Project Update: October 2019

Summary
The quantity and quality of available woody forage species affect the way giraffes select forage in savanna landscapes. In addition, resource patterning determines the range within which animals restrict their movements hence making it possible for ecologists to predict the movement and distribution of animal herds across the landscape. The knowledge about availability and usability of available forage resources is critical in the efforts toward effective rangeland management and species conservation. Hence our current project attempted to understand how giraffes select food resources depending on their proportional availability. As such we investigated whether the spread of woody plants might have benefit giraffe feeding ecology by providing preferred forage, or adversely affecting feeding ecology if the expanding woody vegetation is not selected by giraffes. Scanning sampling was used to quantify the usage of forage species as well as random and systematic vegetation sampling for quantifying availability of food resources in the Tarangire Manyara Ecosystem. Our preliminary results revealed that giraffes showed a strong preference towards some woody forage species while avoiding others in the Tarangire Manyara Ecosystem.

Fieldwork
We continued with field data collection for the 2 months of the dry season (September and October 2019). The same procedures as that used in the wet season were repeated to obtain field data for the other 2 months of the dry season. As such, giraffe groups were observed opportunistically from dawn to dusk and forage data were recorded for 2 hours in each group using instantaneous scan sampling as described in the project proposal.

Vegetation sampling was conducted immediately along the animal routes after completing behavioural forage observations. Activities undertaken during forage behavioural observations includes searching for giraffe groups which were then followed for 2 hours each to obtain foraging observations. Foraging activities of the giraffes were recorded using instantaneous scan sampling at 10-minute intervals. In every scan, we recorded giraffe group size, sex, age class, plant species being fed, plant part, human activities in the area, vegetation types (grasslands, woodlands, wooded grasslands, and bushlands) as well as retaining the GPS coordinates for every record. I worked together with botanists during vegetation sampling where we identified and quantified all the woody plant species encountered in vegetation plots. During the assessment of vegetation sampling, I was also accompanied by a ranger/village game scout (for security), a driver and a local field assistant. While in the field, unidentified woody plant specimens were pressed in a plant press made up of a ventilated wooden frame.

Specimens were folded in newspapers then tightened using elastic string to absorb moisture content while maintaining the morphological integrity of the woody plant specimens for easy identification. Unidentified plant specimens were assigned a collection number (symbol) and record in a field notebook.

Preliminary Results
Our preliminary results revealed that giraffes showed a strong preference towards some woody forage species while avoiding others in the Tarangire Manyara Ecosystem. The

selection of forage species also varied considerably across the seasons. During the dry season, the abundance of some most preferred forages like *Dichrostachys cinerea and Acacia tortilis* declined and sometimes we're not available to some areas. Meanwhile, giraffes were unsurprisingly selecting another palatable forage even if they are not preferred. For example, during the wet season food resources were plenteous, almost every forage species flourished, and it's from this period where forage species like *Lanchocarpus eriocalyx* and *Combretum zheyeri* were not selected. But at the peak of the dry season, some most preferred species such as *Dichrostachys cinerea* were utterly dried in some areas (Figure6). Under such conditions, giraffes were inevitably seeking for forages elsewhere to meet their nutritional requirements.

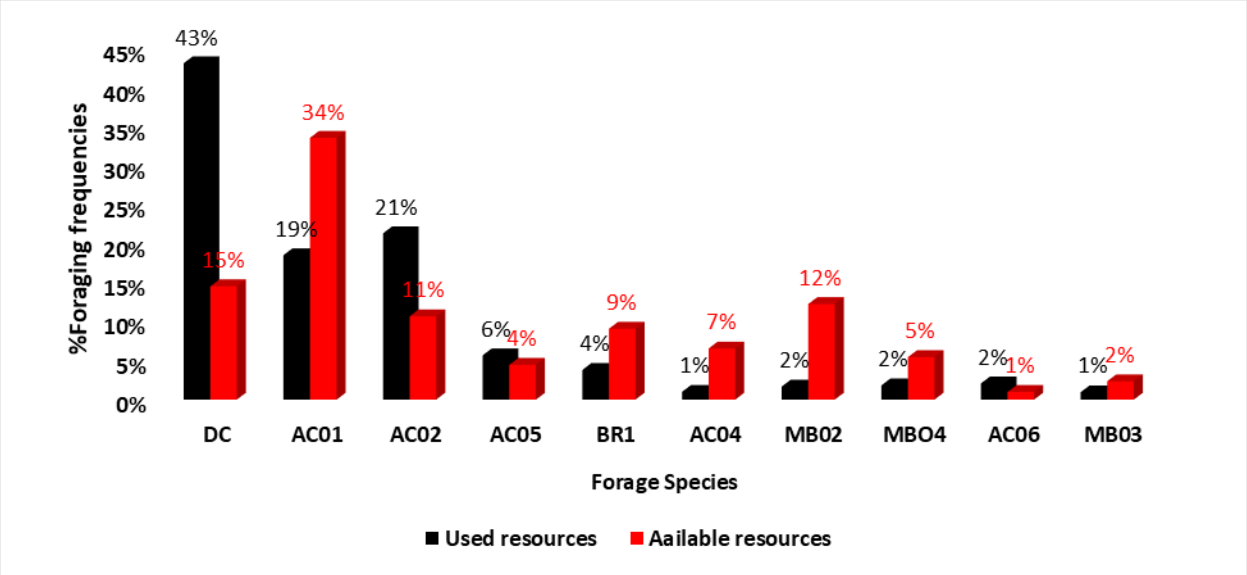


Figure: Giraffe foraging frequencies (%) for ten most foraged woody species against their available resources during the dry season across Tarangire Manyara Ecosystem; Dc=Dichrostachys cinerea, Ac01=Acacia tortilis, Ac02=Acacia mellifera, Ac04=Acacia kirkii, Ac05=Acacia drepanolobium, Br1=Balanite aegyptiaca, MB02=Dalbegia melanoxylon, MB04=Maerua triphylla, Ac=Acacia nilotica and MB03=Strychnos potatorum

Giraffe demonstrated strong habitat selection where many groups were mostly found in habitat composed of open woodland and shrublands. Based on simple field observation *Dichrostachys cinerea* was frequently encountered in many areas across the Tarangire- Manyara landscape owing to the rapid expansion of this bush encroacher in the savannah ecosystem. There was also a sudden shift in habitat selection during the dry season. Unlike in the dry season, several giraffe herds were encountered in woodland habitat dominated by *Combretum* and *Commiphora* species during the wet season.

While in the dry season giraffe preferred foraging on partially green leaves and sprouting shoots. Some woody species like *Balanite aegyptiaca* and *Acacia tortilis* were still/ partially green hence providing forage resources for giraffes in the drought time. Toward the end of the dry season when most of the potential forages were mostly dried, still some were left particularly drought resistant species, in this regards the partly green plants

like *Acacia tortilis, Balanite aegyptiaca, Combretum, and Lanchocapus species* become an important source of food for the giraffes.



Figures 1, 2 & 3.

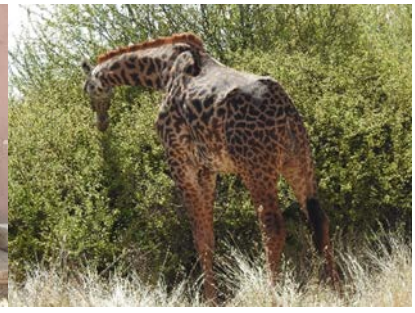


Figures 4, 5 & 6.



Figures 7, 8 & 9.





Figures 10, 11 & 12.

Figure1: Giraffe foraging on Balanite aegyptiaca during the dry season, **Figure2**: Acacia tortilis sprouting on early October, **Figure3**: Giraffe foraging on *Lanchocarpus* pods during the dry season, **Figure4**: Giraffe feeding on dried leaves of *Acacia mellifera* during the dry season, **Figure5**: Partly dried shrubs during the dry season, **Figure6**: *Dichrostachys cinerea* utterly dried during the dry season, **Figure7**: Principle investigator taking note on habitat type **Figure8**: Principle investigator discussing communicating preliminary results to Manayara Ranch Manager, **Figure9**: Cattles grazing within the protected area (Randilen WMA), **Figure10;11**: Training Village Game Rangers (VGS) on GPS usage, **Figure12**: *Acacia mellifera* growing soon after the period of short rain start.

Human Activities and Habitat Change

We consistently recorded human threats influx from pastoralists and cultivation that could regress the rangeland stability in the Tarangire Manyara ecosystem. Habitat changes in the area partly influenced by these human activities. Some of the human activities recorded in the area include; photographic tourism, livestock keeping (**Figure9**), crop cultivation, management activities, lodging and camping (private/public).

Future plan

First of all, I am very thrilled to report to you about the progress of our recent project in the Tarangire Manyara Ecosystem. Based on planned project goals, we have been able to accomplish up to more than 95% of our project activities. So far, we're already done with the collection of field data for both wet and dry seasons. Likewise, we have completed analysing data along with composing the manuscript for publication. We are currently finalising the remaining part (conservation education to local communities).

Henceforth, we will be visiting some schools and villages around Tarangire Manyara Ecosystem in the coming weeks in an attempt to raise community awareness on issues pertained to wildlife conservation whilst communicating our research findings. The final report of the study will be submitted soon after we incorporate the conservation education component.