Impacts of visitation on a trail evaluated through a combined methodology

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Introduction

Visitation is philosophical and conceptual linked to parks (Pimentel, Magro, Silva Filho, 2011). Public use in parks is related to the indirect use of environmental resources as recommended by the Brazilian legislation that instituted the National System of Conservation Units (Law 9,985/00). The practice of recreational, touristic and educational activities fits in this perspective and represents the possibilities of public use carried out by the visitors of the Protected Areas. However, an excessive number of visitors and some behaviors impact negatively on the park and on the visitor's experience.

The Serra da Tiririca State Park (PESET) is located in the Rio de Janeiro State (Brazil), between Niterói and Maricá. The PESET trails are surrounded by a rich biodiversity related to the Atlantic Rainforest. Most visitors access the Park through the Itacoatiara headquarters, where there is a trail that forks in two, one leading to the Itacoatiara Rock belvedere and the other to the Bananal Cove (INEA 2015).

The objective of this article is to present and evaluate the impacts on Bananal Cove Trail (BCT) through different methods that consider its physical characteristics, as well as the visitors' perceptions, seeking to identify the physical and social impacts in order to subsidize the management efforts.

Methods

The sampling point methodology was based on Bayfield and McGowan (1986). Eleven sample units, separated by 50 meters, were established at BCT to measure the physical attributes through parameters such as trail width, slopes, cross-sectional area, soil compaction, and depreciating factors in the trail bed (exposed rocks and roots).

Another method used was adapted from Leung and Marion (1999), which consists of using possible problematic points or areas as an indicator itself. These were selected according to the observation of excessive trail width, high slopes and numerous exposed roots and rocks. Water drainage problems, informal paths and occasional events that indicate visitors' actions (littering, graffiti, marks and notches on trees) were also considered. Geographic coordinates were generated for each problem point or area in order to map the locations that should be focused by the managers.

To evaluate the Social Carrying Capacity, the People at One Time (PAOT) methodology was used. The Bananal Cove area was photographed and measured with *GPS garmin*. People were added with the help of *PhotoScape 3.7*, to simulate different amounts of visitors in five images, elaborated from the recorded picture. BCT visitors were asked to analyze how affected the quality of the visit would be considering the number of people distributed on these photographs, rating from +4 to –4. The grade averages of each photo generated a standard social curve. The neutral point means the minimum acceptable condition from the visitor's perspective, which is the PAOT of the area (Needham et al. 2008).

Results and Discussion

Considering the sampling point and the problem-assessment methodologies, it was observed that the first stretch of BCT is more impacted, probably due to the fact that this section receives all the Itacoatiara Complex visitors (Figure 1).

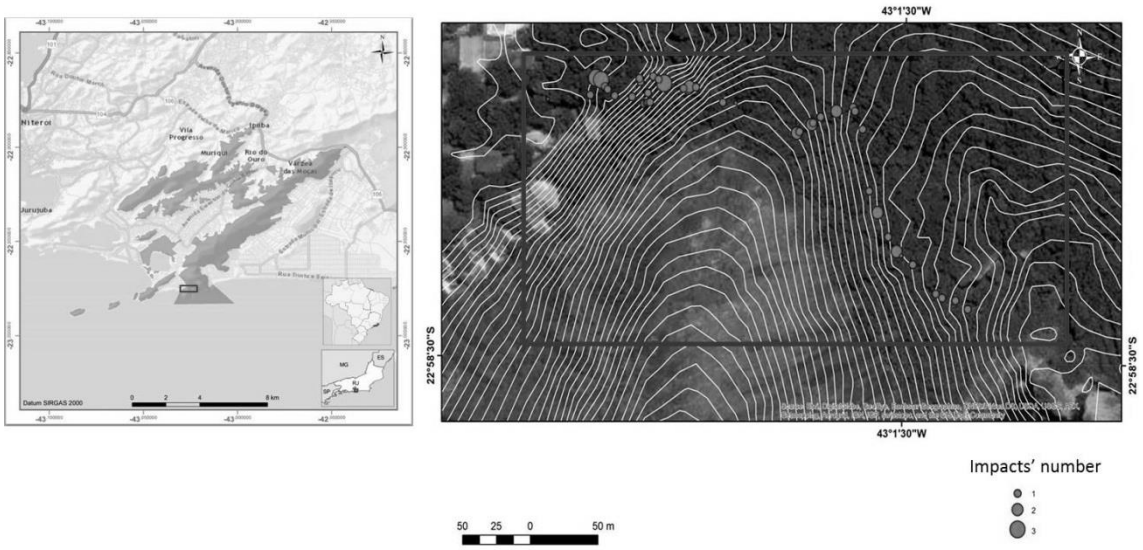

Figure 1 – BCT location and impacts. Those are demonstrated by the amount of impacts observed, considering excessive trail width, high slopes and numerous exposed roots and rocks (source: Luciana Assis, 2017 and https://www.pinterest.pt/pin/381469030913302392/).

The soil is extremely eroded with many exposed rocks and roots. The BCT widths average measured through the problem-assessment methodology was about 2.0 m. This proved to be the most effective because it best represents the trail conditions as the regular sampling points do not always capture the extreme situations. But the first depends on the field experience.
The PAOT of the area was about 19 people in 667sqm. This data, extrapolated to the total area of Bananal Cove (1101 m²) would be about 31 visitors, thus characterizing the minimum acceptable condition. This amount established by the Social Carrying Capacity accessed by the PAOT evaluation would cause a less negative impact on the visitor's perception. Zacharias et al. (2011) consider this methodology useful and easily applicable, which was also observed in this work.

Conclusions

It was verified that the trail is passing through an intense degradation process presenting stretches in deep erosion due to the large number of visitors. As the problem-assessment methodology is more focused on the areas prone to the management actions, it is recommended for the BCT as this method proved to be more effective in demonstrating its emergency situations. Through the PAOT methodology it was found that 31 people in 1101sqm is the number of visitors that causes less interference in the perception of the visit quality. The Park management is expected to take mitigating measures and to try to limit the amount of visitors, in order to reduce impacts on the trail. In fact, given to the verified emergency situation, the PAOT methodology has been used to minimize the impacts caused by the excessive number of visitors in the PESET.

References

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