

Using Camera Traps to Evaluate Biodiversity in Belize

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Introduction

- Belize is a country in Central America known for its tropical climate and rich diversity of species.
- Belize is one of three countries, including Mexico and Guatemala that holds the Maya Forest Corridor (MFC).
- This corridor connects protected forest to the north and south allowing for gene flow among many species, including the jaguar.
- The MFC is not only made up of forest habitat but contains agricultural land and many communities creating challenges to its conservation.
- Past studies of biodiversity in Belize relied on physical traps or indirect evidence, such as scat, to detect their presence ().
- As an alternative, digital camera trapping has shown to be an effective method for species detection ().
- The current study will evaluate the effectiveness of camera trapping for studying biodiversity in the MFC in Belize.
- Camera traps in Belize would provide critical evidence on ecological populations in Belize, potentially impacting major legislation surrounding the addition of underpasses on new highways and protecting wildlife habitats.

Methods

- We conducted our study at three sites: Monkey Bay Wildlife Sanctuary, Cockscomb Basin Wildlife Reserve, and Runaway Creek Nature Reserve and in a variety of habitats including pine savannas, and both lowland and highland broadleaf forests (Figure 1).
- Trails are commonly used by a variety of animals in Belize because they are easy to follow. Larger mammals, like the tapir, follow a collection of trails to water and to feed in small herds, while predators, like jaguars, follow trails in pursuit of their prey.
- Cameras were placed on trails because of increased visibility and activity patterns of wildlife. Once a camera site is selected, brush around the site is cleared so it won't affect visibility, and the cameras are placed approximately two feet above the ground. Cameras are set up in pairs opposite one another on a path about six feet apart to capture both flanks of the animals that may pass, this will help with identification, but at differing wide angles to decrease the chance of flashback (Figure 2).
- Photos were analyzed for ecological patterns, like habitat type, temperature, and time of day. Photos of animals with distinctive spot patterns will be put into HotSpotter, a computer program in which animals can be identified by their spots or botfly scars.



Figure 2. One of the camera traps used in the study immediately after installation. Picture credit Flor Mucino.

Results

With this data, we anticipate trends in time of day, temperature, habitat, and sociality among various species that will hopefully result in further studies conducted via camera traps and increased protection for wildlife in Belize.

Preliminary data analysis suggests that a variety of wildlife captured on our cameras but, at this point, evidence on how they use the trails over time is limited due to the time constraints of the trip.

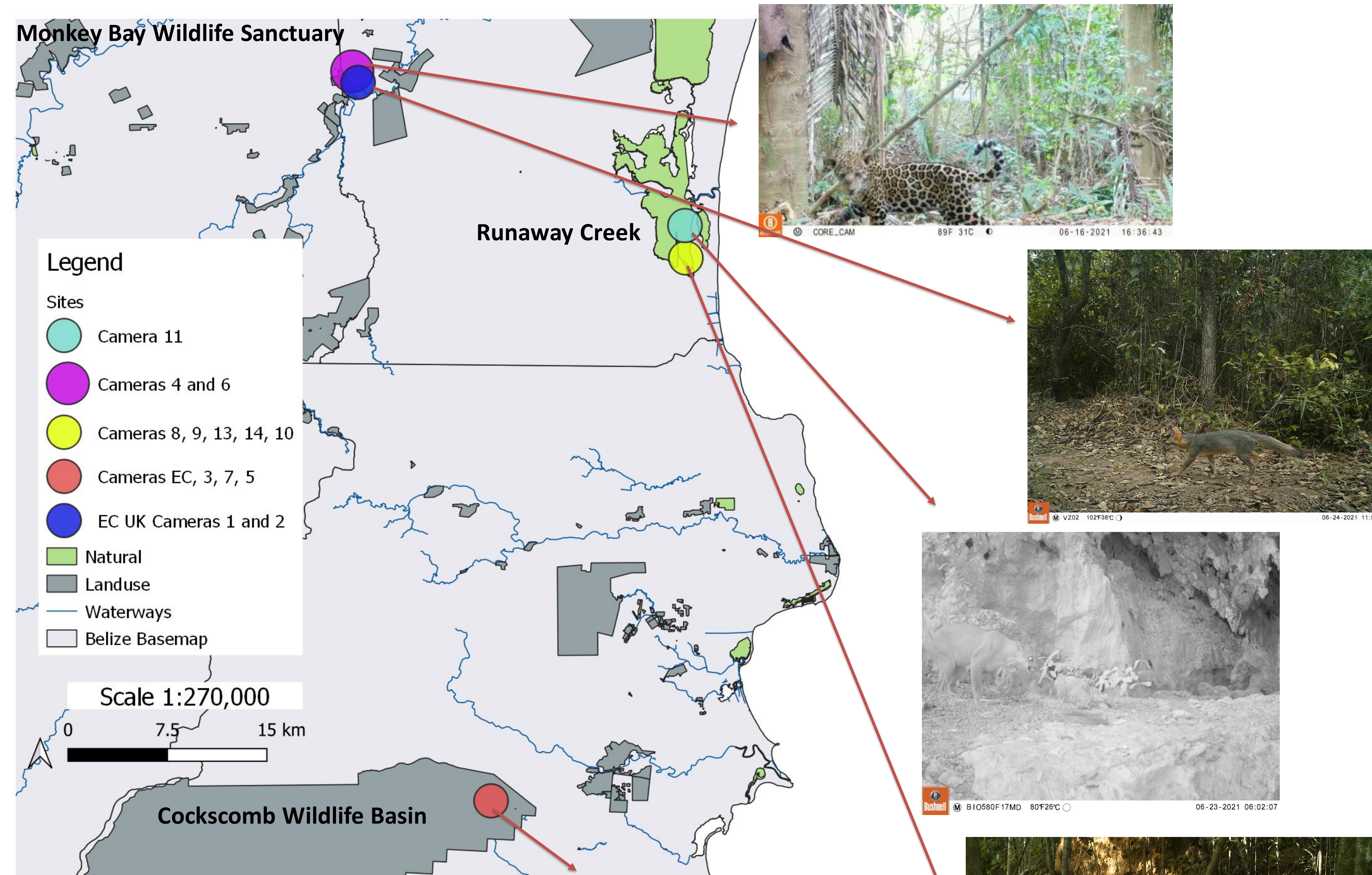


Figure 1. GIS map made by researcher Quincy Ipsaro showing the total number of species caught on camera at each site. Images found at each site are shown with arrows. Photo credit the University of Kentucky Biology Department and BIO 355-2021.

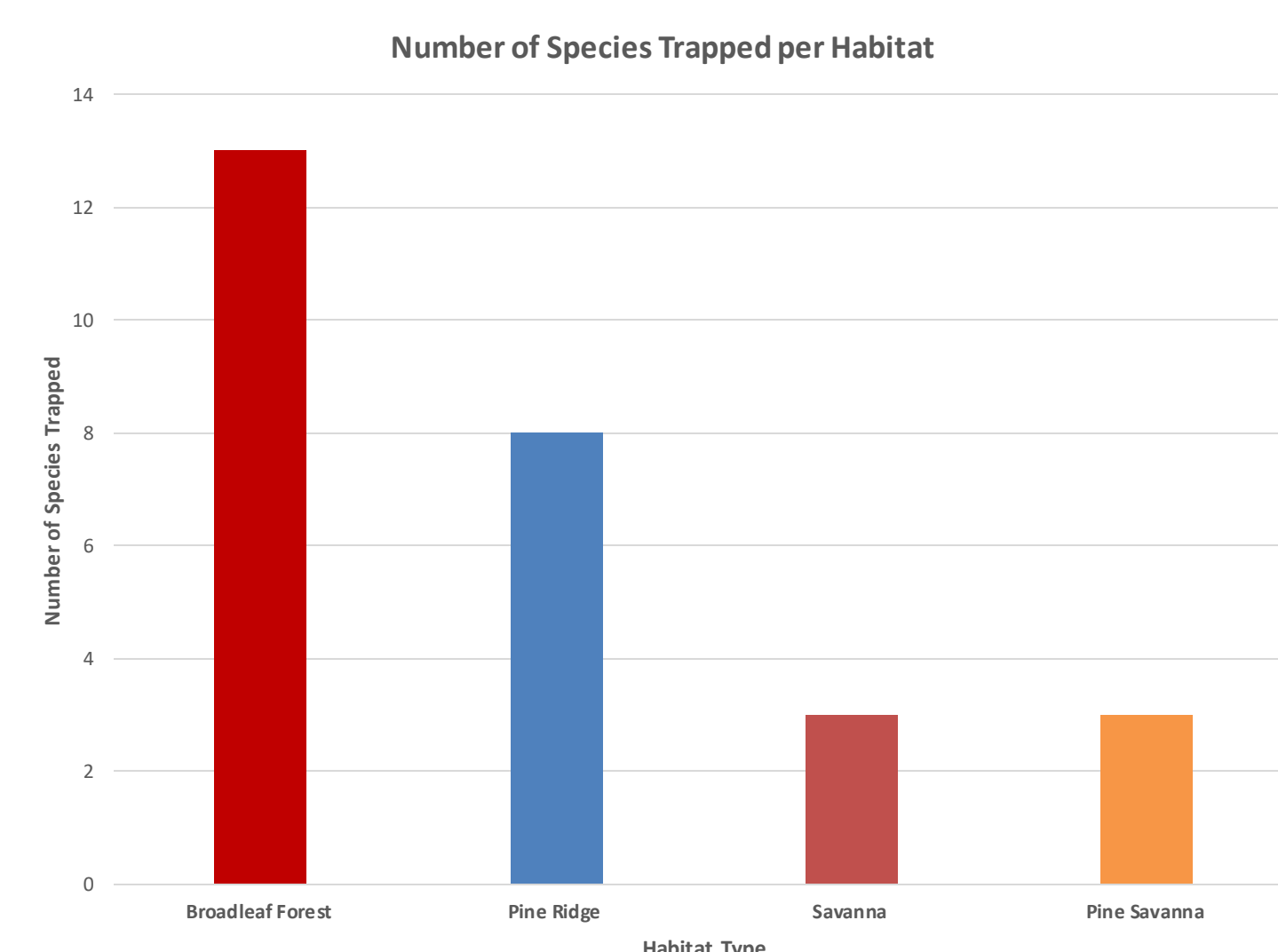


Figure 3. Graph relating the number of species found in the habitat type monitored.

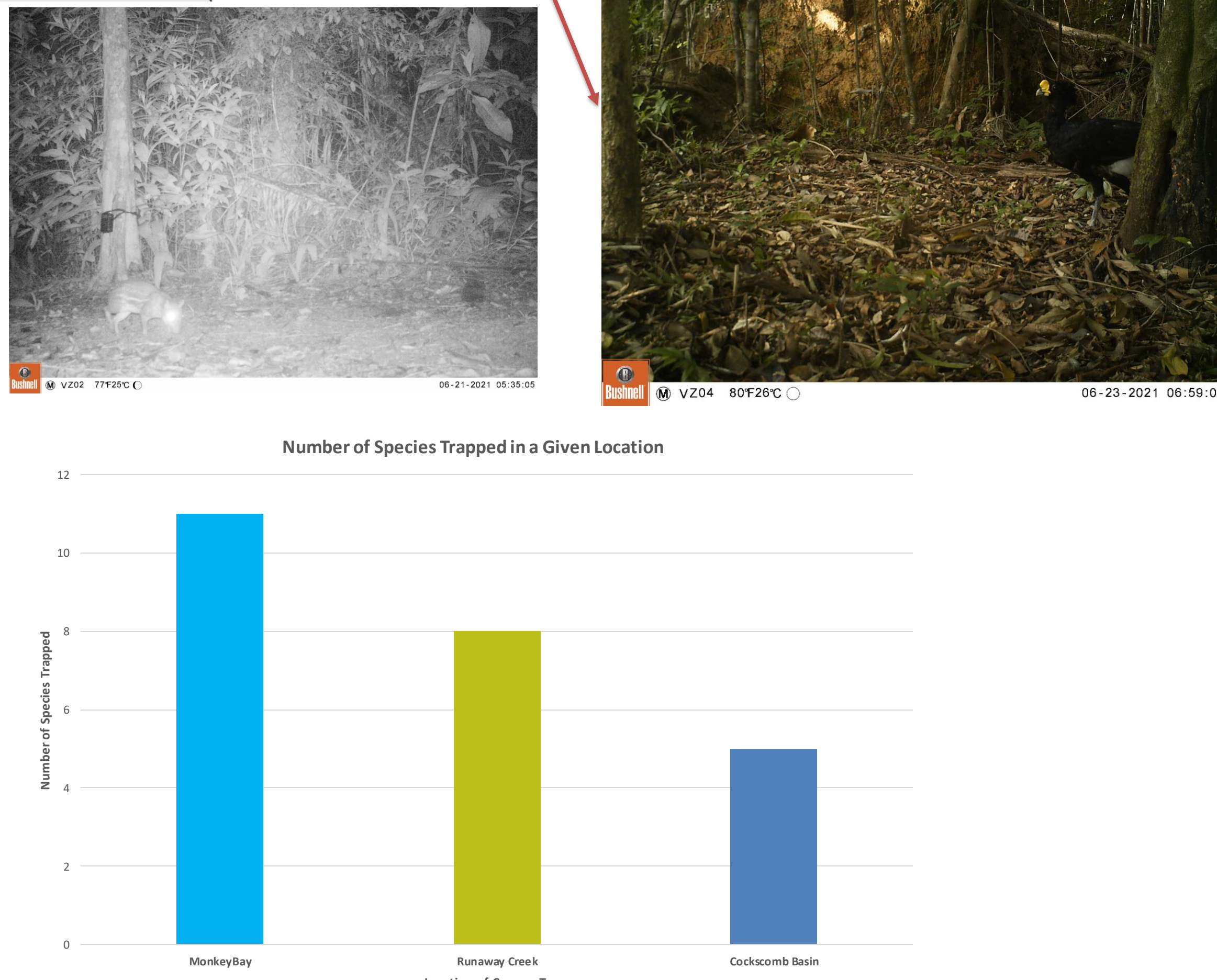


Figure 4. Graph relating the number of species found in the location each camera trap was placed.

Discussion

As seen in figure 3, a more variety of species was camera trapped in Broadleaf forest than any other habitat type. Figure 4 shows a more diverse population of species resides in the Monkey Bay Wildlife Sanctuary as compared to the other locations camera traps were placed in. Our hypothesis was supported. We were able to take photos of and identify a wide variety of Belizean fauna.

Conclusions

- Overall, camera traps allowed for quick and easy data to be collected on wildlife in Belize with little to no invasion or harm to the populations. Camera trapping is a safe and effective way to measure animal activity and evaluate trends in population behavior in Belize.
- Compared to physical trapping and scat collection, camera trapping is far more accurate and allows for more data to be collected in a shorter period. Camera trapping is an accurate and efficient measure of biodiversity in Belize.
- In the future, we hope to continue this research and increase the length of time in which we can collect camera data. Higher quality cameras could be purchased to increase the resolution of photos captured.
- During our time in Belize, we witnessed the construction of the new and obstructive Coastal Highway. This highway cuts directly through the Maya Forest Corridor and could result in less gene flow and increased animal injuries and deaths to already threatened populations. Legislation is being challenged to install wildlife corridors underneath or over the highway but as of now, the passages proposed by the Belize Government are too narrow for many of the larger mammals and to spread apart to allow for ease of access.
- This study hopes to provide the information needed about the diverse wildlife in Belize to help support this cause and protect biodiversity in Belize.
- The study of biodiversity in Belize using camera traps will allow for future research analyzing ecology and biodiversity in Belize. In addition, this research supports the protection of wildlife communities and will provide both a voice and environmental justice for said communities.
- The Belize economy relies heavily on ecotourism so in restoring and protecting these habitats ecotourism in Belize will continue to bring the country financial stability.
- Conservation in Belize also offers the opportunity for social justice. The Maya culture is heavily based on the jaguar and other iconic Belizean species. Conserving these species helps conserve the culture of native people and shed a light on the diverse communities of people and animals that call Belize home.

References

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