



Measured Canopy Closure in the Bellbird Biological Corridor

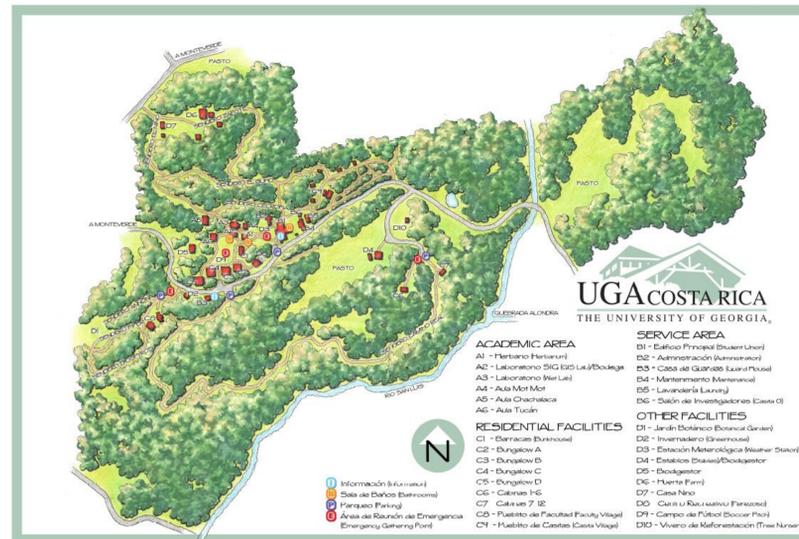
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ABSTRACT

The Costa Rican satellite campus of the University of Georgia, UGA Costa Rica (UGACR), is located in the valley of San Luis. UGACR is one of the seven organizations involved in maintaining the Bellbird Biological Corridor (Corredor Biológico Pájaro Campana), 66,416 hectares of which is unprotected. Wildlife, such as the three-wattled bellbird (Pájaro Campana), migrate seasonally between protected and non-protected areas, which puts the survival of certain species at risk.

As part of a long term project, UGA Costa Rica plans to measure the canopy closure every 50 meters on its maintained trails. Canopy closure is the measure of coverage due to forest canopy. Over time, the data will signal any significant changes to previously collected canopy closure data. The data patterns could then be used for other research, such as changes in butterfly behavior (indicator species) or bird migration patterns (such as the three-wattled bellbird).



RESULTS & DISCUSSION

The data collected was along Sendero Zapote, or the Zapote Trail. The measurements taken along the trail are indicated with the letter “T”. In addition because the some measurements were taken while butterfly traps were set up, “U” indicates the canopy closure of a understory trap, while “C” indicates the measurement of a canopy trap. A higher % cover indicates less light passing the canopy, whereas a lower % cover indicates more light that passing through the canopy. T15 of Sendero Zapote is at the end of the trail close to an open field, thereby having a much lower % cover. Weather conditions, such as a windy day, could increase human error when reading the densitometer due to the trees moving in the wind. In addition, the date of data collection is taken into account in order to compare measurements that were previously taken during a similar time.



INTRODUCTION

Launched in January of 2008, UGA Costa Rica’s Carbon Offset Program has been a unique effort at minimizing net carbon output into the atmosphere while restoring cleared pastureland to its original thick forest cover. Taking place throughout the Pájaro Campana Biological Corridor, this project aims to increase biological connectivity to increase biological diversity throughout the region. In accordance to these goals, our job was to monitor the health and growth rate of the trees planted for this project. This involved GPS tracking and tagging trees, site evaluation, canopy closure measurements with the use of densitometers, data analysis and even planting a few trees ourselves. The end goal of the project is to make UGA Costa Rica a carbon neutral campus while improving biological corridors connecting forests throughout the country.



Location	Average of 4 Directions (N/E/S/W)				% Cover	Weather	Date, time
	N	E	S	W			
T1	82.5	81	83.5	82	85.54	clear, sunny, windy	July 2 2015, 08:40
C1	86	83.5	85.5	83.5	88.01	clear, sunny, windy	July 2 2015, 09:15
U1	90	88	91	93	94.12	clear, sunny, windy	July 2 2015, 09:15
T2	78	78	83	82	82.46	clear, sunny, windy	July 2 2015, 09:26
T3	80	76.5	79	76	80.99	clear, sunny, windy	July 2 2015, 09:37
T4	85.5	76	80.5	85.5	85.15	clear, sunny, windy	July 2 2015, 09:46
T5	90	77.5	77.5	75	81.9	rainy, cloudy	July 2 2015, 07:53
T6	75.5	79.5	80	77	81.12	rainy, cloudy	July 3 2015, 08:03
T7	77.5	77.5	71.5	76.5	78.78	rainy, cloudy	July 3 2015, 08:12
T8	88.5	85.5	87	87.5	90.61	rainy, cloudy	July 3 2015, 08:19
T9	83.5	83	86.5	90	89.18	rainy, cloudy	July 3 2015, 08:27
T10	83	86.5	84	83.5	87.62	rainy, cloudy	July 3 2015, 08:35
T11	87.5	88	88	88	91.39	rainy, cloudy	July 7 2015, 10:06
T12	76	82.5	86	75	83.07	calm, sunny	July 7 2015, 10:19
T13	86.5	87.5	88	92.5	92.17	calm, sunny	July 7 2015, 14:32
T14	88	84.5	77	83	86.45	calm, sunny	July 7 2015, 14:32
T15	1	3.5	0	0	1.17	calm, sunny	July 7 2015, 14:36

FURTHER WORK

Blue labeled flags along the trail were used to mark locations every 50 meters. The use of a GPS to find the coordinates of each flag would aid in finding the previously measured location of every 50 meters. However, GPS accuracy can decrease in more forested areas. The use of both flags and GPS could be used in conjunction in case a flag becomes missing or the label is too worn to read. The average of two measurements were taken in each of the four cardinal directions, North, East, South, and West. Taking readings of the same location multiple times would increase the accuracy of the % cover.

This data used with research of butterflies can help determine the frequency of certain species in specified areas. As an indicator species, changes in their patterns can determine if there is stress in the environment that might be undetected by humans.

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