ZINGELA'S GIRAFFE

The methodology and importance of identifying individuals in conservation

Africa Wild Trails
Giraffe Research Project 2018

Introduction

Zingela is a 500,000 HA reserve located in Kwa-Zulu Natal, South Africa. It is debated as to the number of species of Giraffe that Africa is home to, however the population as a whole has decreased by 40% over the past 30 years. Our research focuses on the Southern giraffe; 20 of which were introduced to Zingela in the 1990s. Since then, their numbers at Zingela and the surrounding reserves have increased to what is estimated to be over 100 individuals - however, actual population size is currently unknown. As with any conservation effort, our first step was to investigate abundance and distribution to allow us to determine what action to take next.

Our aim was to calculate an approximate population size through the use of photo recognition software to identify individuals, photos were taken by cameras out in the field and then collating data back at camp. We also used our findings to create an identikit to allow us - and other visitors to Zingela - to spot individuals, track their movements and contribute to the future of their conservation. We also visited Emaweni camp, an area adjacent to our main study site, to see how the distribution of giraffe differ to those in Zingela.
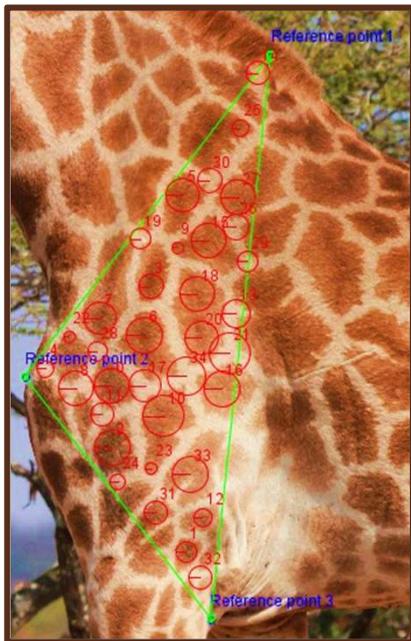
Method

- To locate the giraffe, we used a systematic approach by grid referencing the study area. Scouts would use an elevated position on Hippo Hill to locate the position of the giraffes and radio to the ground teams. When approaching, the teams advanced in stages in order to observe their natural behaviour. We also used the help of a dog and the giraffe's natural curiosity to allow us to get close up photographs of the identifiiable areas.
- Once in a good position, each member would focus on one or two individuals to ensure we didn't count individuals multiple times and to record their age class and gender. Data was collected on the age class, genders and number of giraffes in a tower.
- Photographers in each group would then take photos of both the left and right side of the individual when visibility would allow. The photograph numbers of the best images were recorded to ensure accurate data input. Photographs were uploaded to the I3S pattern database where a profile was created for each giraffe to enable creation of the Identikit (see details below).
- In addition to following the giraffe, we also constructed a hide overlooking a waterhole where we found evidence of giraffe frequenting (eg tracks, droppings, camera traps), which will allow future researchers and the public to observe any giraffe that come to drink and use the identikit. We also used a drone to locate giraffe, but this method will need to be explored and refined further to consider using it for taking identifying photos.

Left: Students on the trail of giraffe. The terrain allowed us to gain elevation to easily determine their whereabouts.

Below: A map of the Zingela reserve, with the distribution of giraffe shown as points. The numbers represent the dates on which a group (tower) of giraffe were observed. Above left of the centre, the Hippo Hill is easily visible, and it seems clear that the giraffe prefer the centre of the map. Our next step in future years could be investigating possible reasons for their distribution (eg shelter from wind, exposure to sun, less disturbance from humans).

Our work on giraffe identification allowed us to identify a suitable area of the giraffe for use in both photo identification software and manual identification (see Figure 2). Using these techniques, we have been able to create profiles for over 30 of Zingela's giraffe in the Identikit and use the I3S pattern recognition software to differentiate between individuals faster and easier when suitable. The Identikit can now be used by guests due to its simplicity to identify giraffe they see while visiting the reserve. This not only creates a new activity to allow guests to engage further with the wildlife, but also a method for continued monitoring of the giraffe population with low costs and effort.
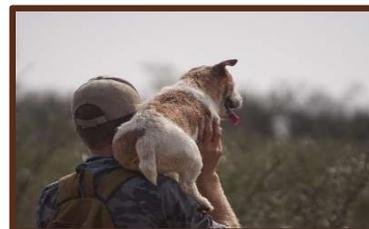
This research has implications in three main areas: monitoring specific giraffe and their populations; the management of lodges and reserves with regard to their giraffe populations, and further research into giraffe in general. Giraffe monitoring can be improved as group dynamics, social behaviour, feeding and health (for example, from droppings) can be studied with more ease as individuals can be quickly identified and so efficiently followed. Giraffe can also be tracked to gain insight into preferred conditions and how this changes as the habitat does. Lodge and reserve management can then be altered to allow trails and

hides to be built in the most effective location to see the giraffe. These facilities can continue to bring in higher income and so allow increased funding for giraffe conservation. Another aspect for consideration is the human-giraffe interactions allowed on managed land. For example, a nearby hunting lodge, Emaweni, has many giraffe but locating and photographing them proved much more difficult as they were much more timid than at Zingela. This is likely due to human activities on this land such as game capture, legal hunting and increased poaching pressure from the local communities. Effective giraffe identification may also allow more viable running and management of lodges and reserves, due to applications in the identification and treatment of 'problem' giraffe. Additionally, it may prove useful in the transfer and translocation of giraffe between areas, the use of genetics in breeding programmes, and monitoring inbreeding/ genetic variation in populations. General giraffe research can also benefit from these developments, as efficient identification can improve the accuracy of endangered species counts (including mark recapture – which can be adapted to be just observational and therefore non-invasive, which is much less stressful and risky for the giraffe) and save money and time in genetic studies (as genetics only need to be tested once then matched to the giraffe when sighted). Improvements to studies and monitoring using this identification is relevant in wild, managed and captive giraffe populations.

Above: Figure 2. A screen capture of the section of the giraffe we used to identify individuals. Using I3S Software, we outlined the section as pictured here and imput each giraffe into the database. When a new picture has been taken, you can search this database for giraffe that match the patterns of your subject and find out its name!

Right: The team (including Troy the dog) hard at work scouting for giraffe. Troy proved an invaluable tool in sparking the giraffe's natural curiosity and allowed us to get even closer for some easily identifiable photographs.

By adapting the mark, release, recapture method, we can reliably estimate the size of a population.
1) Identify a group of giraffe, input them into the database
2) Allow population to mix (aka over a year between projects)
3) Re-observe a group of giraffe and count the number of giraffe of that group already identified.
4) Use this equation:

$$\frac{\text{Number marked in second sample}}{\text{Total caught in second sample}} = \frac{\text{Number marked in first sample}}{\text{Size of whole population (N)}}$$

NAME: KETCHUP

Basic information:
- Code: ZGM?
- Area: Zingela
- Gender: Male
- Age at first sighting: Adult
- Herd: The Tambotis

Photo ID Sections

Above: An example page of the identikit we constructed using our photos and the I3S Pattern Software. It features the key data we collected; age class, sex, area etc. The left and right sections (the same used in the database) are clearly lain out for easy identification. Our identikit is currently 39 giraffe strong and will continue to grow as more giraffe are identified!

To summarise: through the identification of individual giraffe we were able to establish a method to estimate population size, as well as create a manual identification guide which can continue to be used in the future. The construction of a hide as well as the use of a drone allowed us to continue observe the giraffe without altering their behaviour. The identification of individual giraffe also helps to increase tourism and therefore funding for giraffe conservation. Other observations during this research have been made that may impact research further; the section that we found to be the most useful in identification was hard to photograph in shrubbery, although this was much more manoeuvrable in locations with giraffes accustomed to humans. There were also other techniques which may be useful for future giraffe identification. For example, it was noted that taking a small dog on our excursions through Zingela caused the giraffe to become curious and come even closer (even within 10 metres). Although this is a change in their natural behaviour, it did allow for better quality photos for identification in the software and Identikit. Potentially the most useful development for future research on and using giraffe identification is a test flight with a drone in Zingela. The giraffe allowed the drone to get closer than predicted so it may be possible to observe, track and identify giraffe aerially. This may also introduce better security for the giraffe due to the deterrent and actuality of the drone's surveillance. In turn, the reduced negative human influence on the giraffe could allow for better interactions with the giraffe for surveillance, monitoring, research and identifications in future studies.