

Supplemental Table S1. Summary of camera traps and census

| Date | Call-up | Water | Lions | Leopard | Spotted Hyena | Wild Dog | Cheetah | Jackal | Lions | Leopard | Spotted Hyena | Wild Dog | Cheetah | Jackal |
|--------|----------------|--|-------|---------|---------------|----------|---------|--------|-------|---------|---------------|----------|---------|--------|
| May-15 | Call station 1 | 6 dams | n/a | n/a | n/a | n/a | n/a | n/a | 0 | 1 | 0 | 0 | 0 | 0 |
| | Call station 2 | 7 dams 1 dam shared with call | n/a | n/a | n/a | n/a | n/a | n/a | 0 | 0 | 1 | 0 | 0 | 0 |
| | Call station 3 | station 2 | n/a | n/a | n/a | n/a | n/a | n/a | 1 | 0 | 1 | 0 | 0 | 0 |
| | Call station 4 | 6 dams 7 dams share 4 with call | 3 | 4 | 9 | 0 | 0 | 1 | 3 | 0 | 3 | 0 | 0 | 0 |
| | Call station 5 | station 4 11 dams share 3 with call | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 |
| | Call station 6 | station 4 and 5 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 4 | 0 | 0 | 0 |
| | Call station 7 | 5 dams 3 dams share 2 with call | 3 | 0 | 3 | 0 | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 0 |
| | Call station 8 | station 7 | 8 | 1 | 9 | n/a | n/a | n/a | 0 | 0 | 4 | 0 | 0 | 0 |
| Oct-15 | Call station 1 | 6 dams | 5 | 3 | 16 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| | Call station 2 | 7 dams 1 dam shared with call | n/a | n/a | n/a | n/a | n/a | n/a | 4 | 0 | 1 | 0 | 0 | 0 |
| | Call station 3 | station 2 | n/a | n/a | n/a | n/a | n/a | n/a | 0 | 0 | 3 | 0 | 0 | 0 |
| | Call station 4 | 6 dams 7 dams share 4 with call | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | Call station 5 | station 4 11 dams share 3 with call | 1 | 0 | 3 | 0 | 0 | 0 | 6 | 0 | 5 | 0 | 0 | 0 |
| | Call station 6 | station 4 and 5 | 8 | 1 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| | Call station 7 | 5 dams 3 dams share 2 with call | n/a | n/a | n/a | n/a | n/a | n/a | 0 | 1 | 2 | 0 | 0 | 0 |
| | Call station 8 | station 7 | n/a | n/a | n/a | n/a | n/a | n/a | 5 | 0 | 4 | 0 | 0 | 0 |

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|--------|----------------|--|-----|-----|-----|-----|-----|-----|---|---|---|---|---|---|
| May-16 | Call station 1 | 6 dams | n/a | n/a | n/a | n/a | n/a | n/a | 0 | 2 | 0 | 0 | 0 | 0 |
| | Call station 2 | 7 dams 1 dam shared with call station 2 | n/a | n/a | n/a | n/a | n/a | n/a | 0 | 0 | 1 | 0 | 0 | 0 |
| | Call station 3 | 6 dams | n/a | n/a | n/a | n/a | n/a | n/a | 2 | 0 | 0 | 0 | 0 | 0 |
| | Call station 4 | 7 dams share 4 with call station 4 | n/a | n/a | n/a | n/a | n/a | n/a | 3 | 1 | 0 | 0 | 0 | 0 |
| | Call station 5 | 11 dams share 3 with call station 4 and 5 | n/a | n/a | n/a | n/a | n/a | n/a | 1 | 0 | 0 | 0 | 0 | 0 |
| | Call station 6 | 5 dams | n/a | n/a | n/a | n/a | n/a | n/a | 0 | 0 | 0 | 0 | 0 | 0 |
| | Call station 7 | 3 dams share 2 with call station 7 | n/a | n/a | n/a | n/a | n/a | n/a | 0 | 0 | 0 | 0 | 0 | 0 |
| | Call station 8 | 6 dams | n/a | n/a | n/a | n/a | n/a | n/a | 0 | 0 | 1 | 3 | 0 | 0 |
| Oct-16 | Call station 1 | 6 dams | 28 | 2 | 12 | 5 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 |
| | Call station 2 | 7 dams 1 dam shared with call station 2 | n/a | n/a | n/a | n/a | n/a | n/a | 0 | 0 | 2 | 0 | 0 | 0 |
| | Call station 3 | 6 dams | 0 | 0 | 5 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 |
| | Call station 4 | 7 dams share 4 with call station 4 | n/a | n/a | n/a | n/a | n/a | n/a | 2 | 0 | 1 | 0 | 0 | 0 |
| | Call station 5 | 11 dams share 3 with call station 4 and 5 | 9 | 0 | 9 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| | Call station 6 | 5 dams | n/a | n/a | n/a | n/a | n/a | n/a | 0 | 0 | 2 | 0 | 0 | 0 |
| | Call station 7 | 3 dams share 2 with call station 7 | n/a | n/a | n/a | n/a | n/a | n/a | 0 | 1 | 1 | 0 | 0 | 0 |
| | Call station 8 | 6 dams | n/a | n/a | n/a | n/a | n/a | n/a | 0 | 0 | 0 | 0 | 0 | 0 |
| May-17 | Call station 1 | 7 dams | 0 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 |
| | Call station 2 | | | | | | | | | | | | | |

| | | | | | | | | | | | | | |
|----------------|---|-----|-----|-----|-----|-----|-----|----|----|----|---|---|---|
| Call station 3 | 1 dam shared with call station 2 | n/a | n/a | n/a | n/a | n/a | n/a | 4 | 0 | 0 | 0 | 0 | 0 |
| Call station 4 | 6 dams | n/a | n/a | n/a | n/a | n/a | n/a | 2 | 2 | 0 | 0 | 0 | 0 |
| Call station 5 | 7 dams share 4 with call station 4 | n/a | n/a | n/a | n/a | n/a | n/a | 1 | 1 | 0 | 0 | 0 | 0 |
| Call station 6 | 11 dams share 3 with call station 4 and 5 | n/a | n/a | n/a | n/a | n/a | n/a | 1 | 0 | 0 | 0 | 0 | 0 |
| Call station 7 | 5 dams | n/a | n/a | n/a | n/a | n/a | n/a | 0 | 0 | 1 | 0 | 0 | 1 |
| Call station 8 | 3 dams share 2 with call station 7 | n/a | n/a | n/a | n/a | n/a | n/a | 1 | 0 | 1 | 0 | 0 | 0 |
| Totals | | 65 | 12 | 75 | 5 | 1 | 3 | 56 | 14 | 44 | 3 | 2 | 1 |

camera traps within a 5 km range were used on the day of the call-up for the summary.

Table S2. The significant univariate associations between any carnivore group (lion, leopard, serval, cheetah), canine (African wild dog, jackal), other (spotted hyena, civet, and genet) group detection and continuous predictor variables based on camera trap data collected within two protected areas, Mpumalanga Province, South Africa for the years 2015–2017.

| Group | Variable | Compared too | Coefficient | OR (95% CI) | <i>p</i> -value |
|--------|--------------------|--------------|-------------|-------------------|-----------------|
| Any | Spring | Summer | 0.39 | 1.48(0.97–2.25) | 0.067 |
| | Winter | Summer | -0.17 | 0.84 (0.53–1.34) | 0.471 |
| | Autumn | Summer | 0.19 | 1.21 (0.78–1.86) | 0.410 |
| Feline | First quarter | Full moon | 0.32 | 1.38 (0.85–2.23) | 0.199 |
| | New moon | Full moon | 0.08 | 0.93 (0.55–1.57) | 0.782 |
| | Third moon | Full moon | -0.01 | 0.99 (0.59–1.66) | 0.967 |
| | Hippo detected | No hippo | 1.77 | 5.89 (3.27–15.26) | <0.001 |
| | Giraffe detected | No Giraffe | 1.09 | 2.96 (1.40–6.27) | <0.005 |
| | Waterbuck detected | No waterbuck | 1.05 | 2.87 (1.07–7.69) | 0.036 |
| | Buffalo detected | No buffalo | 0.61 | 1.83 (0.98–3.43) | 0.057 |
| | Bosbok detected | No bosbok | 1.00 | 2.72 (0.79–9.34) | 0.113 |

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|----------------------|--------------------------|-------------------|-------------|---------------------|------------------|
| | Njala detected | No njala | 2.24 | 9.42 (1.92–46.24) | 0.006 |
| | Impala detected | No impala | 0.53 | 1.70 (0.94–3.07) | 0.082 |
| | Elephant detected | No elephant | 0.41 | 1.51 (0.90–2.54) | 0.122 |
| | Warthog detected | No warthog | 0.72 | 2.03 (0.84–4.92) | 0.118 |
| | Hare detected | No hare | 1.70 | 5.49 (2.82–10.68) | <0.001 |
| Other | Spring | Summer | 0.27 | 1.32 (0.77–2.25) | 0.316 |
| | Winter | Summer | -0.01 | 0.99 (0.56–1.79) | 0.980 |
| | Autumn | Summer | 0.61 | 1.85 (1.08–3.16) | 0.025 |
| | Ant eater detected | No Anteater | 2.73 | 15.37 (1.29–138.69) | 0.031 |
| | Waterbuck detected | No Waterbuck | 1.04 | 2.83 (1.12–7.13) | 0.028 |
| | Giraffe detected | No giraffe | 0.62 | 1.85 (0.95–3.60) | 0.070 |
| | Elephant detected | No elephant | 0.41 | 1.51 (0.99–2.30) | 0.058 |
| | Buffalo detected | No buffalo | 0.99 | 2.70 (1.70–4.29) | <0.001 |
| | Wildebeest detected | No wildebeest | 0.87 | 2.39 (1.20–4.73) | 0.013 |
| | Rhino detected | | 0.67 | 1.95 (1.04–3.65) | 0.037 |
| | Impala detected | No impala | 0.93 | 2.53 (1.64–3.89) | <0.001 |
| | Grey duiker detected | No Grey duiker | 0.70 | 2.02 (1.10–3.72) | 0.024 |
| | Goat outside detected | No goat outside | 2.38 | 10.75 (0.81–142.28) | 0.072 |
| | Warthog detected | No warthog | 0.97 | 2.64 (1.35–5.18) | 0.009 |
| | Hare detected | No hare | 1.71 | 5.53 (2.67–11.48) | <0.001 |
| | Specie: Spotted Hyena | Elephant detected | No elephant | 0.39 | 1.48 (0.96–2.29) |
| Wildebeest detected | | Wildebeest | 0.88 | 2.41 (1.21–4.80) | 0.012 |
| Grey Duiker detected | | Grey Duiker | 0.46 | 1.59 (0.81–3.12) | 0.177 |
| Impala detected | | Impala | 0.96 | 2.61 (1.97–4.02) | <0.001 |
| Warthog detected | | Warthog | 1.06 | 2.88 (1.47–5.68) | 0.002 |
| Hare detected | | Hare | 1.37 | 3.94 (0.57–2.18) | 0.001 |
| Buffalo detected | | Buffalo | 0.94 | 2.55 (1.58–4.12) | <0.001 |

Any Carnivores: lion, leopard, cheetah, spotted hyena, civet, serval, wild dog, genet. Feline carnivores: lion, leopard, cheetah, serval. Other carnivores: spotted hyena, civet, genet.

Table S3. The important univariate associations between lion, leopard, cheetah, serval, African wild dog, jackal, spotted hyena, civet, and genet detection and continuous predictor variables on camera trap data collected within two protected areas, Mpumalanga Province, South Africa for the years 2015–2017.

| Variable | Coefficient | OR (95% CI) | <i>p</i> -Value |
|---------------------|-------------|--------------------|-----------------|
| Longitude | 2.25 | 9.46 (0.60–149.23) | 0.110 |
| Altitude(meters) | -0.01 | 0.99 (0.99–1.00) | 0.003 |
| Open areas | 0.66 | 1.94 (0.88–4.28) | 0.103 |
| Dam/rivers | -0.57 | 0.57 (0.24–1.34) | 0.196 |
| Rain(mm) | -0.04 | 0.96 (0.91–1.00) | 0.057 |
| Rain previous day | -0.03 | 0.97 (0.93–1.01) | 0.185 |
| Vehicles detected | 0.08 | 1.08 (1.04–1.13) | <0.001 |
| Giraffe detected | 0.69 | 1.99 (1.16–3.45) | 0.013 |
| Buffalo detected | 0.77 | 2.16 (1.45–3.23) | <0.001 |
| Wildebeest detected | 0.60 | 1.81 (1.00–3.30) | 0.051 |
| Impala detected | 0.80 | 3.25 (1.56–3.24) | <0.001. |
| Warthog detected | 0.77 | 2.17 (1.20–3.93) | 0.011 |

Any carnivore: lion, leopard, cheetah, spotted hyena, genet, civet, wild dog, serval.

Table S4. The important univariate associations between lion, leopard, serval, and cheetah detection and continuous predictor variables on camera trap data collected within two protected areas, Mpumalanga Province, South Africa, for the years 2015–2017.

| Variable | Coefficient | OR (95% CI) | <i>p</i> -Value |
|-------------------------|-------------|------------------|-----------------|
| Minimum temperature(°C) | -0.03 | 0.97 (0.92–1.02) | 0.196 |
| Rain(mm) | -0.06 | 0.94 (0.86–1.03) | 0.164 |

Feline carnivores: lion, leopard, serval, cheetah

Table S5. The important univariate associations between spotted hyena, genet, and civet detection and continuous predictor variables on camera trap data collected within two protected areas, Mpumalanga Province, South Africa, for the years 2015–2017.

| Variable | Coefficient | OR (95% CI) | <i>p</i> -Value |
|------------------|-------------|---------------------|-----------------|
| Longitude | 2.74 | 15.47 (1.16–205.56) | 0.038 |
| Altitude(meters) | -0.01 | 0.99 (0.99–1.00) | <0.001 |

| | | | |
|-------------------|-------|------------------|-------|
| Rain(mm) | -0.07 | 0.94 (0.89–1.01) | 0.081 |
| Summer | 0.53 | 1.69 (1.12–2.55) | 0.012 |
| Vehicles detected | 0.03 | 1.03 (0.99–1.07) | 0.117 |

Other carnivores: spotted hyena, genet, civet.

Table S6. The important univariate associations between spotted hyena, detection, and continuous predictor variables on camera trap data collected within two protected areas, Mpumalanga Province, South Africa, for the years 2015–2017.

| Variable | Coefficient | OR (95% CI) | <i>p</i>-Value |
|-------------------|--------------------|---------------------|-----------------------|
| Longitude(meters) | 3.11 | 22.39 (1.55–324.08) | 0.023 |
| Altitude(meters) | -0.01 | 0.99 (0.99–1.00) | <0.001 |
| Rain(mm) | -0.06 | 0.95 (0.89–1.01) | 0.090 |
| Vehicles detected | 0.03 | 0.13 (-0.01–0.06) | 0.130 |