**Introduction**

The environmental costs of meat production include degradation of soil, water, and atmosphere. There are many methods of conservation grazing, however the Natural Resources Conservation Service finds a trade-off between ecological outcomes and profitability due to the necessity of keeping livestock at low stocking rates and at low density. Proponents of Holistic Planned Grazing, however, assert that managing livestock to mimic the high stocking rates, density, and mobility of wild herds improves land function. This study analyzes Dimbongombe Ranch in Zimbabwe (shown in magenta polygon), the site of longest continuous Holistic Planned Graz, for changes in Normalized Difference Vegetation Index between 2010 and 2015 to determine if vegetative health has in fact improved over time. The study compares these changes to those in protected national parks, shown in grey shading.

All data are projected using a Sphere Sinusoidal transformation.

**Methods**

Data from 2015 were differenced (shown in vertical lines) with available monthly data from 2010. For months where there was more than one observation, the raster data were averaged (relationship shown with horizontal lines).

Finally, a Getis-Ord hotspot analysis was conducted using the fishnet to identify spatial trends in NDVI difference.

**Conclusions**

In its pursuit to determine if holistic planned grazing improves incidence of healthy chlorophyll, this analysis is somewhat inconclusive. The changes in in NDVI readings on the ranch are not statistically significant, and show a mix of degradation in the south and improvement in the north. It appears that areas within protected parks have experienced similar variance in changes of healthy chlorophyll, suggesting that livestock exclusion is not adequate for improving ecosystem function and healthy vegetation. Further study should consider using higher resolution data from Landsat to discern more localized nuance. This analysis is prone to spatial error because of the aggregation within fishnet cells. Error also likely arises from incomplete temporal data, as seasonal changes likely defy calendar measurements of time.