

The Jaguar Project

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Mountain Pine Ridge- Belize
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The Jaguar Project- Overview

The Jaguar Project is a long-term population density study started and run by Dr. Marcella Kelly of the Fish and Wildlife Conservation Department here at Virginia Tech, alongside her Project Leaders. The project has been ongoing for 20+ years. The main goal of the project is to understand the ecology and behavior of jaguars in order to inform conservation efforts and promote their long-term survival. It accomplishes this by studying their population in certain areas throughout Belize, as well as the population of various other local wildlife, as their movements can have a direct effect on the movement patterns of the jaguar populations within the region.

The project is as successful as it is because of the abundance of data it collects throughout each season. It does this via camera trapping. Camera trapping is a technique in which motion censored cameras are used to track and monitor the movement of jaguars and other local wildlife throughout the area. These cameras run continuously for the duration of the project and are set up in a way which maximizes both hotspots of activity within the area and maximum visibility.



[Pictured above is Dr. Kelly holding one of the motion cameras (MLT) that are used both in her field technique class at Virginia Tech as well as by the Jaguar Project]



(Pictured above is Dr. Kelly and one of her Project Leaders, Darby McPhail, locating camera stations using customized maps)

Location- The Mountain Pine Ridge

The Mountain Pine Ridge in western Belize was the area in which the 21st session of the Jaguar Project was conducted. The Mountain Pine Ridge, located within the Cayo District, covers an area of 300 square miles and is 1 out of 3 tropical pine forests found throughout the world! This unique biome is characterized by the Caribbean Pine trees that dominate the landscape, as well as its acidic soil, which is unusual for a tropical environment. The soil is a result of the pine trees that grow in the area because they produce many needles and other organic matter, which can make the soil more acidic over time. In addition to its unique flora, the Mountain Pine Ridge also supports a variety of animal life. This includes mammals such as jaguars, pumas, and tapirs. However, this region of the world is best known for the wide range of bird species it supports, including toucans, parrots, and hawks. The Mountain Pine Ridge is also known for its various waterways which cascade throughout its province, which include popular tourist attractions such as the Rio on Pools (a collection of cascading pools visitors can swim in), the Rio Frio Cave (a large cave opening with a running river running throughout it), and the 1,000-foot falls (Central America's largest waterfall, standing at 1,600 feet).



This picture displays the color and texture of the acidic soil known in the region, as well as a good representation of the flora and fauna of the Mountain Pine Ridge



1,000 foot falls pictured



Rio Frio Cave pictured

My internship- My experience as field assistant

As a field assistant, my job was to help setup and maintain the various camera stations the project would use to collect its data. In total there were 67 camera stations throughout the Mountain Pine Ridge, and even some extending into the nearby Chiquibul forest.

Stage #1: Setup

This first included setting up all 134 cameras (two cameras to one station) by ensuring they had batteries that worked, making sure all the settings were correct, and finally testing the cameras out to confirm they were ready for the field. Once setup was complete, it was time to enter the Mountain Pine Ridge and set up each camera station individually.

Stage #2: Camera stations

Moving throughout the Mountain Pine Ridge proved to be difficult, as it involved off-roading on old logging roads that have been closed for many years. Additionally, these roads mainly subside on the various mountainous ridges scattered throughout the region, making the journey even more difficult. This resulted in us getting stuck many times, as well as many other daily challenges we faced. Once at the station, there were numerous parameters we had to go through to ensure our station was in the most optimal position to potentially catch jaguars. This included doing various tests once the camera stations were set up, such as a walk test, and a general motion test to ensure the cameras were working properly. Then it was on to the next one!

Typical setup and motion camera used



Stage #3: Checkups

Every 14 days, the SD cards at each camera station needed to be swapped out. This entailed visiting each of the 67 stations again and swapping out each SD card individually. This continued for the remainder of the session. Additionally, there was a checklist for each station that needed to be filled out to ensure the station was running smoothly and that it could continue to do so in the future.

Trail Maintenance

The days in-between setting up the camera stations and checkups were spent doing trail maintenance. As mentioned, many of the roads we utilized were old-logging roads that have not been utilized in decades and needed constant upkeep to ensure we were able to get to the camera station we needed to get to. The days devoted to the maintained of these trails and roads were called "chop days". During chop days, each field assistant was issued a machete, a tool that was most optimal at cutting down the various vegetation growing on the path. These chop days were typically the most physically demanding of the trip, as they were long and would require us to work outside in the steady 70-90 degree weather. With that said, they were also some of the most rewarding days of the trip where we were able to bond most as a group. The type of vegetation we culled varied depending on the area and surrounding environment (ex: the vegetation near streams of water differed from the vegetation in a dyer area) however, the most common plants that we cut were the Giant Sword Ferns, Sugar Cane, and Wild Cane. These days were also representative of our ability to see the local wildlife as snakes, scorpions, and small burrowing mammals were often easy to find.



Pictured is a **Barong Machete**, the type of machete used in Belize



Giant Sword Fern
(Nephrolepis Biserrate)



Wild Cane
(Saccharum officinarum)

Continuing the Project

Stage #4: WHAPL Lab:

After the data gets collected from the field, it then comes to the WHAPL (Wildlife Habitat and Population Analysis Laboratory) at Virginia Tech. Here begins the meticulous process of combing through the footage captured in the field and extracting the data found. This typically involves the acquisition, processing, analysis, and interpretation of footage stored within the SD cards. This data is entered a computer database, excel or access, to organize the data and make it easier to work with. It must be noted that this data entry is a conscientious process which involves closely monitoring the information within the timesheets in the video to ensure everything is neatly, and correctly organized.



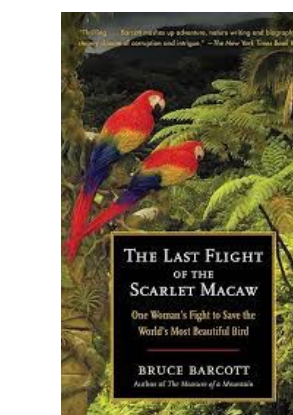
Cheatham hall at Virginia Tech; where the WHAPL lab is located



Spot patterns on Jaguars are unique to each individual, just like snowflakes. This means that in the WHAPL lab, students are able to identify specific jaguar and their families by analyzing their spot patterns! This information can be used to track their movements and hunting grounds.

Stage #5: Peer review and publishing:

Lastly, the data gets displayed in a final report that is sent out for peer review and publishing. This paper will acknowledge Dr. Kelly and her graduate students for their hard work and diligence. Dr. Kelly is the proud author of over 100 peer-reviewed scientific papers. These published reports can then go onto appear in scientific journals and make changes in the real world! The data collected from the Jaguar Project has gone on to provide scientific data and recommendations to inform land-use planning efforts and ensure the effective protection of key jaguar habitats within Belize. These measures helped the Belizean Forestry and Wildlife Conservation Departments to identify vital, key areas for the protection of intact forest habitats and the connectivity of habitat patches— which ensures the viability of jaguar populations. Additionally, with the knowledge accumulated over the years, Dr. Kelly has taken part in various court hearings within Belize. Most notably, she has been called to testify in efforts to save the habitat of the Scarlet Macaw's within Belize from an overseas company trying to build a dam in the ecologically diverse environment.



These efforts to save the Macaws of Belize was famously written about in the well-known book by Bruce Boycott; **The Last Flight of the Scarlet Macaw**

Conclusion

In conclusion, this capstone journey has taught me about the process of how scientific reports are conceived, from collecting the data within the field all the way to publication. It has shown me the meticulous attention to detail and organization that is necessary for these studies to be carried out and that the information must be of the upmost accuracy. Aside from the project, I have learned a great deal about myself during this month-long trip. Previous to this trip, I had not been able to leave the country in 10+ years and working in Belize has exposed me to a culture and environment I was unaware of. It has also shown me the beauty of such environments and that it is critical for us as a human species to preserve and save the aforementioned places before it is too late to do so.

Acknowledgements

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