5,261 |
| 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 | 3 | 401 | 434 | 0,115 | 35447 | 188,27 | 0 | 835 | 108 | 4,528 | 2,841 |
| 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 | 231 | 0 | 7117 | 5596 | 2,051 | 5889172 | 2426,76 | 1521 | 12713 | 79 | 1070,750 | 118,770 |
| 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 | 62 | 139 | 0,018 | 3649 | 60,41 | 0 | 201 | 226 | 0,444 | 0,400 |
| 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 | 15 | 154 | 348 | 0,044 | 22806 | 151,02 | 0 | 502 | 226 | 2,778 | 1,000 |
| all elephants | Loxodonta africana all | 2 | 29 | 62 | 138 | 0,018 | 3599 | 59,99 | 0 | 200 | 225 | 0,444 | 0,569 |
| 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 | 6 | 3 | 185 | 223 | 0,053 | 9336 | 96,62 | 0 | 408 | 121 | 1,250 | 1,972 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 6 | 2 | 185 | 223 | 0,053 | 9336 | 96,62 | 0 | 408 | 121 | 1,250 | 1,972 |

# SUSH – Sankuyu Shorobe

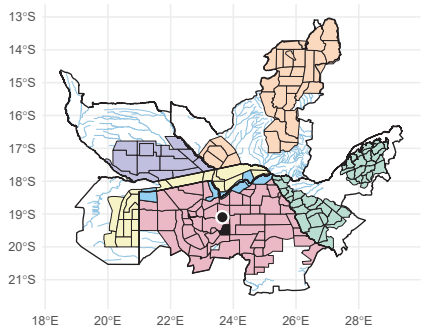
# BOTSWANA – NORTHERN BOTSWANA

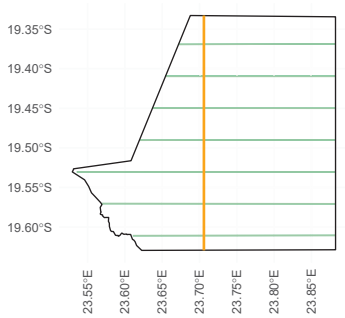
## SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: SUSH
STRATUM NAME: Sankuyu Shorobe
■ STRATUM AREA: 905.84 sqkm
• SURVEY BASE: Khwai
DISTANCE TO SURVEY BASE: 38 km

– TRANSECTS: 7 (200 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 6.6 %

– BASELINE DISTANCE: 32.85 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 2 h
Crew(s): C02
KES2022_V5LJB20220926B 15:58–17:58

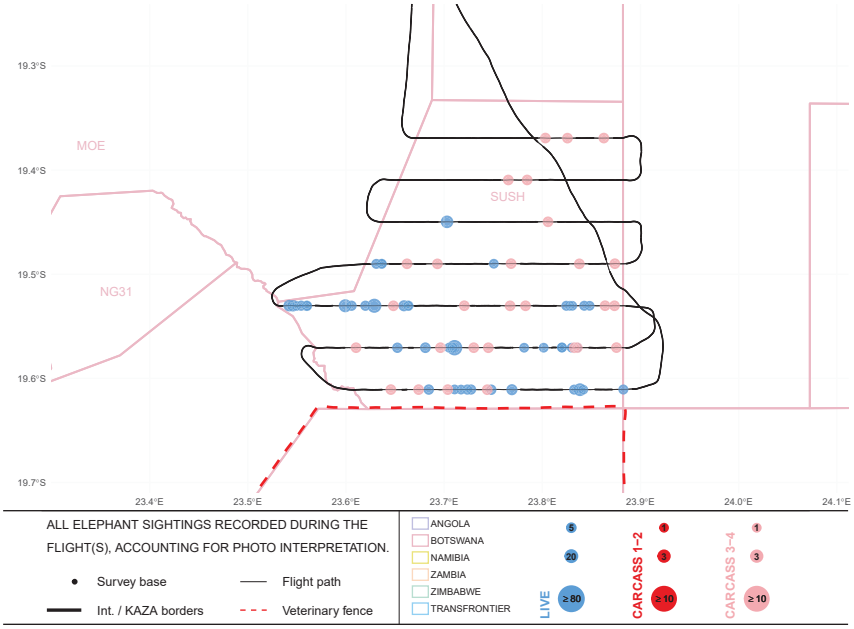
Actual sampling intensity: 7.1 %
Transect flying time: 1.2 h
Transects: 7 – 200 km – 90°
Search effort: 1.08 min/sqkm

## OBSERVER CONTRIBUTION

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

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 76 | 0 | |
| Live elephant (>9): | 0 | | |
| Elephant carcass: | 22 | 0 | |
| Live elephant (<10): | 22 | 0 | |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **62 (22)** |
| Bulls: | 13 (11) |
| Family: | 49 (11) |
| **NOT IN SAMPLE:** | **143 (26)** |
| Outside search strip: | 143 |
| Off transect: | 0 |



## ELEPHANT CARCASSES

| | |
|---|---|
| **IN SAMPLE:** | **22 (22)** |
| Category 1: | 0 (0) |
| Category 2: | 0 (0) |
| Category 3: | 5 (5) |
| Category 4: | 17 (17) |
| **NOT IN SAMPLE:** | **6 (6)** |
| Outside search strip: | 6 |
| Off transect: | 0 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 8 |
| Other wildlife count: | 178 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 2.447, N = 101, w = 323

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 871 | 871 | 309 | 309 |
| Variance of estimate | $Var\hat{Y}$ | 253639 | 253639 | 3270 | 3270 |
| Standard error | $SE\hat{Y}$ | 504 | 504 | 57 | 57 |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 1232 | ± 1232 | ± 140 | ± 140 |
| Percentage of relative precision | $PRP\hat{Y}$ | 141 % | 141 % | 45 % | 45 % |
| Density per sqkm | $R\hat{Y}$ | 0.962 | 0.962 | 0.341 | 0.341 |
| Variance between transect counts | $s^2_y$ | 222.476 | 222.476 | 3.81 | 3.81 |
| Variance between transect areas | $s^2_a$ | 2.513 | 2.513 | 2.513 | 2.513 |
| Covariance between counts & areas | $s_{ay}$ | 21.074 | 21.074 | 2.53 | 2.53 |

## CARCASS RATIOS

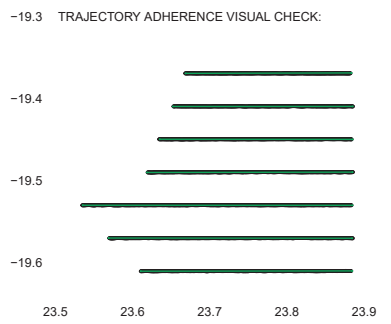
$CR_{1:4} = 26.2$ %
$CR_{1:2} = 0$ %

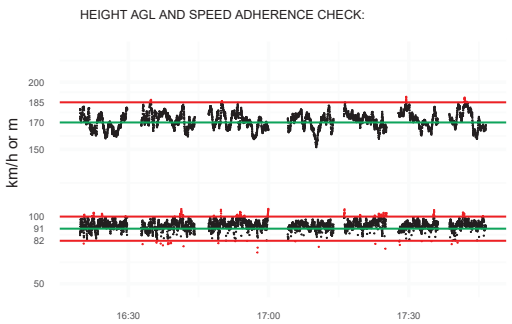
## SUSH – Sankuyu Shorobe

## BOTSWANA – NORTHERN BOTSWANA

### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5LJB20220926B



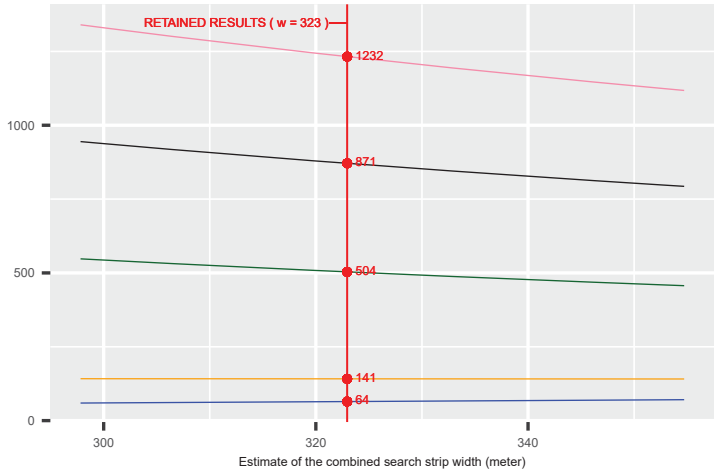

SPEED
Average: 171.4 km/h
Standard dev.: 6 km/h

HEIGHT AGL
Average: 93.5 m (306.6 ft)
Standard dev.: 3.5 m (11.6 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: [157 – 180]
C02 – Right: [136 – 188]




**LIVE ELEPHANT ESTIMATE: [ 945 – 793 ]**
CONFIDENCE INTERVAL: ± [ 1340 – 1118 ]
SAMPLE AREA: [ 59 – 71 ] sqkm
SE: [ 548 – 457 ]
PRP: [ 142 – 141 ] %

## SUSH – Sankuyu Shorobe — BOTSWANA – NORTHERN BOTSWANA

**STRATUM CODE:** SUSH **N:** 102 $S_a^2$: 2,513
**STRATUM NAME:** Sankuyu Shorobe **w:** 323 **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 | 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 | 14 | 35 | 0,016 | 207 | 14,39 | 0 | 49 | 251 | 0,143 | -0,224 |
| 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 | 16 | 183 | 167 | 0,202 | 4671 | 68,34 | 15 | 350 | 92 | 4,476 | 2,939 |
| elephant family | Loxodonta africana family | 49 | 127 | 688 | 1137 | 0,760 | 215947 | 464,70 | 0 | 1826 | 165 | 183,000 | 18,135 |
| 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 | 1 | 70 | 91 | 0,078 | 1397 | 37,38 | 0 | 162 | 130 | 1,238 | 1,534 |
| elephant carcass four | Loxodonta africana carcass four | 17 | 5 | 239 | 115 | 0,264 | 2205 | 46,96 | 124 | 354 | 48 | 1,952 | 0,996 |
| giraffe | Giraffa giraffa | 22 | 0 | 309 | 306 | 0,341 | 15635 | 125,04 | 3 | 615 | 99 | 13,476 | 3,531 |
| 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 | 105 | 0 | 1475 | 1253 | 1,629 | 262121 | 511,98 | 223 | 2728 | 85 | 255,000 | 21,870 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 20 | 0 | 281 | 312 | 0,310 | 16222 | 127,37 | 0 | 593 | 111 | 14,810 | 5,264 |
| 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 | 7 | 0 | 98 | 229 | 0,109 | 8733 | 93,45 | 0 | 327 | 232 | 7,000 | 3,156 |
| 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 | 6 | 0 | 84 | 206 | 0,093 | 7088 | 84,19 | 0 | 290 | 244 | 5,143 | 0,083 |
| 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 | 56 | 88 | 0,062 | 1283 | 35,82 | 0 | 144 | 156 | 0,952 | 0,242 |
| 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, | 13 | 0 | 183 | 395 | 0,202 | 26098 | 161,55 | 0 | 578 | 216 | 20,143 | 3,186 |
| all elephants | Loxodonta africana all | 62 | 143 | 871 | 1232 | 0,962 | 253639 | 503,63 | 0 | 2103 | 141 | 222,476 | 21,074 |
| 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 | 22 | 6 | 309 | 140 | 0,341 | 3270 | 57,18 | 169 | 449 | 45 | 3,810 | 2,530 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 22 | 6 | 309 | 140 | 0,341 | 3270 | 57,18 | 169 | 449 | 45 | 3,810 | 2,530 |

# WOKS – W Okavango South

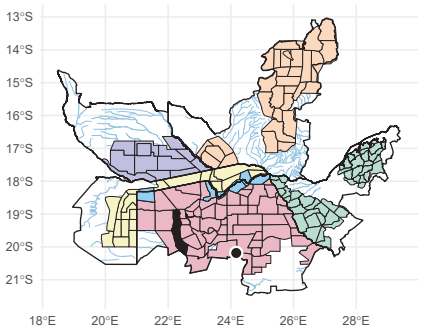
# BOTSWANA – NORTHERN BOTSWANA

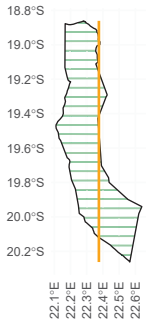
## SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: WOKS
STRATUM NAME: W Okavango South
■ STRATUM AREA: 3635.78 sqkm
• SURVEY BASE: Matopi
DISTANCE TO SURVEY BASE: 212 km

– TRANSECTS: 26 (607 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 5 %

– BASELINE DISTANCE: 155.15 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 2**
Combined flying time: 6.2 h
Crew(s): C02
KES2022_V5LJB20220919A 06:09–10:42
KES2022_V5LJB20220919B 16:20–18:00

Actual sampling intensity: 5.4 %
Transect flying time: 3.5 h
Transects: 26 – 607 km – 90°
Search effort: 1.08 min/sqkm

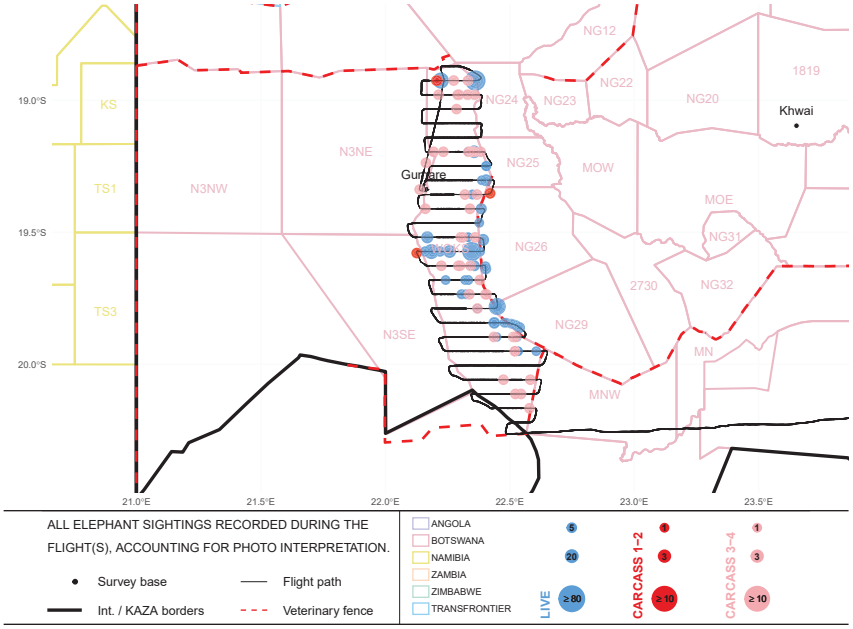
## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C02 | |
| Side: | L | R |
| % sightings: | 53 | 47 |
| % individuals: | 64 | 36 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 134 | 68.66 | 28.26 |
| Live elephant (>9): | 7 | 100 | 28.57 |
| Elephant carcass: | 38 | 63.16 | 12.5 |
| Live elephant (<10): | 19 | 78.95 | 26.67 |

Undetected live elephant: 0
Undetected elephant carcass: 2






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **204 (25)** |
| Bulls: | 23 (14) |
| Family: | 181 (11) |
| **NOT IN SAMPLE:** | **190 (29)** |
| Outside search strip: | 89 |
| Off transect: | 101 |



## ELEPHANT CARCASSES

| | |
|---|---|
| **IN SAMPLE:** | **40 (40)** |
| Category 1: | 0 (0) |
| Category 2: | 2 (2) |
| Category 3: | 9 (9) |
| Category 4: | 29 (29) |
| **NOT IN SAMPLE:** | **8 (8)** |
| Outside search strip: | 4 |
| Off transect: | 4 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 14 |
| Other wildlife count: | 227 |
| Domestic count: | 2114 |

## ELEPHANT DATA ANALYSIS

t = 2.06, N = 480, w = 323

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 3790 | 3790 | 743 | 743 |
| Variance of estimate | $\mathrm{Var}\hat{Y}$ | 2464405 | 2591520 | 31352 | 31798 |
| Standard error | $\mathrm{SE}\hat{Y}$ | 1570 | 1610 | 177 | 178 |
| 95% confidence interval | $\mathrm{CI}_{\hat{Y}}^{95\%}$ | ± 3233 | ± 3315 | ± 365 | ± 367 |
| Percentage of relative precision | $\mathrm{PRP}_{\hat{Y}}$ | 85 % | 87 % | 49 % | 49 % |
| Density per sqkm | $R_{\hat{Y}}$ | 1.042 | 1.042 | 0.204 | 0.204 |
| Variance between transect counts | $s_y^2$ | 287.415 | 302.375 | 3.538 | 3.618 |
| Variance between transect areas | $s_a^2$ | 5.778 | 5.778 | 5.778 | 5.778 |
| Covariance between counts & areas | $s_{ay}$ | 0.37 | 0.298 | 0.131 | 0.197 |

## CARCASS RATIOS

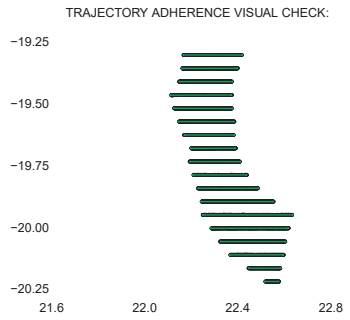
$CR_{1:4} = 16.4\ \%$
$CR_{1:2} = 1\ \%$

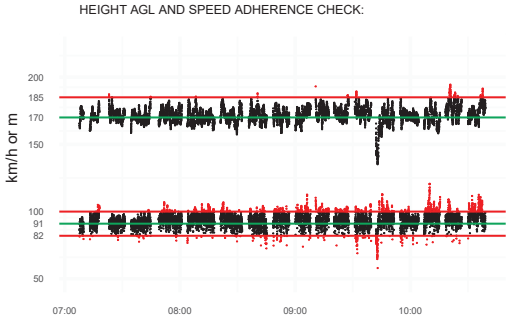
## WOKS – W Okavango South

## BOTSWANA – NORTHERN BOTSWANA

### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5LJB20220919A

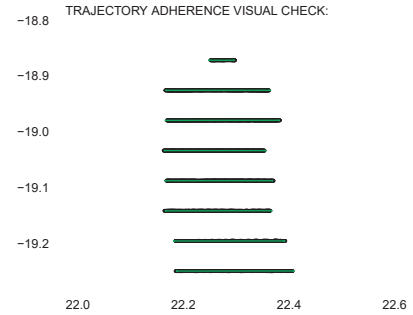


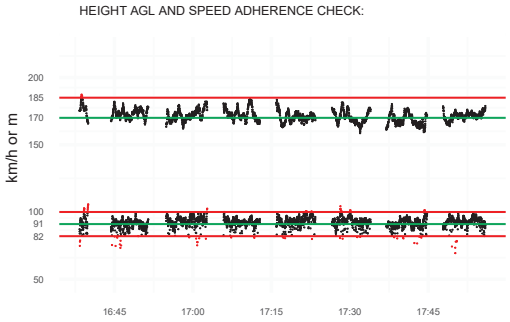




SPEED
Average: 171.8 km/h
Standard dev.: 5.8 km/h

HEIGHT AGL
Average: 93.8 m (307.6 ft)
Standard dev.: 5.2 m (16.9 ft)

### KES2022_ V5LJB20220919B



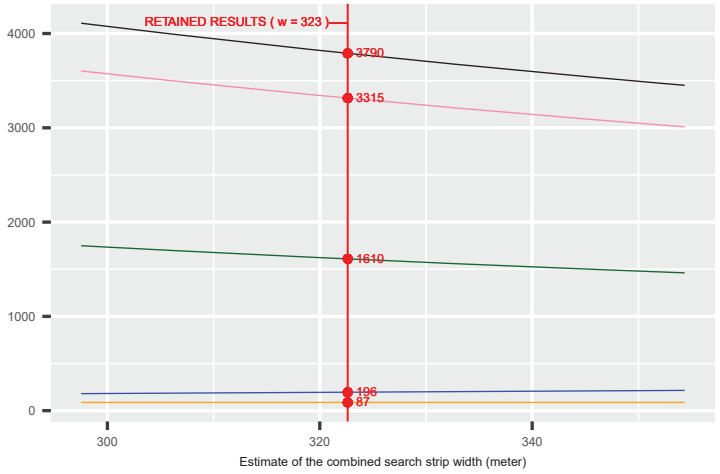

SPEED
Average: 171.4 km/h
Standard dev.: 4.6 km/h

HEIGHT AGL
Average: 92.2 m (302.5 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: [157 – 180]
C02 – Right: [136 – 188]




LIVE ELEPHANT ESTIMATE: [ 4110 – 3451 ]
CONFIDENCE INTERVAL: ± [ 3603 – 3010 ]
SAMPLE AREA: [ 180 – 215 ] sqkm
SE: [ 1750 – 1462 ]
PRP: [ 88 – 87 ] %

## WOKS – W Okavango South

## BOTSWANA – NORTHERN BOTSWANA

**STRATUM CODE:** WOKS **N:** 481 $S_a^2$: 5,778
**STRATUM NAME:** W Okavango South **w:** 323 **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, | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| buffalo | Syncerus caffer | 4 | 0 | 74 | 148 | 0,020 | 5139 | 71,69 | 0 | 222 | 199 | 0,615 | 0,169 |
| bushbuck | Tragelaphus scriptus | 2 | 0 | 37 | 74 | 0,010 | 1291 | 35,93 | 0 | 111 | 199 | 0,154 | 0,049 |
| bushpig | Potamochoerus larvatus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| cattle | Bos taurus | 1166 | 419 | 21662 | 6617 | 5,958 | 10322209 | 3212,82 | 15045 | 28279 | 31 | 1414,055 | 32,919 |
| donkey | Equus asinus | 225 | 33 | 4180 | 2446 | 1,150 | 1410460 | 1187,63 | 1734 | 6626 | 59 | 149,675 | -4,495 |
| duiker | Sylvicapra grimmia | 1 | 0 | 19 | 37 | 0,005 | 319 | 17,86 | 0 | 55 | 198 | 0,038 | 0,067 |
| 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 | 36 | 427 | 251 | 0,118 | 14860 | 121,90 | 176 | 678 | 59 | 1,866 | 0,765 |
| elephant family | Loxodonta africana family | 181 | 154 | 3363 | 3150 | 0,925 | 2338887 | 1529,34 | 213 | 6512 | 94 | 272,198 | -0,466 |
| 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 | 2 | 1 | 37 | 75 | 0,010 | 1314 | 36,25 | 0 | 112 | 201 | 0,154 | -0,084 |
| elephant carcass three | Loxodonta africana carcass three | 9 | 4 | 167 | 107 | 0,046 | 2717 | 52,12 | 60 | 275 | 64 | 0,315 | 0,051 |
| elephant carcass four | Loxodonta africana carcass four | 29 | 2 | 539 | 298 | 0,148 | 20907 | 144,59 | 241 | 837 | 55 | 2,426 | 0,229 |
| giraffe | Giraffa giraffa | 2 | 0 | 37 | 74 | 0,010 | 1285 | 35,84 | 0 | 111 | 199 | 0,154 | 0,085 |
| 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 | 41 | 3 | 762 | 772 | 0,210 | 140534 | 374,88 | 0 | 1534 | 101 | 16,734 | 0,676 |
| impala | Aepyceros melampus | 15 | 0 | 279 | 296 | 0,077 | 20657 | 143,73 | 0 | 575 | 106 | 2,654 | 1,516 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 16 | 3 | 297 | 249 | 0,082 | 14613 | 120,88 | 48 | 546 | 84 | 1,766 | 0,415 |
| 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 | 82 | 26 | 1523 | 1182 | 0,419 | 329496 | 574,02 | 341 | 2706 | 78 | 40,375 | 2,656 |
| 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 | 682 | 113 | 12670 | 6067 | 3,485 | 8678279 | 2945,89 | 6603 | 18737 | 48 | 852,825 | -15,569 |
| 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 | 37 | 74 | 0,010 | 1308 | 36,16 | 0 | 112 | 200 | 0,154 | -0,049 |
| 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, | 75 | 25 | 1393 | 1397 | 0,383 | 460012 | 678,24 | 0 | 2790 | 100 | 52,986 | -1,100 |
| all elephants | Loxodonta africana all | 204 | 190 | 3790 | 3315 | 1,042 | 2591520 | 1609,82 | 474 | 7105 | 87 | 302,375 | 0,298 |
| C1-2 elephant carcasses | Loxodonta africana carcass 1-2 | 2 | 2 | 37 | 75 | 0,010 | 1314 | 36,25 | 0 | 112 | 201 | 0,154 | -0,084 |
| all elephant carcasses | Loxodonta africana carcass all | 40 | 8 | 743 | 367 | 0,204 | 31798 | 178,32 | 376 | 1110 | 49 | 3,618 | 0,197 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 38 | 6 | 706 | 353 | 0,194 | 29340 | 171,29 | 353 | 1059 | 50 | 3,378 | 0,280 |

# WONE – W Okavango North–East

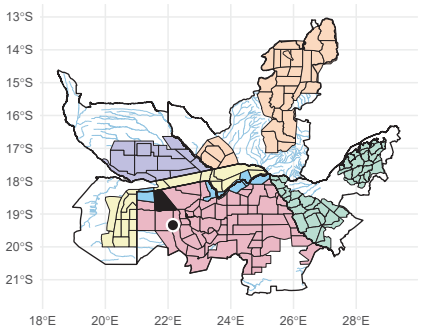
# BOTSWANA – NORTHERN BOTSWANA

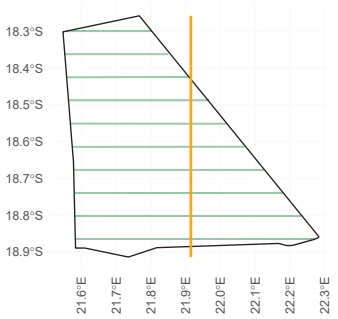
## SURVEY DESIGN

COUNTRY: Botswana
SUPERSTRATUM: Northern Botswana
STRATUM CODE: WONE
STRATUM NAME: W Okavango North–East
■ STRATUM AREA: 3391.09 sqkm
• SURVEY BASE: Gumare
DISTANCE TO SURVEY BASE: 105 km

– TRANSECTS: 10 (494 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 4.4 %

– BASELINE DISTANCE: 72.74 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.4 h
Crew(s): C02
KES2022_V5LJB20220920A 06:15–10:39

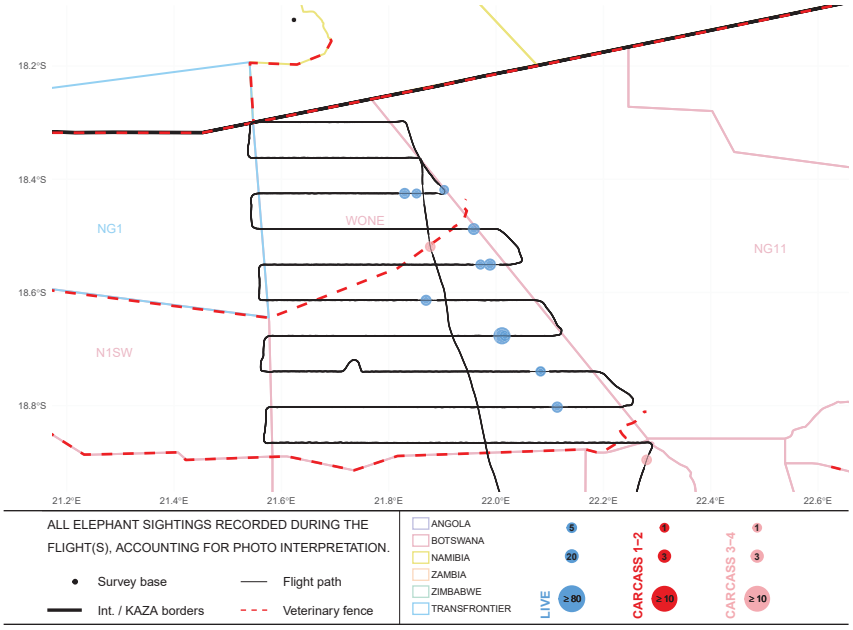
Actual sampling intensity: 4.6 %
Transect flying time: 2.9 h
Transects: 10 – 490 km – 90°
Search effort: 1.1 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C02 | |
| Side: | L | R |
| % sightings: | 44 | 56 |
| % individuals: | 55 | 45 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 15 | 40 | 83.33 |
| Live elephant (>9): | 2 | 50 | 100 |
| Elephant carcass: | 0 | | |
| Live elephant (<10): | 2 | 50 | 0 |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **31 (4)** |
| Bulls: | 19 (3) |
| Family: | 12 (1) |
| **NOT IN SAMPLE:** | **80 (10)** |
| Outside search strip: | 64 |
| Off transect: | 16 |

## 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:** | **2 (2)** |
| Outside search strip: | 0 |
| Off transect: | 2 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 5 |
| Other wildlife count: | 5 |
| Domestic count: | 363 |

## ELEPHANT DATA ANALYSIS

t = 2.262, N = 226, w = 322

| | | LIVE OBS | LIVE FINAL | ALL CARCASSES OBS | ALL CARCASSES FINAL |
|---|---|---|---|---|---|
| Population estimate | $\hat{Y}$ | 646 | 667 | – | – |
| Variance of estimate | $\mathrm{Var}\hat{Y}$ | 150306 | 159362 | – | – |
| Standard error | $\mathrm{SE}\hat{Y}$ | 388 | 399 | – | – |
| 95% confidence interval | $\mathrm{CI}_{\hat{Y}}^{95\%}$ | ± 877 | ± 903 | – | – |
| Percentage of relative precision | $\mathrm{PRP}_{\hat{Y}}$ | 136 % | 135 % | – | – |
| Density per sqkm | $R_{\hat{Y}}$ | 0.19 | 0.197 | – | – |
| Variance between transect counts | $s_y^2$ | 28.889 | 30.544 | – | – |
| Variance between transect areas | $s_a^2$ | 26.656 | 26.656 | – | – |
| Covariance between counts & areas | $s_{ay}$ | −2.415 | −2.676 | – | – |

## CARCASS RATIOS

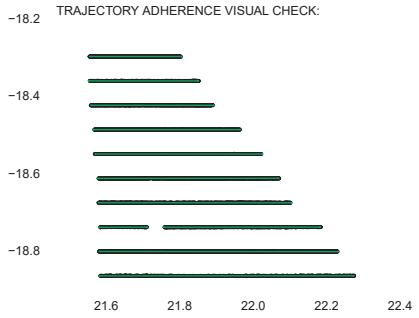
$CR_{1:4} = 0$ %
$CR_{1:2} = 0$ %

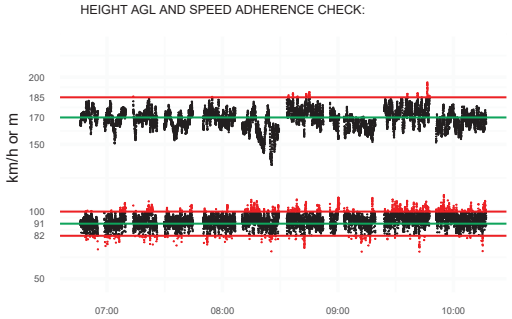
## WONE – W Okavango North–East

## BOTSWANA – NORTHERN BOTSWANA

### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5LJB20220920A



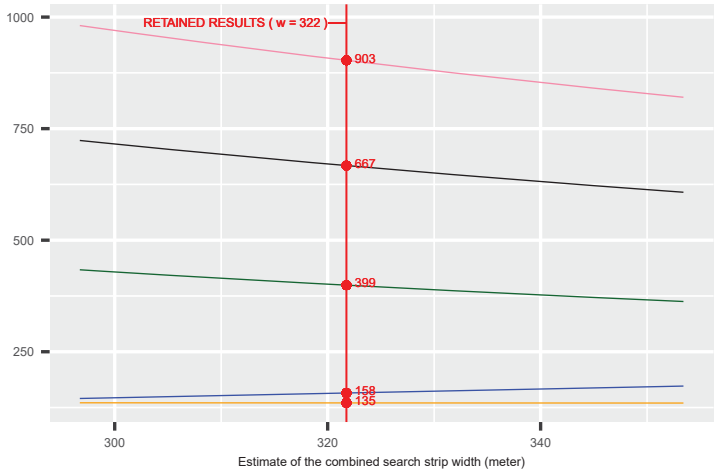

SPEED
Average: 168.8 km/h
Standard dev.: 7.1 km/h

HEIGHT AGL
Average: 93.1 m (305.5 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):

C02 – Left: [156 – 179]
C02 – Right: [136 – 188]




**LIVE ELEPHANT ESTIMATE: [ 724 – 607 ]**
CONFIDENCE INTERVAL: ± [ 981 – 820 ]
SAMPLE AREA: [ 145 – 173 ] sqkm
SE: [ 434 – 363 ]
PRP: [ 136 – 135 ] %

## WONE – W Okavango North–East BOTSWANA – NORTHERN BOTSWANA

**STRATUM CODE:** WONE **N:** 226 $S_a^2$: 26,656
**STRATUM NAME:** W Okavango North-East **w:** 322 ***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 | 243 | 157 | 5230 | 3597 | 1,542 | 2528906 | 1590,25 | 1633 | 8827 | 69 | 366,011 | -28,650 |
| donkey | Equus asinus | 61 | 25 | 1313 | 1381 | 0,387 | 372816 | 610,59 | 0 | 2694 | 105 | 61,656 | -13,796 |
| duiker | Sylvicapra grimmia | 3 | 0 | 65 | 99 | 0,019 | 1929 | 43,93 | 0 | 164 | 154 | 0,456 | 1,843 |
| eland | Tragelaphus oryx | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| elephant bulls | Loxodonta africana males | 19 | 37 | 409 | 593 | 0,121 | 68739 | 262,18 | 0 | 1002 | 145 | 13,211 | -1,971 |
| elephant family | Loxodonta africana family | 12 | 43 | 258 | 605 | 0,076 | 71609 | 267,60 | 0 | 864 | 234 | 14,400 | -0,704 |
| 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 | 2 | 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 | 3 | 0 | 65 | 107 | 0,019 | 2236 | 47,28 | 0 | 172 | 166 | 0,456 | 0,196 |
| 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 | 6 | 22 | 51 | 0,006 | 510 | 22,58 | 0 | 73 | 237 | 0,100 | -0,261 |
| 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 | 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 | 56 | 0 | 1205 | 2116 | 0,355 | 874592 | 935,20 | 0 | 3321 | 176 | 153,600 | -31,096 |
| 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 | 15 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| all elephants | Loxodonta africana all | 31 | 80 | 667 | 903 | 0,197 | 159362 | 399,20 | 0 | 1570 | 135 | 30,544 | -2,676 |
| 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 | 2 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 0 | 2 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |

# NAMIBIA



## 14HNA – NG14 high Namibia

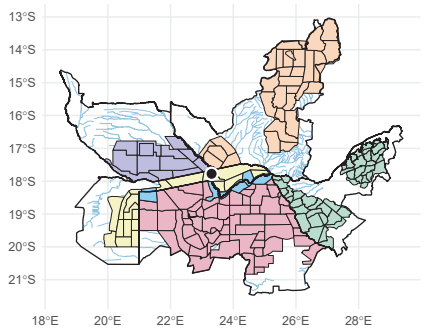
## NAMIBIA – KAVANGO ZAMBEZI

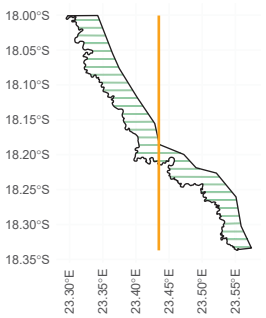
### SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Kavango Zambezi
STRATUM CODE: 14HNA
STRATUM NAME: NG14 high Namibia
■ STRATUM AREA: 164.7 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 45 km

– TRANSECTS: 30 (129 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 23.5 %

– BASELINE DISTANCE: 37.24 km




### SURVEY IMPLEMENTATION

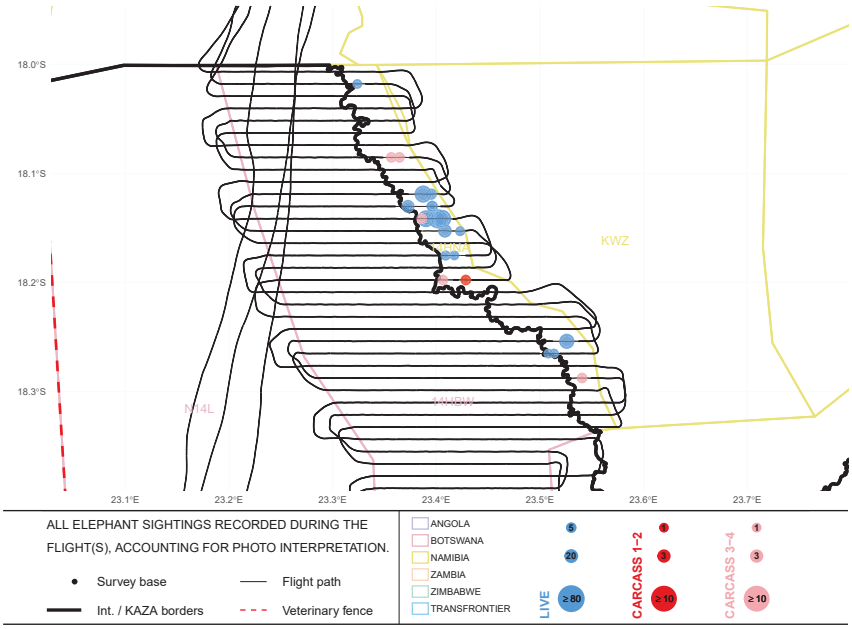
**Number of flight(s): 3**
Combined flying time: 11.4 h
Crew(s): C01, C02, C04
KES2022_V5IIM20221006A 06:45–10:46
KES2022_V5WOT20221007A 07:19–11:01
KES2022_V5LJB20221007A 06:50–10:30
Actual sampling intensity: 24.8 %
Transect flying time: 0.7 h
Transects: 30 – 129 km – 0°
Search effort: 1.1 min/sqkm

### OBSERVER CONTRIBUTION

| Crew(s): | C01 | | C04 | | C02 | |
|---|---|---|---|---|---|---|
| Side: | L | R | L | R | L | R |
| % sightings: | 42 | 58 | 44 | 56 | 39 | 61 |
| % individuals: | 66 | 34 | 33 | 67 | 35 | 65 |

### PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 46 | 39.13 | 50 |
| Live elephant (>9): | 4 | 100 | 25 |
| Elephant carcass: | 5 | 20 | 0 |
| Live elephant (<10): | 7 | 28.57 | 0 |




### LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **101 (11)** |
| Bulls: | 3 (2) |
| Family: | 98 (9) |
| **NOT IN SAMPLE:** | **156 (11)** |
| Outside search strip: | 156 |
| Off transect: | 0 |

### ELEPHANT CARCASSES



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

### OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 9 |
| Other wildlife count: | 760 |
| Domestic count: | 186 |

### ELEPHANT DATA ANALYSIS

t = 2.132, N = 111, 119, 106, w = 321

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 404 | 408 | 20 | 20 |
| Variance of estimate | $Var\hat{Y}$ | 62186 | 63103 | 91 | 91 |
| Standard error | $SE\hat{Y}$ | 249 | 251 | 10 | 10 |
| 95% confidence interval | $CI_{\hat{Y}}^{95\%}$ | ± 534 | ± 537 | ± 20 | ± 20 |
| Percentage of relative precision | $PRP\hat{Y}$ | 132 % | 132 % | 99 % | 99 % |
| Density per sqkm | $R\hat{Y}$ | 2.456 | 2.478 | 0.122 | 0.122 |
| Variance between transect counts | $s_y^2$ | 140.023 | 141.964 | 0.213 | 0.213 |
| Variance between transect areas | $s_a^2$ | 0.138 | 0.138 | 0.138 | 0.138 |
| Covariance between counts & areas | $s_{ay}$ | 0.022 | 0.026 | 0.052 | 0.052 |

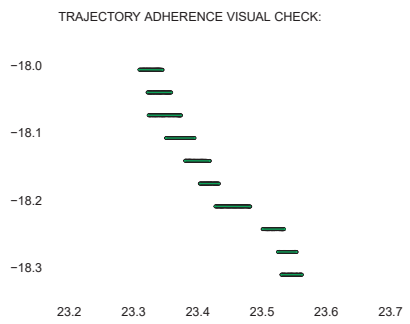
### CARCASS RATIOS

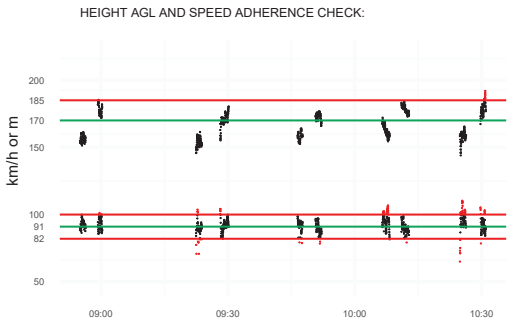
$CR_{1:4} = 4.7\ \%$
$CR_{1:2} = 0.9\ \%$

## 14HNA – NG14 high Namibia — NAMIBIA – KAVANGO ZAMBEZI

### ADHERENCE TO FLIGHT PARAMETERS

#### KES2022_ V5IIM20221006A

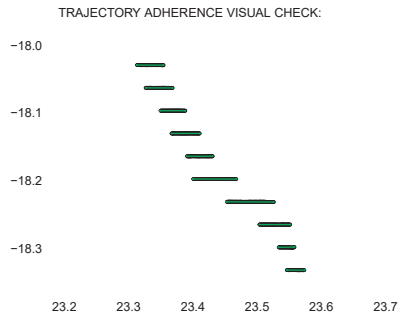


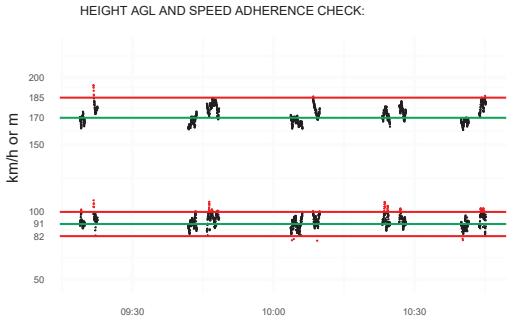




SPEED
Average: 167 km/h
Standard dev.: 10.1 km/h

HEIGHT AGL
Average: 92.3 m (302.9 ft)
Standard dev.: 5.8 m (18.9 ft)

#### KES2022_ V5WOT20221007A

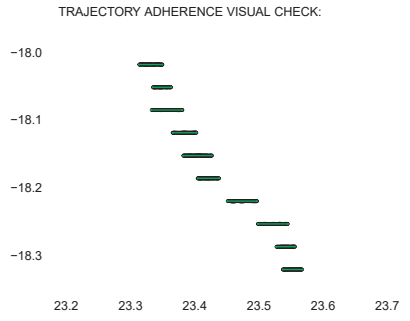


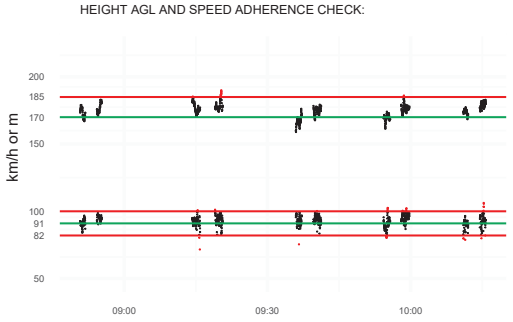




SPEED
Average: 172.5 km/h
Standard dev.: 6.1 km/h

HEIGHT AGL
Average: 93.2 m (305.8 ft)
Standard dev.: 4.8 m (15.8 ft)

#### KES2022_ V5LJB20221007A




SPEED
Average: 174.8 km/h
Standard dev.: 5 km/h

HEIGHT AGL
Average: 92.8 m (304.5 ft)
Standard dev.: 4.1 m (13.5 ft)

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

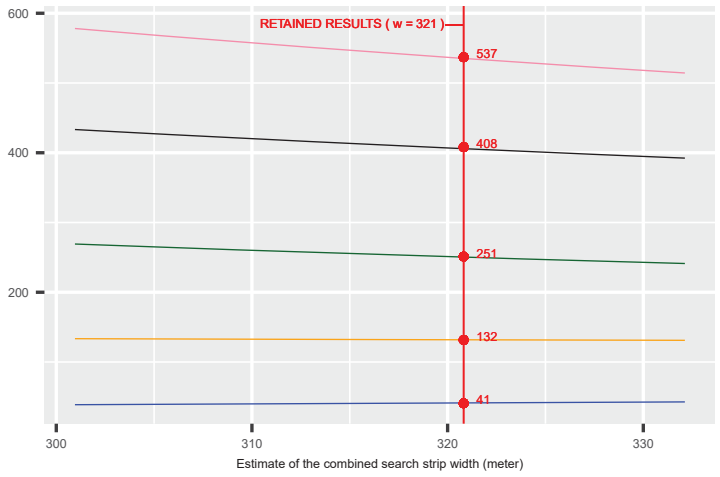
Range of search strip width estimates (m):

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

C02 – Left: [156 – 179]
C02 – Right: [135 – 187]

C04 – Left: [156 – 156]
C04 – Right: [157 – 157]

**LIVE ELEPHANT ESTIMATE: [ 433 – 392 ]**
CONFIDENCE INTERVAL: ± [ 578 – 514 ]
SAMPLE AREA: [ 39 – 43 ] sqkm
SE: [ 269 – 241 ]
PRP: [ 133 – 131 ] %



## 14HNA – NG14 high Namibia NAMIBIA – KAVANGO ZAMBEZI

**STRATUM CODE:** 14HNA **N:** 88, 94, 84 $S_a^2$: 0,138
**STRATUM NAME:** NG14 high Namibia **w:** 321 **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 | 523 | 220 | 2036 | 1603 | 12,363 | 575602 | 758,68 | 433 | 3639 | 79 | 1724,668 | 9,897 |
| 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 | 167 | 31 | 675 | 553 | 4,099 | 68841 | 262,38 | 122 | 1228 | 82 | 168,185 | 0,479 |
| 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 | 3 | 6 | 11 | 18 | 0,067 | 67 | 8,17 | 0 | 30 | 167 | 0,162 | 0,015 |
| elephant family | Loxodonta africana family | 98 | 150 | 397 | 531 | 2,411 | 61375 | 247,74 | 0 | 928 | 134 | 138,340 | 0,011 |
| 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 | 4 | 8 | 0,022 | 13 | 3,62 | 0 | 12 | 222 | 0,033 | 0,028 |
| elephant carcass three | Loxodonta africana carcass three | 2 | 1 | 8 | 11 | 0,048 | 27 | 5,22 | 0 | 19 | 139 | 0,064 | 0,025 |
| elephant carcass four | Loxodonta africana carcass four | 2 | 0 | 8 | 11 | 0,052 | 24 | 4,90 | 0 | 20 | 131 | 0,064 | -0,001 |
| 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 | 8 | 0 | 33 | 58 | 0,201 | 670 | 25,88 | 0 | 91 | 176 | 1,651 | 0,077 |
| horse | Equus caballus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 49 | 0 | 205 | 298 | 1,246 | 17552 | 132,48 | 0 | 503 | 145 | 42,171 | -0,110 |
| 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 | 141 | 44 | 584 | 377 | 3,548 | 31622 | 177,83 | 208 | 961 | 64 | 80,562 | 0,709 |
| reedbuck | Redunca arundinum | 10 | 0 | 42 | 86 | 0,255 | 1454 | 38,13 | 0 | 128 | 205 | 3,333 | -0,096 |
| 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 | 19 | 0 | 81 | 154 | 0,490 | 4616 | 67,94 | 0 | 234 | 190 | 12,033 | 0,221 |
| 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 | 10 | 0 | 42 | 65 | 0,252 | 845 | 29,07 | 0 | 107 | 157 | 2,161 | 0,149 |
| waterbuck | Kobus ellipsiprymnus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| wildebeest | Connochaetes taurinus | 1 | 0 | 4 | 9 | 0,026 | 15 | 3,84 | 0 | 13 | 207 | 0,033 | -0,012 |
| zebra | Equus spp, | 16 | 0 | 68 | 89 | 0,410 | 1789 | 42,30 | 0 | 156 | 131 | 4,120 | -0,058 |
| all elephants | Loxodonta africana all | 101 | 156 | 408 | 537 | 2,478 | 63103 | 251,20 | 0 | 945 | 132 | 141,964 | 0,026 |
| C1-2 elephant carcasses | Loxodonta africana carcass 1-2 | 1 | 0 | 4 | 8 | 0,022 | 13 | 3,62 | 0 | 12 | 222 | 0,033 | 0,028 |
| all elephant carcasses | Loxodonta africana carcass all | 5 | 1 | 20 | 20 | 0,122 | 91 | 9,52 | 0 | 40 | 99 | 0,213 | 0,052 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 4 | 1 | 16 | 15 | 0,100 | 51 | 7,16 | 2 | 31 | 90 | 0,120 | 0,024 |

# BUF – Buffalo

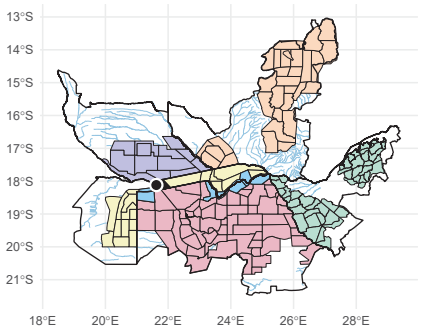
# NAMIBIA – KAVANGO ZAMBEZI

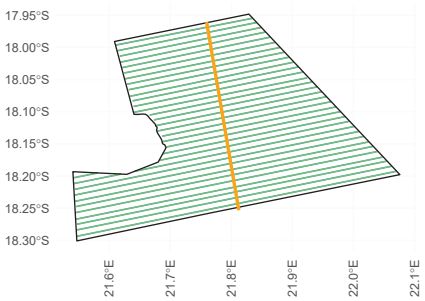
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Kavango Zambezi
STRATUM CODE: BUF
STRATUM NAME: Buffalo
■ STRATUM AREA: 1177.2 sqkm
• SURVEY BASE: Bagani
DISTANCE TO SURVEY BASE: 23 km

– TRANSECTS: 32 (1168 km)
TRANSECT ORIENTATION: 79.8°
PLANNED SAMPLING INTENSITY: 29.8 %

– BASELINE DISTANCE: 32.85 km




## SURVEY IMPLEMENTATION

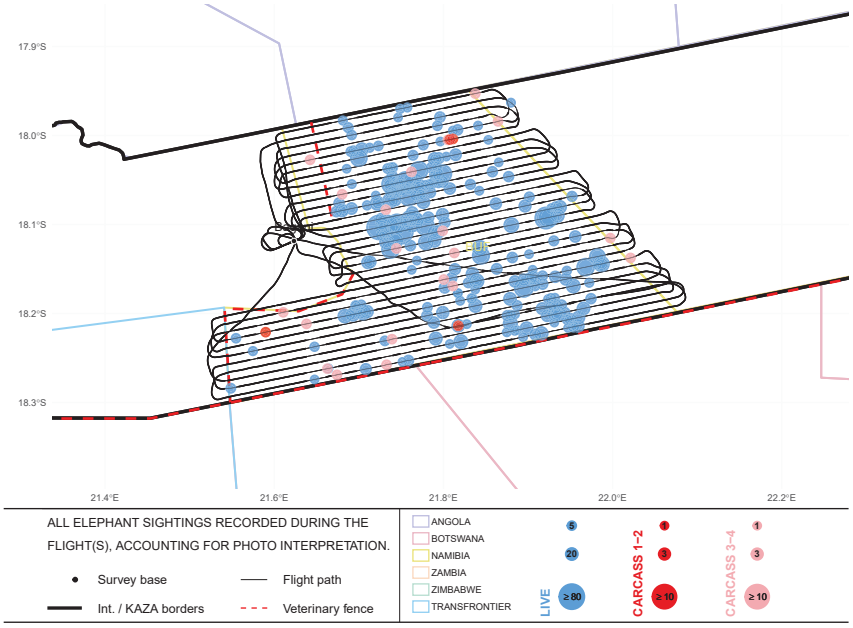
**Number of flight(s): 3**
Combined flying time: 9.2 h
Crew(s): C01, C02, C04
KES2022_V5IIM20221010A 06:59–10:11
KES2022_V5LJB20221010A 06:47–09:57
KES2022_V5WOT20221010A 06:30–09:22
Actual sampling intensity: 31.3 %
Transect flying time: 6.8 h
Transects: 32 – 1168 km – 79.8°
Search effort: 1.11 min/sqkm

## OBSERVER CONTRIBUTION

| Crew(s): | C01 | | C02 | | C04 | |
|---|---|---|---|---|---|---|
| Side: | L | R | L | R | L | R |
| % sightings: | 42 | 58 | 56 | 44 | 43 | 57 |
| % individuals: | 47 | 53 | 60 | 40 | 50 | 50 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 320 | 15.31 | 36.73 |
| Live elephant (>9): | 47 | 25.53 | 75 |
| Elephant carcass: | 21 | 19.05 | 0 |
| Live elephant (<10): | 66 | 30.3 | 10 |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **1258 (112)** |
| Bulls: | 82 (37) |
| Family: | 1176 (75) |
| **NOT IN SAMPLE:** | **1943 (142)** |
| Outside search strip: | 1927 |
| Off transect: | 16 |



## ELEPHANT CARCASSES

| | |
|---|---|
| **IN SAMPLE:** | **21 (21)** |
| Category 1: | 1 (1) |
| Category 2: | 3 (3) |
| Category 3: | 3 (3) |
| Category 4: | 14 (14) |
| **NOT IN SAMPLE:** | **3 (3)** |
| Outside search strip: | 1 |
| Off transect: | 2 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 22 |
| Other wildlife count: | 2594 |
| Domestic count: | 62 |

## ELEPHANT DATA ANALYSIS

t = 2.04, N = 104, w = 315

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 3867 | 4020 | 67 | 67 |
| Variance of estimate | $Var\hat{Y}$ | 427140 | 495118 | 153 | 153 |
| Standard error | $SE\hat{Y}$ | 654 | 704 | 12 | 12 |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 1333 | ± 1435 | ± 25 | ± 25 |
| Percentage of relative precision | $PRP\hat{Y}$ | 34 % | 36 % | 38 % | 38 % |
| Density per sqkm | $R\hat{Y}$ | 3.285 | 3.415 | 0.057 | 0.057 |
| Variance between transect counts | $s^2_y$ | 2005.512 | 2318.028 | 0.684 | 0.684 |
| Variance between transect areas | $s^2_a$ | 13.493 | 13.493 | 13.493 | 13.493 |
| Covariance between counts & areas | $s_{ay}$ | 50.668 | 53.848 | 0.67 | 0.67 |

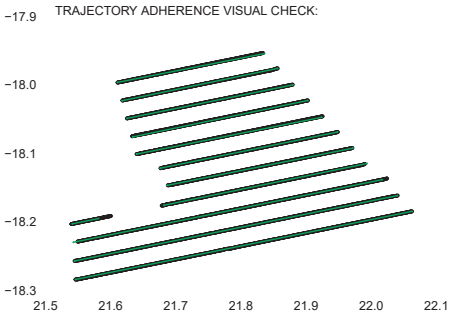
## CARCASS RATIOS

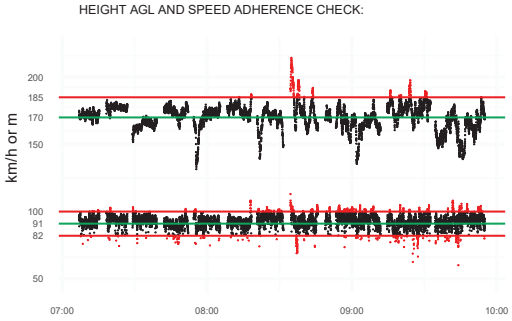
$CR_{1:4}$ = 1.6 %
$CR_{1:2}$ = 0.3 %

## BUF – Buffalo — NAMIBIA – KAVANGO ZAMBEZI

### ADHERENCE TO FLIGHT PARAMETERS

#### KES2022_ V5IIM20221010A

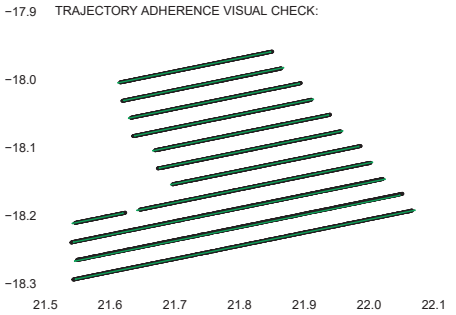


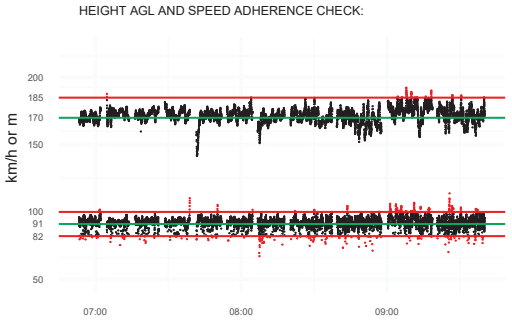




SPEED
Average: 170.1 km/h
Standard dev.: 9.6 km/h

HEIGHT AGL
Average: 92.7 m (304 ft)
Standard dev.: 4.7 m (15.5 ft)

#### KES2022_ V5LJB20221010A

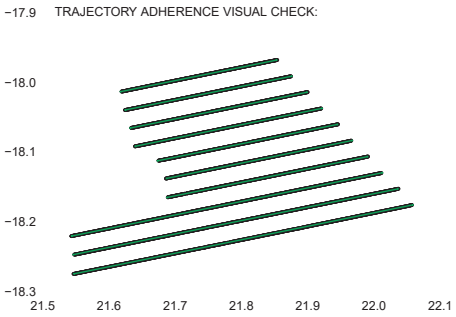


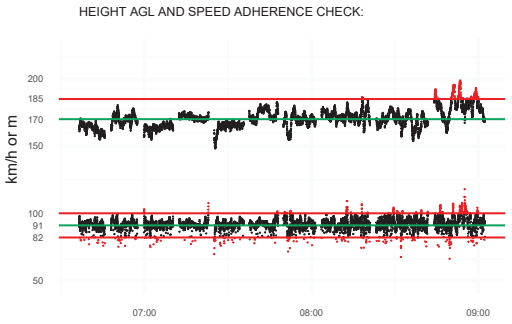




SPEED
Average: 171.8 km/h
Standard dev.: 5.3 km/h

HEIGHT AGL
Average: 92.1 m (302.1 ft)
Standard dev.: 3.8 m (12.4 ft)

#### KES2022_ V5WOT20221010A




SPEED
Average: 170.4 km/h
Standard dev.: 6.9 km/h

HEIGHT AGL
Average: 91.7 m (301 ft)
Standard dev.: 4.2 m (13.6 ft)

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

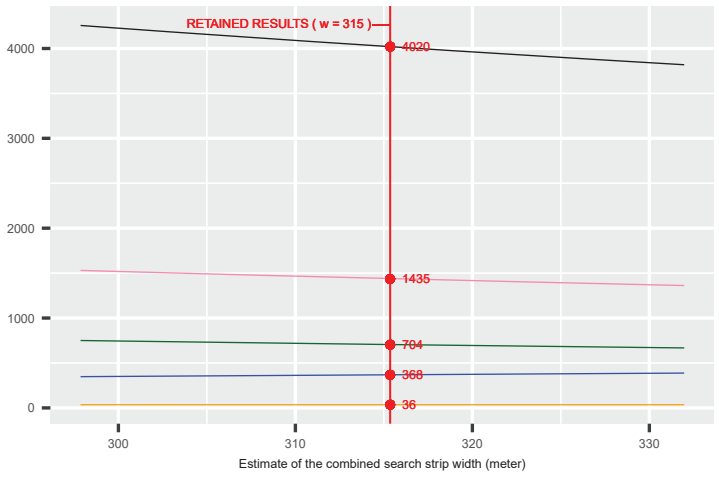
Range of search strip width estimates (m):

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

C02 – Left: [155 – 177]
C02 – Right: [134 – 186]

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

**LIVE ELEPHANT ESTIMATE: [ 4256 – 3819 ]**
CONFIDENCE INTERVAL: ± [ 1530 – 1362 ]
SAMPLE AREA: [ 348 – 388 ] sqkm
SE: [ 750 – 668 ]
PRP: [ 36 – 36 ] %



# BUF – Buffalo — NAMIBIA – KAVANGO ZAMBEZI

**STRATUM CODE:** BUF **N:** 104 $S_a^2$: 13,493
**STRATUM NAME:** Buffalo **w:** 315 **df:** 31

| 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, | 19 | 0 | 61 | 103 | 0,052 | 2574 | 50,73 | 0 | 164 | 170 | 11,281 | 3,506 |
| buffalo | Syncerus caffer | 989 | 688 | 3161 | 1405 | 2,685 | 474331 | 688,72 | 1756 | 4565 | 44 | 2351,249 | 79,968 |
| 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 | 62 | 0 | 198 | 159 | 0,168 | 6109 | 78,16 | 39 | 358 | 80 | 25,931 | 0,915 |
| donkey | Equus asinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| duiker | Sylvicapra grimmia | 2 | 0 | 6 | 11 | 0,005 | 30 | 5,47 | 0 | 18 | 175 | 0,125 | -0,200 |
| eland | Tragelaphus oryx | 11 | 7 | 35 | 50 | 0,030 | 608 | 24,66 | 0 | 85 | 143 | 2,555 | -0,361 |
| elephant bulls | Loxodonta africana males | 82 | 120 | 262 | 190 | 0,223 | 8651 | 93,01 | 72 | 452 | 72 | 40,448 | 9,633 |
| elephant family | Loxodonta africana family | 1176 | 1823 | 3758 | 1427 | 3,192 | 489433 | 699,60 | 2331 | 5185 | 38 | 2228,194 | 44,215 |
| elephant carcass one | Loxodonta africana carcass one | 1 | 0 | 3 | 5 | 0,003 | 7 | 2,67 | 0 | 9 | 170 | 0,031 | 0,194 |
| elephant carcass two | Loxodonta africana carcass two | 3 | 0 | 10 | 12 | 0,008 | 36 | 6,01 | 0 | 22 | 128 | 0,152 | -0,043 |
| elephant carcass three | Loxodonta africana carcass three | 3 | 1 | 10 | 9 | 0,008 | 21 | 4,56 | 0 | 19 | 97 | 0,088 | 0,002 |
| elephant carcass four | Loxodonta africana carcass four | 14 | 2 | 45 | 19 | 0,038 | 85 | 9,24 | 26 | 64 | 42 | 0,383 | 0,517 |
| giraffe | Giraffa giraffa | 20 | 0 | 64 | 64 | 0,054 | 986 | 31,40 | 0 | 128 | 100 | 4,435 | 2,552 |
| 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 | 244 | 24 | 780 | 716 | 0,662 | 123127 | 350,89 | 64 | 1495 | 92 | 571,339 | 40,112 |
| horse | Equus caballus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 274 | 9 | 876 | 567 | 0,744 | 77326 | 278,08 | 308 | 1443 | 65 | 347,351 | 17,247 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 97 | 13 | 310 | 122 | 0,263 | 3583 | 59,86 | 188 | 432 | 39 | 17,967 | 6,931 |
| 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 | 15 | 9 | 48 | 30 | 0,041 | 211 | 14,54 | 18 | 78 | 62 | 1,031 | 1,887 |
| puku | Kobus vardonii | 2 | 0 | 6 | 11 | 0,005 | 29 | 5,35 | 0 | 17 | 171 | 0,125 | 0,309 |
| red lechwe | Kobus leche | 260 | 72 | 831 | 560 | 0,706 | 75286 | 274,38 | 271 | 1390 | 67 | 376,048 | 44,130 |
| reedbuck | Redunca arundinum | 2 | 0 | 6 | 11 | 0,005 | 29 | 5,37 | 0 | 17 | 171 | 0,125 | 0,262 |
| roan | Hippotragus equinus | 36 | 10 | 115 | 63 | 0,098 | 951 | 30,83 | 52 | 178 | 55 | 4,113 | 0,998 |
| sable | Hippotragus niger | 398 | 136 | 1272 | 792 | 1,080 | 150868 | 388,42 | 480 | 2064 | 62 | 618,899 | -3,500 |
| 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 | 30 | 0 | 96 | 120 | 0,081 | 3472 | 58,92 | 0 | 216 | 125 | 15,480 | 4,846 |
| warthog | Phacochoerus africanus | 47 | 0 | 150 | 79 | 0,128 | 1490 | 38,60 | 71 | 229 | 52 | 7,741 | 6,338 |
| waterbuck | Kobus ellipsiprymnus | 28 | 6 | 89 | 91 | 0,076 | 1996 | 44,68 | 0 | 181 | 102 | 8,823 | 2,647 |
| wildebeest | Connochaetes taurinus | 0 | 10 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| zebra | Equus spp, | 88 | 10 | 281 | 186 | 0,239 | 8352 | 91,39 | 95 | 468 | 66 | 38,323 | 7,410 |
| all elephants | Loxodonta africana all | 1258 | 1943 | 4020 | 1435 | 3,415 | 495118 | 703,65 | 2585 | 5455 | 36 | 2318,028 | 53,848 |
| C1-2 elephant carcasses | Loxodonta africana carcass 1-2 | 4 | 0 | 13 | 13 | 0,011 | 41 | 6,43 | 0 | 26 | 103 | 0,177 | 0,151 |
| all elephant carcasses | Loxodonta africana carcass all | 21 | 3 | 67 | 25 | 0,057 | 153 | 12,38 | 42 | 92 | 38 | 0,684 | 0,670 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 17 | 3 | 54 | 19 | 0,046 | 86 | 9,28 | 35 | 73 | 35 | 0,386 | 0,519 |

# BWA – Bwabwata

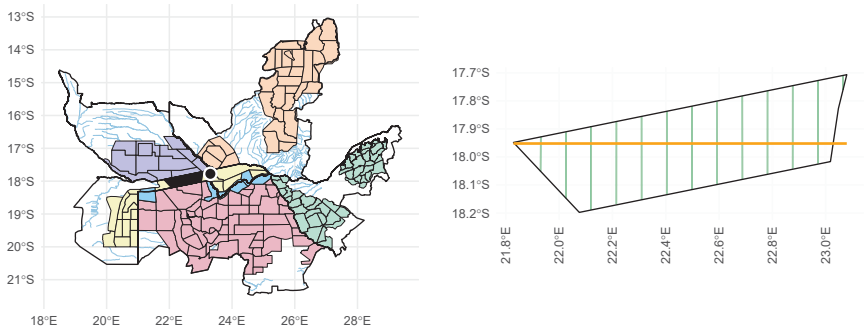
# NAMIBIA – KAVANGO ZAMBEZI

## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Kavango Zambezi
STRATUM CODE: BWA
STRATUM NAME: Bwabwata
■ STRATUM AREA: 3810.53 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 94 km

– TRANSECTS: 13 (379 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 3 %

– BASELINE DISTANCE: 132.46 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 3.7 h
Crew(s): C01
KES2022_V5IIM20221009A 06:30–10:11

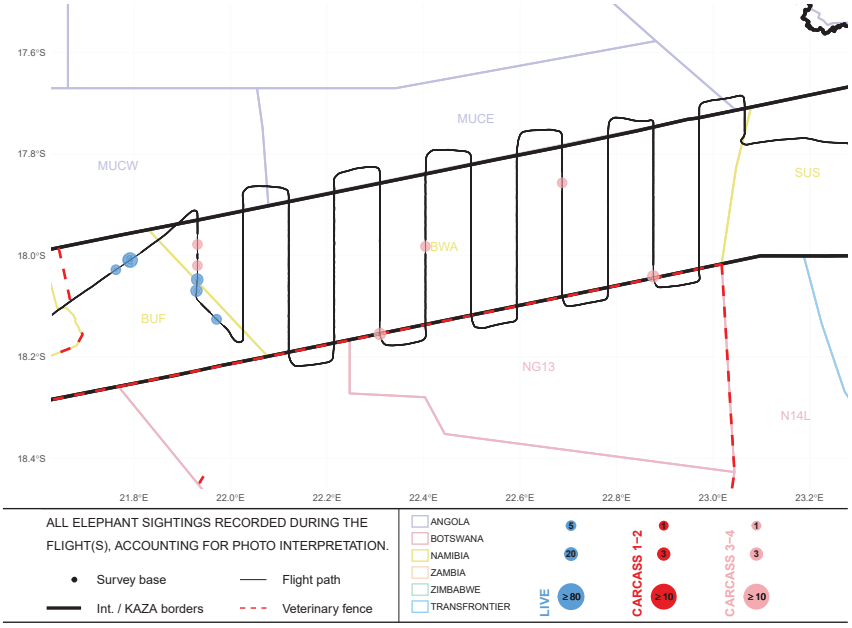
Actual sampling intensity: 3.2 %
Transect flying time: 2.3 h
Transects: 13 – 379 km – 0°
Search effort: 1.12 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C01 | |
| Side: | L | R |
| % sightings: | 43 | 57 |
| % individuals: | 52 | 48 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 10 | 30 | 33.33 |
| Live elephant (>9): | 0 | | |
| Elephant carcass: | 6 | 33.33 | 0 |
| Live elephant (<10): | 0 | | |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **0 (0)** |
| Bulls: | 0 (0) |
| Family: | 0 (0) |
| **NOT IN SAMPLE:** | **101 (7)** |
| Outside search strip: | 14 |
| Off transect: | 87 |

## ELEPHANT CARCASSES



| | |
|---|---|
| **IN SAMPLE:** | **8 (6)** |
| Category 1: | 0 (0) |
| Category 2: | 0 (0) |
| Category 3: | 8 (6) |
| 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: | 44 |
| Domestic count: | 28 |

## ELEPHANT DATA ANALYSIS

t = 2.179, N = 415, w = 319

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | – | – | 252 | 252 |
| Variance of estimate | $\mathrm{Var}\hat{Y}$ | – | – | 10394 | 10394 |
| Standard error | $\mathrm{SE}\hat{Y}$ | – | – | 102 | 102 |
| 95% confidence interval | $\mathrm{CI}_{\hat{Y}}^{95\%}$ | – | – | ± 222 | ± 222 |
| Percentage of relative precision | $\mathrm{PRP}\hat{Y}$ | – | – | 88 % | 88 % |
| Density per sqkm | $R\hat{Y}$ | – | – | 0.066 | 0.066 |
| Variance between transect counts | $s_y^2$ | – | – | 0.756 | 0.756 |
| Variance between transect areas | $s_a^2$ | – | – | 8.043 | 8.043 |
| Covariance between counts & areas | $s_{ay}$ | – | – | −0.135 | −0.135 |

## CARCASS RATIOS

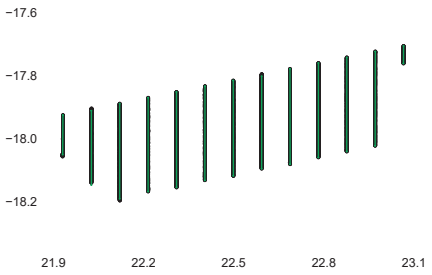
$CR_{1:4}$ = 100 %
$CR_{1:2}$ = n/a

BWA – Bwabwata NAMIBIA – KAVANGO ZAMBEZI

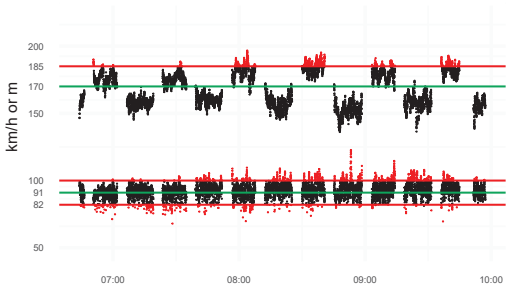
## ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5IIM20221009A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:




SPEED
Average: 167.6 km/h
Standard dev.: 12.6 km/h

HEIGHT AGL
Average: 92.6 m (303.8 ft)
Standard dev.: 5.3 m (17.5 ft)

## BWA – Bwabwata NAMIBIA – KAVANGO ZAMBEZI

**STRATUM CODE:** BWA **N:** 415 $S_a^2$: 8,043
**STRATUM NAME:** Bwabwata **w:** 319 **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 | 28 | 15 | 882 | 1901 | 0,231 | 761505 | 872,64 | 0 | 2783 | 216 | 60,308 | 3,101 |
| donkey | Equus asinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| duiker | Sylvicapra grimmia | 4 | 0 | 126 | 152 | 0,033 | 4861 | 69,72 | 0 | 278 | 121 | 0,397 | 0,418 |
| 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 | 5 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| elephant family | Loxodonta africana family | 0 | 96 | 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 | 8 | 0 | 252 | 222 | 0,066 | 10394 | 101,95 | 30 | 474 | 88 | 0,756 | -0,135 |
| 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 | 6 | 0 | 189 | 184 | 0,050 | 7168 | 84,66 | 5 | 373 | 98 | 0,603 | 0,647 |
| 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 | 63 | 136 | 0,017 | 3899 | 62,44 | 0 | 199 | 216 | 0,308 | 0,190 |
| 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 | 16 | 0 | 504 | 950 | 0,132 | 190242 | 436,17 | 0 | 1454 | 189 | 14,859 | 0,697 |
| 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, | 15 | 0 | 472 | 1021 | 0,124 | 219753 | 468,78 | 0 | 1494 | 216 | 17,308 | 1,282 |
| all elephants | Loxodonta africana all | 0 | 101 | 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 | 0 | 252 | 222 | 0,066 | 10394 | 101,95 | 30 | 474 | 88 | 0,756 | -0,135 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 8 | 0 | 252 | 222 | 0,066 | 10394 | 101,95 | 30 | 474 | 88 | 0,756 | -0,135 |

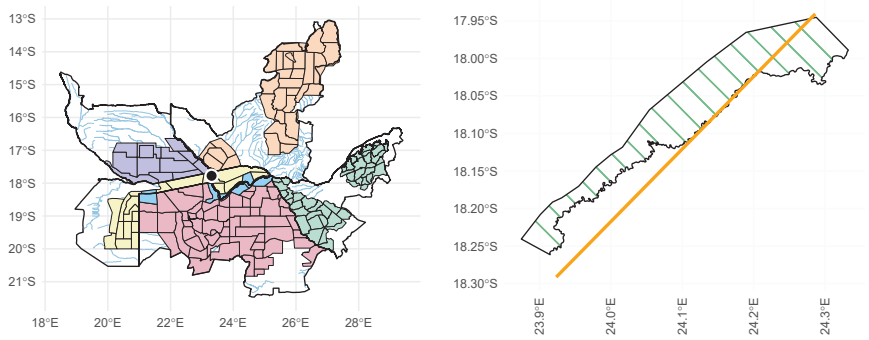
## CH1NA – CH1 Namibia — NAMIBIA – KAVANGO ZAMBEZI

### SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Kavango Zambezi
STRATUM CODE: CH1NA
STRATUM NAME: CH1 Namibia
■ STRATUM AREA: 294.4 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 89 km

– TRANSECTS: 17 (93 km)
TRANSECT ORIENTATION: 136°
PLANNED SAMPLING INTENSITY: 9.5 %

– BASELINE DISTANCE: 54.55 km




### SURVEY IMPLEMENTATION

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

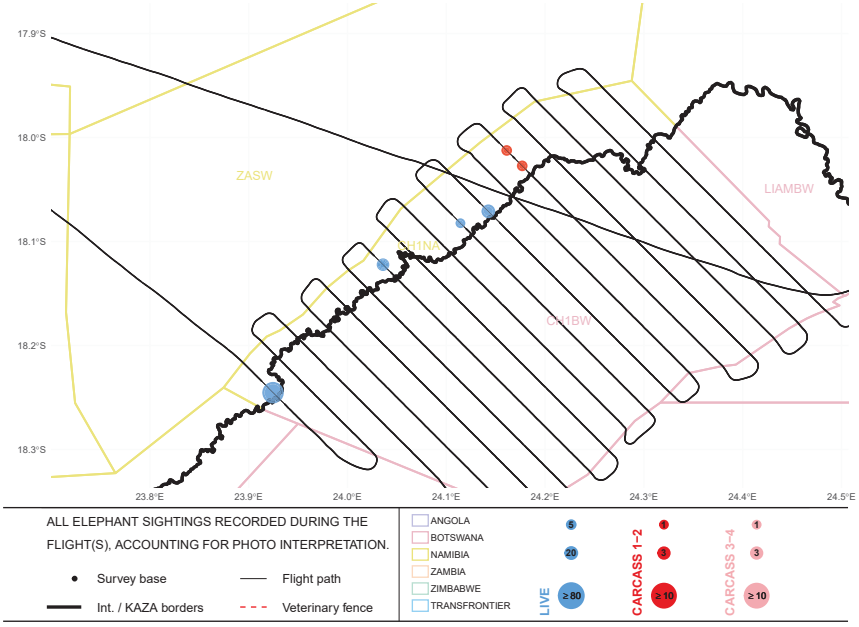
Actual sampling intensity: 10.1 %
Transect flying time: 0.6 h
Transects: 17 – 93 km – 136°
Search effort: 1.12 min/sqkm

### OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C01 | |
| Side: | L | R |
| % sightings: | 35 | 65 |
| % individuals: | 32 | 68 |

### PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 38 | 31.58 | 58.33 |
| Live elephant (>9): | 2 | 50 | 100 |
| Elephant carcass: | 2 | 50 | 0 |
| Live elephant (<10): | 1 | 100 | 0 |




### LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **52 (3)** |
| Bulls: | 3 (1) |
| Family: | 49 (2) |
| **NOT IN SAMPLE:** | **40 (3)** |
| Outside search strip: | 40 |
| Off transect: | 0 |



### ELEPHANT CARCASSES

| | |
|---|---|
| **IN SAMPLE:** | **2 (2)** |
| Category 1: | 0 (0) |
| Category 2: | 2 (2) |
| 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: | 641 |
| Domestic count: | 871 |

### ELEPHANT DATA ANALYSIS

t = 2.12, N = 171, w = 319

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 445 | 515 | 20 | 20 |
| Variance of estimate | $Var\hat{Y}$ | 91537 | 107898 | 365 | 365 |
| Standard error | $SE\hat{Y}$ | 303 | 328 | 19 | 19 |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 641 | ± 696 | ± 40 | ± 40 |
| Percentage of relative precision | $PRP\hat{Y}$ | 144 % | 135 % | 204 % | 204 % |
| Density per sqkm | $R\hat{Y}$ | 1.513 | 1.749 | 0.067 | 0.067 |
| Variance between transect counts | $s^2_y$ | 58.368 | 69.434 | 0.235 | 0.235 |
| Variance between transect areas | $s^2_a$ | 0.631 | 0.631 | 0.631 | 0.631 |
| Covariance between counts & areas | $s_{ay}$ | 0.265 | 0.516 | 0.023 | 0.023 |

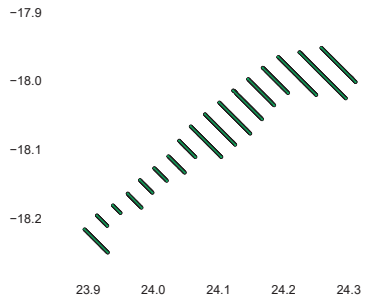
### CARCASS RATIOS

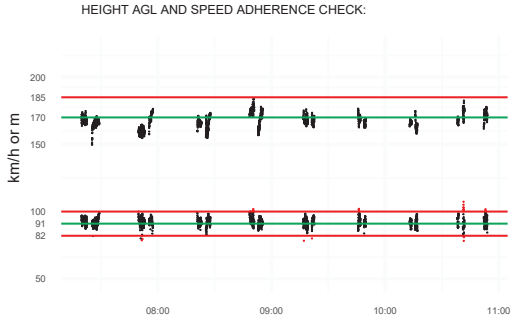
$CR_{1:4}$ = 3.7 %
$CR_{1:2}$ = 3.7 %

## CH1NA – CH1 Namibia — NAMIBIA – KAVANGO ZAMBEZI

### ADHERENCE TO FLIGHT PARAMETERS

**KES2022_ V5IIM20221004A**



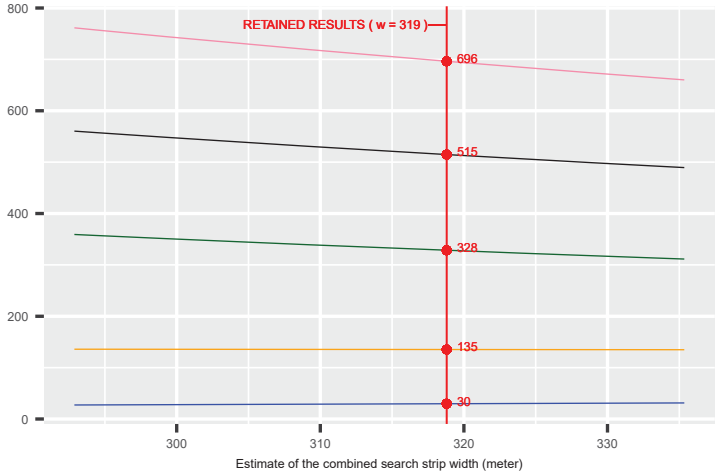

SPEED
Average: 167.3 km/h
Standard dev.: 5.9 km/h

HEIGHT AGL
Average: 92.5 m (303.4 ft)
Standard dev.: 3.2 m (10.6 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: [160 – 192]
C01 – Right: [121 – 162]




**LIVE ELEPHANT ESTIMATE: [ 560 – 489 ]**
CONFIDENCE INTERVAL: ± [ 761 – 660 ]
SAMPLE AREA: [ 27 – 31 ] sqkm
SE: [ 359 – 311 ]
PRP: [ 136 – 135 ] %

## CH1NA – CH1 Namibia NAMIBIA – KAVANGO ZAMBEZI

**STRATUM CODE:** CH1NA **N:** 152 $S_a^2$: 0,631
**STRATUM NAME:** CH1 Namibia **w:** 319 **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 | 80 | 110 | 792 | 1054 | 2,690 | 247018 | 497,01 | 0 | 1846 | 133 | 163,596 | 1,657 |
| 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 | 871 | 96 | 8622 | 6433 | 29,288 | 9207184 | 3034,33 | 2190 | 15055 | 75 | 5488,191 | 1,607 |
| 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 | 3 | 1 | 30 | 62 | 0,101 | 862 | 29,37 | 0 | 92 | 210 | 0,529 | -0,100 |
| elephant family | Loxodonta africana family | 49 | 39 | 485 | 697 | 1,648 | 108068 | 328,74 | 0 | 1182 | 144 | 69,985 | 0,616 |
| 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 | 20 | 40 | 0,067 | 365 | 19,10 | 0 | 60 | 204 | 0,235 | 0,023 |
| 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 | 7 | 0 | 69 | 139 | 0,235 | 4275 | 65,39 | 0 | 208 | 200 | 2,882 | 0,342 |
| 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 | 11 | 0 | 109 | 200 | 0,370 | 8877 | 94,22 | 0 | 309 | 183 | 5,868 | 0,313 |
| zebra | Equus spp, | 543 | 299 | 5375 | 4079 | 18,259 | 3702933 | 1924,30 | 1296 | 9455 | 76 | 2812,934 | 17,423 |
| all elephants | Loxodonta africana all | 52 | 40 | 515 | 696 | 1,749 | 107898 | 328,48 | 0 | 1211 | 135 | 69,434 | 0,516 |
| C1-2 elephant carcasses | Loxodonta africana carcass 1-2 | 2 | 0 | 20 | 40 | 0,067 | 365 | 19,10 | 0 | 60 | 204 | 0,235 | 0,023 |
| all elephant carcasses | Loxodonta africana carcass all | 2 | 0 | 20 | 40 | 0,067 | 365 | 19,10 | 0 | 60 | 204 | 0,235 | 0,023 |
| 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 |

# CRNA – Chobe River NE Namibia

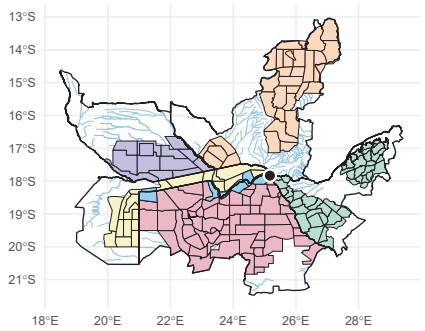
# NAMIBIA – KAVANGO ZAMBEZI

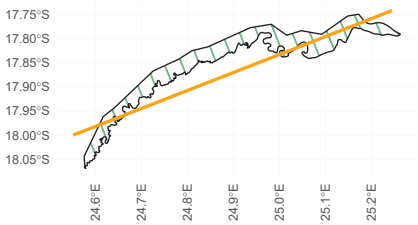
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Kavango Zambezi
STRATUM CODE: CRNA
STR. NAME: Chobe River NE Namibia
■ STRATUM AREA: 274.2 sqkm
• SURVEY BASE: Kasane
DISTANCE TO SURVEY BASE: 50 km

– TRANSECTS: 21 (73 km)
TRANSECT ORIENTATION: 159.6°
PLANNED SAMPLING INTENSITY: 8 %

– BASELINE DISTANCE: 78.74 km




## SURVEY IMPLEMENTATION

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

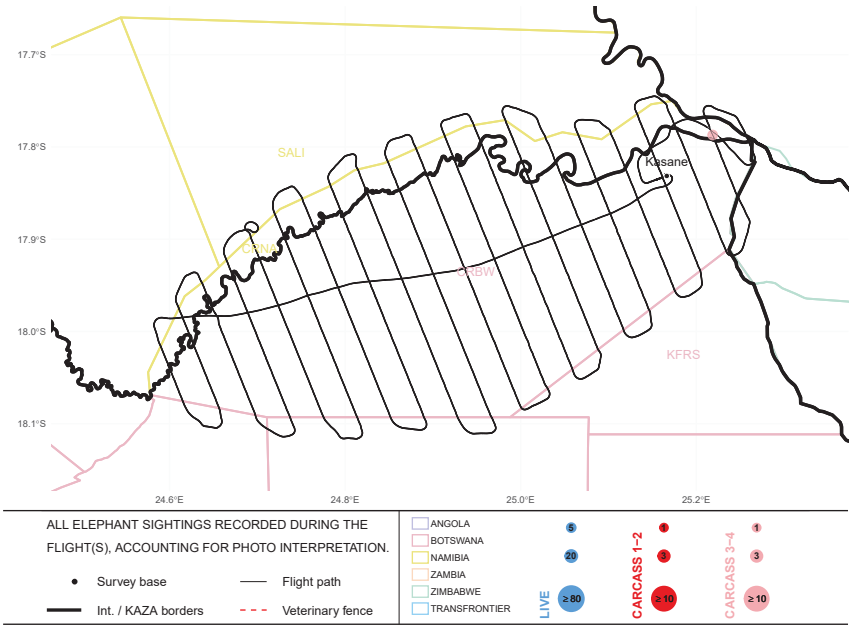
Actual sampling intensity: 8.6 %
Transect flying time: 0.4 h
Transects: 21 – 73 km – 0°
Search effort: 1.08 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C02 | |
| Side: | L | R |
| % sightings: | 48 | 52 |
| % individuals: | 51 | 49 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 17 | 41.18 | 57.14 |
| 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: | 0 (0) |
| Category 4: | 1 (1) |
| **NOT IN SAMPLE:** | **0 (0)** |
| Outside search strip: | 0 |
| Off transect: | 0 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 5 |
| Other wildlife count: | 225 |
| Domestic count: | 285 |

## ELEPHANT DATA ANALYSIS

t = 2.086, N = 243, w = 324

| | | LIVE OBS | LIVE FINAL | ALL CARCASSES OBS | ALL CARCASSES FINAL |
|---|---|---|---|---|---|
| Population estimate | $\hat{Y}$ | – | – | 12 | 12 |
| Variance of estimate | $Var\hat{Y}$ | – | – | 133 | 133 |
| Standard error | $SE\hat{Y}$ | – | – | 12 | 12 |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | – | – | ± 24 | ± 24 |
| Percentage of relative precision | $PRP\hat{Y}$ | – | – | 208 % | 208 % |
| Density per sqkm | $R\hat{Y}$ | – | – | 0.042 | 0.042 |
| Variance between transect counts | $s^2_y$ | – | – | 0.048 | 0.048 |
| Variance between transect areas | $s^2_a$ | – | – | 0.203 | 0.203 |
| Covariance between counts & areas | $s_{ay}$ | – | – | −0.044 | −0.044 |

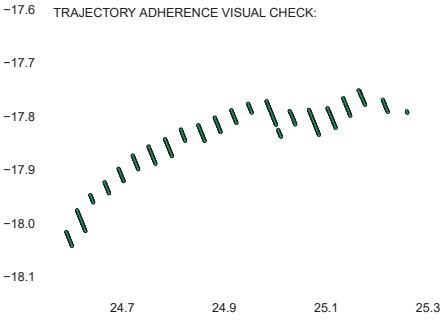
## CARCASS RATIOS

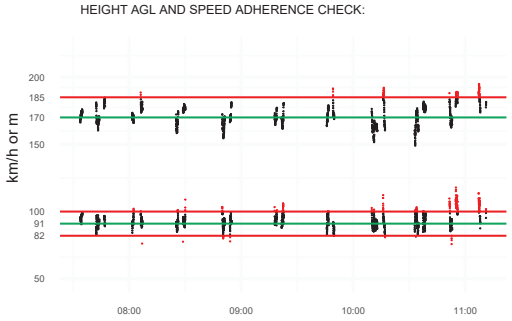
$CR_{1:4}$ = 100 %
$CR_{1:2}$ = n/a

## CRNA – Chobe River NE Namibia NAMIBIA – KAVANGO ZAMBEZI

### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5LJB20221001A




SPEED
Average: 171.5 km/h
Standard dev.: 8.2 km/h

HEIGHT AGL
Average: 93.5 m (306.8 ft)
Standard dev.: 5.8 m (18.9 ft)

## CRNA – Chobe River NE Namibia NAMIBIA – KAVANGO ZAMBEZI

**STRATUM CODE:** CRNA **N:** 225 $S_a^2$: 0,203
**STRATUM NAME:** Chobe River NE Namibia **w:** 324 **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, | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| buffalo | Syncerus caffer | 30 | 0 | 347 | 699 | 1,266 | 112328 | 335,15 | 0 | 1046 | 201 | 42,857 | -0,158 |
| 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 | 278 | 20 | 3216 | 2562 | 11,728 | 1508371 | 1228,16 | 654 | 5778 | 80 | 565,990 | 0,370 |
| 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 | 1 | 0 | 12 | 24 | 0,042 | 133 | 11,54 | 0 | 36 | 208 | 0,048 | -0,044 |
| 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 | 1 | 0 | 12 | 23 | 0,042 | 121 | 10,99 | 0 | 34 | 198 | 0,048 | 0,013 |
| horse | Equus caballus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 15 | 0 | 174 | 346 | 0,633 | 27467 | 165,73 | 0 | | 199 | 10,714 | 0,110 |
| 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 | 7 | 0 | 81 | 163 | 0,295 | 6088 | 78,03 | 0 | 244 | 201 | 2,333 | -0,019 |
| 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, | 173 | 74 | 2001 | 2296 | 7,298 | 1211497 | 1100,68 | 0 | 4297 | 115 | 487,890 | 1,963 |
| 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 | 12 | 24 | 0,042 | 133 | 11,54 | 0 | 36 | 208 | 0,048 | -0,044 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 1 | 0 | 12 | 24 | 0,042 | 133 | 11,54 | 0 | 36 | 208 | 0,048 | -0,044 |

# EZN – E Zambezi North

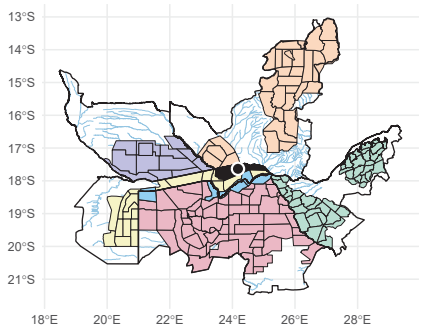
# NAMIBIA – KAVANGO ZAMBEZI

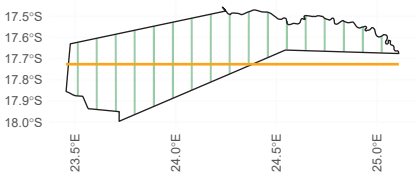
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Kavango Zambezi
STRATUM CODE: EZN
STRATUM NAME: E Zambezi North
■ STRATUM AREA: 4792.03 sqkm
• SURVEY BASE: Katima Mulilo
DISTANCE TO SURVEY BASE: 29 km

– TRANSECTS: 17 (480 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 3 %

– BASELINE DISTANCE: 175.31 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 2**
Combined flying time: 5.1 h
Crew(s): C02, C04
KES2022_V5LJB20221002A 09:25–11:46
KES2022_V5WOT20221002A 09:22–12:07

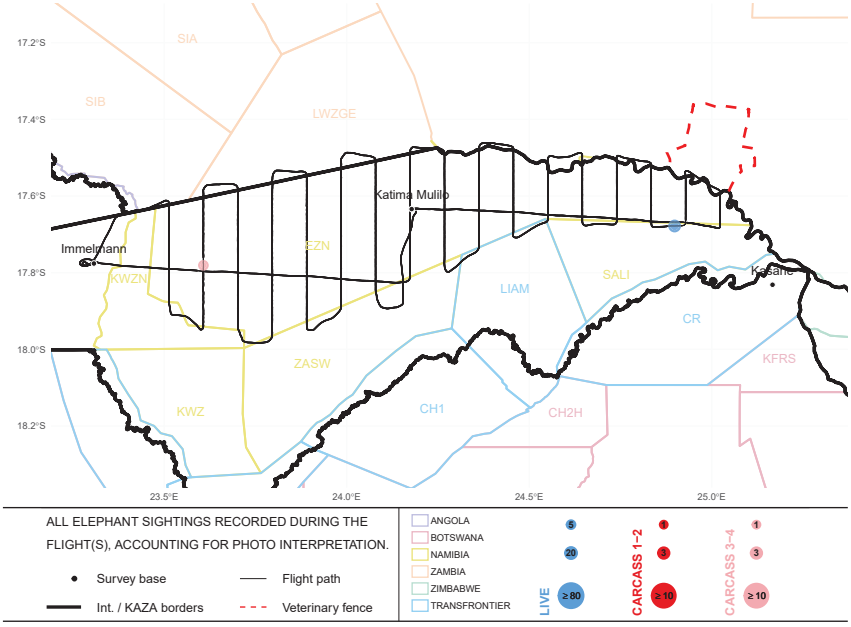
Actual sampling intensity: 3.2 %
Transect flying time: 2.8 h
Transects: 17 – 480 km – 0°
Search effort: 1.09 min/sqkm

## OBSERVER CONTRIBUTION

| Crew(s): | C02 | | C04 | |
|---|---|---|---|---|
| Side: | L | R | L | R |
| % sightings: | 51 | 49 | 38 | 62 |
| % individuals: | 64 | 36 | 28 | 72 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 70 | 27.14 | 73.68 |
| 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:** | **15 (1)** |
| Outside search strip: | 0 |
| Off transect: | 15 |



## ELEPHANT CARCASSES

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

## OTHER SPECIES

| Other wildlife species: | 6 |
|---|---|
| Other wildlife count: | 31 |
| Domestic count: | 2162 |

## ELEPHANT DATA ANALYSIS

t = 2.12, N = 557, w = 314

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | – | – | 32 | 32 |
| Variance of estimate | $\mathrm{Var}\hat{Y}$ | – | – | 1008 | 1008 |
| Standard error | $\mathrm{SE}\hat{Y}$ | – | – | 32 | 32 |
| 95% confidence interval | $\mathrm{CI}_{\hat{Y}}^{95\%}$ | – | – | ± 67 | ± 67 |
| Percentage of relative precision | $\mathrm{PRP}\hat{Y}$ | – | – | 212 % | 212 % |
| Density per sqkm | $R\hat{Y}$ | – | – | 0.007 | 0.007 |
| Variance between transect counts | $s_y^2$ | – | – | 0.059 | 0.059 |
| Variance between transect areas | $s_a^2$ | – | – | 14.33 | 14.33 |
| Covariance between counts & areas | $s_{ay}$ | – | – | 0.202 | 0.202 |

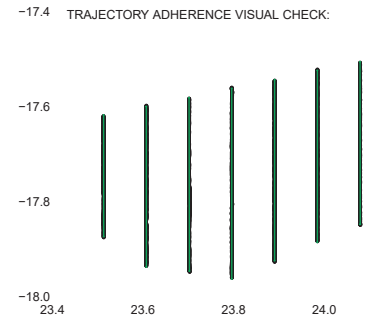
## CARCASS RATIOS

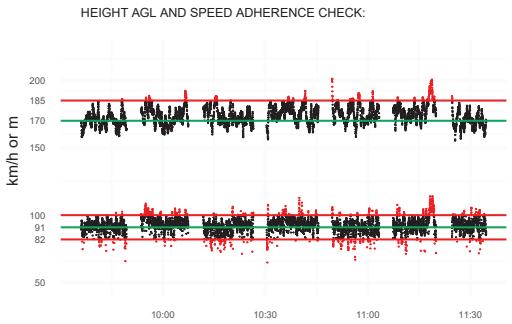
$CR_{1:4}$ = 100 %
$CR_{1:2}$ = n/a

## EZN – E Zambezi North NAMIBIA – KAVANGO ZAMBEZI

### ADHERENCE TO FLIGHT PARAMETERS

#### KES2022_ V5LJB20221002A

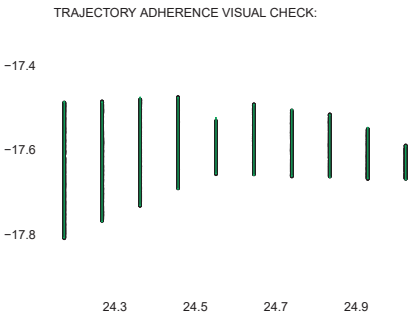


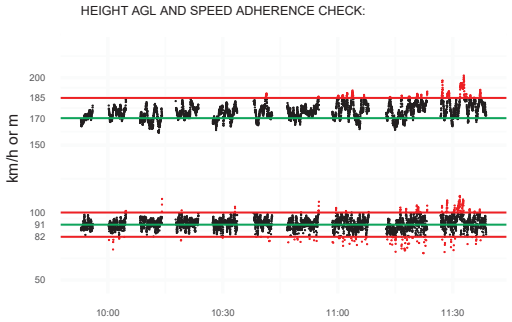




SPEED
Average: 173.8 km/h
Standard dev.: 6.9 km/h

HEIGHT AGL
Average: 92.5 m (303.4 ft)
Standard dev.: 5.6 m (18.5 ft)

#### KES2022_ V5WOT20221002A




SPEED
Average: 175.3 km/h
Standard dev.: 6.2 km/h

HEIGHT AGL
Average: 91.6 m (300.5 ft)
Standard dev.: 4.8 m (15.7 ft)

## EZN – E Zambezi North NAMIBIA – KAVANGO ZAMBEZI

**STRATUM CODE:** EZN **N:** 558 $S_a^2$: 14,330
**STRATUM NAME:** E Zambezi North **w:** 314 **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 | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| bushbuck | Tragelaphus scriptus | 1 | 0 | 32 | 69 | 0,007 | 1046 | 32,34 | 0 | 100 | 216 | 0,059 | 0,039 |
| bushpig | Potamochoerus larvatus | 0 | 24 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| cattle | Bos taurus | 1999 | 178 | 63448 | 36878 | 13,240 | 302626249 | 17396,16 | 26570 | 100326 | 58 | 9002,132 | -209,204 |
| donkey | Equus asinus | 2 | 0 | 63 | 142 | 0,013 | 4504 | 67,11 | 0 | 206 | 224 | 0,235 | -0,605 |
| duiker | Sylvicapra grimmia | 12 | 1 | 381 | 277 | 0,079 | 17094 | 130,74 | 104 | 658 | 73 | 1,221 | 2,188 |
| 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 | 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 | 1 | 0 | 32 | 67 | 0,007 | 1008 | 31,74 | 0 | 99 | 212 | 0,059 | 0,202 |
| 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 | 16 | 5 | 508 | 1135 | 0,106 | 286406 | 535,17 | 0 | 1642 | 223 | 15,059 | -4,342 |
| 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 | 161 | 0 | 5110 | 4181 | 1,066 | 3889938 | 1972,29 | 929 | 9291 | 82 | 234,390 | 14,757 |
| 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 | 192 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| all elephants | Loxodonta africana all | 0 | 15 | 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 | 32 | 67 | 0,007 | 1008 | 31,74 | 0 | 99 | 212 | 0,059 | 0,202 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 1 | 0 | 32 | 67 | 0,007 | 1008 | 31,74 | 0 | 99 | 212 | 0,059 | 0,202 |

# KWZ – Kwando Zambezi

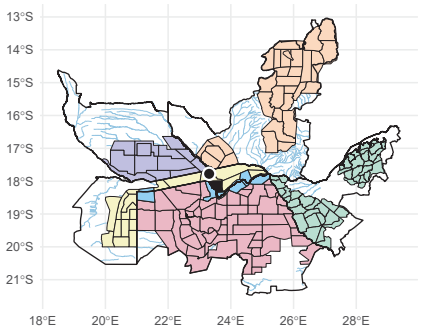
# NAMIBIA – KAVANGO ZAMBEZI

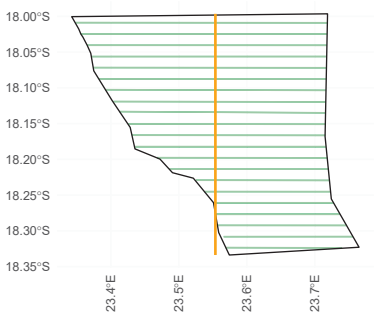
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Kavango Zambezi
STRATUM CODE: KWZ
STRATUM NAME: Kwando Zambezi
■ STRATUM AREA: 1057.25 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 51 km

– TRANSECTS: 21 (601 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 17.1 %

– BASELINE DISTANCE: 37.32 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.9 h
Crew(s): C01
KES2022_V5IIM20221007A 06:20–11:16

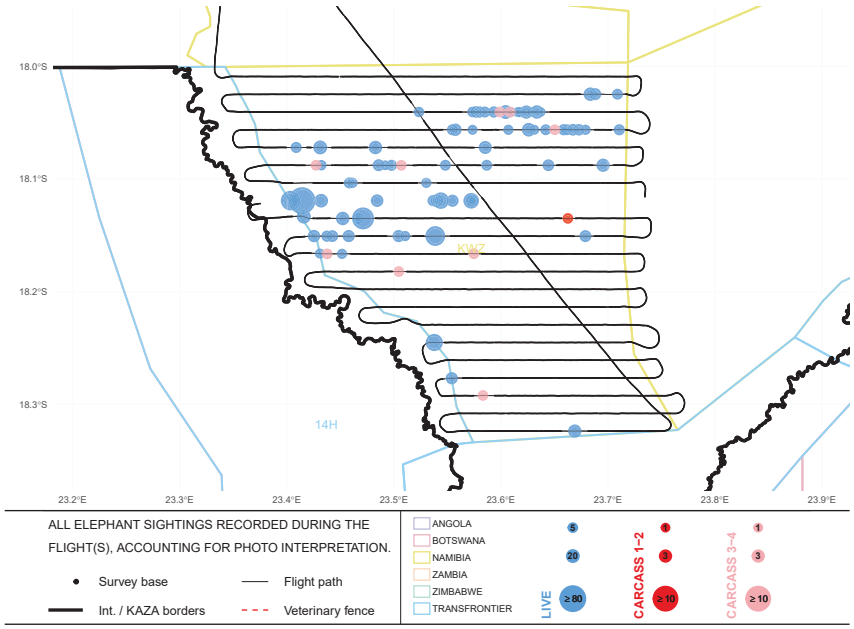
Actual sampling intensity: 17.9 %
Transect flying time: 3.6 h
Transects: 21 – 601 km – 90°
Search effort: 1.13 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C01 | |
| Side: | L | R |
| % sightings: | 42 | 58 |
| % individuals: | 44 | 56 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 138 | 16.67 | 60.87 |
| Live elephant (>9): | 20 | 60 | 41.67 |
| Elephant carcass: | 10 | 10 | 0 |
| Live elephant (<10): | 36 | 5.56 | 100 |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **499 (54)** |
| Bulls: | 19 (9) |
| Family: | 480 (45) |
| **NOT IN SAMPLE:** | **439 (29)** |
| Outside search strip: | 333 |
| Off transect: | 106 |

## ELEPHANT CARCASSES



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

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 15 |
| Other wildlife count: | 511 |
| Domestic count: | 1085 |

## ELEPHANT DATA ANALYSIS

t = 2.086, N = 118, w = 315

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 2662 | 2785 | 56 | 56 |
| Variance of estimate | $Var\hat{Y}$ | 472245 | 532734 | 282 | 282 |
| Standard error | $SE\hat{Y}$ | 687 | 730 | 17 | 17 |
| 95% confidence interval | $CI_{\hat{Y}}^{95\%}$ | ± 1433 | ± 1523 | ± 35 | ± 35 |
| Percentage of relative precision | $PRP\hat{Y}$ | 54 % | 55 % | 63 % | 63 % |
| Density per sqkm | $R\hat{Y}$ | 2.518 | 2.634 | 0.053 | 0.053 |
| Variance between transect counts | $s_y^2$ | 1032.914 | 1156.69 | 0.562 | 0.562 |
| Variance between transect areas | $s_a^2$ | 5.358 | 5.358 | 5.358 | 5.358 |
| Covariance between counts & areas | $s_{ay}$ | 41.15 | 42.539 | 0.599 | 0.599 |

## CARCASS RATIOS

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

## KWZ – Kwando Zambezi — NAMIBIA – KAVANGO ZAMBEZI

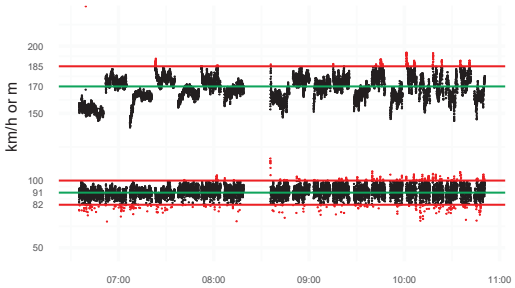
### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5IIM20221007A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:




SPEED
Average: 168.1 km/h
Standard dev.: 8.7 km/h

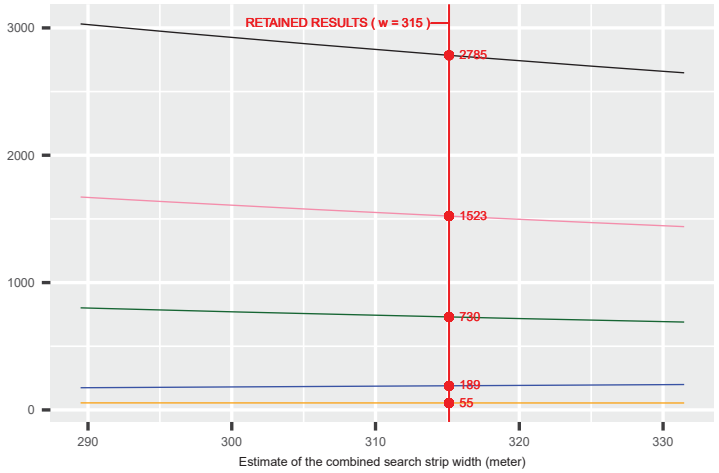
HEIGHT AGL
Average: 91.4 m (299.9 ft)
Standard dev.: 4.1 m (13.5 ft)

The laser altimeter did not record data throughout transect KWZ−14.

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: [ 3031 − 2647 ]**
CONFIDENCE INTERVAL: ± [ 1672 − 1439 ]
SAMPLE AREA: [ 174 − 199 ] sqkm
SE: [ 801 − 690 ]
PRP: [ 55 − 54 ] %

## KWZ – Kwando Zambezi NAMIBIA – KAVANGO ZAMBEZI

**STRATUM CODE:** KWZ **N:** 118 $S_a^2$: 5,358
**STRATUM NAME:** Kwando Zambezi **w:** 315 **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, | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| buffalo | Syncerus caffer | 114 | 435 | 636 | 1149 | 0,602 | 303533 | 550,94 | 0 | 1785 | 181 | 534,057 | -13,744 |
| bushbuck | Tragelaphus scriptus | 10 | 0 | 56 | 105 | 0,053 | 2547 | 50,47 | 0 | 161 | 189 | 4,762 | 1,323 |
| bushpig | Potamochoerus larvatus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| cattle | Bos taurus | 1054 | 255 | 5882 | 3783 | 5,564 | 3288933 | 1813,54 | 2099 | 9665 | 64 | 4795,462 | -92,177 |
| 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 | 19 | 23 | 106 | 99 | 0,100 | 2256 | 47,50 | 7 | 205 | 93 | 4,490 | 2,178 |
| elephant family | Loxodonta africana family | 480 | 416 | 2679 | 1470 | 2,534 | 496385 | 704,55 | 1209 | 4149 | 55 | 1073,729 | 40,361 |
| 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 | 6 | 11 | 0,005 | 26 | 5,09 | 0 | 16 | 190 | 0,048 | 0,054 |
| elephant carcass three | Loxodonta africana carcass three | 5 | 0 | 28 | 25 | 0,026 | 149 | 12,21 | 2 | 53 | 91 | 0,290 | 0,429 |
| elephant carcass four | Loxodonta africana carcass four | 4 | 0 | 22 | 25 | 0,021 | 142 | 11,94 | 0 | 47 | 112 | 0,262 | 0,117 |
| 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 | 1 | 0 | 6 | 11 | 0,005 | 27 | 5,20 | 0 | 16 | 194 | 0,048 | -0,134 |
| horse | Equus caballus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 58 | 5 | 324 | 318 | 0,306 | 23226 | 152,40 | 6 | 642 | 98 | 39,690 | -3,407 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 8 | 0 | 45 | 63 | 0,042 | 923 | 30,38 | 0 | 108 | 142 | 1,748 | 0,915 |
| 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 | 74 | 0 | 413 | 509 | 0,391 | 59567 | 244,06 | 0 | 922 | 123 | 100,762 | -8,772 |
| reedbuck | Redunca arundinum | 4 | 0 | 22 | 44 | 0,021 | 435 | 20,86 | 0 | 66 | 195 | 0,762 | -0,667 |
| roan | Hippotragus equinus | 24 | 4 | 134 | 119 | 0,127 | 3247 | 56,99 | 15 | 253 | 89 | 6,329 | 1,986 |
| sable | Hippotragus niger | 35 | 0 | 195 | 182 | 0,185 | 7581 | 87,07 | 14 | 377 | 93 | 15,333 | 4,642 |
| shoat | Capra hircus - Ovis aries | 31 | 0 | 173 | 248 | 0,164 | 14170 | 119,04 | 0 | 421 | 144 | 24,762 | -2,715 |
| 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 | 11 | 21 | 0,011 | 102 | 10,12 | 0 | 32 | 189 | 0,190 | 0,223 |
| warthog | Phacochoerus africanus | 8 | 0 | 45 | 40 | 0,042 | 359 | 18,95 | 5 | 84 | 89 | 0,648 | 0,038 |
| waterbuck | Kobus ellipsiprymnus | 8 | 0 | 45 | 87 | 0,042 | 1729 | 41,58 | 0 | 131 | 194 | 3,048 | -1,070 |
| wildebeest | Connochaetes taurinus | 28 | 61 | 156 | 151 | 0,148 | 5259 | 72,52 | 5 | 308 | 97 | 10,033 | 1,951 |
| zebra | Equus spp, | 136 | 2 | 759 | 434 | 0,718 | 43355 | 208,22 | 325 | 1193 | 57 | 94,962 | 13,095 |
| all elephants | Loxodonta africana all | 499 | 439 | 2785 | 1523 | 2,634 | 532734 | 729,89 | 1262 | 4307 | 55 | 1156,690 | 42,539 |
| C1-2 elephant carcasses | Loxodonta africana carcass 1-2 | 1 | 0 | 6 | 11 | 0,005 | 26 | 5,09 | 0 | 16 | 190 | 0,048 | 0,054 |
| all elephant carcasses | Loxodonta africana carcass all | 10 | 0 | 56 | 35 | 0,053 | 282 | 16,80 | 21 | 91 | 63 | 0,562 | 0,599 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 9 | 0 | 50 | 35 | 0,048 | 284 | 16,86 | 15 | 85 | 70 | 0,557 | 0,545 |

# KWZN – Kwando Zambezi North

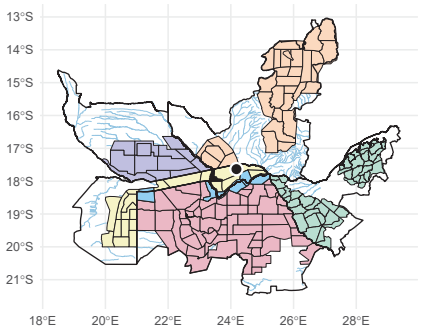
# NAMIBIA – KAVANGO ZAMBEZI

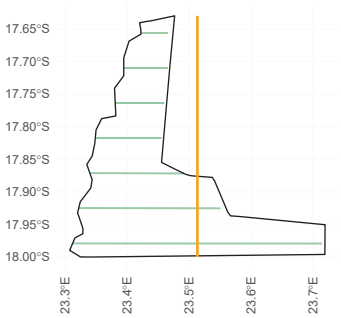
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Kavango Zambezi
STRATUM CODE: KWZN
STRATUM NAME: Kwando Zambezi North
■ STRATUM AREA: 685.89 sqkm
• SURVEY BASE: Katima Mulilo
DISTANCE TO SURVEY BASE: 85 km

– TRANSECTS: 7 (116 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 5.1 %

– BASELINE DISTANCE: 41 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 2.9 h
Crew(s): C01
KES2022_V5IIM20221002A 09:19–12:10

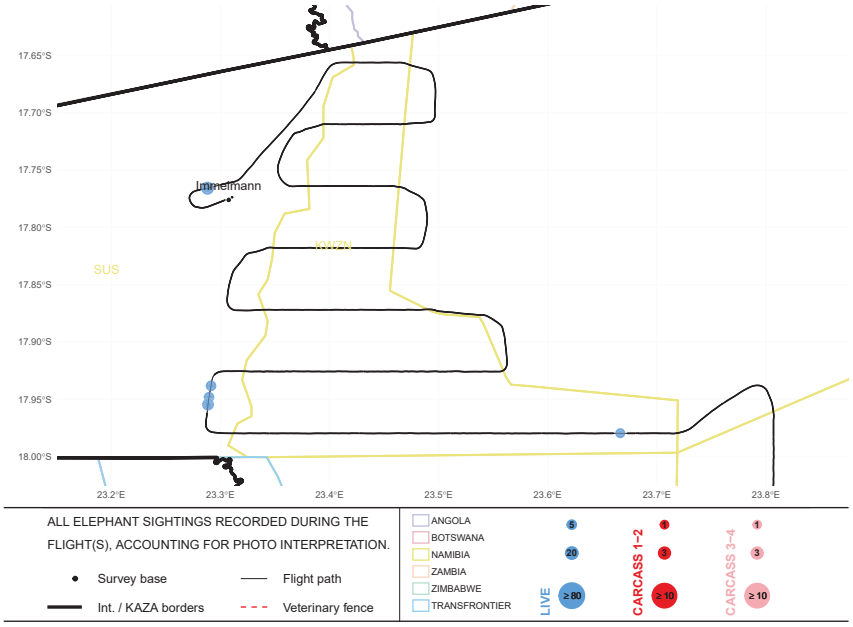
Actual sampling intensity: 5.5 %
Transect flying time: 0.7 h
Transects: 7 – 116 km – 90°
Search effort: 1.09 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C01 | |
| Side: | L | R |
| % sightings: | 40 | 60 |
| % individuals: | 49 | 51 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 23 | 39.13 | 88.89 |
| Live elephant (>9): | 0 | | |
| Elephant carcass: | 0 | | |
| Live elephant (<10): | 1 | 100 | 0 |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **2 (1)** |
| Bulls: | 0 (0) |
| Family: | 2 (1) |
| **NOT IN SAMPLE:** | **38 (5)** |
| Outside search strip: | 0 |
| Off transect: | 38 |

## 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: | 5 |
| Other wildlife count: | 42 |
| Domestic count: | 574 |

## ELEPHANT DATA ANALYSIS

t = 2.447, N = 125, w = 326

| | | LIVE OBS | LIVE FINAL | ALL CARCASSES OBS | ALL CARCASSES FINAL |
|---|---|---|---|---|---|
| Population estimate | $\hat{Y}$ | 36 | 36 | – | – |
| Variance of estimate | $Var\hat{Y}$ | 700 | 700 | – | – |
| Standard error | $SE\hat{Y}$ | 26 | 26 | – | – |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 65 | ± 65 | – | – |
| Percentage of relative precision | $PRP\hat{Y}$ | 178 % | 178 % | – | – |
| Density per sqkm | $R\hat{Y}$ | 0.053 | 0.053 | – | – |
| Variance between transect counts | $s^2_y$ | 0.571 | 0.571 | – | – |
| Variance between transect areas | $s^2_a$ | 18.331 | 18.331 | – | – |
| Covariance between counts & areas | $s_{ay}$ | 2.789 | 2.789 | – | – |

## CARCASS RATIOS

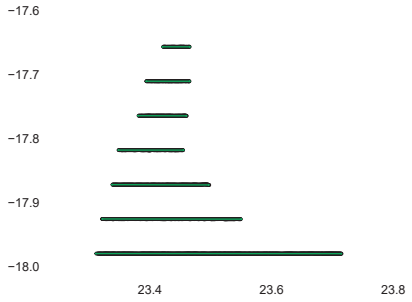
$CR_{1:4} = 0$ %
$CR_{1:2} = 0$ %

## KWZN – Kwando Zambezi North — NAMIBIA – KAVANGO ZAMBEZI

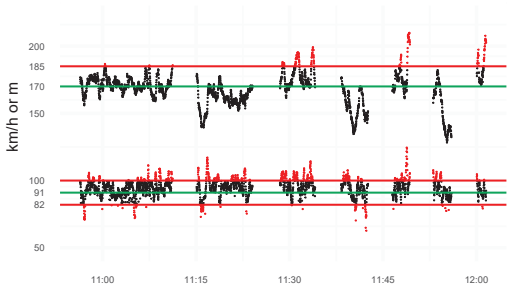
### ADHERENCE TO FLIGHT PARAMETERS

**KES2022_ V5IIM20221002A**

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



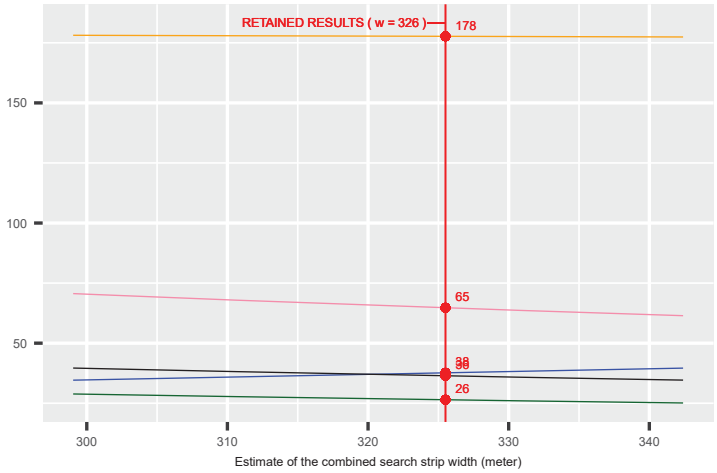

SPEED
Average: 168 km/h
Standard dev.: 12.8 km/h

HEIGHT AGL
Average: 94.4 m (309.8 ft)
Standard dev.: 6.8 m (22.4 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: [163 – 196]
C01 – Right: [123 – 165]




**LIVE ELEPHANT ESTIMATE: [ 40 – 35 ]**
CONFIDENCE INTERVAL: ± [ 71 – 61 ]
SAMPLE AREA: [ 35 – 40 ] sqkm
SE: [ 29 – 25 ]
PRP: [ 178 – 177 ] %

## KWZN – Kwando Zambezi North NAMIBIA – KAVANGO ZAMBEZI

**STRATUM CODE:** KWZN **N:** 126 $S_a^2$: 18,331
**STRATUM NAME:** Kwando Zambezi North **w:** 326 **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, | 2 | 0 | 36 | 65 | 0,053 | 700 | 26,45 | 0 | 101 | 178 | 0,571 | 2,789 |
| 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 | 406 | 32 | 7394 | 5100 | 10,780 | 4344392 | 2084,32 | 2294 | 12494 | 69 | 1610,000 | 79,344 |
| donkey | Equus asinus | 1 | 0 | 18 | 49 | 0,027 | 407 | 20,17 | 0 | 68 | 271 | 0,143 | -0,644 |
| duiker | Sylvicapra grimmia | 2 | 0 | 36 | 35 | 0,053 | 207 | 14,39 | 1 | 72 | 97 | 0,238 | 1,817 |
| 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 | 2 | 32 | 36 | 65 | 0,053 | 700 | 26,45 | 0 | 101 | 178 | 0,571 | 2,789 |
| 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 | 2 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| sable | Hippotragus niger | 37 | 0 | 674 | 984 | 0,982 | 161656 | 402,06 | 0 | 1658 | 146 | 151,571 | 47,708 |
| shoat | Capra hircus - Ovis aries | 167 | 0 | 3041 | 6515 | 4,434 | 7089951 | 2662,70 | 0 | 9557 | 214 | 3510,143 | 62,945 |
| 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 | 2 | 38 | 36 | 65 | 0,053 | 700 | 26,45 | 0 | 101 | 178 | 0,571 | 2,789 |
| 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 |

# LIAMNA – Liambezi Namibia

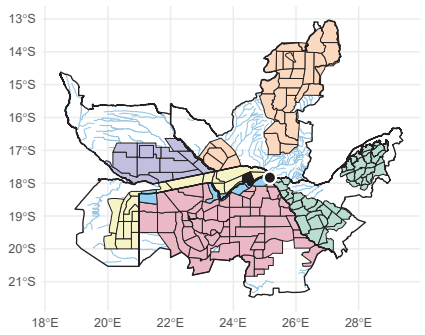
# NAMIBIA – KAVANGO ZAMBEZI

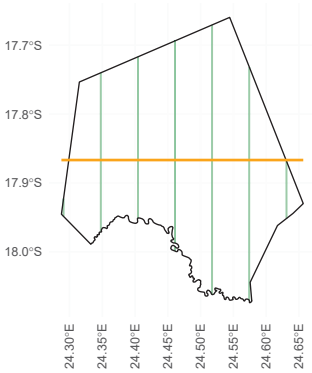
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Kavango Zambezi
STRATUM CODE: LIAMNA
STRATUM NAME: Liambezi Namibia
■ STRATUM AREA: 1074.1 sqkm
• SURVEY BASE: Kasane
DISTANCE TO SURVEY BASE: 75 km

– TRANSECTS: 7 (179 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 5 %

– BASELINE DISTANCE: 39.1 km




## SURVEY IMPLEMENTATION

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

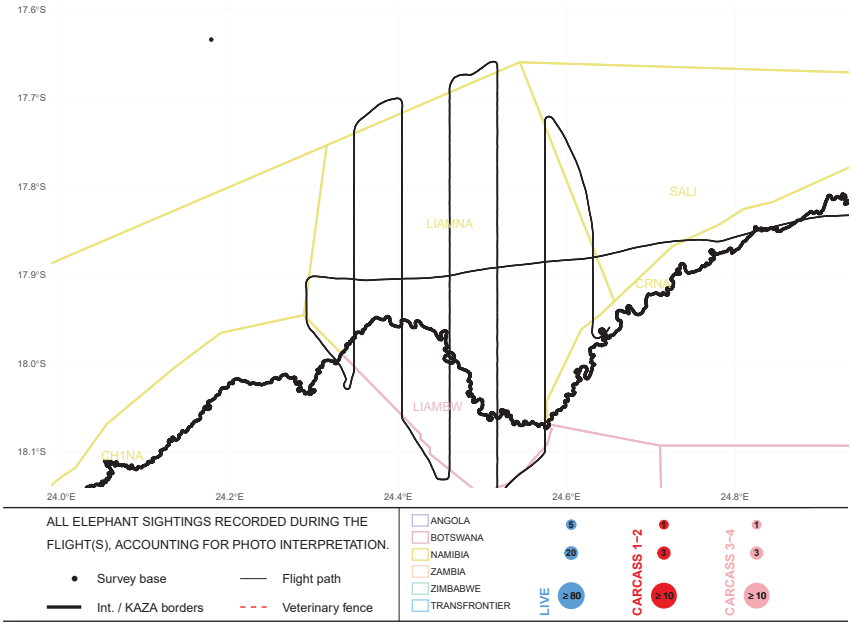
Actual sampling intensity: 5.2 %
Transect flying time: 1 h
Transects: 7 – 179 km – 0°
Search effort: 1.11 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C03 | |
| Side: | L | R |
| % sightings: | 36 | 64 |
| % individuals: | 32 | 68 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 24 | 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: | 6 |
| Other wildlife count: | 84 |
| Domestic count: | 560 |

## ELEPHANT DATA ANALYSIS

t = 2.447, N = 124, 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

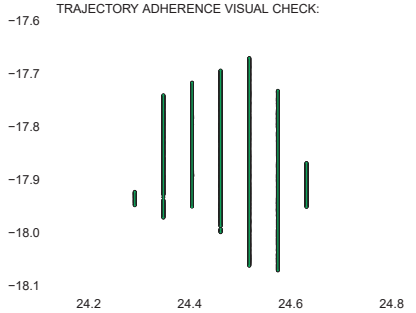
$CR_{1:4}$ = n/a
$CR_{1:2}$ = n/a

## LIAMNA – Liambezi Namibia — NAMIBIA – KAVANGO ZAMBEZI

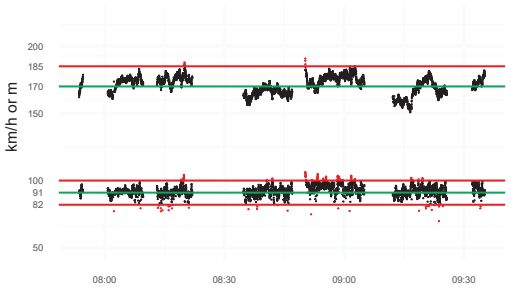
### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5WOT20221001A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:




SPEED
Average: 170.9 km/h
Standard dev.: 6.5 km/h

HEIGHT AGL
Average: 92.4 m (303.3 ft)
Standard dev.: 3.8 m (12.6 ft)

## LIAMNA – Liambezi Namibia NAMIBIA – KAVANGO ZAMBEZI

**STRATUM CODE:** LIAMNA **N:** 124 $S_a^2$: 22,098
**STRATUM NAME:** Liambezi Namibia **w:** 314 **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 | 502 | 0 | 9613 | 3839 | 8,950 | 2461249 | 1568,84 | 5774 | 13452 | 40 | 3302,905 | 217,564 |
| 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 | 1 | 0 | 19 | 40 | 0,018 | 267 | 16,33 | 0 | 59 | 209 | 0,143 | 0,622 |
| 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 | 7 | 0 | 134 | 303 | 0,125 | 15365 | 123,96 | 0 | 437 | 226 | 7,000 | -0,055 |
| 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 | 19 | 38 | 0,018 | 238 | 15,42 | 0 | 57 | 197 | 0,143 | 1,009 |
| 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 | 0 | 1111 | 1420 | 1,034 | 336976 | 580,50 | 0 | 2531 | 128 | 176,571 | 18,778 |
| 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 | 57 | 113 | 0,053 | 2141 | 46,27 | 0 | 171 | 197 | 1,286 | 3,027 |
| 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, | 69 | 159 | 1321 | 1640 | 1,230 | 449386 | 670,36 | 0 | 2962 | 124 | 328,476 | 59,635 |
| 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 |

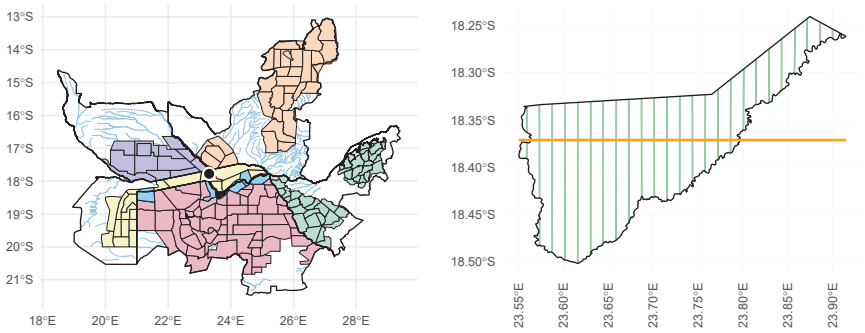
# MSNA – Mamili South Namibia — NAMIBIA – KAVANGO ZAMBEZI

## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Kavango Zambezi
STRATUM CODE: MSNA
STRATUM NAME: Mamili South Namibia
■ STRATUM AREA: 390.6 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 77 km

– TRANSECTS: 25 (262 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 20.1 %

– BASELINE DISTANCE: 38.53 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

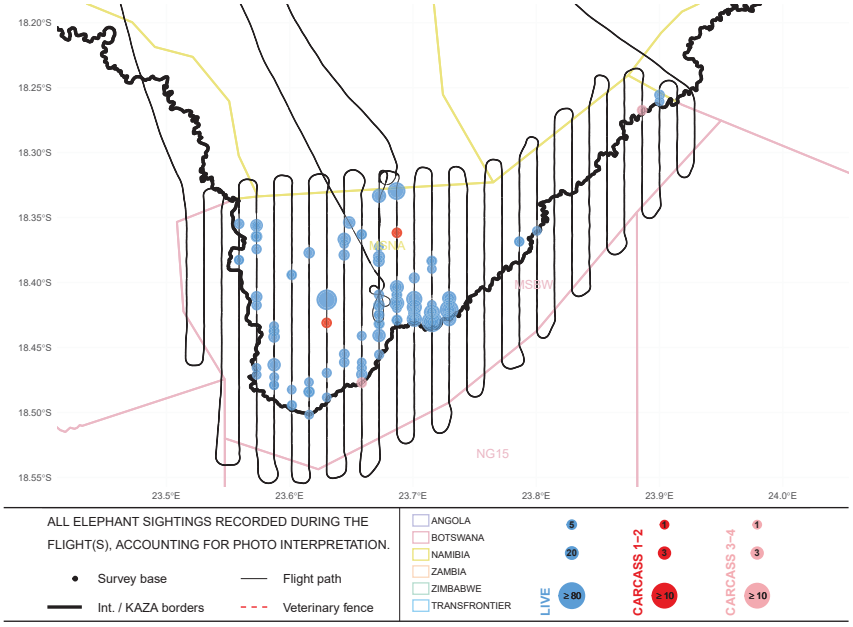
Actual sampling intensity: 21.1 %
Transect flying time: 1.5 h
Transects: 25 – 262 km – 0°
Search effort: 1.11 min/sqkm

## OBSERVER CONTRIBUTION

| Crew(s): | C01 | | C04 | |
|---|---|---|---|---|
| Side: | L | R | L | R |
| % sightings: | 40 | 60 | 39 | 61 |
| % individuals: | 47 | 53 | 26 | 74 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 171 | 12.28 | 42.86 |
| Live elephant (>9): | 13 | 69.23 | 33.33 |
| Elephant carcass: | 4 | 100 | 0 |
| Live elephant (<10): | 73 | 1.37 | 100 |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **497 (85)** |
| Bulls: | 91 (41) |
| Family: | 406 (44) |
| **NOT IN SAMPLE:** | **389 (31)** |
| Outside search strip: | 364 |
| Off transect: | 25 |



## ELEPHANT CARCASSES

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

## OTHER SPECIES

Other wildlife species: 15
Other wildlife count: 2722
Domestic count: 169

## ELEPHANT DATA ANALYSIS

t = 2.064, N = 122, w = 315

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 2330 | 2354 | 19 | 19 |
| Variance of estimate | $Var\hat{Y}$ | 177524 | 182729 | 65 | 65 |
| Standard error | $SE\hat{Y}$ | 421 | 427 | 8 | 8 |
| 95% confidence interval | $CI_{\hat{Y}}^{95\%}$ | ± 870 | ± 882 | ± 17 | ± 17 |
| Percentage of relative precision | $PRP\hat{Y}$ | 37 % | 37 % | 88 % | 88 % |
| Density per sqkm | $R\hat{Y}$ | 5.965 | 6.026 | 0.048 | 0.048 |
| Variance between transect counts | $s_y^2$ | 546.227 | 561.193 | 0.14 | 0.14 |
| Variance between transect areas | $s_a^2$ | 2.996 | 2.996 | 2.996 | 2.996 |
| Covariance between counts & areas | $s_{ay}$ | 23.425 | 23.703 | 0.098 | 0.098 |

## CARCASS RATIOS

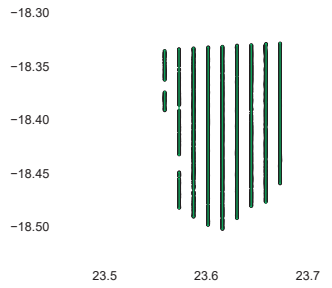
$CR_{1:4} = 0.8$ %
$CR_{1:2} = 0.4$ %

## MSNA – Mamili South Namibia — NAMIBIA – KAVANGO ZAMBEZI

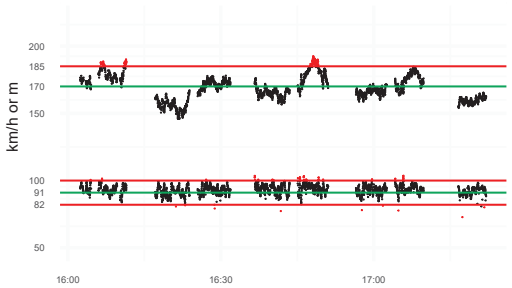
### ADHERENCE TO FLIGHT PARAMETERS

#### KES2022_ V5IIM20221004B

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:

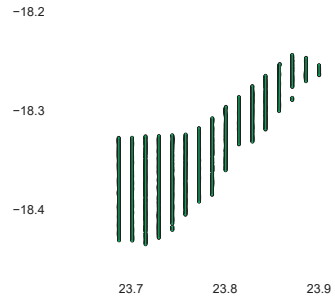



SPEED
Average: 168.6 km/h
Standard dev.: 9.4 km/h

HEIGHT AGL
Average: 93.1 m (305.4 ft)
Standard dev.: 3.5 m (11.5 ft)

#### KES2022_ V5WOT20221004B

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:




SPEED
Average: 174.3 km/h
Standard dev.: 7.1 km/h

HEIGHT AGL
Average: 92 m (301.8 ft)
Standard dev.: 3.3 m (10.7 ft)

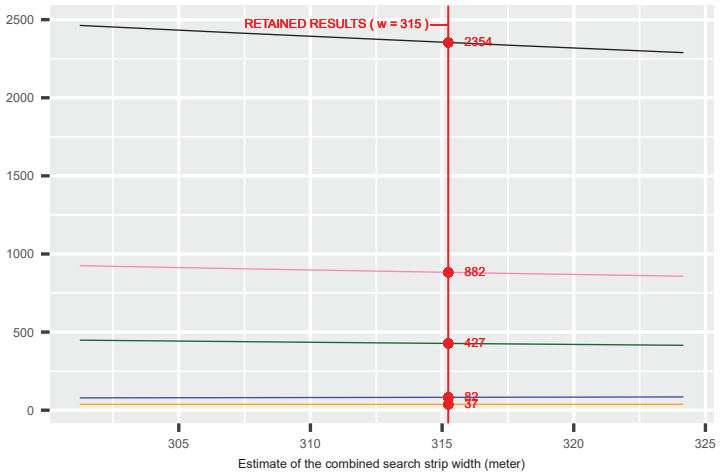
INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C01 – Left: [161 – 193]
C01 – Right: [122 – 163]

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

**LIVE ELEPHANT ESTIMATE: [ 2463 – 2289 ]**
CONFIDENCE INTERVAL: ± [ 925 – 858 ]
SAMPLE AREA: [ 79 – 85 ] sqkm
SE: [ 448 – 416 ]
PRP: [ 38 – 37 ] %



## MSNA – Mamili South Namibia — NAMIBIA – KAVANGO ZAMBEZI

**STRATUM CODE:** MSNA **N:** 122 $S_a^2$: 2,996
**STRATUM NAME:** Mamili South Namibia **w:** 315 **df:** 24

| 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, | 8 | 0 | 38 | 45 | 0,097 | 478 | 21,86 | 0 | 83 | 119 | 1,143 | 0,857 |
| buffalo | Syncerus caffer | 719 | 719 | 3405 | 2511 | 8,718 | 1480729 | 1216,85 | 894 | 5917 | 74 | 3254,773 | 21,120 |
| bushbuck | Tragelaphus scriptus | 1 | 0 | 5 | 9 | 0,012 | 18 | 4,24 | 0 | 13 | 185 | 0,040 | 0,110 |
| bushpig | Potamochoerus larvatus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| cattle | Bos taurus | 169 | 108 | 800 | 795 | 2,049 | 148367 | 385,18 | 5 | 1595 | 99 | 259,357 | -9,786 |
| 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 | 91 | 45 | 431 | 149 | 1,103 | 5234 | 72,35 | 282 | 580 | 35 | 19,990 | 5,723 |
| elephant family | Loxodonta africana family | 406 | 344 | 1923 | 883 | 4,923 | 183066 | 427,86 | 1040 | 2806 | 46 | 489,440 | 17,980 |
| elephant carcass one | Loxodonta africana carcass one | 1 | 0 | 5 | 9 | 0,012 | 19 | 4,37 | 0 | 14 | 191 | 0,040 | 0,010 |
| elephant carcass two | Loxodonta africana carcass two | 1 | 0 | 5 | 9 | 0,012 | 18 | 4,24 | 0 | 13 | 185 | 0,040 | 0,106 |
| elephant carcass three | Loxodonta africana carcass three | 2 | 0 | 9 | 13 | 0,024 | 38 | 6,14 | 0 | 22 | 134 | 0,077 | -0,018 |
| 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 | 158 | 15 | 748 | 306 | 1,916 | 22032 | 148,43 | 442 | 1055 | 41 | 57,977 | 5,907 |
| horse | Equus caballus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 303 | 15 | 1435 | 597 | 3,674 | 83780 | 289,45 | 838 | 2032 | 42 | 270,860 | 18,386 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 2 | 0 | 9 | 18 | 0,024 | 76 | 8,73 | 0 | 27 | 190 | 0,160 | 0,033 |
| 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 | 1032 | 52 | 4887 | 1938 | 12,512 | 881582 | 938,93 | 2950 | 6825 | 40 | 2662,377 | 51,041 |
| reedbuck | Redunca arundinum | 37 | 1 | 175 | 113 | 0,449 | 2980 | 54,59 | 63 | 288 | 64 | 6,593 | 1,035 |
| roan | Hippotragus equinus | 2 | 0 | 9 | 18 | 0,024 | 76 | 8,74 | 0 | 28 | 190 | 0,160 | 0,024 |
| 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 | 427 | 9 | 2022 | 600 | 5,177 | 84439 | 290,58 | 1422 | 2622 | 30 | 363,993 | 25,757 |
| waterbuck | Kobus ellipsiprymnus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| wildebeest | Connochaetes taurinus | 16 | 42 | 76 | 107 | 0,194 | 2688 | 51,85 | 0 | 183 | 141 | 5,990 | 1,158 |
| zebra | Equus spp, | 4 | 0 | 19 | 36 | 0,048 | 305 | 17,48 | 0 | 55 | 190 | 0,640 | 0,048 |
| all elephants | Loxodonta africana all | 497 | 389 | 2354 | 882 | 6,026 | 182729 | 427,47 | 1471 | 3236 | 37 | 561,193 | 23,703 |
| C1-2 elephant carcasses | Loxodonta africana carcass 1-2 | 2 | 0 | 9 | 12 | 0,024 | 35 | 5,88 | 0 | 22 | 128 | 0,077 | 0,116 |
| all elephant carcasses | Loxodonta africana carcass all | 4 | 0 | 19 | 17 | 0,048 | 65 | 8,09 | 2 | 36 | 88 | 0,140 | 0,098 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 2 | 0 | 9 | 13 | 0,024 | 38 | 6,14 | 0 | 22 | 134 | 0,077 | -0,018 |

# NG1NA – NG 1 Namibia

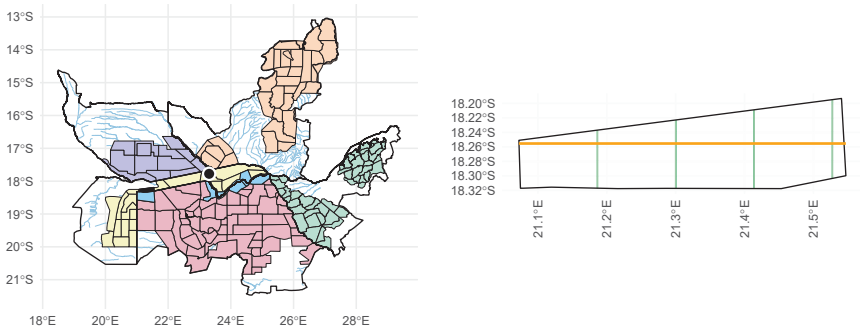
# NAMIBIA – KAVANGO ZAMBEZI

## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Kavango Zambezi
STRATUM CODE: NG1NA
STRATUM NAME: NG 1 Namibia
■ STRATUM AREA: 515.13 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 219 km

– TRANSECTS: 4 (43 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 2.5 %

– BASELINE DISTANCE: 50.21 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 2.8 h
Crew(s): C04
KES2022_V5WOT20221009A 06:29–09:16

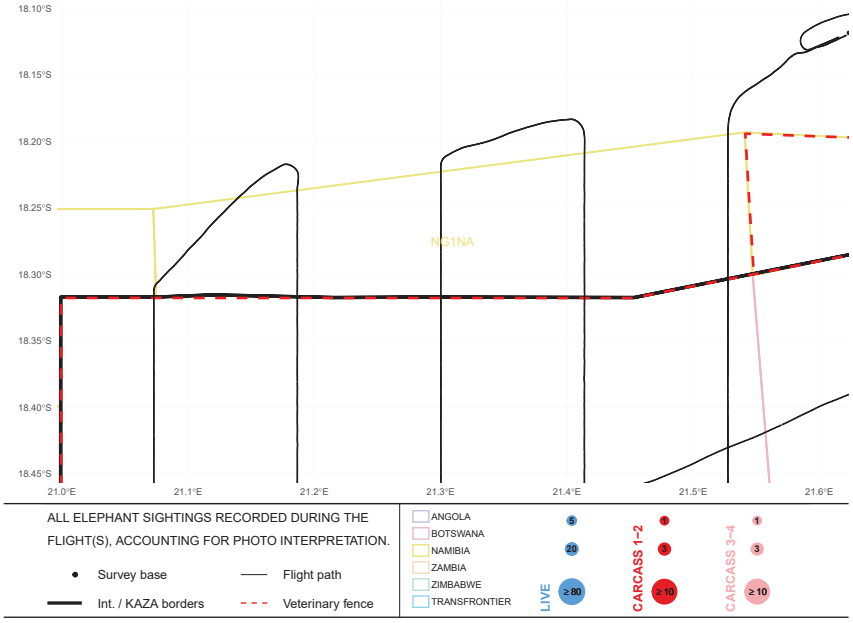
Actual sampling intensity: 2.6 %
Transect flying time: 0.2 h
Transects: 4 – 43 km – 0°
Search effort: 1.11 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C04 | |
| Side: | L | R |
| % sightings: | 53 | 47 |
| % individuals: | 67 | 33 |

## 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:** | **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: | 1 |
| Other wildlife count: | 1 |
| Domestic count: | 80 |

## ELEPHANT DATA ANALYSIS

t = 3.182, N = 162, w = 309

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | 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 | $s_{ay}$ | – | – | – | – |

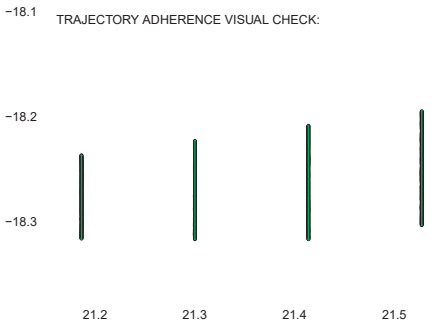
## CARCASS RATIOS

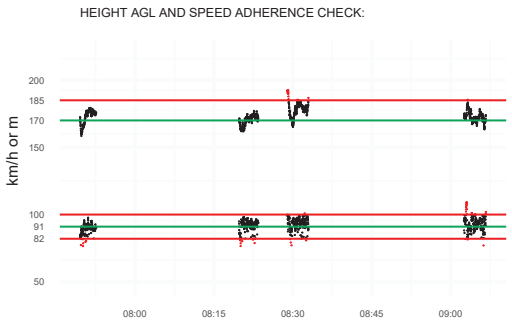
$CR_{1:4}$ = n/a
$CR_{1:2}$ = n/a

## NG1NA – NG 1 Namibia — NAMIBIA – KAVANGO ZAMBEZI

### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5WOT20221009A




SPEED
Average: 173.6 km/h
Standard dev.: 5.7 km/h

HEIGHT AGL
Average: 92.2 m (302.6 ft)
Standard dev.: 4.7 m (15.5 ft)

## NG1NA – NG 1 Namibia — NAMIBIA – KAVANGO ZAMBEZI

**STRATUM CODE:** NG1NA **N:** 162 $S_a^2$: 0,291
**STRATUM NAME:** NG1 Namibia **w:** 309 **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 | 74 | 11 | 2833 | 3241 | 5,499 | 1037049 | 1018,36 | 0 | 6074 | 114 | 240,333 | 7,961 |
| donkey | Equus asinus | 6 | 0 | 230 | 778 | 0,446 | 59776 | 244,49 | 0 | 1008 | 339 | 9,000 | -0,286 |
| duiker | Sylvicapra grimmia | 1 | 0 | 38 | 136 | 0,074 | 1838 | 42,88 | 0 | 175 | 356 | 0,250 | -0,234 |
| 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 | 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 |

# SALI – Salamimpa

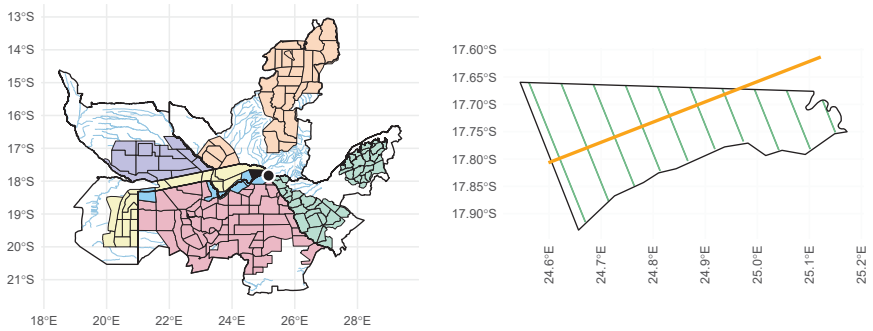
# NAMIBIA – KAVANGO ZAMBEZI

## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Kavango Zambezi
STRATUM CODE: SALI
STRATUM NAME: Salamimpa
■ STRATUM AREA: 1002.78 sqkm
• SURVEY BASE: Kasane
DISTANCE TO SURVEY BASE: 45 km

– TRANSECTS: 10 (176 km)
TRANSECT ORIENTATION: 159.7°
PLANNED SAMPLING INTENSITY: 5.3 %

– BASELINE DISTANCE: 59.48 km




## SURVEY IMPLEMENTATION

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

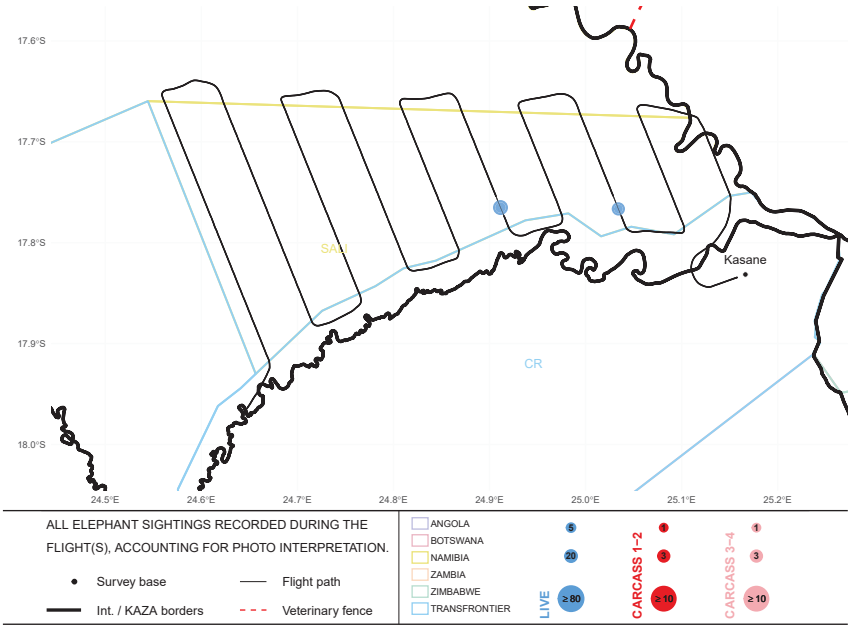
Actual sampling intensity: 5.5 %
Transect flying time: 1 h
Transects: 10 – 176 km – 159.7°
Search effort: 1.09 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C03 | |
| Side: | L | R |
| % sightings: | 36 | 64 |
| % individuals: | 47 | 53 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 49 | 0 | |
| Live elephant (>9): | 1 | 0 | |
| Elephant carcass: | 0 | | |
| Live elephant (<10): | 0 | | |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **17 (1)** |
| Bulls: | 0 (0) |
| Family: | 17 (1) |
| **NOT IN SAMPLE:** | **25 (1)** |
| Outside search strip: | 25 |
| 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: | 2 |
| Other wildlife count: | 89 |
| Domestic count: | 1080 |

## ELEPHANT DATA ANALYSIS

t = 2.262, N = 189, w = 313

| | | LIVE OBS | LIVE FINAL | ALL CARCASSES OBS | ALL CARCASSES FINAL |
|---|---|---|---|---|---|
| Population estimate | $\hat{Y}$ | 309 | 309 | – | – |
| Variance of estimate | $\mathrm{Var}\hat{Y}$ | 104894 | 104894 | – | – |
| Standard error | $\mathrm{SE}\hat{Y}$ | 324 | 324 | – | – |
| 95% confidence interval | $\mathrm{CI}_{\hat{Y}}^{95\%}$ | ± 733 | ± 733 | – | – |
| Percentage of relative precision | $\mathrm{PRP}_{\hat{Y}}$ | 237 % | 237 % | – | – |
| Density per sqkm | $R_{\hat{Y}}$ | 0.309 | 0.309 | – | – |
| Variance between transect counts | $s_y^2$ | 28.9 | 28.9 | – | – |
| Variance between transect areas | $s_a^2$ | 4.88 | 4.88 | – | – |
| Covariance between counts & areas | $s_{ay}$ | −2.143 | −2.143 | – | – |

## CARCASS RATIOS

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

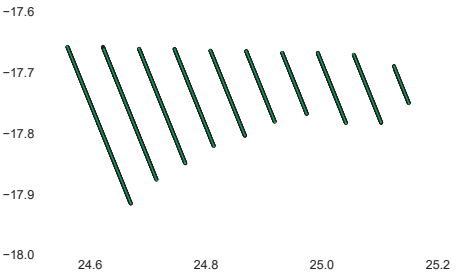
## SALI – Salamimpa

## NAMIBIA – KAVANGO ZAMBEZI

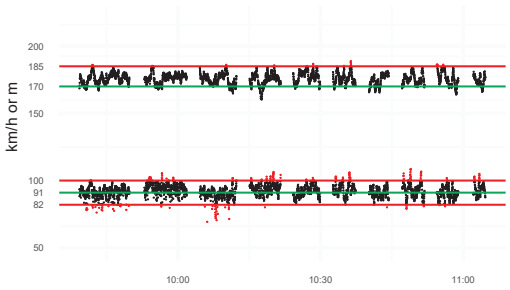
### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5WOT20221001A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



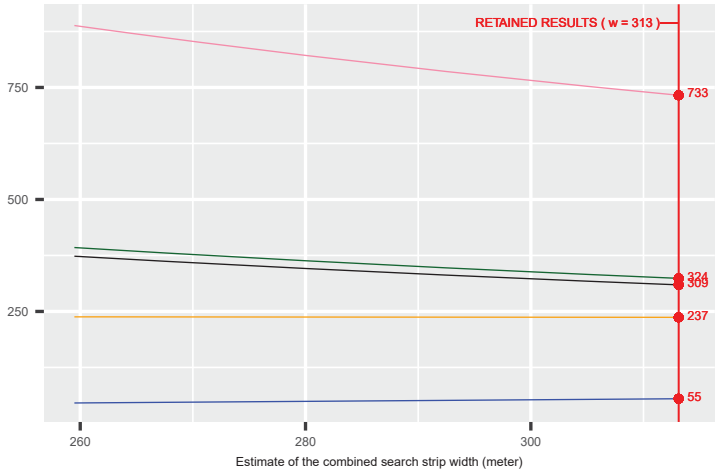

SPEED
Average: 175.7 km/h
Standard dev.: 4.3 km/h

HEIGHT AGL
Average: 92.1 m (302.3 ft)
Standard dev.: 4.7 m (15.3 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: [103 – 156]
C03 – Right: [145 – 173]




**LIVE ELEPHANT ESTIMATE: [ 373 – 309 ]**
CONFIDENCE INTERVAL: ± [ 888 – 733 ]
SAMPLE AREA: [ 46 – 55 ] sqkm
SE: [ 393 – 324 ]
PRP: [ 238 – 237 ] %

## SALI – Salamimpa NAMIBIA – KAVANGO ZAMBEZI

**STRATUM CODE:** SALI **N:** 190 $S_a^2$: 4,880
**STRATUM NAME:** Salamimpa **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 | 1070 | 0 | 19472 | 15199 | 19,418 | 45143183 | 6718,87 | 4272 | 34671 | 78 | 8676,889 | -69,265 |
| 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 | 17 | 25 | 309 | 733 | 0,309 | 104894 | 323,87 | 0 | 1042 | 237 | 28,900 | -2,143 |
| 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 | 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 | 10 | 0 | 182 | 398 | 0,181 | 30917 | 175,83 | 0 | 580 | 219 | 10,000 | 3,075 |
| 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, | 88 | 72 | 1601 | 3664 | 1,597 | 2623216 | 1619,63 | 0 | 5265 | 229 | 774,400 | 6,080 |
| all elephants | Loxodonta africana all | 17 | 25 | 309 | 733 | 0,309 | 104894 | 323,87 | 0 | 1042 | 237 | 28,900 | -2,143 |
| 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 | 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 |

# SUS – Susuwe

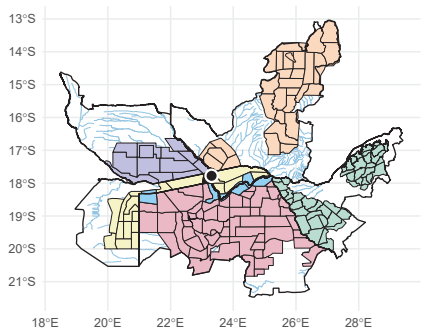
# NAMIBIA – KAVANGO ZAMBEZI

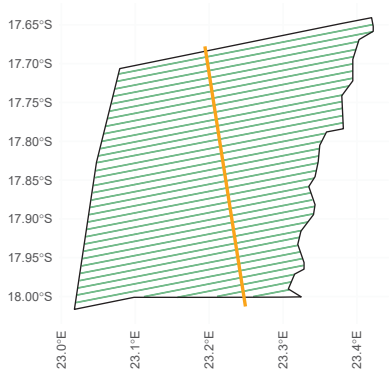
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Kavango Zambezi
STRATUM CODE: SUS
STRATUM NAME: Susuwe
■ STRATUM AREA: 1171.43 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 14 km

– TRANSECTS: 36 (1152 km)
TRANSECT ORIENTATION: 80.7°
PLANNED SAMPLING INTENSITY: 29.5 %

– BASELINE DISTANCE: 37.54 km




## SURVEY IMPLEMENTATION

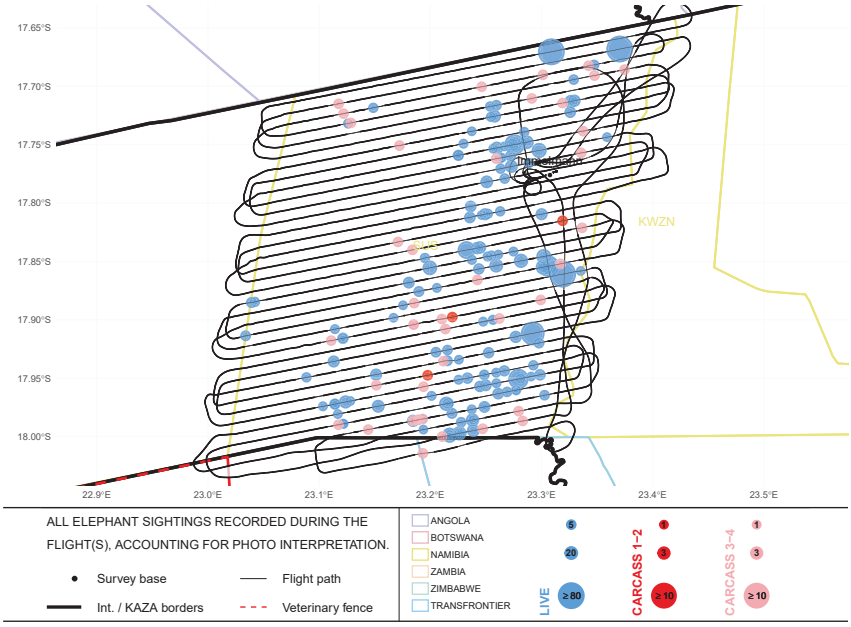
**Number of flight(s): 3**
Combined flying time: 9.5 h
Crew(s): C01, C02, C04
KES2022_V5IIM20221008A 06:43–10:00
KES2022_V5LJB20221008A 07:15–10:29
KES2022_V5WOT20221008A 07:05–10:06
Actual sampling intensity: 31.3 %
Transect flying time: 6.7 h
Transects: 36 – 1152 km – 80.7°
Search effort: 1.09 min/sqkm

## OBSERVER CONTRIBUTION

| Crew(s): | C01 | | C02 | | C04 | |
|---|---|---|---|---|---|---|
| Side: | L | R | L | R | L | R |
| % sightings: | 50 | 50 | 55 | 45 | 42 | 58 |
| % individuals: | 54 | 46 | 57 | 43 | 39 | 61 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 229 | 25.33 | 25.86 |
| Live elephant (>9): | 16 | 62.5 | 40 |
| Elephant carcass: | 37 | 59.46 | 0 |
| Live elephant (<10): | 60 | 21.67 | 15.38 |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **580 (76)** |
| Bulls: | 51 (28) |
| Family: | 529 (48) |
| **NOT IN SAMPLE:** | **1041 (78)** |
| Outside search strip: | 1035 |
| Off transect: | 6 |

## ELEPHANT CARCASSES



| | |
|---|---|
| **IN SAMPLE:** | **37 (37)** |
| Category 1: | 1 (1) |
| Category 2: | 2 (2) |
| Category 3: | 9 (9) |
| Category 4: | 25 (25) |
| **NOT IN SAMPLE:** | **7 (7)** |
| Outside search strip: | 5 |
| Off transect: | 2 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 22 |
| Other wildlife count: | 1833 |
| Domestic count: | 110 |

## ELEPHANT DATA ANALYSIS

t = 2.03, N = 117, w = 319

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 1650 | 1851 | 118 | 118 |
| Variance of estimate | $Var\hat{Y}$ | 82883 | 120707 | 390 | 390 |
| Standard error | $SE\hat{Y}$ | 288 | 347 | 20 | 20 |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 584 | ± 705 | ± 40 | ± 40 |
| Percentage of relative precision | $PRP\hat{Y}$ | 35 % | 38 % | 34 % | 34 % |
| Density per sqkm | $R\hat{Y}$ | 1.408 | 1.58 | 0.101 | 0.101 |
| Variance between transect counts | $s^2_y$ | 270.237 | 405.53 | 1.399 | 1.399 |
| Variance between transect areas | $s^2_a$ | 5.118 | 5.118 | 5.118 | 5.118 |
| Covariance between counts & areas | $s_{ay}$ | −10.366 | −10.304 | −0.021 | −0.021 |

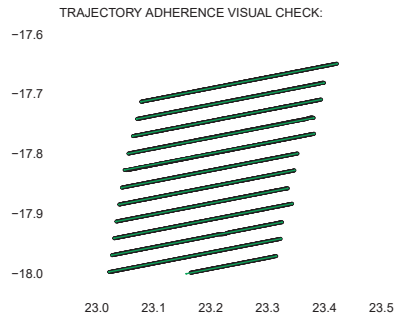
## CARCASS RATIOS

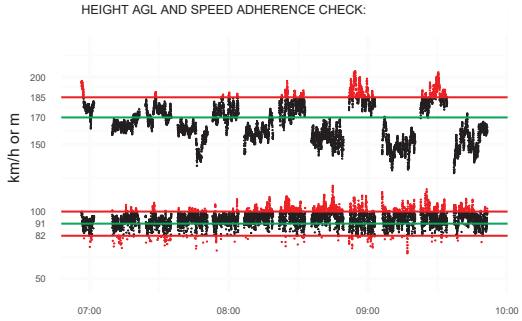
$CR_{1:4}$ = 6 %
$CR_{1:2}$ = 0.5 %

## SUS – Susuwe NAMIBIA – KAVANGO ZAMBEZI

### ADHERENCE TO FLIGHT PARAMETERS

#### KES2022_ V5IIM20221008A



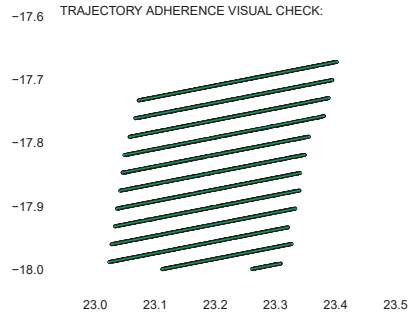



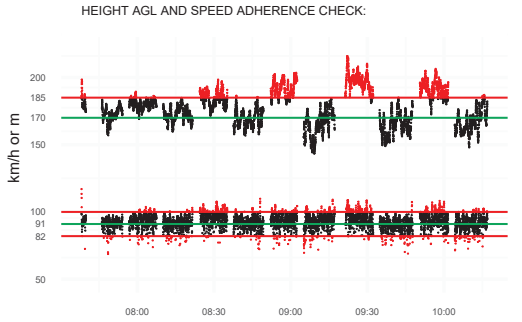

SPEED
Average: 166.3 km/h
Standard dev.: 14.3 km/h

HEIGHT AGL
Average: 94.5 m (310.1 ft)
Standard dev.: 5.7 m (18.8 ft)

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#### KES2022_ V5LJB20221008A



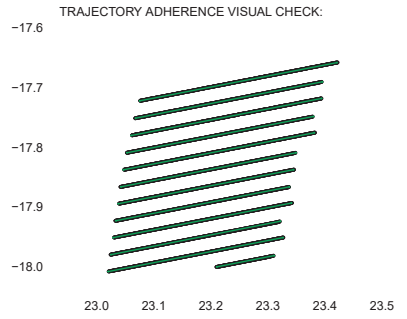



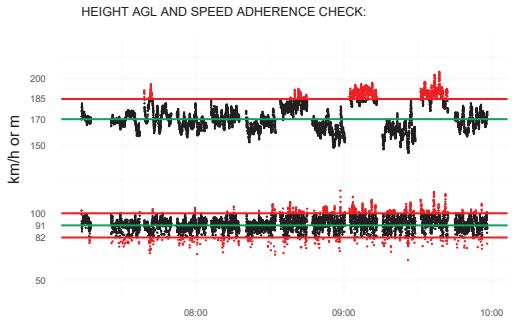

SPEED
Average: 177.3 km/h
Standard dev.: 13 km/h

HEIGHT AGL
Average: 92.8 m (304.5 ft)
Standard dev.: 5.2 m (17 ft)

---

#### KES2022_ V5WOT20221008A




SPEED
Average: 171.9 km/h
Standard dev.: 10.3 km/h

HEIGHT AGL
Average: 92.1 m (302.1 ft)
Standard dev.: 5.4 m (17.7 ft)

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

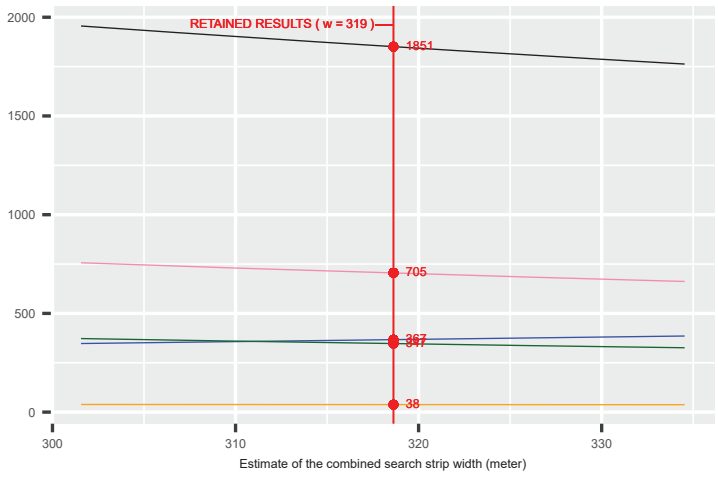
Range of search strip width estimates (m):

C01 – Left: [163 – 196]
C01 – Right: [123 – 165]

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

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

**LIVE ELEPHANT ESTIMATE: [ 1956 – 1763 ]**
CONFIDENCE INTERVAL: ± [ 756 – 662 ]
SAMPLE AREA: [ 347 – 385 ] sqkm
SE: [ 373 – 326 ]
PRP: [ 39 – 38 ] %



## SUS – Susuwe NAMIBIA – KAVANGO ZAMBEZI

**STRATUM CODE:** SUS **N:** 118 $S_a^2$: 5,118
**STRATUM NAME:** Susuwe **w:** 319 **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, | 18 | 0 | 57 | 58 | 0,049 | 802 | 28,32 | 0 | 115 | 100 | 3,000 | 0,159 |
| buffalo | Syncerus caffer | 142 | 162 | 453 | 354 | 0,387 | 30486 | 174,60 | 99 | 808 | 78 | 107,083 | -7,784 |
| bushbuck | Tragelaphus scriptus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| bushpig | Potamochoerus larvatus | 2 | 0 | 6 | 11 | 0,005 | 30 | 5,45 | 0 | 17 | 174 | 0,111 | 0,011 |
| cattle | Bos taurus | 110 | 0 | 351 | 409 | 0,300 | 40491 | 201,22 | 0 | 760 | 116 | 152,740 | 3,262 |
| donkey | Equus asinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| duiker | Sylvicapra grimmia | 2 | 0 | 6 | 8 | 0,005 | 15 | 3,83 | 0 | 14 | 122 | 0,054 | -0,066 |
| eland | Tragelaphus oryx | 1 | 8 | 3 | 6 | 0,003 | 7 | 2,72 | 0 | 9 | 173 | 0,028 | 0,021 |
| elephant bulls | Loxodonta africana males | 51 | 52 | 163 | 98 | 0,139 | 2321 | 48,18 | 65 | 261 | 60 | 8,707 | 0,488 |
| elephant family | Loxodonta africana family | 529 | 989 | 1688 | 684 | 1,441 | 113531 | 336,94 | 1004 | 2372 | 41 | 382,333 | -10,792 |
| elephant carcass one | Loxodonta africana carcass one | 1 | 0 | 3 | 6 | 0,003 | 7 | 2,72 | 0 | 9 | 173 | 0,028 | 0,023 |
| elephant carcass two | Loxodonta africana carcass two | 2 | 0 | 6 | 8 | 0,005 | 15 | 3,81 | 0 | 14 | 121 | 0,054 | -0,009 |
| elephant carcass three | Loxodonta africana carcass three | 9 | 1 | 29 | 17 | 0,025 | 67 | 8,18 | 12 | 45 | 58 | 0,250 | 0,068 |
| elephant carcass four | Loxodonta africana carcass four | 25 | 6 | 80 | 34 | 0,068 | 283 | 16,81 | 46 | 114 | 43 | 1,018 | -0,104 |
| giraffe | Giraffa giraffa | 41 | 3 | 131 | 58 | 0,112 | 812 | 28,50 | 73 | 189 | 44 | 3,094 | 0,554 |
| 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 | 71 | 0 | 227 | 128 | 0,193 | 3966 | 62,98 | 99 | 354 | 56 | 14,999 | 0,973 |
| horse | Equus caballus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 195 | 50 | 622 | 335 | 0,531 | 27159 | 164,80 | 288 | 957 | 54 | 98,079 | -1,810 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 43 | 0 | 137 | 73 | 0,117 | 1280 | 35,78 | 65 | 210 | 53 | 4,847 | 0,579 |
| 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 | 5 | 13 | 13 | 0,011 | 42 | 6,48 | 0 | 26 | 103 | 0,159 | 0,119 |
| puku | Kobus vardonii | 2 | 1 | 6 | 11 | 0,005 | 30 | 5,46 | 0 | 17 | 174 | 0,111 | -0,008 |
| red lechwe | Kobus leche | 750 | 60 | 2393 | 704 | 2,043 | 120252 | 346,77 | 1689 | 3097 | 29 | 470,771 | 10,515 |
| reedbuck | Redunca arundinum | 13 | 0 | 41 | 44 | 0,035 | 480 | 21,90 | 0 | 86 | 107 | 1,780 | -0,070 |
| roan | Hippotragus equinus | 19 | 2 | 61 | 51 | 0,052 | 641 | 25,32 | 9 | 112 | 85 | 2,371 | -0,095 |
| sable | Hippotragus niger | 246 | 45 | 785 | 289 | 0,670 | 20271 | 142,38 | 496 | 1074 | 37 | 75,400 | 1,479 |
| 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 | 19 | 1 | 61 | 54 | 0,052 | 717 | 26,77 | 6 | 115 | 90 | 2,656 | -0,065 |
| warthog | Phacochoerus africanus | 11 | 0 | 35 | 30 | 0,030 | 221 | 14,88 | 5 | 65 | 86 | 0,847 | 0,410 |
| waterbuck | Kobus ellipsiprymnus | 2 | 0 | 6 | 8 | 0,005 | 15 | 3,87 | 0 | 14 | 123 | 0,054 | -0,167 |
| wildebeest | Connochaetes taurinus | 28 | 27 | 89 | 73 | 0,076 | 1279 | 35,76 | 17 | 162 | 81 | 4,692 | -0,356 |
| zebra | Equus spp, | 219 | 84 | 699 | 400 | 0,597 | 38746 | 196,84 | 299 | 1098 | 57 | 144,193 | 1,080 |
| all elephants | Loxodonta africana all | 580 | 1041 | 1851 | 705 | 1,580 | 120707 | 347,43 | 1146 | 2556 | 38 | 405,530 | -10,304 |
| C1-2 elephant carcasses | Loxodonta africana carcass 1-2 | 3 | 0 | 10 | 9 | 0,008 | 21 | 4,59 | 0 | 19 | 97 | 0,079 | 0,014 |
| all elephant carcasses | Loxodonta africana carcass all | 37 | 7 | 118 | 40 | 0,101 | 390 | 19,74 | 78 | 158 | 34 | 1,399 | -0,021 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 34 | 7 | 109 | 37 | 0,093 | 334 | 18,27 | 71 | 146 | 34 | 1,197 | -0,036 |

# ZASW – Zambezi South–West

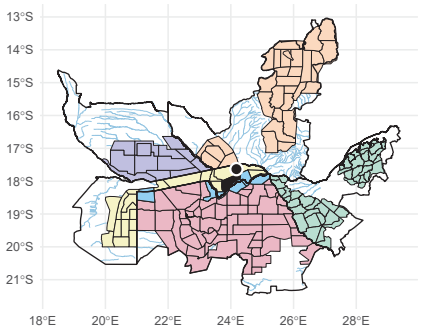
# NAMIBIA – KAVANGO ZAMBEZI

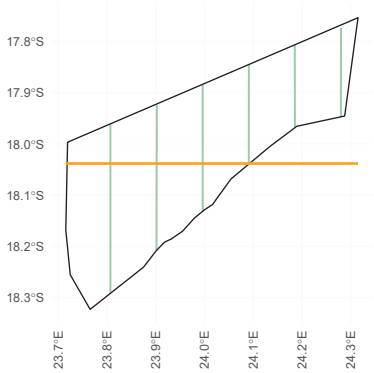
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Kavango Zambezi
STRATUM CODE: ZASW
STRATUM NAME: Zambezi South–West
■ STRATUM AREA: 1646.75 sqkm
• SURVEY BASE: Katima Mulilo
DISTANCE TO SURVEY BASE: 53 km

– TRANSECTS: 6 (155 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 2.8 %

– BASELINE DISTANCE: 63.53 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 2.9 h
Crew(s): C01
KES2022_V5IIM20221002A 09:19–12:10

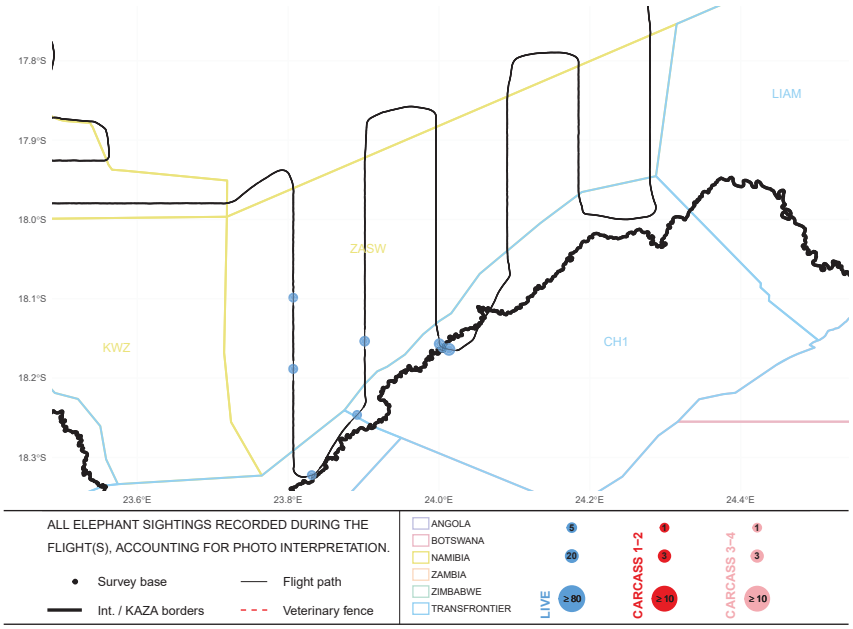
Actual sampling intensity: 3 %
Transect flying time: 0.9 h
Transects: 6 – 155 km – 0°
Search effort: 1.11 min/sqkm

## OBSERVER CONTRIBUTION

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

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 31 | 12.9 | 50 |
| Live elephant (>9): | 0 | | |
| Elephant carcass: | 0 | | |
| Live elephant (<10): | 1 | 100 | 0 |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **2 (1)** |
| Bulls: | 2 (1) |
| Family: | 0 (0) |
| **NOT IN SAMPLE:** | **33 (7)** |
| Outside search strip: | 6 |
| Off transect: | 27 |



## 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: | 2 |
| Other wildlife count: | 3 |
| Domestic count: | 701 |

## ELEPHANT DATA ANALYSIS

t = 2.571, N = 198, w = 320

| | | LIVE OBS | LIVE FINAL | ALL CARCASSES OBS | ALL CARCASSES FINAL |
|---|---|---|---|---|---|
| Population estimate | $\hat{Y}$ | 67 | 67 | – | – |
| Variance of estimate | $Var\hat{Y}$ | 3549 | 3549 | – | – |
| Standard error | $SE\hat{Y}$ | 60 | 60 | – | – |
| 95% confidence interval | $CI_{\hat{Y}}^{95\%}$ | ± 153 | ± 153 | – | – |
| Percentage of relative precision | $PRP\hat{Y}$ | 230 % | 230 % | – | – |
| Density per sqkm | $R\hat{Y}$ | 0.04 | 0.04 | – | – |
| Variance between transect counts | $s_y^2$ | 0.667 | 0.667 | – | – |
| Variance between transect areas | $s_a^2$ | 6.142 | 6.142 | – | – |
| Covariance between counts & areas | $s_{ay}$ | 1.487 | 1.487 | – | – |

## CARCASS RATIOS

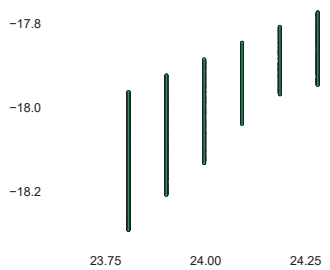
$CR_{1:4} = 0$ %
$CR_{1:2} = 0$ %

## ZASW – Zambezi South–West — NAMIBIA – KAVANGO ZAMBEZI

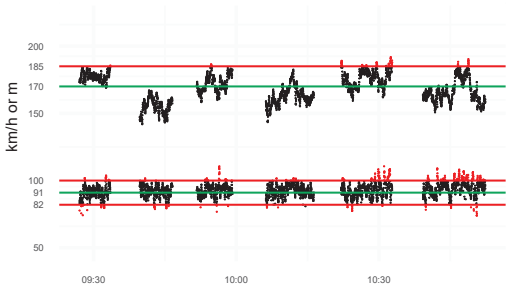
### ADHERENCE TO FLIGHT PARAMETERS

**KES2022_ V5IIM20221002A**

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



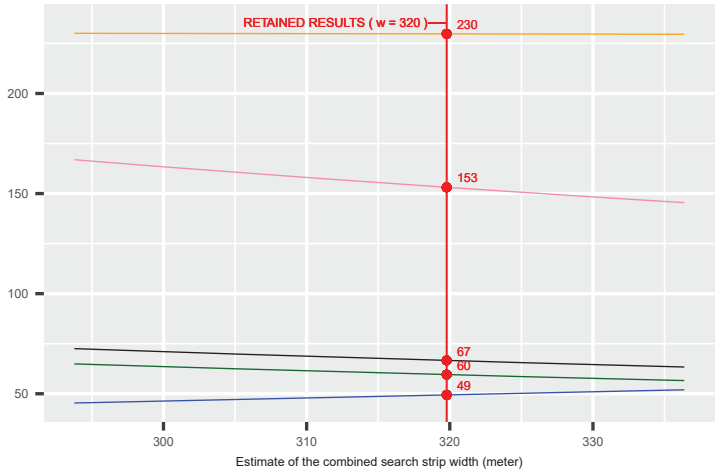

SPEED
Average: 168.2 km/h
Standard dev.: 9.9 km/h

HEIGHT AGL
Average: 92.8 m (304.4 ft)
Standard dev.: 5.2 m (17 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 – 193]
C01 – Right: [121 – 162]




**LIVE ELEPHANT ESTIMATE: [ 73 – 63 ]**
CONFIDENCE INTERVAL: ± [ 167 – 145 ]
SAMPLE AREA: [ 45 – 52 ] sqkm
SE: [ 65 – 57 ]
PRP: [ 230 – 230 ] %

## ZASW – Zambezi South–West NAMIBIA – KAVANGO ZAMBEZI

**STRATUM CODE:** ZASW **N:** 199 $S_a^2$: 6,142
**STRATUM NAME:** Zambezi South-West **w:** 320 **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 | 658 | 175 | 21927 | 14368 | 13,315 | 31242111 | 5589,46 | 7559 | 36295 | 66 | 2459,067 | -50,696 |
| donkey | Equus asinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| duiker | Sylvicapra grimmia | 3 | 0 | 100 | 160 | 0,061 | 3858 | 62,11 | 0 | 260 | 160 | 0,700 | 0,971 |
| 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 | 18 | 67 | 153 | 0,040 | 3549 | 59,57 | 0 | 220 | 230 | 0,667 | 1,487 |
| 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 | 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 | 1 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| shoat | Capra hircus - Ovis aries | 43 | 43 | 1433 | 3537 | 0,870 | 1893408 | 1376,01 | 0 | 4970 | 247 | 260,167 | -18,403 |
| 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 | 2 | 33 | 67 | 153 | 0,040 | 3549 | 59,57 | 0 | 220 | 230 | 0,667 | 1,487 |
| 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 |

# KC – KC

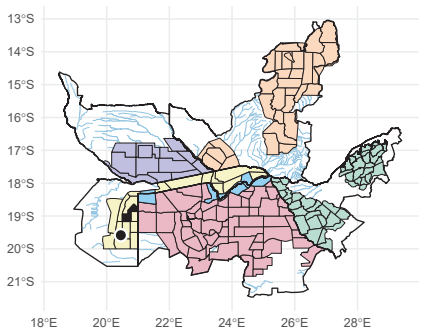
# NAMIBIA – KHAUDUM NYAE–NYAE

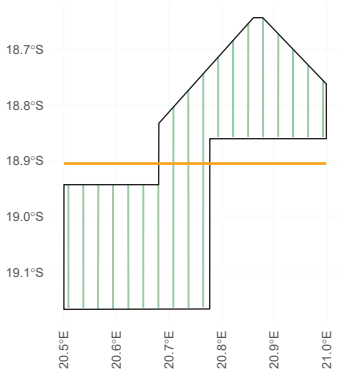
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Khaudum Nyae–Nyae
STRATUM CODE: KC
STRATUM NAME: KC
■ STRATUM AREA: 1343.26 sqkm
• SURVEY BASE: Tsumkwe
DISTANCE TO SURVEY BASE: 81 km

– TRANSECTS: 18 (454 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 10.1 %

– BASELINE DISTANCE: 52.59 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.4 h
Crew(s): C01
KES2022_V5IIM20221015A 06:20–10:43

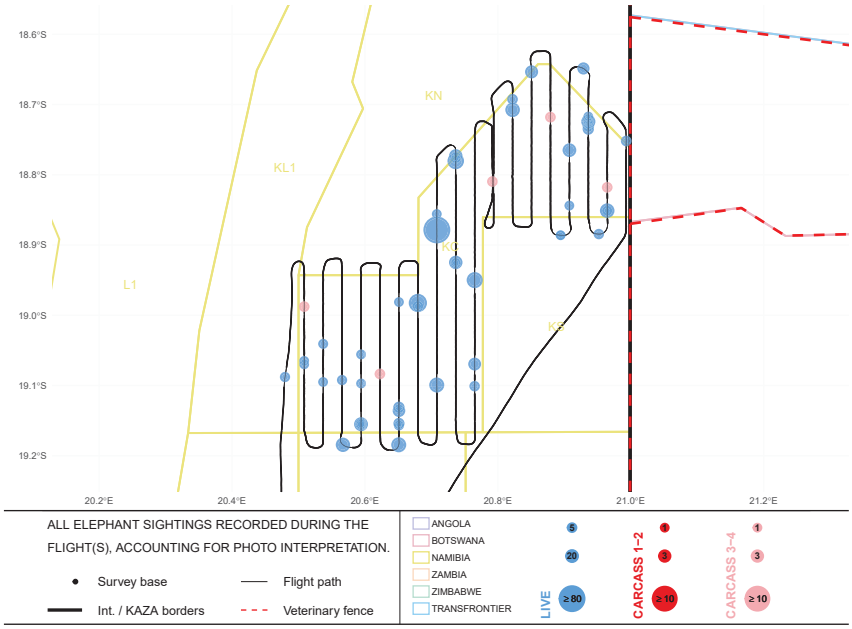
Actual sampling intensity: 10.5 %
Transect flying time: 2.6 h
Transects: 18 – 454 km – 0°
Search effort: 1.11 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C01 | |
| Side: | L | R |
| % sightings: | 41 | 59 |
| % individuals: | 55 | 45 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 49 | 22.45 | 9.09 |
| Live elephant (>9): | 10 | 80 | 12.5 |
| Elephant carcass: | 4 | 25 | 0 |
| Live elephant (<10): | 18 | 0 | |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **321 (28)** |
| Bulls: | 20 (13) |
| Family: | 301 (15) |
| **NOT IN SAMPLE:** | **250 (26)** |
| Outside search strip: | 171 |
| Off transect: | 79 |



## ELEPHANT CARCASSES

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

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 11 |
| Other wildlife count: | 124 |
| Domestic count: | 55 |

## ELEPHANT DATA ANALYSIS

t = 2.11, N = 168, w = 311

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 3002 | 3049 | 38 | 38 |
| Variance of estimate | $\mathrm{Var}\hat{Y}$ | 921556 | 928311 | 287 | 287 |
| Standard error | $\mathrm{SE}\hat{Y}$ | 960 | 963 | 17 | 17 |
| 95% confidence interval | $\mathrm{CI}_{\hat{Y}}^{95\%}$ | ± 2025 | ± 2033 | ± 36 | ± 36 |
| Percentage of relative precision | $\mathrm{PRP}\hat{Y}$ | 67 % | 67 % | 94 % | 94 % |
| Density per sqkm | $R\hat{Y}$ | 2.235 | 2.27 | 0.028 | 0.028 |
| Variance between transect counts | $s_y^2$ | 814.379 | 816.618 | 0.183 | 0.183 |
| Variance between transect areas | $s_a^2$ | 8.645 | 8.645 | 8.645 | 8.645 |
| Covariance between counts & areas | $s_{ay}$ | 46.339 | 45.363 | −0.224 | −0.224 |

## CARCASS RATIOS

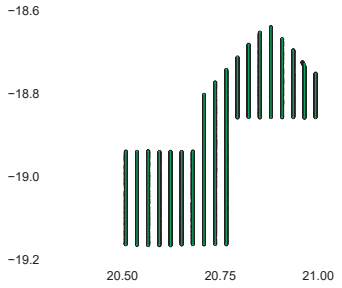
$CR_{1:4} = 1.2$ %
$CR_{1:2} = 0$ %

## KC – KC NAMIBIA – KHAUDUM NYAE–NYAE

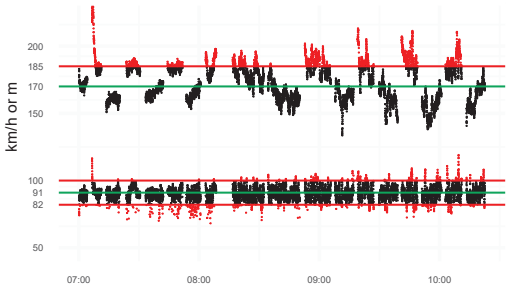
### ADHERENCE TO FLIGHT PARAMETERS

**KES2022_ V5IIM20221015A**

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



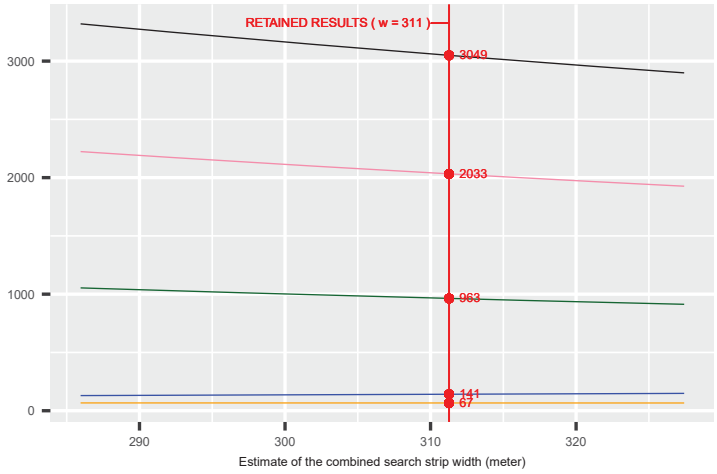

SPEED
Average: 173.5 km/h
Standard dev.: 14 km/h

HEIGHT AGL
Average: 90.3 m (296.2 ft)
Standard dev.: 5.1 m (16.7 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: [156 – 188]
C01 – Right: [118 – 158]




**LIVE ELEPHANT ESTIMATE: [ 3319 – 2899 ]**
CONFIDENCE INTERVAL: ± [ 2223 – 1926 ]
SAMPLE AREA: [ 130 – 149 ] sqkm
SE: [ 1054 – 913 ]
PRP: [ 67 – 66 ] %

# KC – KC NAMIBIA – KHAUDUM NYAE–NYAE

**STRATUM CODE:** KC **N:** 169 $S_a^2$: 8,645
**STRATUM NAME:** KC **w:** 311 **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, | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| buffalo | Syncerus caffer | 1 | 0 | 9 | 19 | 0,007 | 80 | 8,94 | 0 | 28 | 198 | 0,056 | -0,026 |
| 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 | 5 | 0 | 47 | 94 | 0,035 | 1986 | 44,57 | 0 | 142 | 198 | 1,389 | -0,031 |
| donkey | Equus asinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| duiker | Sylvicapra grimmia | 2 | 0 | 19 | 26 | 0,014 | 151 | 12,28 | 0 | 45 | 136 | 0,105 | -0,003 |
| 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 | 24 | 190 | 103 | 0,141 | 2395 | 48,94 | 87 | 293 | 54 | 2,340 | 2,907 |
| elephant family | Loxodonta africana family | 301 | 226 | 2859 | 2010 | 2,129 | 907826 | 952,80 | 849 | 4870 | 70 | 782,330 | 42,457 |
| 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 | 1 | 28 | 32 | 0,021 | 228 | 15,08 | 0 | 60 | 112 | 0,147 | -0,227 |
| elephant carcass four | Loxodonta africana carcass four | 1 | 0 | 9 | 19 | 0,007 | 79 | 8,90 | 0 | 28 | 198 | 0,056 | 0,003 |
| giraffe | Giraffa giraffa | 14 | 0 | 133 | 120 | 0,099 | 3261 | 57,11 | 13 | 253 | 91 | 2,536 | 1,610 |
| 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 | 11 | 0 | 104 | 143 | 0,078 | 4603 | 67,85 | 0 | 248 | 137 | 3,193 | -0,026 |
| oribi | Ourebia ourebi | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| oryx | Oryx gazella | 30 | 15 | 285 | 199 | 0,212 | 8853 | 94,09 | 86 | 484 | 70 | 7,059 | 2,827 |
| ostrich | Struthio camelus | 1 | 1 | 9 | 19 | 0,007 | 81 | 8,99 | 0 | 28 | 200 | 0,056 | -0,072 |
| 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 | 32 | 0 | 304 | 315 | 0,226 | 22296 | 149,32 | 0 | 619 | 104 | 15,595 | 0,665 |
| sable | Hippotragus niger | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| shoat | Capra hircus - Ovis aries | 50 | 0 | 475 | 940 | 0,354 | 198620 | 445,67 | 0 | 1415 | 198 | 138,889 | -0,306 |
| 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 | 9 | 0 | 85 | 95 | 0,064 | 2011 | 44,84 | 0 | 180 | 111 | 1,559 | 1,373 |
| waterbuck | Kobus ellipsiprymnus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| wildebeest | Connochaetes taurinus | 13 | 15 | 123 | 245 | 0,092 | 13493 | 116,16 | 0 | 369 | 198 | 9,389 | -0,333 |
| zebra | Equus spp, | 8 | 0 | 76 | 150 | 0,057 | 5086 | 71,32 | 0 | 226 | 198 | 3,556 | -0,058 |
| all elephants | Loxodonta africana all | 321 | 250 | 3049 | 2033 | 2,270 | 928311 | 963,49 | 1017 | 5082 | 67 | 816,618 | 45,363 |
| 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 | 38 | 36 | 0,028 | 287 | 16,94 | 2 | 74 | 94 | 0,183 | -0,224 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 4 | 1 | 38 | 36 | 0,028 | 287 | 16,94 | 2 | 74 | 94 | 0,183 | -0,224 |

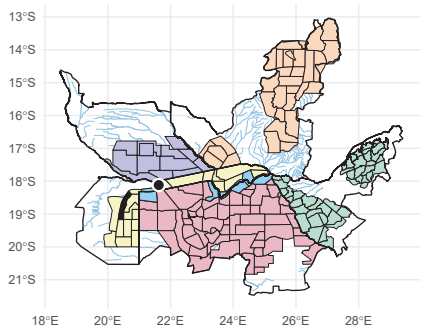
# KL1 – KL1 NAMIBIA – KHAUDUM NYAE–NYAE

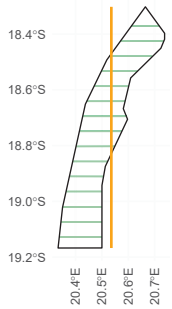
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Khaudum Nyae–Nyae
STRATUM CODE: KL1
STRATUM NAME: KL1
■ STRATUM AREA: 1413.6 sqkm
● SURVEY BASE: Bagani
DISTANCE TO SURVEY BASE: 142 km

– TRANSECTS: 15 (232 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 4.9 %

– BASELINE DISTANCE: 95.78 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 3.5 h
Crew(s): C02
KES2022_V5LJB20221011A 06:30–10:03

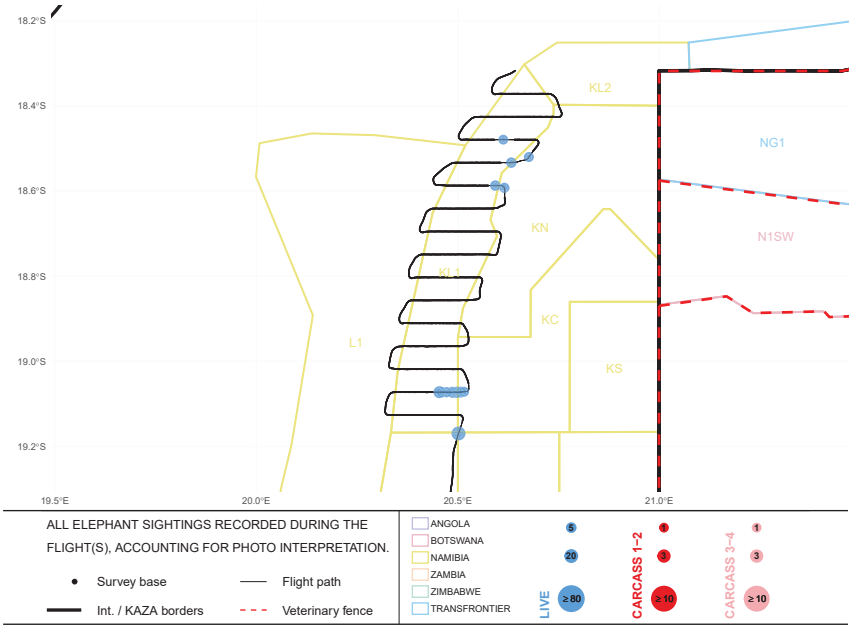
Actual sampling intensity: 5.2 %
Transect flying time: 1.3 h
Transects: 15 – 232 km – 90°
Search effort: 1.09 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C02 | |
| Side: | L | R |
| % sightings: | 61 | 39 |
| % individuals: | 73 | 27 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 12 | 33.33 | 25 |
| Live elephant (>9): | 0 | | |
| Elephant carcass: | 0 | | |
| Live elephant (<10): | 5 | 60 | 0 |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **16 (5)** |
| Bulls: | 16 (5) |
| Family: | 0 (0) |
| **NOT IN SAMPLE:** | **61 (12)** |
| Outside search strip: | 28 |
| Off transect: | 33 |



## 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: | 8 |
| Other wildlife count: | 33 |
| Domestic count: | 82 |

## ELEPHANT DATA ANALYSIS

t = 2.145, N = 301, w = 318

| | | LIVE OBS | LIVE FINAL | ALL CARCASSES OBS | ALL CARCASSES FINAL |
|---|---|---|---|---|---|
| Population estimate | $\hat{Y}$ | 307 | 307 | – | – |
| Variance of estimate | $Var\hat{Y}$ | 49522 | 49522 | – | – |
| Standard error | $SE\hat{Y}$ | 223 | 223 | – | – |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 477 | ± 477 | – | – |
| Percentage of relative precision | $PRP\hat{Y}$ | 156 % | 156 % | – | – |
| Density per sqkm | $R\hat{Y}$ | 0.217 | 0.217 | – | – |
| Variance between transect counts | $s^2_y$ | 8.638 | 8.638 | – | – |
| Variance between transect areas | $s^2_a$ | 0.266 | 0.266 | – | – |
| Covariance between counts & areas | $s_{ay}$ | 0.068 | 0.068 | – | – |

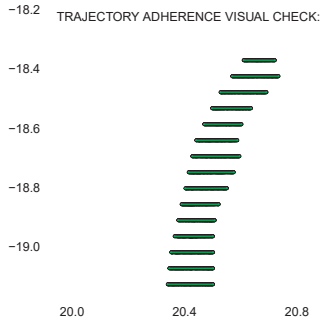
## CARCASS RATIOS

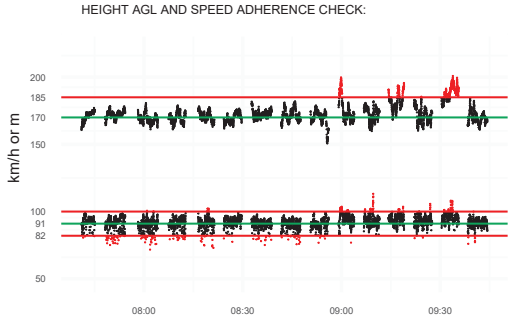
$CR_{1:4} = 0$ %
$CR_{1:2} = 0$ %

## KL1 – KL1 NAMIBIA – KHAUDUM NYAE–NYAE

### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5LJB20221011A



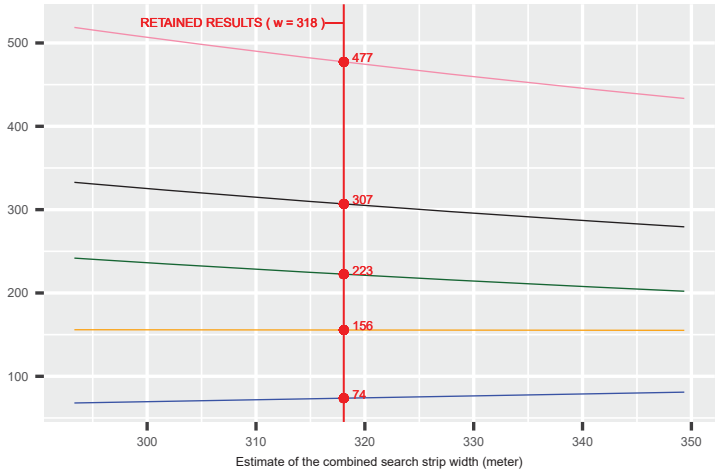

SPEED
Average: 172.8 km/h
Standard dev.: 6.9 km/h

HEIGHT AGL
Average: 92 m (301.8 ft)
Standard dev.: 4.3 m (14.1 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: [155 – 177]
C02 – Right: [134 – 185]




**LIVE ELEPHANT ESTIMATE: [ 333 – 279 ]**
CONFIDENCE INTERVAL: ± [ 519 – 433 ]
SAMPLE AREA: [ 68 – 81 ] sqkm
SE: [ 242 – 202 ]
PRP: [ 156 – 155 ] %

# KL1 – KL1 NAMIBIA – KHAUDUM NYAE–NYAE

**STRATUM CODE:** KL1 **N:** 301 $S_a^2$: 0,266
**STRATUM NAME:** KL1 **w:** 318 **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 | 82 | 7 | 1573 | 1312 | 1,112 | 374024 | 611,57 | 261 | 2884 | 83 | 61,124 | -1,645 |
| donkey | Equus asinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| duiker | Sylvicapra grimmia | 8 | 0 | 153 | 120 | 0,109 | 3131 | 55,95 | 33 | 273 | 78 | 0,552 | 0,048 |
| eland | Tragelaphus oryx | 17 | 14 | 326 | 714 | 0,231 | 110840 | 332,93 | 0 | 1040 | 219 | 19,267 | -0,033 |
| elephant bulls | Loxodonta africana males | 16 | 41 | 307 | 477 | 0,217 | 49522 | 222,54 | 0 | 784 | 156 | 8,638 | 0,068 |
| elephant family | Loxodonta africana family | 0 | 20 | 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 | 3 | 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 | 9 | 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 | 5 | 12 | 96 | 170 | 0,068 | 6297 | 79,35 | 0 | 266 | 177 | 1,095 | 0,002 |
| ostrich | Struthio camelus | 2 | 2 | 38 | 58 | 0,027 | 732 | 27,05 | 0 | 96 | 151 | 0,124 | -0,063 |
| 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 | 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 | 16 | 61 | 307 | 477 | 0,217 | 49522 | 222,54 | 0 | 784 | 156 | 8,638 | 0,068 |
| 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 |

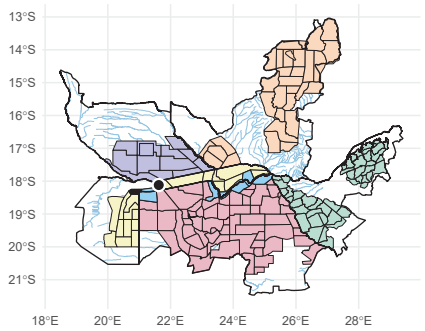
# KL2 – KL2 NAMIBIA – KHAUDUM NYAE–NYAE

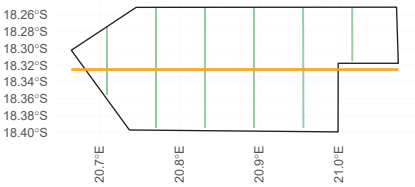
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Khaudum Nyae–Nyae
STRATUM CODE: KL2
STRATUM NAME: KL2
■ STRATUM AREA: 568.27 sqkm
• SURVEY BASE: Bagani
DISTANCE TO SURVEY BASE: 86 km

– TRANSECTS: 6 (82 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 4.3 %

– BASELINE DISTANCE: 43.34 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 3.5 h
Crew(s): C02
KES2022_V5LJB20221011A 06:30–10:03

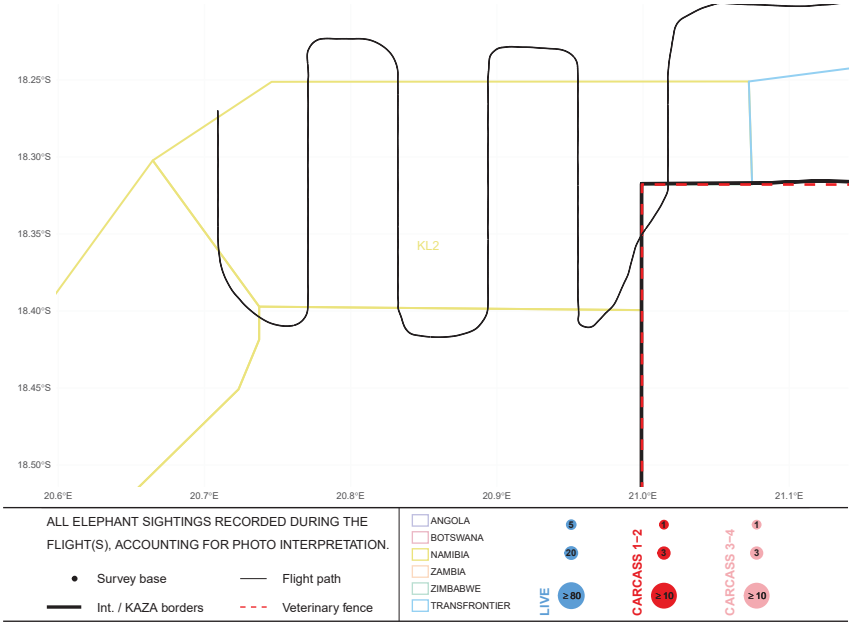
Actual sampling intensity: 4.6 %
Transect flying time: 0.5 h
Transects: 6 – 82 km – 0°
Search effort: 1.1 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C02 | |
| Side: | L | R |
| % sightings: | 48 | 52 |
| % individuals: | 59 | 41 |

## 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:** | **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: | 3 |
| Other wildlife count: | 13 |
| Domestic count: | 62 |

## ELEPHANT DATA ANALYSIS

t = 2.571, N = 137, 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

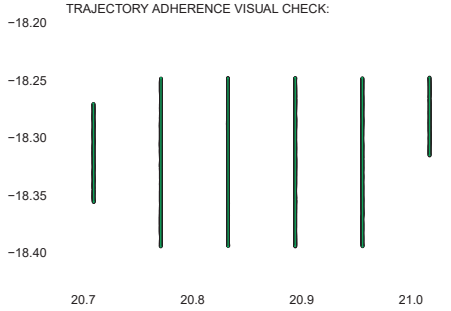
$CR_{1:4}$ = n/a
$CR_{1:2}$ = n/a

## KL2 – KL2 NAMIBIA – KHAUDUM NYAE-NYAE

### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5LJB20221011A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:




SPEED

| | |
|---|---|
| Average: | 172.6 km/h |
| Standard dev.: | 4 km/h |

HEIGHT AGL

| | | |
|---|---|---|
| Average: | 91.3 m | (299.7 ft) |
| Standard dev.: | 4.1 m | (13.4 ft) |

## KL2 – KL2 NAMIBIA – KHAUDUM NYAE–NYAE

**STRATUM CODE:** KL2 **N:** 137 $S_a^2$: 1,685
**STRATUM NAME:** KL2 **w:** 316 ***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 | 55 | 0 | 1204 | 1655 | 2,119 | 414463 | 643,79 | 0 | 2859 | 137 | 112,567 | -4,207 |
| donkey | Equus asinus | 1 | 0 | 22 | 63 | 0,039 | 600 | 24,50 | 0 | 85 | 288 | 0,167 | -0,397 |
| duiker | Sylvicapra grimmia | 4 | 0 | 88 | 161 | 0,154 | 3918 | 62,59 | 0 | 248 | 184 | 1,467 | 0,657 |
| eland | Tragelaphus oryx | 0 | 20 | 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 | 1 | 0 | 22 | 56 | 0,039 | 471 | 21,70 | 0 | 78 | 255 | 0,167 | 0,162 |
| 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 | 3 | 153 | 240 | 0,270 | 8739 | 93,48 | 0 | 394 | 157 | 3,367 | 1,076 |
| 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 | 5 | 0 | 109 | 278 | 0,193 | 11713 | 108,23 | 0 | 388 | 254 | 4,167 | 0,857 |
| 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 |

# KN – KN

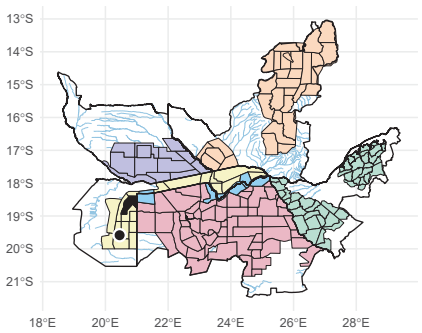
# NAMIBIA – KHAUDUM NYAE–NYAE

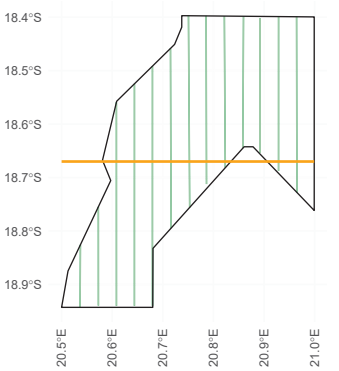
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Khaudum Nyae–Nyae
STRATUM CODE: KN
STRATUM NAME: KN
■ STRATUM AREA: 1715.16 sqkm
• SURVEY BASE: Tsumkwe
DISTANCE TO SURVEY BASE: 103 km

– TRANSECTS: 14 (480 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 8.4 %

– BASELINE DISTANCE: 52.64 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.4 h
Crew(s): C01
KES2022_V5IIM20221013A 06:34–11:01

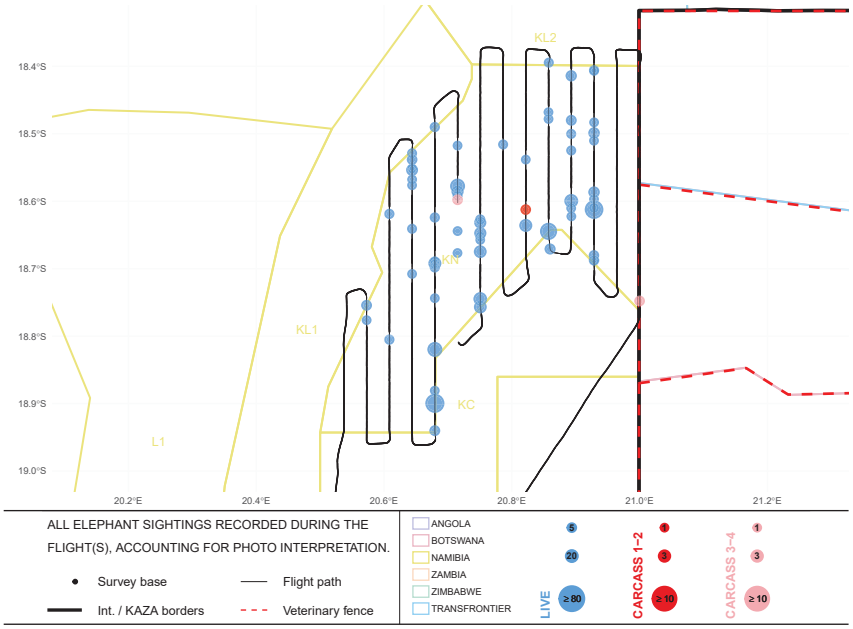
Actual sampling intensity: 8.1 %
Transect flying time: 2.6 h
Transects: 14 – 444 km – 0°
Search effort: 1.1 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C01 | |
| Side: | L | R |
| % sightings: | 40 | 60 |
| % individuals: | 57 | 43 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 67 | 20.9 | 7.14 |
| Live elephant (>9): | 7 | 85.71 | 16.67 |
| Elephant carcass: | 3 | 66.67 | 0 |
| Live elephant (<10): | 32 | 15.62 | 0 |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **207 (39)** |
| Bulls: | 41 (26) |
| Family: | 166 (13) |
| **NOT IN SAMPLE:** | **242 (30)** |
| Outside search strip: | 189 |
| Off transect: | 53 |

## ELEPHANT CARCASSES



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

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 8 |
| Other wildlife count: | 190 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 2.16, N = 167, w = 313

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 2613 | 2551 | 37 | 37 |
| Variance of estimate | $Var\hat{Y}$ | 792617 | 756153 | 336 | 336 |
| Standard error | $SE\hat{Y}$ | 890 | 870 | 18 | 18 |
| 95% confidence interval | $CI_{\hat{Y}}^{95\%}$ | ± 1923 | ± 1879 | ± 40 | ± 40 |
| Percentage of relative precision | $PRP\hat{Y}$ | 74 % | 74 % | 107 % | 107 % |
| Density per sqkm | $R\hat{Y}$ | 1.524 | 1.488 | 0.022 | 0.022 |
| Variance between transect counts | $s_y^2$ | 472.44 | 450.489 | 0.181 | 0.181 |
| Variance between transect areas | $s_a^2$ | 12.455 | 12.455 | 12.455 | 12.455 |
| Covariance between counts & areas | $s_{ay}$ | 23.703 | 23.08 | 0.117 | 0.117 |

## CARCASS RATIOS

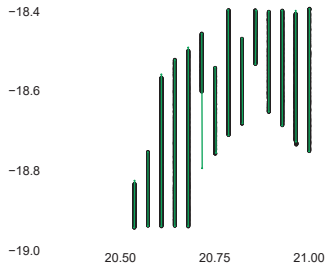
$CR_{1:4}$ = 1.4 %
$CR_{1:2}$ = 0.5 %

## KN – KN NAMIBIA – KHAUDUM NYAE–NYAE

### ADHERENCE TO FLIGHT PARAMETERS

**KES2022_ V5IIM20221013A**

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



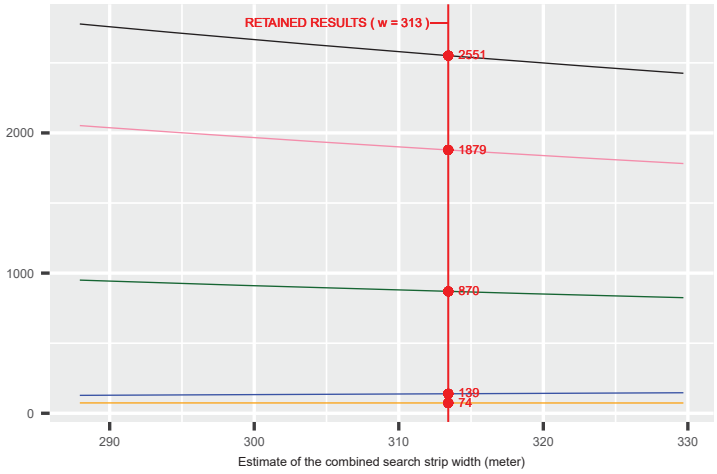

SPEED
Average: 171.6 km/h
Standard dev.: 6.7 km/h

HEIGHT AGL
Average: 91 m (298.7 ft)
Standard dev.: 5 m (16.5 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: [157 – 189]
C01 – Right: [119 – 159]




**LIVE ELEPHANT ESTIMATE: [ 2777 – 2426 ]**
CONFIDENCE INTERVAL: ± [ 2052 – 1782 ]
SAMPLE AREA: [ 128 – 146 ] sqkm
SE: [ 950 – 825 ]
PRP: [ 74 – 73 ] %

## KN – KN NAMIBIA – KHAUDUM NYAE–NYAE

**STRATUM CODE:** KN **N:** 168 $S_a^2$: 12,455
**STRATUM NAME:** KN **w:** 313 **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 | 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 | 11 | 2 | 136 | 177 | 0,079 | 6698 | 81,84 | 0 | 312 | 130 | 3,874 | 2,058 |
| elephant bulls | Loxodonta africana males | 41 | 43 | 505 | 294 | 0,295 | 18470 | 135,90 | 212 | 799 | 58 | 12,841 | 6,656 |
| elephant family | Loxodonta africana family | 166 | 199 | 2046 | 1820 | 1,193 | 709939 | 842,58 | 226 | 3866 | 89 | 405,824 | 16,424 |
| elephant carcass one | Loxodonta africana carcass one | 1 | 0 | 12 | 25 | 0,007 | 138 | 11,75 | 0 | 38 | 206 | 0,071 | -0,184 |
| 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 | 25 | 33 | 0,014 | 232 | 15,24 | 0 | 58 | 134 | 0,132 | 0,301 |
| 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 | 13 | 9 | 160 | 298 | 0,093 | 19090 | 138,17 | 0 | 459 | 186 | 10,225 | -0,006 |
| 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 | 42 | 17 | 518 | 296 | 0,302 | 18831 | 137,23 | 221 | 814 | 57 | 13,538 | 7,418 |
| ostrich | Struthio camelus | 2 | 1 | 25 | 33 | 0,014 | 237 | 15,40 | 0 | 58 | 135 | 0,132 | 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 | 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 | 20 | 0 | 247 | 293 | 0,144 | 18363 | 135,51 | 0 | 539 | 119 | 9,341 | -1,196 |
| 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 | 15 | 0 | 185 | 185 | 0,108 | 7363 | 85,81 | 0 | 370 | 100 | 3,764 | -0,362 |
| waterbuck | Kobus ellipsiprymnus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| wildebeest | Connochaetes taurinus | 81 | 6 | 998 | 1255 | 0,582 | 337254 | 580,74 | 0 | 2253 | 126 | 176,335 | -1,748 |
| zebra | Equus spp, | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| all elephants | Loxodonta africana all | 207 | 242 | 2551 | 1879 | 1,488 | 756153 | 869,57 | 673 | 4430 | 74 | 450,489 | 23,080 |
| C1-2 elephant carcasses | Loxodonta africana carcass 1-2 | 1 | 0 | 12 | 25 | 0,007 | 138 | 11,75 | 0 | 38 | 206 | 0,071 | -0,184 |
| all elephant carcasses | Loxodonta africana carcass all | 3 | 0 | 37 | 40 | 0,022 | 336 | 18,34 | 0 | 77 | 107 | 0,181 | 0,117 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 2 | 0 | 25 | 33 | 0,014 | 232 | 15,24 | 0 | 58 | 134 | 0,132 | 0,301 |

# KS – KS

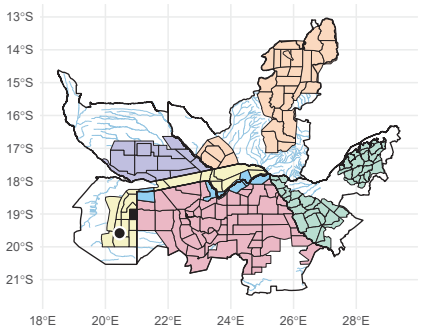
# NAMIBIA – KHAUDUM NYAE–NYAE

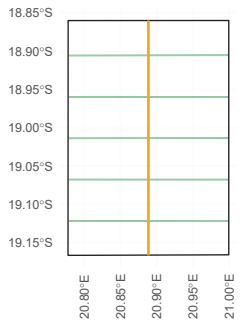
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Khaudum Nyae–Nyae
STRATUM CODE: KS
STRATUM NAME: KS
■ STRATUM AREA: 790.64 sqkm
• SURVEY BASE: Tsumkwe
DISTANCE TO SURVEY BASE: 78 km

– TRANSECTS: 5 (117 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 4.4 %

– BASELINE DISTANCE: 33.91 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 1.7 h
Crew(s): C04
KES2022_V5WOT20221013B 15:35–17:18

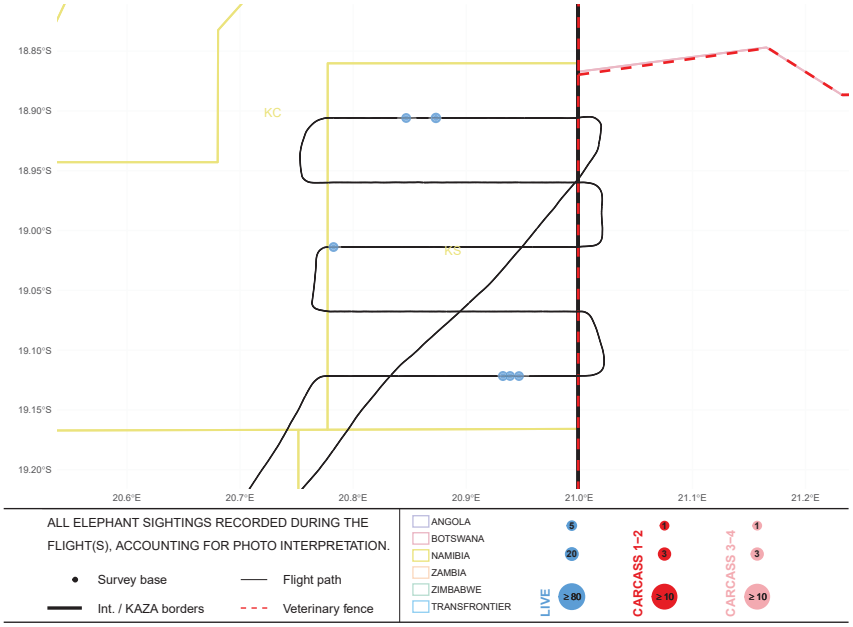
Actual sampling intensity: 4.6 %
Transect flying time: 0.7 h
Transects: 5 – 117 km – 90°
Search effort: 1.09 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C04 | |
| Side: | L | R |
| % sightings: | 33 | 67 |
| % individuals: | 18 | 82 |

## PHOTO INTERPRETATION

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






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **1 (1)** |
| Bulls: | 1 (1) |
| Family: | 0 (0) |
| **NOT IN SAMPLE:** | **9 (5)** |
| Outside search strip: | 9 |
| 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: | 3 |
| Other wildlife count: | 10 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 2.776, N = 109, w = 311

| | | LIVE OBS | LIVE FINAL | ALL CARCASSES OBS | ALL CARCASSES FINAL |
|---|---|---|---|---|---|
| Population estimate | $\hat{Y}$ | 22 | 22 | – | – |
| Variance of estimate | $\mathrm{Var}\hat{Y}$ | 458 | 458 | – | – |
| Standard error | $\mathrm{SE}\hat{Y}$ | 21 | 21 | – | – |
| 95% confidence interval | $\mathrm{CI}_{\hat{Y}}^{95\%}$ | ± 59 | ± 59 | – | – |
| Percentage of relative precision | $\mathrm{PRP}\hat{Y}$ | 272 % | 272 % | – | – |
| Density per sqkm | $R\hat{Y}$ | 0.028 | 0.028 | – | – |
| Variance between transect counts | $s_y^2$ | 0.2 | 0.2 | – | – |
| Variance between transect areas | $s_a^2$ | 0.01 | 0.01 | – | – |
| Covariance between counts & areas | $s_{ay}$ | −0.027 | −0.027 | – | – |

## CARCASS RATIOS

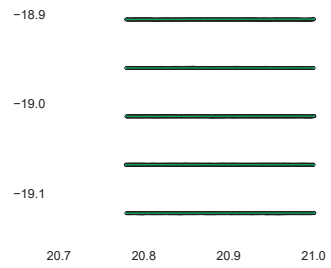
$CR_{1:4} = 0$ %
$CR_{1:2} = 0$ %

## KS – KS NAMIBIA – KHAUDUM NYAE-NYAE

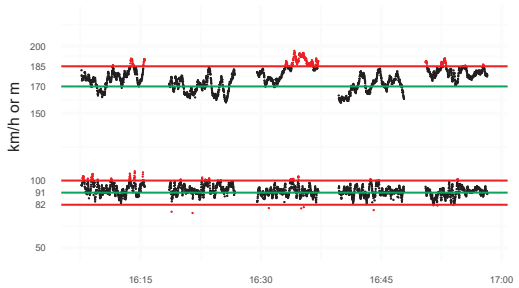
### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5WOT20221013B

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:




SPEED
Average: 175.9 km/h
Standard dev.: 7.8 km/h

HEIGHT AGL
Average: 92.6 m (303.7 ft)
Standard dev.: 4 m (13.1 ft)

## KS – KS NAMIBIA – KHAUDUM NYAE–NYAE

**STRATUM CODE:** KS **N:** 109 $S_a^2$: 0,010
**STRATUM NAME:** KS **w:** 311 **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 | 2 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| elephant bulls | Loxodonta africana males | 1 | 9 | 22 | 59 | 0,028 | 458 | 21,41 | 0 | 81 | 272 | 0,200 | -0,027 |
| 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 | 153 | 273 | 0,193 | 9656 | 98,26 | 0 | 426 | 178 | 4,300 | 0,146 |
| 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 | 3 | 0 | 66 | 118 | 0,083 | 1803 | 42,46 | 0 | 183 | 180 | 0,800 | 0,046 |
| 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 | 1 | 9 | 22 | 59 | 0,028 | 458 | 21,41 | 0 | 81 | 272 | 0,200 | -0,027 |
| 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 |

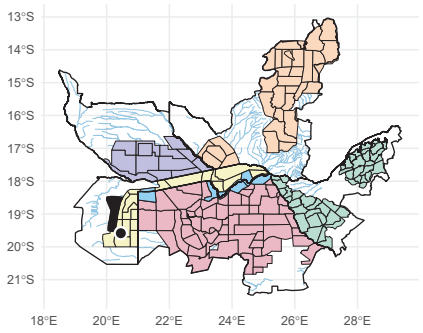
# L1 – L1 NAMIBIA – KHAUDUM NYAE–NYAE

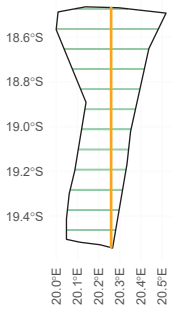
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Khaudum Nyae–Nyae
STRATUM CODE: L1
STRATUM NAME: L1
■ STRATUM AREA: 3630.54 sqkm
• SURVEY BASE: Tsumkwe
DISTANCE TO SURVEY BASE: 73 km

– TRANSECTS: 12 (364 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 3 %

– BASELINE DISTANCE: 119.36 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.1 h
Crew(s): C02
KES2022_V5LJB20221013A 06:31–10:36

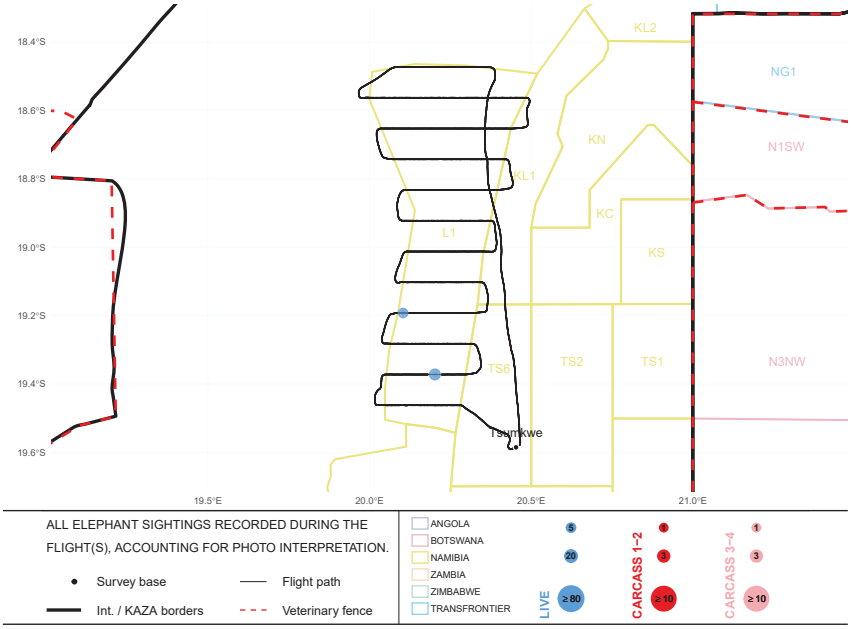
Actual sampling intensity: 3.2 %
Transect flying time: 2.1 h
Transects: 12 – 364 km – 90°
Search effort: 1.09 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C02 | |
| Side: | L | R |
| % sightings: | 51 | 49 |
| % individuals: | 67 | 33 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 10 | 70 | 57.14 |
| Live elephant (>9): | 0 | | |
| Elephant carcass: | 0 | | |
| Live elephant (<10): | 1 | 100 | 0 |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **5 (1)** |
| Bulls: | 5 (1) |
| Family: | 0 (0) |
| **NOT IN SAMPLE:** | **11 (1)** |
| Outside search strip: | 11 |
| 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: | 48 |
| Domestic count: | 242 |

## ELEPHANT DATA ANALYSIS

t = 2.201, N = 375, w = 318

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 157 | 157 | – | – |
| Variance of estimate | $\widehat{Var}$ | 24560 | 24560 | – | – |
| Standard error | $\widehat{SE}$ | 157 | 157 | – | – |
| 95% confidence interval | $\widehat{CI}^{95\%}$ | ± 345 | ± 345 | – | – |
| Percentage of relative precision | $\widehat{PRP}$ | 220 % | 220 % | – | – |
| Density per sqkm | $\hat{R}$ | 0.043 | 0.043 | – | – |
| Variance between transect counts | $s_y^2$ | 2.083 | 2.083 | – | – |
| Variance between transect areas | $s_a^2$ | 7.447 | 7.447 | – | – |
| Covariance between counts & areas | $s_{ay}$ | −0.718 | −0.718 | – | – |

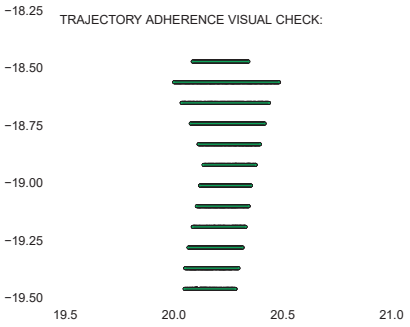
## CARCASS RATIOS

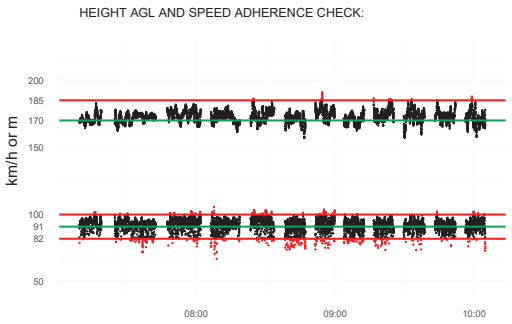
$CR_{1:4} = 0$ %
$CR_{1:2} = 0$ %

## L1 – L1 NAMIBIA – KHAUDUM NYAE–NYAE

### ADHERENCE TO FLIGHT PARAMETERS

**KES2022_ V5LJB20221013A**



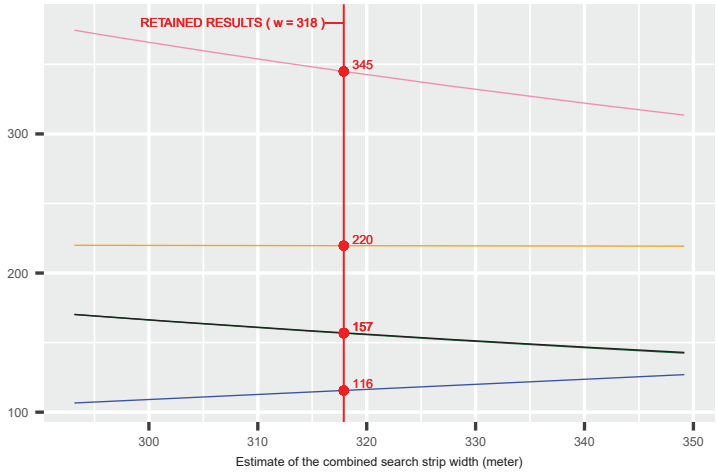

SPEED
Average: 172.8 km/h
Standard dev.: 4.3 km/h

HEIGHT AGL
Average: 92 m (301.8 ft)
Standard dev.: 4.6 m (15 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: [ 170 – 143 ]**
CONFIDENCE INTERVAL: ± [ 375 – 314 ]
SAMPLE AREA: [ 107 – 127 ] sqkm
SE: [ 170 – 142 ]
PRP: [ 220 – 219 ] %

# L1 – L1 NAMIBIA – KHAUDUM NYAE–NYAE

**STRATUM CODE:** L1 **N:** 375 $S_a^2$: 7,447
**STRATUM NAME:** L1 **w:** 318 **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 | 3 | 0 | 94 | 191 | 0,026 | 7537 | 86,82 | 0 | 285 | 203 | 0,750 | 1,779 |
| cattle | Bos taurus | 182 | 0 | 5716 | 5462 | 1,574 | 6158738 | 2481,68 | 253 | 11178 | 96 | 739,424 | 68,723 |
| donkey | Equus asinus | 6 | 0 | 188 | 289 | 0,052 | 17231 | 131,27 | 0 | 477 | 153 | 1,545 | 0,487 |
| duiker | Sylvicapra grimmia | 17 | 1 | 534 | 400 | 0,147 | 33109 | 181,96 | 133 | 934 | 75 | 2,447 | -1,030 |
| eland | Tragelaphus oryx | 20 | 0 | 628 | 1382 | 0,173 | 394408 | 628,02 | 0 | 2010 | 220 | 33,333 | -3,241 |
| elephant bulls | Loxodonta africana males | 5 | 0 | 157 | 345 | 0,043 | 24560 | 156,72 | 0 | 502 | 220 | 2,083 | -0,718 |
| elephant family | Loxodonta africana family | 0 | 11 | 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 | 2 | 0 | 63 | 134 | 0,017 | 3690 | 60,74 | 0 | 197 | 213 | 0,333 | 0,322 |
| 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 | 63 | 138 | 0,017 | 3944 | 62,80 | 0 | 201 | 220 | 0,333 | -0,324 |
| oribi | Ourebia ourebi | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| oryx | Oryx gazella | 2 | 0 | 63 | 138 | 0,017 | 3941 | 62,77 | 0 | 201 | 220 | 0,333 | -0,315 |
| 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 | 52 | 0 | 1633 | 1755 | 0,450 | 635700 | 797,31 | 0 | 3388 | 107 | 63,697 | 10,350 |
| 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 | 5 | 11 | 157 | 345 | 0,043 | 24560 | 156,72 | 0 | 502 | 220 | 2,083 | -0,718 |
| 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 |

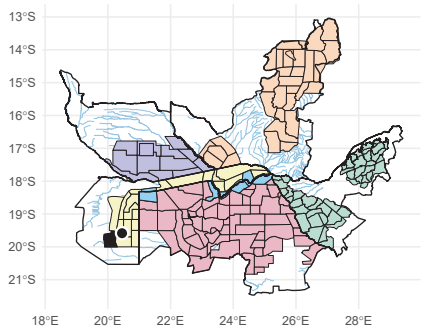
# T1 – T1 NAMIBIA – KHAUDUM NYAE–NYAE

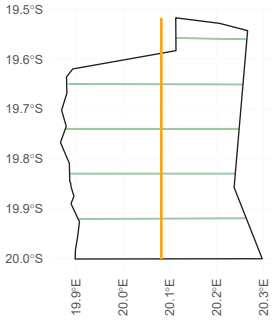
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Khaudum Nyae–Nyae
STRATUM CODE: T1
STRATUM NAME: T1
■ STRATUM AREA: 1838.71 sqkm
• SURVEY BASE: Tsumkwe
DISTANCE TO SURVEY BASE: 45 km

– TRANSECTS: 5 (168 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 2.7 %

– BASELINE DISTANCE: 53.6 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 2.1 h
Crew(s): C01
KES2022_V5IIM20221013B 15:31–17:37

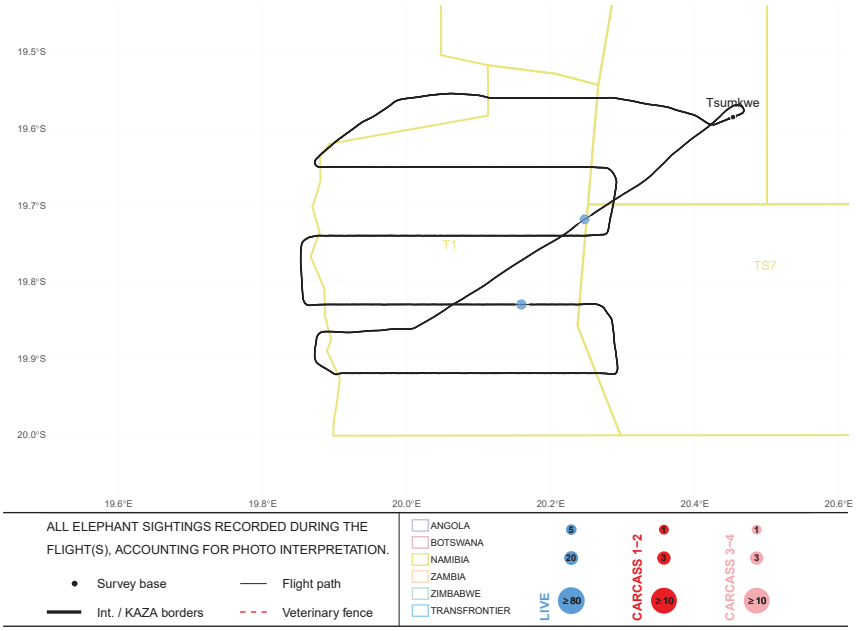
Actual sampling intensity: 2.9 %
Transect flying time: 1 h
Transects: 5 – 168 km – 90°
Search effort: 1.12 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C01 | |
| Side: | L | R |
| % sightings: | 50 | 50 |
| % individuals: | 50 | 50 |

## PHOTO INTERPRETATION

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






## LIVE ELEPHANTS

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



## 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: | 1 |
| Other wildlife count: | 2 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 2.776, N = 168, w = 318

| | | LIVE OBS | LIVE FINAL | ALL CARCASSES OBS | ALL CARCASSES FINAL |
|---|---|---|---|---|---|
| Population estimate | $\hat{Y}$ | 69 | 69 | – | – |
| Variance of estimate | $Var\hat{Y}$ | 4297 | 4297 | – | – |
| Standard error | $SE\hat{Y}$ | 66 | 66 | – | – |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 182 | ± 182 | – | – |
| Percentage of relative precision | $PRP\hat{Y}$ | 265 % | 265 % | – | – |
| Density per sqkm | $R\hat{Y}$ | 0.037 | 0.037 | – | – |
| Variance between transect counts | $s^2_y$ | 0.8 | 0.8 | – | – |
| Variance between transect areas | $s^2_a$ | 10.402 | 10.402 | – | – |
| Covariance between counts & areas | $s_{ay}$ | 0.448 | 0.448 | – | – |

## CARCASS RATIOS

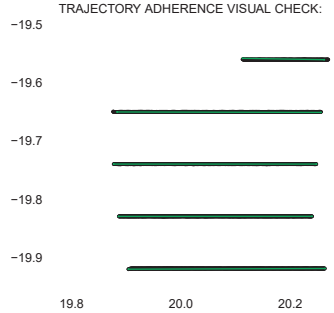
$CR_{1:4}$ = 0 %
$CR_{1:2}$ = 0 %

## T1 – T1 NAMIBIA – KHAUDUM NYAE–NYAE

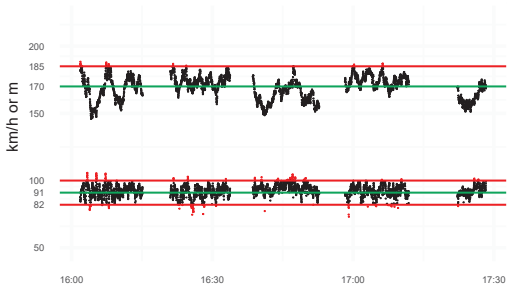
### ADHERENCE TO FLIGHT PARAMETERS

**KES2022_ V5IIM20221013B**

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



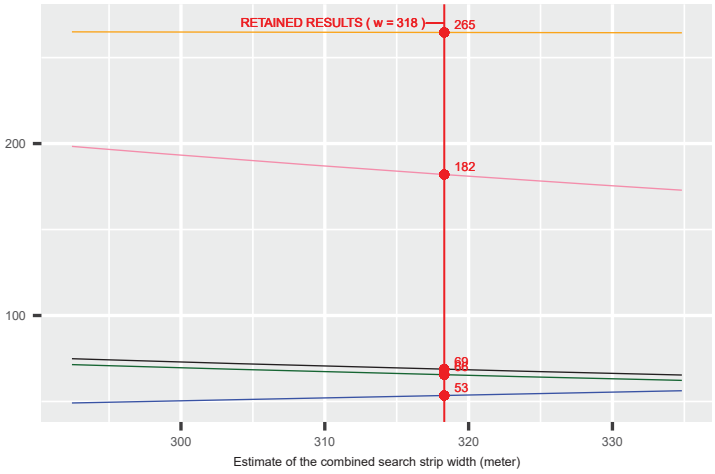

SPEED
Average: 169 km/h
Standard dev.: 8.5 km/h

HEIGHT AGL
Average: 92.4 m (303.1 ft)
Standard dev.: 4.4 m (14.4 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: [160 – 192]
C01 – Right: [121 – 161]




**LIVE ELEPHANT ESTIMATE: [ 75 – 65 ]**
CONFIDENCE INTERVAL: ± [ 198 – 173 ]
SAMPLE AREA: [ 49 – 56 ] sqkm
SE: [ 71 – 62 ]
PRP: [ 265 – 264 ] %

## T1 – T1 NAMIBIA – KHAUDUM NYAE–NYAE

**STRATUM CODE:** T1 **N:** 168 $S_a^2$: 10,402
**STRATUM NAME:** T1 **w:** 318 **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 | 2 | 2 | 69 | 182 | 0,037 | 4297 | 65,55 | 0 | 251 | 265 | 0,800 | 0,448 |
| 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 | 2 | 1 | 69 | 178 | 0,037 | 4132 | 64,28 | 0 | 247 | 260 | 0,800 | 0,849 |
| 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 | 2 | 2 | 69 | 182 | 0,037 | 4297 | 65,55 | 0 | 251 | 265 | 0,800 | 0,448 |
| 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 |

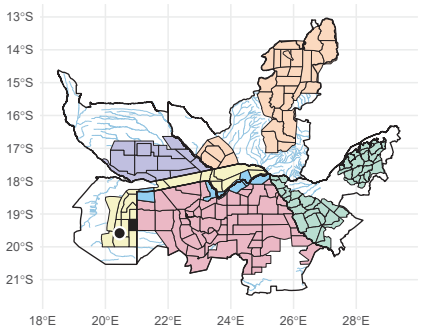
# TS1 – TS1 NAMIBIA – KHAUDUM NYAE–NYAE

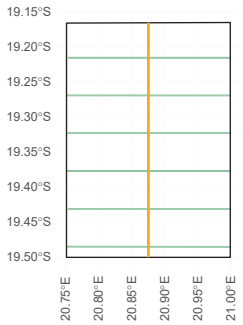
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Khaudum Nyae–Nyae
STRATUM CODE: TS1
STRATUM NAME: TS1
■ STRATUM AREA: 963.6 sqkm
• SURVEY BASE: Tsumkwe
DISTANCE TO SURVEY BASE: 52 km

– TRANSECTS: 6 (156 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 4.8 %

– BASELINE DISTANCE: 37.08 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 1.6 h
Crew(s): C02
KES2022_V5LJB20221013B 15:29–17:06

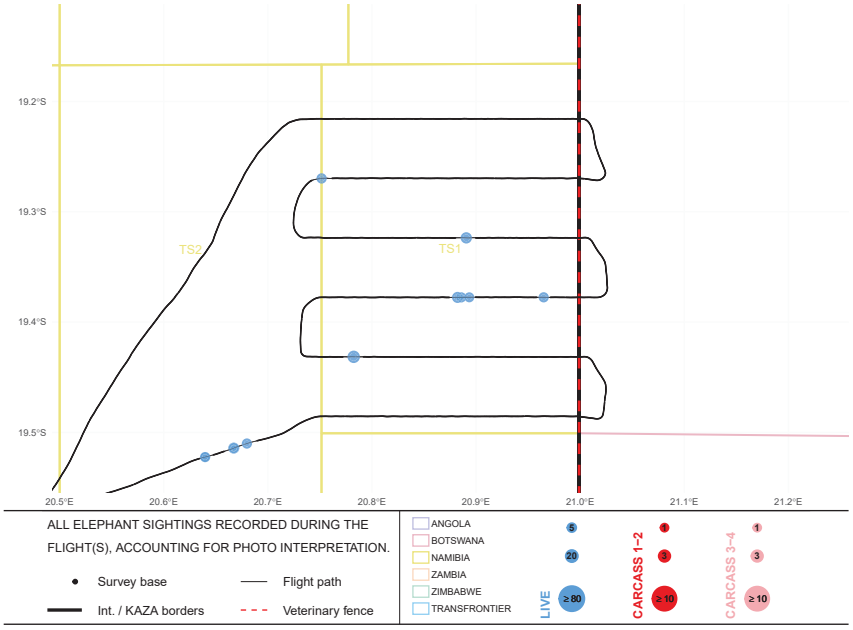
Actual sampling intensity: 5.2 %
Transect flying time: 0.9 h
Transects: 6 – 156 km – 90°
Search effort: 1.09 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C02 | |
| Side: | L | R |
| % sightings: | 53 | 47 |
| % individuals: | 53 | 47 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 7 | 14.29 | 0 |
| Live elephant (>9): | 1 | 100 | 0 |
| Elephant carcass: | 0 | | |
| Live elephant (<10): | 1 | 0 | |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **13 (2)** |
| Bulls: | 3 (1) |
| Family: | 10 (1) |
| **NOT IN SAMPLE:** | **44 (11)** |
| Outside search strip: | 26 |
| Off transect: | 18 |



## 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: | 23 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 2.571, N = 115, w = 320

| | | LIVE OBS | LIVE FINAL | ALL CARCASSES OBS | ALL CARCASSES FINAL |
|---|---|---|---|---|---|
| Population estimate | $\hat{Y}$ | 251 | 251 | – | – |
| Variance of estimate | $\mathrm{Var}\hat{Y}$ | 34488 | 34488 | – | – |
| Standard error | $\mathrm{SE}\hat{Y}$ | 186 | 186 | – | – |
| 95% confidence interval | $\mathrm{CI}^{95\%}_{\hat{Y}}$ | ± 477 | ± 477 | – | – |
| Percentage of relative precision | $\mathrm{PRP}\hat{Y}$ | 190 % | 190 % | – | – |
| Density per sqkm | $R\hat{Y}$ | 0.261 | 0.261 | – | – |
| Variance between transect counts | $s^2_y$ | 16.167 | 16.167 | – | – |
| Variance between transect areas | $s^2_a$ | 0.005 | 0.005 | – | – |
| Covariance between counts & areas | $s_{ay}$ | −0.155 | −0.155 | – | – |

## CARCASS RATIOS

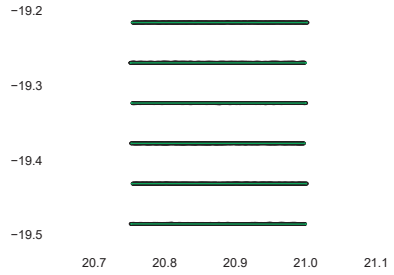
$CR_{1:4} = 0$ %
$CR_{1:2} = 0$ %

## TS1 – TS1 NAMIBIA – KHAUDUM NYAE–NYAE

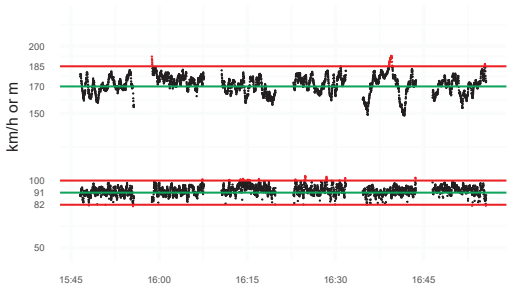
### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5LJB20221013B

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



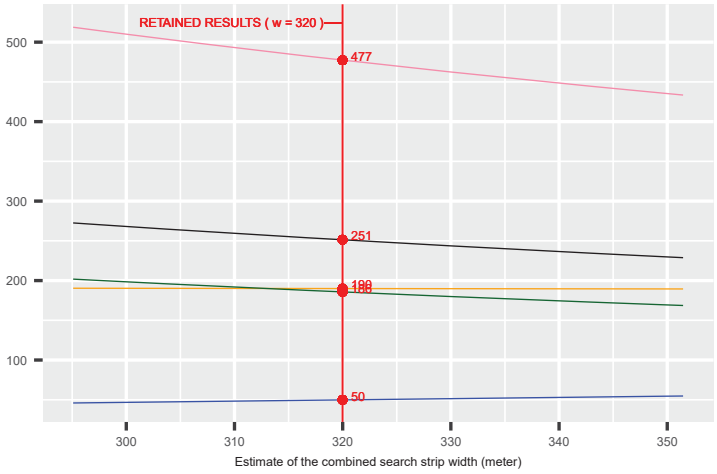

SPEED
Average: 171.3 km/h
Standard dev.: 6.9 km/h

HEIGHT AGL
Average: 92.6 m (303.8 ft)
Standard dev.: 3.2 m (10.7 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: [ 273 – 229 ]**
CONFIDENCE INTERVAL: ± [ 519 – 433 ]
SAMPLE AREA: [ 46 – 55 ] sqkm
SE: [ 202 – 169 ]
PRP: [ 190 – 189 ] %

## TS1 – TS1 NAMIBIA – KHAUDUM NYAE–NYAE

**STRATUM CODE:** TS1 **N:** 116 $S_a^2$: 0,005
**STRATUM NAME:** TS1 **w:** 320 **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 | 8 | 0 | 155 | 143 | 0,160 | 3111 | 55,77 | 11 | 298 | 93 | 1,467 | 0,004 |
| eland | Tragelaphus oryx | 5 | 0 | 97 | 241 | 0,100 | 8821 | 93,92 | 0 | 338 | 250 | 4,167 | 0,054 |
| elephant bulls | Loxodonta africana males | 3 | 26 | 58 | 145 | 0,060 | 3181 | 56,40 | 0 | 203 | 250 | 1,500 | 0,013 |
| elephant family | Loxodonta africana family | 10 | 18 | 193 | 484 | 0,201 | 35520 | 188,47 | 0 | 678 | 251 | 16,667 | -0,168 |
| 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 | 7 | 1 | 135 | 191 | 0,140 | 5494 | 74,12 | 0 | 326 | 141 | 2,567 | -0,077 |
| ostrich | Struthio camelus | 3 | 0 | 58 | 145 | 0,060 | 3176 | 56,35 | 0 | 203 | 250 | 1,500 | 0,032 |
| 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 | 10 | 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 | 13 | 44 | 251 | 477 | 0,261 | 34488 | 185,71 | 0 | 729 | 190 | 16,167 | -0,155 |
| 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 |

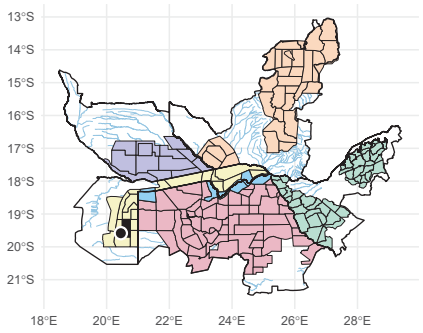
# TS2 – TS2 NAMIBIA – KHAUDUM NYAE–NYAE

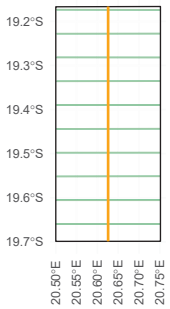
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Khaudum Nyae–Nyae
STRATUM CODE: TS2
STRATUM NAME: TS2
■ STRATUM AREA: 1554.95 sqkm
• SURVEY BASE: Tsumkwe
DISTANCE TO SURVEY BASE: 33 km

– TRANSECTS: 10 (264 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 5.1 %

– BASELINE DISTANCE: 58.92 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 2.3 h
Crew(s): C04
KES2022_V5WOT20221015A 06:39–08:59

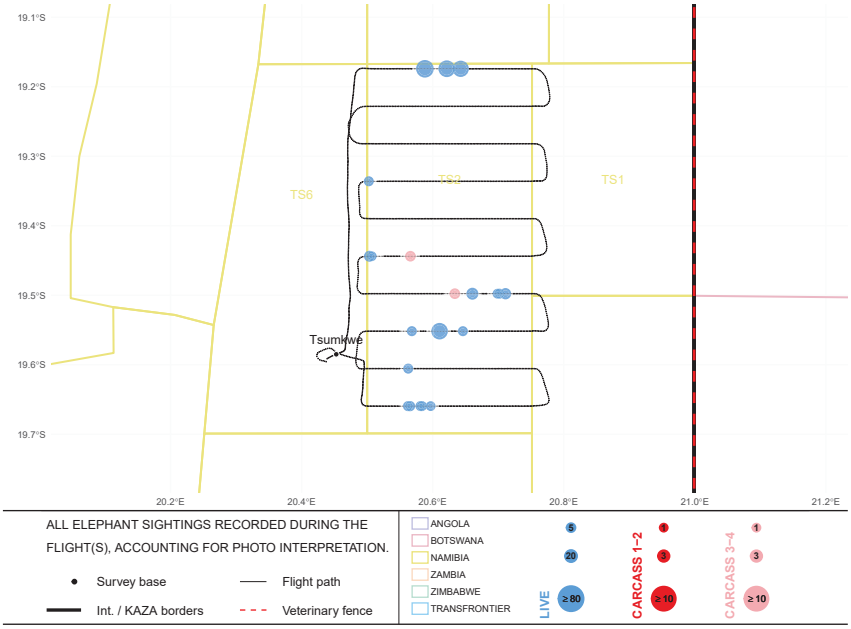
Actual sampling intensity: 5.2 %
Transect flying time: 1.5 h
Transects: 10 – 264 km – 90°
Search effort: 1.12 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C04 | |
| Side: | L | R |
| % sightings: | 41 | 59 |
| % individuals: | 26 | 74 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 24 | 16.67 | 25 |
| Live elephant (>9): | 2 | 50 | 100 |
| Elephant carcass: | 2 | 0 | |
| Live elephant (<10): | 7 | 42.86 | 0 |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **46 (9)** |
| Bulls: | 7 (5) |
| Family: | 39 (4) |
| **NOT IN SAMPLE:** | **134 (13)** |
| Outside search strip: | 134 |
| Off transect: | 0 |



## 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:** | **0 (0)** |
| Outside search strip: | 0 |
| Off transect: | 0 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 8 |
| Other wildlife count: | 35 |
| Domestic count: | 82 |

## ELEPHANT DATA ANALYSIS

t = 2.262, N = 190, w = 309

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 859 | 878 | 38 | 38 |
| Variance of estimate | $Var\hat{Y}$ | 188240 | 201292 | 614 | 614 |
| Standard error | $SE\hat{Y}$ | 434 | 449 | 25 | 25 |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 981 | ± 1015 | ± 56 | ± 56 |
| Percentage of relative precision | $PRP\hat{Y}$ | 114 % | 116 % | 147 % | 147 % |
| Density per sqkm | $R\hat{Y}$ | 0.552 | 0.565 | 0.025 | 0.025 |
| Variance between transect counts | $s^2_y$ | 54.278 | 58.044 | 0.178 | 0.178 |
| Variance between transect areas | $s^2_a$ | 0.006 | 0.006 | 0.006 | 0.006 |
| Covariance between counts & areas | $s_{ay}$ | −0.214 | −0.221 | −0.003 | −0.003 |

## CARCASS RATIOS

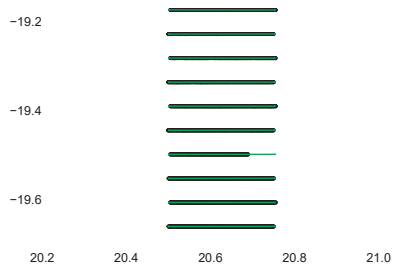
$CR_{1:4}$ = 4.2 %
$CR_{1:2}$ = 0 %

## TS2 – TS2 NAMIBIA – KHAUDUM NYAE-NYAE

### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5WOT20221015A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:




SPEED

| | |
|---|---|
| Average: | 172.3 km/h |
| Standard dev.: | 4.5 km/h |

HEIGHT AGL

| | | |
|---|---|---|
| Average: | 92 m | (301.8 ft) |
| Standard dev.: | 2.6 m | (8.5 ft) |

## TS2 – TS2 NAMIBIA – KHAUDUM NYAE–NYAE

**STRATUM CODE:** TS2 **N:** 191 $S_a^2$: 0,006
**STRATUM NAME:** TS2 **w:** 309 **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 | 69 | 0 | 1317 | 2022 | 0,847 | 799097 | 893,92 | 0 | 3339 | 154 | 231,656 | 0,139 |
| donkey | Equus asinus | 2 | 4 | 38 | 84 | 0,025 | 1378 | 37,12 | 0 | 122 | 220 | 0,400 | 0,021 |
| duiker | Sylvicapra grimmia | 3 | 0 | 57 | 64 | 0,037 | 808 | 28,43 | 0 | 122 | 112 | 0,233 | -0,010 |
| eland | Tragelaphus oryx | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| elephant bulls | Loxodonta africana males | 7 | 15 | 134 | 141 | 0,086 | 3873 | 62,23 | 0 | 274 | 105 | 1,122 | 0,004 |
| elephant family | Loxodonta africana family | 39 | 119 | 744 | 982 | 0,479 | 188320 | 433,96 | 0 | 1726 | 132 | 54,322 | -0,225 |
| 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 | 42 | 0,012 | 346 | 18,61 | 0 | 61 | 221 | 0,100 | -0,011 |
| elephant carcass four | Loxodonta africana carcass four | 1 | 0 | 19 | 42 | 0,012 | 345 | 18,56 | 0 | 61 | 220 | 0,100 | 0,008 |
| giraffe | Giraffa giraffa | 11 | 0 | 210 | 462 | 0,135 | 41745 | 204,32 | 0 | 672 | 220 | 12,100 | 0,039 |
| 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 | 5 | 38 | 84 | 0,025 | 1385 | 37,21 | 0 | 122 | 221 | 0,400 | -0,022 |
| oribi | Ourebia ourebi | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| oryx | Oryx gazella | 2 | 10 | 38 | 84 | 0,025 | 1380 | 37,15 | 0 | 122 | 220 | 0,400 | 0,007 |
| ostrich | Struthio camelus | 4 | 12 | 76 | 93 | 0,049 | 1691 | 41,12 | 0 | 169 | 122 | 0,489 | -0,007 |
| 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 | 1 | 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 | 11 | 0 | 210 | 462 | 0,135 | 41672 | 204,14 | 0 | 672 | 220 | 12,100 | 0,117 |
| 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 | 112 | 0,049 | 2459 | 49,59 | 0 | 189 | 147 | 0,711 | -0,010 |
| waterbuck | Kobus ellipsiprymnus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| wildebeest | Connochaetes taurinus | 9 | 25 | 172 | 378 | 0,110 | 27917 | 167,08 | 0 | 550 | 220 | 8,100 | 0,069 |
| zebra | Equus spp, | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| all elephants | Loxodonta africana all | 46 | 134 | 878 | 1015 | 0,565 | 201292 | 448,66 | 0 | 1893 | 116 | 58,044 | -0,221 |
| 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 | 2 | 0 | 38 | 56 | 0,025 | 614 | 24,79 | 0 | 94 | 147 | 0,178 | -0,003 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 2 | 0 | 38 | 56 | 0,025 | 614 | 24,79 | 0 | 94 | 147 | 0,178 | -0,003 |

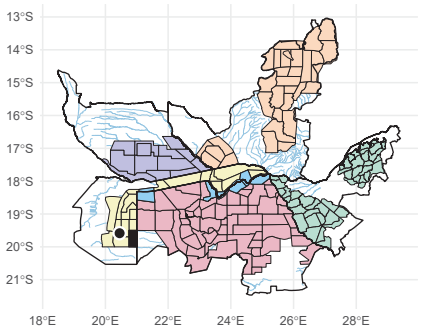
# TS3 – TS3 NAMIBIA – KHAUDUM NYAE–NYAE

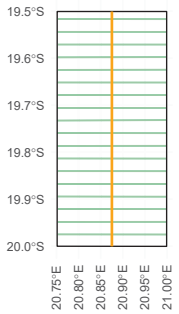
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Khaudum Nyae–Nyae
STRATUM CODE: TS3
STRATUM NAME: TS3
■ STRATUM AREA: 1435.52 sqkm
• SURVEY BASE: Tsumkwe
DISTANCE TO SURVEY BASE: 50 km

– TRANSECTS: 18 (465 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 9.7 %

– BASELINE DISTANCE: 55.34 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 3.9 h
Crew(s): C01
KES2022_V5IIM20221014A 06:32–10:27

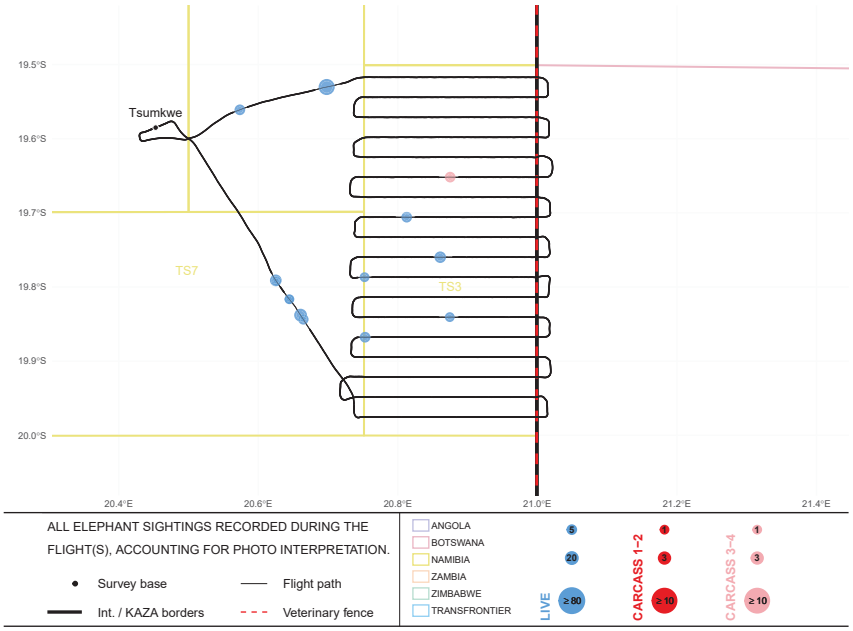
Actual sampling intensity: 10.3 %
Transect flying time: 2.7 h
Transects: 18 – 465 km – 90°
Search effort: 1.1 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C01 | |
| Side: | L | R |
| % sightings: | 35 | 65 |
| % individuals: | 22 | 78 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 10 | 40 | 25 |
| Live elephant (>9): | 0 | | |
| Elephant carcass: | 1 | 0 | |
| Live elephant (<10): | 4 | 25 | 0 |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **20 (4)** |
| Bulls: | 6 (2) |
| Family: | 14 (2) |
| **NOT IN SAMPLE:** | **68 (9)** |
| Outside search strip: | 1 |
| Off transect: | 67 |

## ELEPHANT CARCASSES



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

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 11 |
| Other wildlife count: | 134 |
| Domestic count: | 11 |

## ELEPHANT DATA ANALYSIS

t = 2.11, N = 173, w = 319

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 194 | 194 | 10 | 10 |
| Variance of estimate | $\mathrm{Var}\hat{Y}$ | 9646 | 9646 | 83 | 83 |
| Standard error | $\mathrm{SE}\hat{Y}$ | 98 | 98 | 9 | 9 |
| 95% confidence interval | $\mathrm{CI}_{\hat{Y}}^{95\%}$ | ± 207 | ± 207 | ± 19 | ± 19 |
| Percentage of relative precision | $\mathrm{PRP}\hat{Y}$ | 107 % | 107 % | 199 % | 199 % |
| Density per sqkm | $R\hat{Y}$ | 0.135 | 0.135 | 0.007 | 0.007 |
| Variance between transect counts | $s_y^2$ | 6.458 | 6.458 | 0.056 | 0.056 |
| Variance between transect areas | $s_a^2$ | 0.019 | 0.019 | 0.019 | 0.019 |
| Covariance between counts & areas | $s_{ay}$ | 0.115 | 0.115 | −0.003 | −0.003 |

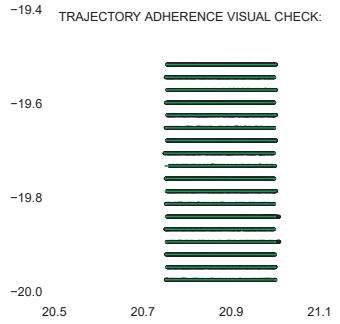
## CARCASS RATIOS

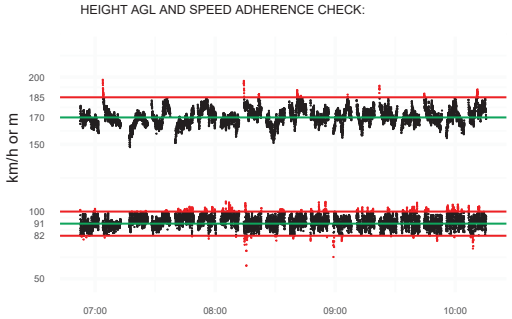
$CR_{1:4} = 4.8$ %
$CR_{1:2} = 0$ %

## TS3 – TS3 NAMIBIA – KHAUDUM NYAE–NYAE

### ADHERENCE TO FLIGHT PARAMETERS

**KES2022_ V5IIM20221014A**



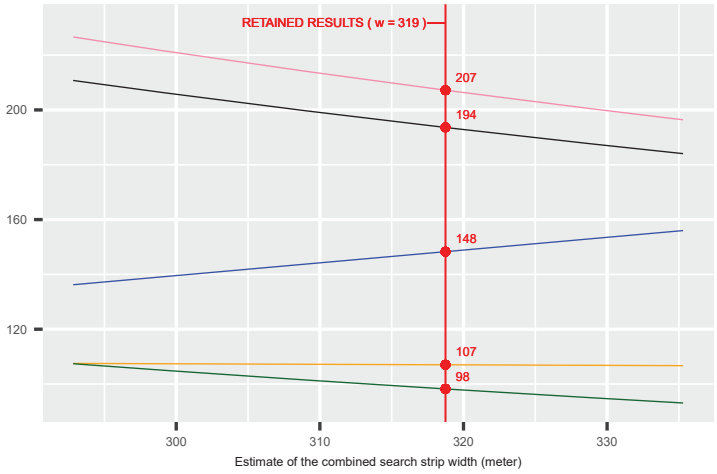

SPEED
Average: 170.6 km/h
Standard dev.: 6.1 km/h

HEIGHT AGL
Average: 92.5 m (303.5 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: [160 – 192]
C01 – Right: [121 – 162]




**LIVE ELEPHANT ESTIMATE: [ 211 – 184 ]**
CONFIDENCE INTERVAL: ± [ 227 – 196 ]
SAMPLE AREA: [ 136 – 156 ] sqkm
SE: [ 107 – 93 ]
PRP: [ 108 – 107 ] %

## TS3 – TS3 NAMIBIA – KHAUDUM NYAE–NYAE

**STRATUM CODE:** TS3 **N:** 174 $S_a^2$: 0,019
**STRATUM NAME:** TS3 **w:** 319 **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, | 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 | 11 | 27 | 106 | 212 | 0,074 | 10102 | 100,51 | 0 | 319 | 199 | 6,722 | -0,054 |
| donkey | Equus asinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| duiker | Sylvicapra grimmia | 1 | 0 | 10 | 19 | 0,007 | 83 | 9,13 | 0 | 29 | 199 | 0,056 | -0,001 |
| eland | Tragelaphus oryx | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| elephant bulls | Loxodonta africana males | 6 | 13 | 58 | 97 | 0,040 | 2109 | 45,92 | 0 | 155 | 167 | 1,412 | 0,083 |
| elephant family | Loxodonta africana family | 14 | 55 | 136 | 193 | 0,094 | 8388 | 91,59 | 0 | 329 | 143 | 5,595 | 0,033 |
| 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 | 1 | 0 | 10 | 19 | 0,007 | 83 | 9,13 | 0 | 29 | 199 | 0,056 | -0,003 |
| giraffe | Giraffa giraffa | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| grysbok | Raphicerus sharpei | 1 | 0 | 10 | 19 | 0,007 | 84 | 9,14 | 0 | 29 | 199 | 0,056 | -0,007 |
| 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 | 2 | 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 | 8 | 0 | 77 | 85 | 0,054 | 1619 | 40,23 | 0 | 162 | 110 | 1,085 | 0,060 |
| oribi | Ourebia ourebi | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| oryx | Oryx gazella | 15 | 1 | 145 | 164 | 0,101 | 6030 | 77,66 | 0 | 309 | 113 | 4,029 | 0,058 |
| ostrich | Struthio camelus | 11 | 15 | 106 | 109 | 0,074 | 2688 | 51,84 | 0 | 216 | 103 | 1,781 | -0,065 |
| 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 | 28 | 0 | 271 | 382 | 0,189 | 32770 | 181,03 | 0 | 653 | 141 | 21,791 | -0,112 |
| 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 | 2 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| warthog | Phacochoerus africanus | 3 | 0 | 29 | 42 | 0,020 | 397 | 19,91 | 0 | 71 | 145 | 0,265 | 0,013 |
| waterbuck | Kobus ellipsiprymnus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| wildebeest | Connochaetes taurinus | 55 | 31 | 532 | 743 | 0,371 | 123866 | 351,95 | 0 | 1275 | 139 | 82,644 | 0,160 |
| zebra | Equus spp, | 7 | 0 | 68 | 135 | 0,047 | 4078 | 63,86 | 0 | 202 | 199 | 2,722 | 0,054 |
| all elephants | Loxodonta africana all | 20 | 68 | 194 | 207 | 0,135 | 9646 | 98,21 | 0 | 401 | 107 | 6,458 | 0,115 |
| 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 | 10 | 19 | 0,007 | 83 | 9,13 | 0 | 29 | 199 | 0,056 | -0,003 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 1 | 0 | 10 | 19 | 0,007 | 83 | 9,13 | 0 | 29 | 199 | 0,056 | -0,003 |

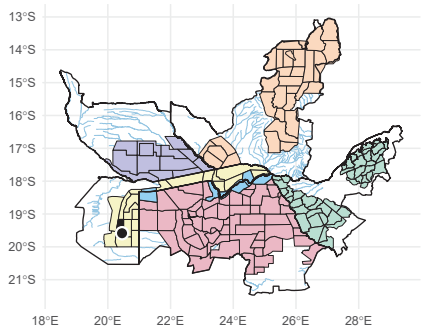
# TS6 – TS6 NAMIBIA – KHAUDUM NYAE–NYAE

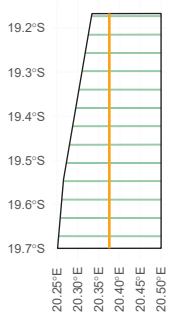
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Khaudum Nyae–Nyae
STRATUM CODE: TS6
STRATUM NAME: TS6
■ STRATUM AREA: 1311.33 sqkm
• SURVEY BASE: Tsumkwe
DISTANCE TO SURVEY BASE: 26 km

– TRANSECTS: 13 (289 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 6.6 %

– BASELINE DISTANCE: 58.87 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 2.7 h
Crew(s): C02
KES2022_V5LJB20221014A 06:47–09:30

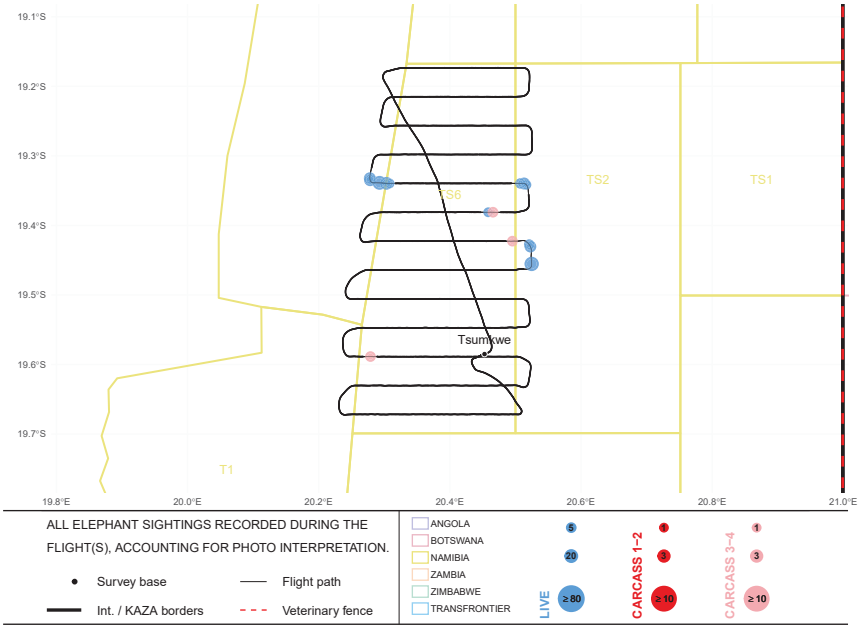
Actual sampling intensity: 7 %
Transect flying time: 1.7 h
Transects: 13 – 289 km – 90°
Search effort: 1.1 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C02 | |
| Side: | L | R |
| % sightings: | 62 | 38 |
| % individuals: | 53 | 47 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 12 | 58.33 | 28.57 |
| Live elephant (>9): | 0 | | |
| Elephant carcass: | 3 | 100 | 0 |
| Live elephant (<10): | 1 | 100 | 0 |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **2 (1)** |
| Bulls: | 2 (1) |
| Family: | 0 (0) |
| **NOT IN SAMPLE:** | **111 (11)** |
| Outside search strip: | 1 |
| Off transect: | 110 |



## 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:** | **0 (0)** |
| Outside search strip: | 0 |
| Off transect: | 0 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 12 |
| Other wildlife count: | 77 |
| Domestic count: | 159 |

## ELEPHANT DATA ANALYSIS

t = 2.179, N = 185, w = 317

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 29 | 29 | 43 | 43 |
| Variance of estimate | $Var\hat{Y}$ | 769 | 769 | 469 | 469 |
| Standard error | $SE\hat{Y}$ | 28 | 28 | 22 | 22 |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 60 | ± 60 | ± 47 | ± 47 |
| Percentage of relative precision | $PRP\hat{Y}$ | 211 % | 211 % | 110 % | 110 % |
| Density per sqkm | $R\hat{Y}$ | 0.022 | 0.022 | 0.033 | 0.033 |
| Variance between transect counts | $s^2_y$ | 0.308 | 0.308 | 0.192 | 0.192 |
| Variance between transect areas | $s^2_a$ | 0.764 | 0.764 | 0.764 | 0.764 |
| Covariance between counts & areas | $s_{ay}$ | −0.075 | −0.075 | 0.053 | 0.053 |

## CARCASS RATIOS

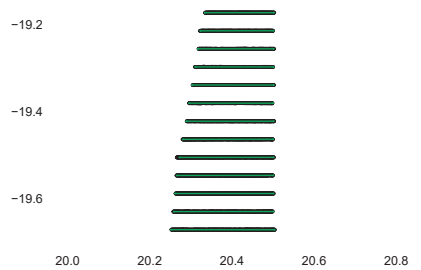
$CR_{1:4}$ = 60 %
$CR_{1:2}$ = 0 %

## TS6 – TS6 NAMIBIA – KHAUDUM NYAE–NYAE

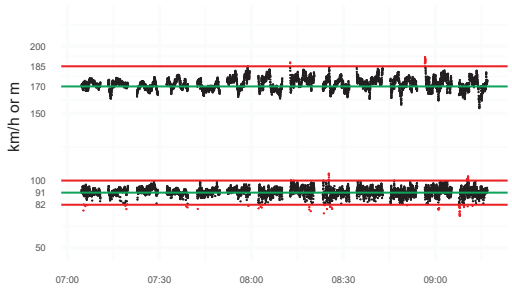
### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5LJB20221014A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



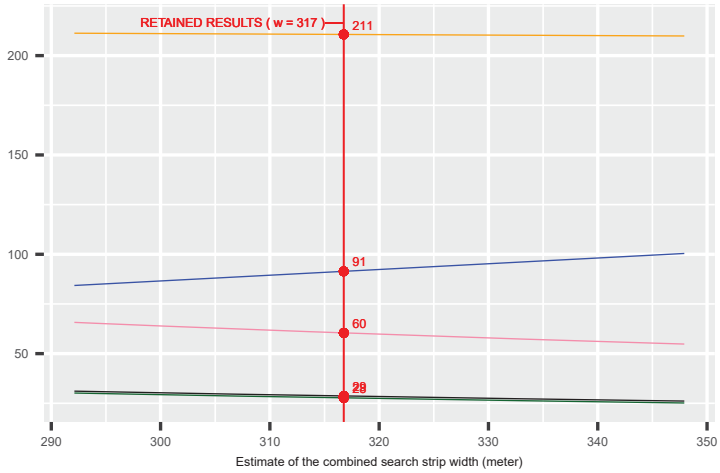

SPEED
Average: 171.8 km/h
Standard dev.: 4.7 km/h

HEIGHT AGL
Average: 91.7 m (300.7 ft)
Standard dev.: 3 m (9.9 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: [154 – 176]
C02 – Right: [134 – 185]




**LIVE ELEPHANT ESTIMATE: [ 31 – 26 ]**
CONFIDENCE INTERVAL: ± [ 66 – 55 ]
SAMPLE AREA: [ 84 – 100 ] sqkm
SE: [ 30 – 25 ]
PRP: [ 211 – 210 ] %

## TS6 – TS6 NAMIBIA – KHAUDUM NYAE–NYAE

**STRATUM CODE:** TS6 **N:** 186 $S_a^2$: 0,764
**STRATUM NAME:** TS6 **w:** 317 **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 | 5 | 42 | 72 | 149 | 0,055 | 4703 | 68,58 | 0 | 221 | 208 | 1,923 | 0,201 |
| 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 | 155 | 28 | 2223 | 4579 | 1,695 | 4415796 | 2101,38 | 0 | 6802 | 206 | 1822,410 | 11,091 |
| donkey | Equus asinus | 4 | 0 | 57 | 119 | 0,044 | 2983 | 54,62 | 0 | 176 | 207 | 1,231 | 0,285 |
| duiker | Sylvicapra grimmia | 7 | 0 | 100 | 106 | 0,077 | 2378 | 48,76 | 0 | 207 | 106 | 0,936 | -0,142 |
| eland | Tragelaphus oryx | 25 | 1 | 359 | 715 | 0,273 | 107669 | 328,13 | 0 | 1074 | 199 | 44,077 | 1,028 |
| elephant bulls | Loxodonta africana males | 2 | 21 | 29 | 60 | 0,022 | 769 | 27,74 | 0 | 89 | 211 | 0,308 | -0,075 |
| elephant family | Loxodonta africana family | 0 | 90 | 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 | 14 | 30 | 0,011 | 186 | 13,65 | 0 | 44 | 207 | 0,077 | 0,071 |
| elephant carcass four | Loxodonta africana carcass four | 2 | 0 | 29 | 41 | 0,022 | 351 | 18,74 | 0 | 70 | 142 | 0,141 | -0,018 |
| giraffe | Giraffa giraffa | 7 | 0 | 100 | 212 | 0,077 | 9501 | 97,48 | 0 | 313 | 212 | 3,769 | -0,466 |
| 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 | 0 | 57 | 94 | 0,044 | 1872 | 43,27 | 0 | 152 | 164 | 0,731 | -0,292 |
| oribi | Ourebia ourebi | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| oryx | Oryx gazella | 11 | 9 | 158 | 186 | 0,120 | 7324 | 85,58 | 0 | 344 | 118 | 2,974 | 0,090 |
| ostrich | Struthio camelus | 13 | 2 | 186 | 274 | 0,142 | 15791 | 125,66 | 0 | 460 | 147 | 6,333 | -0,147 |
| 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 | 4 | 0 | 57 | 121 | 0,044 | 3099 | 55,67 | 0 | 179 | 211 | 1,231 | -0,249 |
| waterbuck | Kobus ellipsiprymnus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| wildebeest | Connochaetes taurinus | 0 | 1 | 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 | 2 | 111 | 29 | 60 | 0,022 | 769 | 27,74 | 0 | 89 | 211 | 0,308 | -0,075 |
| 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 | 0 | 43 | 47 | 0,033 | 469 | 21,65 | 0 | 90 | 110 | 0,192 | 0,053 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 3 | 0 | 43 | 47 | 0,033 | 469 | 21,65 | 0 | 90 | 110 | 0,192 | 0,053 |

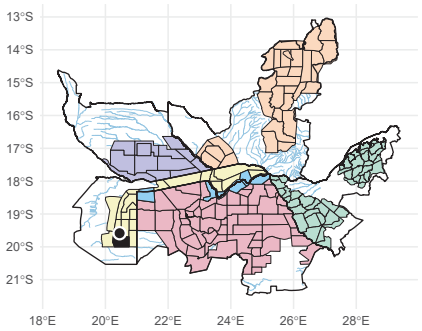
# TS7 – TS7 NAMIBIA – KHAUDUM NYAE–NYAE

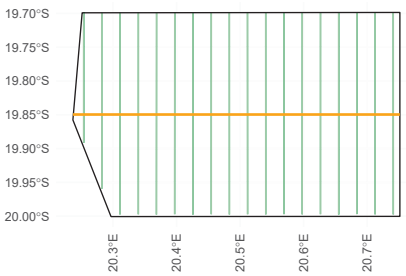
## SURVEY DESIGN

COUNTRY: Namibia
SUPERSTRATUM: Khaudum Nyae–Nyae
STRATUM CODE: TS7
STRATUM NAME: TS7
■ STRATUM AREA: 1737.77 sqkm
• SURVEY BASE: Tsumkwe
DISTANCE TO SURVEY BASE: 22 km

– TRANSECTS: 18 (588 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 10.1 %

– BASELINE DISTANCE: 53.9 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.2 h
Crew(s): C04
KES2022_V5WOT20221013A 06:47–11:02

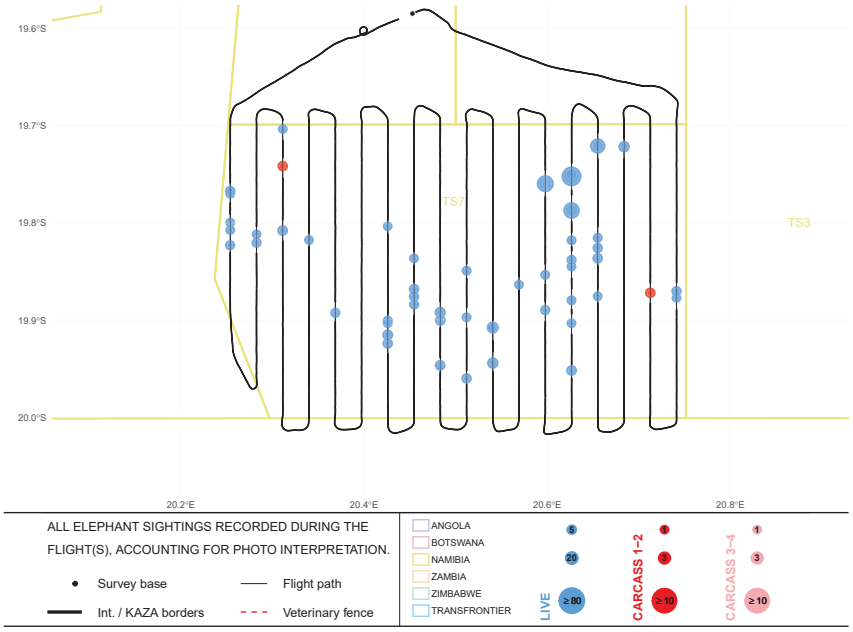
Actual sampling intensity: 10.4 %
Transect flying time: 3.4 h
Transects: 18 – 588 km – 0°
Search effort: 1.12 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C04 | |
| Side: | L | R |
| % sightings: | 45 | 55 |
| % individuals: | 34 | 66 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 60 | 15 | 11.11 |
| Live elephant (>9): | 3 | 33.33 | 0 |
| Elephant carcass: | 2 | 0 | |
| Live elephant (<10): | 22 | 31.82 | 0 |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **129 (25)** |
| Bulls: | 53 (20) |
| Family: | 76 (5) |
| **NOT IN SAMPLE:** | **173 (30)** |
| Outside search strip: | 173 |
| Off transect: | 0 |

## ELEPHANT CARCASSES



| | |
|---|---|
| **IN SAMPLE:** | **2 (2)** |
| Category 1: | 0 (0) |
| Category 2: | 2 (2) |
| 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: | 12 |
| Other wildlife count: | 195 |
| Domestic count: | 2 |

## ELEPHANT DATA ANALYSIS

t = 2.11, N = 175, w = 308

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 1238 | 1238 | 19 | 19 |
| Variance of estimate | $Var\hat{Y}$ | 232128 | 232128 | 159 | 159 |
| Standard error | $SE\hat{Y}$ | 482 | 482 | 13 | 13 |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 1017 | ± 1017 | ± 27 | ± 27 |
| Percentage of relative precision | $PRP\hat{Y}$ | 82 % | 82 % | 139 % | 139 % |
| Density per sqkm | $R\hat{Y}$ | 0.712 | 0.712 | 0.011 | 0.011 |
| Variance between transect counts | $s^2_y$ | 153.088 | 153.088 | 0.105 | 0.105 |
| Variance between transect areas | $s^2_a$ | 0.847 | 0.847 | 0.847 | 0.847 |
| Covariance between counts & areas | $s_{ay}$ | 1.02 | 1.02 | 0.022 | 0.022 |

## CARCASS RATIOS

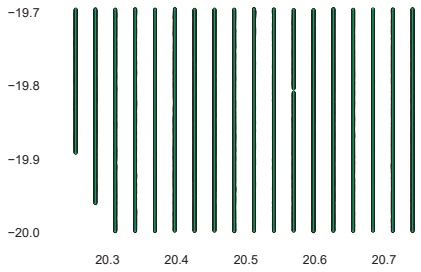
$CR_{1:4}$ = 1.5 %
$CR_{1:2}$ = 1.5 %

## TS7 – TS7 NAMIBIA – KHAUDUM NYAE-NYAE

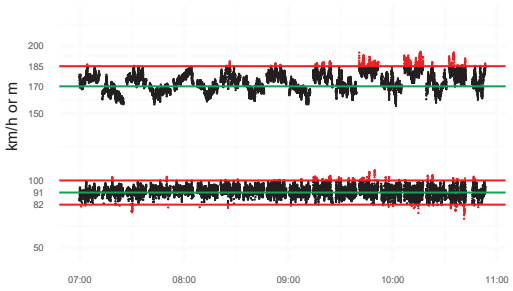
### ADHERENCE TO FLIGHT PARAMETERS

**KES2022_ V5WOT20221013A**

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:




SPEED
Average: 173.7 km/h
Standard dev.: 7 km/h

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

## TS7 – TS7 NAMIBIA – KHAUDUM NYAE–NYAE

**STRATUM CODE:** TS7 **N:** 175 $S_a^2$: 0,847
**STRATUM NAME:** TS7 **w:** 308 **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, | 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 | 7 | 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 | 19 | 27 | 0,011 | 158 | 12,58 | 0 | 46 | 138 | 0,105 | 0,043 |
| eland | Tragelaphus oryx | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| elephant bulls | Loxodonta africana males | 53 | 87 | 509 | 350 | 0,293 | 27575 | 166,06 | 158 | 859 | 69 | 18,291 | 0,511 |
| elephant family | Loxodonta africana family | 76 | 86 | 729 | 945 | 0,420 | 200456 | 447,72 | 0 | 1674 | 129 | 131,595 | 0,510 |
| 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 | 19 | 27 | 0,011 | 159 | 12,61 | 0 | 46 | 139 | 0,105 | 0,022 |
| 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 | 2 | 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 | 2 | 6 | 19 | 39 | 0,011 | 339 | 18,41 | 0 | 58 | 202 | 0,222 | 0,017 |
| 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 | 20 | 9 | 192 | 150 | 0,110 | 5075 | 71,24 | 42 | 342 | 78 | 3,399 | 0,383 |
| oribi | Ourebia ourebi | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| oryx | Oryx gazella | 15 | 1 | 144 | 233 | 0,083 | 12209 | 110,49 | 0 | 377 | 162 | 8,029 | 0,225 |
| ostrich | Struthio camelus | 13 | 21 | 125 | 143 | 0,072 | 4624 | 68,00 | 0 | 268 | 115 | 3,036 | 0,077 |
| 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 | 0 | 115 | 233 | 0,066 | 12171 | 110,32 | 0 | 348 | 202 | 8,000 | 0,233 |
| 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 | 2 | 0 | 19 | 39 | 0,011 | 338 | 18,40 | 0 | 58 | 202 | 0,222 | 0,030 |
| tsessebe | Damaliscus lunatus | 0 | 13 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| warthog | Phacochoerus africanus | 42 | 28 | 403 | 644 | 0,232 | 93165 | 305,23 | 0 | 1047 | 160 | 61,294 | 0,665 |
| waterbuck | Kobus ellipsiprymnus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| wildebeest | Connochaetes taurinus | 85 | 139 | 816 | 1008 | 0,469 | 228155 | 477,66 | 0 | 1824 | 124 | 150,918 | 1,750 |
| zebra | Equus spp, | 0 | 6 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| all elephants | Loxodonta africana all | 129 | 173 | 1238 | 1017 | 0,712 | 232128 | 481,80 | 222 | 2255 | 82 | 153,088 | 1,020 |
| C1-2 elephant carcasses | Loxodonta africana carcass 1-2 | 2 | 0 | 19 | 27 | 0,011 | 159 | 12,61 | 0 | 46 | 139 | 0,105 | 0,022 |
| all elephant carcasses | Loxodonta africana carcass all | 2 | 0 | 19 | 27 | 0,011 | 159 | 12,61 | 0 | 46 | 139 | 0,105 | 0,022 |
| 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 |

# TRANSFRONTIER



# 14H – NG 14 high

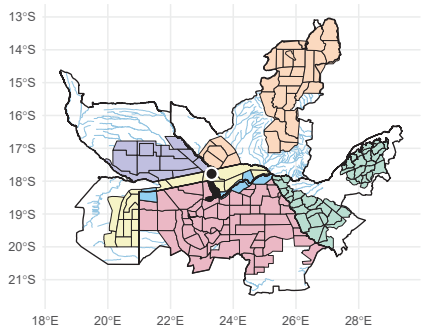
# TRANSFRONTIER – NORTHERN BOTSWANA

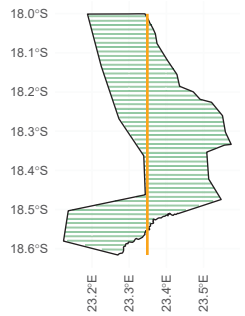
## SURVEY DESIGN

COUNTRY: Transfrontier
SUPERSTRATUM: Northern Botswana
STRATUM CODE: 14H
STRATUM NAME: NG 14 high
■ STRATUM AREA: 1480.81 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 62 km

– TRANSECTS: 54 (1173 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 23.8 %

– BASELINE DISTANCE: 68.14 km




## SURVEY IMPLEMENTATION

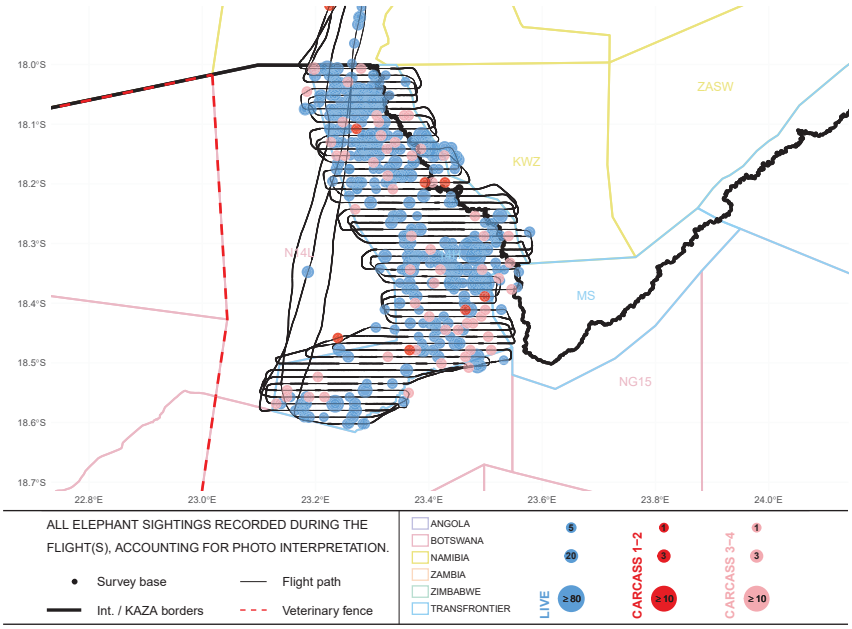
**Number of flight(s): 3**
Combined flying time: 11.4 h
Crew(s): C01, C02, C04
KES2022_V5IIM20221006A 06:45–10:46
KES2022_V5WOT20221007A 07:19–11:01
KES2022_V5LJB20221007A 06:50–10:30
Actual sampling intensity: 8.5, 8.2, 8.4 %
Transect flying time: 6.8 h
Transects: 54 – 1173 km – 90°
Search effort: 1.11 min/sqkm

## OBSERVER CONTRIBUTION

| Crew(s): | C01 | | C04 | | C02 | |
|---|---|---|---|---|---|---|
| Side: | L | R | L | R | L | R |
| % sightings: | 38 | 62 | 46 | 54 | 53 | 47 |
| % individuals: | 42 | 58 | 45 | 55 | 55 | 45 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 493 | 19.07 | 41.49 |
| Live elephant (>9): | 59 | 79.66 | 40.43 |
| Elephant carcass: | 50 | 14 | 14.29 |
| Live elephant (<10): | 136 | 5.15 | 42.86 |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **1543 (193)** |
| Bulls: | 112 (62) |
| Family: | 1431 (131) |
| **NOT IN SAMPLE:** | **2173 (222)** |
| Outside search strip: | 1824 |
| Off transect: | 349 |

## ELEPHANT CARCASSES



| | |
|---|---|
| **IN SAMPLE:** | **51 (50)** |
| Category 1: | 1 (1) |
| Category 2: | 4 (4) |
| Category 3: | 14 (13) |
| Category 4: | 32 (32) |
| **NOT IN SAMPLE:** | **16 (16)** |
| Outside search strip: | 9 |
| Off transect: | 7 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 20 |
| Other wildlife count: | 3588 |
| Domestic count: | 210 |

## ELEPHANT DATA ANALYSIS

t = 2.016, N = 204, 221, 194, w = 321

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 6005 | 6174 | 204 | 204 |
| Variance of estimate | $Var\hat{Y}$ | 852842 | 906808 | 918 | 918 |
| Standard error | $SE\hat{Y}$ | 923 | 952 | 30 | 30 |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 1861 | ± 1919 | ± 61 | ± 61 |
| Percentage of relative precision | $PRP\hat{Y}$ | 31 % | 31 % | 30 % | 30 % |
| Density per sqkm | $R\hat{Y}$ | 4.056 | 4.169 | 0.138 | 0.138 |
| Variance between transect counts | $s^2_y$ | 962.09 | 1020.249 | 1.072 | 1.072 |
| Variance between transect areas | $s^2_a$ | 2.582 | 2.582 | 2.582 | 2.582 |
| Covariance between counts & areas | $s_{ay}$ | −4.862 | −5.197 | −0.039 | −0.039 |

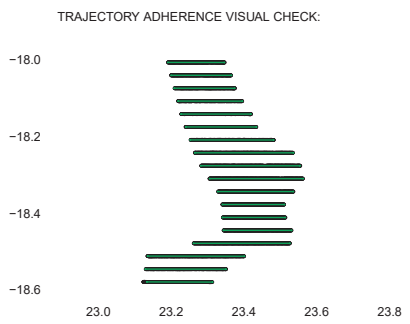
## CARCASS RATIOS

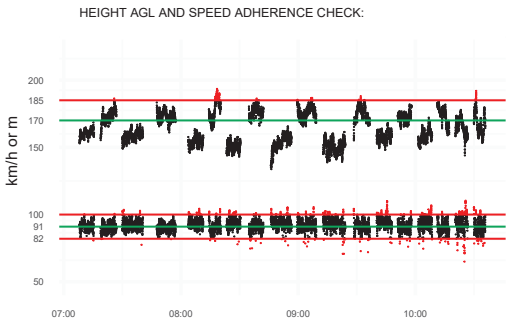
$CR_{1:4} = 3.2$ %
$CR_{1:2} = 0.3$ %

## 14H – NG 14 high — TRANSFRONTIER – NORTHERN BOTSWANA

### ADHERENCE TO FLIGHT PARAMETERS

#### KES2022_ V5IIM20221006A

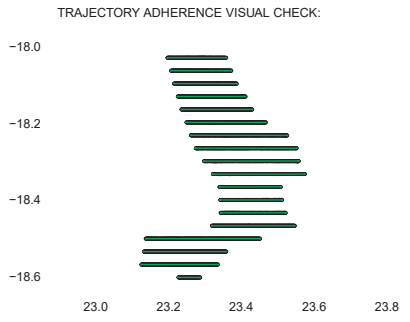


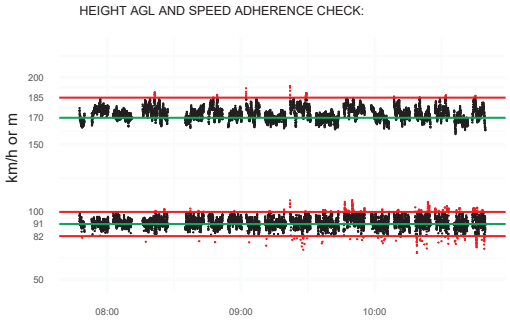




SPEED
Average: 164.5 km/h
Standard dev.: 10.8 km/h

HEIGHT AGL
Average: 92.1 m (302.1 ft)
Standard dev.: 4.2 m (13.9 ft)

#### KES2022_ V5WOT20221007A

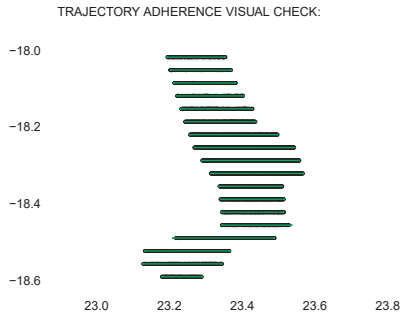


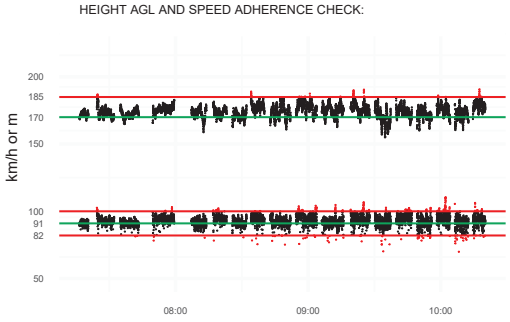




SPEED
Average: 173 km/h
Standard dev.: 4.8 km/h

HEIGHT AGL
Average: 92 m (302 ft)
Standard dev.: 4 m (13.1 ft)

#### KES2022_ V5LJB20221007A




SPEED
Average: 174.2 km/h
Standard dev.: 4.5 km/h

HEIGHT AGL
Average: 92.8 m (304.4 ft)
Standard dev.: 3.6 m (11.7 ft)

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

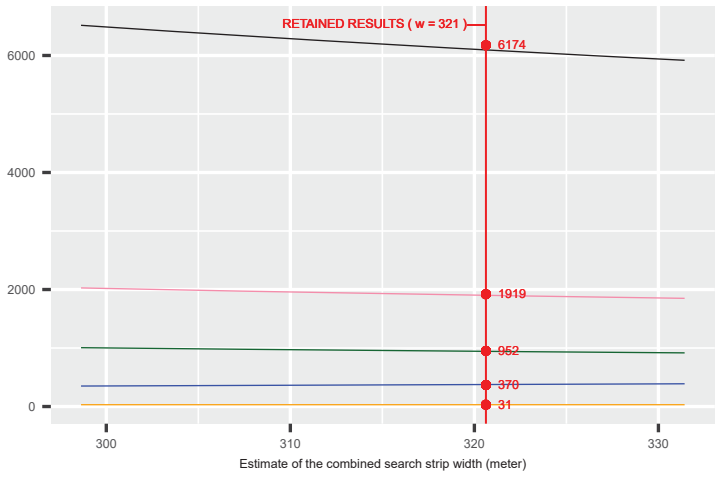
Range of search strip width estimates (m):

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: [ 6516 – 5918 ]**
CONFIDENCE INTERVAL: ± [ 2027 – 1849 ]
SAMPLE AREA: [ 350 – 389 ] sqkm
SE: [ 1006 – 917 ]
PRP: [ 31 – 31 ] %



# 14H – NG 14 high — TRANSFRONTIER – NORTHERN BOTSWANA

**STRATUM CODE:** 14H **N:** 204, 221, 194 $S_a^2$: 2,582
**STRATUM NAME:** NG 14 high **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 | 15 | 3,94 | 0 | 12 | 204 | 0,019 | -0,009 |
| buffalo | Syncerus caffer | 1254 | 420 | 5009 | 3425 | 3,383 | 2891873 | 1700,55 | 1584 | 8434 | 68 | 3478,931 | -6,519 |
| bushbuck | Tragelaphus scriptus | 0 | 0 | 0 | NA | 0,000 | 0 | 0,00 | NA | NA | NA | 0,000 | 0,000 |
| bushpig | Potamochoerus larvatus | 0 | 0 | 0 | NA | 0,000 | 0 | 0,00 | NA | NA | NA | 0,000 | 0,000 |
| cattle | Bos taurus | 191 | 31 | 768 | 644 | 0,519 | 101038 | 317,87 | 124 | 1412 | 84 | 123,536 | -1,398 |
| donkey | Equus asinus | 0 | 0 | 0 | NA | 0,000 | 0 | 0,00 | NA | NA | NA | 0,000 | 0,000 |
| duiker | Sylvicapra grimmia | 0 | 0 | 0 | NA | 0,000 | 0 | 0,00 | NA | NA | NA | 0,000 | 0,000 |
| eland | Tragelaphus oryx | 6 | 1 | 24 | 33 | 0,016 | 252 | 15,88 | 0 | 57 | 139 | 0,327 | 0,172 |
| elephant bulls | Loxodonta africana males | 112 | 157 | 448 | 171 | 0,303 | 7233 | 85,04 | 277 | 619 | 38 | 8,372 | -0,339 |
| elephant family | Loxodonta africana family | 1431 | 2016 | 5726 | 1880 | 3,867 | 870502 | 933,01 | 3846 | 7605 | 33 | 986,292 | -4,858 |
| elephant carcass one | Loxodonta africana carcass one | 1 | 3 | 4 | 8 | 0,003 | 14 | 3,80 | 0 | 12 | 201 | 0,019 | -0,019 |
| elephant carcass two | Loxodonta africana carcass two | 4 | 0 | 16 | 19 | 0,011 | 90 | 9,47 | 0 | 35 | 121 | 0,108 | -0,029 |
| elephant carcass three | Loxodonta africana carcass three | 14 | 5 | 56 | 28 | 0,038 | 191 | 13,82 | 28 | 84 | 50 | 0,233 | -0,143 |
| elephant carcass four | Loxodonta africana carcass four | 32 | 8 | 128 | 51 | 0,086 | 653 | 25,56 | 76 | 179 | 40 | 0,850 | 0,152 |
| giraffe | Giraffa giraffa | 66 | 15 | 264 | 142 | 0,178 | 4951 | 70,36 | 122 | 405 | 54 | 6,365 | 0,989 |
| grysbok | Raphicerus sharpei | 0 | 0 | 0 | NA | 0,000 | 0 | 0,00 | NA | NA | NA | 0,000 | 0,000 |
| hartebeest | Alcelaphus spp, | 0 | 0 | 0 | NA | 0,000 | 0 | 0,00 | NA | NA | NA | 0,000 | 0,000 |
| hippopotamus | Hippopotamus amphibius | 74 | 1 | 295 | 168 | 0,199 | 6939 | 83,30 | 127 | 463 | 57 | 8,955 | 0,903 |
| horse | Equus caballus | 0 | 0 | 0 | NA | 0,000 | 0 | 0,00 | NA | NA | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 242 | 19 | 964 | 493 | 0,651 | 58784 | 242,45 | 471 | 1457 | 51 | 81,915 | 2,727 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | NA | 0,000 | 0 | 0,00 | NA | NA | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 35 | 5 | 141 | 104 | 0,095 | 2667 | 51,64 | 36 | 245 | 74 | 3,289 | 0,289 |
| oribi | Ourebia ourebi | 0 | 0 | 0 | NA | 0,000 | 0 | 0,00 | NA | NA | NA | 0,000 | 0,000 |
| oryx | Oryx gazella | 0 | 0 | 0 | NA | 0,000 | 0 | 0,00 | NA | NA | NA | 0,000 | 0,000 |
| ostrich | Struthio camelus | 13 | 4 | 52 | 50 | 0,035 | 614 | 24,78 | 1 | 102 | 97 | 0,790 | 0,130 |
| puku | Kobus vardonii | 19 | 0 | 77 | 138 | 0,052 | 4301 | 65,58 | 0 | 216 | 179 | 5,402 | 0,523 |
| red lechwe | Kobus leche | 981 | 44 | 3948 | 2948 | 2,666 | 2001939 | 1414,90 | 1000 | 6897 | 75 | 2600,745 | 25,158 |
| reedbuck | Redunca arundinum | 14 | 0 | 55 | 84 | 0,037 | 1579 | 39,74 | 0 | 139 | 152 | 2,120 | 0,261 |
| roan | Hippotragus equinus | 25 | 8 | 100 | 67 | 0,067 | 1073 | 32,75 | 32 | 167 | 68 | 1,461 | 0,303 |
| sable | Hippotragus niger | 164 | 44 | 652 | 344 | 0,440 | 28724 | 169,48 | 307 | 996 | 53 | 37,961 | 0,348 |
| shoat | Capra hircus - Ovis aries | 19 | 0 | 76 | 152 | 0,051 | 5220 | 72,25 | 0 | 228 | 201 | 6,685 | -0,348 |
| sitatunga | Tragelaphus spekii | 0 | 0 | 0 | NA | 0,000 | 0 | 0,00 | NA | NA | NA | 0,000 | 0,000 |
| springbok | Antidorcas marsupialis | 0 | 0 | 0 | NA | 0,000 | 0 | 0,00 | NA | NA | NA | 0,000 | 0,000 |
| tsessebe | Damaliscus lunatus | 59 | 1 | 236 | 192 | 0,160 | 9090 | 95,34 | 44 | 428 | 81 | 11,520 | 0,360 |
| warthog | Phacochoerus africanus | 31 | 10 | 123 | 83 | 0,083 | 1662 | 40,77 | 40 | 207 | 67 | 2,211 | 0,721 |
| waterbuck | Kobus ellipsiprymnus | 26 | 0 | 106 | 179 | 0,072 | 7216 | 84,94 | 0 | 285 | 169 | 9,047 | 0,494 |
| wildebeest | Connochaetes taurinus | 78 | 44 | 313 | 196 | 0,212 | 9412 | 97,02 | 117 | 509 | 63 | 11,874 | 0,628 |
| zebra | Equus spp, | 487 | 41 | 1951 | 766 | 1,317 | 144987 | 380,77 | 1184 | 2717 | 39 | 170,660 | -0,905 |
| all elephants | Loxodonta africana all | 1543 | 2173 | 6174 | 1919 | 4,169 | 906808 | 952,26 | 4255 | 8093 | 31 | 1020,249 | -5,197 |
| C1-2 elephant carcasses | Loxodonta africana carcass 1-2 | 5 | 3 | 20 | 21 | 0,014 | 104 | 10,21 | 0 | 41 | 103 | 0,123 | -0,048 |
| all elephant carcasses | Loxodonta africana carcass all | 51 | 16 | 204 | 61 | 0,138 | 918 | 30,31 | 143 | 265 | 30 | 1,072 | -0,039 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 46 | 13 | 184 | 58 | 0,124 | 832 | 28,84 | 126 | 242 | 32 | 0,997 | 0,009 |

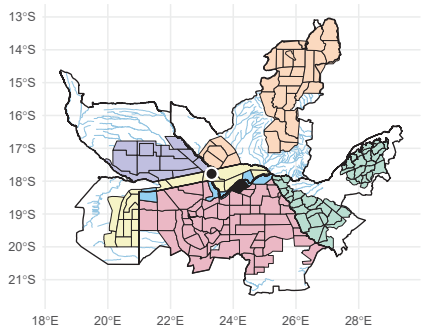
# CH1 – CH 1 TRANSFRONTIER – NORTHERN BOTSWANA

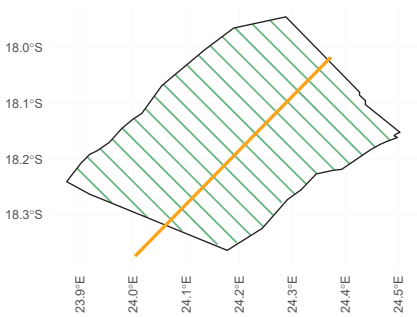
## SURVEY DESIGN

COUNTRY: Transfrontier
SUPERSTRATUM: Northern Botswana
STRATUM CODE: CH1
STRATUM NAME: CH 1
■ STRATUM AREA: 1599.7 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 107 km

– TRANSECTS: 17 (521 km)
TRANSECT ORIENTATION: 136°
PLANNED SAMPLING INTENSITY: 9.8 %

– BASELINE DISTANCE: 55.52 km




## SURVEY IMPLEMENTATION

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

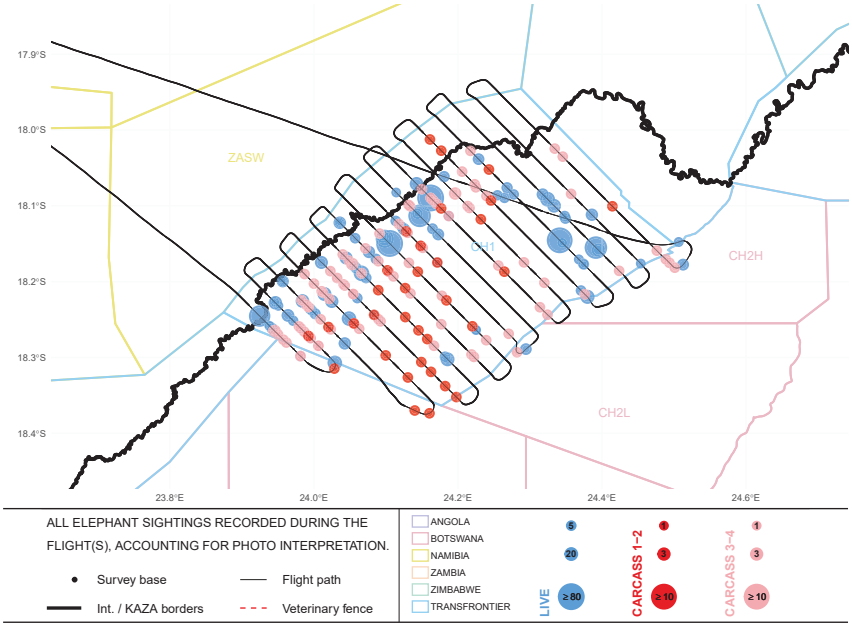
Actual sampling intensity: 10.4 %
Transect flying time: 3.1 h
Transects: 17 – 521 km – 136°
Search effort: 1.11 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C01 | |
| Side: | L | R |
| % sightings: | 38 | 62 |
| % individuals: | 34 | 66 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 246 | 44.72 | 19.09 |
| Live elephant (>9): | 11 | 72.73 | 25 |
| Elephant carcass: | 103 | 66.02 | 0 |
| Live elephant (<10): | 38 | 28.95 | 36.36 |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **400 (49)** |
| Bulls: | 31 (12) |
| Family: | 369 (37) |
| **NOT IN SAMPLE:** | **856 (43)** |
| Outside search strip: | 780 |
| Off transect: | 76 |



## ELEPHANT CARCASSES

| | |
|---|---|
| **IN SAMPLE:** | **106 (103)** |
| Category 1: | 15 (15) |
| Category 2: | 11 (11) |
| Category 3: | 60 (57) |
| Category 4: | 20 (20) |
| **NOT IN SAMPLE:** | **18 (18)** |
| Outside search strip: | 6 |
| Off transect: | 12 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 17 |
| Other wildlife count: | 1288 |
| Domestic count: | 1510 |

## ELEPHANT DATA ANALYSIS

t = 2.12, N = 173, w = 320

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 3703 | 3837 | 1017 | 1017 |
| Variance of estimate | $Var\hat{Y}$ | 720064 | 787332 | 22361 | 22361 |
| Standard error | $SE\hat{Y}$ | 849 | 887 | 150 | 150 |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 1799 | ± 1881 | ± 317 | ± 317 |
| Percentage of relative precision | $PRP\hat{Y}$ | 49 % | 49 % | 31 % | 31 % |
| Density per sqkm | $R\hat{Y}$ | 2.315 | 2.399 | 0.636 | 0.636 |
| Variance between transect counts | $s^2_y$ | 381.596 | 424.015 | 10.691 | 10.691 |
| Variance between transect areas | $s^2_a$ | 5.468 | 5.468 | 5.468 | 5.468 |
| Covariance between counts & areas | $s_{ay}$ | −8.477 | −7.653 | −0.848 | −0.848 |

## CARCASS RATIOS

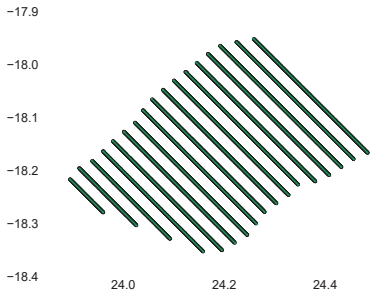
$CR_{1:4} = 20.9$ %
$CR_{1:2} = 6.1$ %

## CH1 – CH 1 TRANSFRONTIER – NORTHERN BOTSWANA

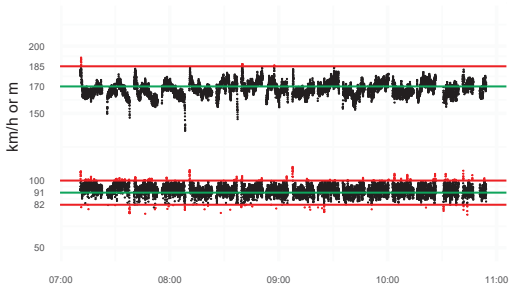
### ADHERENCE TO FLIGHT PARAMETERS

**KES2022_ V5IIM20221004A**

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



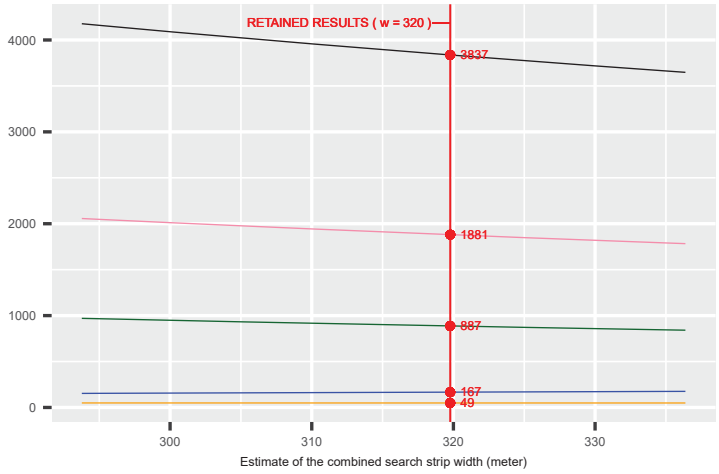

SPEED
Average: 168.1 km/h
Standard dev.: 5.2 km/h

HEIGHT AGL
Average: 92.8 m (304.4 ft)
Standard dev.: 3.7 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: [160 – 193]
C01 – Right: [121 – 162]




**LIVE ELEPHANT ESTIMATE: [ 4177 – 3648 ]**
CONFIDENCE INTERVAL: ± [ 2057 – 1783 ]
SAMPLE AREA: [ 153 – 175 ] sqkm
SE: [ 970 – 841 ]
PRP: [ 49 – 49 ] %

# CH1 – CH 1 TRANSFRONTIER – NORTHERN BOTSWANA

**STRATUM CODE:** CH1 **N:** 174 $S_a^2$: 5,468
**STRATUM NAME:** CH 1 **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 | 225 | 196 | 2158 | 2868 | 1,349 | 1830578 | 1352,99 | 0 | 5027 | 133 | 1017,816 | -43,205 |
| 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 | 1510 | 250 | 14485 | 8525 | 9,055 | 16171830 | 4021,42 | 5960 | 23010 | 59 | 8836,779 | -45,526 |
| 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 | 63 | 0,024 | 887 | 29,78 | 0 | 102 | 165 | 0,566 | 0,308 |
| elephant bulls | Loxodonta africana males | 31 | 33 | 297 | 232 | 0,186 | 12013 | 109,61 | 65 | 530 | 78 | 6,904 | -1,121 |
| elephant family | Loxodonta africana family | 369 | 823 | 3540 | 1857 | 2,213 | 767078 | 875,83 | 1683 | 5396 | 52 | 423,846 | -6,532 |
| elephant carcass one | Loxodonta africana carcass one | 15 | 4 | 144 | 78 | 0,090 | 1350 | 36,75 | 66 | 222 | 54 | 0,860 | 0,336 |
| elephant carcass two | Loxodonta africana carcass two | 11 | 3 | 106 | 65 | 0,066 | 951 | 30,83 | 40 | 171 | 62 | 0,618 | 0,358 |
| elephant carcass three | Loxodonta africana carcass three | 60 | 10 | 576 | 207 | 0,360 | 9531 | 97,62 | 369 | 783 | 36 | 4,015 | -1,717 |
| elephant carcass four | Loxodonta africana carcass four | 20 | 1 | 192 | 97 | 0,120 | 2105 | 45,88 | 95 | 289 | 51 | 1,279 | 0,175 |
| giraffe | Giraffa giraffa | 11 | 1 | 106 | 131 | 0,066 | 3825 | 61,85 | 0 | 237 | 124 | 2,493 | 0,949 |
| 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 | 77 | 169 | 0,048 | 6384 | 79,90 | 0 | 246 | 221 | 3,765 | -2,224 |
| horse | Equus caballus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 35 | 0 | 336 | 399 | 0,210 | 35438 | 188,25 | 0 | 735 | 119 | 23,059 | 2,731 |
| 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 | 18 | 11 | 173 | 184 | 0,108 | 7548 | 86,88 | 0 | 357 | 107 | 4,934 | 1,294 |
| 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 | 182 | 376 | 0,114 | 31428 | 177,28 | 0 | 558 | 206 | 18,985 | -2,592 |
| 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 | 307 | 376 | 0,192 | 31400 | 177,20 | 0 | 683 | 122 | 19,860 | 1,127 |
| 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 | 41 | 0,012 | 371 | 19,27 | 0 | 60 | 213 | 0,235 | 0,166 |
| warthog | Phacochoerus africanus | 17 | 0 | 163 | 137 | 0,102 | 4170 | 64,57 | 26 | 300 | 84 | 2,625 | 0,369 |
| waterbuck | Kobus ellipsiprymnus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| wildebeest | Connochaetes taurinus | 47 | 0 | 451 | 546 | 0,282 | 66311 | 257,51 | 0 | 997 | 121 | 43,191 | 3,854 |
| zebra | Equus spp, | 819 | 425 | 7857 | 5208 | 4,911 | 6036028 | 2456,83 | 2648 | 13065 | 66 | 4234,404 | 60,367 |
| all elephants | Loxodonta africana all | 400 | 856 | 3837 | 1881 | 2,399 | 787332 | 887,32 | 1956 | 5718 | 49 | 424,015 | -7,653 |
| C1-2 elephant carcasses | Loxodonta africana carcass 1-2 | 26 | 7 | 249 | 110 | 0,156 | 2690 | 51,86 | 139 | 359 | 44 | 1,765 | 0,694 |
| all elephant carcasses | Loxodonta africana carcass all | 106 | 18 | 1017 | 317 | 0,636 | 22361 | 149,53 | 700 | 1334 | 31 | 10,691 | -0,848 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 80 | 11 | 767 | 247 | 0,480 | 13530 | 116,32 | 521 | 1014 | 32 | 5,721 | -1,542 |

# CR – Chobe River North–East

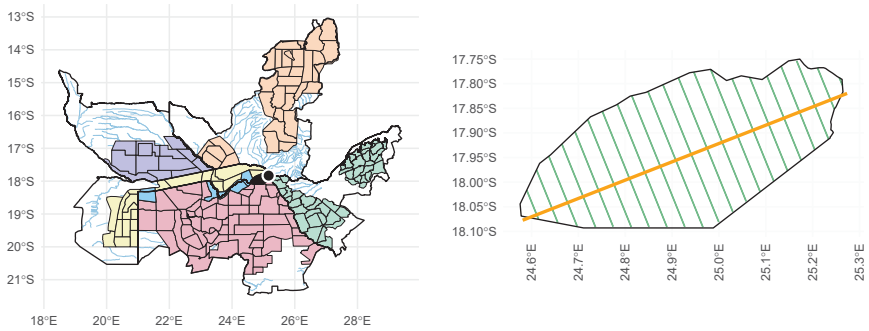
# TRANSFRONTIER – NORTHERN BOTSWANA

## SURVEY DESIGN

COUNTRY: Transfrontier
SUPERSTRATUM: Northern Botswana
STRATUM CODE: CR
STR. NAME: Chobe River North–East
■ STRATUM AREA: 1794.32 sqkm
• SURVEY BASE: Kasane
DISTANCE TO SURVEY BASE: 25 km

– TRANSECTS: 21 (484 km)
TRANSECT ORIENTATION: 159.6°
PLANNED SAMPLING INTENSITY: 8.1 %

– BASELINE DISTANCE: 78.71 km




## SURVEY IMPLEMENTATION

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

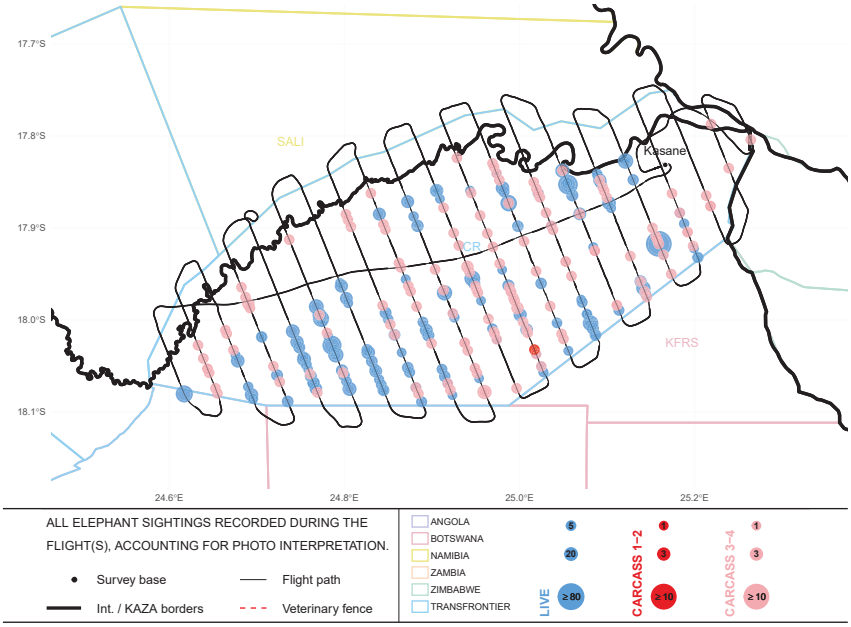
Actual sampling intensity: 8.6 %
Transect flying time: 2.8 h
Transects: 21 – 484 km – 159.6°
Search effort: 1.08 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C02 | |
| Side: | L | R |
| % sightings: | 50 | 50 |
| % individuals: | 63 | 37 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 325 | 11.08 | 22.22 |
| Live elephant (>9): | 25 | 12 | 33.33 |
| Elephant carcass: | 100 | 15 | 0 |
| Live elephant (<10): | 49 | 20.41 | 20 |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **606 (74)** |
| Bulls: | 27 (17) |
| Family: | 579 (57) |
| **NOT IN SAMPLE:** | **878 (95)** |
| Outside search strip: | 843 |
| Off transect: | 35 |



## ELEPHANT CARCASSES

| | |
|---|---|
| **IN SAMPLE:** | **101 (100)** |
| Category 1: | 0 (0) |
| Category 2: | 1 (1) |
| Category 3: | 4 (4) |
| Category 4: | 96 (95) |
| **NOT IN SAMPLE:** | **40 (37)** |
| Outside search strip: | 40 |
| Off transect: | 0 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 16 |
| Other wildlife count: | 867 |
| Domestic count: | 419 |

## ELEPHANT DATA ANALYSIS

t = 2.086, N = 245, w = 321

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 6983 | 7007 | 1168 | 1168 |
| Variance of estimate | $Var\hat{Y}$ | 1809109 | 1873046 | 28211 | 28211 |
| Standard error | $SE\hat{Y}$ | 1345 | 1369 | 168 | 168 |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 2806 | ± 2855 | ± 350 | ± 350 |
| Percentage of relative precision | $PRP\hat{Y}$ | 40 % | 41 % | 30 % | 30 % |
| Density per sqkm | $R\hat{Y}$ | 3.892 | 3.905 | 0.651 | 0.651 |
| Variance between transect counts | $s^2_y$ | 798.99 | 826.129 | 13.262 | 13.262 |
| Variance between transect areas | $s^2_a$ | 8.089 | 8.089 | 8.089 | 8.089 |
| Covariance between counts & areas | $s_{ay}$ | 29.867 | 30.23 | 4.566 | 4.566 |

## CARCASS RATIOS

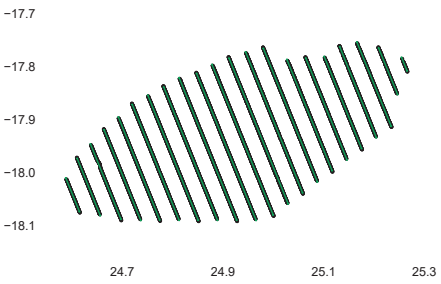
$CR_{1:4} = 14.3$ %
$CR_{1:2} = 0.2$ %

## CR – Chobe River North–East  TRANSFRONTIER – NORTHERN BOTSWANA

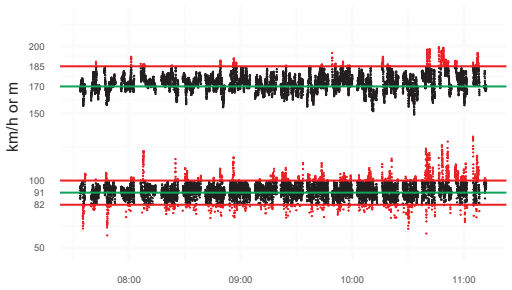
### ADHERENCE TO FLIGHT PARAMETERS

**KES2022_ V5LJB20221001A**

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



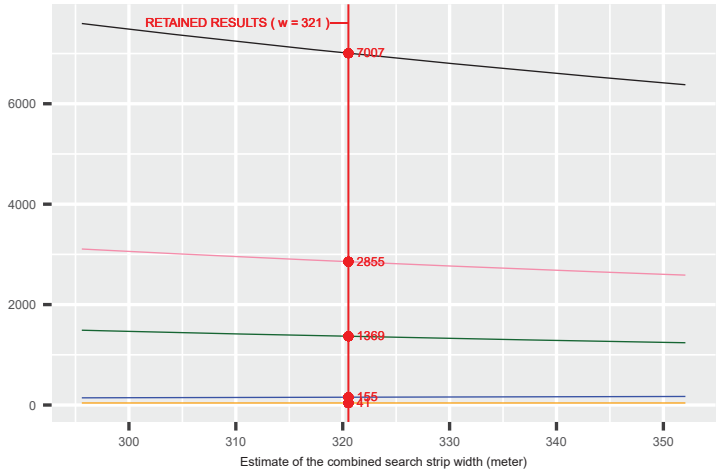

SPEED
Average: 172.9 km/h
Standard dev.: 6.7 km/h

HEIGHT AGL
Average: 92.7 m (304.1 ft)
Standard dev.: 6.5 m (21.4 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: [ 7598 – 6379 ]**
CONFIDENCE INTERVAL: ± [ 3107 – 2587 ]
SAMPLE AREA: [ 143 – 170 ] sqkm
SE: [ 1489 – 1240 ]
PRP: [ 41 – 41 ] %

## CR – Chobe River North–East TRANSFRONTIER – NORTHERN BOTSWANA

**STRATUM CODE:** CR **N:** 246 $S_a^2$: 8,089
**STRATUM NAME:** Chobe River North-East **w:** 321 **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 | 277 | 436 | 0,155 | 43689 | 209,02 | 0 | 713 | 157 | 17,329 | 2,852 |
| buffalo | Syncerus caffer | 106 | 300 | 1226 | 1377 | 0,683 | 435983 | 660,29 | 0 | 2603 | 112 | 177,448 | 11,104 |
| 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 | 397 | 20 | 4590 | 3447 | 2,558 | 2730798 | 1652,51 | 1143 | 8037 | 75 | 861,290 | -24,599 |
| 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 | 17 | 0 | 197 | 398 | 0,110 | 36331 | 190,61 | 0 | 594 | 202 | 13,762 | 0,099 |
| elephant bulls | Loxodonta africana males | 27 | 32 | 312 | 138 | 0,174 | 4391 | 66,26 | 174 | 450 | 44 | 2,114 | 1,974 |
| elephant family | Loxodonta africana family | 579 | 846 | 6694 | 2832 | 3,731 | 1843452 | 1357,74 | 3862 | 9527 | 42 | 800,357 | 28,256 |
| 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 | 12 | 23 | 0,006 | 120 | 10,97 | 0 | 34 | 198 | 0,048 | 0,163 |
| elephant carcass three | Loxodonta africana carcass three | 4 | 1 | 46 | 41 | 0,026 | 383 | 19,58 | 5 | 87 | 88 | 0,162 | 0,413 |
| elephant carcass four | Loxodonta africana carcass four | 96 | 39 | 1110 | 319 | 0,619 | 23408 | 153,00 | 791 | 1429 | 29 | 10,757 | 3,991 |
| giraffe | Giraffa giraffa | 10 | 2 | 116 | 120 | 0,064 | 3294 | 57,40 | 0 | 235 | 104 | 1,262 | 0,317 |
| 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 | 18 | 0 | 208 | 297 | 0,116 | 20321 | 142,55 | 0 | 505 | 143 | 7,129 | -2,166 |
| horse | Equus caballus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 318 | 45 | 3677 | 1572 | 2,049 | 568000 | 753,66 | 2105 | 5249 | 43 | 278,629 | 23,488 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 3 | 0 | 35 | 69 | 0,019 | 1089 | 32,99 | 0 | 104 | 198 | 0,429 | 0,439 |
| 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 | 0 | 12 | 23 | 0,006 | 120 | 10,97 | 0 | 34 | 198 | 0,048 | 0,166 |
| sable | Hippotragus niger | 10 | 0 | 116 | 143 | 0,064 | 4716 | 68,67 | 0 | 259 | 124 | 1,662 | -0,782 |
| shoat | Capra hircus - Ovis aries | 22 | 0 | 254 | 393 | 0,142 | 35477 | 188,35 | 0 | 647 | 154 | 12,548 | -2,828 |
| 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 | 6 | 0 | 69 | 138 | 0,039 | 4363 | 66,05 | 0 | 207 | 199 | 1,714 | 0,835 |
| waterbuck | Kobus ellipsiprymnus | 8 | 0 | 92 | 165 | 0,052 | 6261 | 79,13 | 0 | 258 | 178 | 2,348 | -0,151 |
| wildebeest | Connochaetes taurinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| zebra | Equus spp, | 225 | 92 | 2601 | 2314 | 1,450 | 1230821 | 1109,42 | 287 | 4916 | 89 | 517,414 | 22,635 |
| all elephants | Loxodonta africana all | 606 | 878 | 7007 | 2855 | 3,905 | 1873046 | 1368,59 | 4152 | 9861 | 41 | 826,129 | 30,230 |
| C1-2 elephant carcasses | Loxodonta africana carcass 1-2 | 1 | 0 | 12 | 23 | 0,006 | 120 | 10,97 | 0 | 34 | 198 | 0,048 | 0,163 |
| all elephant carcasses | Loxodonta africana carcass all | 101 | 40 | 1168 | 350 | 0,651 | 28211 | 167,96 | 817 | 1518 | 30 | 13,262 | 4,566 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 100 | 40 | 1156 | 338 | 0,644 | 26188 | 161,83 | 819 | 1494 | 29 | 12,290 | 4,404 |

# LIAM – Liambezi

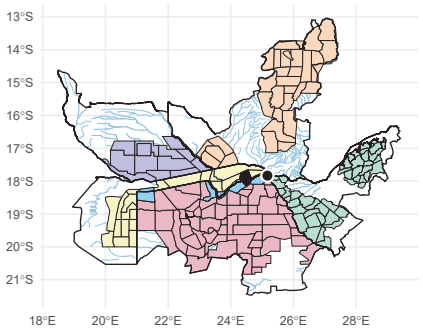
## TRANSFRONTIER – KAVANGO ZAMBEZI

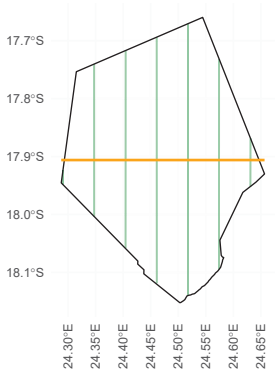
### SURVEY DESIGN

COUNTRY: Transfrontier
SUPERSTRATUM: Kavango Zambezi
STRATUM CODE: LIAM
STRATUM NAME: Liambezi
■ STRATUM AREA: 1323.34 sqkm
• SURVEY BASE: Kasane
DISTANCE TO SURVEY BASE: 75 km

– TRANSECTS: 7 (222 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 5 %

– BASELINE DISTANCE: 39.09 km




### SURVEY IMPLEMENTATION

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

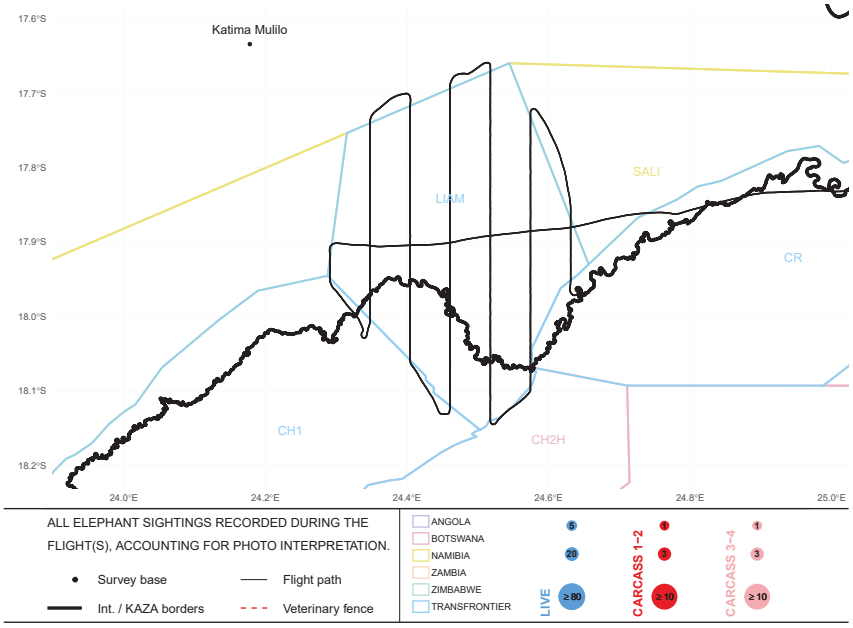
Actual sampling intensity: 5.3 %
Transect flying time: 1.3 h
Transects: 7 – 222 km – 0°
Search effort: 1.11 min/sqkm

### OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C03 | |
| Side: | L | R |
| % sightings: | 35 | 65 |
| % individuals: | 35 | 65 |

### PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 37 | 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: | 281 |
| Domestic count: | 796 |

### ELEPHANT DATA ANALYSIS

t = 2.447, N = 124, w = 315

| | | 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

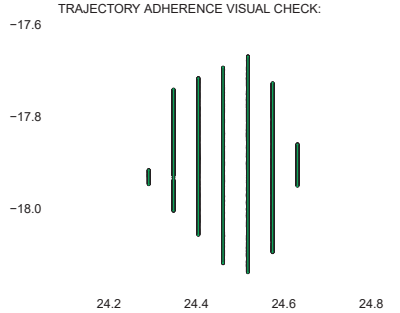
## LIAM – Liambezi

## TRANSFRONTIER – KAVANGO ZAMBEZI

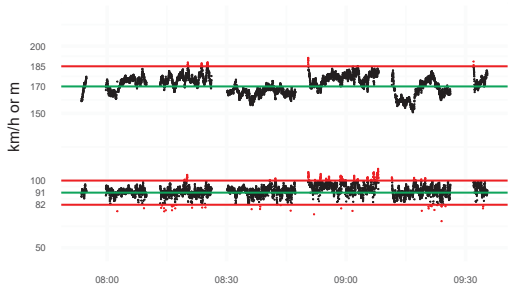
### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5WOT20221001A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:




SPEED

| | | |
|---|---|---|
| Average: | 171.2 km/h | |
| Standard dev.: | 6.6 km/h | |

HEIGHT AGL

| | | |
|---|---|---|
| Average: | 92.6 m | (303.6 ft) |
| Standard dev.: | 3.9 m | (12.8 ft) |

## LIAM – Liambezi TRANSFRONTIER – KAVANGO ZAMBEZI

**STRATUM CODE:** LIAM **N:** 124 $S_a^2$: 34,666
**STRATUM NAME:** Liambezi **w:** 315 **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 | 625 | 0 | 11862 | 3155 | 8,963 | 1662783 | 1289,49 | 8706 | 15017 | 27 | 2519,238 | 251,340 |
| 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 | 1 | 0 | 19 | 41 | 0,014 | 284 | 16,87 | 0 | 60 | 217 | 0,143 | 0,466 |
| 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 | 31 | 0 | 588 | 909 | 0,445 | 138072 | 371,58 | 0 | 1498 | 155 | 66,619 | 8,045 |
| 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 | 11 | 0 | 209 | 385 | 0,158 | 24800 | 157,48 | 0 | 594 | 185 | 13,952 | 9,202 |
| 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 | 171 | 0 | 3245 | 3996 | 2,452 | 2667022 | 1633,10 | 0 | 7241 | 123 | 1438,619 | 74,644 |
| 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 | 57 | 114 | 0,043 | 2184 | 46,73 | 0 | 171 | 201 | 1,286 | 3,499 |
| waterbuck | Kobus ellipsiprymnus | 1 | 0 | 19 | 44 | 0,014 | 321 | 17,91 | 0 | 63 | 231 | 0,143 | -0,140 |
| wildebeest | Connochaetes taurinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| zebra | Equus spp, | 231 | 231 | 4384 | 4477 | 3,313 | 3348268 | 1829,83 | 0 | 8862 | 102 | 2597,333 | 206,706 |
| 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 |

# MS – Mamili South

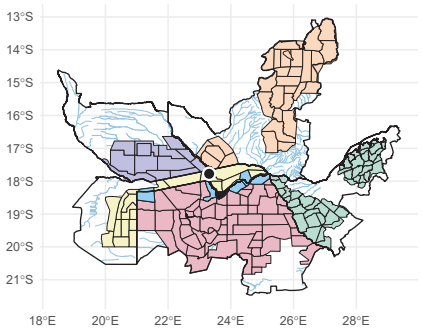
## TRANSFRONTIER – KAVANGO ZAMBEZI

### SURVEY DESIGN

COUNTRY: Transfrontier
SUPERSTRATUM: Kavango Zambezi
STRATUM CODE: MS
STRATUM NAME: Mamili South
■ STRATUM AREA: 736.28 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 78 km

– TRANSECTS: 30 (492 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 20.1 %

– 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

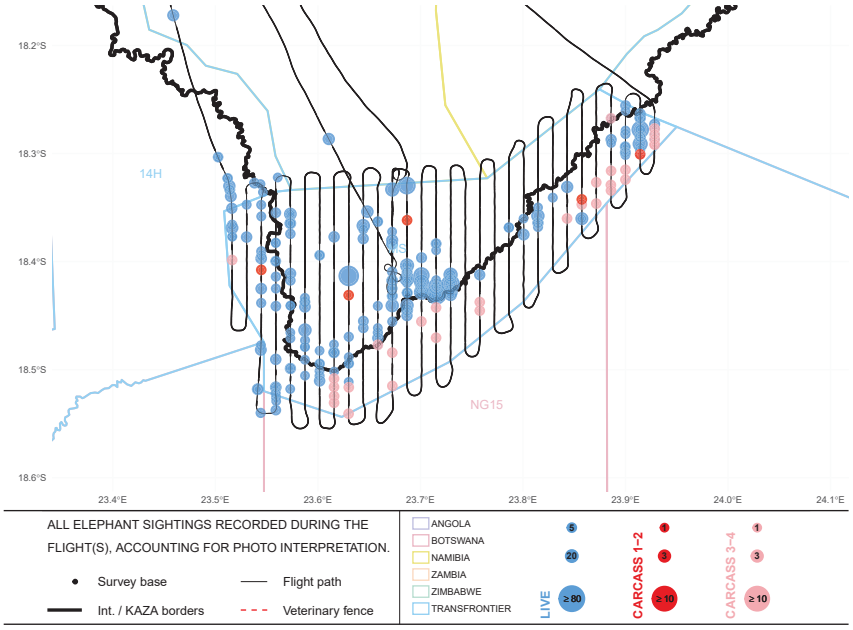
Actual sampling intensity: 21.1 %
Transect flying time: 2.9 h
Transects: 30 – 492 km – 0°
Search effort: 1.1 min/sqkm

### OBSERVER CONTRIBUTION

| Crew(s): | C01 | | C04 | |
|---|---|---|---|---|
| Side: | L | R | L | R |
| % sightings: | 40 | 60 | 41 | 59 |
| % individuals: | 43 | 57 | 28 | 72 |

### PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 320 | 15.94 | 23.53 |
| Live elephant (>9): | 21 | 61.9 | 30.77 |
| Elephant carcass: | 35 | 80 | 0 |
| Live elephant (<10): | 129 | 0.78 | 100 |






### LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **799 (149)** |
| Bulls: | 161 (73) |
| Family: | 638 (76) |
| **NOT IN SAMPLE:** | **683 (77)** |
| Outside search strip: | 519 |
| Off transect: | 164 |



### ELEPHANT CARCASSES

| | |
|---|---|
| **IN SAMPLE:** | **35 (35)** |
| Category 1: | 1 (1) |
| Category 2: | 4 (4) |
| Category 3: | 6 (6) |
| Category 4: | 24 (24) |
| **NOT IN SAMPLE:** | **1 (1)** |
| Outside search strip: | 1 |
| Off transect: | 0 |

### OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 23 |
| Other wildlife count: | 3875 |
| Domestic count: | 169 |

### ELEPHANT DATA ANALYSIS

t = 2.045, N = 147, w = 315

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 3761 | 3790 | 166 | 166 |
| Variance of estimate | $\mathrm{Var}\hat{Y}$ | 255776 | 260422 | 1362 | 1362 |
| Standard error | $\mathrm{SE}\hat{Y}$ | 506 | 510 | 37 | 37 |
| 95% confidence interval | $\mathrm{CI}_{\hat{Y}}^{95\%}$ | ± 1034 | ± 1044 | ± 75 | ± 75 |
| Percentage of relative precision | $\mathrm{PRP}\hat{Y}$ | 28 % | 28 % | 45 % | 45 % |
| Density per sqkm | $R\hat{Y}$ | 5.108 | 5.147 | 0.225 | 0.225 |
| Variance between transect counts | $s_y^2$ | 523.151 | 533.895 | 1.799 | 1.799 |
| Variance between transect areas | $s_a^2$ | 3.126 | 3.126 | 3.126 | 3.126 |
| Covariance between counts & areas | $s_{ay}$ | 16.089 | 16.356 | −0.859 | −0.859 |

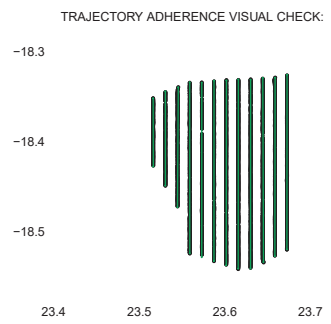
### CARCASS RATIOS

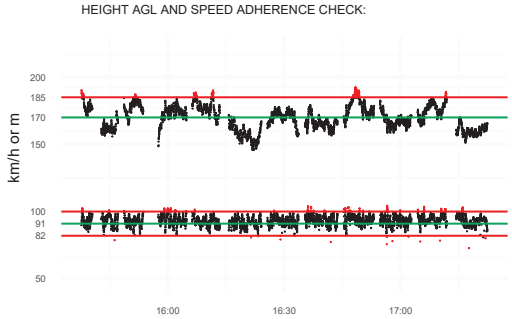
$CR_{1:4} = 4.2\ \%$
$CR_{1:2} = 0.6\ \%$

## MS – Mamili South — TRANSFRONTIER – KAVANGO ZAMBEZI

### ADHERENCE TO FLIGHT PARAMETERS

#### KES2022_ V5IIM20221004B

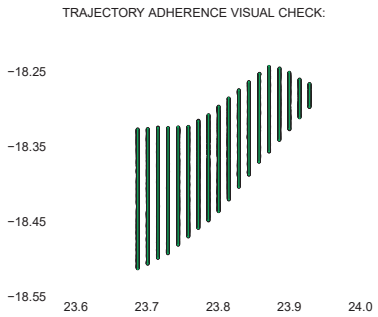


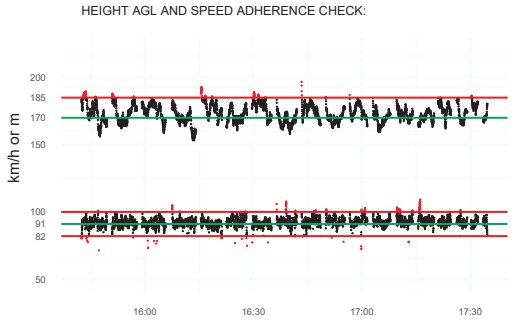




SPEED
Average: 169.6 km/h
Standard dev.: 8.9 km/h

HEIGHT AGL
Average: 93.3 m (306 ft)
Standard dev.: 3.7 m (12.2 ft)

#### KES2022_ V5WOT20221004B




SPEED
Average: 173.2 km/h
Standard dev.: 6.6 km/h

HEIGHT AGL
Average: 92.3 m (303 ft)
Standard dev.: 3.3 m (10.9 ft)

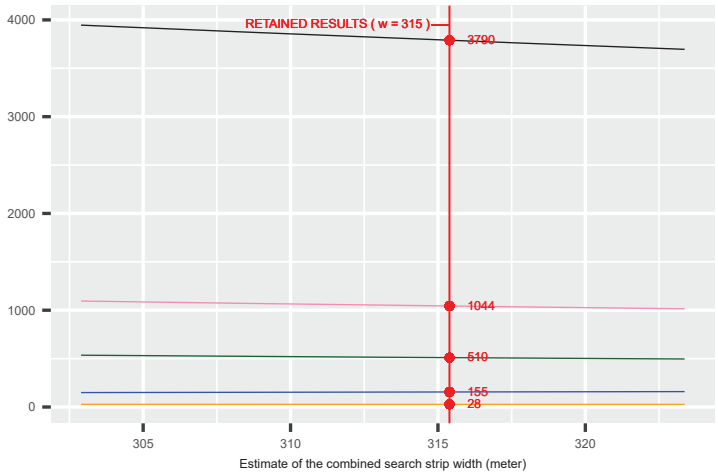
INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

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

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

**LIVE ELEPHANT ESTIMATE: [ 3946 – 3696 ]**
CONFIDENCE INTERVAL: ± [ 1095 – 1015 ]
SAMPLE AREA: [ 149 – 159 ] sqkm
SE: [ 535 – 496 ]
PRP: [ 28 – 27 ] %



## MS – Mamili South — TRANSFRONTIER – KAVANGO ZAMBEZI

**STRATUM CODE:** MS **N:** 148 $S_a^2$: 3,126
**STRATUM NAME:** Mamili South **w:** 315 **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, | 8 | 0 | 38 | 47 | 0,052 | 525 | 22,91 | 0 | 85 | 124 | 0,961 | 0,634 |
| buffalo | Syncerus caffer | 768 | 748 | 3643 | 2539 | 4,947 | 1540533 | 1241,18 | 1104 | 6181 | 70 | 2783,283 | 20,984 |
| bushbuck | Tragelaphus scriptus | 1 | 0 | 5 | 9 | 0,006 | 19 | 4,35 | 0 | 14 | 187 | 0,033 | 0,073 |
| bushpig | Potamochoerus larvatus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| cattle | Bos taurus | 169 | 108 | 802 | 756 | 1,089 | 136749 | 369,80 | 45 | 1558 | 94 | 221,206 | -4,829 |
| 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 | 161 | 104 | 764 | 242 | 1,037 | 14021 | 118,41 | 521 | 1006 | 32 | 31,757 | 5,294 |
| elephant family | Loxodonta africana family | 638 | 579 | 3026 | 1056 | 4,110 | 266800 | 516,53 | 1970 | 4082 | 35 | 497,444 | 11,061 |
| elephant carcass one | Loxodonta africana carcass one | 1 | 0 | 5 | 9 | 0,006 | 19 | 4,37 | 0 | 14 | 189 | 0,033 | 0,041 |
| elephant carcass two | Loxodonta africana carcass two | 4 | 0 | 19 | 18 | 0,026 | 73 | 8,56 | 1 | 36 | 92 | 0,120 | -0,087 |
| elephant carcass three | Loxodonta africana carcass three | 6 | 1 | 28 | 24 | 0,039 | 138 | 11,77 | 4 | 53 | 85 | 0,234 | 0,011 |
| elephant carcass four | Loxodonta africana carcass four | 24 | 0 | 114 | 67 | 0,155 | 1089 | 32,99 | 46 | 181 | 59 | 1,545 | -0,823 |
| giraffe | Giraffa giraffa | 10 | 3 | 47 | 42 | 0,064 | 419 | 20,48 | 6 | 89 | 88 | 0,644 | -0,507 |
| 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 | 203 | 27 | 963 | 346 | 1,308 | 28591 | 169,09 | 617 | 1309 | 36 | 59,013 | 5,787 |
| horse | Equus caballus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 407 | 19 | 1930 | 854 | 2,622 | 174304 | 417,50 | 1077 | 2784 | 44 | 369,289 | 17,296 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 4 | 0 | 19 | 21 | 0,026 | 108 | 10,38 | 0 | 40 | 112 | 0,189 | 0,096 |
| 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 | 0,006 | 20 | 4,42 | 0 | 14 | 190 | 0,033 | -0,010 |
| puku | Kobus vardonii | 5 | 0 | 24 | 38 | 0,032 | 347 | 18,64 | 0 | 62 | 161 | 0,557 | -0,581 |
| red lechwe | Kobus leche | 1823 | 129 | 8646 | 3615 | 11,743 | 3124752 | 1767,70 | 5031 | 12262 | 42 | 6319,909 | 58,392 |
| reedbuck | Redunca arundinum | 41 | 1 | 194 | 114 | 0,264 | 3103 | 55,70 | 81 | 308 | 59 | 5,757 | 1,201 |
| roan | Hippotragus equinus | 2 | 0 | 9 | 18 | 0,013 | 77 | 8,76 | 0 | 27 | 189 | 0,133 | 0,068 |
| sable | Hippotragus niger | 10 | 24 | 47 | 57 | 0,064 | 778 | 27,90 | 0 | 104 | 120 | 1,333 | 0,050 |
| 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 | 0,006 | 20 | 4,43 | 0 | 14 | 191 | 0,033 | -0,023 |
| 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 | 447 | 10 | 2120 | 745 | 2,879 | 132607 | 364,15 | 1375 | 2865 | 35 | 330,300 | 22,213 |
| waterbuck | Kobus ellipsiprymnus | 3 | 0 | 14 | 27 | 0,019 | 171 | 13,08 | 0 | 41 | 188 | 0,300 | 0,171 |
| wildebeest | Connochaetes taurinus | 52 | 44 | 247 | 248 | 0,335 | 14676 | 121,14 | 0 | 494 | 100 | 24,202 | -1,063 |
| zebra | Equus spp, | 23 | 11 | 109 | 116 | 0,148 | 3221 | 56,75 | 0 | 225 | 106 | 5,220 | -0,868 |
| all elephants | Loxodonta africana all | 799 | 683 | 3790 | 1044 | 5,147 | 260422 | 510,32 | 2746 | 4833 | 28 | 533,895 | 16,356 |
| C1-2 elephant carcasses | Loxodonta africana carcass 1-2 | 5 | 0 | 24 | 19 | 0,032 | 87 | 9,33 | 5 | 43 | 80 | 0,144 | -0,046 |
| all elephant carcasses | Loxodonta africana carcass all | 35 | 1 | 166 | 75 | 0,225 | 1362 | 36,91 | 91 | 241 | 45 | 1,799 | -0,859 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 30 | 1 | 142 | 72 | 0,193 | 1252 | 35,38 | 70 | 215 | 51 | 1,724 | -0,812 |

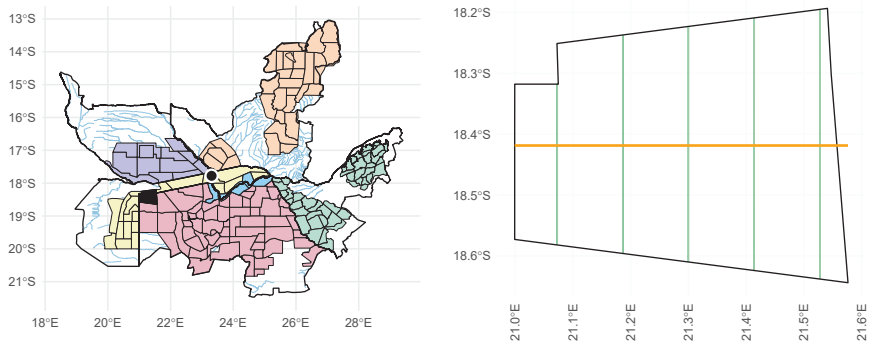
# NG1 – NG 1 TRANSFRONTIER – NORTHERN BOTSWANA

## SURVEY DESIGN

COUNTRY: Transfrontier
SUPERSTRATUM: Northern Botswana
STRATUM CODE: NG1
STRATUM NAME: NG 1
■ STRATUM AREA: 2438.51 sqkm
• SURVEY BASE: Immelmann
DISTANCE TO SURVEY BASE: 228 km

– TRANSECTS: 5 (210 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 2.6 %

– BASELINE DISTANCE: 61 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 2.8 h
Crew(s): C04
KES2022_V5WOT20221009A 06:29–09:16

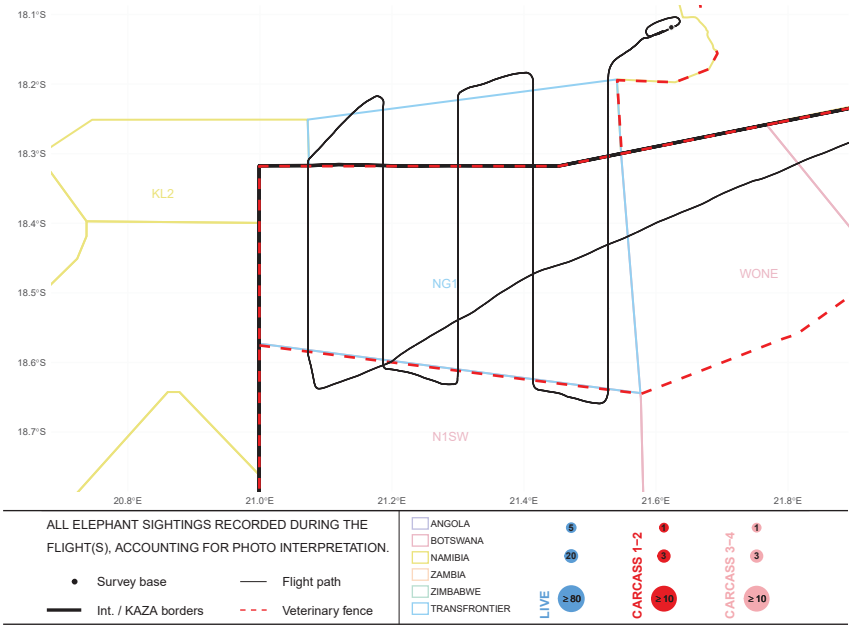
Actual sampling intensity: 2.6 %
Transect flying time: 1.2 h
Transects: 5 – 210 km – 0°
Search effort: 1.12 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C04 | |
| Side: | L | R |
| % sightings: | 48 | 52 |
| % individuals: | 53 | 47 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 4 | 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: | 11 |
| Domestic count: | 229 |

## 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

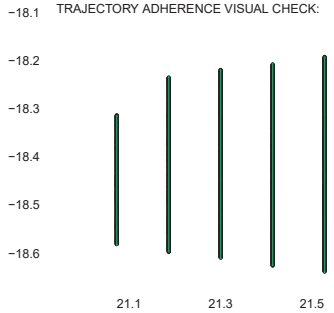
$CR_{1:4}$ = n/a
$CR_{1:2}$ = n/a

## NG1 – NG 1 TRANSFRONTIER – NORTHERN BOTSWANA

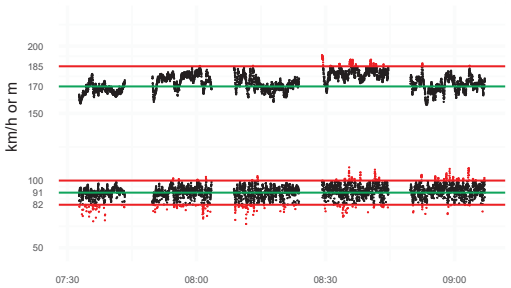
### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ V5WOT20221009A

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: 91.5 m (300.3 ft)
Standard dev.: 5.1 m (16.8 ft)

# NG1 – NG 1 TRANSFRONTIER – NORTHERN BOTSWANA

**STRATUM CODE:** NG1 **N:** 199 $S_a^2$: 6,158
**STRATUM NAME:** NG 1 **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 | 234 | 0,031 | 7122 | 84,39 | 0 | 310 | 310 | 0,800 | -1,940 |
| 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 | 116 | 24 | 4391 | 4073 | 1,800 | 2152199 | 1467,04 | 317 | 8464 | 93 | 391,700 | 36,574 |
| donkey | Equus asinus | 25 | 0 | 946 | 1177 | 0,388 | 179814 | 424,05 | 0 | 2124 | 124 | 21,000 | -1,885 |
| duiker | Sylvicapra grimmia | 3 | 1 | 114 | 244 | 0,047 | 7748 | 88,02 | 0 | 358 | 215 | 0,800 | -2,089 |
| 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 | 681 | 1955 | 0,279 | 495596 | 703,99 | 0 | 2636 | 287 | 64,800 | 1,456 |
| 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 | 189 | 586 | 0,078 | 44511 | 210,98 | 0 | 775 | 310 | 5,000 | -4,850 |
| 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 | 104 | 0,016 | 1395 | 37,35 | 0 | 142 | 274 | 0,200 | 0,643 |
| 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 | 2649 | 5140 | 1,087 | 3427596 | 1851,38 | 0 | 7790 | 194 | 380,000 | -26,963 |
| 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 |

# ZAMBIA



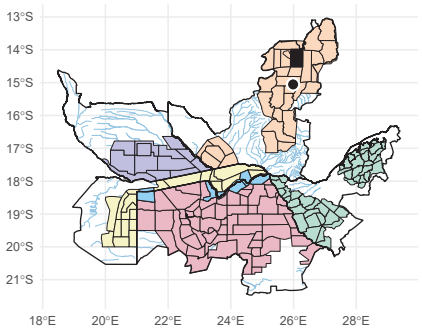
# A1 – A1 ZAMBIA – KAFUE

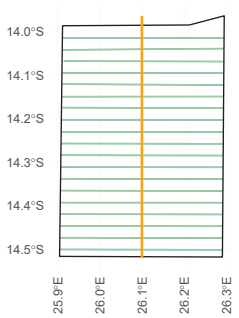
## SURVEY DESIGN

COUNTRY: Zambia
SUPERSTRATUM: Kafue
STRATUM CODE: A1
STRATUM NAME: A1
■ STRATUM AREA: 2456.55 sqkm
• SURVEY BASE: Chunga
DISTANCE TO SURVEY BASE: 90 km

– TRANSECTS: 19 (790 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 9.6 %

– BASELINE DISTANCE: 61.38 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 2**
Combined flying time: 8.8 h
Crew(s): C05, C07
KES2022_9JCMA20220829A 07:25–12:03
KES2022_9JMFZ20220829A 07:15–11:23

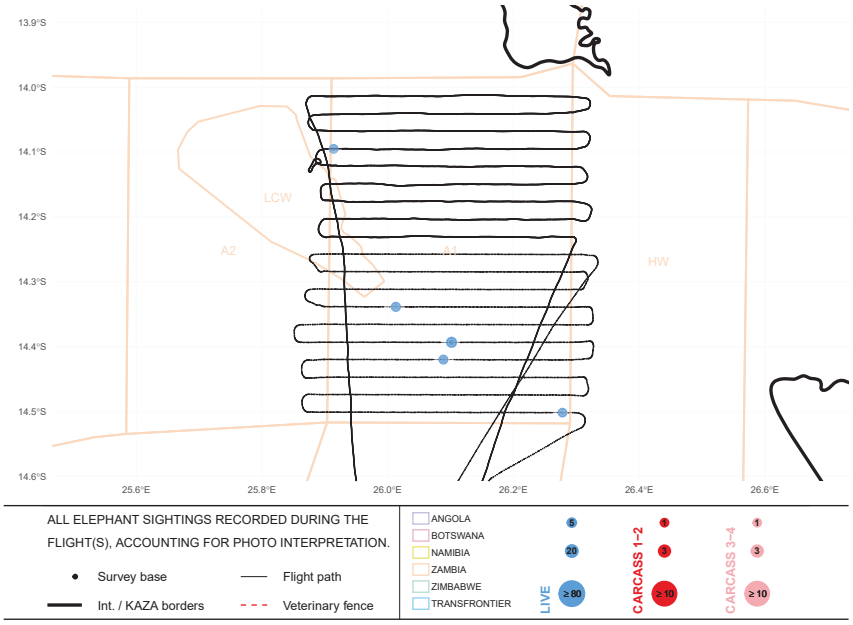
Actual sampling intensity: 10.1 %
Transect flying time: 4.5 h
Transects: 19 – 790 km – 90°
Search effort: 1.09 min/sqkm

## OBSERVER CONTRIBUTION

| Crew(s): | C05 | | C07 | |
|---|---|---|---|---|
| Side: | L | R | L | R |
| % sightings: | 69 | 31 | 52 | 48 |
| % individuals: | 37 | 63 | 41 | 59 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 21 | 33.33 | 42.86 |
| Live elephant (>9): | 0 | | |
| Elephant carcass: | 0 | | |
| Live elephant (<10): | 4 | 25 | 0 |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **12 (4)** |
| Bulls: | 2 (2) |
| Family: | 10 (2) |
| **NOT IN SAMPLE:** | **8 (2)** |
| Outside search strip: | 8 |
| 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: | 21 |
| Other wildlife count: | 572 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 2.101, N = 196, w = 313

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 119 | 119 | – | – |
| Variance of estimate | $Var\hat{Y}$ | 6312 | 6312 | – | – |
| Standard error | $SE\hat{Y}$ | 79 | 79 | – | – |
| 95% confidence interval | $CI_{\hat{Y}}^{95\%}$ | ± 167 | ± 167 | – | – |
| Percentage of relative precision | $PRP\hat{Y}$ | 140 % | 140 % | – | – |
| Density per sqkm | $R\hat{Y}$ | 0.049 | 0.049 | – | – |
| Variance between transect counts | $s_y^2$ | 3.468 | 3.468 | – | – |
| Variance between transect areas | $s_a^2$ | 0.097 | 0.097 | – | – |
| Covariance between counts & areas | $s_{ay}$ | 0.143 | 0.143 | – | – |

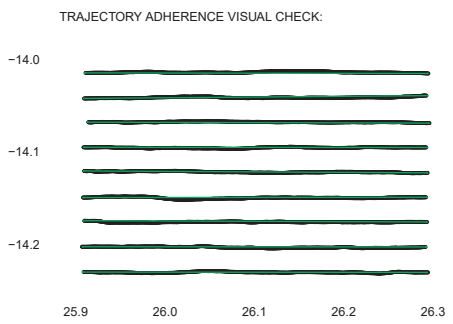
## CARCASS RATIOS

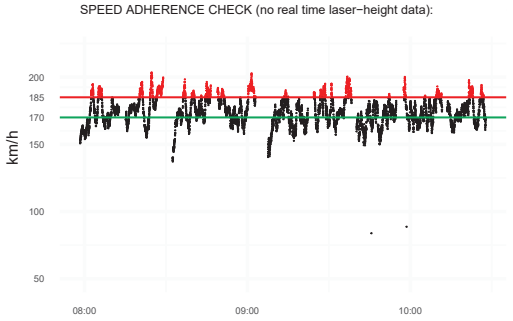
$CR_{1:4} = 0$ %
$CR_{1:2} = 0$ %

## A1 – A1 ZAMBIA – KAFUE

### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ 9JCMA20220829A



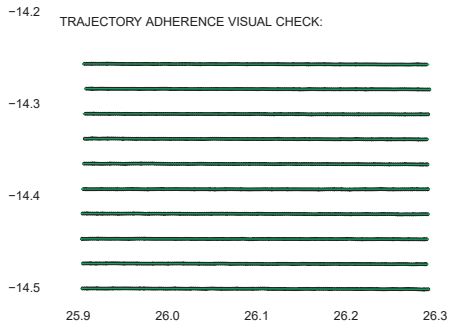



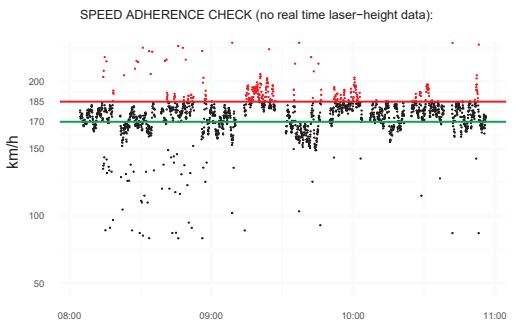

SPEED
Average: 174.3 km/h
Standard dev.: 10.4 km/h

HEIGHT AGL
Average: 92.2 m (302.6 ft)
Standard dev.: 6.2 m (20.5 ft)

Despite the failure of the laser to automatically record continuous height data, the front seat observer manually recorded this information approximately every 30 seconds throughout the flight.

### KES2022_ 9JMFZ20220829A




SPEED
Average: 174.9 km/h
Standard dev.: 16.1 km/h

HEIGHT AGL
Average: 93.5 m (306.6 ft)
Standard dev.: 4.9 m (16.1 ft)

Despite the failure of the laser to automatically record continuous height data, the front seat observer manually recorded this information approximately every 30 seconds throughout the flight.

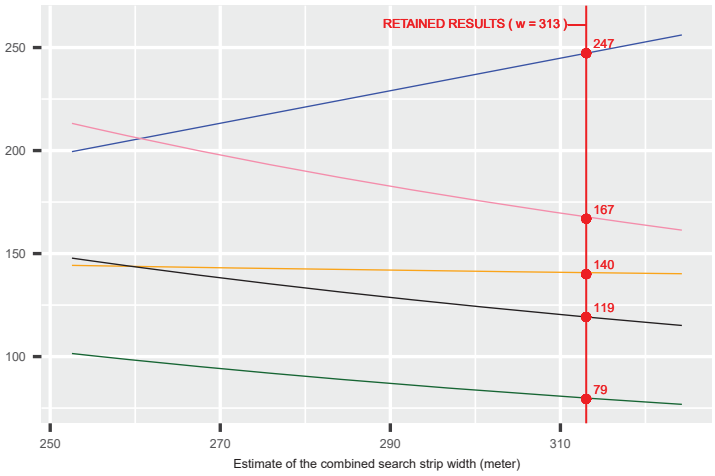
INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C05 – Left: [147 – 169]
C05 – Right: [142 – 166]

C07 – Left: [112 – 157]
C07 – Right: [98 – 161]

**LIVE ELEPHANT ESTIMATE: [ 148 – 115 ]**
CONFIDENCE INTERVAL: ± [ 213 – 161 ]
SAMPLE AREA: [ 199 – 256 ] sqkm
SE: [ 101 – 77 ]
PRP: [ 144 – 140 ] %



## A1 – A1 ZAMBIA – KAFUE

**STRATUM CODE:** A1 **N:** 196 $S_a^2$: 0,097
**STRATUM NAME:** A1 **w:** 313 **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, | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| buffalo | Syncerus caffer | 3 | 7 | 30 | 62 | 0,012 | 866 | 29,42 | 0 | 92 | 207 | 0,474 | -0,005 |
| 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 | 40 | 38 | 0,016 | 320 | 17,90 | 2 | 77 | 95 | 0,175 | 0,005 |
| eland | Tragelaphus oryx | 2 | 67 | 20 | 41 | 0,008 | 384 | 19,59 | 0 | 61 | 207 | 0,211 | 0,030 |
| elephant bulls | Loxodonta africana males | 2 | 0 | 20 | 28 | 0,008 | 182 | 13,48 | 0 | 48 | 142 | 0,099 | 0,003 |
| elephant family | Loxodonta africana family | 10 | 8 | 99 | 167 | 0,040 | 6348 | 79,67 | 0 | 267 | 168 | 3,485 | 0,140 |
| 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, | 76 | 19 | 755 | 647 | 0,307 | 94784 | 307,87 | 108 | 1402 | 86 | 51,667 | -0,322 |
| hippopotamus | Hippopotamus amphibius | 23 | 0 | 229 | 395 | 0,093 | 35325 | 187,95 | 0 | 623 | 173 | 19,398 | 0,352 |
| horse | Equus caballus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 34 | 140 | 338 | 409 | 0,138 | 37828 | 194,49 | 0 | 746 | 121 | 20,842 | 0,514 |
| 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 | 94 | 55 | 934 | 944 | 0,380 | 201759 | 449,18 | 0 | 1878 | 101 | 111,164 | 0,997 |
| red lechwe | Kobus leche | 65 | 462 | 646 | 841 | 0,263 | 160187 | 400,23 | 0 | 1487 | 130 | 87,924 | 0,500 |
| reedbuck | Redunca arundinum | 7 | 0 | 70 | 124 | 0,028 | 3492 | 59,09 | 0 | 194 | 178 | 1,912 | 0,024 |
| roan | Hippotragus equinus | 78 | 6 | 775 | 931 | 0,315 | 196454 | 443,23 | 0 | 1706 | 120 | 107,655 | 0,235 |
| sable | Hippotragus niger | 80 | 47 | 795 | 1228 | 0,324 | 341907 | 584,73 | 0 | 2023 | 155 | 186,842 | -0,414 |
| 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 | 51 | 16 | 507 | 306 | 0,206 | 21267 | 145,83 | 200 | 813 | 60 | 11,784 | 0,360 |
| waterbuck | Kobus ellipsiprymnus | 1 | 11 | 10 | 21 | 0,004 | 96 | 9,80 | 0 | 31 | 207 | 0,053 | 0,015 |
| wildebeest | Connochaetes taurinus | 6 | 163 | 60 | 73 | 0,024 | 1219 | 34,92 | 0 | 133 | 123 | 0,673 | 0,111 |
| zebra | Equus spp, | 18 | 72 | 179 | 190 | 0,073 | 8164 | 90,36 | 0 | 369 | 106 | 4,497 | 0,202 |
| all elephants | Loxodonta africana all | 12 | 8 | 119 | 167 | 0,049 | 6312 | 79,45 | 0 | 286 | 140 | 3,468 | 0,143 |
| 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 | 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 |

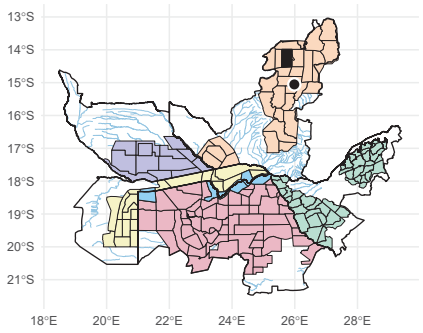
# A2 – A2 ZAMBIA – KAFUE

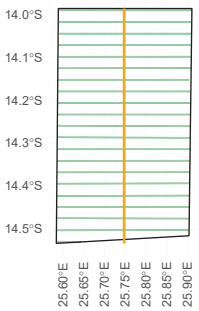
## SURVEY DESIGN

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 (699 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 10.2 %

– BASELINE DISTANCE: 60.66 km




## 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

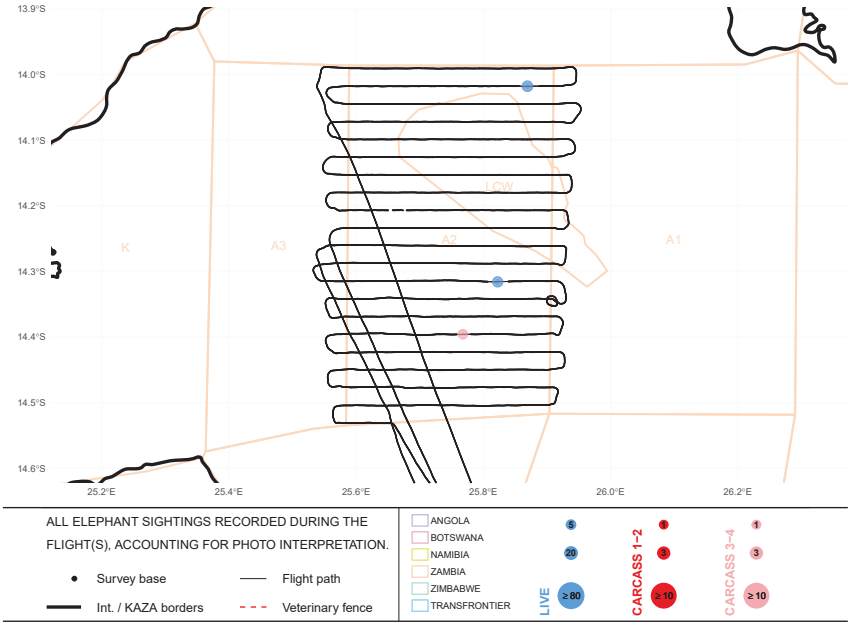
Actual sampling intensity: 10.1 %
Transect flying time: 4 h
Transects: 21 – 699 km – 90°
Search effort: 1.16 min/sqkm

## OBSERVER CONTRIBUTION

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

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 46 | 36.96 | 64.71 |
| Live elephant (>9): | 1 | 100 | 100 |
| Elephant carcass: | 1 | 100 | 0 |
| Live elephant (<10): | 1 | 100 | 100 |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **8 (1)** |
| Bulls: | 0 (0) |
| Family: | 8 (1) |
| **NOT IN SAMPLE:** | **10 (1)** |
| Outside search strip: | 10 |
| 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: | 21 |
| Other wildlife count: | 1495 |
| Domestic count: | 0 |

## 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 | $Var\hat{Y}$ | 14210 | 5381 | 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 | $R\hat{Y}$ | 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 | $s_{ay}$ | 0.255 | 0.157 | 0.004 | 0.004 |

## CARCASS RATIOS

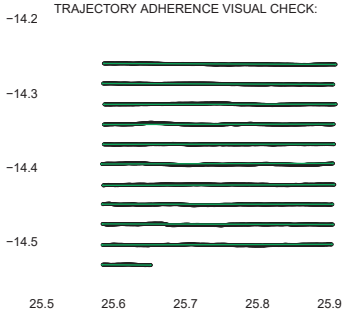
$CR_{1:4} = 11.1$ %
$CR_{1:2} = 0$ %

## A2 – A2 ZAMBIA – KAFUE

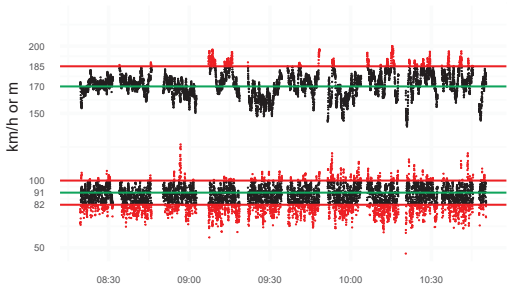
### ADHERENCE TO FLIGHT PARAMETERS

#### KES2022_ 9JCMA20220827A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:

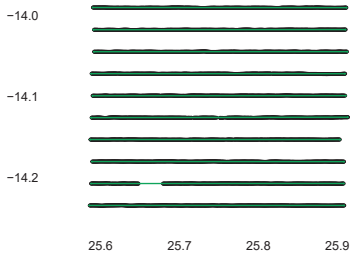



SPEED
Average: 171.8 km/h
Standard dev.: 9.4 km/h

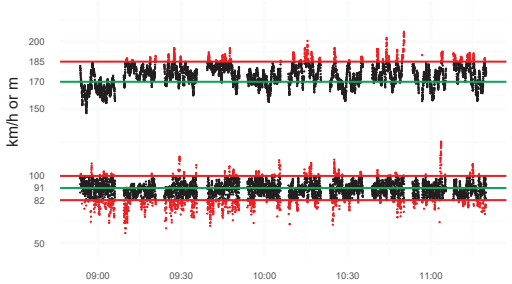
HEIGHT AGL
Average: 87.7 m (287.9 ft)
Standard dev.: 8.6 m (28.1 ft)

#### KES2022_ 9JMFZ20220827A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:




SPEED
Average: 174.8 km/h
Standard dev.: 8.4 km/h

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

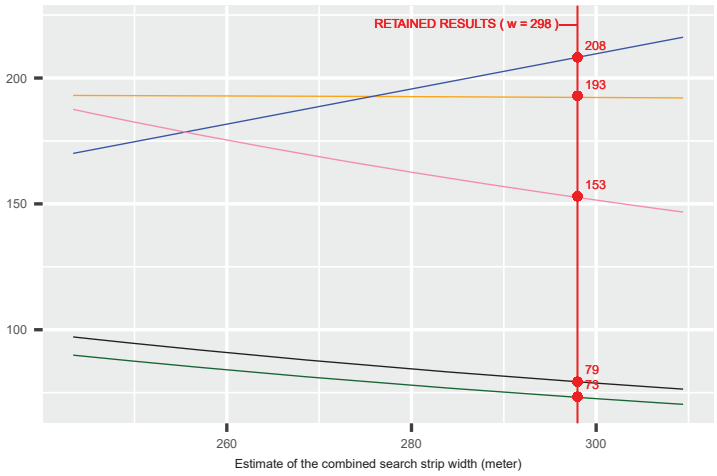
INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C05 – Left: [140 – 161]
C05 – Right: [135 – 158]

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

**LIVE ELEPHANT ESTIMATE: [ 97 – 76 ]**
CONFIDENCE INTERVAL: ± [ 188 – 147 ]
SAMPLE AREA: [ 170 – 216 ] sqkm
SE: [ 90 – 70 ]
PRP: [ 193 – 192 ] %



# A2 – A2 ZAMBIA – KAFUE

**STRATUM CODE:** A2 **N:** 204 $S_a^2$: 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 (%) | $S_y^2$ | $S_{ay}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| baboon | Papio spp, | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| buffalo | Syncerus caffer | 9 | 250 | 89 | 138 | 0,043 | 4353 | 65,98 | 0 | 227 | 154 | 2,457 | 0,043 |
| bushbuck | Tragelaphus scriptus | 4 | 0 | 40 | 45 | 0,019 | 458 | 21,40 | 0 | 84 | 113 | 0,262 | 0,113 |
| bushpig | Potamochoerus larvatus | 7 | 0 | 69 | 101 | 0,034 | 2358 | 48,56 | 0 | 171 | 146 | 1,333 | 0,067 |
| 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 | 10 | 19 | 0,005 | 84 | 9,15 | 0 | 29 | 193 | 0,048 | 0,037 |
| 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 | 8 | 10 | 79 | 153 | 0,038 | 5381 | 73,36 | 0 | 232 | 193 | 3,048 | 0,157 |
| 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 | 10 | 19 | 0,005 | 84 | 9,18 | 0 | 29 | 193 | 0,048 | 0,004 |
| 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, | 70 | 67 | 694 | 713 | 0,336 | 116772 | 341,72 | 0 | 1407 | 103 | 66,033 | 0,630 |
| hippopotamus | Hippopotamus amphibius | 16 | 20 | 159 | 252 | 0,077 | 14563 | 120,68 | 0 | 410 | 159 | 8,290 | 0,532 |
| horse | Equus caballus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 22 | 32 | 218 | 291 | 0,106 | 19431 | 139,39 | 0 | 509 | 133 | 11,048 | 0,500 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 0 | 6 | 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 | 38 | 79 | 377 | 460 | 0,183 | 48670 | 220,61 | 0 | 837 | 122 | 27,862 | 1,292 |
| red lechwe | Kobus leche | 944 | 1265 | 9360 | 6880 | 4,534 | 10876799 | 3298,00 | 2481 | 16240 | 73 | 6367,748 | 31,827 |
| reedbuck | Redunca arundinum | 6 | 3 | 59 | 84 | 0,029 | 1604 | 40,05 | 0 | 143 | 140 | 0,914 | 0,184 |
| roan | Hippotragus equinus | 16 | 142 | 159 | 214 | 0,077 | 10548 | 102,70 | 0 | 373 | 135 | 5,990 | 0,328 |
| sable | Hippotragus niger | 148 | 158 | 1467 | 1064 | 0,711 | 259937 | 509,84 | 404 | 2531 | 72 | 148,048 | 1,977 |
| shoat | Capra hircus - Ovis aries | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| sitatunga | Tragelaphus spekii | 3 | 0 | 30 | 42 | 0,014 | 403 | 20,07 | 0 | 72 | 141 | 0,229 | 0,061 |
| 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 | 50 | 2 | 496 | 606 | 0,240 | 84522 | 290,73 | 0 | 1102 | 122 | 48,148 | 1,208 |
| waterbuck | Kobus ellipsiprymnus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| wildebeest | Connochaetes taurinus | 121 | 375 | 1200 | 1302 | 0,581 | 389837 | 624,37 | 0 | 2502 | 109 | 223,790 | 3,982 |
| zebra | Equus spp, | 0 | 24 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| all elephants | Loxodonta africana all | 8 | 10 | 79 | 153 | 0,038 | 5381 | 73,36 | 0 | 232 | 193 | 3,048 | 0,157 |
| 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 | 10 | 19 | 0,005 | 84 | 9,18 | 0 | 29 | 193 | 0,048 | 0,004 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 1 | 0 | 10 | 19 | 0,005 | 84 | 9,18 | 0 | 29 | 193 | 0,048 | 0,004 |

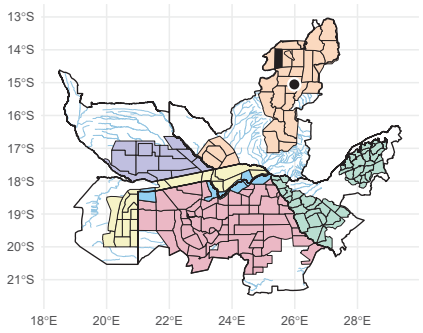
# A3 – A3 ZAMBIA – KAFUE

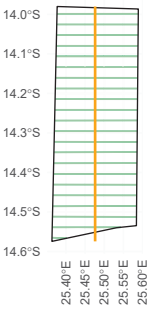
## SURVEY DESIGN

COUNTRY: Zambia
SUPERSTRATUM: Kafue
STRATUM CODE: A3
STRATUM NAME: A3
■ STRATUM AREA: 1467.64 sqkm
• SURVEY BASE: Chunga
DISTANCE TO SURVEY BASE: 103 km

– TRANSECTS: 22 (491 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 10 %

– BASELINE DISTANCE: 65.75 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 2**
Combined flying time: 7.5 h
Crew(s): C05, C07
KES2022_9JCMA20220901A 06:56–09:28
KES2022_9JMFZ20220901A 07:06–12:03

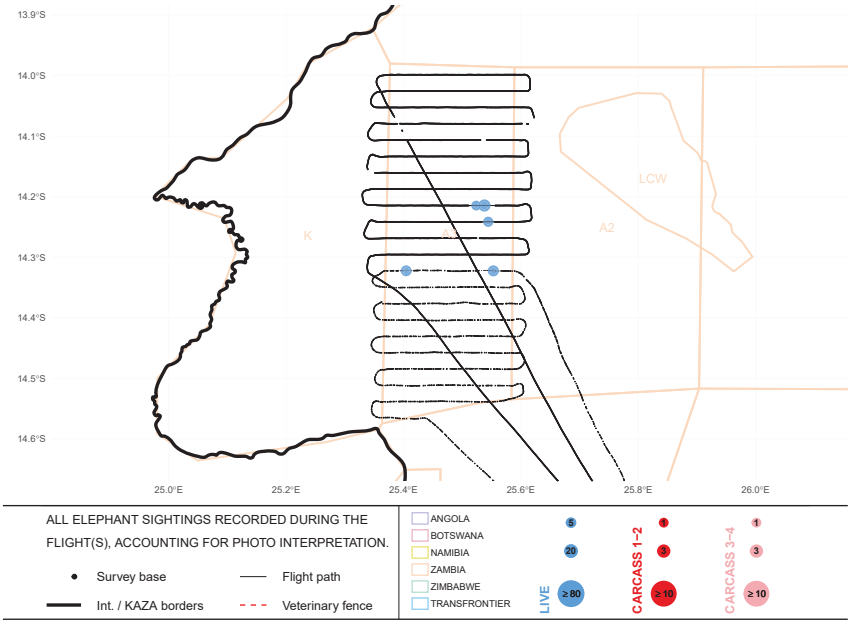
Actual sampling intensity: 9.9 %
Transect flying time: 2.8 h
Transects: 22 – 491 km – 90°
Search effort: 1.14 min/sqkm

## OBSERVER CONTRIBUTION

| Crew(s): | C05 | | C07 | |
|---|---|---|---|---|
| Side: | L | R | L | R |
| % sightings: | 42 | 58 | 58 | 42 |
| % individuals: | 50 | 50 | 52 | 48 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 11 | 0 | |
| Live elephant (>9): | 0 | | |
| Elephant carcass: | 0 | | |
| Live elephant (<10): | 2 | 0 | |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **10 (2)** |
| Bulls: | 0 (0) |
| Family: | 10 (2) |
| **NOT IN SAMPLE:** | **19 (3)** |
| Outside search strip: | 19 |
| 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: | 14 |
| Other wildlife count: | 190 |
| Domestic count: | 85 |

## ELEPHANT DATA ANALYSIS

t = 2.08, N = 221, w = 297

| | | LIVE OBS | LIVE FINAL | ALL CARCASSES OBS | ALL CARCASSES FINAL |
|---|---|---|---|---|---|
| Population estimate | $\hat{Y}$ | 101 | 101 | – | – |
| Variance of estimate | $Var\hat{Y}$ | 5106 | 5106 | – | – |
| Standard error | $SE\hat{Y}$ | 71 | 71 | – | – |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 149 | ± 149 | – | – |
| Percentage of relative precision | $PRP\hat{Y}$ | 147 % | 147 % | – | – |
| Density per sqkm | $R\hat{Y}$ | 0.069 | 0.069 | – | – |
| Variance between transect counts | $s^2_y$ | 2.545 | 2.545 | – | – |
| Variance between transect areas | $s^2_a$ | 1.492 | 1.492 | – | – |
| Covariance between counts & areas | $s_{ay}$ | 0.106 | 0.106 | – | – |

## CARCASS RATIOS

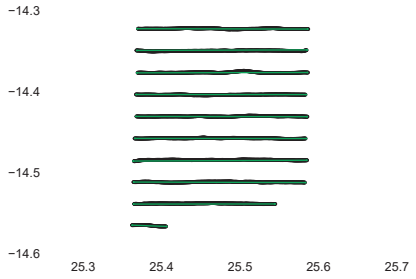
$CR_{1:4} = 0$ %
$CR_{1:2} = 0$ %

## A3 – A3 ZAMBIA – KAFUE

### ADHERENCE TO FLIGHT PARAMETERS

#### KES2022_ 9JCMA20220901A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:

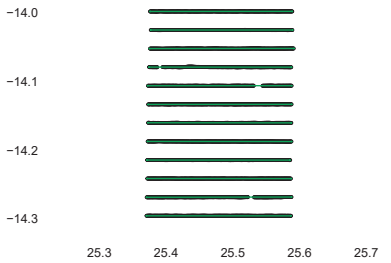



SPEED
Average: 178.2 km/h
Standard dev.: 11.4 km/h

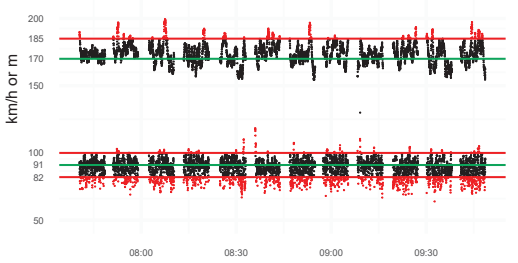
HEIGHT AGL
Average: 87 m (285.5 ft)
Standard dev.: 9.8 m (32.3 ft)

#### KES2022_ 9JMFZ20220901A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:




SPEED
Average: 174 km/h
Standard dev.: 7.4 km/h

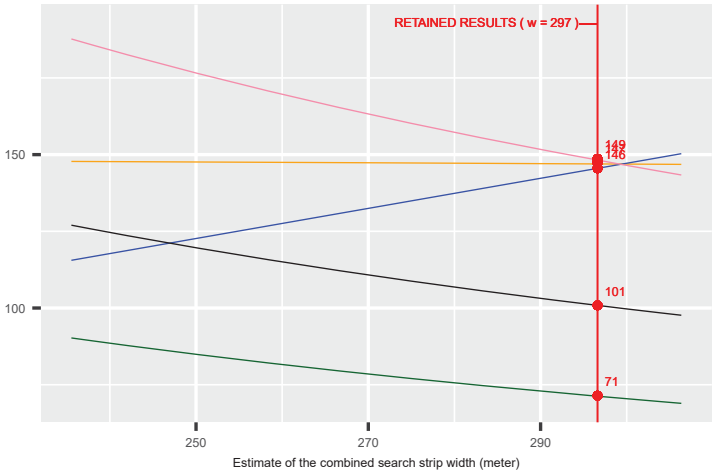
HEIGHT AGL
Average: 88.6 m (290.7 ft)
Standard dev.: 6.4 m (21.1 ft)

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

Range of search strip width estimates (m):

C05 – Left: [139 – 159]
C05 – Right: [134 – 157]

C07 – Left: [106 – 149]
C07 – Right: [93 – 152]




**LIVE ELEPHANT ESTIMATE: [ 127 – 98 ]**
CONFIDENCE INTERVAL: ± [ 188 – 143 ]
SAMPLE AREA: [ 116 – 150 ] sqkm
SE: [ 90 – 69 ]
PRP: [ 148 – 147 ] %

## A3 – A3 ZAMBIA – KAFUE

**STRATUM CODE:** A3 **N:** 222 $S_a^2$: 1,492
**STRATUM NAME:** A3 **w:** 297 **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, | 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 | 7 | 0 | 71 | 139 | 0,048 | 4458 | 66,77 | 0 | 209 | 197 | 2,227 | 0,156 |
| cattle | Bos taurus | 69 | 0 | 696 | 983 | 0,474 | 223217 | 472,46 | 0 | 1678 | 141 | 109,361 | -1,322 |
| donkey | Equus asinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| duiker | Sylvicapra grimmia | 3 | 0 | 30 | 33 | 0,021 | 247 | 15,70 | 0 | 63 | 108 | 0,123 | 0,036 |
| 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 | 10 | 18 | 101 | 149 | 0,069 | 5106 | 71,46 | 0 | 249 | 147 | 2,545 | 0,106 |
| 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, | 31 | 39 | 313 | 356 | 0,213 | 29234 | 170,98 | 0 | 668 | 114 | 14,729 | 0,625 |
| 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 | 25 | 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 | 6 | 0 | 61 | 119 | 0,041 | 3284 | 57,31 | 0 | 180 | 197 | 1,636 | 0,078 |
| 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 | 21 | 0 | 212 | 396 | 0,144 | 36329 | 190,60 | 0 | 608 | 187 | 18,141 | 0,397 |
| 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 | 30 | 43 | 0,021 | 436 | 20,89 | 0 | 74 | 144 | 0,219 | 0,058 |
| roan | Hippotragus equinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| sable | Hippotragus niger | 59 | 262 | 595 | 561 | 0,405 | 72683 | 269,60 | 34 | 1156 | 94 | 36,703 | 1,013 |
| shoat | Capra hircus - Ovis aries | 16 | 0 | 161 | 224 | 0,110 | 11550 | 107,47 | 0 | 385 | 139 | 5,636 | -0,394 |
| 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 | 24 | 0 | 242 | 203 | 0,165 | 9540 | 97,67 | 39 | 445 | 84 | 4,848 | 0,447 |
| waterbuck | Kobus ellipsiprymnus | 11 | 0 | 111 | 218 | 0,076 | 11001 | 104,89 | 0 | 329 | 197 | 5,500 | 0,268 |
| wildebeest | Connochaetes taurinus | 1 | 0 | 10 | 20 | 0,007 | 91 | 9,54 | 0 | 30 | 197 | 0,045 | 0,021 |
| 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 | 19 | 101 | 149 | 0,069 | 5106 | 71,46 | 0 | 249 | 147 | 2,545 | 0,106 |
| 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 |

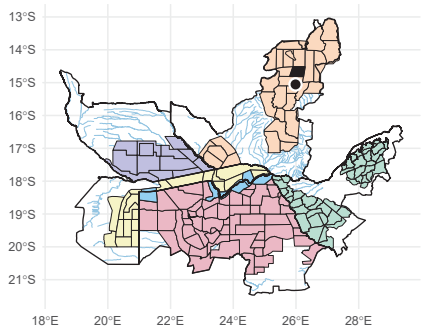
# C1 – C1 ZAMBIA – KAFUE

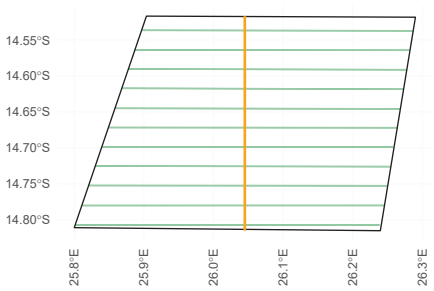
## SURVEY DESIGN

COUNTRY: Zambia
SUPERSTRATUM: Kafue
STRATUM CODE: C1
STRATUM NAME: C1
■ STRATUM AREA: 1456.12 sqkm
• SURVEY BASE: Chunga
DISTANCE TO SURVEY BASE: 44 km

– TRANSECTS: 11 (492 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 10.1 %

– BASELINE DISTANCE: 32.99 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.1 h
Crew(s): C05
KES2022_9JCMA20220908A 06:56–11:03

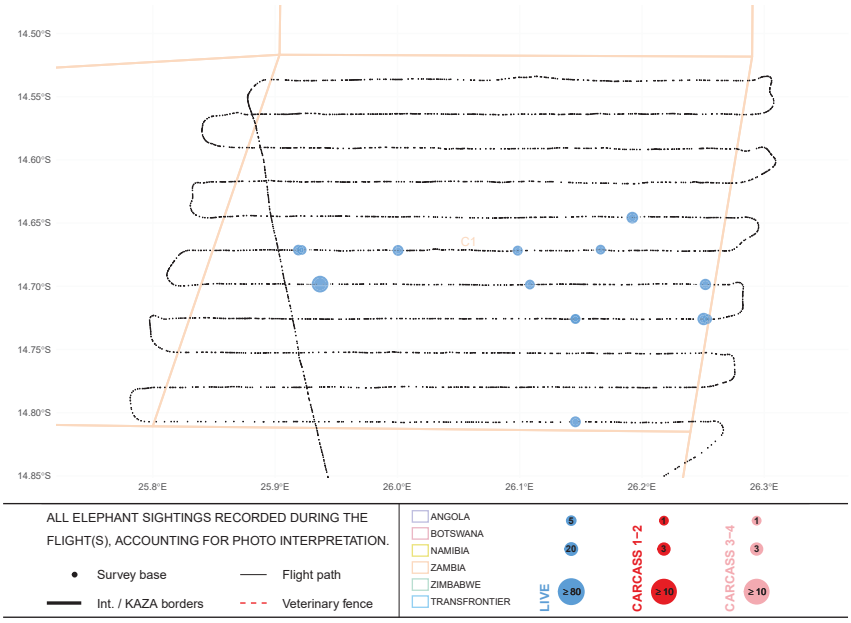
Actual sampling intensity: 10.3 %
Transect flying time: 2.9 h
Transects: 11 – 492 km – 90°
Search effort: 1.16 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C05 | |
| Side: | L | R |
| % sightings: | 53 | 47 |
| % individuals: | 63 | 37 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 43 | 37.21 | 0 |
| Live elephant (>9): | 2 | 100 | 0 |
| Elephant carcass: | 0 | | |
| Live elephant (<10): | 9 | 44.44 | 0 |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **52 (11)** |
| Bulls: | 7 (5) |
| Family: | 45 (6) |
| **NOT IN SAMPLE:** | **38 (4)** |
| Outside search strip: | 38 |
| 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: | 20 |
| Other wildlife count: | 823 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 2.228, N = 108, w = 304

| | | LIVE OBS | LIVE FINAL | ALL CARCASSES OBS | ALL CARCASSES FINAL |
|---|---|---|---|---|---|
| Population estimate | $\hat{Y}$ | 507 | 507 | – | – |
| Variance of estimate | $Var\hat{Y}$ | 37670 | 37670 | – | – |
| Standard error | $SE\hat{Y}$ | 194 | 194 | – | – |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 432 | ± 432 | – | – |
| Percentage of relative precision | $PRP\hat{Y}$ | 85 % | 85 % | – | – |
| Density per sqkm | $R\hat{Y}$ | 0.348 | 0.348 | – | – |
| Variance between transect counts | $s^2_y$ | 40.018 | 40.018 | – | – |
| Variance between transect areas | $s^2_a$ | 0.259 | 0.259 | – | – |
| Covariance between counts & areas | $s_{ay}$ | 1.313 | 1.313 | – | – |

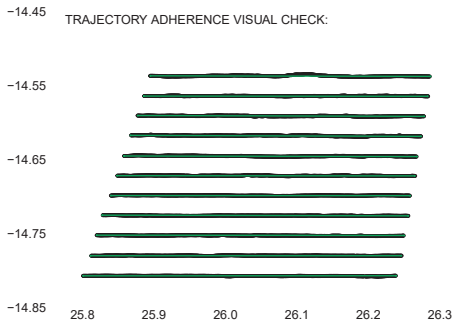
## CARCASS RATIOS

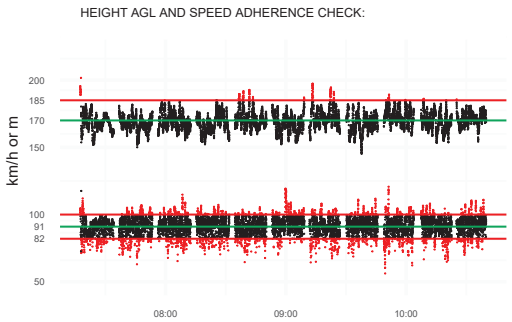
$CR_{1:4} = 0$ %
$CR_{1:2} = 0$ %

## C1 – C1 ZAMBIA – KAFUE

### ADHERENCE TO FLIGHT PARAMETERS

**KES2022_ 9JCMA20220908A**



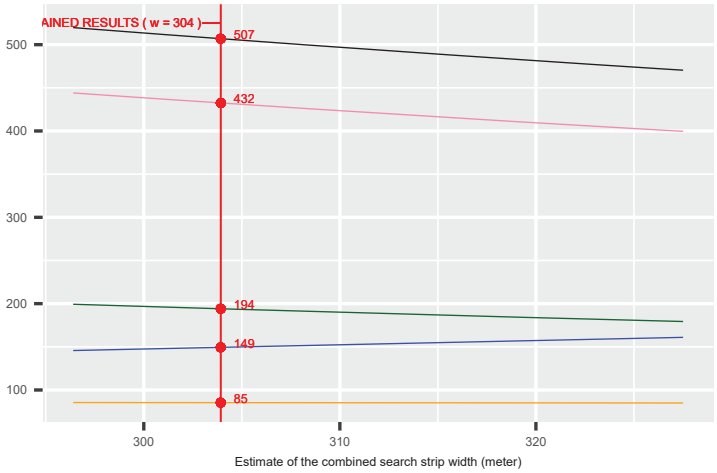

SPEED
Average: 169.5 km/h
Standard dev.: 6.8 km/h

HEIGHT AGL
Average: 91.3 m (299.4 ft)
Standard dev.: 6.8 m (22.5 ft)

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

Range of search strip width estimates (m):

C05 – Left: [146 – 167]
C05 – Right: [141 – 164]




**LIVE ELEPHANT ESTIMATE: [ 520 – 470 ]**
CONFIDENCE INTERVAL: ± [ 444 – 400 ]
SAMPLE AREA: [ 146 – 161 ] sqkm
SE: [ 199 – 179 ]
PRP: [ 85 – 85 ] %

## C1 – C1 ZAMBIA – KAFUE

**STRATUM CODE:** C1 **N:** 109 $S_a^2$: 0,259
**STRATUM NAME:** C1 **w:** 304 **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 | 72 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| bushbuck | Tragelaphus scriptus | 2 | 0 | 19 | 28 | 0,013 | 158 | 12,56 | 0 | 47 | 144 | 0,164 | -0,009 |
| bushpig | Potamochoerus larvatus | 3 | 0 | 29 | 45 | 0,020 | 402 | 20,05 | 0 | 74 | 153 | 0,418 | 0,020 |
| 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 | 19 | 28 | 0,013 | 155 | 12,44 | 0 | 47 | 142 | 0,164 | 0,105 |
| eland | Tragelaphus oryx | 15 | 27 | 146 | 193 | 0,100 | 7492 | 86,56 | 0 | 339 | 132 | 7,855 | 0,364 |
| elephant bulls | Loxodonta africana males | 7 | 2 | 68 | 98 | 0,047 | 1950 | 44,16 | 0 | 167 | 144 | 2,055 | 0,306 |
| elephant family | Loxodonta africana family | 45 | 36 | 439 | 353 | 0,301 | 25130 | 158,53 | 85 | 792 | 81 | 26,691 | 1,006 |
| 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, | 48 | 36 | 468 | 693 | 0,321 | 96681 | 310,94 | 0 | 1161 | 148 | 101,455 | 1,615 |
| hippopotamus | Hippopotamus amphibius | 21 | 0 | 205 | 196 | 0,141 | 7749 | 88,03 | 9 | 401 | 96 | 7,891 | -0,551 |
| horse | Equus caballus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 218 | 101 | 2125 | 2233 | 1,459 | 1004520 | 1002,26 | 0 | 4358 | 105 | 1063,764 | 7,094 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 3 | 0 | 29 | 44 | 0,020 | 396 | 19,91 | 0 | 74 | 152 | 0,418 | 0,159 |
| 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 | 312 | 235 | 3041 | 2315 | 2,089 | 1079328 | 1038,91 | 726 | 5356 | 76 | 1155,055 | 8,344 |
| 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 | 39 | 56 | 0,027 | 630 | 25,10 | 0 | 95 | 143 | 0,655 | 0,000 |
| roan | Hippotragus equinus | 8 | 23 | 78 | 146 | 0,054 | 4297 | 65,55 | 0 | 224 | 187 | 4,418 | -0,421 |
| sable | Hippotragus niger | 31 | 106 | 302 | 313 | 0,208 | 19747 | 140,52 | 0 | 615 | 104 | 20,964 | 1,106 |
| 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 | 52 | 19 | 507 | 285 | 0,348 | 16362 | 127,91 | 222 | 792 | 56 | 16,618 | -0,502 |
| waterbuck | Kobus ellipsiprymnus | 72 | 13 | 702 | 555 | 0,482 | 61972 | 248,94 | 147 | 1257 | 79 | 63,873 | -0,467 |
| wildebeest | Connochaetes taurinus | 12 | 0 | 117 | 191 | 0,080 | 7375 | 85,88 | 0 | 308 | 164 | 7,691 | 0,191 |
| zebra | Equus spp, | 16 | 18 | 156 | 242 | 0,107 | 11752 | 108,41 | 0 | 398 | 155 | 12,273 | 0,311 |
| all elephants | Loxodonta africana all | 52 | 38 | 507 | 432 | 0,348 | 37670 | 194,09 | 74 | 939 | 85 | 40,018 | 1,313 |
| 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 |

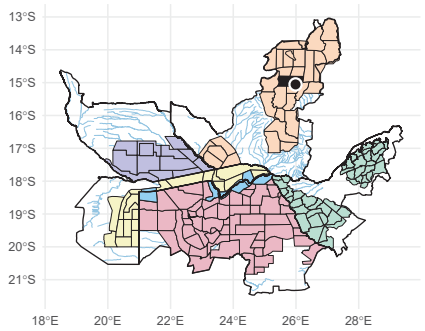
# C2 – C2 ZAMBIA – KAFUE

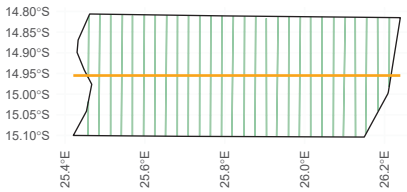
## SURVEY DESIGN

COUNTRY: Zambia
SUPERSTRATUM: Kafue
STRATUM CODE: C2
STRATUM NAME: C2
■ STRATUM AREA: 2642.74 sqkm
• SURVEY BASE: Chunga
DISTANCE TO SURVEY BASE: 19 km

– TRANSECTS: 28 (881 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 10 %

– BASELINE DISTANCE: 88.08 km




## SURVEY IMPLEMENTATION

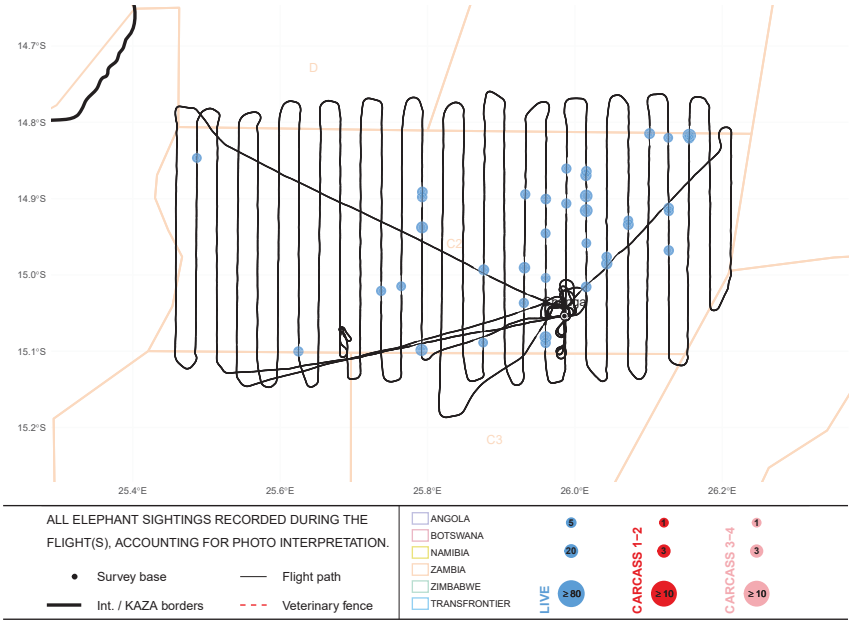
**Number of flight(s): 3**
Combined flying time: 9.4 h
Crew(s): C05, C07
KES2022_9JCMA20220910A 06:39–08:24
KES2022_9JMFZ20220910A 06:52–11:13
KES2022_9JMFZ20220911A 07:03–10:20
Actual sampling intensity: 10.3 %
Transect flying time: 5.1 h
Transects: 28 – 881 km – 0°
Search effort: 1.13 min/sqkm

## OBSERVER CONTRIBUTION

| Crew(s): | C05 | | C07 | |
|---|---|---|---|---|
| Side: | L | R | L | R |
| % sightings: | 61 | 39 | **56** | **44** |
| % individuals: | 70 | 30 | **65** | **35** |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 57 | 56.14 | 31.25 |
| Live elephant (>9): | 5 | 100 | 20 |
| Elephant carcass: | 0 | | |
| Live elephant (<10): | 17 | 76.47 | 7.69 |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **118 (22)** |
| Bulls: | 7 (7) |
| Family: | 111 (15) |
| **NOT IN SAMPLE:** | **84 (18)** |
| Outside search strip: | 84 |
| 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: | 21 |
| Other wildlife count: | 727 |
| Domestic count: | 19 |

## ELEPHANT DATA ANALYSIS

t = 2.052, N = 286, w = 308

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 1150 | 1150 | – | – |
| Variance of estimate | $Var\hat{Y}$ | 210060 | 220548 | – | – |
| Standard error | $SE\hat{Y}$ | 458 | 470 | – | – |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 940 | ± 964 | – | – |
| Percentage of relative precision | $PRP\hat{Y}$ | 82 % | 84 % | – | – |
| Density per sqkm | $R\hat{Y}$ | 0.435 | 0.435 | – | – |
| Variance between transect counts | $s^2_y$ | 80.767 | 84.767 | – | – |
| Variance between transect areas | $s^2_a$ | 1.009 | 1.009 | – | – |
| Covariance between counts & areas | $s_{ay}$ | 1.569 | 1.599 | – | – |

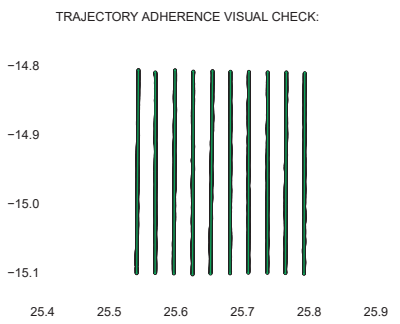
## CARCASS RATIOS

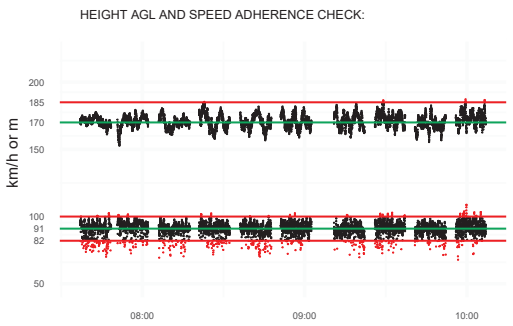
$CR_{1:4} = 0$ %
$CR_{1:2} = 0$ %

## C2 – C2 ZAMBIA – KAFUE

### ADHERENCE TO FLIGHT PARAMETERS

#### KES2022_ 9JMFZ20220911A

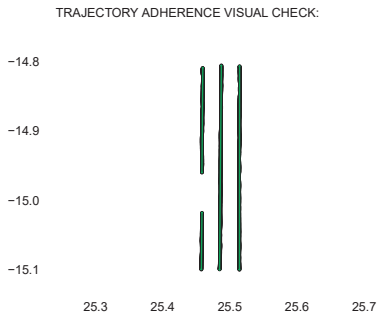


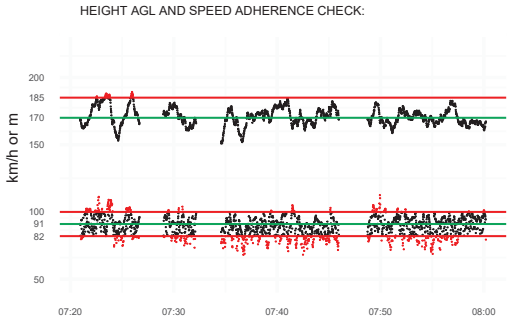




SPEED
Average: 170.9 km/h
Standard dev.: 4.9 km/h

HEIGHT AGL
Average: 90.8 m (298 ft)
Standard dev.: 4.8 m (15.6 ft)

#### KES2022_ 9JCMA20220910A

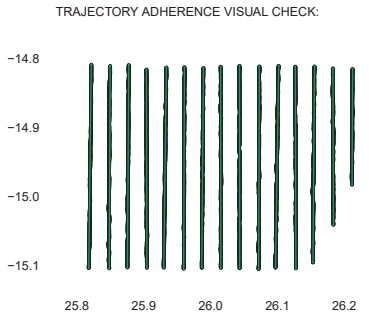


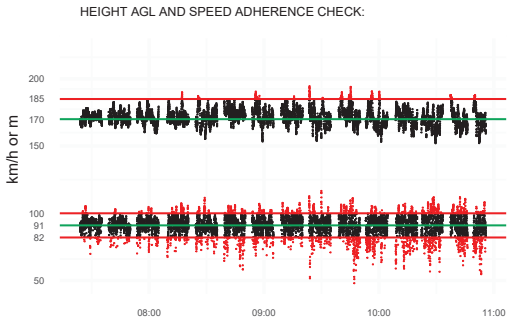




SPEED
Average: 170.8 km/h
Standard dev.: 6.7 km/h

HEIGHT AGL
Average: 89.4 m (293.4 ft)
Standard dev.: 7.5 m (24.7 ft)

#### KES2022_ 9JMFZ20220910A




SPEED
Average: 171.6 km/h
Standard dev.: 6.1 km/h

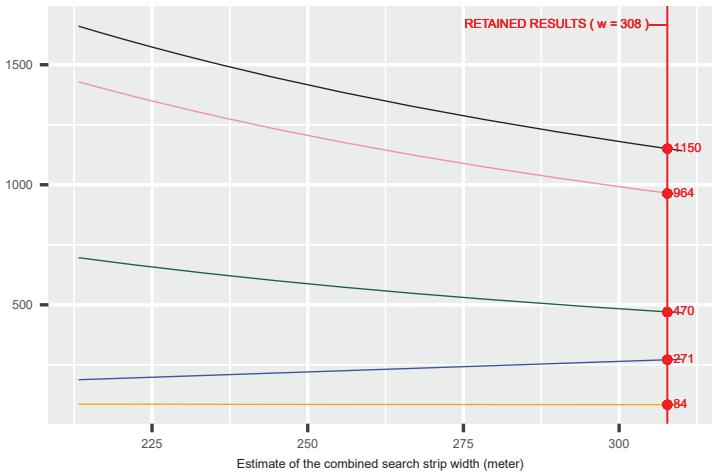
HEIGHT AGL
Average: 90.7 m (297.4 ft)
Standard dev.: 7.4 m (24.4 ft)

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

Range of search strip width estimates (m):

C05 – Left: [143 – 164]
C05 – Right: [138 – 161]

C07 – Left: [109 – 153]
C07 – Right: [95 – 156]




LIVE ELEPHANT ESTIMATE: [ 1661 – 1142 ]
CONFIDENCE INTERVAL: ± [ 1429 – 957 ]
SAMPLE AREA: [ 188 – 273 ] sqkm
SE: [ 696 – 467 ]
PRP: [ 86 – 84 ] %

## C2 – C2 ZAMBIA – KAFUE

**STRATUM CODE:** C2 **N:** 286 $S_a^2$: 1,009
**STRATUM NAME:** C2 **w:** 308 **df:** 27

| 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 | 740 | 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 | 7 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| cattle | Bos taurus | 19 | 7 | 185 | 381 | 0,070 | 34520 | 185,79 | 0 | 566 | 206 | 12,893 | -1,297 |
| donkey | Equus asinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| duiker | Sylvicapra grimmia | 5 | 0 | 49 | 50 | 0,018 | 595 | 24,39 | 0 | 99 | 103 | 0,226 | 0,030 |
| eland | Tragelaphus oryx | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| elephant bulls | Loxodonta africana males | 7 | 3 | 68 | 46 | 0,026 | 506 | 22,50 | 22 | 114 | 68 | 0,194 | 0,064 |
| elephant family | Loxodonta africana family | 111 | 81 | 1082 | 946 | 0,410 | 212464 | 460,94 | 136 | 2028 | 87 | 81,591 | 1,535 |
| 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 | 1 | 0 | 10 | 20 | 0,004 | 94 | 9,70 | 0 | 30 | 204 | 0,036 | 0,015 |
| hartebeest | Alcelaphus spp, | 109 | 43 | 1063 | 897 | 0,402 | 191264 | 437,34 | 165 | 1960 | 84 | 73,358 | 1,307 |
| hippopotamus | Hippopotamus amphibius | 105 | 35 | 1024 | 770 | 0,387 | 140856 | 375,31 | 254 | 1794 | 75 | 54,120 | 1,163 |
| horse | Equus caballus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 190 | 231 | 1852 | 1399 | 0,701 | 465135 | 682,01 | 453 | 3252 | 76 | 171,878 | -2,758 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 3 | 2 | 29 | 60 | 0,011 | 847 | 29,10 | 0 | 89 | 204 | 0,321 | 0,029 |
| oribi | Ourebia ourebi | 0 | 2 | 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 | 121 | 49 | 1180 | 832 | 0,446 | 164266 | 405,30 | 348 | 2011 | 70 | 62,967 | 1,039 |
| red lechwe | Kobus leche | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| reedbuck | Redunca arundinum | 16 | 0 | 156 | 141 | 0,059 | 4735 | 68,81 | 15 | 297 | 91 | 1,810 | 0,161 |
| roan | Hippotragus equinus | 1 | 45 | 10 | 20 | 0,004 | 94 | 9,70 | 0 | 30 | 204 | 0,036 | 0,015 |
| sable | Hippotragus niger | 36 | 52 | 351 | 440 | 0,133 | 45934 | 214,32 | 0 | 791 | 125 | 17,397 | 0,038 |
| shoat | Capra hircus - Ovis aries | 0 | 3 | 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 | 73 | 21 | 712 | 315 | 0,269 | 23610 | 153,66 | 396 | 1027 | 44 | 8,988 | 0,214 |
| waterbuck | Kobus ellipsiprymnus | 17 | 37 | 166 | 244 | 0,063 | 14105 | 118,77 | 0 | 409 | 147 | 5,358 | 0,142 |
| wildebeest | Connochaetes taurinus | 2 | 0 | 19 | 40 | 0,007 | 376 | 19,40 | 0 | 59 | 204 | 0,143 | 0,024 |
| zebra | Equus spp, | 22 | 18 | 214 | 190 | 0,081 | 8598 | 92,72 | 24 | 405 | 89 | 3,286 | 0,213 |
| all elephants | Loxodonta africana all | 118 | 84 | 1150 | 964 | 0,435 | 220548 | 469,63 | 187 | 2114 | 84 | 84,767 | 1,599 |
| 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 |

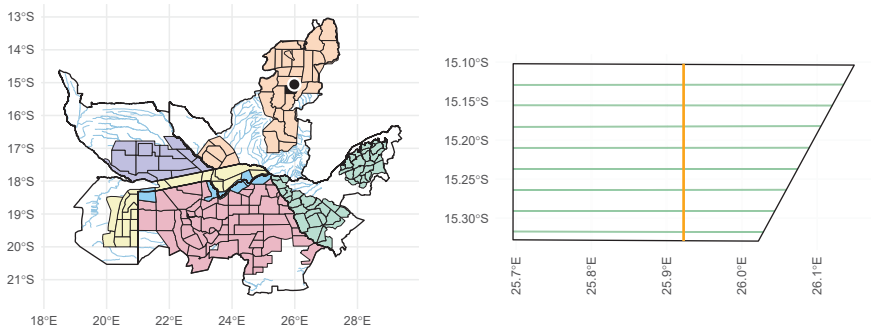
# C3 – C3 ZAMBIA – KAFUE

## SURVEY DESIGN

COUNTRY: Zambia
SUPERSTRATUM: Kafue
STRATUM CODE: C3
STRATUM NAME: C3
■ STRATUM AREA: 1046.2 sqkm
• SURVEY BASE: Chunga
DISTANCE TO SURVEY BASE: 21 km

– TRANSECTS: 8 (331 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 9.5 %

– BASELINE DISTANCE: 25.16 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 3.3 h
Crew(s): C05
KES2022_9JCMA20220905A 07:03–10:20

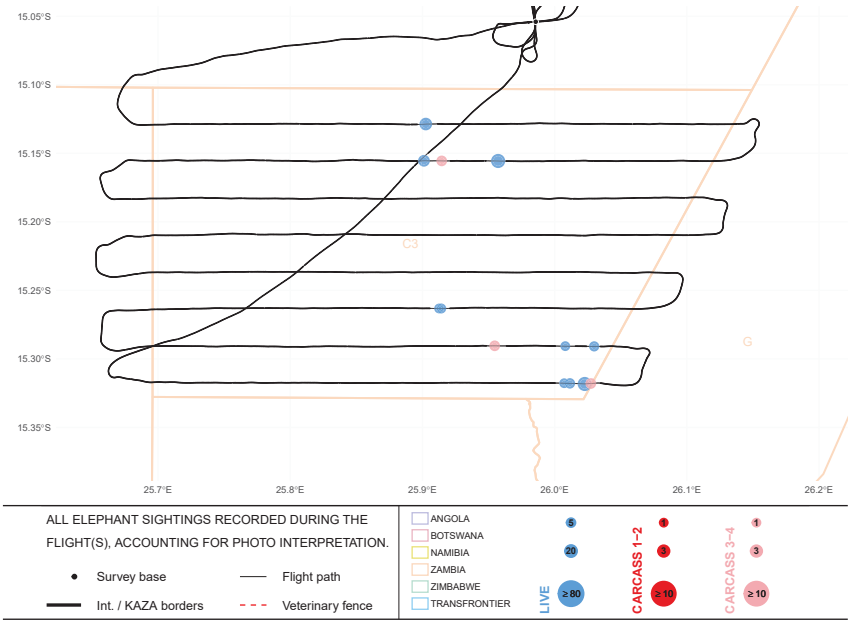
Actual sampling intensity: 9.2 %
Transect flying time: 1.9 h
Transects: 8 – 331 km – 90°
Search effort: 1.21 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C05 | |
| Side: | L | R |
| % sightings: | 44 | 56 |
| % individuals: | 49 | 51 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 23 | 43.48 | 50 |
| Live elephant (>9): | 3 | 100 | 66.67 |
| Elephant carcass: | 1 | 100 | 0 |
| Live elephant (<10): | 5 | 20 | 0 |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **53 (8)** |
| Bulls: | 5 (4) |
| Family: | 48 (4) |
| **NOT IN SAMPLE:** | **25 (2)** |
| 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:** | **2 (2)** |
| Outside search strip: | 2 |
| Off transect: | 0 |

## OTHER SPECIES

| | |
|---|---|
| Other wildlife species: | 13 |
| Other wildlife count: | 365 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 2.365, N = 86, w = 291

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 587 | 576 | 11 | 11 |
| Variance of estimate | $Var\hat{Y}$ | 103561 | 93286 | 102 | 102 |
| Standard error | $SE\hat{Y}$ | 322 | 305 | 10 | 10 |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 761 | ± 722 | ± 24 | ± 24 |
| Percentage of relative precision | $PRP\hat{Y}$ | 130 % | 125 % | 220 % | 220 % |
| Density per sqkm | $R\hat{Y}$ | 0.561 | 0.55 | 0.01 | 0.01 |
| Variance between transect counts | $s^2_y$ | 131.357 | 118.839 | 0.125 | 0.125 |
| Variance between transect areas | $s^2_a$ | 1.786 | 1.786 | 1.786 | 1.786 |
| Covariance between counts & areas | $s_{ay}$ | 9.073 | 8.827 | 0.232 | 0.232 |

## CARCASS RATIOS

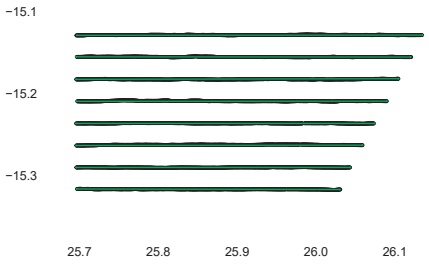
$CR_{1:4}$ = 1.9 %
$CR_{1:2}$ = 0 %

## C3 – C3 ZAMBIA – KAFUE

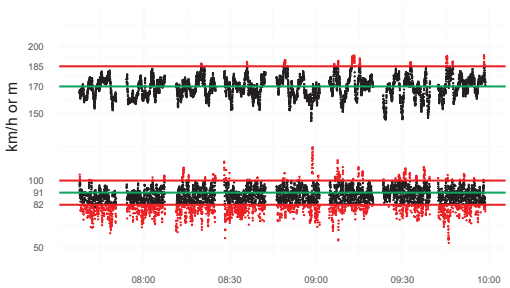
### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ 9JCMA20220905A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



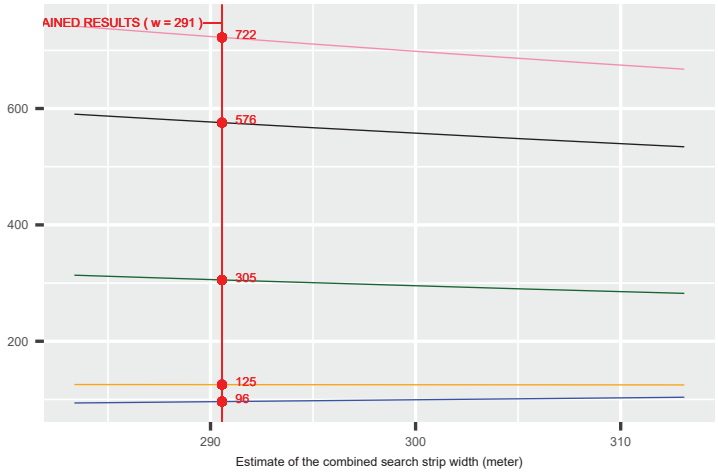

SPEED
Average: 169.3 km/h
Standard dev.: 7.9 km/h

HEIGHT AGL
Average: 87.2 m (286.3 ft)
Standard dev.: 8 m (26.1 ft)

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

Range of search strip width estimates (m):

C05 – Left: [139 – 160]
C05 – Right: [135 – 157]




**LIVE ELEPHANT ESTIMATE: [ 590 – 534 ]**
CONFIDENCE INTERVAL: ± [ 742 – 668 ]
SAMPLE AREA: [ 94 – 104 ] sqkm
SE: [ 314 – 282 ]
PRP: [ 126 – 125 ] %

## C3 – C3 ZAMBIA – KAFUE

**STRATUM CODE:** C3 **N:** 87 $S_a^2$: 1,786
**STRATUM NAME:** C3 **w:** 291 **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 | 19 | 0 | 206 | 282 | 0,197 | 14179 | 119,08 | 0 | 488 | 136 | 15,125 | -3,738 |
| 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 | 22 | 32 | 0,021 | 185 | 13,60 | 0 | 54 | 148 | 0,214 | -0,054 |
| 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 | 0 | 54 | 76 | 0,052 | 1033 | 32,14 | 0 | 130 | 140 | 1,125 | -0,813 |
| elephant family | Loxodonta africana family | 48 | 25 | 521 | 744 | 0,498 | 98898 | 314,48 | 0 | 1265 | 143 | 125,429 | 9,641 |
| 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 | 11 | 24 | 0,010 | 102 | 10,12 | 0 | 35 | 220 | 0,125 | 0,232 |
| 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, | 53 | 71 | 576 | 627 | 0,550 | 70386 | 265,30 | 0 | 1203 | 109 | 78,839 | -3,057 |
| hippopotamus | Hippopotamus amphibius | 17 | 0 | 185 | 197 | 0,177 | 6975 | 83,52 | 0 | 382 | 107 | 8,982 | 2,375 |
| horse | Equus caballus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 95 | 62 | 1032 | 1505 | 0,986 | 405236 | 636,58 | 0 | 2537 | 146 | 453,554 | -10,695 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 5 | 3 | 54 | 52 | 0,052 | 486 | 22,05 | 2 | 106 | 96 | 0,554 | -0,127 |
| 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 | 36 | 5 | 391 | 502 | 0,374 | 45102 | 212,37 | 0 | 893 | 128 | 57,143 | 5,847 |
| 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 | 15 | 0 | 163 | 359 | 0,156 | 23098 | 151,98 | 0 | 522 | 221 | 28,125 | 3,259 |
| sable | Hippotragus niger | 4 | 64 | 43 | 53 | 0,042 | 509 | 22,57 | 0 | 97 | 123 | 0,571 | -0,292 |
| 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 | 64 | 4 | 695 | 671 | 0,664 | 80555 | 283,82 | 24 | 1366 | 97 | 92,857 | -0,793 |
| waterbuck | Kobus ellipsiprymnus | 38 | 35 | 413 | 342 | 0,395 | 20921 | 144,64 | 71 | 755 | 83 | 27,357 | 3,854 |
| wildebeest | Connochaetes taurinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| zebra | Equus spp, | 10 | 2 | 109 | 241 | 0,104 | 10416 | 102,06 | 0 | 350 | 222 | 12,500 | 1,320 |
| all elephants | Loxodonta africana all | 53 | 25 | 576 | 722 | 0,550 | 93286 | 305,43 | 0 | 1298 | 125 | 118,839 | 8,827 |
| 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 | 2 | 11 | 24 | 0,010 | 102 | 10,12 | 0 | 35 | 220 | 0,125 | 0,232 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 1 | 2 | 11 | 24 | 0,010 | 102 | 10,12 | 0 | 35 | 220 | 0,125 | 0,232 |

# D – D

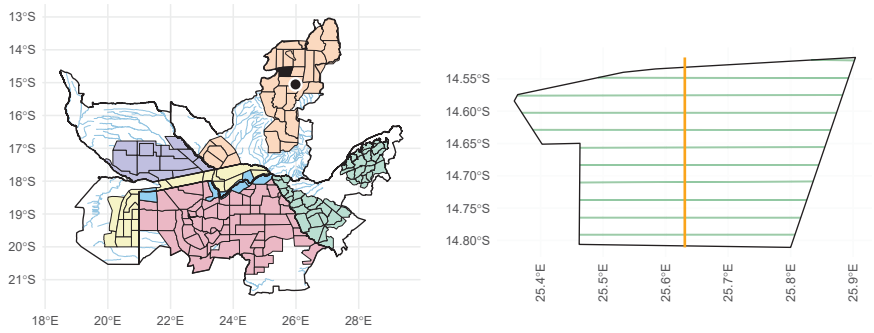
# ZAMBIA – KAFUE

## SURVEY DESIGN

COUNTRY: Zambia
SUPERSTRATUM: Kafue
STRATUM CODE: D
STRATUM NAME: D
■ STRATUM AREA: 1372.38 sqkm
• SURVEY BASE: Chunga
DISTANCE TO SURVEY BASE: 51 km

– TRANSECTS: 11 (451 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 9.9 %

– BASELINE DISTANCE: 32.52 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 3.8 h
Crew(s): C05
KES2022_9JCMA20220903A 07:05–10:55

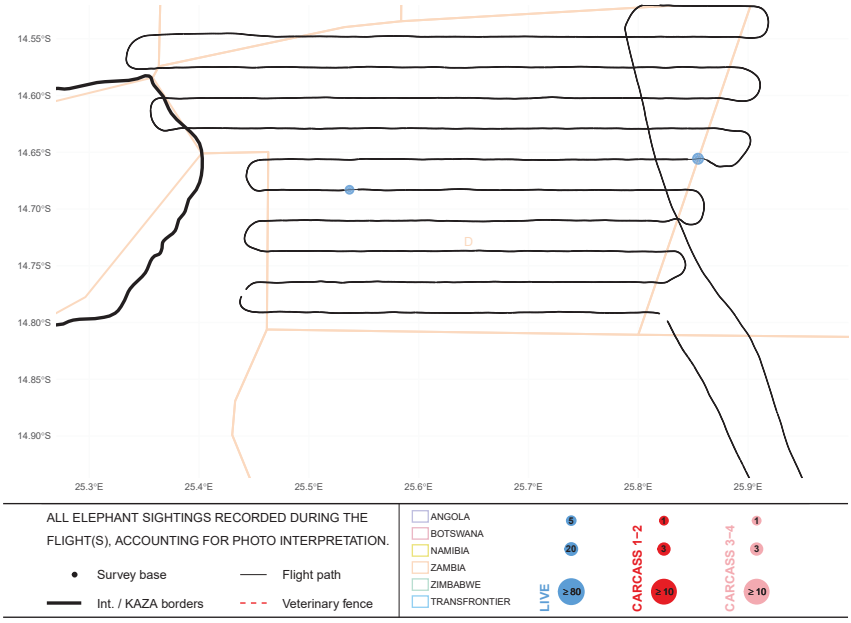
Actual sampling intensity: 9.8 %
Transect flying time: 2.6 h
Transects: 11 – 451 km – 90°
Search effort: 1.16 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C05 | |
| Side: | L | R |
| % sightings: | 41 | 59 |
| % individuals: | 34 | 66 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 16 | 37.5 | 33.33 |
| 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:** | **12 (2)** |
| Outside search strip: | 12 |
| 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: | 11 |
| Other wildlife count: | 215 |
| Domestic count: | 177 |

## ELEPHANT DATA ANALYSIS

t = 2.228, N = 109, w = 297

| | | 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

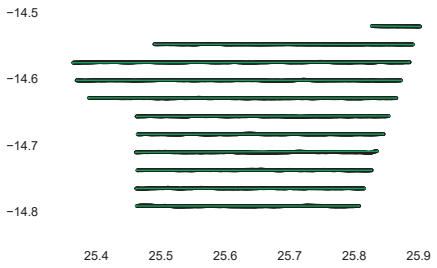
## D – D

## ZAMBIA – KAFUE

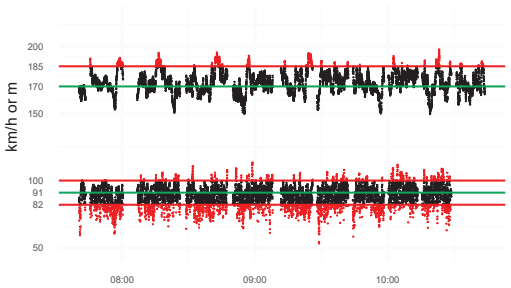
### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ 9JCMA20220903A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:




SPEED

| | |
|---|---|
| Average: | 173.1 km/h |
| Standard dev.: | 8.1 km/h |

HEIGHT AGL

| | | |
|---|---|---|
| Average: | 88.7 m | (290.8 ft) |
| Standard dev.: | 7.7 m | (25.2 ft) |

Despite the failure of the laser to automatically record continuous height data throughout transect D−11, the front seat observer manually recorded this information approximately every 30 seconds.

# D – D ZAMBIA – KAFUE

**STRATUM CODE:** D **N:** 109 $S_a^2$: 14,021
**STRATUM NAME:** D **w:** 297 **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 | 42 | 116 | 430 | 598 | 0,314 | 71974 | 268,28 | 0 | 1028 | 139 | 60,964 | -17,752 |
| 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 | 149 | 21 | 1526 | 924 | 1,112 | 171930 | 414,64 | 602 | 2450 | 61 | 205,273 | 21,178 |
| donkey | Equus asinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| duiker | Sylvicapra grimmia | 2 | 0 | 20 | 42 | 0,015 | 358 | 18,92 | 0 | 63 | 206 | 0,364 | 0,049 |
| 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 | 11 | 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, | 23 | 77 | 236 | 301 | 0,172 | 18302 | 135,28 | 0 | 537 | 128 | 18,291 | 0,062 |
| 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 | 3 | 0 | 31 | 63 | 0,022 | 805 | 28,38 | 0 | 94 | 206 | 0,818 | 0,073 |
| roan | Hippotragus equinus | 4 | 13 | 41 | 38 | 0,030 | 293 | 17,10 | 3 | 79 | 93 | 0,255 | -0,529 |
| sable | Hippotragus niger | 104 | 216 | 1065 | 712 | 0,776 | 102254 | 319,77 | 353 | 1778 | 67 | 113,273 | 11,168 |
| shoat | Capra hircus - Ovis aries | 28 | 0 | 287 | 392 | 0,209 | 30982 | 176,02 | 0 | 679 | 137 | 32,873 | 4,445 |
| 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 | 21 | 17 | 215 | 185 | 0,157 | 6879 | 82,94 | 30 | 400 | 86 | 7,691 | 3,231 |
| waterbuck | Kobus ellipsiprymnus | 2 | 0 | 20 | 42 | 0,015 | 362 | 19,02 | 0 | 63 | 207 | 0,364 | -0,079 |
| wildebeest | Connochaetes taurinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| zebra | Equus spp, | 1 | 5 | 10 | 21 | 0,007 | 89 | 9,46 | 0 | 31 | 206 | 0,091 | 0,024 |
| all elephants | Loxodonta africana all | 0 | 12 | 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 |

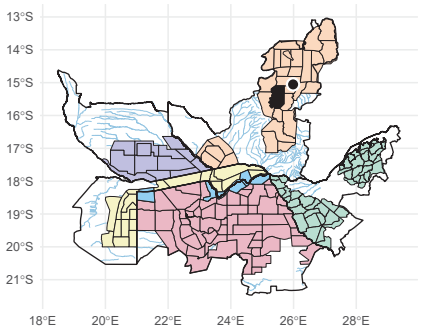
# E – E ZAMBIA – KAFUE

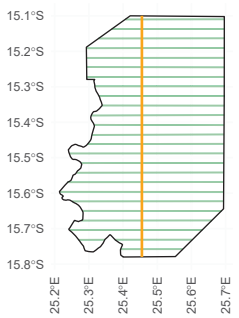
## SURVEY DESIGN

COUNTRY: Zambia
SUPERSTRATUM: Kafue
STRATUM CODE: E
STRATUM NAME: E
■ STRATUM AREA: 3092.98 sqkm
• SURVEY BASE: Chunga
DISTANCE TO SURVEY BASE: 67 km

– TRANSECTS: 25 (1032 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 10 %

– BASELINE DISTANCE: 75.26 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 2**
Combined flying time: 9.7 h
Crew(s): C05, C07
KES2022_9JCMA20220915A 07:01–11:44
KES2022_9JMFZ20220915A 07:05–12:06

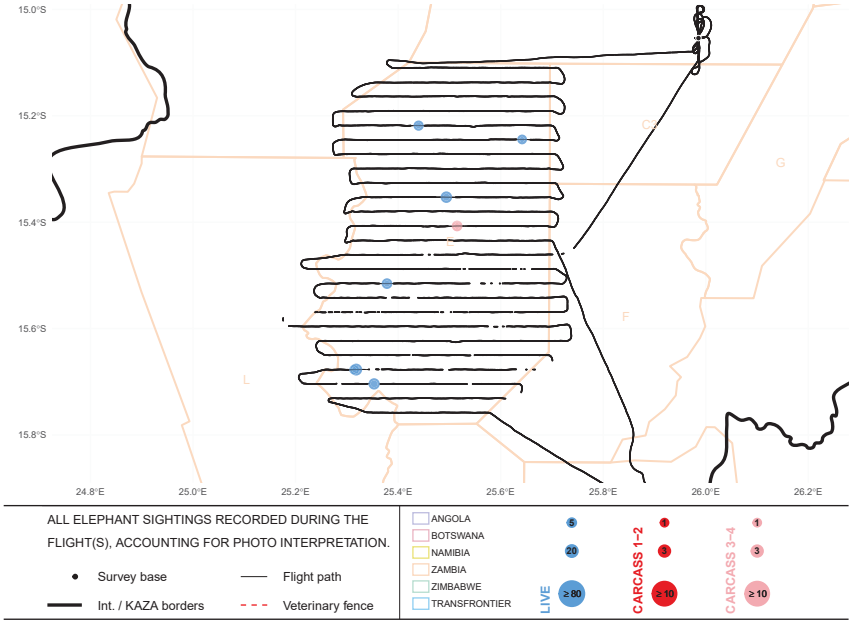
Actual sampling intensity: 10.2 %
Transect flying time: 6 h
Transects: 25 – 1032 km – 90°
Search effort: 1.15 min/sqkm

## OBSERVER CONTRIBUTION

| Crew(s): | C05 | | C07 | |
|---|---|---|---|---|
| Side: | L | R | L | R |
| % sightings: | 51 | 49 | 48 | 52 |
| % individuals: | 54 | 46 | 40 | 60 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 25 | 60 | 40 |
| Live elephant (>9): | 1 | 100 | 100 |
| Elephant carcass: | 1 | 100 | 0 |
| Live elephant (<10): | 2 | 50 | 0 |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **17 (3)** |
| Bulls: | 1 (1) |
| Family: | 16 (2) |
| **NOT IN SAMPLE:** | **21 (4)** |
| Outside search strip: | 21 |
| 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: | 18 |
| Other wildlife count: | 655 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 2.064, N = 247, w = 304

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 158 | 167 | 10 | 10 |
| Variance of estimate | $Var\hat{Y}$ | 12340 | 14315 | 88 | 88 |
| Standard error | $SE\hat{Y}$ | 111 | 120 | 9 | 9 |
| 95% confidence interval | $CI^{95\%}_{\hat{Y}}$ | ± 229 | ± 247 | ± 19 | ± 19 |
| Percentage of relative precision | $PRP\hat{Y}$ | 146 % | 148 % | 197 % | 197 % |
| Density per sqkm | $R\hat{Y}$ | 0.051 | 0.054 | 0.003 | 0.003 |
| Variance between transect counts | $s^2_y$ | 5.657 | 6.56 | 0.04 | 0.04 |
| Variance between transect areas | $s^2_a$ | 4.024 | 4.024 | 4.024 | 4.024 |
| Covariance between counts & areas | $s_{ay}$ | 0.475 | 0.496 | −0.016 | −0.016 |

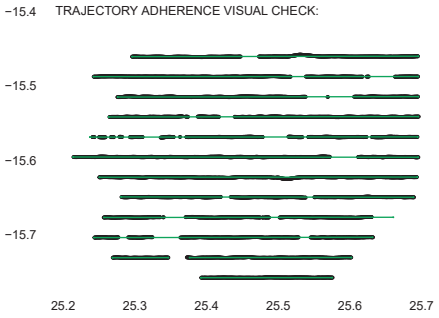
## CARCASS RATIOS

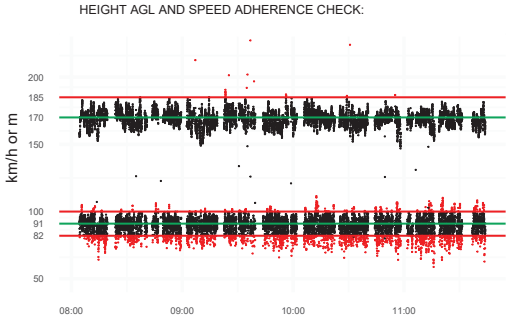
$CR_{1:4}$ = 5.6 %
$CR_{1:2}$ = 0 %

## E – E ZAMBIA – KAFUE

### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ 9JMFZ20220915A

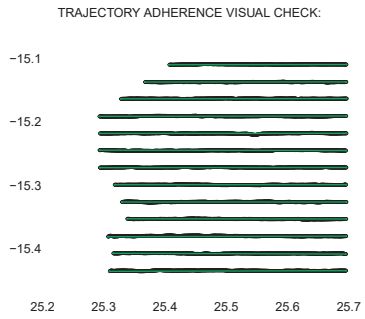


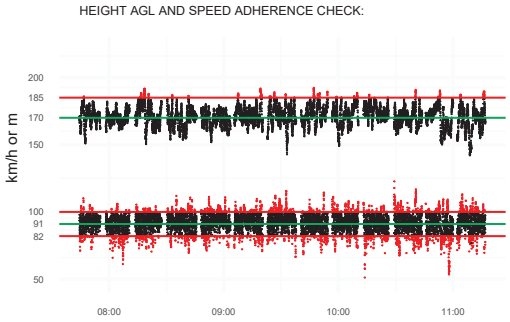




SPEED
Average: 169.1 km/h
Standard dev.: 5.9 km/h

HEIGHT AGL
Average: 89.2 m (292.7 ft)
Standard dev.: 6.4 m (20.9 ft)

### KES2022_ 9JCMA20220915A




SPEED
Average: 170.9 km/h
Standard dev.: 7.4 km/h

HEIGHT AGL
Average: 91.7 m (300.8 ft)
Standard dev.: 7.2 m (23.6 ft)

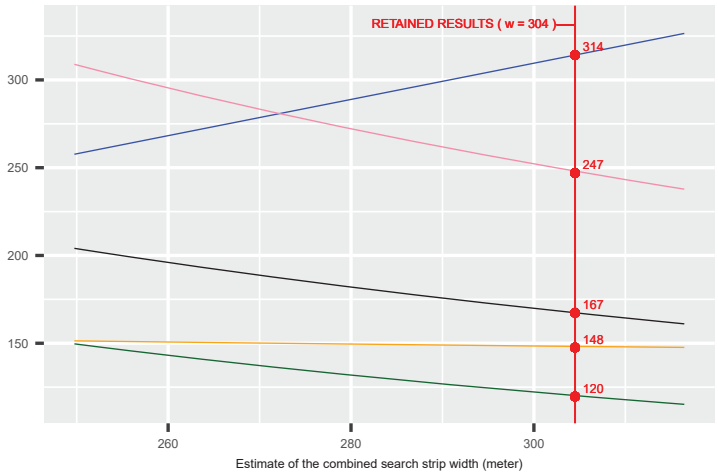
INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C05 – Left: [146 – 168]
C05 – Right: [141 – 165]

C07 – Left: [107 – 150]
C07 – Right: [94 – 153]

**LIVE ELEPHANT ESTIMATE: [ 204 – 161 ]**
CONFIDENCE INTERVAL: ± [ 309 – 238 ]
SAMPLE AREA: [ 258 – 326 ] sqkm
SE: [ 150 – 115 ]
PRP: [ 151 – 148 ] %



# E – E ZAMBIA – KAFUE

**STRATUM CODE:** E **N:** 247 $S_a^2$: 4,024
**STRATUM NAME:** E **w:** 304 **df:** 24

| 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 | 300 | 20 | 39 | 0,006 | 353 | 18,79 | 0 | 58 | 197 | 0,160 | -0,042 |
| bushbuck | Tragelaphus scriptus | 1 | 0 | 10 | 19 | 0,003 | 87 | 9,35 | 0 | 29 | 196 | 0,040 | 0,037 |
| bushpig | Potamochoerus larvatus | 1 | 0 | 10 | 19 | 0,003 | 87 | 9,32 | 0 | 29 | 195 | 0,040 | 0,080 |
| 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 | 0 | 148 | 98 | 0,048 | 2262 | 47,56 | 50 | 246 | 66 | 1,083 | 0,656 |
| 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 | 10 | 19 | 0,003 | 88 | 9,36 | 0 | 29 | 196 | 0,040 | 0,022 |
| elephant family | Loxodonta africana family | 16 | 20 | 158 | 229 | 0,051 | 12340 | 111,09 | 0 | 387 | 146 | 5,657 | 0,475 |
| 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 | 10 | 19 | 0,003 | 88 | 9,39 | 0 | 29 | 197 | 0,040 | -0,016 |
| 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, | 101 | 25 | 994 | 810 | 0,321 | 154048 | 392,49 | 184 | 1804 | 81 | 68,957 | -1,195 |
| 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 | 34 | 63 | 335 | 394 | 0,108 | 36351 | 190,66 | 0 | 728 | 118 | 16,823 | 1,474 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 25 | 0 | 246 | 212 | 0,080 | 10546 | 102,69 | 34 | 458 | 86 | 4,917 | 0,881 |
| oribi | Ourebia ourebi | 2 | 1 | 20 | 39 | 0,006 | 349 | 18,68 | 0 | 58 | 196 | 0,160 | 0,095 |
| 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 | 14 | 31 | 138 | 187 | 0,045 | 8244 | 90,80 | 0 | 325 | 136 | 3,757 | 0,122 |
| 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 | 30 | 42 | 0,010 | 422 | 20,54 | 0 | 72 | 144 | 0,193 | 0,084 |
| roan | Hippotragus equinus | 67 | 71 | 660 | 792 | 0,213 | 147165 | 383,62 | 0 | 1451 | 120 | 66,477 | -0,814 |
| sable | Hippotragus niger | 206 | 294 | 2028 | 952 | 0,656 | 212831 | 461,34 | 1076 | 2980 | 47 | 91,440 | -2,848 |
| 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 | 123 | 50 | 1211 | 470 | 0,392 | 51818 | 227,64 | 741 | 1681 | 39 | 24,577 | 2,043 |
| waterbuck | Kobus ellipsiprymnus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| wildebeest | Connochaetes taurinus | 9 | 0 | 89 | 174 | 0,029 | 7084 | 84,17 | 0 | 262 | 196 | 3,240 | 0,309 |
| zebra | Equus spp, | 14 | 7 | 138 | 196 | 0,045 | 9010 | 94,92 | 0 | 334 | 142 | 4,090 | -0,051 |
| all elephants | Loxodonta africana all | 17 | 21 | 167 | 247 | 0,054 | 14315 | 119,65 | 0 | 414 | 148 | 6,560 | 0,496 |
| 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 | 10 | 19 | 0,003 | 88 | 9,39 | 0 | 29 | 197 | 0,040 | -0,016 |
| C3-4 elephant carcasses | Loxodonta africana carcass 3-4 | 1 | 0 | 10 | 19 | 0,003 | 88 | 9,39 | 0 | 29 | 197 | 0,040 | -0,016 |

# F – F

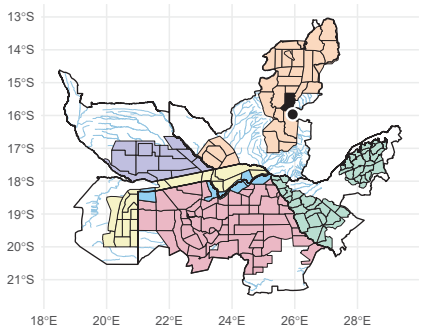
# ZAMBIA – KAFUE

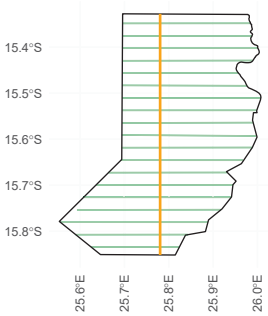
## SURVEY DESIGN

COUNTRY: Zambia
SUPERSTRATUM: Kafue
STRATUM CODE: F
STRATUM NAME: F
■ STRATUM AREA: 1804.69 sqkm
• SURVEY BASE: Ngoma
DISTANCE TO SURVEY BASE: 44 km

– TRANSECTS: 19 (593 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 9.9 %

– BASELINE DISTANCE: 57.98 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 2**
Combined flying time: 5.8 h
Crew(s): C05, C07
KES2022_9JCMA20220916A 06:47–09:52
KES2022_9JMFZ20220916A 06:39–09:22

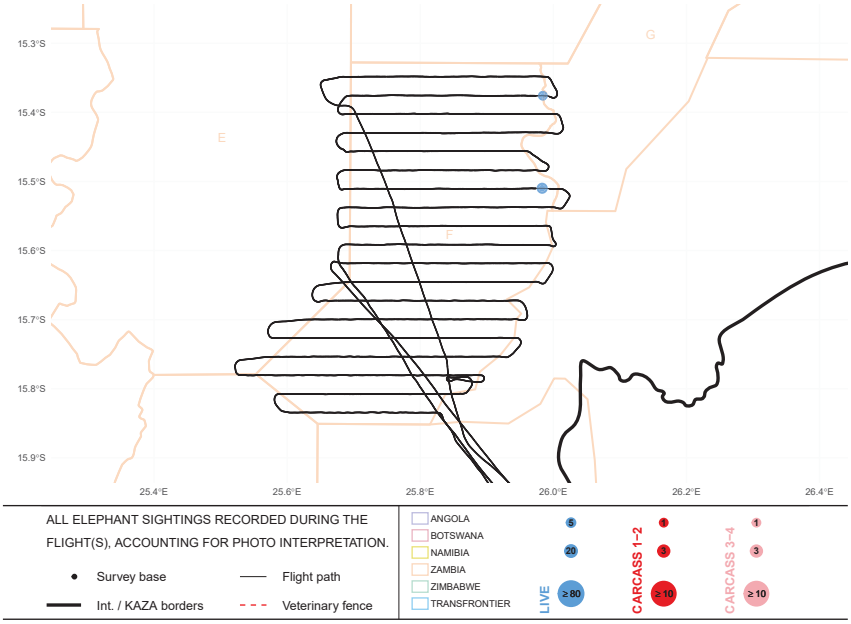
Actual sampling intensity: 10 %
Transect flying time: 3.5 h
Transects: 19 – 593 km – 90°
Search effort: 1.15 min/sqkm

## OBSERVER CONTRIBUTION

| Crew(s): | C05 | | C07 | |
|---|---|---|---|---|
| Side: | L | R | L | R |
| % sightings: | 44 | 56 | 67 | 33 |
| % individuals: | 54 | 46 | 72 | 28 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 19 | 47.37 | 33.33 |
| Live elephant (>9): | 0 | | |
| Elephant carcass: | 0 | | |
| Live elephant (<10): | 2 | 50 | 0 |






## LIVE ELEPHANTS

| | |
|---|---|
| **IN SAMPLE:** | **8 (2)** |
| Bulls: | 1 (1) |
| Family: | 7 (1) |
| **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: | 19 |
| Other wildlife count: | 655 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 2.101, N = 190, w = 305

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 80 | 80 | – | – |
| Variance of estimate | $Var\hat{Y}$ | 4403 | 4403 | – | – |
| Standard error | $SE\hat{Y}$ | 66 | 66 | – | – |
| 95% confidence interval | $CI_{\hat{Y}}^{95\%}$ | ± 139 | ± 139 | – | – |
| Percentage of relative precision | $PRP\hat{Y}$ | 174 % | 174 % | – | – |
| Density per sqkm | $R\hat{Y}$ | 0.044 | 0.044 | – | – |
| Variance between transect counts | $s_y^2$ | 2.591 | 2.591 | – | – |
| Variance between transect areas | $s_a^2$ | 1.037 | 1.037 | – | – |
| Covariance between counts & areas | $s_{ay}$ | 0.323 | 0.323 | – | – |

## CARCASS RATIOS

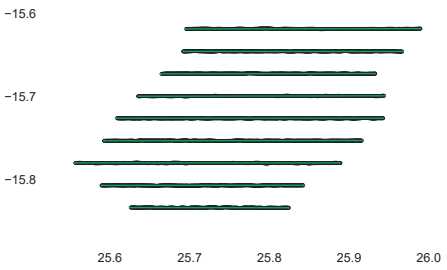
$CR_{1:4} = 0$ %
$CR_{1:2} = 0$ %

F – F ZAMBIA – KAFUE

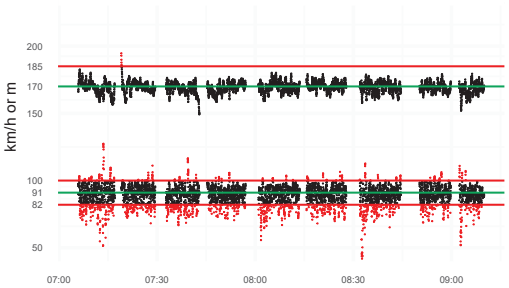
## ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ 9JMFZ20220916A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:

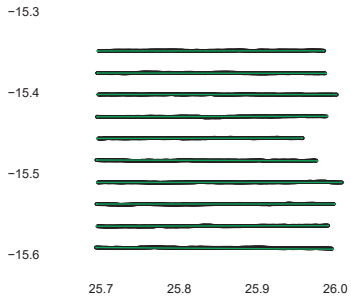



SPEED
Average: 169.2 km/h
Standard dev.: 4.2 km/h

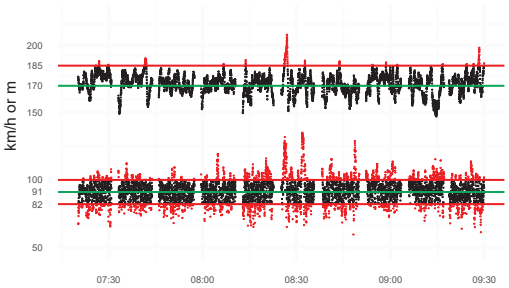
HEIGHT AGL
Average: 88.9 m (291.7 ft)
Standard dev.: 7.7 m (25.4 ft)

### KES2022_ 9JCMA20220916A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:




SPEED
Average: 171.7 km/h
Standard dev.: 7.4 km/h

HEIGHT AGL
Average: 91.9 m (301.6 ft)
Standard dev.: 9.1 m (29.9 ft)

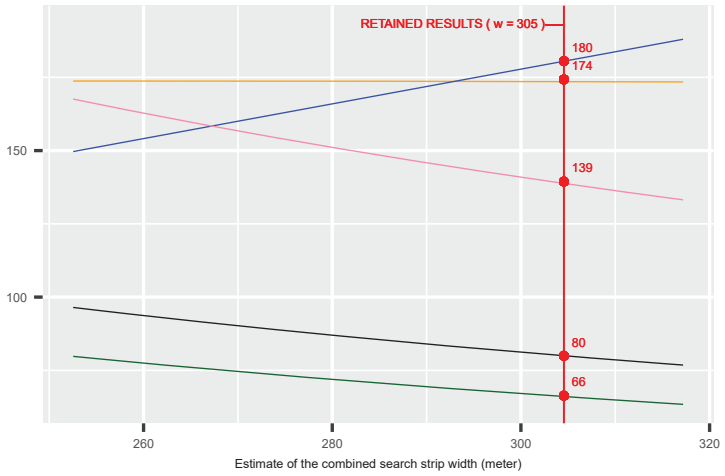
INFLUENCE OF
SEARCH STRIP WIDTH ESTIMATES
ON THE ESTIMATED NUMBER OF ELEPHANTS
AND OTHER STATISTICS

Range of search strip width estimates (m):

C05 – Left: [147 – 168]
C05 – Right: [142 – 166]

C07 – Left: [107 – 150]
C07 – Right: [94 – 153]

**LIVE ELEPHANT ESTIMATE: [ 96 – 77 ]**
CONFIDENCE INTERVAL: ± [ 168 – 133 ]
SAMPLE AREA: [ 150 – 188 ] sqkm
SE: [ 80 – 63 ]
PRP: [ 174 – 173 ] %



# F – F ZAMBIA – KAFUE

**STRATUM CODE:** F **N:** 190 $S_a^2$: 1,037
**STRATUM NAME:** F **w:** 305 **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, | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| buffalo | Syncerus caffer | 77 | 840 | 770 | 1389 | 0,427 | 437169 | 661,19 | 0 | 2159 | 180 | 256,275 | 2,219 |
| bushbuck | Tragelaphus scriptus | 4 | 0 | 40 | 55 | 0,022 | 687 | 26,20 | 0 | 95 | 138 | 0,398 | -0,036 |
| bushpig | Potamochoerus larvatus | 1 | 0 | 10 | 20 | 0,006 | 90 | 9,47 | 0 | 30 | 199 | 0,053 | 0,036 |
| 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 | 7 | 0 | 70 | 65 | 0,039 | 965 | 31,06 | 5 | 135 | 93 | 0,579 | 0,240 |
| 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 | 0 | 10 | 20 | 0,006 | 90 | 9,51 | 0 | 30 | 200 | 0,053 | 0,001 |
| elephant family | Loxodonta africana family | 7 | 0 | 70 | 139 | 0,039 | 4389 | 66,25 | 0 | 209 | 199 | 2,579 | 0,322 |
| 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, | 67 | 150 | 670 | 816 | 0,371 | 150866 | 388,42 | 0 | 1486 | 122 | 89,596 | 2,542 |
| hippopotamus | Hippopotamus amphibius | 15 | 19 | 150 | 300 | 0,083 | 20322 | 142,56 | 0 | 449 | 200 | 11,842 | 0,091 |
| horse | Equus caballus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 110 | 176 | 1100 | 935 | 0,609 | 198114 | 445,10 | 165 | 2035 | 85 | 113,842 | -0,934 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 8 | 7 | 80 | 109 | 0,044 | 2685 | 51,82 | 0 | 189 | 136 | 1,591 | 0,328 |
| 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 | 25 | 271 | 250 | 253 | 0,139 | 14510 | 120,46 | 0 | 503 | 101 | 8,339 | -0,327 |
| 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 | 40 | 79 | 0,022 | 1429 | 37,80 | 0 | 119 | 199 | 0,842 | 0,238 |
| roan | Hippotragus equinus | 14 | 0 | 140 | 176 | 0,078 | 6987 | 83,59 | 0 | 316 | 125 | 4,094 | 0,200 |
| sable | Hippotragus niger | 116 | 290 | 1160 | 784 | 0,643 | 139323 | 373,26 | 376 | 1944 | 68 | 84,544 | 2,989 |
| 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 | 162 | 39 | 1620 | 527 | 0,898 | 63037 | 251,07 | 1092 | 2147 | 33 | 38,930 | 1,703 |
| waterbuck | Kobus ellipsiprymnus | 36 | 2 | 360 | 344 | 0,199 | 26856 | 163,88 | 16 | 704 | 96 | 15,988 | 0,980 |
| wildebeest | Connochaetes taurinus | 1 | 2 | 10 | 20 | 0,006 | 90 | 9,49 | 0 | 30 | 199 | 0,053 | 0,020 |
| zebra | Equus spp, | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| all elephants | Loxodonta africana all | 8 | 0 | 80 | 139 | 0,044 | 4403 | 66,36 | 0 | 219 | 174 | 2,591 | 0,323 |
| 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 |

# G – G

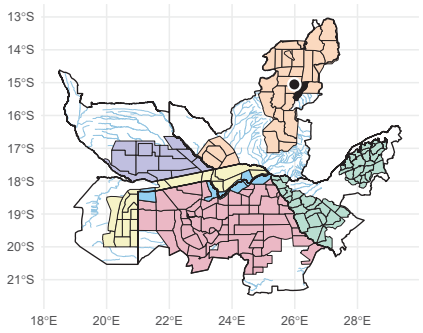
# ZAMBIA – KAFUE

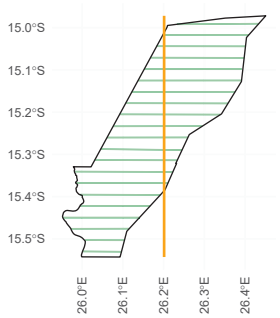
## SURVEY DESIGN

COUNTRY: Zambia
SUPERSTRATUM: Kafue
STRATUM CODE: G
STRATUM NAME: G
■ STRATUM AREA: 1369.96 sqkm
• SURVEY BASE: Chunga
DISTANCE TO SURVEY BASE: 31 km

– TRANSECTS: 21 (462 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 10.1 %

– BASELINE DISTANCE: 63.2 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.4 h
Crew(s): C05
KES2022_9JCMA20220906A 06:48–11:15

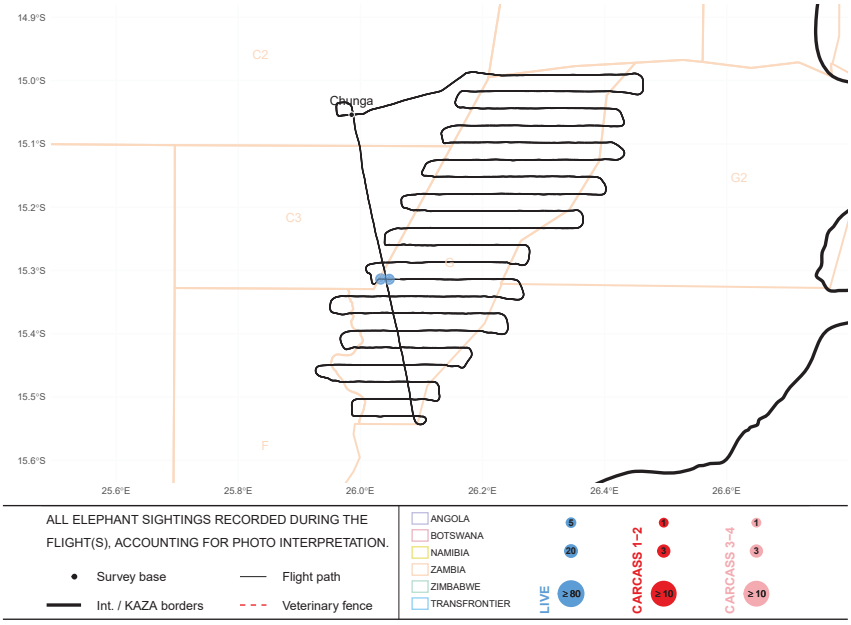
Actual sampling intensity: 9.8 %
Transect flying time: 2.7 h
Transects: 21 – 462 km – 90°
Search effort: 1.21 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C05 | |
| Side: | L | R |
| % sightings: | 43 | 57 |
| % individuals: | 38 | 62 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 29 | 6.9 | 50 |
| Live elephant (>9): | 0 | | |
| Elephant carcass: | 0 | | |
| Live elephant (<10): | 1 | 100 | 0 |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **7 (1)** |
| Bulls: | 0 (0) |
| Family: | 7 (1) |
| **NOT IN SAMPLE:** | **8 (1)** |
| Outside search strip: | 8 |
| 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: | 8 |
| Other wildlife count: | 63 |
| Domestic count: | 803 |

## ELEPHANT DATA ANALYSIS

t = 2.086, N = 217, w = 291

| | | LIVE OBS | LIVE FINAL | ALL CARCASSES OBS | ALL CARCASSES FINAL |
|---|---|---|---|---|---|
| Population estimate | $\hat{Y}$ | 71 | 71 | – | – |
| Variance of estimate | $\widehat{Var}$ | 4753 | 4753 | – | – |
| Standard error | $\widehat{SE}$ | 69 | 69 | – | – |
| 95% confidence interval | $\widehat{CI}^{95\%}$ | ± 144 | ± 144 | – | – |
| Percentage of relative precision | $\widehat{PRP}$ | 201 % | 201 % | – | – |
| Density per sqkm | $\hat{R}$ | 0.052 | 0.052 | – | – |
| Variance between transect counts | $s_y^2$ | 2.333 | 2.333 | – | – |
| Variance between transect areas | $s_a^2$ | 1.903 | 1.903 | – | – |
| Covariance between counts & areas | $s_{ay}$ | −0.028 | −0.028 | – | – |

## CARCASS RATIOS

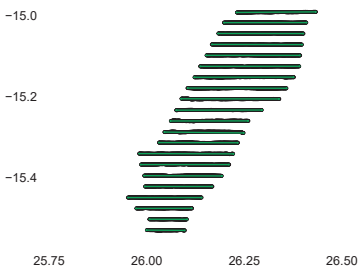
$CR_{1:4} = 0$ %
$CR_{1:2} = 0$ %

## G – G ZAMBIA – KAFUE

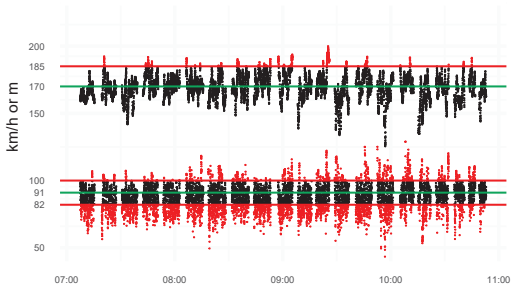
### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ 9JCMA20220906A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:



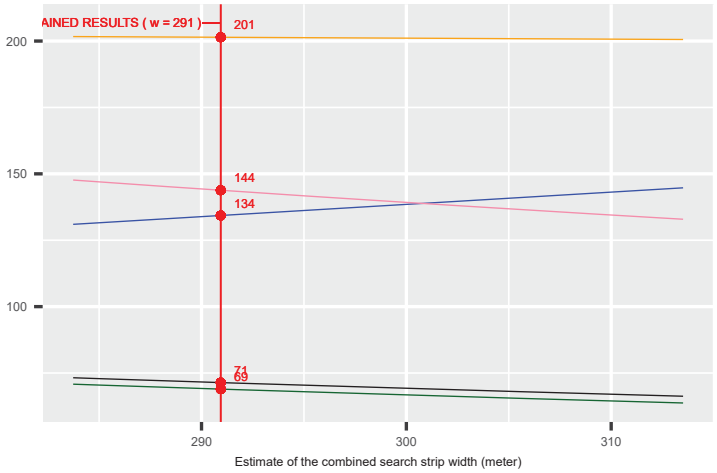

SPEED
Average: 169.3 km/h
Standard dev.: 9.4 km/h

HEIGHT AGL
Average: 87.3 m (286.6 ft)
Standard dev.: 9.6 m (31.5 ft)

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

Range of search strip width estimates (m):

C05 – Left: [139 – 160]
C05 – Right: [135 – 157]




**LIVE ELEPHANT ESTIMATE: [ 73 – 66 ]**
CONFIDENCE INTERVAL: ± [ 148 – 133 ]
SAMPLE AREA: [ 131 – 145 ] sqkm
SE: [ 71 – 64 ]
PRP: [ 202 – 201 ] %

## G – G ZAMBIA – KAFUE

**STRATUM CODE:** G **N:** 217 $S_a^2$: 1,903
**STRATUM NAME:** G **w:** 291 **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, | 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 | 514 | 0 | 5243 | 3134 | 3,827 | 2257250 | 1502,41 | 2109 | 8377 | 60 | 1016,662 | -8,807 |
| donkey | Equus asinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| duiker | Sylvicapra grimmia | 1 | 0 | 10 | 20 | 0,007 | 96 | 9,78 | 0 | 31 | 200 | 0,048 | 0,041 |
| 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 | 7 | 8 | 71 | 144 | 0,052 | 4753 | 68,94 | 0 | 215 | 201 | 2,333 | -0,028 |
| 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, | 12 | 3 | 122 | 143 | 0,089 | 4722 | 68,72 | 0 | 266 | 117 | 2,357 | 0,258 |
| 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 | 163 | 253 | 0,119 | 14752 | 121,46 | 0 | 417 | 155 | 7,390 | 0,631 |
| 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 | 9 | 43 | 92 | 163 | 0,067 | 6097 | 78,09 | 0 | 255 | 177 | 3,057 | 0,463 |
| shoat | Capra hircus - Ovis aries | 289 | 0 | 2948 | 2224 | 2,152 | 1136343 | 1065,99 | 724 | 5171 | 75 | 503,390 | -11,055 |
| 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 | 23 | 0 | 235 | 303 | 0,171 | 21049 | 145,08 | 0 | 537 | 129 | 10,590 | 0,810 |
| waterbuck | Kobus ellipsiprymnus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| wildebeest | Connochaetes taurinus | 0 | 4 | 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 | 8 | 71 | 144 | 0,052 | 4753 | 68,94 | 0 | 215 | 201 | 2,333 | -0,028 |
| 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 |

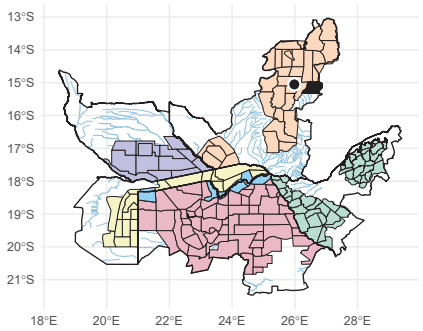
# G2 – G2 ZAMBIA – KAFUE

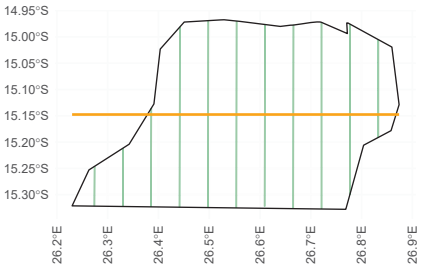
## SURVEY DESIGN

COUNTRY: Zambia
SUPERSTRATUM: Kafue
STRATUM CODE: G2
STRATUM NAME: G2
■ STRATUM AREA: 1999.18 sqkm
• SURVEY BASE: Chunga
DISTANCE TO SURVEY BASE: 69 km

– TRANSECTS: 11 (333 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 5 %

– BASELINE DISTANCE: 69.22 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 3.8 h
Crew(s): C07
KES2022_9JMFZ20220912A 06:31–10:19

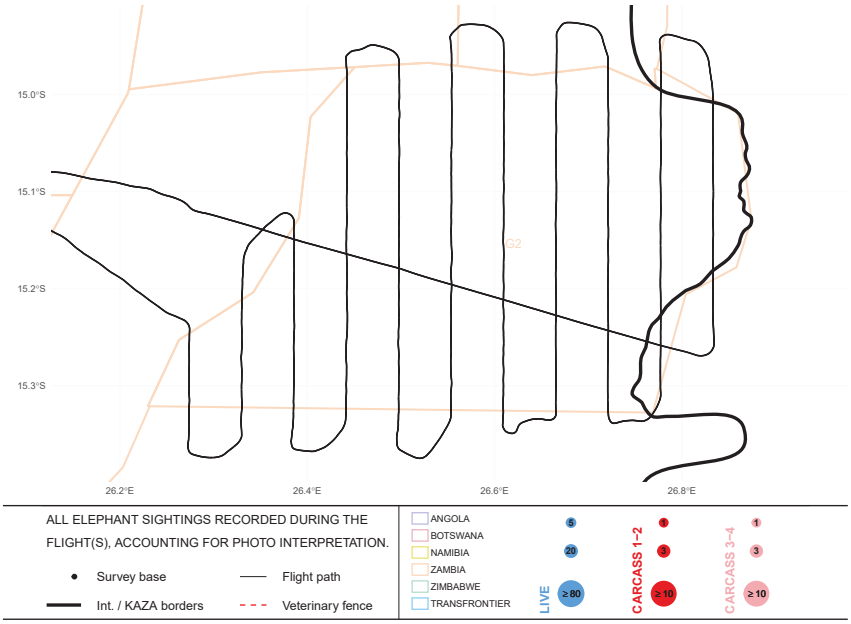
Actual sampling intensity: 5.1 %
Transect flying time: 1.9 h
Transects: 11 – 333 km – 0°
Search effort: 1.14 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C07 | |
| Side: | L | R |
| % sightings: | 49 | 51 |
| % individuals: | 56 | 44 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 41 | 21.95 | 88.89 |
| 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: | 1 |
| Other wildlife count: | 1 |
| Domestic count: | 1126 |

## ELEPHANT DATA ANALYSIS

t = 2.228, N = 227, w = 304

| | | 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

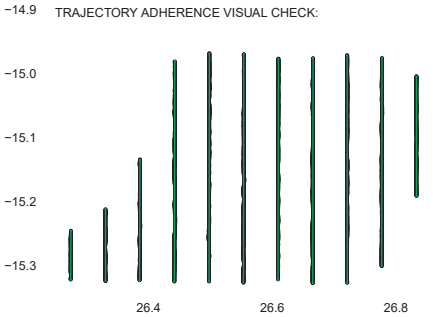
$CR_{1:4}$ = n/a
$CR_{1:2}$ = n/a

## G2 – G2 ZAMBIA – KAFUE

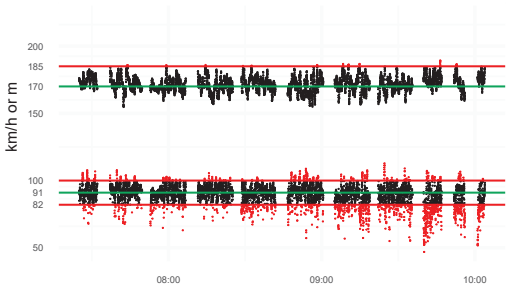
### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ 9JMFZ20220912A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:




SPEED
Average: 171.8 km/h
Standard dev.: 5.6 km/h

HEIGHT AGL
Average: 89.4 m (293.4 ft)
Standard dev.: 7.7 m (25.2 ft)

## G2 – G2 ZAMBIA – KAFUE

**STRATUM CODE:** G2 **N:** 227 $S_a^2$: 14,519
**STRATUM NAME:** G2 **w:** 304 **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 | 722 | 593 | 14218 | 3682 | 7,112 | 2730171 | 1652,32 | 10536 | 17899 | 26 | 838,455 | 67,657 |
| 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 | 404 | 320 | 7956 | 4964 | 3,979 | 4962804 | 2227,74 | 2992 | 12919 | 62 | 1410,418 | 66,673 |
| 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 |

# HE – HE

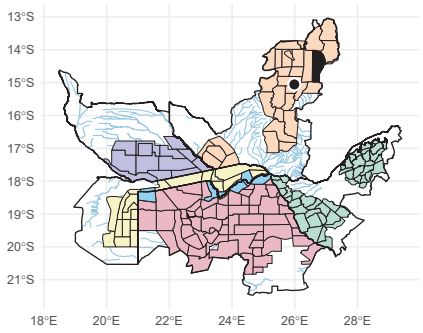
# ZAMBIA – KAFUE

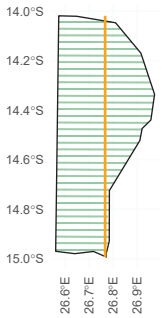
## SURVEY DESIGN

COUNTRY: Zambia
SUPERSTRATUM: Kafue
STRATUM CODE: HE
STRATUM NAME: HE
■ STRATUM AREA: 3413.26 sqkm
• SURVEY BASE: Chunga
DISTANCE TO SURVEY BASE: 102 km

– TRANSECTS: 35 (1137 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 10 %

– BASELINE DISTANCE: 107.83 km




## SURVEY IMPLEMENTATION

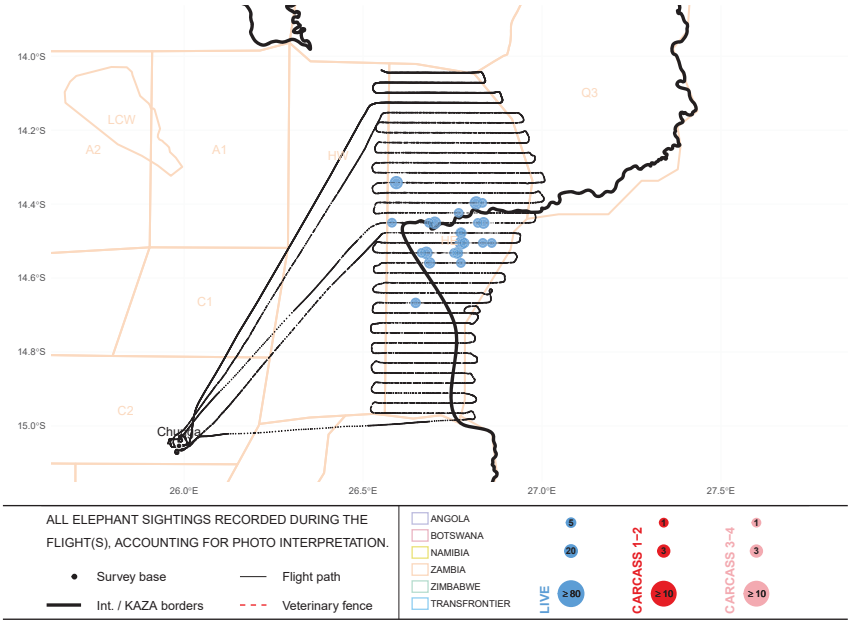
**Number of flight(s): 3**
Combined flying time: 15.3 h
Crew(s): C07
KES2022_9JMFZ20220903A 06:58–12:13
KES2022_9JMFZ20220904A 06:48–11:33
KES2022_9JMFZ20220905A 06:52–12:09
Actual sampling intensity: 10 %
Transect flying time: 6.4 h
Transects: 35 – 1137 km – 90°
Search effort: 1.13 min/sqkm

## OBSERVER CONTRIBUTION

| | |
|---|---|
| Crew(s): | C07 |
| Side: | L R |
| % sightings: | **61 39** |
| % individuals: | **57 43** |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 51 | 17.65 | 55.56 |
| Live elephant (>9): | 2 | 100 | 50 |
| Elephant carcass: | 0 | | |
| Live elephant (<10): | 7 | 0 | |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **44 (9)** |
| Bulls: | 3 (3) |
| Family: | 41 (6) |
| **NOT IN SAMPLE:** | **95 (15)** |
| Outside search strip: | 95 |
| 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: | 20 |
| Other wildlife count: | 843 |
| Domestic count: | 131 |

## ELEPHANT DATA ANALYSIS

t = 2.032, N = 358, w = 301

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | FINAL |
| Population estimate | $\hat{Y}$ | 430 | 440 | – | – |
| Variance of estimate | $Var\hat{Y}$ | 37431 | 40335 | – | – |
| Standard error | $SE\hat{Y}$ | 193 | 201 | – | – |
| 95% confidence interval | $CI_{\hat{Y}}^{95\%}$ | ± 393 | ± 408 | – | – |
| Percentage of relative precision | $PRP\hat{Y}$ | 92 % | 93 % | – | – |
| Density per sqkm | $R\hat{Y}$ | 0.126 | 0.129 | – | – |
| Variance between transect counts | $s_y^2$ | 11.77 | 12.667 | – | – |
| Variance between transect areas | $s_a^2$ | 5.074 | 5.074 | – | – |
| Covariance between counts & areas | $s_{ay}$ | 2.252 | 2.301 | – | – |

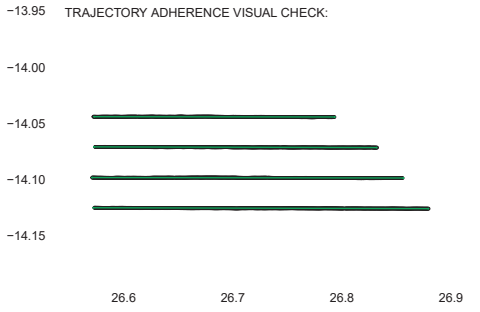
## CARCASS RATIOS

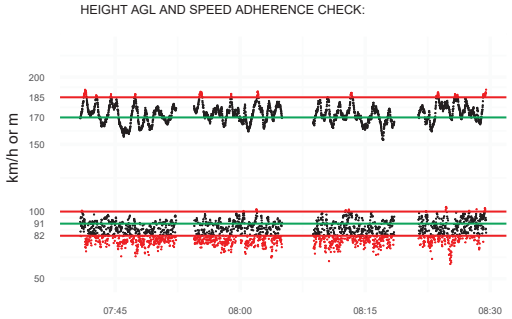
$CR_{1:4} = 0$ %
$CR_{1:2} = 0$ %

## HE – HE ZAMBIA – KAFUE

### ADHERENCE TO FLIGHT PARAMETERS

#### KES2022_ 9JMFZ20220905A

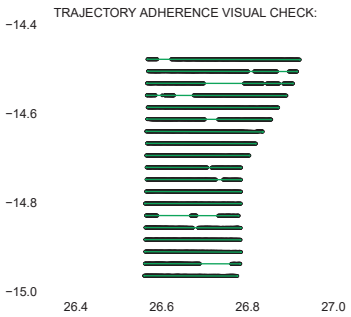


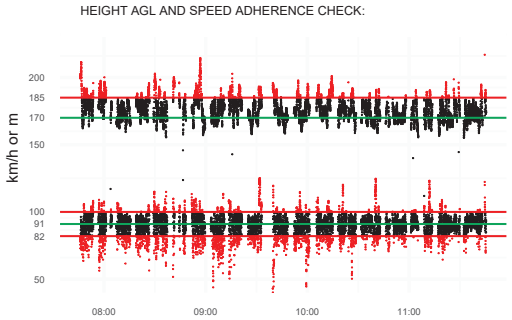




SPEED
Average: 172.8 km/h
Standard dev.: 7.1 km/h

HEIGHT AGL
Average: 84.6 m (277.4 ft)
Standard dev.: 7.4 m (24.2 ft)

#### KES2022_ 9JMFZ20220903A

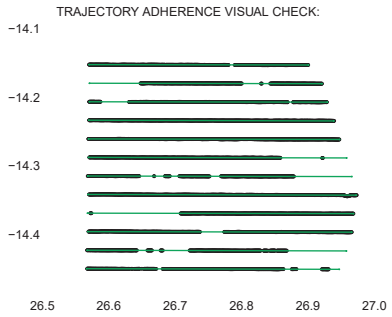


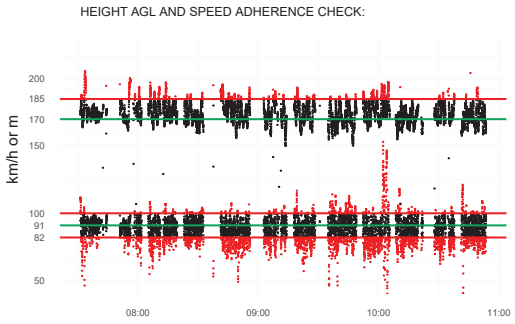




SPEED
Average: 176.2 km/h
Standard dev.: 8.8 km/h

HEIGHT AGL
Average: 89.5 m (293.7 ft)
Standard dev.: 8.6 m (28.1 ft)

#### KES2022_ 9JMFZ20220904A



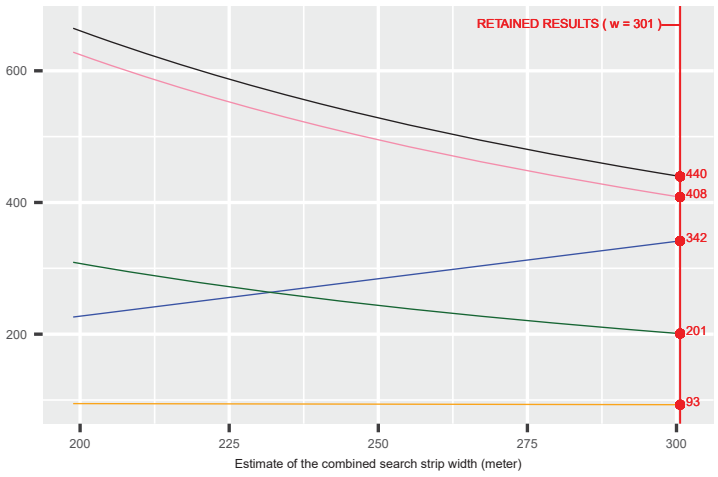

SPEED
Average: 174.6 km/h
Standard dev.: 8.4 km/h

HEIGHT AGL
Average: 87.8 m (288 ft)
Standard dev.: 9.8 m (32.3 ft)

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

Range of search strip width estimates (m):

C07 – Left: [106 – 149]
C07 – Right: [93 – 152]




**LIVE ELEPHANT ESTIMATE: [ 665 – 440 ]**
CONFIDENCE INTERVAL: ± [ 628 – 408 ]
SAMPLE AREA: [ 226 – 342 ] sqkm
SE: [ 309 – 201 ]
PRP: [ 95 – 93 ] %

# HE – HE ZAMBIA – KAFUE

**STRATUM CODE:** HE **N:** 359 $S_a^2$: 5,074
**STRATUM NAME:** HE **w:** 301 **df:** 34

| 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 | 67 | 133 | 669 | 833 | 0,196 | 167864 | 409,71 | 0 | 1502 | 124 | 51,139 | 1,868 |
| bushbuck | Tragelaphus scriptus | 10 | 0 | 100 | 105 | 0,029 | 2651 | 51,49 | 0 | 205 | 105 | 0,798 | 0,059 |
| bushpig | Potamochoerus larvatus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| cattle | Bos taurus | 66 | 30 | 659 | 563 | 0,193 | 76880 | 277,27 | 96 | 1223 | 85 | 22,516 | -1,216 |
| donkey | Equus asinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| duiker | Sylvicapra grimmia | 11 | 0 | 110 | 71 | 0,032 | 1231 | 35,08 | 39 | 181 | 65 | 0,398 | 0,505 |
| eland | Tragelaphus oryx | 62 | 0 | 619 | 1030 | 0,181 | 257096 | 507,05 | 0 | 1650 | 166 | 77,770 | 1,202 |
| elephant bulls | Loxodonta africana males | 3 | 8 | 30 | 32 | 0,009 | 254 | 15,94 | 0 | 62 | 108 | 0,081 | 0,254 |
| elephant family | Loxodonta africana family | 41 | 87 | 410 | 402 | 0,120 | 39102 | 197,74 | 8 | 811 | 98 | 12,205 | 2,046 |
| 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, | 38 | 47 | 380 | 264 | 0,111 | 16849 | 129,81 | 116 | 643 | 69 | 5,022 | 0,024 |
| hippopotamus | Hippopotamus amphibius | 40 | 15 | 400 | 561 | 0,117 | 76125 | 275,91 | 0 | 960 | 140 | 23,655 | 3,320 |
| horse | Equus caballus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 55 | 240 | 549 | 482 | 0,161 | 56299 | 237,28 | 67 | 1032 | 88 | 17,546 | 2,194 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 9 | 0 | 90 | 129 | 0,026 | 4058 | 63,70 | 0 | 219 | 144 | 1,255 | 0,679 |
| 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 | 344 | 262 | 3437 | 3720 | 1,007 | 3351294 | 1830,65 | 0 | 7157 | 108 | 1059,852 | 27,196 |
| red lechwe | Kobus leche | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| reedbuck | Redunca arundinum | 13 | 2 | 130 | 157 | 0,038 | 5997 | 77,44 | 0 | 287 | 121 | 1,770 | -0,404 |
| roan | Hippotragus equinus | 7 | 12 | 70 | 103 | 0,020 | 2547 | 50,46 | 0 | 172 | 147 | 0,753 | -0,308 |
| sable | Hippotragus niger | 59 | 150 | 589 | 454 | 0,173 | 49820 | 223,20 | 136 | 1043 | 77 | 14,104 | -2,208 |
| shoat | Capra hircus - Ovis aries | 65 | 0 | 649 | 669 | 0,190 | 108340 | 329,15 | 0 | 1318 | 103 | 30,597 | -4,936 |
| 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 | 56 | 26 | 559 | 393 | 0,164 | 37340 | 193,24 | 167 | 952 | 70 | 12,071 | 2,901 |
| waterbuck | Kobus ellipsiprymnus | 45 | 6 | 450 | 567 | 0,132 | 77854 | 279,02 | 0 | 1017 | 126 | 23,798 | 1,586 |
| wildebeest | Connochaetes taurinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| zebra | Equus spp, | 9 | 0 | 90 | 124 | 0,026 | 3700 | 60,83 | 0 | 214 | 137 | 1,138 | 0,492 |
| all elephants | Loxodonta africana all | 44 | 95 | 440 | 408 | 0,129 | 40335 | 200,84 | 31 | 848 | 93 | 12,667 | 2,301 |
| 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 |

# HW – HW

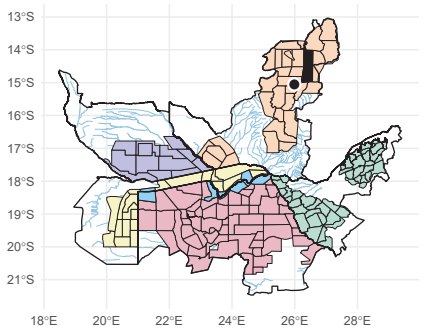
# ZAMBIA – KAFUE

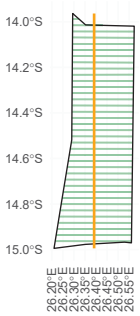
## SURVEY DESIGN

COUNTRY: Zambia
SUPERSTRATUM: Kafue
STRATUM CODE: HW
STRATUM NAME: HW
■ STRATUM AREA: 3394.4 sqkm
• SURVEY BASE: Chunga
DISTANCE TO SURVEY BASE: 99 km

– TRANSECTS: 37 (1133 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 10 %

– BASELINE DISTANCE: 114.08 km




## SURVEY IMPLEMENTATION

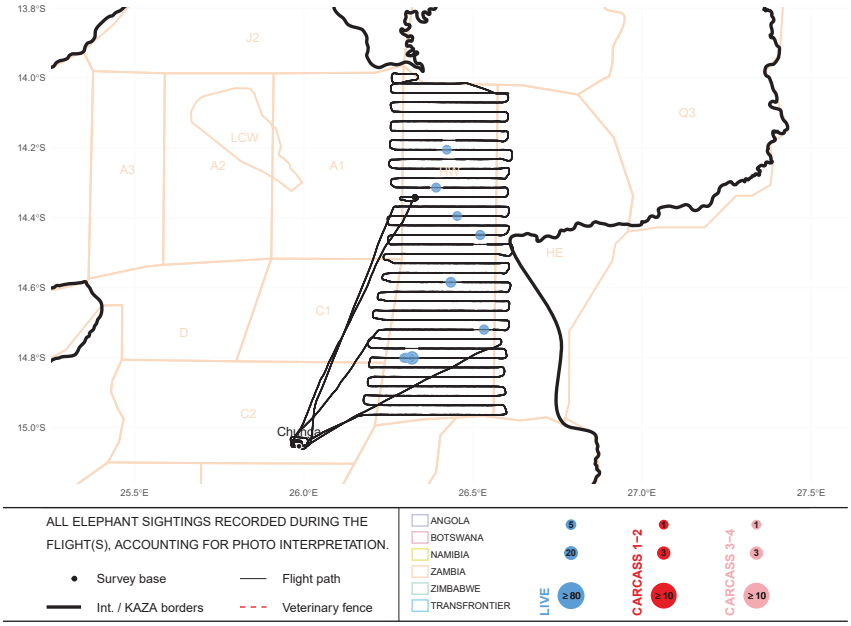
**Number of flight(s): 3**
Combined flying time: 12.8 h
Crew(s): C07
KES2022_9JMFZ20220905A 06:52–12:09
KES2022_9JMFZ20220906A 06:44–11:02
KES2022_9JMFZ20220908A 06:55–10:06
Actual sampling intensity: 10.1 %
Transect flying time: 6.6 h
Transects: 37 – 1133 km – 90°
Search effort: 1.15 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C07 | |
| Side: | L | R |
| % sightings: | 52 | 48 |
| % individuals: | 63 | 37 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 38 | 18.42 | 28.57 |
| Live elephant (>9): | 0 | | |
| Elephant carcass: | 0 | | |
| Live elephant (<10): | 7 | 28.57 | 0 |




## LIVE ELEPHANTS



| | |
|---|---|
| **IN SAMPLE:** | **20 (7)** |
| Bulls: | 5 (3) |
| Family: | 15 (4) |
| **NOT IN SAMPLE:** | **20 (3)** |
| Outside search strip: | 20 |
| 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: | 22 |
| Other wildlife count: | 933 |
| Domestic count: | 0 |

## ELEPHANT DATA ANALYSIS

t = 2.028, N = 376, w = 303

| | | LIVE OBS | LIVE FINAL | ALL CARCASSES OBS | ALL CARCASSES FINAL |
|---|---|---|---|---|---|
| Population estimate | $\hat{Y}$ | 197 | 197 | – | – |
| Variance of estimate | $Var\hat{Y}$ | 6939 | 6939 | – | – |
| Standard error | $SE\hat{Y}$ | 83 | 83 | – | – |
| 95% confidence interval | $CI_{\hat{Y}}^{95\%}$ | ± 169 | ± 169 | – | – |
| Percentage of relative precision | $PRP\hat{Y}$ | 86 % | 86 % | – | – |
| Density per sqkm | $R\hat{Y}$ | 0.058 | 0.058 | – | – |
| Variance between transect counts | $s_y^2$ | 2.033 | 2.033 | – | – |
| Variance between transect areas | $s_a^2$ | 3.257 | 3.257 | – | – |
| Covariance between counts & areas | $s_{ay}$ | 0.259 | 0.259 | – | – |

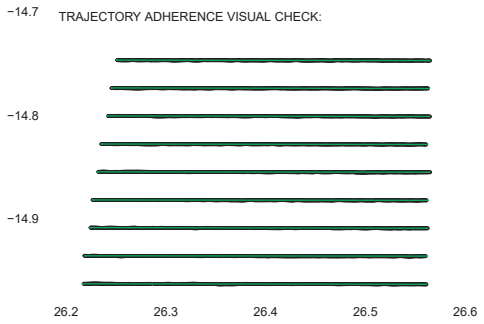
## CARCASS RATIOS

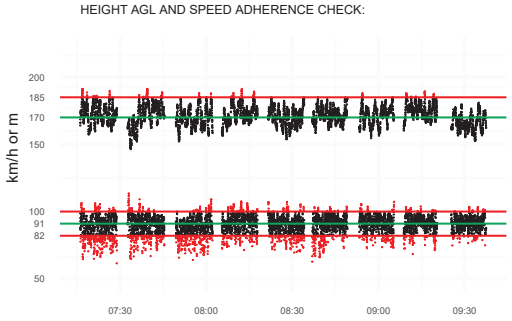
$CR_{1:4} = 0$ %
$CR_{1:2} = 0$ %

## HW – HW ZAMBIA – KAFUE

### ADHERENCE TO FLIGHT PARAMETERS

#### KES2022_ 9JMFZ20220908A

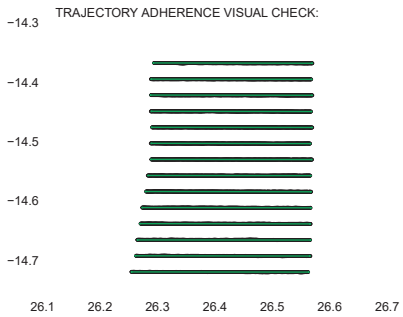


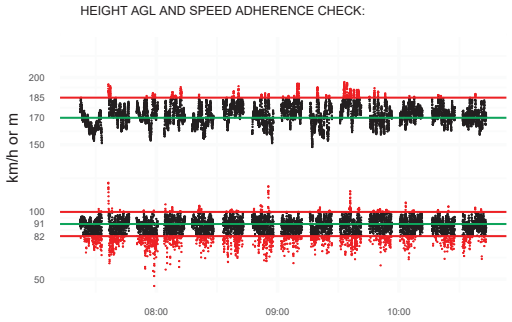




SPEED
Average: 171.3 km/h
Standard dev.: 7.5 km/h

HEIGHT AGL
Average: 90 m (295.1 ft)
Standard dev.: 7.2 m (23.7 ft)

#### KES2022_ 9JMFZ20220906A

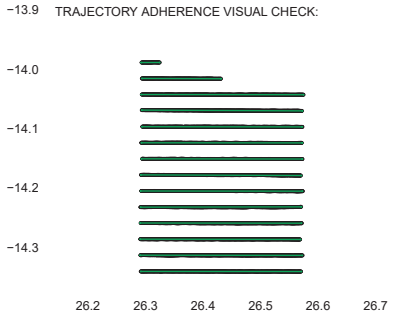


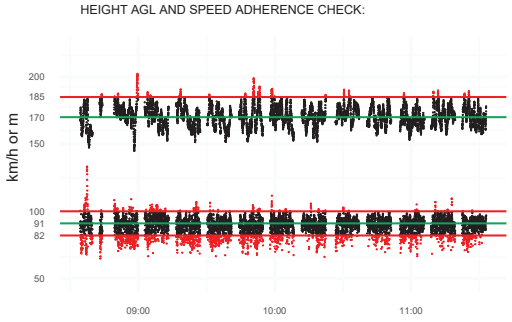




SPEED
Average: 172.7 km/h
Standard dev.: 7.7 km/h

HEIGHT AGL
Average: 88.5 m (290.4 ft)
Standard dev.: 6.9 m (22.5 ft)

#### KES2022_ 9JMFZ20220905A



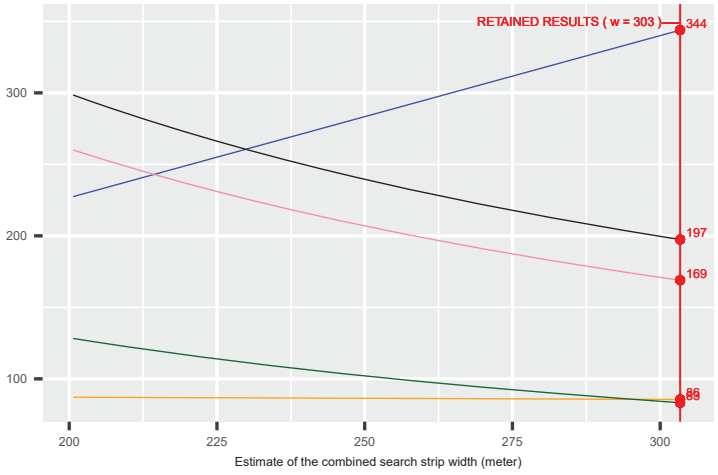

SPEED
Average: 171.8 km/h
Standard dev.: 7.8 km/h

HEIGHT AGL
Average: 89.1 m (292.3 ft)
Standard dev.: 6.7 m (22.1 ft)

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

Range of search strip width estimates (m):

C07 – Left: [107 – 150]
C07 – Right: [94 – 153]




LIVE ELEPHANT ESTIMATE: [ 298 – 197 ]
CONFIDENCE INTERVAL: ± [ 260 – 169 ]
SAMPLE AREA: [ 227 – 344 ] sqkm
SE: [ 128 – 83 ]
PRP: [ 87 – 86 ] %

## HW – HW ZAMBIA – KAFUE

**STRATUM CODE:** HW **N:** 376 $S_a^2$: 3,257
**STRATUM NAME:** HW **w:** 303 **df:** 36

| 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 | 59 | 153 | 582 | 1036 | 0,172 | 260873 | 510,76 | 0 | 1618 | 178 | 76,414 | 2,333 |
| bushbuck | Tragelaphus scriptus | 3 | 0 | 30 | 43 | 0,009 | 455 | 21,34 | 0 | 73 | 146 | 0,132 | 0,012 |
| bushpig | Potamochoerus larvatus | 0 | 3 | 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 | 7 | 0 | 69 | 47 | 0,020 | 537 | 23,17 | 22 | 116 | 68 | 0,158 | 0,080 |
| 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 | 2 | 49 | 64 | 0,015 | 980 | 31,31 | 0 | 113 | 129 | 0,287 | 0,101 |
| elephant family | Loxodonta africana family | 15 | 18 | 148 | 152 | 0,044 | 5613 | 74,92 | 0 | 300 | 103 | 1,637 | 0,158 |
| 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 | 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, | 26 | 67 | 257 | 318 | 0,076 | 24603 | 156,85 | 0 | 575 | 124 | 7,270 | 0,984 |
| hippopotamus | Hippopotamus amphibius | 73 | 39 | 721 | 633 | 0,212 | 97274 | 311,89 | 88 | 1353 | 88 | 28,249 | 0,390 |
| horse | Equus caballus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| impala | Aepyceros melampus | 189 | 253 | 1866 | 1066 | 0,550 | 276098 | 525,45 | 800 | 2931 | 57 | 79,488 | 0,313 |
| klipspringer | Oreotragus oreotragus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| kudu | Tragelaphus strepsiceros | 10 | 19 | 99 | 140 | 0,029 | 4742 | 68,86 | 0 | 238 | 141 | 1,369 | -0,070 |
| oribi | Ourebia ourebi | 3 | 1 | 30 | 59 | 0,009 | 841 | 29,00 | 0 | 88 | 199 | 0,243 | -0,029 |
| 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 | 280 | 198 | 2764 | 1774 | 0,814 | 765305 | 874,82 | 990 | 4538 | 64 | 218,808 | -0,698 |
| red lechwe | Kobus leche | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| reedbuck | Redunca arundinum | 5 | 2 | 49 | 80 | 0,015 | 1541 | 39,26 | 0 | 129 | 161 | 0,453 | 0,237 |
| roan | Hippotragus equinus | 3 | 5 | 30 | 59 | 0,009 | 833 | 28,87 | 0 | 88 | 198 | 0,243 | 0,095 |
| sable | Hippotragus niger | 51 | 60 | 503 | 612 | 0,148 | 91069 | 301,78 | 0 | 1115 | 122 | 26,408 | 0,170 |
| 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 | 168 | 64 | 1658 | 781 | 0,489 | 148413 | 385,24 | 877 | 2440 | 47 | 42,033 | -0,267 |
| waterbuck | Kobus ellipsiprymnus | 31 | 0 | 306 | 309 | 0,090 | 23261 | 152,52 | 0 | 615 | 101 | 6,751 | 0,147 |
| wildebeest | Connochaetes taurinus | 0 | 9 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| zebra | Equus spp, | 10 | 14 | 99 | 160 | 0,029 | 6192 | 78,69 | 0 | 258 | 162 | 1,814 | 0,334 |
| all elephants | Loxodonta africana all | 20 | 20 | 197 | 169 | 0,058 | 6939 | 83,30 | 28 | 366 | 86 | 2,033 | 0,259 |
| 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 |

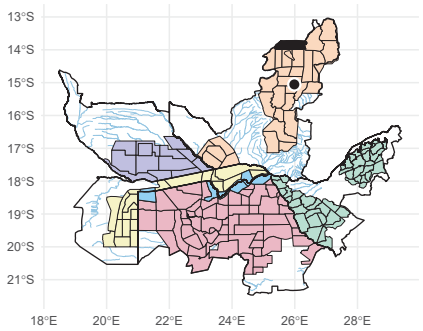
# J2 – J2 ZAMBIA – KAFUE

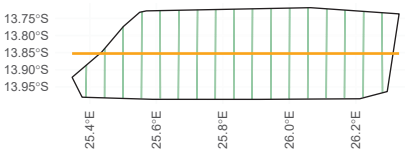
## SURVEY DESIGN

COUNTRY: Zambia
SUPERSTRATUM: Kafue
STRATUM CODE: J2
STRATUM NAME: J2
■ STRATUM AREA: 2723.89 sqkm
• SURVEY BASE: Chunga
DISTANCE TO SURVEY BASE: 130 km

– TRANSECTS: 17 (451 km)
TRANSECT ORIENTATION: 0°
PLANNED SAMPLING INTENSITY: 5 %

– BASELINE DISTANCE: 106.28 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.9 h
Crew(s): C05
KES2022_9JCMA20220831A 06:43–11:36

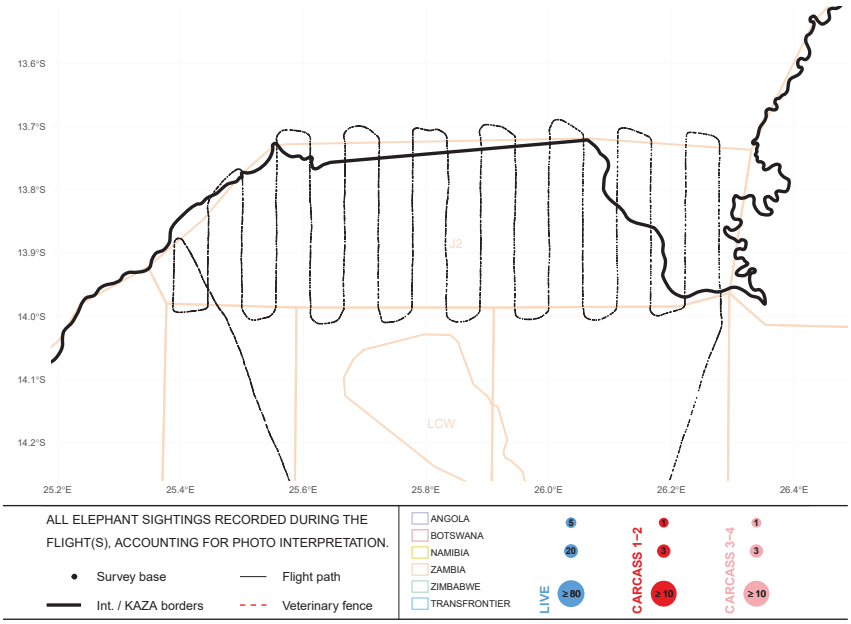
Actual sampling intensity: 4.8 %
Transect flying time: 2.6 h
Transects: 17 – 451 km – 0°
Search effort: 1.19 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C05 | |
| Side: | L | R |
| % sightings: | 44 | 56 |
| % individuals: | 57 | 43 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 6 | 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: | 16 |
| Domestic count: | 115 |

## ELEPHANT DATA ANALYSIS

t = 2.12, N = 367, w = 289

| | | 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

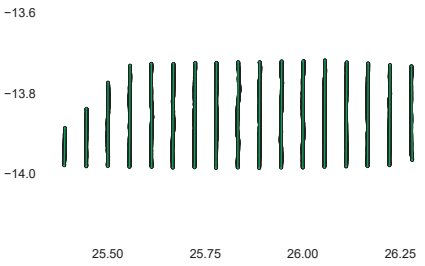
$CR_{1:4}$ = n/a
$CR_{1:2}$ = n/a

## J2 – J2 ZAMBIA – KAFUE

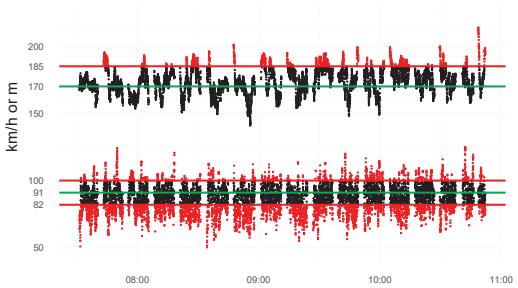
### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ 9JCMA20220831A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:




SPEED
Average: 173.9 km/h
Standard dev.: 9.5 km/h

HEIGHT AGL
Average: 86.7 m (284.5 ft)
Standard dev.: 10.2 m (33.5 ft)

## J2 – J2 ZAMBIA – KAFUE

**STRATUM CODE:** J2 **N:** 368 $S_a^2$: 2,233
**STRATUM NAME:** J2 **w:** 289 **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 | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| bushbuck | Tragelaphus scriptus | 1 | 0 | 21 | 45 | 0,008 | 454 | 21,32 | 0 | 66 | 216 | 0,059 | -0,058 |
| bushpig | Potamochoerus larvatus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| cattle | Bos taurus | 77 | 44 | 1609 | 1473 | 0,591 | 482897 | 694,91 | 136 | 3082 | 92 | 66,765 | 3,340 |
| donkey | Equus asinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| duiker | Sylvicapra grimmia | 1 | 0 | 21 | 45 | 0,008 | 444 | 21,07 | 0 | 66 | 214 | 0,059 | 0,032 |
| 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 | 3 | 0 | 63 | 97 | 0,023 | 2115 | 45,99 | 0 | 160 | 155 | 0,279 | 0,045 |
| 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 | 38 | 0 | 794 | 832 | 0,292 | 153943 | 392,36 | 0 | 1626 | 105 | 21,066 | 1,683 |
| 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 |

# K – K

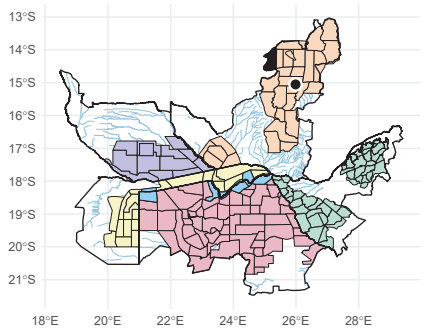
# ZAMBIA – KAFUE

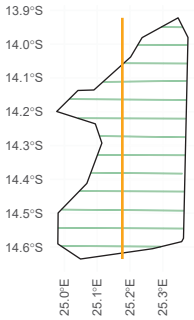
## SURVEY DESIGN

COUNTRY: Zambia
SUPERSTRATUM: Kafue
STRATUM CODE: K
STRATUM NAME: K
■ STRATUM AREA: 2295.55 sqkm
• SURVEY BASE: Chunga
DISTANCE TO SURVEY BASE: 119 km

– TRANSECTS: 13 (384 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 5 %

– BASELINE DISTANCE: 78.95 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.4 h
Crew(s): C05
KES2022_9JCMA20220826A 07:40–12:03

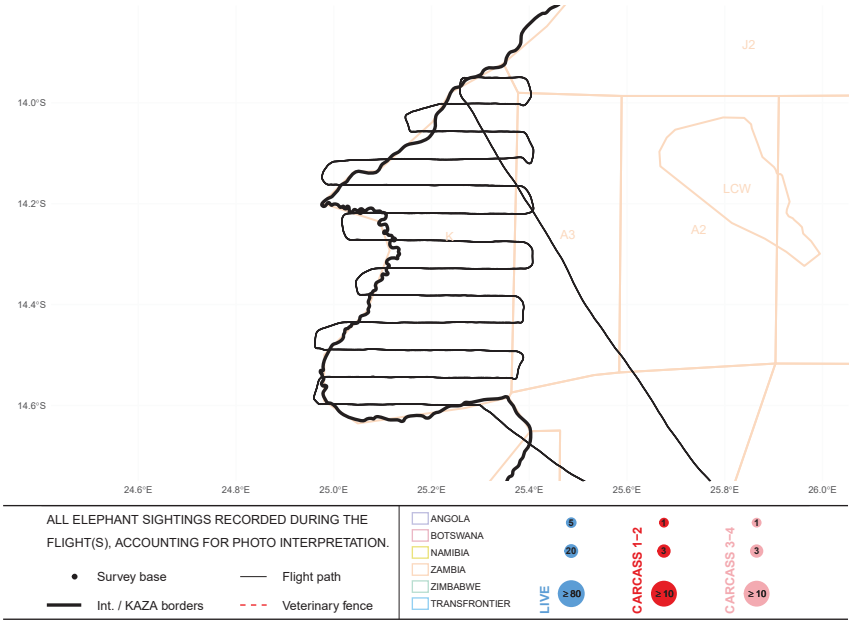
Actual sampling intensity: 4.9 %
Transect flying time: 2.2 h
Transects: 13 – 384 km – 90°
Search effort: 1.17 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C05 | |
| Side: | L | R |
| % sightings: | 54 | 46 |
| % individuals: | 59 | 41 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 11 | 45.45 | 80 |
| 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: | 6 |
| Other wildlife count: | 70 |
| Domestic count: | 208 |

## ELEPHANT DATA ANALYSIS

t = 2.179, N = 268, w = 295

| | | 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

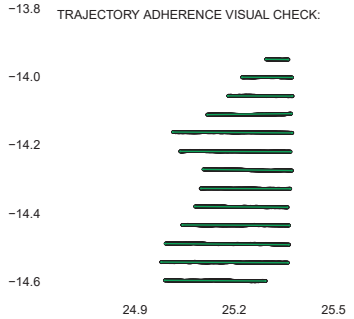
$CR_{1:4}$ = n/a
$CR_{1:2}$ = n/a

## K – K ZAMBIA – KAFUE

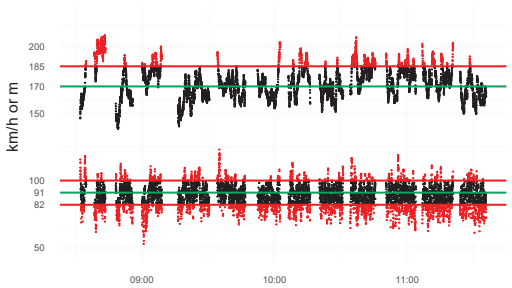
### ADHERENCE TO FLIGHT PARAMETERS

**KES2022_ 9JCMA20220826A**

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:




SPEED

| | |
|---|---|
| Average: | 173 km/h |
| Standard dev.: | 12.1 km/h |

HEIGHT AGL

| | | |
|---|---|---|
| Average: | 88.5 m | (290.3 ft) |
| Standard dev.: | 8.9 m | (29.2 ft) |

# K – K ZAMBIA – KAFUE

**STRATUM CODE:** K **N:** 268 $S_a^2$: 8,506
**STRATUM NAME:** K **w:** 295 **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 | 208 | 60 | 4219 | 3452 | 1,838 | 2510101 | 1584,33 | 767 | 7671 | 82 | 547,333 | 26,842 |
| donkey | Equus asinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| duiker | Sylvicapra grimmia | 3 | 1 | 61 | 71 | 0,027 | 1048 | 32,37 | 0 | 131 | 116 | 0,192 | -0,018 |
| 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, | 22 | 7 | 446 | 643 | 0,194 | 86976 | 294,92 | 0 | 1089 | 144 | 15,731 | -1,261 |
| 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 | 9 | 0 | 183 | 395 | 0,080 | 32945 | 181,51 | 0 | 578 | 217 | 6,231 | 0,117 |
| sable | Hippotragus niger | 22 | 1 | 446 | 828 | 0,194 | 144570 | 380,22 | 0 | 1275 | 186 | 27,231 | 0,144 |
| 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 | 4 | 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 |

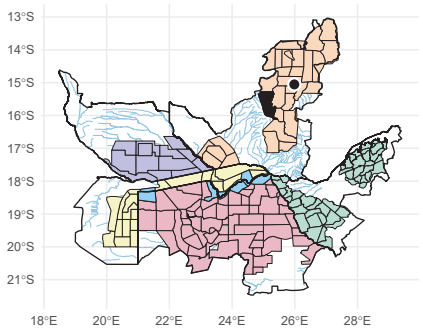
# L – L ZAMBIA – KAFUE

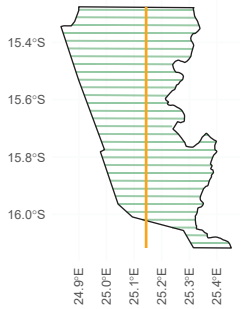
## SURVEY DESIGN

COUNTRY: Zambia
SUPERSTRATUM: Kafue
STRATUM CODE: L
STRATUM NAME: L
■ STRATUM AREA: 3331.35 sqkm
• SURVEY BASE: Chunga
DISTANCE TO SURVEY BASE: 118 km

– TRANSECTS: 31 (1114 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 10 %

– BASELINE DISTANCE: 93.01 km




## SURVEY IMPLEMENTATION

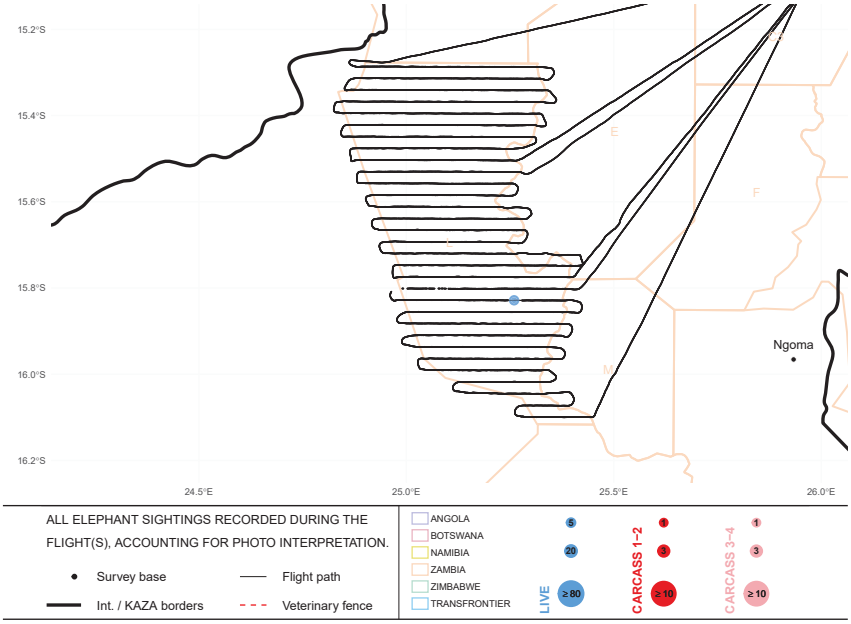
**Number of flight(s): 3**
Combined flying time: 12.4 h
Crew(s): C05, C07
KES2022_9JCMA20220912A 06:41–10:54
KES2022_9JCMA20220913A 06:42–10:38
KES2022_9JMFZ20220913A 06:40–10:58
Actual sampling intensity: 9.9 %
Transect flying time: 6.5 h
Transects: 31 – 1114 km – 90°
Search effort: 1.18 min/sqkm

## OBSERVER CONTRIBUTION

| Crew(s): | C05 | | C07 | |
|---|---|---|---|---|
| Side: | L | R | L | R |
| % sightings: | 58 | 42 | 47 | 53 |
| % individuals: | 82 | 18 | 37 | 63 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 9 | 22.22 | 100 |
| 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:** | **4 (1)** |
| Outside search strip: | 4 |
| 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: | 13 |
| Other wildlife count: | 277 |
| Domestic count: | 72 |

## ELEPHANT DATA ANALYSIS

t = 2.042, N = 312, w = 298

| | | 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 | $s_{ay}$ | – | – | – | – |

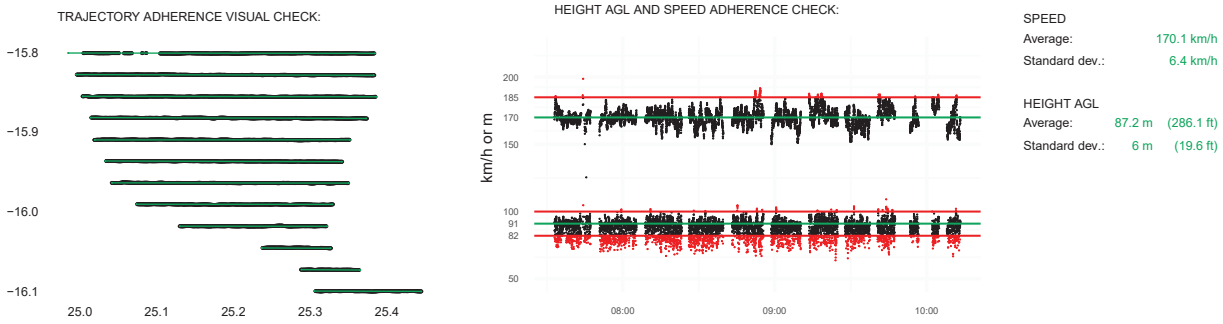
## CARCASS RATIOS

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

## L – L ZAMBIA – KAFUE

### ADHERENCE TO FLIGHT PARAMETERS

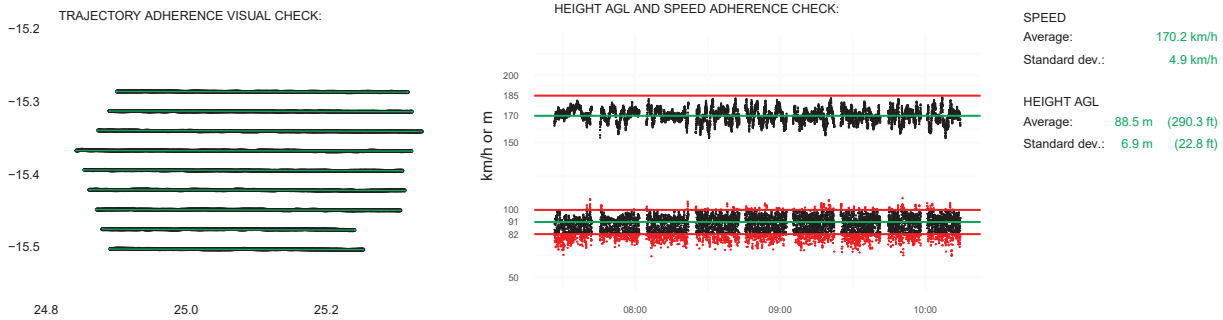
#### KES2022_ 9JMFZ20220913A




SPEED
Average: 170.1 km/h
Standard dev.: 6.4 km/h

HEIGHT AGL
Average: 87.2 m (286.1 ft)
Standard dev.: 6 m (19.6 ft)

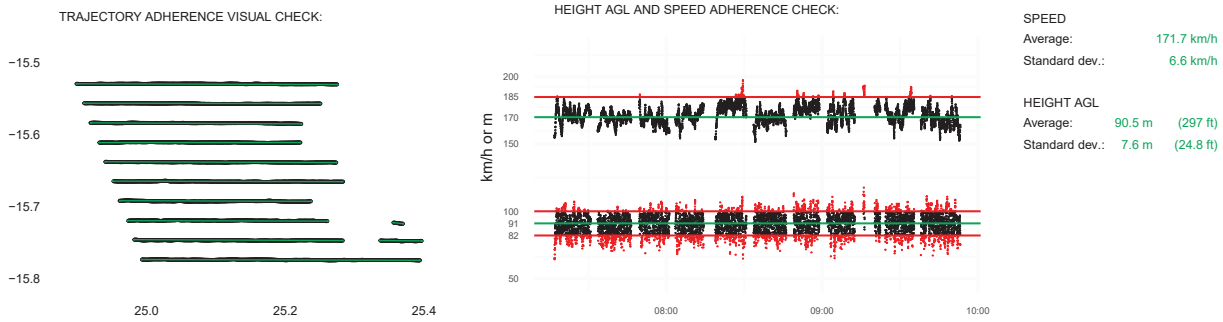
#### KES2022_ 9JCMA20220912A




SPEED
Average: 170.2 km/h
Standard dev.: 4.9 km/h

HEIGHT AGL
Average: 88.5 m (290.3 ft)
Standard dev.: 6.9 m (22.8 ft)

#### KES2022_ 9JCMA20220913A




SPEED
Average: 171.7 km/h
Standard dev.: 6.6 km/h

HEIGHT AGL
Average: 90.5 m (297 ft)
Standard dev.: 7.6 m (24.8 ft)

# L – L ZAMBIA – KAFUE

**STRATUM CODE:** L **N:** 313 $S_a^2$: 10,281
**STRATUM NAME:** L **w:** 298 **df:** 30

| 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 | 40 | 61 | 0,012 | 884 | 29,74 | 0 | 101 | 151 | 0,316 | 0,258 |
| cattle | Bos taurus | 72 | 41 | 724 | 724 | 0,217 | 125529 | 354,30 | 0 | 1447 | 100 | 43,492 | -0,530 |
| donkey | Equus asinus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| duiker | Sylvicapra grimmia | 40 | 1 | 402 | 190 | 0,121 | 8642 | 92,96 | 212 | 592 | 47 | 2,813 | -0,334 |
| 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 | 4 | 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, | 67 | 22 | 674 | 600 | 0,202 | 86414 | 293,96 | 73 | 1274 | 89 | 29,206 | -1,994 |
| 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 | 1 | 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 | 70 | 104 | 0,021 | 2578 | 50,77 | 0 | 174 | 147 | 0,914 | 0,255 |
| oribi | Ourebia ourebi | 2 | 0 | 20 | 39 | 0,006 | 363 | 19,05 | 0 | 59 | 193 | 0,129 | 0,137 |
| 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 | 3 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| roan | Hippotragus equinus | 16 | 62 | 161 | 220 | 0,048 | 11654 | 107,95 | 0 | 381 | 137 | 3,991 | -0,919 |
| sable | Hippotragus niger | 89 | 160 | 895 | 947 | 0,269 | 214854 | 463,52 | 0 | 1841 | 106 | 75,649 | 1,348 |
| 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 | 23 | 6 | 231 | 177 | 0,069 | 7528 | 86,76 | 54 | 408 | 77 | 2,598 | -0,027 |
| waterbuck | Kobus ellipsiprymnus | 0 | 0 | 0 | 0 | 0,000 | 0 | 0,00 | 0 | 0 | NA | 0,000 | 0,000 |
| wildebeest | Connochaetes taurinus | 0 | 4 | 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 | 4 | 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 |

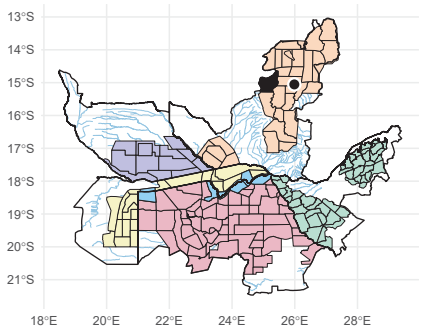
# L2 – L2 ZAMBIA – KAFUE

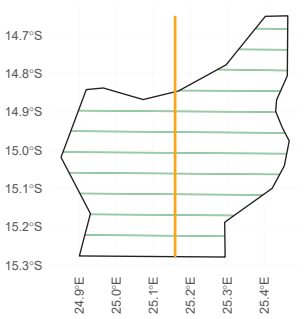
## SURVEY DESIGN

COUNTRY: Zambia
SUPERSTRATUM: Kafue
STRATUM CODE: L2
STRATUM NAME: L2
■ STRATUM AREA: 2913.74 sqkm
• SURVEY BASE: Chunga
DISTANCE TO SURVEY BASE: 89 km

– TRANSECTS: 11 (455 km)
TRANSECT ORIENTATION: 90°
PLANNED SAMPLING INTENSITY: 4.7 %

– BASELINE DISTANCE: 69.65 km




## SURVEY IMPLEMENTATION

**Number of flight(s): 1**
Combined flying time: 4.7 h
Crew(s): C05
KES2022_9JCMA20220904A 06:55–11:39

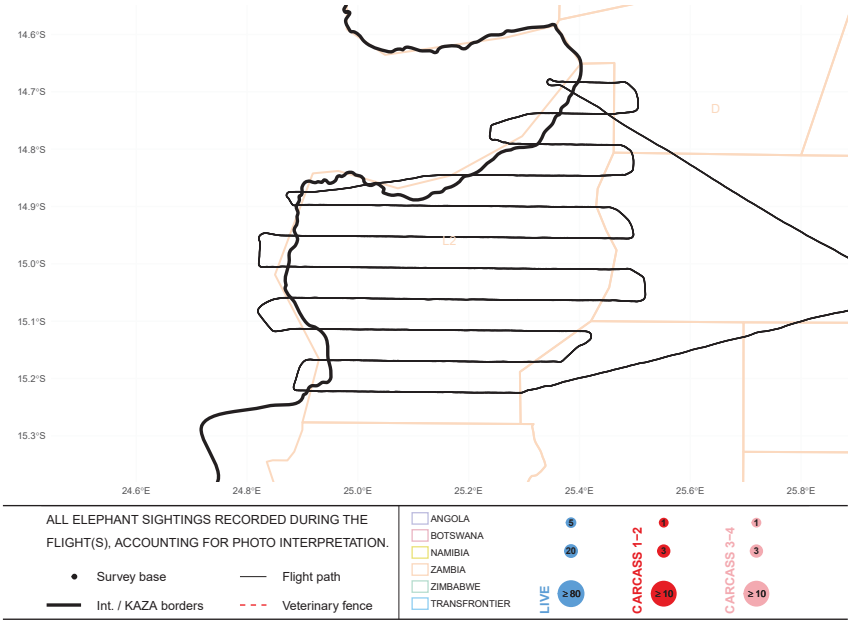
Actual sampling intensity: 4.6 %
Transect flying time: 2.7 h
Transects: 11 – 455 km – 90°
Search effort: 1.21 min/sqkm

## OBSERVER CONTRIBUTION

| | | |
|---|---|---|
| Crew(s): | C05 | |
| Side: | L | R |
| % sightings: | 48 | 52 |
| % individuals: | 37 | 63 |

## PHOTO INTERPRETATION

| | Photo | Match (%) | Corr. (%) |
|---|---|---|---|
| All species (>9): | 28 | 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: | 1 |
| Other wildlife count: | 4 |
| Domestic count: | 822 |

## ELEPHANT DATA ANALYSIS

t = 2.228, N = 238, w = 293

| | | LIVE | | ALL CARCASSES | |
|---|---|---|---|---|---|
| | | OBS | FINAL | OBS | 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

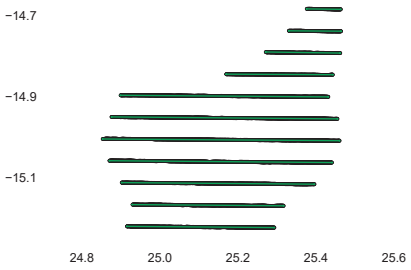
$CR_{1:4}$ = n/a
$CR_{1:2}$ = n/a

## L2 – L2 ZAMBIA – KAFUE

### ADHERENCE TO FLIGHT PARAMETERS

### KES2022_ 9JCMA20220904A

TRAJECTORY ADHERENCE VISUAL CHECK:




HEIGHT AGL AND SPEED ADHERENCE CHECK:




SPEED
Average: 168.6 km/h
Standard dev.: 6.4 km/h

HEIGHT AGL
Average: 87.8 m (288.2 ft)
Standard dev.: 6.5 m (21.3 ft)

## L2 – L2 ZAMBIA – KAFUE

**STRATUM CODE:** L2 **N:** 238 $S_a^2$: 35,743
**STRATUM NAME:** L2 **w:** 293 **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 | 522 | 118 | 11431 | 6055 | 3,923 | 7384272 | 2717,40 | 5376 | 17486 | 53 | 2685,873 | 221,005 |
| 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 | 300 | 0 | 6569 | 5063 | 2,255 | 5162994 | 2272,22 | 1507 | 11632 | 77 | 946,018 | 17,205 |
| 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 |