Biological Corridor Construction in the Osa Peninsula

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Abstract

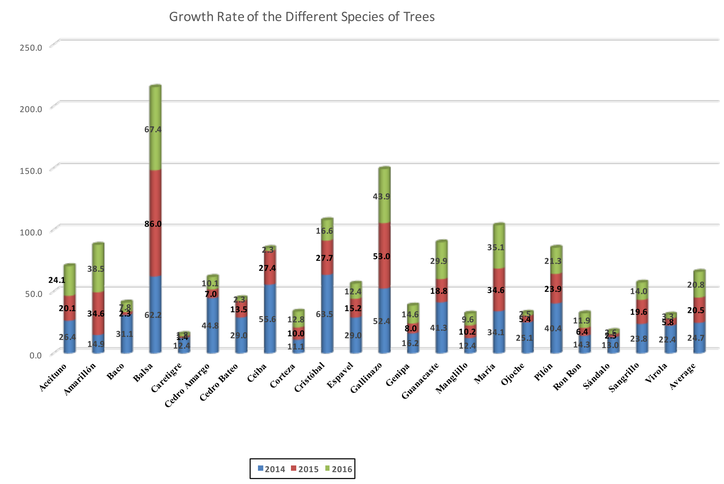
The Osa Peninsula, situated on the southernmost tip of Costa Rica, is home to 2.5% of the world's biodiversity. It is interesting to note that this small piece of land covers less than a thousandth percent of the Earth's total surface area!

Osa Conservation is a non-profit organization that is actively involved in protecting over 4,000 plants, 10,000 insects, 700 species of trees, and 323 endemic species in the Osa Peninsula. The conservation of these intricate ecosystems is critical in preserving cultural resources and providing climate security.

Among Osa Conservation's various projects, The Corcovado-Matapalo Biological Corridor Project aims to create a biological corridor between Corcovado National Park and the Osa Conservation owned land. This biological corridor will help maintain migratory pathways for birds and facilitate movement of insects and mammals throughout the rainforest while protecting the endangered species of flora and fauna.

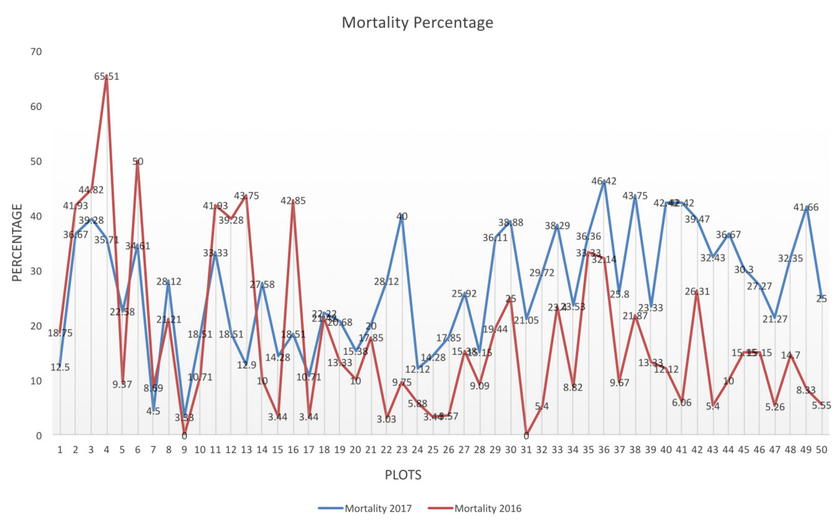
Much of Osa Conservation's land was once teak and pochote plantations, and although these plantations are no longer active, the forest is still in the process of regenerating. Between 2013 and 2015, native tree species were planted in 50 of Osa Conservation's regeneration plots, located in Cerro Osa. In the summer of 2017, we monitored growth rates and mortality rates of trees in the regeneration plots. This work included verifying the tags, assessing the health, and measuring the height of the planted trees. The data collected is used to assess the success of the project and aid in future reforestation practices in the area.

In addition, we were actively involved in the vegetation surveying of 40 plots in Osa Verde. We analyzed the ground cover, canopy cover, and decomposition levels in all directions around the center point of the plot. This information is the preliminary data for Osa Conservation's next reforestation initiative.

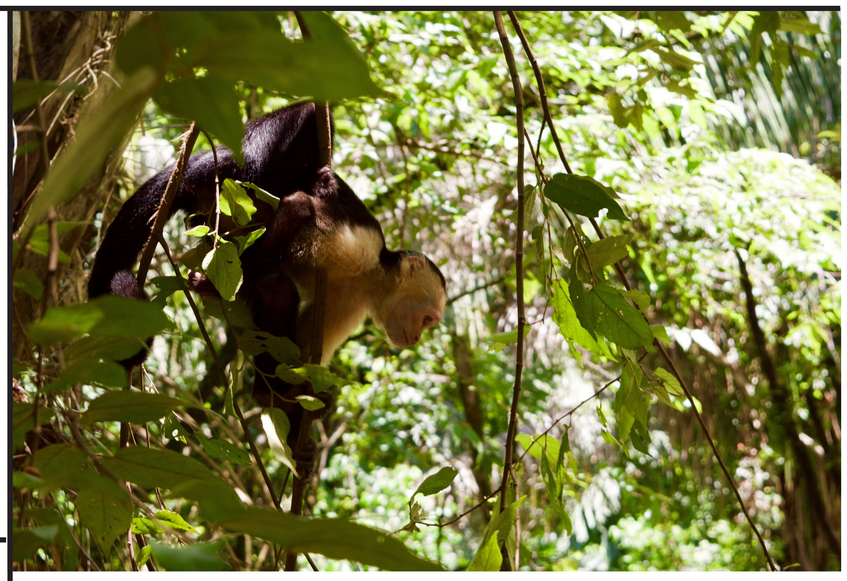


Data Analysis

In general, mortality rates for the Cerro Osa plots are high because of lack of nutrients in the soil. The average mortality rate in 2016 was 26.75% and in 2017 was 17.69%. This can be attributed to reforestation initiatives and increased maintenance of the restoration plots. However it was extremely striking to notice that in both years, the standard deviation was very high: 10.87% in 2016 and 15% in 2017. This is due to the diversity between the plots in Cerro Osa. An example of this is, in 2017, the maximum mortality rate for a specific plot was 65.5% while the minimum rate for a specific plot was 0%.



Average	26.76	17.7
Standard Deviation	10.87	15.02
First Quartile	18.51	6.63
Median Value	26.6	12.73
Third Quartile	36.3	23.02
Maximum Value	46.42	65.51
Minimum Value	3.33	0



Impacts and Future Work

The Corcovado-Matapalo Biological Corridor Project is an ongoing project with a large gestation period. It will take at least 50 years for the reforested plots to develop and integrate into a fully functioning biological corridor. The rate of growth of trees can be attributed to factors such as canopy cover. We observed high growth rate in certain species of trees in areas with a thin canopy cover, which allows for adequate sunlight and rain to reach the developing trees. Additionally, in the plots that were located in denser areas of Cerro Osa, we observed high mortality rate among species. We recommend that vegetation surveying should be conducted on plots to assess the canopy cover and accordingly plant the appropriate species of trees.

The data that we collected will help future researchers and conservationists to measure mortality rates of plots and growth rates of individual species of trees within the forest. This will improve the reforestation process and ensure that Osa Conservation can utilize their resources more efficiently. Specifically, in the next few years, the reforestation projects can be implemented such that only the most successful tree species will be planted. Additionally, each year data can be collected and evaluated to continually improve the reforestation process.

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