



Hello again from OTS South Africa!

I'm excited to present you with the final instalment of the OTS Fall 2014 newsletter trilogy. Writing these letters has been one of my favourite tasks as it forces me to think back on all we have done and allows me time to reflect and reminisce on what we've achieved. And we've achieved a lot. In 99 days we have transected South Africa twice, stayed in nine sites in four provinces, learnt so much about ecology, conservation and culture through interactions with leading South African academics, and have had the most incredible time doing so. Since the last time you heard from us we've journeyed back from the Cape to Kruger National Park and although we've only stayed in one place since – Skukuza Rest Camp – our final month has been jam-packed with so many different activities that the time has just flown by... So let me tell you about the last month of the OTS Fall 2014 semester...



Arriving back in the bush after so much time away is always extremely exciting and the students couldn't wait to get back into the rhythm of morning games drives and evening sport and sundowners.. Although these are the things that make OTS so special, the imminent exams were a very real reminder that OTS is first and foremost an academic program. So after studying hard and revising all they've learnt about South African ecology and conservation, the students wrote two exams and I'm sure were relieved to get them over and done with and, most of all, excited to get back into the field. And that was exactly what came next. Monitoring biodiversity is one of OTS's key commitments to SANParks and is something we contribute towards with each semester's biodiversity surveys. For us this means three days of really fun field work and an opportunity for the students to learn about collecting and curating plant and animal specimens – an important part of being an ecologist. Although the class was split into groups and each group was responsible for a different 'taxon', everybody got the chance to learn about rodent trapping, active and passive insect catching techniques, vegetation surveys and collecting data on tree morphology.



Caroline and a doormouse, Leigh caught a Cristina, setting up pit-fall traps, collecting tree morphology data and Sara admiring the insect collection

Once the fieldwork for the biodiversity collections was done and dusted, it was time for the capstone of the OTS semester—the independent projects or IPs. After three months of engaging with ecology and conservation and gaining experience in field biology, the students encouraged to employ their curiosity to devise their own questions based on what they have observed around them. Here is a little about each of the IPs:



For the Crocodile Nesting Habitat IP, Hannah and Nicole spent four days walking along the riverbanks of the Sabie River with two game guards Philly and Renson, under the supervision of Kristi. Whilst dodging hippos and side-stepping the odd dugga-boy (buffalo) these two brave ‘crocodile-hunters’ set out to find potential crocodile nesting sites. Using Google Earth to first identify potential crocodile nesting sites Hannah and Nicole visited these sites, recorded soil temperatures, collected soil samples, assessed vegetation cover, scored and ranked the sites according to habitat suitability. Unfortunately they didn’t find any nests but according to their results there were many potential nesting sites along the Sabie River, which was therefore strange as crocodiles evidently weren’t nesting there. The main conclusion they derived from this was that the high abundance of large mammals on the Sabie River as hippos especially are harmful to crocodile populations because they cause high disturbance which lowers the success rate of nests.



The class goes for a bush walk to generate ideas for their IPs. Leigh helps Hannah and Nicole with their crocodile habitat fieldwork

Jaina, Allison and Leigh, under the supervision of Kristi and Karen set out to study the Nile crocodile movement patterns in the Kruger National Park. These three computer-whizz girls bravely took it upon themselves to analyse a large database provided by SANParks Scientific Services that consisted of GPS coordinates of 13 collared crocodiles over a period of 12 months. These girls spent a lot of intimate time with ArcGIS, analyzing home ranges, seasonal movement patterns and how this varied across sex as well as size. Their strong perseverance and dedication most certainly paid off, as their results were well received by all, including SANParks staff at the final presentations. Among other interesting results they found that female crocodiles showed greater average daily distances in the wet season than the dry season and had seasonally distinct regional preferences. Males spent both seasons within the two regions and did not show distinct seasonal movement patterns, though they did generally move more per day than females. This information is particularly valuable for informing crocodile management within the Kruger National Park.

Ben, Chris and Ukyoung, under the supervision of Jason, spent their independent project time investigating the responses of mantid (e.g. praying mantis) communities to disturbances such as fire and herbivory. Study sites based in the west of the Kruger National Park were visited by the mantid crew who replaced their usual gym routines with swinging heavy-duty butterfly nets while bent double scanning for grass mimicking mantids. Mantids feature as both predators and prey in the savanna system and rely heavily on their cryptic abilities in order to both find and avoid becoming food. This makes mantids very sensitive to changes in their surroundings and fire events that leave the landscape blackened were expected to drastically change the mantid communities living in burnt areas. Ben, Chris and “The Uk” found exactly that, with observations in the field showing mantids displaying melanistic coloration (when animals display blackened coloration) to avoid detection in recently burnt areas. All this work culminated in a mostly moustache-clad crew presenting to SANParks on the importance of disturbance events such as fire in maintaining the diversity of insect communities.

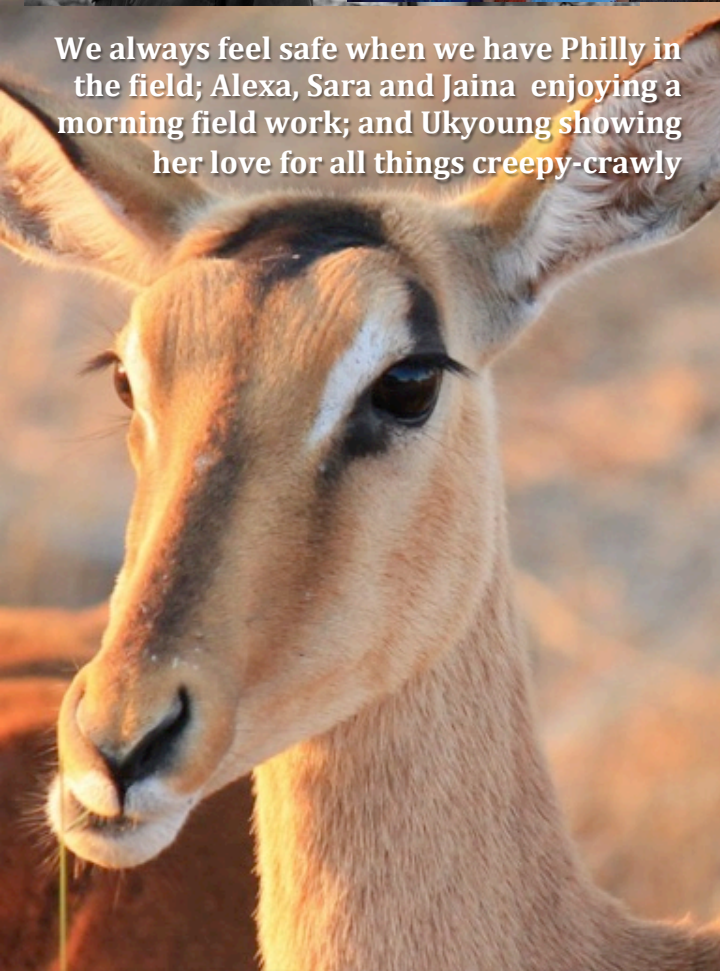


Audra and Blair collecting sampling river habitats, Ben sweep-netting for mantids and Bennett testing water quality

Of the five major perennial rivers that traverse Kruger Park, the Crocodile River is one of the most biologically diverse and ecologically important systems in the country. The river flows eastwards through the *lowveld* region of Mpumalanga Province where it is heavily used for agricultural purposes before reaching Kruger. With this in mind, Bennett, Kelly, Blair and Audra set out to investigate how water quality of the river changes as it traverses Kruger Park and receives contributions from tributary catchments inside Kruger. To assess water quality, the crew sampled aquatic macro invertebrates at sites upstream and downstream of the confluence of the Biyamiti River – a major tributary of the Crocodile River with a catchment area entirely located within the bounds of Kruger Park. Macro-invertebrate assemblages are particularly good indicators of localized conditions in rivers, which has led to the development of a number of national protocols for their use in river assessments. The fieldwork for this project was no joke, and the crew, along with Don, Jordan and ever vigilant game guards, spent the majority of their five data collection days with sampling nets, buckets and sorting trays in hand, only to return in the late afternoons to begin identification of the collected specimens. Making it all worthwhile however, was the amazing opportunity to see and explore some of the more remote locations in the park, surrounded by the incredibly scenic landscapes only a river flowing through a savanna can provide. Their findings supported their predictions that water quality in the Crocodile River improved downstream of the Biyamiti confluence, with a greater proportion of sensitive species in the downstream sampling reach. The group also conducted one of the first assessments of macro-invertebrate communities in the seasonal rivers in Kruger, data which SANParks researchers were excited about and will use to compile baseline inventory data for comparison with the perennial rivers in the reserve.



We always feel safe when we have Philly in the field; Alexa, Sara and Jaina enjoying a morning field work; and Ukyoung showing her love for all things creepy-crawly

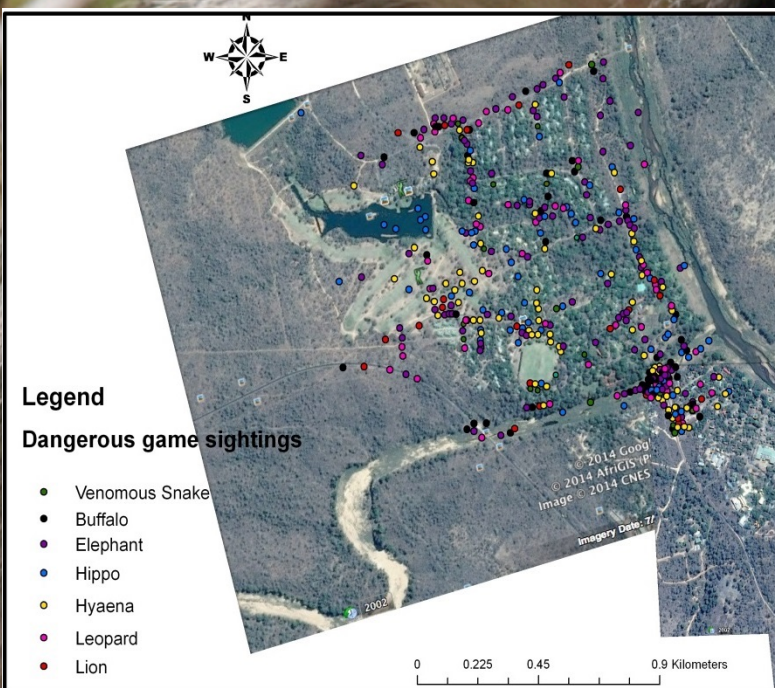


"Impala" – a word that is heard numerous times on any given day on an OTS semester, and I guess it is not surprising considering that there are approximately 900 000 impala antelope in Kruger. Instead of getting bored of the herds which are frequently spotted on the daily game drives, a group of four very determined (and perhaps slightly off-the-wall) students chose them as a study species to investigate the effect of human presence on animal vigilance and predator response patterns. Ceci, Jessica, Deanna and Caroline scrambled into the game drive vehicles and spent their mornings and afternoons observing impala behaviour across sites with varying degrees of human presence. After identifying some emerging trends in their behavioural data, the girls decided to take things a step further and test the response of impala to auditory predator calls to see if being surrounded by a higher degree of human activity changed the threat response of impalas. But that still wasn't enough for these four ladies, who opted to complete their story by comparing flight initiation distances of herds approached on foot. What did they find? Well their findings suggest that impala tend to spend less time being vigilant in high human presence areas, and consequently are able to spend more time foraging in these areas. The auditory and flight initiation distance results suggested that reduced vigilance in high human presence sites was most likely to be explained by habituation to human threat alone, and not an overall reduced predator threat response. These results provided managers with some evidence of how ecotourism can influence the behavioural patterns in social antelope species.



Deanna and Caroline observing impala from the safety of the GDV

Two student groups were interested in gaining better understanding into how humans and wildlife coexist in the residential areas of Kruger National Park. The staff village in Skukuza (which is KNP's administrative center and therefore the largest village) consists of some 240 houses which are individually fenced (with 1.5m high fences) but there is no perimeter fence to stop dangerous game from coming into the residential area. In addition problem animals, like baboons and vervets make themselves quite at home around our homes and sometimes, even in our homes! Sara, Kyle, Cristina, and Rhiannon conducted a project to document and observe wildlife in the staff village both during the day and night. They studied both human behavior (are humans disposing of waste correctly, keeping gates and windows closed etc.) and animal behavior (are baboons, vervet monkeys and hyaenas that reside in and around the village largely behaving and foraging naturally or are they eating human garbage etc.). Using daytime observations on foot, nighttime observations from a vehicle and camera trapping, they documented over 28 species in the staff village including 5 species of dangerous game and 4 problem animals. But overall they concluded that these animals are largely behaving naturally and are not causing major conflict for staff residents.



Adri's map of all the locations of dangerous game sightings residents claim to have had in the past 6 months!



A vervet sitting on the fence of a residents house



A hyaena caught on a camera trap investigating a dumpster in the staff village

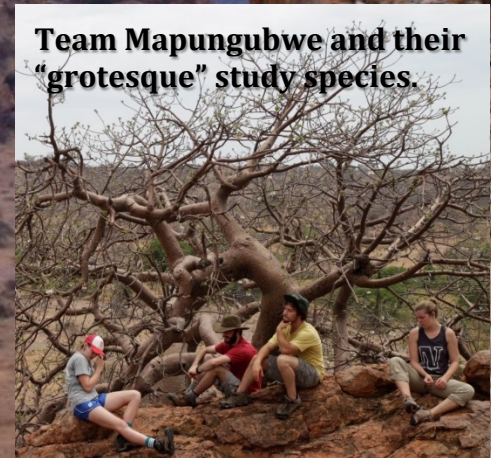
To compliment this, Adri was then interested in hearing about resident's perspectives on the matter. She designed a 15 minute questionnaire and surveyed about 70 residents in the staff village gaining insight into how often (in the last 6 months) they have encountered dangerous game on foot or in a car and how they felt about it, how often did animals get into their yards, rubbish bins, and houses, and did they think more needed to be done to protect them? Interestingly, residents indicated they largely like it when they see dangerous game in the village, they don't have encounters too frequently and generally understand that in a national park, we are the visitors and so must behave accordingly (of course there were a few dissenting views...). All in all these two projects help SANParks to better understand that despite the odd rumblings you hear from residents, levels of human-wildlife conflict in the staff village are generally quite low!

Mapungubwe National Park is located in the north of the country at the confluence of the Shashe and Limpopo Rivers, the point where South Africa abuts both Botswana and Zimbabwe. An arid area, it is dominated by the Boabab and Mopane and a range of succulent trees. One of the more common species is the Sesame Bush, *Sesamothamnus lugardii*. An odd looking tree-shrub, described as “grotesque”, it has evolved an interesting life history story: it possesses long-tubed, white flowers that only open at night, suggesting that it might be pollinated by a single species, and therefore, highly specialised pollinator. Managers of these arid systems are concerned about succulent species that are highly palatable, and particularly those which are dependent on specialist mutualisms for long term survival.

So within the context of trying to assess the resilience of this species, Matt, Lily, Alexa and Nate headed north with Laurence and spent a week studying the plant. They looked at the demographic profile of the plant, identifying the key agents of disturbance and spent time tracking the pollinators. After a week of early mornings, finding plants in the rugged landscape, putting up camera traps and then later, evenings observing visitors to the flowers, they found the following: The flowers are indeed visited by a specialist pollinator: the flowers being so long (3 inches or so) can only be pollinated by an insect with a proboscis or beak at least as long. The only viable candidate is a hawkmoth (*Agrius*) with a tongue as long as the flower tube. When visiting the flower to drink the nectar, they faces brush the anthers, and, as they move from flower to flower for their sugary meal, they spread the pollen. However, the plant is entirely dependent on the pollinator, as it is self-incompatible (it will not produce fruit if the flower is pollinated by pollen from itself) i.e. It is what they call an "Obligate Outcrosser". This renders the plant vulnerable to local extinction if the pollinator is lost, and ultimately co-extinction if the pollinator vanishes. Fortunately, *Agrius* is a robust moth, and is not endangered. However, the results of the second portion of the project suggest that the story is not so simple. They assessed how vulnerable the sesame bush is to disturbance. It turns out, that despite heavy browsing by Kudu, Eland and Zebra, they can recover their lost bark and branches through vegetation growth. Furthermore, the amount that the plant is browsed upon does not affect how much they can flower, suggesting that the plant is very resilient (at the level of the individual). The final piece of the puzzle is that they are incredibly long lived (400 – 600 years old!!) so they can also survive in the long term, and wait until pollinator communities recover or for germination/establishment opportunities become available. In essence, this intrepid team of biologists unravelled one of the pollination mysteries of the arid north of the country, but also provided managers with some guidance as to what is most critical in the conservation of the species.



Team Mapungubwe and their “grotesque” study species.



A hawkmoth pollinating a flower caught on a camera trap

So there you have it! Eight successful IPs executed professionally by 25 diligent, creative and hard-working students with the help of equally dedicated staff. And if it weren't impressive enough for them to have written up these projects so proficiently, they all wowed us at the final presentations where SANParks staff were invited to watch and comment on their work. Really, really proud of all of you, well done!

All this brings us to the last two nights and the final day of the semester. After the IP talks we held a final dinner at the vet camp and enjoyed our last "braai" together and an evening of beautiful speeches and silly dances. And then we were down to one day. And after getting all the packing and course reviews out the way, what better way to spend our last day in Kruger together than with a long evening game drive rewarded with an unforgettable cheetah sighting! Afterwards we headed to "5 minutes" for some Frisbee in the river bed, a delicious meal by the bonfire and a series of hilarious and tear-jerking songs and slideshows.



The whole class plus Jordan, looking very smart for their final talks

Cristina, Kelly, Rhiannon, Deanna, Jess, Ceci and Leigh hanging out in the riverbed



Day 99 of the OTS semester is not something we look forward to. And although saying goodbye is heart breaking, having met, lived and played with this group has been the most incredible experience and worth every tear.

When you ask an OTS student to describe the course you can expect words like "awesome", "eye-opening" or "best three months of my life", but sometimes all you hear is silence as many are lost for words and insist that it's an indescribable experience that one can only truly understand if you've experienced it. So you can look forward to asking your sons and daughters and friends about the last few months of their lives, but be prepared for a goofy smile and glazed over eyes and don't worry, it's normal.

Thank you

The OTS crew; Jordan, Karen, Don, Jason, Kristi, Laurence, and Philly

