Project Update: March 2019

Introduction:
As mentioned in my proposal, this research is focusing on investigating the ecological and social dimensions of leopard-livestock conflict in Sri Lanka, in two buffer zone communities that are increasing in the amount of dairy (cattle) farms present. These expanding dairy farms encroach onto the endangered Sri Lankan leopard *(Panthera pardus kotiya)* habitat, and effectively introduce a new prey species onto the landscape (domesticated dairy cattle). Reported incidents of leopard-livestock conflict have been increasing in recent years, though this has yet to be quantified and modelled against explanatory variables, which is what this project aims to accomplish. Variables measured are leopard native prey relative abundance, distance to forest, distance to water, cattle density and cattle husbandry technique employed. These will be modelled against resulting level of depredation (amount of livestock lost to leopards) in order to see what factors have the greatest explanatory effect on conflict, and where we can then direct limited resources towards conserving this endangered, apex predator. The Rufford Small Grant was used to purchase remote trail cameras Bushnell Essential E3) in order to measure leopard native prey relative abundance, which is a current knowledge gap in these buffer zone habitats. The grant was also used to pay for field assistant salaries, and daily vehicle and driver rentals to complete this field work.

Another aspect of this research involves community surveys with dairy farmers who rear livestock in these buffer zone habitats. The survey will include information on the household, socio-demographics, husbandry practices, priorities, experience, knowledge and attitudes towards leopards and potentially mitigating husbandry techniques. Resulting attitudes will be scored and modelled against predictor variables measured in the survey in order to identify explanatory factors (e.g. a farmer's previous negative experience losing livestock to leopards, or knowledge of leopard conservation and ecological significance) that influence community attitudes. This will help focus awareness and education programs towards the communities in a more effective manner.

Fig.1. Yala buffer zone cattle

Field Visits & Pre-Survey Testing:
Prior to beginning the field work, the study sites were visited in order to get a feel for the landscape and environmental factors involved. Potential locations for camera traps were scoped out, particularly regarding signs of human presence as this landscape posed a high threat of theft/damage to cameras. The survey was also pre-tested on 10 dairy farmers, with questions being modified, added and deleted appropriately in order to ensure clear understanding between respondents and researchers.

Camera Trapping:
Initial rounds of camera trapping began in early May 2018. Additional cameras were brought to Sri Lanka mid-field season. By August 2018 when the field season was over, there were 24 stations of camera traps set up, varying in length of time due to permitting, safety, and the need to rotate existing cameras to cover a greater area. Analysis of camera trap images is currently underway, with species such as leopard, axis deer (*Axis axis*), sambar deer (*Rusa unicolor*), wild boar (*Sus scrofa*), fishing cat (*Prionailurus viverrinus*), black-naped hare (*Lepus nigricollis*), saltwater crocodile (*Crocodylus porosus*), mongoose (*Herpestes* spp.*)*, porcupine (*Hystrix indica*), jackal (*Canis aureus*), Asian elephant (*Elephas maximus*), gray langur (*Semnopithecus priam*), and civet (*Viverricula indica*) being caught on images.

Left: Setting up a camera trap in Yala to a grazing ground. Right: A camera trap set up close

Left: Male Sri Lankan leopard *(Panthera Pardus kotiya*. Right: Ruddy mongoose *(Herpestes smithii)*

Livestock-Rearing Communities: Interviews

119 interviews were conducted between the two study sites. Respondents varied in terms of livestock depredation experienced, age, socio-demographics, knowledge, husbandry techniques employed, and overall attitudes.

Left: Children of an estate community in the Maskeliya. Right: Interviews conducted in Dunkeld Estate

Current Progress:

Analysis of field data is underway. I am using GIS and a two-step modeling approach to:

- Use camera trap images to calculate leopard prey availability (in terms of biomass).
- Run generalised linear models to identify ecological variables related to prey biomass.
- Extrapolate prey biomass out to individual dairy farm locations.
- Create a larger conflict model using these extrapolated prey biomass values, along with other variables such as distance to water, distance to roads, forest

density, cattle density, cattle husbandry technique used to measure their relative influence on resulting amount of depredation at the individual farm level.

Survey data will be analysed in a similar fashion, using generalised linear mixed models to account for nestedness in the data. Preliminary results will be finished by May 2019.

Another round of fieldwork will be conducted from June-August 2019, upon which results from the camera trapping section will be complete.