APPENDIX 3.2 – Occupancy Covariate Maps

Water Availability

Water Availability Probability (standardised score)

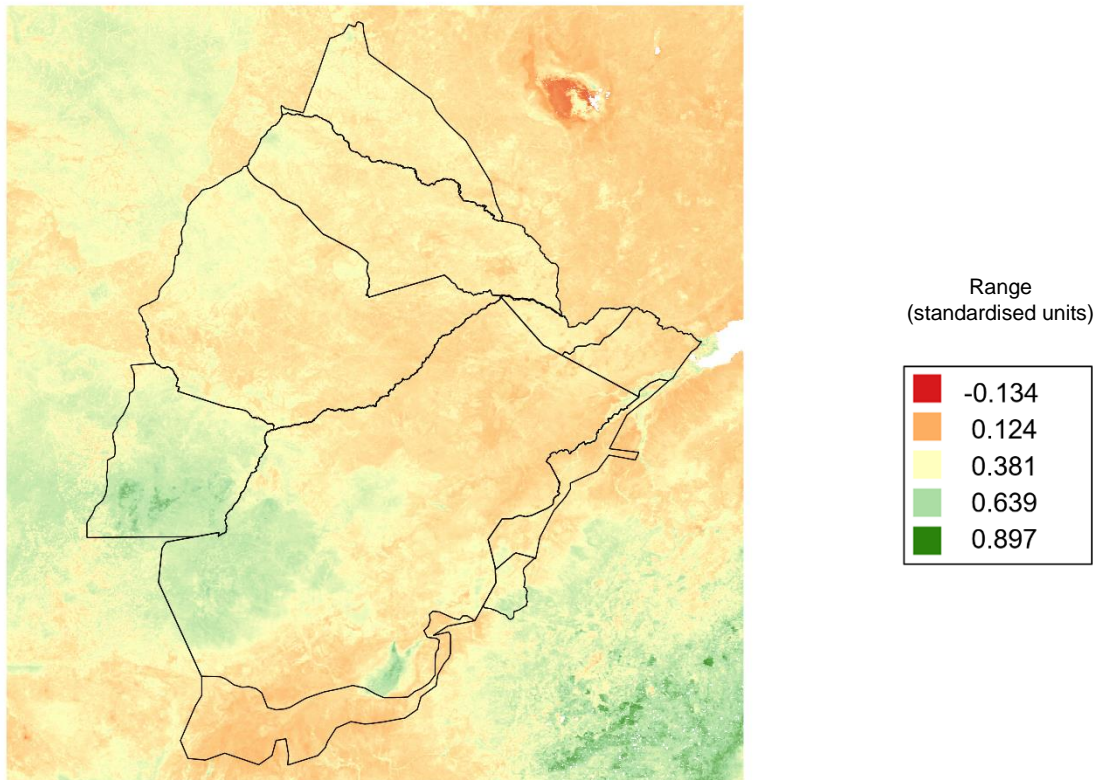|	
	1.12e-09
	29.5
	59
	88.6
	118
	148
	177
	204
	227
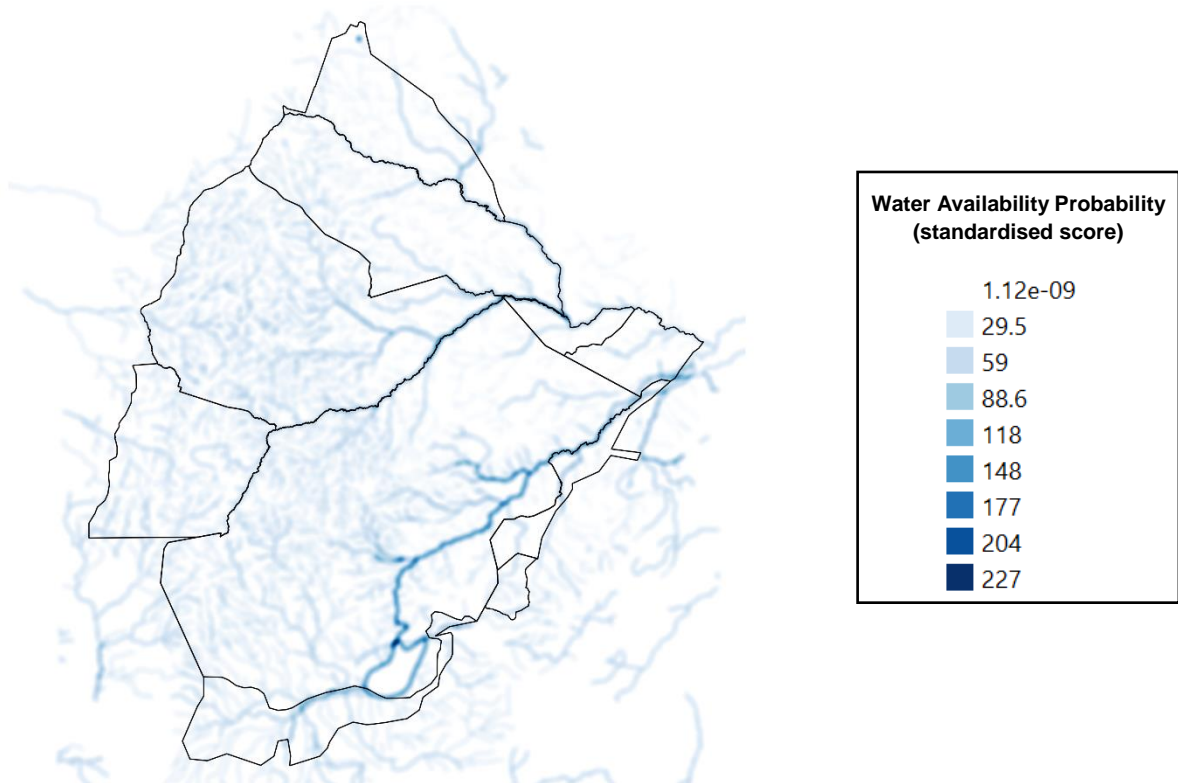
Source: See Appendix 3.1.

Methodology: See Appendix 3.1.

Normalized Difference Vegetation Index (NDVI) – Average (2017-2018)

Range
(standardised units)

🟥	-0.134
🟧	0.124
🟨	0.381
🟩	0.639
🟩	0.897

Source: MCD43A4_NDVI (NASA LP DAAC, https://lpdaac.usgs. gov/)

Methodology: A single average value for each pixel (30x30 m) was calculated from NDVI values extracted for the survey period (June-November 2017 & 2018) in QGIS 3.4.6. See Appendix 3.1 for additional details.

Normalized Difference Vegetation Index (NDVI) – Standard deviation (2017-2018)

Range
(standardised units)

■	0
■	301.2
■	401.6
■	494.3
■	598.6
■	714.4
■	853.5
■	1043
■	1340
■	3858

Source: MCD43A4_NDVI (NASA LP DAAC, https://lpdaac.usgs. gov/).
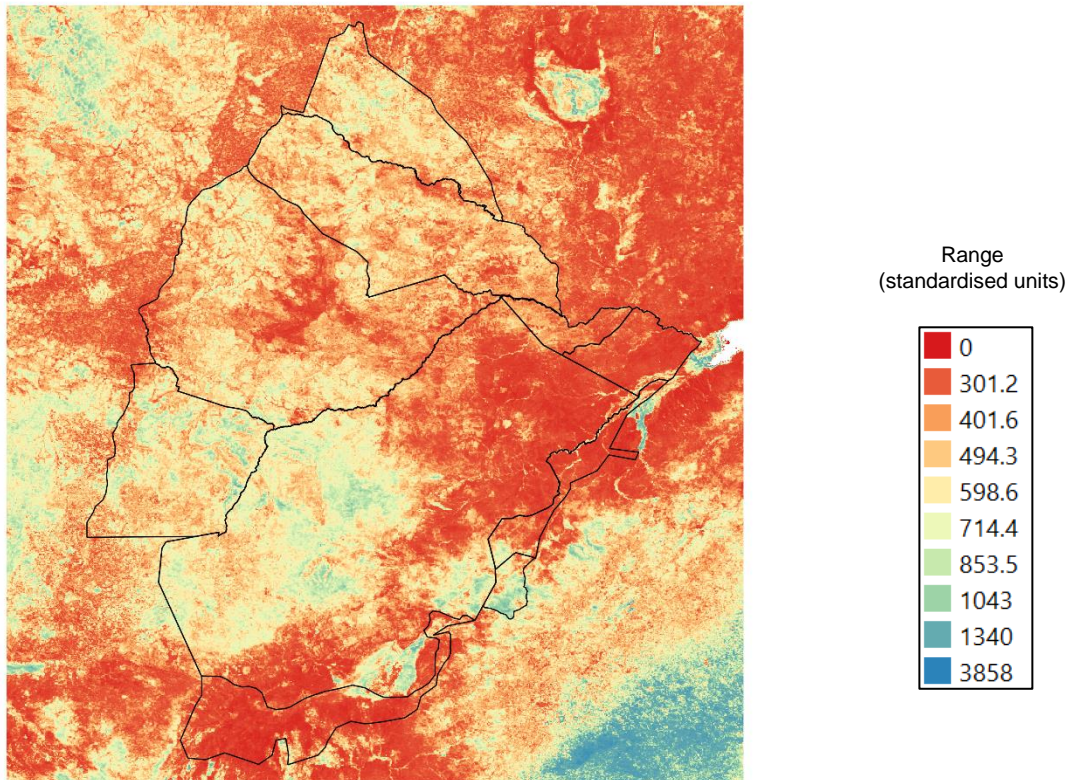
Methodology: NDVI values extracted for the survey period (June-November 2017 & 2018) were employed to calculate the standard deviation for each 30x30m pixel in QGIS 3.4.6. See Appendix 3.1 for additional details.
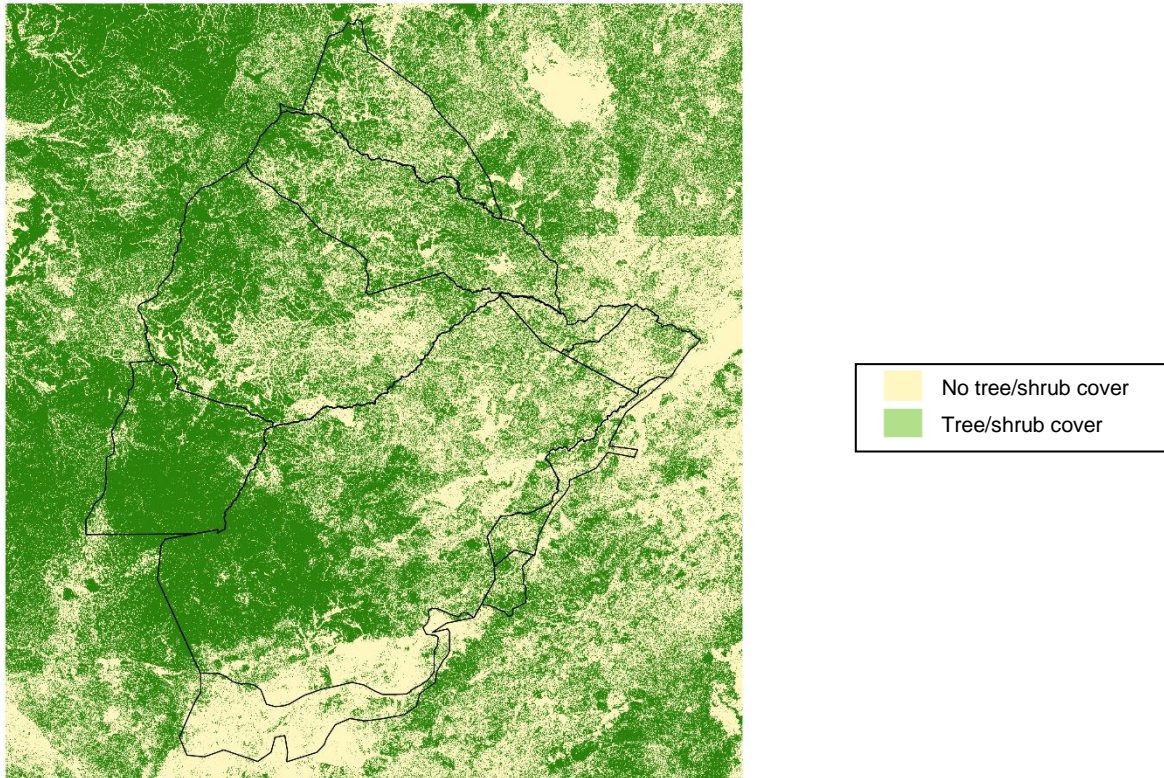
Vegetation cover (trees cover only)
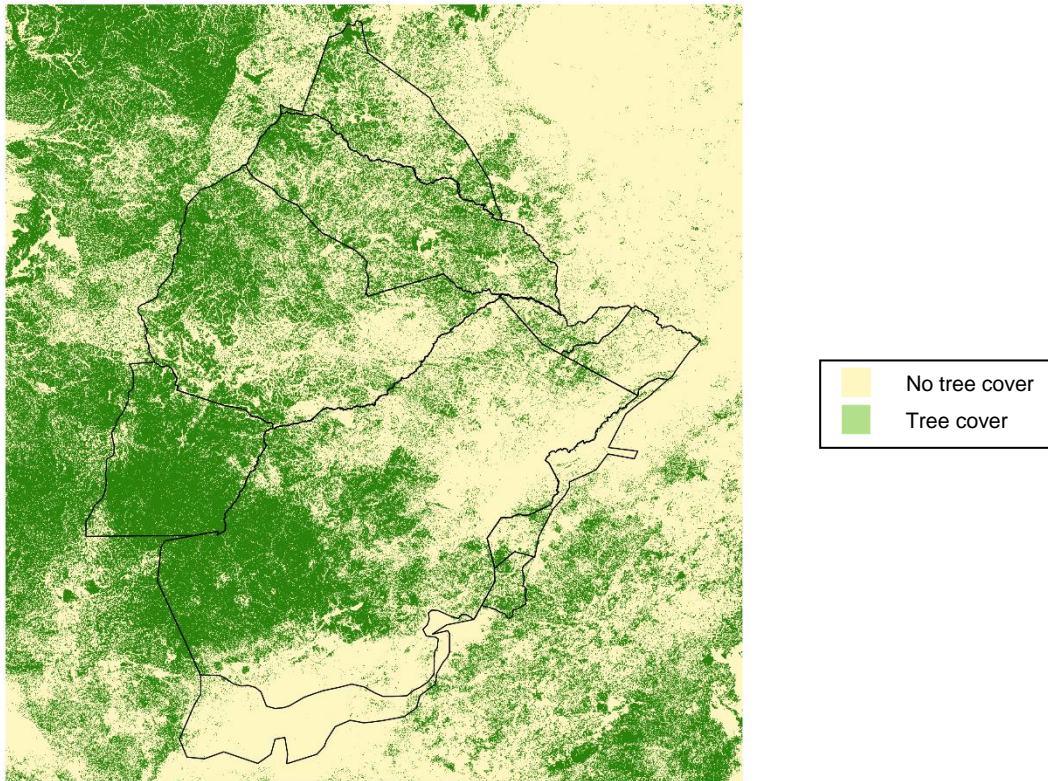
Source: ESA CCI Land Cover – S2 prototype land cover 20m map of Africa

http://2016africalandcover20m.esrin.esa.int/.

Methodology: Collapsed all land cover categories with the exception of 'Trees cover area' into a new 'No tree cover' category. See Appendix 3.1 for additional details.

Vegetation cover (tree & shrub cover)

Source: ESA CCI Land Cover – S2 prototype land cover 20m map of Africa

http://2016africalandcover20m.esrin.esa.int/.

Methodology: Collapsed all land cover categories with the exception of 'Trees cover area' and 'Shrub cover area' into a new 'No tree/shrub cover' category, and collapsed 'Trees cover area' and 'Shrub cover area' into a new 'Trees/shrub cover' category. See Appendix 3.1 for additional details.

Primary habitat (vegetation) type
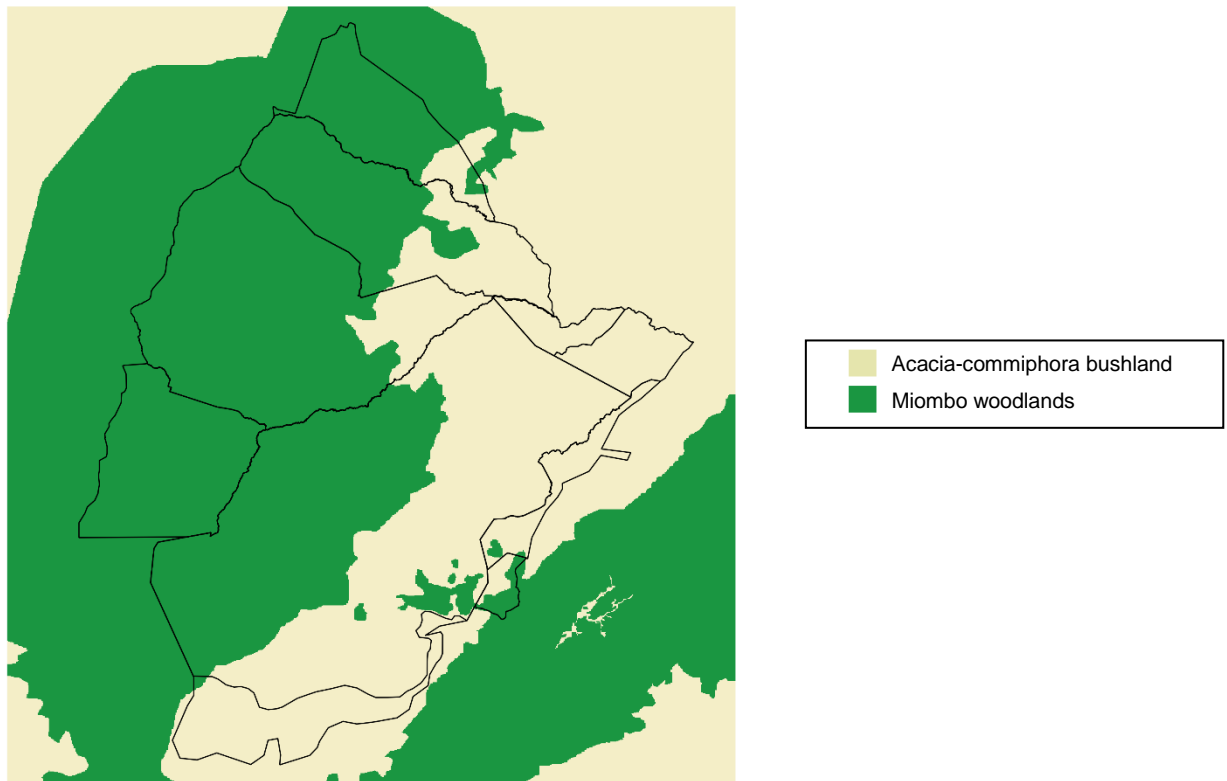
Source: WWF Terrestrial Ecoregions of the World

https://www.worldwildlife.org/publications/terrestrial-ecoregions-of-the-world.

Methodology: The two miombo woodland ecoregions present in the study area ('Central Zambezian Miombo woodlands' and 'Eastern Miombo woodlands') were collapsed into a single miombo woodland primary habitat category. The only other primary habitat type present in the study area was 'Southern Acacia-commiphora bushland and thickets', simplified to 'Acacia-commiphora bushland in the legend above. See Appendix 3.1 for additional details.

Cropland (habitat conversion to agriculture)
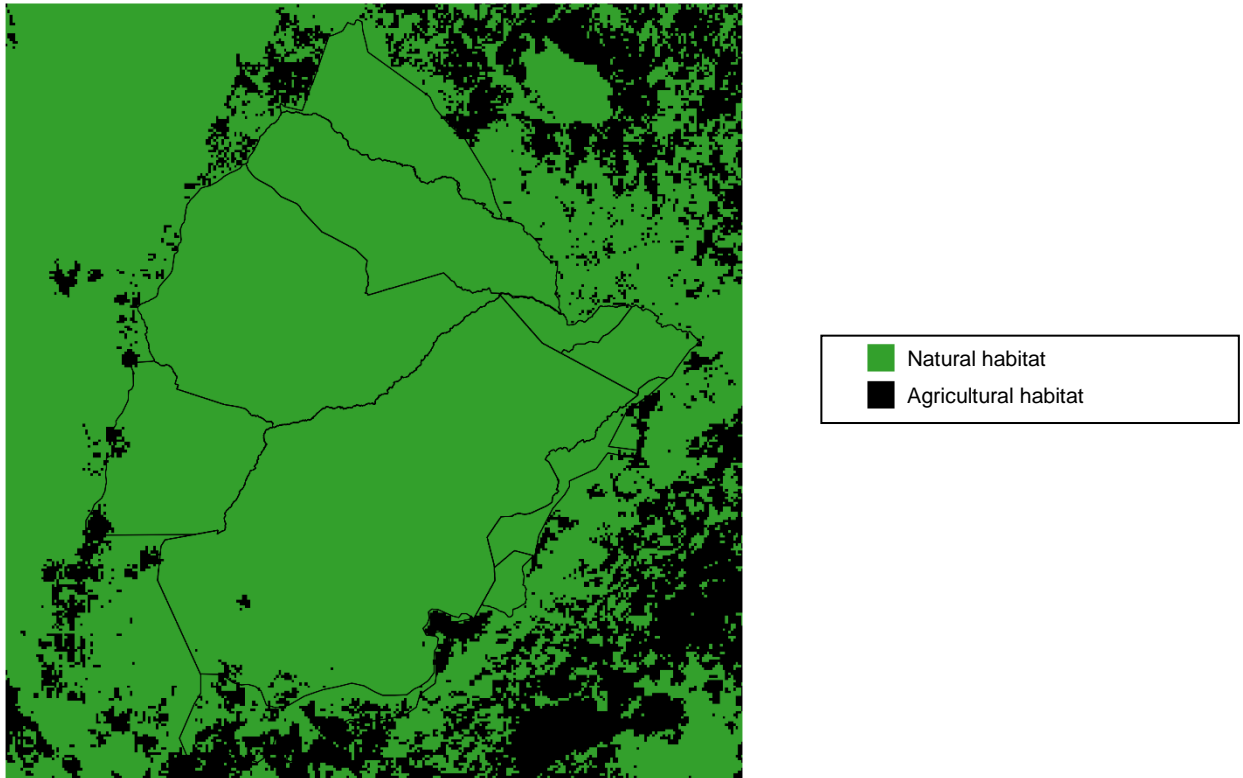
Source: Google Earth Grids (Jacobson, A., Dhanota, J., Godfrey, J., Jacobson, H., Rossman, Z., Stanish, A., Walker, H. and Riggio, J., 2015. A novel approach to mapping land conversion using Google Earth with an application to East Africa. *Environmental Modelling & Software*, *72*, pp.1-9.)

Methodology: The habitat convention raster consists of 1 km^2 pixels; the pixel is considered as agricultural habitat if > 50% of the area is converted to agriculture. The raster was manually updated prior to analyses using Google Earth imagery from 2018. See Appendix 3.1 for additional details.

Distance to human settlements
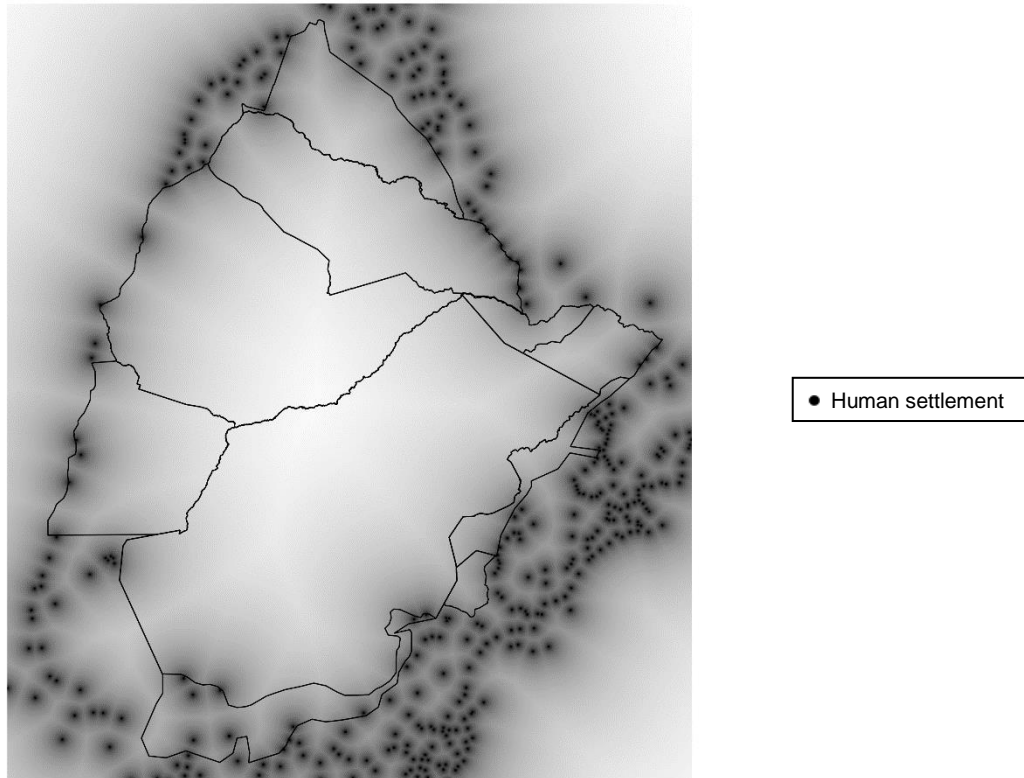
Source: Google Earth satellite imagery and OpenStreetMap.

Methodology: *A*ettlements (including hamlets, villages and towns) were mapped from Google Earth satellite images and OpenStreetMaps in QGIS 3.4.6, and employed to develop a raster of the natural logarithm of distance from the nearest settlement in QGIS 3.4.6. See Appendix 3.1 for additional details.

Legally protected area (PA)
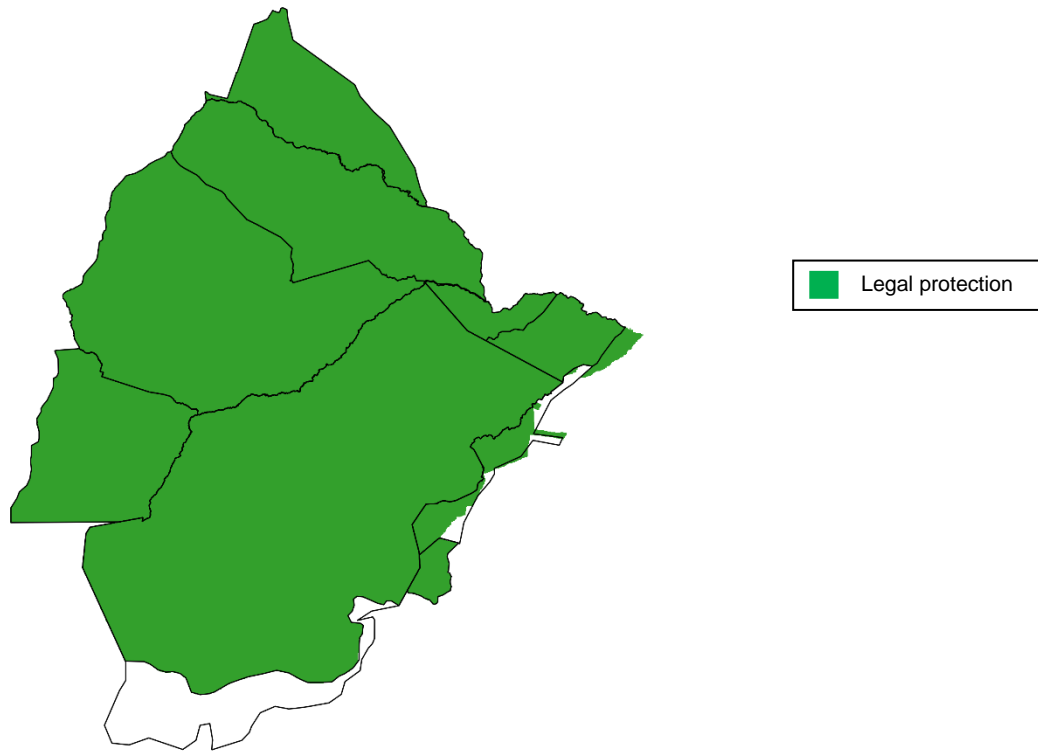
Source: IUCN WDPA, modified (WDPA; https://protectedplanet.net/); Riggio, J., & Caro, T. (2017). Structural connectivity at a national scale: Wildlife corridors in Tanzania. *PloS one*, *12*(11); protected area management; this study.

Methodology: Site-specific values extracted from raster. See Appendix 3.1 for additional details.

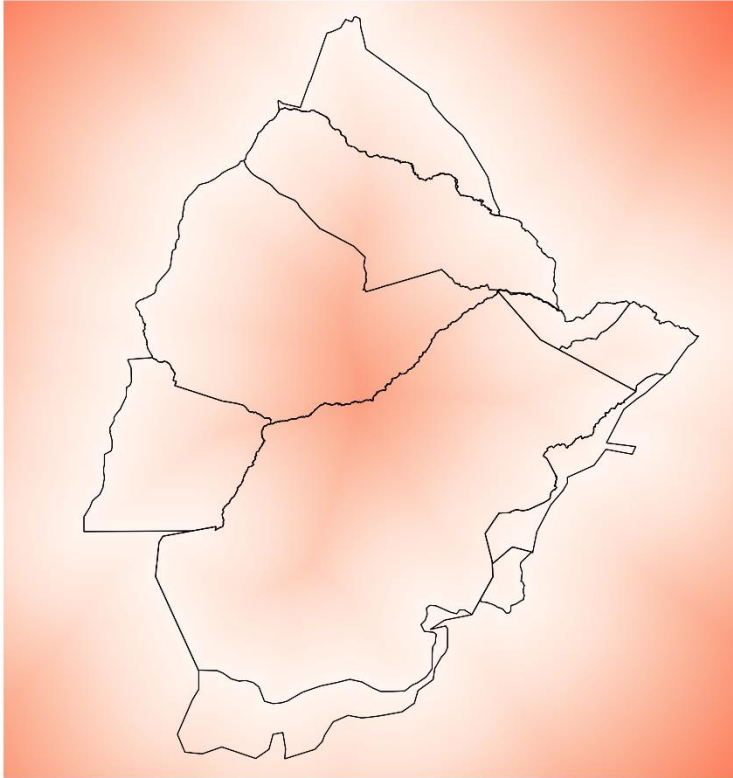**Strong effective protection (on-the-ground law enforcement)**

***Source*:** IUCN WDPA, modified (WDPA; https://protectedplanet.net/); Riggio, J., & Caro, T. (2017).

Structural connectivity at a national scale: Wildlife corridors in Tanzania. *PloS one*, *12*(11); protected

area management; this study.

***Methodology*:** Site-specific values extracted from raster. See Appendix 3.1 for additional details.
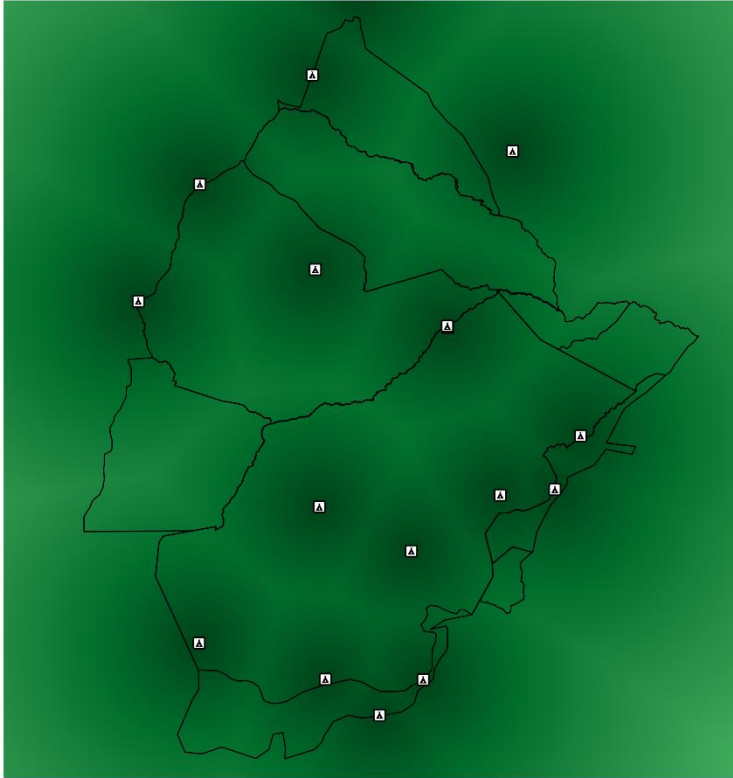
Distance to protected area boundary

Methodology: Protected area boundaries were employed to develop a raster of the distance from nearest boundary point in QGIS 3.4.6. See Appendix 3.1 for additional details.
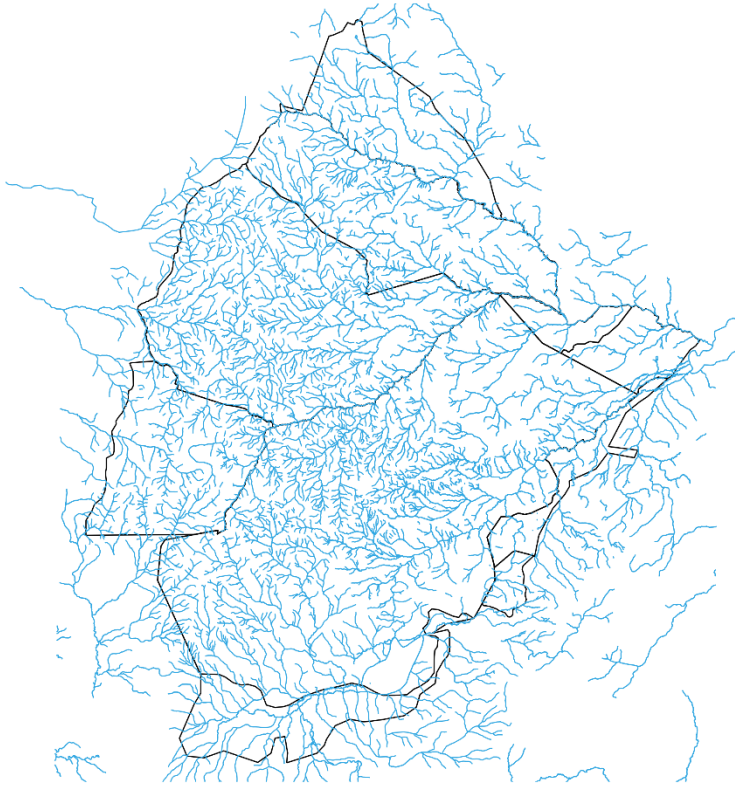
Distance to ranger post

Source: Protected area management; this study.

Methodology: Ranger posts locations were obtained from protected area management and mapped during this study, and employed to develop a raster of distance from the nearest ranger posts in QGIS 3.4.6. See Appendix 3.1 for additional details.
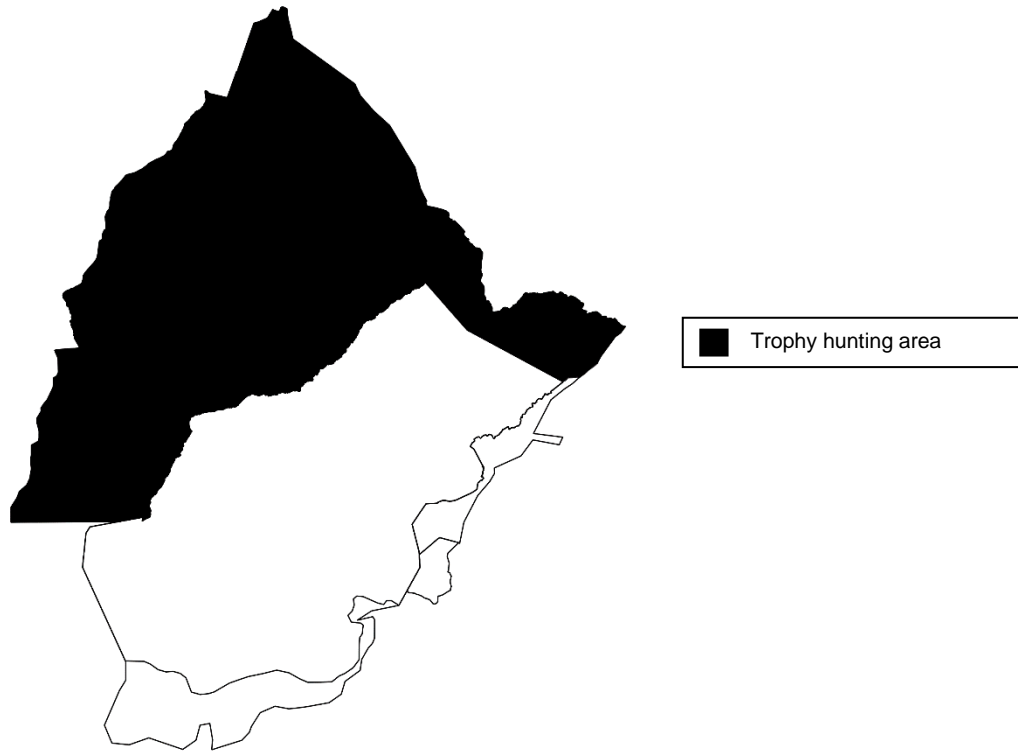
Riparian habitat

Methodology: The hand digitised river layer developed (see Appendix 3.1 for additional details) was employed to calculate site-specific average distances to nearest riparian habitat in QGIS 3.4.6.
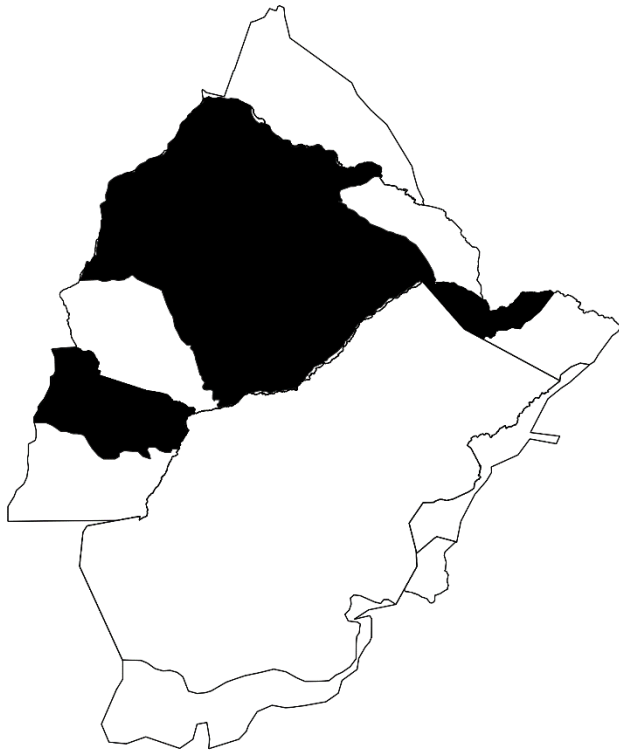
Trophy hunting (legally permitted)

Legend: Trophy hunting area

Source: IUCN WDPA, modified (WDPA; https://protectedplanet.net/); Riggio, J., & Caro, T. (2017). Structural connectivity at a national scale: Wildlife corridors in Tanzania. *PloS one*, *12*(11); protected area management; this study.

Methodology: Site-specific values extracted from raster. See Appendix 3.1 for additional details.

Trophy hunting (occurring – actively hunted area)

Methodology: Site-specific values extracted from raster. See Appendix 3.1 for additional details.