Project Update: February 2017

Report October 2016 - December 2016

Increasingly, savanna ecosystems are changing from their pristine conditions due to human pressure exerted on them. As such, changes in these ecosystems are more often driven by human beings than nature its self. These land manipulation practices can potentially affect wildlife conservation efforts in the long run if unchecked.

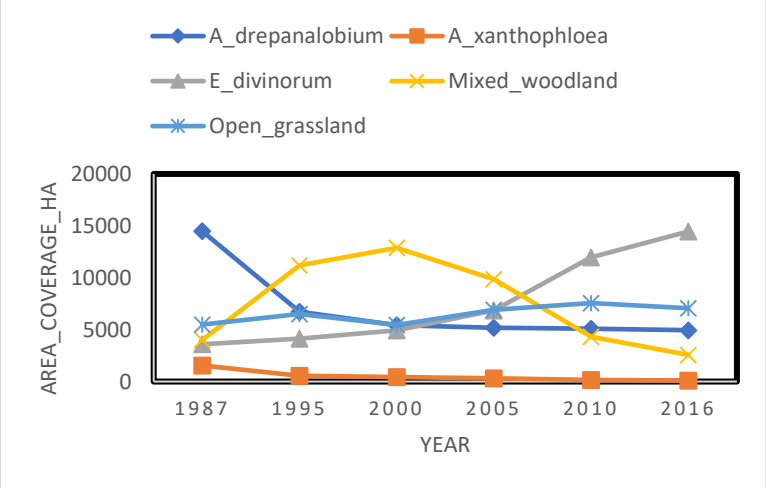
This report highlights results of the data collected on spatial dynamics of *E. divinorum*, topographic features attributable to encroachment, species diversity and composition in the conservancy as function of bush encroachment.

In order to understand dynamics of encroachment in the conservancy, Landsat images from United States Geological Survey (USGS) were used to classify vegetation cover in to five classes. These classes include *Euclea divinorum*, *Acacia drepenalobium*, *Acacia xanthophloea*, open grassland and mixed bushland. Further to this, topographic features such as slope and altitude were used to examine their influence on encroachment in the conservancy. Digital elevation models and contour lines (isobars) were overlaid on vegetation maps to examine different class cover distribution patterns. Additionally, Normalized Difference Vegetation Index (NDVI), a simple numerical indicator and powerful tool for understanding vegetation healthy (greenness) was used to examine direction of encroachment. Species diversity and composition was examined remotely using motion triggered infra-red camera traps. Here, a total of 36 camera traps were deployed in the field for a total of 14 days and nights where in each vegetation class there were 9 camera traps used.

Results

E. divinorum and other vegetation classes' spatial coverage

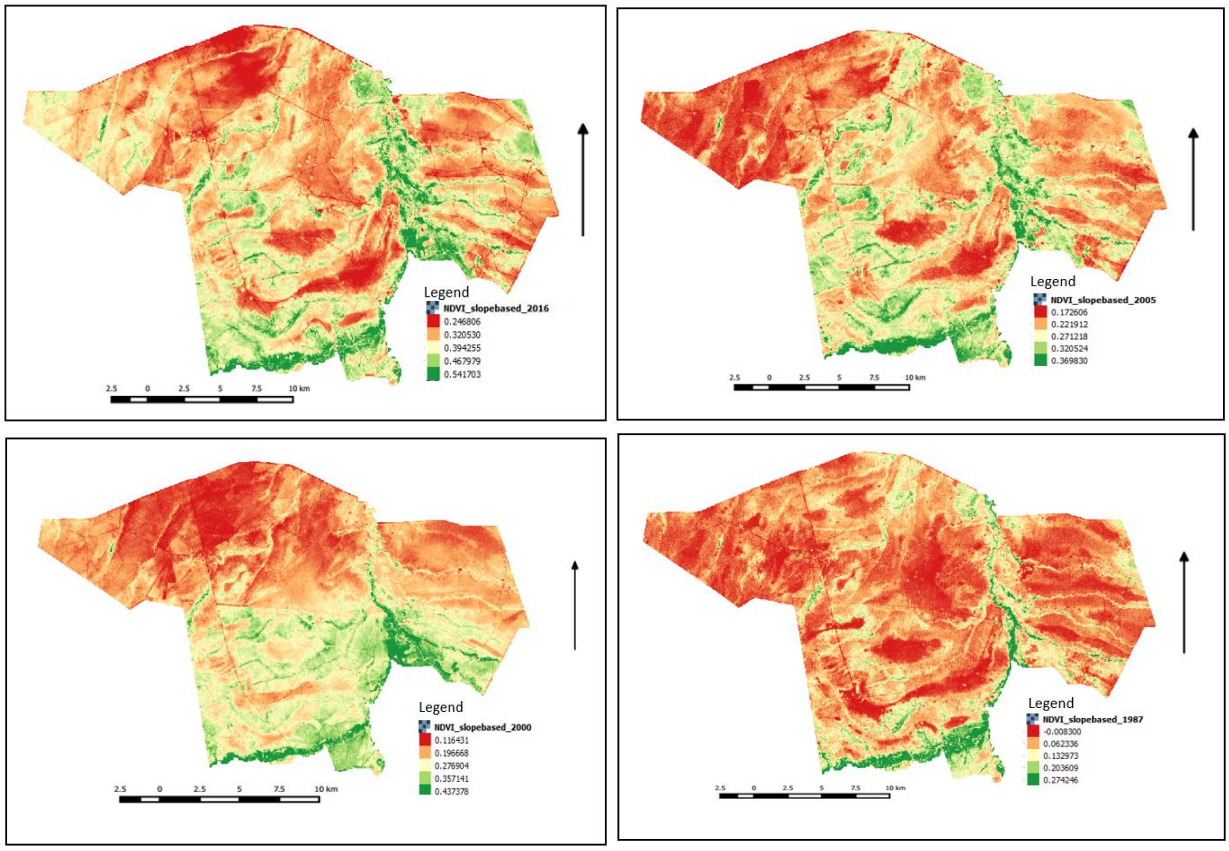
The results revealed that since 1987 to 2016 the spatial coverage of *E. divinorum* has been increasing to the current coverage of 14455.98 ha which is about (49.65%) of the total vegetation cover. As a result of this changes in cover, other vegetation classes have either increased or decreased in coverage. Notably *A. drepanalobium* and *A. xanthophloea* exhibited significant downward decreasing trend throughout the study period hence being the most affected as shown in the figure below.



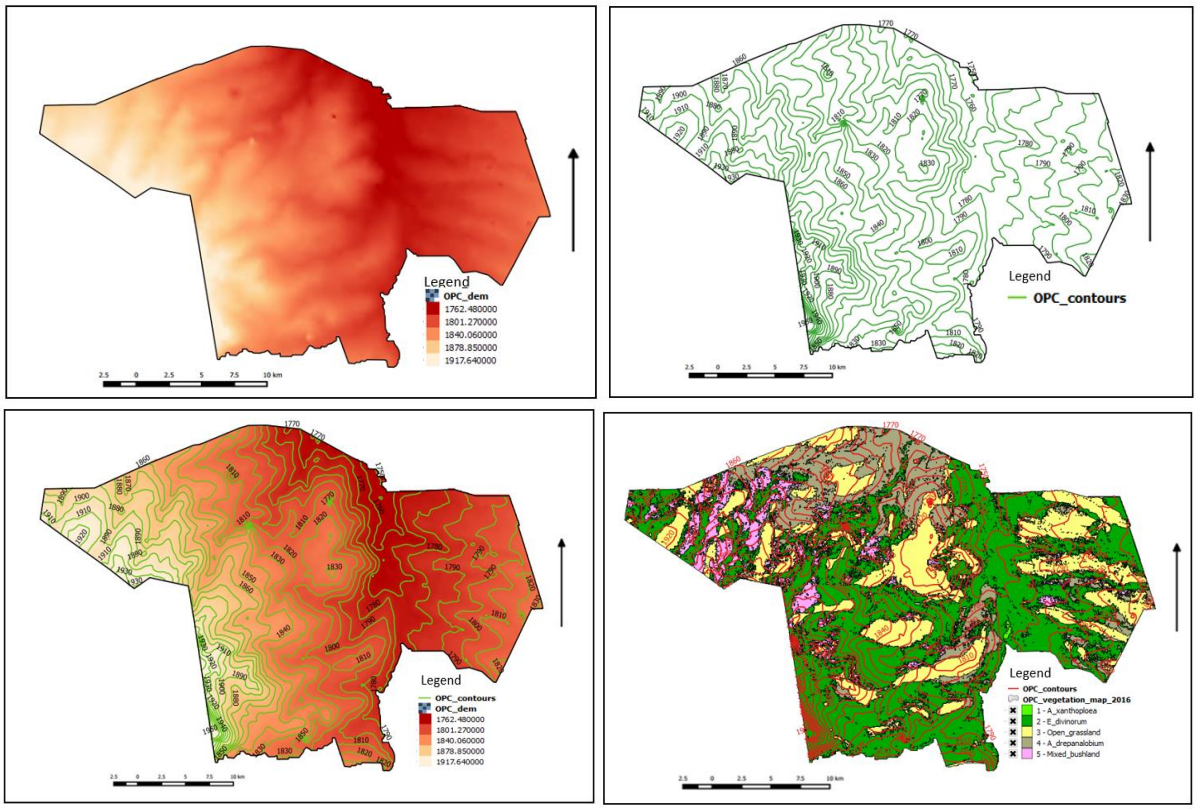
Topographic features attributable to encroachment

The results showed that areas along the deep channels had high NDVI values suggesting coverage by *E. divinorum* as depicted in the NDVI maps below for years considered. This was an indication of cover by *E. divinorum* which is green throughout the year hence easy to map during dry seasons.

Overlay of both topographic features, which include contours and elevation (observable features) showed that areas below 1800 m above sea level (asl) were covered by *E. divionurm* however this encroachment appeared to be potentially expanding towards area even at higher altitudes than 1800 m asl. This adds to the question the role of soil type in augmenting bush encroachment by *E. divinorum* in the conservancy.



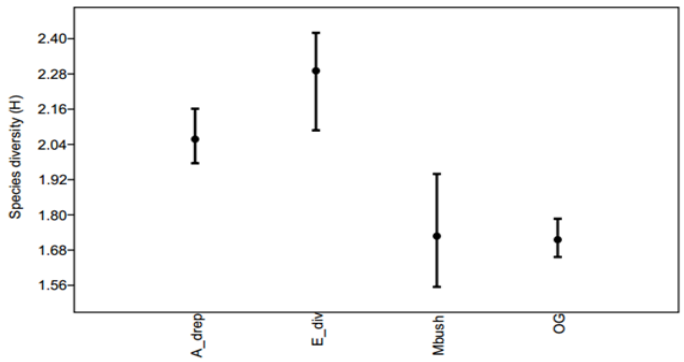
NDVI maps (slope based) for various years considered



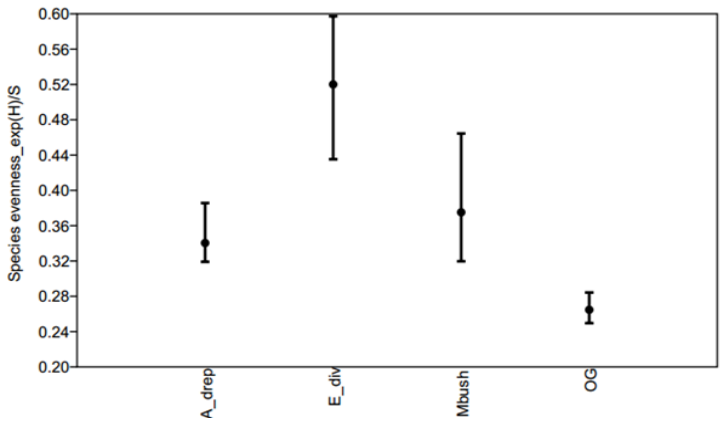
DEM, Contours and vegetation overlays for OPC

Species diversity evenness and composition

Species diversity (H) was higher in *E. divinorum* vegetation cover at 2.291, *A. drepanalobium* at 2.058, Mixed bushland at 1.728 and Open grassland with least index value of 1.715 as shown in figure below. Evenness (H/S) was highest in area under *E. divinorum* at 0.5201, followed by mixed bushland at 0.3751, then closed by *A. drepanalobium* at 0.3404 and finally open grassland at 0.2647.

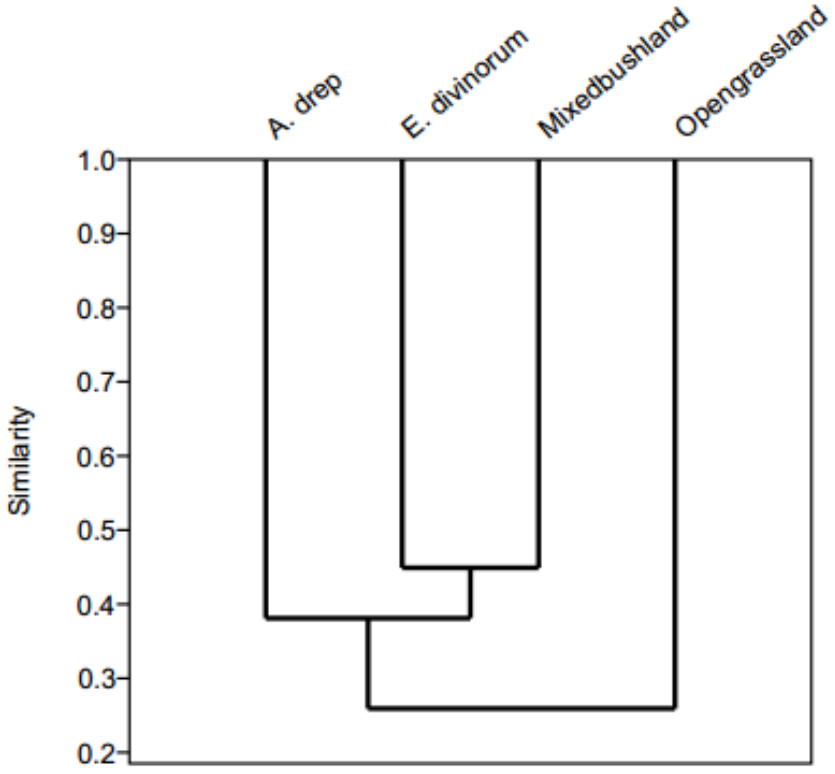


Graph showing species diversity across the four vegetation class types



Species evenness across four vegetation class types

Hierarchical Cluster Analysis compared results across the four habitat types, namely *A. drepanalobium* habitat, *E. divinorum* habitat, mixed bushland habitat and open grassland *E. divinorum* habitat and mixed bushland shared 45% similarity in species composition. Both *E. divinorum* habitat and mixed bushland shared 39% similarity in species composition with *A. drepanalobium* dominated habitat. On the other hand, open grassland habitat shared 27% similarity in species composition with three habitat type namely, *E. divinorum, A. drepanalobium* and mixed bushland as shown in the figure below.



Dendrogram showing species composition

Plates

Plate a) preparing camera traps for deployment, plate b) fastening camera trap on a tree, plate c) deploying a camera trap with the help of research asssitants plate d) Nearly an areial view showing area domianted by *E. divinorum* in the conservancy and plate e) Open grassland dotted by stumps of *E. divinorum*. Photo Credit Nelly Meiyo, Simon Nakita and Cyrus Kavwele.