Project Update: February 2020

Habitat use of wild and domestic animals

We have had 27 camera traps set in a controlled long-term enclosure experiment in which access by cattle, meso-herbivores (15-1000 kg) and mega-herbivores (>1000 kg) has been manipulated in different treatment plots. By June 2020, the camera traps will have been recording habitat use by domestic and wild animals in the 27 treatment plots (three replicates of nine treatments, which combine the presence and absence of meso-herbivore and mega-herbivore wildlife with three cattle use intensities) for a full year. This will enable us to investigate the mediation of competitive and facilitative livestock-wildlife interactions by intra-annual rainfall. So far, we have recorded the presence of 33 wild animal species, including 14 large mammals, five small mammals, seven large carnivores and seven ground-dwelling birds. Although the full dataset will not be ready for analysis until June 2020, we have also been working on an analysis of large mammal aerial census data to explore the spatio-temporal dynamics of livestock and wild herbivores in Laikipia, Kenya. Through this work, which was recently published in the journal Biological Conservation, we found that species richness of wild herbivores is lower in areas with higher livestock abundance. We aim to follow up this work with a more detailed analysis that disentangles the differential impact of cattle, sheep/goats, camels and donkeys on wildlife at the species and community levels.

We have also used the species richness predictions to investigate landscape connectivity of large mammals which we plan to publish later this year. This connectivity analysis involved the engagement of local land managers to help map

the fences that impede wildlife movement and their permeability to different species. Ultimately, we hope to integrate the results from the localised manipulative enclosure experiment (high causal inferential strength but limited scope) with the aerial survey monitoring data (broad scope but low causal inferential strength) into a hybrid dataset that enables us to address questions that neither of the component datasets can answer alone.

Rangeland rehabilitation through invasive species management

The aspect of this project that focuses more strongly on community engagement centres on rehabilitation of degraded rangelands through the management of an alien invasive cactus species, *Opuntia stricta*. This rangeland is within a communally managed Maasai group ranch where vegetation cover has been declining, limiting the forage available to both domestic and wild animals. The increase in bare ground has facilitated the spread of *Opuntia*, particularly around homesteads, exacerbating human-wildlife conflict as elephant are attracted to these areas to consume the cactus' fruit. When consumed by livestock, Opuntia spines lead to secondary infections around the mouth and gastrointestinal tract, sometimes leading to death.

To increase forage availability for livestock and wildlife, improve livestock health and reduce human-elephant conflict, we have cleared *Opuntia* from key sites identified by the community (e.g. around schools), around homesteads and within a 200 ha area set aside for dry season grazing. To date, we have cleared 25% (50 ha) of this dry season grazing area, gathering the cut and uprooted cacti in large piles. Clearing the cactus in this conserved area reduces the chance of reestablishment due to competition with native vegetation, while the large piles also prevent re-spreading.

Cladodes at the top of the pile wither and die without contact with soil, the cacti beneath are shaded out and those around the edge can be uprooted and placed on top of the pile after several months. Manual clearing of *Opuntia* is the most cost-effective method of managing the cactus available to the community, while creating much needed employment (sometimes referred to as the 'restoration economy').

Even those not directly employed are benefitting in ways other than the improved grazing conditions. For example, some have set up businesses selling tea and food to the labourers and others ferry the labourers to and from the site on motorbike. Issues of equity have been addressed by ensuring that employment is provided to individuals from all 'clusters' of the group ranch, so that no community is favoured.