



# WPI



RESERVA BOSQUE NUBOSO  
**Santa Elena**  
Monteverde C.R.

## Trail Maintenance and *Shinrin-Yoku* in Santa Elena Reserve

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Cloud Forest Reserve (SER)

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## **Abstract**

Urbanization correlates to mental and physical distress. To address this issue, we have implemented a self-guided forest bathing experience within Santa Elena Cloud Forest Reserve (SER). We conducted interviews, surveys, pilot testing, and gathered observational data. Our results enabled us to provide a list of trail, facility and forest bathing experience improvements with focus on visitor satisfaction. Our project will help SER to increase visitor satisfaction throughout the reserve and provide a unique outlet to connect with nature and de-stress.

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## Executive Summary

People that live in urban environments with little to no access to nature are more likely to experience higher levels of stress and anxiety (White et al., 2013). Other mental health problems, such as anger and post-traumatic stress disorder, are more common in cities and urban areas (Fraga, 2019). Exposure to nature can help to reduce stress and anxiety by lowering the stress hormone cortisol and reaffirming human connection to nature. Based on the therapeutic properties of interaction with nature, a number of nature reserves and centers are adopting the practice of *shinrin-yoku*, also known as forest bathing. With our help, the Santa Elena Cloud Forest Reserve (SER), located in Monteverde, Costa Rica, introduced a self-guided forest bathing program to benefit the mental and physical health of visitors through immersion into the peaceful cloud forest environment. Greater awareness of forest bathing/forest therapy and its availability at SER will encourage visitors to experience the benefits of this practice and potentially spread interest in forest bathing across multiple communities.

We have divided our project into two main goals. Our first goal focused on improving the trails and facilities throughout the entirety of the reserve. The second was to increase visitor awareness of forest bathing through recommendations for promotion and further development of a forest bathing trail. To accomplish these goals, we began by assessing the current state of the trails with regard to accessibility and erosion. Additionally, we determined what visitors would like to see in SER and how SER can better serve its visitors via visitor feedback. For increased visitor safety and satisfaction, we developed possible solutions to improve the conditions of the trails and facilities in SER. In addition, we designed a self-guided forest bathing walk that allows visitors to experience a unique and deep connection with the environment around them to bring them peace and relaxation. Based on pilot testing of this trail, we identified



effective *shinrin-yoku* informational materials and other ways to supplement and improve the self-guided forest bathing walk.

Our methodology included surveys, interviews, observations, and a pilot forest bathing trail to test the success of our chosen materials. We used the surveys to determine the perceptions and opinions of general visitors and their specific responses to our forest bathing trail. Direct observation was used to determine the current conditions of the trails. The pilot trail engaged visitors to participate in *shinrin-yoku* and determined whether the experience positively affected participants' mood. Data from each of these methods was categorized and analyzed to reveal trends or areas for improvement.

After gathering data via the methods above, we developed recommendations that will help Santa Elena Reserve improve visitor satisfaction and further develop a forest bathing program. The list of trail recommendations includes suggestions for general trail maintenance, as well as ways to provide visitors with more information about the trails and points of interest. Our highest priority recommendations are reducing mud with gravel, replacing old bridge signs, and adding more information to the map, such as difficulty ratings, recalculated times to complete each trail. We have also recommended some changes and additions to the services SER offers, based on both our observations and suggestions from visitor surveys. Some recommendations include limiting the number of people per guided tour and adding more buses to and from the reserve and the main bus stop in Santa Elena. In addition to our recommendations for overall reserve improvement, we implemented a self-guided forest bathing experience along the Sendero Del Bajo that requires continued development. The most important recommendation for this experience is to greatly increase promotion and understanding of the self-guided trail among SER staff. It is important that reception staff understand the forest bathing trail and its benefits to be able to recommend this specific trail feature to visitors. Promotion on the official reserve website and social media and coordination with hotels, hostels, and tour companies in the area will help visitors discover the opportunity for

forest bathing at SER. If the forest bathing trail is successful in the future, we recommend that SER replaces the signs we implemented with sturdier, more permanent, and more professional looking signs. We also recommend that materials be translated and provided in Spanish so that SER staff and visitors who prefer Spanish can understand and participate. Materials can also be provided in French and German to include tourists who prefer to read and speak these languages. If they would prefer to make the forest bathing trail more official, SER can pay for certification of the trail through the Association of Nature and Forest Therapy (ANFT).

The completion of this project introduced a successful forest bathing program to Santa Elena Reserve to mentally and physically benefit visitors. Alongside this, we provided insights and suggestions to help with other areas of general improvement throughout SER. We hope that both of these accomplished goals will encourage Santa Elena Reserve to make continual developments to their trails and programs with a focus on visitor enrichment and satisfaction.

## 1.0 Introduction

As the world continues to develop, urbanization is progressing at an aggressive rate, leading to detrimental effects on the wellbeing of many people. According to a 2019 compilation of urban stress research studies in North America, Europe, South America, and Asia, individuals living in a city are 21% more likely to have anxiety and 39% more likely to have a mood disorder than individuals living in a rural location (Fraga, 2019). Urban residents also have a higher chance to have post-traumatic stress disorder (PTSD), anger disorder, and general anxiety disorder. In 2018, roughly 82.26% of the US population lived in an urban area, and this number continues to increase (Pletcher, 2020). In addition, a study done in the United States on the general population says that 44% of Americans have said that their stress had gone up in the last 5 years (Clay, 2011). As studies connecting increased stress with increased urbanization continue, people are turning to nature and green spaces to combat this trend. Places and practices that encourage extended periods of time immersed in nature can be a solution to this problem of compounding stress due to an unnatural environment.

Costa Rica is a well-known example of a country that prides itself with appreciating and connecting with the natural environment. Within Costa Rica, 51% of the land is covered by forest. Within that area, there are more than 1,500 known amphibians, birds, mammals, and reptiles, and there are over 12,000 species of vascular plants (Mongabay, 2013). Based on its biodiversity and a large amount of forested land, Costa Rica could be an ideal location for practices that encourage immersion and time spent in nature. *Shinrin-yoku*, also known as forest bathing, is a practice that encourages a deep connection with nature to improve mental and emotional wellbeing (Butler, 2017). Santa Elena Cloud Forest Reserve (SER) in Costa Rica wants to develop an effective forest bathing program within its existing hiking trails, yet, as of now, SER does not have any such programs.

Choosing a prime location for forest bathing is a key part of developing the practice for individuals to fully benefit from forest bathing. In addition, the trails used must be designed and maintained with a fulfilling forest bathing experience in mind (AmericanTrails.org, 2007; Marion & Wimpey, 2017). According to *Life Science Weekly* (2017), Costa Rica and Monteverde are already recognized as ideal locations for a forest bathing experience. The Sensoria Forest Therapy Trail, located in the northwest of the Alajuela Province, Costa Rica, is certified by the Association of Nature and Forest Therapy (2019a) as a location to engage in a guided nature therapy experience. Extensive research has been conducted on the benefits of forest bathing (Butler, 2017; *Life Science Weekly*, 2017). The effects of nature therapy and other such practices have been studied in a scientific manner when comparing the anxiety and stress levels of people living in urban areas before and after a forest bathing experience (White et al, 2013).

Thus far, there have been no studies of the effects of forest bathing on tourists, which covers a wide range of nationalities, backgrounds, cultures, and personal identities. Specifically, there has been no information on how the act of forest therapy affects the population of tourists who visit Costa Rica, and who visit SER. Santa Elena Reserve staff believe that the tourist population would benefit from such practices, and they have wanted to develop a fulfilling forest bathing experience through better signage, better educational materials, and improved trails.

The overarching goal of this project was to identify ways to improve the visitor experience and awareness of the benefits of forest bathing at SER. In order to achieve this goal and meet SER's needs, we developed two sub-goals, each with its own set of objectives. Our first sub-goal was to help SER improve its trail maintenance strategies and use visitor feedback as a tool for overall betterment of the reserve. The objectives for this goal were: determine how well-marked the trails were, how they were classified and what the conditions of the trails were. Additionally, we determined what the visitors would like to do and see in SER, using a survey for obtaining their ratings and suggestions. Our second sub-goal, in conjunction with the first, was

to design and test a pilot forest bathing experience on the trail that we and SER determined was most suited for it. A survey of the users of our pilot forest bathing walk informed us how useful the experience was for decreasing stress. Ultimately, we provided our sponsor with recommendations for trail improvements and supplemental educational materials, as well as additions to one trail to facilitate forest bathing. Accomplishing our goals for this project allowed visitors to be more informed, provided ways to make Santa Elena Reserve safer, and provided an outlet for visitors to be connected with nature in a unique way. Visitors will gain more satisfaction after our recommendations are considered and implemented and will have the ability to participate in a deeply relaxing and physically beneficial practice.

## 2.0 Background

In this chapter we provide information on forest bathing and the Association of Nature and Forest Therapy, the leading organization promoting and spreading forest bathing worldwide. We discuss currently operating forest therapy practices in various locations to provide context for any future forest therapy trails in Santa Elena Reserve (SER). As a prerequisite for any forest bathing trail, we discuss the conditions that affect trail accessibility and how this can translate into an ideal forest bathing trail. We finally examine how SER might be able to attract visitors to participate in a forest bathing experience and incorporate it into their already existing programs.

### 2.1 Forest Bathing

Forest bathing is a practice cultivated by Japanese researchers in the 1980s that they described as “taking in the forest atmosphere” (Fitzgerald, 2019, p. 1). According to this tradition, the purpose of forest bathing is to take in the environment around you to help reduce stressors caused by everyday life. Though the Japanese coined the term *shinrin-yoku*, which directly translates to forest bathing, to refer to this practice back in the 1980s, many other cultures have understood the importance of connecting with nature and believed in its health benefits. Forest bathing is not merely for individuals who wish to go hiking; it is the willingness to make a conscious effort to connect with the environment around them.

Forest bathing is practiced globally, including in locations such as in Costa Rica, New Zealand, Kenya, Hawaii, and the Adirondack Mountains in New York (Fitzgerald, 2019). Forest bathing can occur anywhere as long as it incorporates wilderness elements. Because forest bathing originated in Japan, one study in Japan was able to be conducted in 24 different forests across the country. Modern day forest bathing practices in Japan are often focused on the physical and scientific aspects of the practice. A common forest bathing experience in Japan can include numerous different types of tests before, during, and after the walk (personal

communication, Marcela Morales, January 24, 2020). Researchers measure saliva to test for levels of cortisol and amylase, which are proteins that indicate stress level, and take blood pressure and heart rate measurements, as well as use electrodes to measure prefrontal cortex activity. Western forest bathing practices are improving based on new studies, but many are not searching to find evidence of improved physical health and instead focus on mental and emotional wellbeing.

When reviewing forest bathing, Forest Holidays (2019), an organization that encourages time spent in forests, has found many different studies that prove the benefits to the psychological and physical health of a person. It has been shown to reduce stress, improve mood, increase creativity, boost immune function, reduce high blood pressure, and accelerate recovery from an illness. A study by professors Park et al. (2010) in Japan has found that walking in the forest decreased stress by 12.4%. This was concluded by measuring the amount of one hormone responsible for stress, cortisol, within the body. A similar study by Derby University was conducted to see the improvement of mood in people who participated in forest bathing (Richardson, McEwan, Maratos, & Sheffield, 2016). The study concluded that nature can be linked to happiness and mental well-being. Researchers also saw that spending time in nature helps release hormones that can help increase joy, improve calmness and decrease anxiety. A separate study at the University of Utah saw a 50% increase in creative problem solving after 3 days of forest bathing and being without any modern technology, such as a phone (Atchley, Strayer, & Atchley, 2012). Without modern technology, participants could better connect with nature during the forest bathing practice. A study on immune systems showed that trees and plants emit phytoncides, a “volatile antimicrobial compound given off by a plant”, which have been shown to help people fight disease (Definitions, 2019). These phytoncides are taken into the body when a person breathes, which help to boost immune system function and white blood cell count (Li, 2010). Dr. Roger Ulrich (1984) conducted a separate study that includes further evidence of nature improving immune function and proved that nature can act

as a catalyst during recovery from an illness. It was shown that even looking out into nature through a window will help accelerate the recovery process. Another study in Japan, with 732 participants that included 20 different forest trails, showed that forest bathing reduces high blood pressure (Ideno et al., 2017). The researchers conducted the study by comparing the results from individuals participating in forest bathing versus those in a non-forest environment. Many research efforts such as these are supported, although not financially, by the Association of Nature and Forest Therapy (ANFT), which is the leading organization raising awareness and support for forest bathing practices around the world (Nadine Mazzola, personal communication, November 15, 2019). The ANFT, founded in 2012, works to promote and spread knowledge of forest bathing and support individuals and locations that wish to provide guided walks or develop specific forest bathing trails (ANFT, 2019b).

## **2.2 Association of Nature and Forest Therapy Recommendations**

Based on the official Association of Nature and Forest Therapy website (2019d), a walk that focuses on forest bathing is recommended to be led by a certified forest therapy guide but can also be adapted into a self-guided experience. The motto of the ANFT (2019c) is “The forest is the therapist. The guide opens the door” (p. 5). A core set of values drives a forest bathing experience. The first is to make a deliberate, mindful, and deep connection with nature. Secondly, it is recommended that the trail being used is short in length (less than one mile), but the duration of the walk will be between two and four hours. This recommendation is made based on the concept that a forest bathing experience should not be rushed. This also allows time to sit and completely immerse oneself in the environment. Common practices during guided forest bathing walks include sit spots, cross-species communication, and sensory connection with the environment.

Based on information provided by ANFT (2019d), these activities are often facilitated by a guide who is well-versed in creating a mutually beneficial connection between the individual



and nature. A guide has the ability to provide suggestions and draw focus to specific areas of the trail or sensations of the forest. These suggestions are called “invitations”. Invitations are non-mandatory offerings to participate in practices that emphasize sensory and emotional connection to nature. All invitations, although unique and adaptable, follow a short guideline represented as the acronym SOS (Marcela Morales, personal communication, January 24, 2020). SOS is “Simple, Open, and Sensory”. The language and concepts of each invitation must be simple enough for people of all backgrounds to understand them and be worded in an open manner to allow participants to interpret the invitation in a way most comfortable and effective for them. On par with the practice of forest bathing itself, invitations must appeal to a person's senses to form a connection between oneself and the surrounding natural environment. Invitations that follow these rules are effective in opening opportunities for participants to deeply connect with nature and be impacted mentally and emotionally. During a guided forest bathing walk, the guide provides the invitations and is able to cater the experience to the current environment, the participants and other variables.

In order to adapt this practice into a self-guided forest bathing experience, landmarks and postings along the walk need to attract the attention of the visitor to keep a slow pace and to encourage mindfulness (Marcela Morales, personal communication, January 24, 2020). The signs may include invitations that highlight what visitors can slow down to focus on, such as the sounds of birds, wind through the trees, the feeling of warmth/coolness in the air and any other natural sensations that would connect the individual to all aspects of the environment around them. ANFT (2019a) has a certification process for forest therapy guides as well as forest therapy trails. To certify a forest bathing trail, it costs over US \$700 and then an extra US \$200 every year to keep the certification (ANFT, 2019e). The trails are evaluated based on accessibility, safety, management, natural features, and biodiversity. The Association of Nature and Forest Therapy has certified forest bathing trails across the globe, including in Costa Rica.

### **2.2.1 Sensoria Forest Therapy Tour**

Sensoria (2019), a forest park in Alajuela Province, Costa Rica, has an ANFT certified Forest Therapy Tour. The tour is given by a certified forest therapy guide along an 800-meter-long trail. The purpose of the tour is to unwind, immerse oneself in the forest, and form a deep relationship with nature. A tour must be reserved in advance because it involves a forest therapy guide and no walk-ins to the forest therapy trail are allowed. Adult reservations are US \$105.00 and reservations for children from ages 6 to 11 cost US \$74.00. The trail is advertised as suited for walkers of all levels because the walk will be slow and gentle. A majority of the walk takes place on a boardwalk, which facilitates accessibility to many levels of walkers, which is important for creating a trail that will be used by a wide audience.

### **2.3 Trail Planning**

In order to create an optimal forest experience, high quality, sustainable trails must be used. Trail designers must know how rainwater affects a trail and what can be done to prevent erosion (Marion & Wimpey, 2017). Along with this, a good trail should be accessible.

The US National Park Service (USNPS) defines a sustainable trail as one with the following characteristics: minimal impact on natural systems, negligible soil loss, vegetation allowed to grow, no adverse effects on wildlife, and little rerouting and maintenance necessary (American Trails, 2007). USNPS also acknowledges that some pruning or removal of certain vegetation may be necessary, but only what is needed to clear the trail.

When planning a trail, the designer must be aware of the features of the land it traverses. There are certain natural features that are optimal for a trail, and others that should be avoided (American Trails, 2007). In a mountainous area, one should consider routing the trail along the ridge lines in order to minimize steep slopes. A trail along, but not too close to, a bluff or cliff with overlook spur trails is another way for hikers to experience views while still remaining safe. The trail system in natural areas should include points of interest such as rock formations,

waterfalls, historical landmarks, and other natural formations. Among the areas to avoid are active farmland and private property, wetlands or swamps, and very steep slopes because construction of a trail in these conditions is more difficult than in others. Many wetlands are protected lands that help to prevent flooding in surrounding areas (US Environmental Protection Agency, 2016). In order to construct a trail in wetlands or swamp lands, a boardwalk must be created to leave the water retention areas undisturbed. Any trail with a foundation will disrupt the natural environment or sink into the wetland.

The most effective ways to reduce soil erosion on a trail are to limit the grade and implement side slopes (Marion & Wimpey, 2017). A side sloped trail is one that travels more sideways along a slope instead of going directly up. Side sloping trails have proven to significantly decrease erosion on trails up inclines. A greater angle between the trail and the upward direction reduces soil loss more effectively.

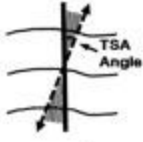



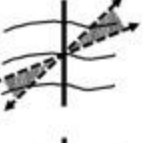



Trail Slope Alignment (TSA)	Degradation Potential	Trail Profile
<b><i>Fall-aligned Trails</i></b>		
0-22° 	<b>Very High</b> – tread drainage rarely possible; erosion, widening, & muddiness probable	
23-45° 	<b>High</b> – tread drainage is often difficult; erosion, widening, & muddiness are likely	
<b><i>Side-hill Trails</i></b>		
46-68° 	<b>Low</b> – tread drainage is possible; low potential for problems	
69-90° 	<b>Very Low</b> – tread drainage is easy; very low potential for problems	

Figure 1: Trail Slope Alignment, from *Assessing the influence of sustainable trail design and maintenance on soil loss* (Marion & Wimpey, 2017).

Figure 1 shows what a side sloped trail is and how the profile of the trail decreases erosion (Marion & Wimpey, 2017). Side sloped trails allow the water to flow sideways across the trail, instead of flowing along the trail and eroding it. It is optimal to design a trail with an angle of at least 45 degrees from the uphill direction.

Another important factor to consider when designing trails is accessibility. The United States Access Board (2019) publishes accessibility standards for various places and structures. Despite SER not being in the US, these standards can be a helpful guideline for adapting trails with accessibility in mind. The section of standards regarding trails recommends that all trails have a firm, stable surface and be at least 36 inches wide over the entire length. If it is not at least 60 inches wide, passing spaces that are 60 inches should be included at regular intervals. The maximum grade of the trail should not exceed 12%. The standards also state that signs

should include the length, width, surface type, and maximum slope for each trail. With all of the above factors in mind, a trail specifically designed for forest bathing has a number of other key features that should be included.

### **2.3.1 What Makes a Good Forest Bathing Trail**

Forest bathing can take place anywhere in nature, but specific features are important for an optimum forest bathing experience (Nadine Mazzola, personal communication, November 15, 2019). Forest bathing has two main parts: 1) invitations to walk through and experience the forest; and, 2) moments to share thoughts and feelings on the forest bathing experience. The paths where the walks occur should not be strenuous; they should facilitate slow movement and periods of stillness to absorb the sensory elements of the environment. Another aspect to giving forest bathing participants freedom to connect with the forest is a relatively wide trail. A wider trail, with potential offshoots for wandering, will give the walkers space to explore and interact with the forest. Space on the trail for wandering and exploration allows participants to immerse themselves into the forest, as well as provides areas for the group to come together and share their feelings and what they personally experienced. Sharing thoughts before, during, and after the forest bathing experience are an important part of connecting between individuals and can fortify their connections made with nature. Any method of sharing is welcomed, whether it be in words, poetry, song, or silence. This time of regrouping and reflecting can also serve to deepen connectedness within individuals. Forest bathing has a range of effects that depends on the individual involved, including being an extremely relaxing experience or something very deep and spiritual.

Nadine Mazzola (personal communication, November 15, 2019), who holds an executive position at ANFT, has her own forest bathing practice that operates in Acton, Massachusetts, United States of America, and surrounding areas. During a telephone interview (see Appendix T), she described the benefit of a wider trail: “We stop and gather between invitations so having

places along the trail wide enough for this or having clearings to do this, depending on how many people are with you, is important.” In her practice, the group returns to talk after each invitation to experience different sensory aspects of the forest. She stated that a narrow trail, typical in more tropical climates compared to the temperate deciduous forests of Massachusetts, would be limiting for both allowing the participants to wander deeper into the forest and to regroup and talk through experiences.

In the forests of New England, the vegetation mostly allows for space to walk between trees, giving participants opportunities to wander through spaces that are not necessarily part of the designated trails (personal communication with Mazzola, November 15, 2019). In an area where this is not necessarily possible, she recommends small clearings formed around trees, small trail offshoots or “spots along the way where people can pause and sit, so maybe benches or rocks would be helpful” to help with forest interaction. Benches, rocks, and other places to rest are also important for accessibility. Children, elderly folks, or physically impaired walkers can utilize this to take a break from walking. If trails are too steep or otherwise not accessible to those who are not comfortable with a lengthy walk through a forest, an expansive trailhead with seating is important. A trailhead, the area before entering a trail itself, is bordered by forest which can still provide some sensory features essential for forest therapy. A trailhead with space to wander, as well as sit, is beneficial for accessibility because it facilitates forest interaction and resting.

In any case, the trail should immerse the forest bathing participants in the sensations of nature, which also includes limiting distractions, especially from other people. Small groups or pairs of walkers work best for everyone to be able to relax, enjoy, and take in the sights, sounds and textures of the forest. A new program for forest bathing at Santa Elena Reserve should take the above recommendations into account to create an effective forest bathing experience that engages and benefits visitors.

## 2.4 Promoting a Forest Bathing Program

When introducing a new program or activity in a place like a forest reserve, the organization must provide enough information to interest and engage visitors. A variety of methods can be effective in attracting attention to a new program and its key features. For distributing information, a brochure is a good method, with the benefit that it is easy to distribute, it is cost-effective, holds a lot of information, and can be personalized for multiple uses (Flottman, 2016). Brochures can be placed in many different locations, not just at the business itself, but also in airports, hotels, hostels and at other local businesses, which is beneficial for promoting a program in a wider scope. Brochures are cost-effective when compared to online options. Also, one can use the same design and create a large number to distribute to people without needing to change the design over time. Brochures are able to hold a lot of information for the business or product that is being described and can be personalized to whatever target audience one wants to approach. The brochure can effectively present information in a way that is attention-grabbing or on-theme with the organization. One disadvantage of using brochures is that they are expensive to print (Krow, 2017). To make sure there are enough brochures and that they are up to date, a lot of printing may be required, and the costs can add up. Also, when printing, even if done on recycled paper, most brochures are only one per person, which could take a negative toll on the environment if the brochures are not properly recycled after use. This issue can be remedied by limiting brochures and other printed material to one per group of people. Another tactic is asking patrons to take a picture of the brochure, map, or other source of information to limit the number of physical copies that need to be printed and handed out.

Besides a brochure, which could be costly and potentially contribute to an unwanted amount of waste, there are other, non-material options that could promote a new forest bathing program within the reserve. The reserve has a classroom equipped with a screen that could be used to show videos about the reserve in general, and to help briefly introduce and teach visitors about forest bathing in an eye-catching way. There is also a TV in the reception area

that is used to show footage from the reserve. A downside to this would be that places outside of the reserve that are promoting the forest bathing program, unlike the brochures, cannot show the promotional video. Another technology-based option, an app, could be created to introduce, teach, and help guide visitors of the reserve through a forest bathing experience. This would require resources that the reserve does not currently have. The reserve would need to potentially hire or contract a programmer or app developer as well as obtain licensing for the app. Following an app development cost calculator and filling in very broad categories of what a forest bathing program app would contain, we calculated the output cost to be US \$78,500 (Z1 Digital, 2019). This expense would be large, and even if the app were available, the money could be put to better use elsewhere to invest in improvements and maintaining the park or investing in the surrounding community.

Another option that could promote the program over a wider area would be large posters or billboards within Monteverde and Santa Elena that pique the interests of passersby. This is a fair option, but the cost to print and place these boards in key locations could total more than it would take to print brochures. These brochures could then be provided to hotels and travel agencies in the community. The billboards could reach travelers, but brochures placed in key locations could have a larger impact on visitors who are staying at hotels or who seek out the recommendations of travel agencies.

## **2.5 Santa Elena Reserve Trails and Programs**

Santa Elena Reserve (2019e) offers four types of walks available to all visitors. Three forms of walks offered include having a guide lead a group through the forest, pointing out plants, animals, and views of interest. A Guided Natural History Trek, offered in Spanish or English, focuses mainly on the natural characteristics of SER. A Private Natural History Walk is offered for patrons who would like a guided tour at a specified time other than those available on the regular tour schedule or would like to be in a more close-knit group. Similar to a private walk



are Specialized Walks, in which the visitor informs the tour guide of a specific interest, such as bird watching or tree identification, and the guide will tailor the walk experience to suit the main interests of the visitor. For visitors who do not want a guided walk through SER, Self-Guided Walks are available. All visitors are required by the Monteverde Board of Tourism to sign in when they enter the reserve and sign out when they leave (SER Environmental Education Program Coordinator, Walter Bello Villalobos, personal communication, January 17, 2020). This is to make sure that all visitors who entered have found their way out, and to collect certain demographic data from each visitor for use by the reserve. The map shown in Figure 2 shows the five different trails a visitor can choose from, which vary in difficulty. The Sendero Mundo Joven is a short trail specially adapted for children, seniors or those with physical impairments. On the other end of the spectrum is the Sendero Caño Negro, which is a mostly unaltered, natural path that includes steep inclines and muddy areas.

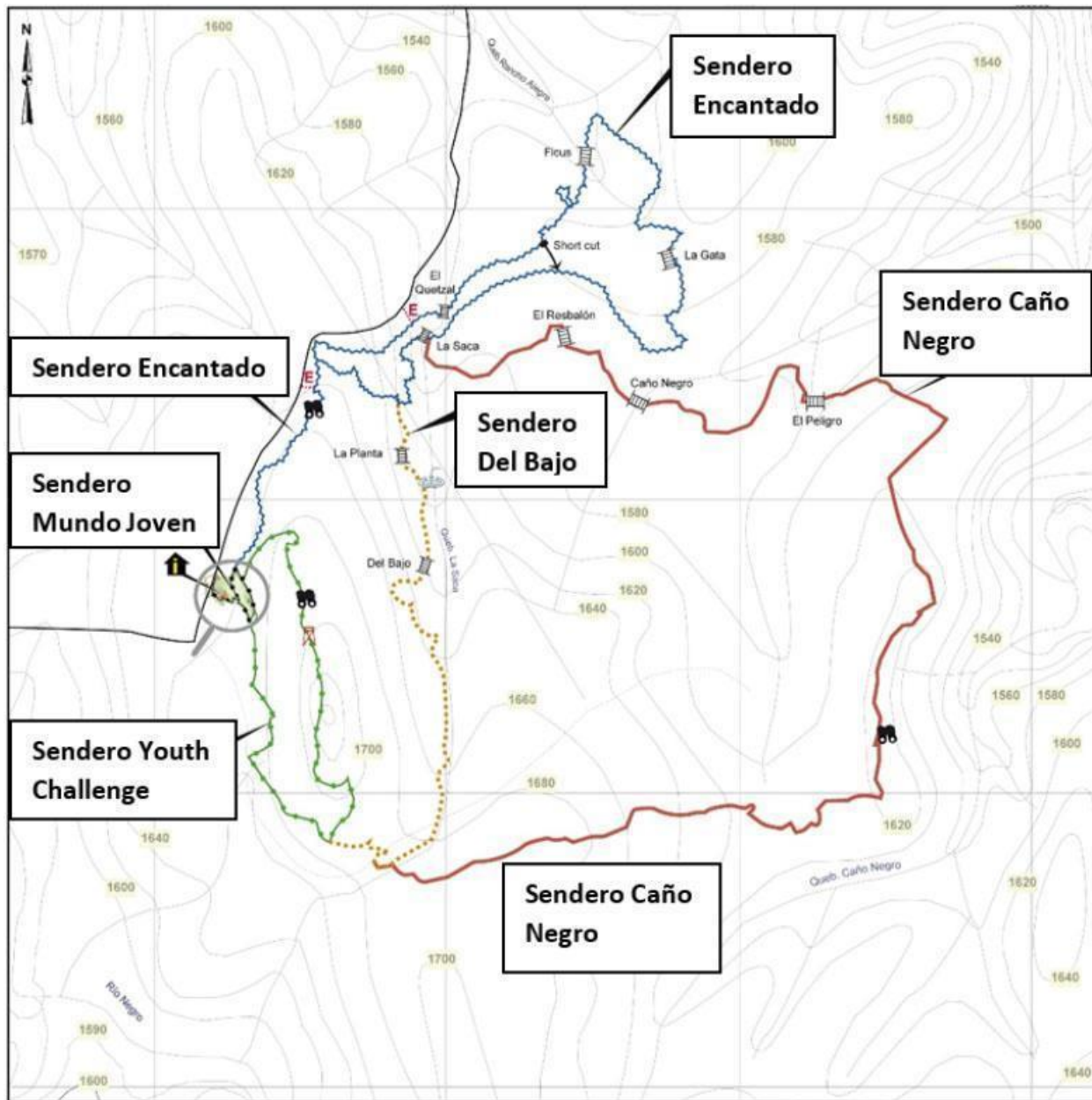


Figure 2: Santa Elena Cloud Forest Reserve Trail Map. (Santa Elena Reserve, 2019e)

Besides these different tours and walking experiences, SER (2019c; 2019e) boasts ten different programs, some of which are offered within SER, while others are external programs within the surrounding community that are heavily impacted by SER. SER offers volunteer opportunities to help the reserve and, in turn, enrich the volunteer through participation in biodiversity conservation efforts and becoming part of a community of friendly, respectful, and

driven individuals. An Investigation program does research within SER, the results of which could impact nature studies and how SER is managed if conclusions would promise a positive impact on SER or the environment it protects.

Santa Elena Reserve (2019e) also participates in the popular Monteverde Christmas Count. Since 1993, the Monteverde community and surrounding communities have conducted an annual bird count around Christmas time. They note the number of individual birds and the number of different bird species. This fun activity both unites the community and keeps track of how many birds and species are present in the area. A donation program is open and available to all who wish to contribute. All proceeds will benefit environmental education, research, and reforestation programs supported by Santa Elena Reserve.

The Environmental Education Program includes SER staff visits to primary schools in Monteverde to talk about environmental issues and facilitate workshops and activities that engage students to learn about and encourage care for the environment (SER, 2019c). Certain workshops focus on the Santa Elena Reserve and what the forest contains and what parts of the SER and similar forests need to be protected. Friends of the Environment is a program “to promote the use of the Santa Elena Cloud Forest Reserve as a natural laboratory for the development of environmental research and education projects by young people from the Monteverde district” (p. 2). This program combines environmental education with research projects to promote understanding of biodiversity and conservation throughout the community.

The Social Management and Interinstitutional Support Program focuses on making SER (2019c) an active contributor to the Monteverde community as well as international organizations. This collaboration will encourage the spread of conservation efforts and knowledge as well as combine the goals of multiple organizations to make progress on focus areas as a group. Via this program, SER also supports other programs in the area with the same goals. Along the same lines of collaboration, Santa Elena Reserve also contributes to the Science Exchange Program. This program was initially developed by the Rocky Mountain

National Park in Estes Park in Colorado, United States. The Twinning Agreement between Rocky Mountain National Park and the Arenal Tempisque Conservation Area - Huetar Norte Conservation Area, of which Santa Elena Reserve is a part, allows parks to exchange resources and environmental knowledge to benefit local communities.

Further community involvement comes with the Reforestation Program (SER, 2019c). Established in 2007, the Reforestation Program utilizes the support of students, both national and international, to plant trees of various species native to the Monteverde region in strategic areas to support the forest habitat of the community and surrounding areas. The program specifically focuses on supporting the Pájaro Campana Biological Corridor and planting trees to form windbreak zones and on the banks of water springs to preserve natural water sources.

To directly support Santa Elena Reserve's (2019c) purpose of conservation of biodiversity and protection of the natural ecosystem of the forest, the Control and Protection Program is used to certify those who will be directly caring for the SER. In collaboration with SINAC (Sistema Nacional de Áreas de Conservación, or National System of Conservation Areas) and the Natural Resources Surveillance Committees, SER has trained 90% of its personnel for specialized care of SER to the highest standard of conservation. SER as a whole protects a huge variety of species and is trying to preserve the cloud forest for years to come. The trails within SER have been planned to offer a variety of levels of difficulty to suit the desires of visitors while also maintaining the integrity of the cloud forest.

## **2.6 Summary**

In summary, prior research has been done that is helpful for creating a forest bathing experience at Santa Elena Reserve. The health benefits of forest bathing have been documented, and the Association of Nature and Forest Therapy (2019c) is devoted to its integrity and promotion. Active forest bathing practices provide a baseline for how a forest bathing experience could become an addition to Santa Elena Reserve's many programs. The

features of an effective trail, both for accessibility and for forest bathing purposes, are important considerations. Even with all of this information, there is no research on how forest bathing might affect or attract tourists who visit Santa Elena Reserve. To contribute to answering these questions, we performed research at SER, and in the next chapter we explain how we carried out this research.

### 3.0 Methodology

There were two complementary goals of this project. The first was to determine how to improve current trail conditions throughout the entirety of Santa Elena Cloud Forest Reserve and receive visitor feedback on their experiences within the reserve. The second was to determine how to create and test a forest bathing experience along one of SER's trails best suited for this type of walk. Additionally, we provided SER with informative materials on the practice of forest bathing for continued development. Both of these goals focused on visitor enrichment and satisfaction.

*Our measurable objectives:*

1. Determine how well-marked the trails were, how they were classified and what the conditions of the trails were.
2. Determine how to improve the condition of trails for better accessibility, cleanliness, safety and erosion prevention.
3. Determine how Santa Elena Reserve trail management and facilities can better serve its visitors.
4. Identify the best way(s) to create self-guided forest bathing walks in SER that would achieve the therapeutic benefits of being in nature.
5. Identify the most effective educational materials and points of interest for visitors participating in forest bathing.

To achieve our overall goals, we selected research methods to obtain essential information, which included interviews, surveys, focus groups, a prototype (pilot trail) and observations. In the following sections we will describe how we achieved each of our objectives, explaining and justifying the methods that we chose to achieve each one.

### **3.1 Determine how well-marked the trails were, how they were classified and what the conditions of the trails were.**

In order to help improve the existing trail network, we first diagnosed its current state. The easiest way to do this was to walk along each trail ourselves and record observations about their condition. We observed the surface of the trail and specifically looked for and photographed erosion-prone, unsafe or inaccessible areas (see observation checklist in Appendix B). We also observed and photographed the surrounding area and navigational aids such as blazes or trail markers and signs (see Appendix D for example photographs). Doing this helped us determine what could be fixed, changed, or added in order to improve the visitor experience. Observations and gathered data were organized by priority and problems present on all trails were focused on in our recommendations for the reserve.

### **3.2 Determine how to improve the condition of trails for better accessibility, cleanliness, safety and erosion prevention.**

After observing the state of the trails, we used our observations to determine how SER could improve any areas on the trails that needed work. We observed how the climate of SER affects trail conditions. Because of heavy and frequent rainfall, we determined what types of materials best suit the trails based on successful drainage types in other places along the trails in the reserve. Other reserves in the area, depending on location, do not have the same climate as SER. Those with a similar climate, such as part of the Monteverde Cloud Forest Reserve, have similar drainage systems (e.g. PVC drainage pipes, gravel trails, water run off ruts, etc.). This helped us to identify any important areas when it comes to preventing erosion and places of standing water, which could pose a safety risk over time. We were able to provide recommendations that were more specific and feasible to the needs and resources of Santa Elena Reserve, based on the typical climate within the reserve and information gathered while discussing the reserve with our sponsor. These observations, combined with the information

provided in Chapter 2, helped us deduce a practical and effective solution to improve trails for overall visitor satisfaction and possible forest bathing use for SER.

### **3.3 Determine how Santa Elena Reserve trail management and facilities can better serve its visitors.**

As a key part of our research, we determined how to improve Santa Elena Reserve based on a survey of visitors. The target population of this survey was the tourists who visited SER, as well as people from local communities who chose to visit SER. Our team developed a list of survey questions for visitors to respond to after their visit (see Appendix F-1 [English], F-2 [Español], F-3 [Français], F-4 [Deutsche]). Questions included ratings, recommendations, and visitor perceptions of the reserve, which helped our team to come up with possible solutions to increase attendance to SER and improve visitor experiences based on visitors' suggestions. The survey questionnaire also asked about forest bathing, which helped us to determine the general awareness about this topic among tourists and other visitors to SER. The survey was originally available in both English and Spanish in order to increase the number of responses because we believed the majority of visitors spoke these languages. We discovered that many visitors speak French or German as well, so we created surveys in these languages to garner a larger sample of people.

Our team started the exit survey at the beginning of the third week of our work at SER. The survey was distributed on paper via convenience sampling in the reception area of the reserve. Typically, visitors were waiting to be picked up by the shuttle leaving the reserve at 1pm and 4pm each day. Our sample size was 300. The ratings were compiled into an Excel document and presented graphically to form an accurate determination of how visitors feel about different aspects of SER. We also consulted 50 online reviews of SER on TripAdvisor from the past year and determined what past visitors thought about the reserve and what suggestions for improvements they had. Through content analysis, we took a tally of key words and phrases in each review to determine which feature or issue was most prominent or



important to past visitors. Suggestions were compiled, and the most common suggestions were discussed with SER administration to determine what changes could be made to accommodate these preferences. Additionally, this survey helped us determine what percentage of visitors are familiar with forest bathing. This was the basis of our investigation of successful promotion of a new forest bathing program, which was discussed in Section 2.4.

### **3.4 Identify the best way to create self-guided forest bathing walks in SER.**

Prior to working on a self-guided trail for forest bathing, we participated in a guided forest bathing walk as a group once we had arrived in Monteverde, CR. We gained first-hand information on what a forest bathing walk should entail and took note of key features. Results from these observations, as well as supplemental information from two forest bathing experts, whom we interviewed, and knowledge gained from participating in forest bathing, gave us insights into what content to include and the best way to present it in a self-guided forest bathing trail.

When creating a self-guided forest bathing experience that both engages visitors and introduces them to its benefits, we needed to provide materials that did this effectively. To test a variety of supplementary materials, we worked with SER to create a pilot trail, designed and installed signage along the trail that includes invitations and reminders, and provided visitors with pamphlets (see Appendix I-4) on forest bathing. We monitored the usage of additional signage that encouraged visitors to participate in forest bathing activities by seeing how long participants stopped at each invitation and whether they appeared to read and participate.



Figure 3: Example Image of Invitation Along Self-Guided Forest Bathing Trail

The signs included invitations for visitors to focus on the many sensory stimulations in the forest - different sounds, sights, smells, and textures - and invitations to slow down, take a moment to contemplate and de-stress. An example of an invitation installation is pictured in Figure 3 above. These invitations were based on other effective forest bathing walks that are active currently, such as forest bathing walks led by Nadine Mazzola in Acton, MA, and ones led by Marcela Morales in Monteverde, CR. The signs along the trails served as a guide for forest bathing. To see how the signage and handouts engaged visitors to participate in forest bathing, we observed, via wildlife cameras, and noted how participants interacted with the signs and whether they followed along with the pamphlet and any instructions on the signs. We put four different cameras along the Del Bajo Trail. The first was placed at the beginning of the trail, and the second at the end of the trail. This helped us see how much time it took visitors to complete the *shinrin-yoku* walk. The third camera was near Invitation 4, which is near the intersection of

the waterfall spur trail. The last camera was near the third reminder that asks people to pay attention to the sounds around them, specifically to pay attention to the calls of birds.

The cameras had been programmed to record lower quality videos to allow us to get more recorded clips without taking up as much memory. The average camera can record from 8 to 10 hours; however, they do not record for the whole time, they record only when there is motion detected and only in 10 second clips. Recordings gave us insight on how the signs and/or pamphlets helped the guests to participate in forest bathing. To make sure that people are aware that they may be recorded, we placed two “Trap Cameras Present” notices (see Appendix M) in the reserve and this procedure was approved by WPI Internal Review Board (IRB). The first notice is at the entrance and the second one is at the beginning of the Del Bajo Trail. Subjects in the recordings were completely anonymous and footage was not published. Overall, this process helped us to gather more experiential data from visitors after they had finished the walk. Noting how visitors participated in the pilot forest bathing trail showed us where improvements needed to be made, including the content of handouts, content of signage, and placement of signage, among other things. This method using the pilot trail is to test the effectiveness of invitations and helping people participate in forest bathing to de-stress and connect with the forest. Observational data was tabulated in a checklist (see Appendix L) and compared to determine trends that were represented graphically.

### **3.5 Identify the most effective educational materials and points of interest for visitors participating in forest bathing.**

There are a variety of educational materials that can be used to inform people of the benefits of forest bathing. We identified which methods were most effective in informing visitors about forest bathing and which were useful to guide them through the experience by conducting a short survey using face-to-face interviews (part of Appendix N) with a sample size of 24 visitors, chosen through convenience sampling, after they had completed our pilot forest bathing trail (see Method 3.4). Pamphlets included supplementary information on forest bathing. As part

of the survey discussed in Section 3.4, we asked questions on what participants have learned about forest bathing itself. This information is provided in the pamphlets we provided, whereas signs along the trail only include invitations. This part of the questionnaire allowed us to gauge the effectiveness of the informational material we included in the pamphlet. Results on what participants have learned about forest bathing allowed us to see what changes or additions needed to be made to the educational materials we provided. The supplemental camera footage was analyzed to determine levels of participation and how long participants were on the forest bathing trail. The survey data and camera observations were gathered, analyzed and represented graphically.

### **3.6 Summary**

To accomplish our main goals for this project, we used observations, surveys, and interviews. In order to make informed recommendations for improving trails and increasing visitor satisfaction, we utilized our own observations, as well as an exit survey for visitors that was used to gauge their attitudes toward various features of the reserve. In order to prepare and create an effective self-guided forest bathing trail, we observed a guided forest bathing walk to translate it into a specific program for SER. To gauge the success of this program, we created a pilot trail to observe participants and gain feedback via a short survey. In the next chapter, we will discuss the results we obtained using these methods to show how we achieved our objectives and goals.

## 4.0 Results and Analysis

This project was separated into two goals to help improve visitor experience: overall trail maintenance and forest bathing trail development. The first goal was to make recommendations for trail maintenance throughout the entire reserve. The second was to implement a forest bathing trail to improve visitor interaction with nature and benefit their mental and physical wellbeing. These goals combine to help SER improve and better serve a majority of its visitors.

### Our measurable objectives:

1. Determine how well-marked the trails were, how they were classified and what the conditions of the trails were.
2. Determine how to improve the condition of trails for better accessibility, cleanliness, safety and erosion prevention.
3. Determine how Santa Elena Reserve trail management and facilities can better serve its visitors.
4. Identify the best way(s) to create self-guided forest bathing walks in SER that would achieve the therapeutic benefits of being in nature.
5. Identify the most effective educational materials and points of interest for visitors participating in forest bathing.

The following sections discuss the results we obtained and analyzed to accomplish our objectives.

### 4.1 Categorization of Trail Conditions for Overall Reserve Recommendations and Improvements

Our initial assessment of trails was essential to understand what recommendations we need to give to the reserve for improvements of trails regarding level of difficulty, safety and replacement of older features that are in poor condition. Assessment of trails and the subsequent recommendations and discussions helped us to begin progress on our goal of recommending how to improve Santa Elena Reserve trail conditions and focusing on visitor

experience and satisfaction. Our trail observations served as a reference for our recommendations to implement throughout the reserve. The following sections include our progress on our first two objectives, which include observation of trails and determining how to improve them.

#### **4.1.1 Trail Condition Observations**

We walked the entire lengths of all five trails and recorded observations. These observations became the basis for our trail improvement recommendations and helped us decide which trail was best suited for a forest bathing experience based on our discussions with forest bathing experts. In general, the trail conditions were better closer to the entrance. For example, the small trail used to get to the others (Sendero Mundo Joven [see Figure 2]) was composed of entirely concrete pathways and was very easy to follow. The trails and sections closer to the information center were mostly gravel or rock and in good condition, while more remote, outer sections were much muddier and traveled through more difficult terrain. The following subsections contain our observations, organized by trail, from shortest to longest. A full table of our observations can be found in Appendix C.

SER staff and volunteers have done a thorough job maintaining the network of trails, especially given the challenges of the terrain and climate. For this reason, we have not suggested any major changes to the trails, however we have general recommendations that apply to the entire reserve, and specific recommendations for each trail. It is to be noted that we were conducting observations during the dry season in Costa Rica, but because of the reserve's location and altitude, rain is common on a majority of days throughout the year. Our observations occurred during a time when the weather was drier than usual, and we would have expected to see much more rain-related damages to the trails during the wet season.

One general improvement could be to add a system for visitors to notify staff about branches or other obstacles on the trails so that SER staff can address the issues in a timely

manner. The estimated times to complete walking each trail should be recalculated, and more information about the attractions of each trail to provide more accurate and detailed information to visitors. The visitor sign-in book in the reception building can also be updated. An age or age range section would be helpful to gather more data that could help SER decide what new attractions to include, for example, those that appeal to kids or trail changes for better accessibility for the elderly. Additionally, the existing “number of people” option (currently written as “N° Pax”) is hard to understand and should be reworded to increase responses. For example, “Number of People” would be much clearer. Besides these, each trail had specific areas for improvement.

#### **4.1.1a Sendero Mundo Joven**

The Sendero Mundo Joven is made entirely of concrete and serves as a connector from the entrance area to the other trails. It is a 480 m long trail for visitors who may not be physically capable of hiking longer, unpaved trails. Because of the paved surface, puddles, mud, erosion, steepness, and clearance were not an issue. The signs along the trail, which contained maps, navigational information, and wildlife viewing areas, were clear and easy to understand. It already featured a few signs about plant and animal life nearby, but more can be added so reflect the biodiversity of the forest. The map at the entrance of Mundo Joven is currently sideways. The map is sideways so that the trails are in a more logical and the map is easier to follow, however, all of the words and labeling are sideways, which makes them hard to read. A map that has both logical trail orientation and easy to read labels. Overall, the Sendero Mundo Joven was in excellent condition and did not require improvements regarding the trail surface.

#### **4.1.1b Sendero Youth Challenge**

The next shortest trail (1.4 km) is the Sendero Youth Challenge. It is a very popular trail, possibly because of its shorter length and proximity to the information center, as well as its

observation tower. Other points of interest include the highest point in the reserve (1725 m), and a tree whose base is naturally hollow, which makes it possible to go under the roots. The trail surface was mostly made of gravel or rocks and was in good condition. There were a few wet, muddy, or slippery areas, but these can be remedied by adding more rocks whenever they are needed. To provide more facts about the reserve for visitors, more information at the highest point in the reserve could be added. It would also benefit visitors if information about conservation efforts of the reserve alongside what can be seen from the observation tower were added. A visual that points out where the four nearby volcanoes can be seen and data about their highest peaks would help engage visitors in what features are there even if they are hidden by clouds.

Elsewhere along the trail, there is an old route that is no longer in use that needs to be more effectively blocked off. Currently, there is yellow, plastic caution tape across the path, but a wooden railing, chain, or “No Entry” sign would keep the forest looking more natural and allow workers to access the area if needed. This trail also includes a designated “Safe Zone”, originally built for earthquake safety. This area is mostly unused. Our on-site liaison, Walter Bello Villalobos, and we proposed that this clearing could be cleaned up and maintained as a rest spot for visitors. The addition of picnic tables or benches would make it a suitable place to rest. Lastly, one of the tour guides suggested that signs which abbreviate the trail to “Y. Challenge” can be misleading and should be changed to “Youth Challenge” to improve clarity.

#### **4.1.1c Sendero Del Bajo**

The Sendero Del Bajo is 2.6 km in length and is deeper within the reserve than the Sendero Youth Challenge. Compared to the previously discussed trails, Sendero Del Bajo is less maintained and includes more stairs. There were a few puddles along the trail, but mud and erosion in these areas were not impactful. Figure 3 below includes an example of one such area. Numerous stepping stones were loose and required stabilization. Periodically, branches



would fall across the trail, which required reserve staff to remove them. The main point of interest on this trail is a small waterfall. The spur trail to the waterfall is currently unmarked. It would be best to add a sign that could help direct visitors to the waterfall. At the waterfall viewing area is a wooden railing that needs to be replaced. The wet, deteriorating wood could collapse if an individual were to lean on it with substantial force.

Along the rest of the trail, there are stairs in need of repair. A few cinder blocks and pieces of wood that are holding the stairs in shape are missing or broken. Replacing these will ensure that the structure of the stairs remains intact and will prevent injuries from missteps or collapsing stairs. This trail receives less traffic than other trails at SER on average, according to SER staff.



*Figure 4. Del Bajo, Mud on Trail*

#### **4.1.1d Sendero Encantado**

The Sendero Encantado follows a loop in the northern part of the reserve and includes a short cut to bypass the middle section of the trail. The front part of the trail was in similar condition to the Youth Challenge and Del Bajo Trails. The furthest section was very muddy and

had several areas of standing water. There were also a few steep switchbacks and branches on the trail, as well as unstable stepping stones. Similar to the Youth Challenge Trail, there was an old section of the trail that needed to be blocked off more effectively. Interesting points on the trail include large trees, a scenic bridge and stream (El Quetzal), and locations to observe wildlife. Clearing a path around the large and unique ficus trees would help visitors venture around them and observe them more. The Ficus Bridge requires repair of wire netting along its surface. A Quetzal information sign along the trail needs to be reprinted and replaced. There were a few clearings (3-5) that could be converted to rest areas with standing room or benches. The back section of the trail (past the shortcut) was more muddy and had more difficult terrain. However, there is difficulty in adding gravel to a more remote trail. Since the shortcut bypasses this section, it is not necessary to develop the further section of this trail much more. The more natural section gives visitors more options regarding types of trail terrain. Despite this, we believe a sign near the shortcut can be added to warn visitors that the area ahead is very muddy. Figure 4 below shows examples of mud and a branch across the Encantado Trail.



*Figure 5. Encantado, Puente La Gata Fallen Branch*

#### **4.1.1e Sendero Caño Negro**

The longest, most remote trail in the reserve is the Sendero Caño Negro. Because of this, it was in the worst condition. Most of the trail was muddy, even on a drier day, and there were many wet or eroded areas. Some muddy areas were aided by wooden boards to walk on, but some had sunken far into the mud and were useless, and overall there were not enough to remedy the large amount of mud. At multiple points along the trail, there were large trees or branches across the trail, including one that completely blocked the trail. As mentioned before, the rough conditions serve as an attraction to certain types of visitors who would prefer a hike on more unaltered terrain, although some improvements could be made. Branches on the trail should always be removed. Placing more boards in some places along the trail could remedy some of the muddiest areas. Reconstructing the entire 4.8 km trail out of stones or gravel like the other trails would be very time consuming, expensive and would limit the amount of trail

variety available to visitors. The rocks must be carried by hand to the outermost trails, up to 5 km away from the reception area, which would require substantial time and labor. The bags of rocks themselves cost about US \$40 per cubic meter. On average a cubic meter of rocks can cover about 20 meters of trail, depending on the distribution of rocks. This would total about US \$9,600, if not more, to place rocks along the entirety of the Caño Negro Trail. Altering the trail could also diminish the organic feel of the path. At present, the isolation from the rest of the reserve can lead to increased chances of seeing wildlife. Near the midway point of the trail is a section that travels next to a steep drop-off which requires installation of a safety railing. Near this section, a bench had been carved out of a log. It would be a photo attraction for visitors if the bench had a painted picture or text on it to make it stand out. Figures 6 and 7 below include trail condition examples from our observations of this trail. Overall, the Sendero Caño Negro is a trail that could use some improvement, while still retaining its unique and organic features.



*Figure 6. Caño Negro, Steep Drop Near Trail: A steep drop near the trail as pictured requires a safety railing.*



*Figure 7. Caño Negro, Broken Bench Near Viewpoint*

#### **4.1.2 Conclusions**

There were a few observations that applied to all of the trails at the SER. First, despite not having any blazes, the trails were all easy to follow. The high density of the forest makes it difficult to mistake anything else for a trail. Due to the amount of moss and epiphytic plants on

the trees, traditional painted blazes would be impractical and would become overgrown and hidden within a matter of months. There were also signs at most intersections, often including maps with a “You Are Here” point. Most of the bridges along each trail had signs as well, but all signs were in need of replacement; a few had fallen from their original posts and all were too dirty to read clearly. It would be best to replace these signs and others that would get dirty/damaged biennially. To inform hikers on how far they have walked, distance markers on the longer trails would be helpful.

After observing all of the trails, we concluded that the Sendero Del Bajo is the best trail on which to implement a self-guided forest bathing experience. It is not too long nor too short, meaning the walk is not strenuous to the average person. The trail is an appropriate length to fully immerse oneself in the forest. The lower amount of visitor traffic makes it ideal for a relaxing walk away from other visitors, who could detract from a forest bathing experience. For these reasons we set up our pilot forest bathing trail on the Del Bajo Trail.

#### **4.2 Determining Common Interests, Suggestions, and Improvements for Trails**

To determine the common interests of the Santa Elena Reserve visitors, we put together an exit survey to gather the visitor’s overall ratings of their experience. With this survey, we determined why they visited Santa Elena Reserve, how they found out about it, which trails they used and their conditions, their opinion of ticket prices, if they had a guided tour, and whether they had any suggestions for the reserve. We also compiled and analyzed the reviews and comments from TripAdvisor from the previous year. This mainly gave us information on the guests who booked guided tours. This information helped us determine how the visitors felt about the reserve and gave us the ability to suggest alterations to the reserve to best fit a majority of guests. In the following sections, we discuss the results of our survey and the reviews from the last year on TripAdvisor.

### 4.2.1 Exit Survey Results

Our sample size for general surveys was 300. Most visitors were English speakers, however, after we had conducted the survey for a short time, we found that some tourists were not able to complete the survey accurately because they did not know English or Spanish. Our sponsor suggested translating the questionnaire into French and German, the other most common native languages of visitors of the reserve. We then administered the questionnaire in four languages, which helped us to avoid discrepancies and biases of people who could not understand certain questions or answers when written in English or Spanish.

The survey indicated that 95% of people who were visiting Santa Elena Reserve for the first time. An important consideration regarding responses to this question is that most of our respondents are tourists who spent 1-3 days in Monteverde and who typically do not revisit the same attraction.

One of the questions asked why people decided to travel to Monteverde. The most common response was hiking, which was selected by 73.3% of people. Sixty-one percent of people selected that they were visiting to see the scenic views offered in the area (see Figure 8 for full distribution of responses). In a question asking why visitors specifically came to SER, 76.3% of people chose hiking as their main motivation. Another large group of respondents (58.3%) answered that they came to see wildlife (see Figure 9 for full distribution of responses).

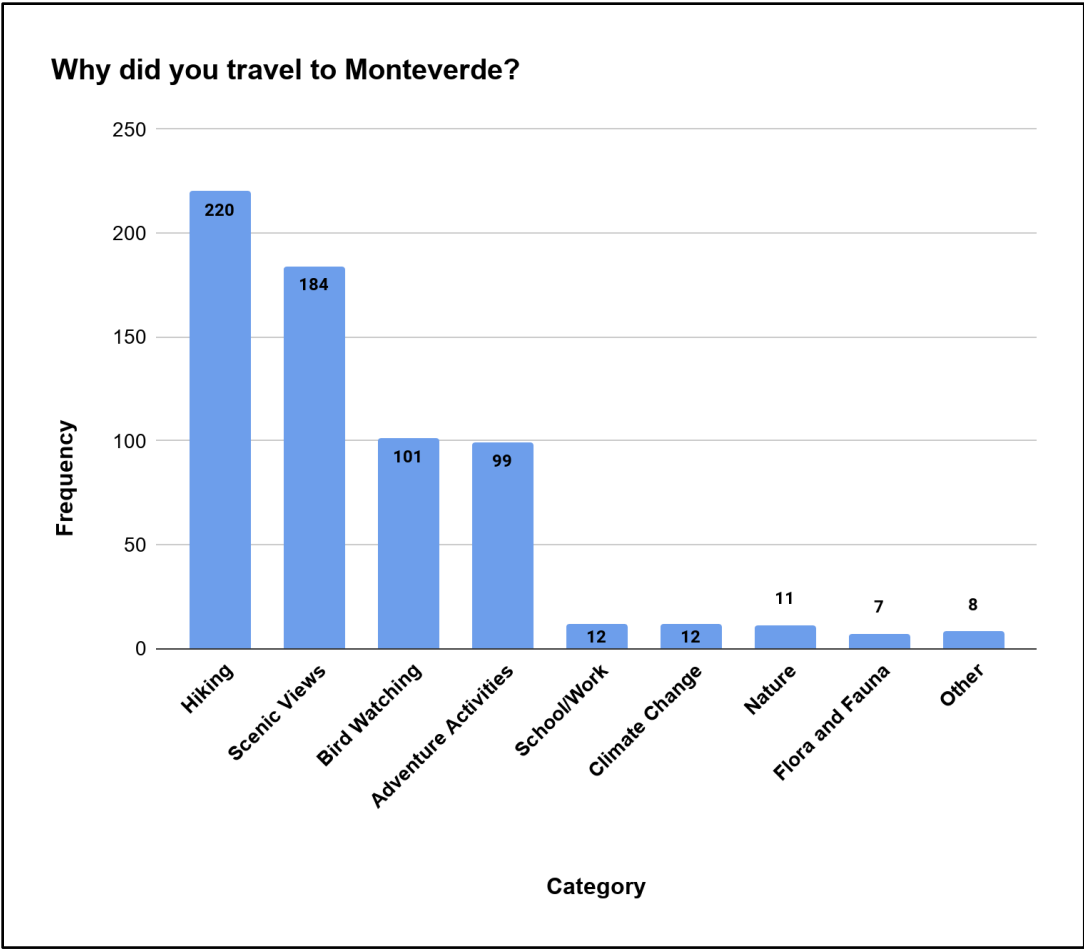


Figure 8: "Why Travel to Monteverde" Bar Graph of All Responses



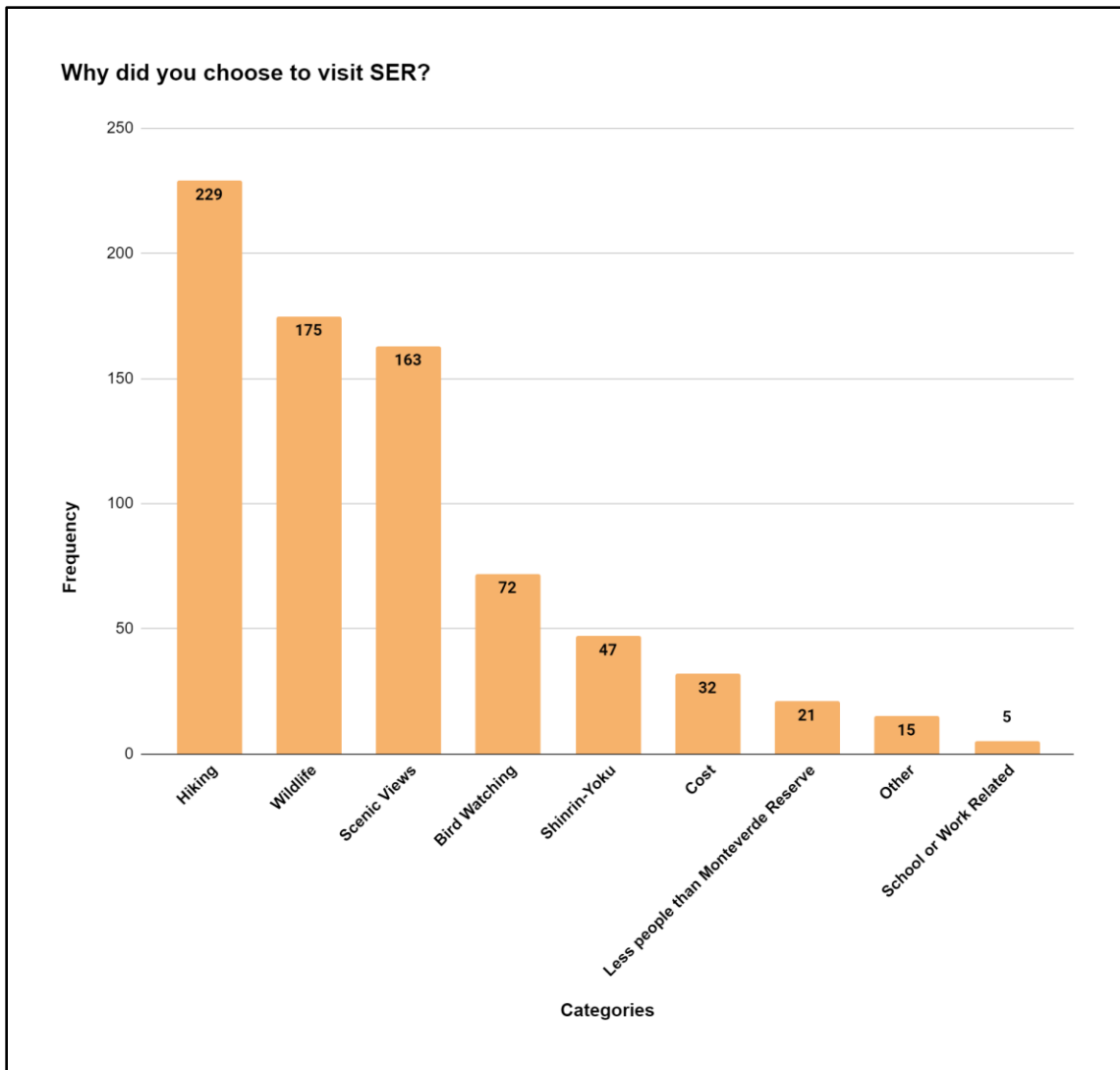


Figure 9: “Why Visit SER” Bar Graph of All Responses

Within the question of what motivated visitors to come to SER, *shinrin-yoku* was included as a response to gauge how many people were aware of or interested in forest bathing. Fifteen percent of people chose this option. It should be taken into account that at the beginning of our survey period, this answer was listed as “Forest Bathing/Forest Therapy” and after some discussion, we changed it to “*Shinrin-Yoku* / Forest Bathing” to remain consistent with our provided materials and more widely recognized terms.

According to the responses, the most frequent response (27.3%) was that visitors gained knowledge of SER through recommendations from family and friends. Regarding the second most frequent response, 24.3% of visitors learned of SER through hotels/hostels. Other common methods included social media (20%) and guidebooks (17.6%), specifically “Lonely Planet” (9.3%). The full distribution of responses to this question is shown below in Figure 10.

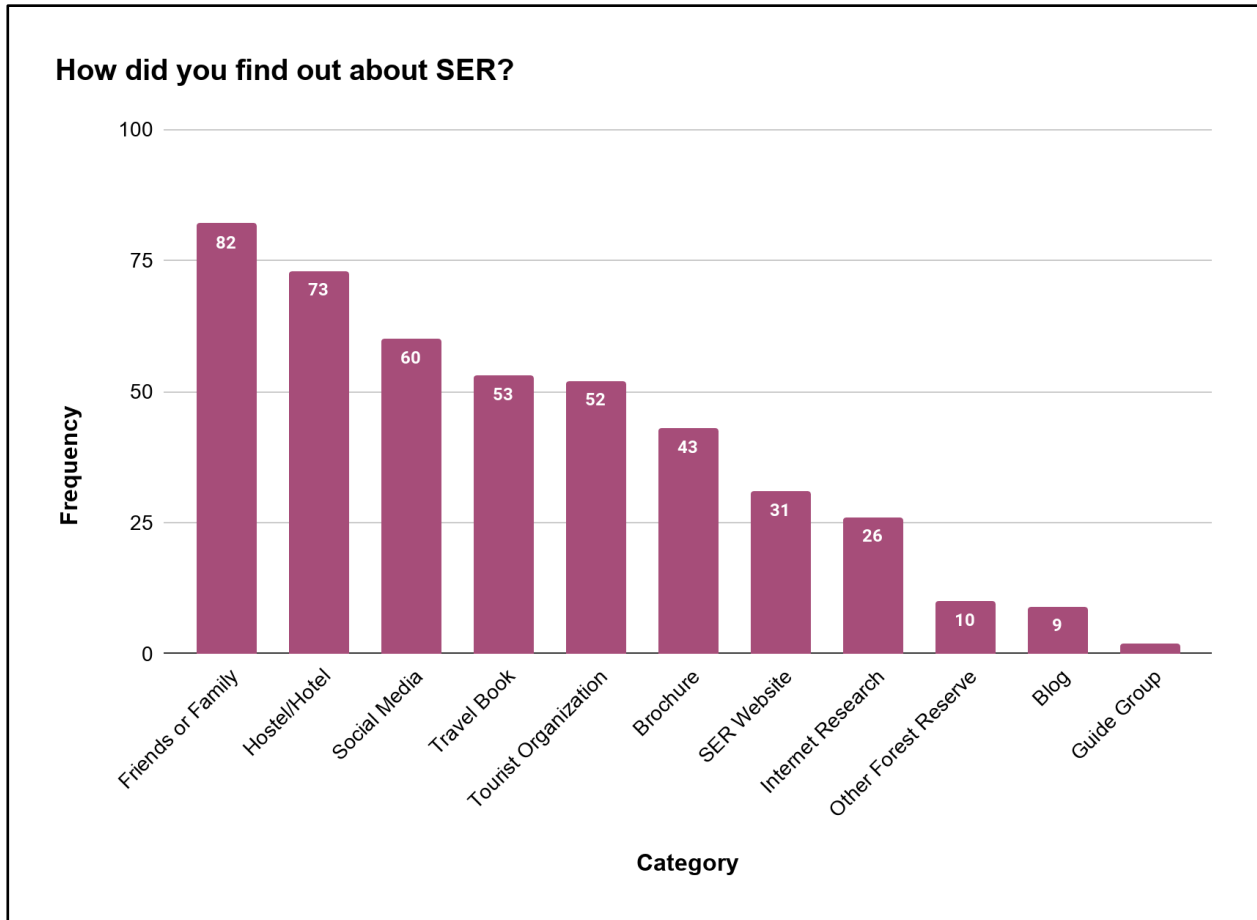


Figure 10: “How did you find out about SER” Bar Graph of Total Responses

To get a better understanding of what people think about SER and how they want to improve it, it was important to receive their honest feedback about the conditions of the trails. A compilation of all responses to this question are represented graphically in Figure 11 below. A majority of people mentioned that trails are well-marked and clean (73% and 65.3%,

respectively). Forty-nine percent of people responded that some of the trails are muddy and slippery. This is a trail maintenance challenge within SER because the weather within the cloud forest is rain most of the time. During our gathering of survey responses, it was a dry season in Monteverde. Although it is still often rainy in the reserve, the wet season would result in even more precipitation. Because of this, our survey data of trail conditions may be skewed toward conditions only present in the dry season or skewed away from results that would be more prominent during the wet season. Because of this, we cannot get a full perspective of the trail conditions of the reserve all year round.

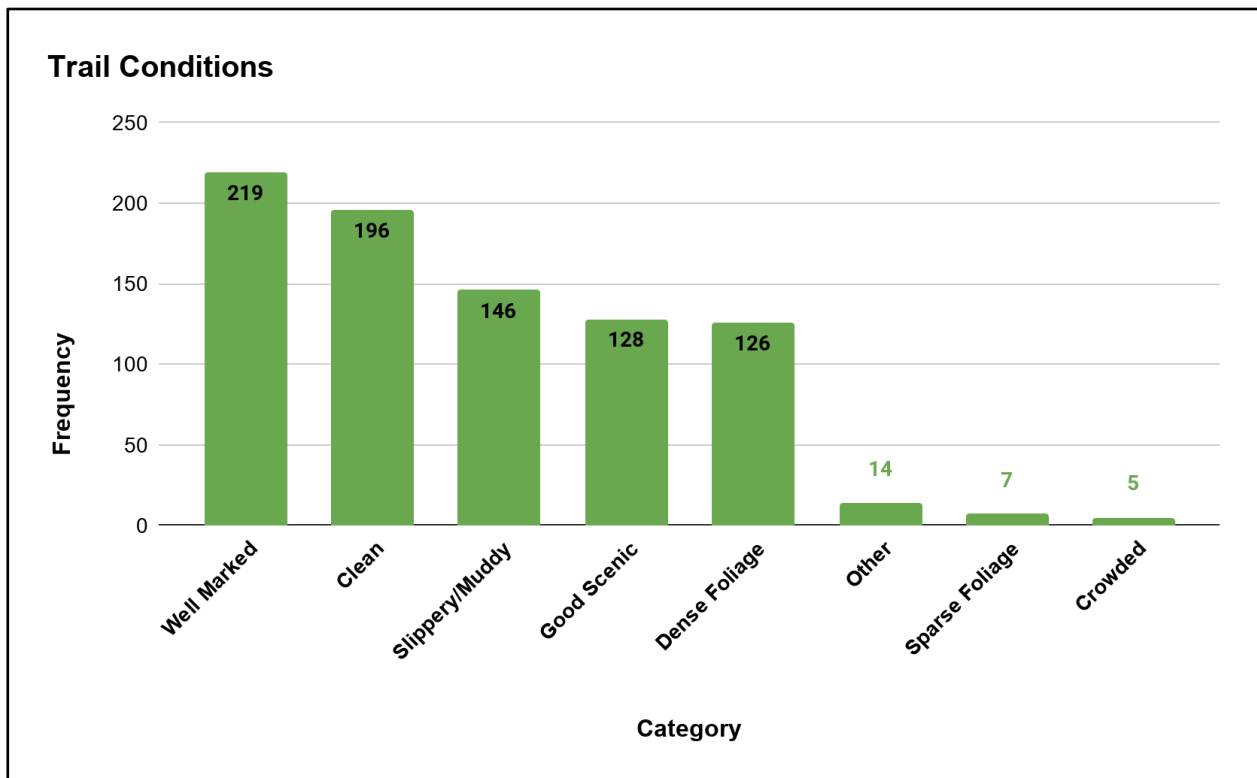


Figure 11: "Trail Conditions" Bar Graph of All Results

Based on our results, we also found a correlation between which trails visitors used and which conditions visitors reported on their surveys. Caño Negro Trail had a significant number of negative reviews due to the fact that some parts were unstable and muddy (27.7%), and some

visitors felt unprepared for and surprised by these conditions. Those who were prepared appreciated the more natural, unaltered feel of the trail. Some tourists mentioned that some parts of the trail were blocked with trees. In contrast, the Youth Challenge Trail had positive reviews about its conditions and fewer people (only 5.3%) said that this trail specifically was muddy and slippery. This shows the correlation between usage of gravel on trails and lower presence of mud.

Our survey question regarding which trail(s) visitors used resulted in the most responses for the Encantado Trail. The receptionists usually recommend that trail when people want to hike a relatively longer trail with the option of a short cut. It is also a place where they could encounter birds or other animals. 48.3% of people indicated that they hiked the full length and 25.3% indicated that they hiked the short cut. There is likely some degree of error in these results; people who hiked the short cut may have marked full length and vice versa, or marked both options, which would lead to inaccurate trail usage data. Although this trail has a more natural back section, the Encantado Trail is not as long and does not require as much time as the Caño Negro Trail, which garnered 43.8% of responses in comparison. The second most popular trail was the Youth Challenge Trail (48.8%), which includes an observation tower from which you can see up to four volcanos (Arenal, Tenorio, Miravalles, and Rincón de la Vieja) in good weather. The least popular trail, with a response rate of 11.4%, was the Mundo Joven Trail, despite the fact that this trail is actually a part of every trail and you need travel on it to get to the beginning of other trails (see Figure 12 for full distribution of results). Those who chose Mundo Joven on the survey could have walked the entire trail deliberately, or the respondent knew that the trail lead to others and considered themselves to have hiked it. Another point of inaccuracy could be that visitors forgot which trails they walked or had selected the wrong trail by accident.

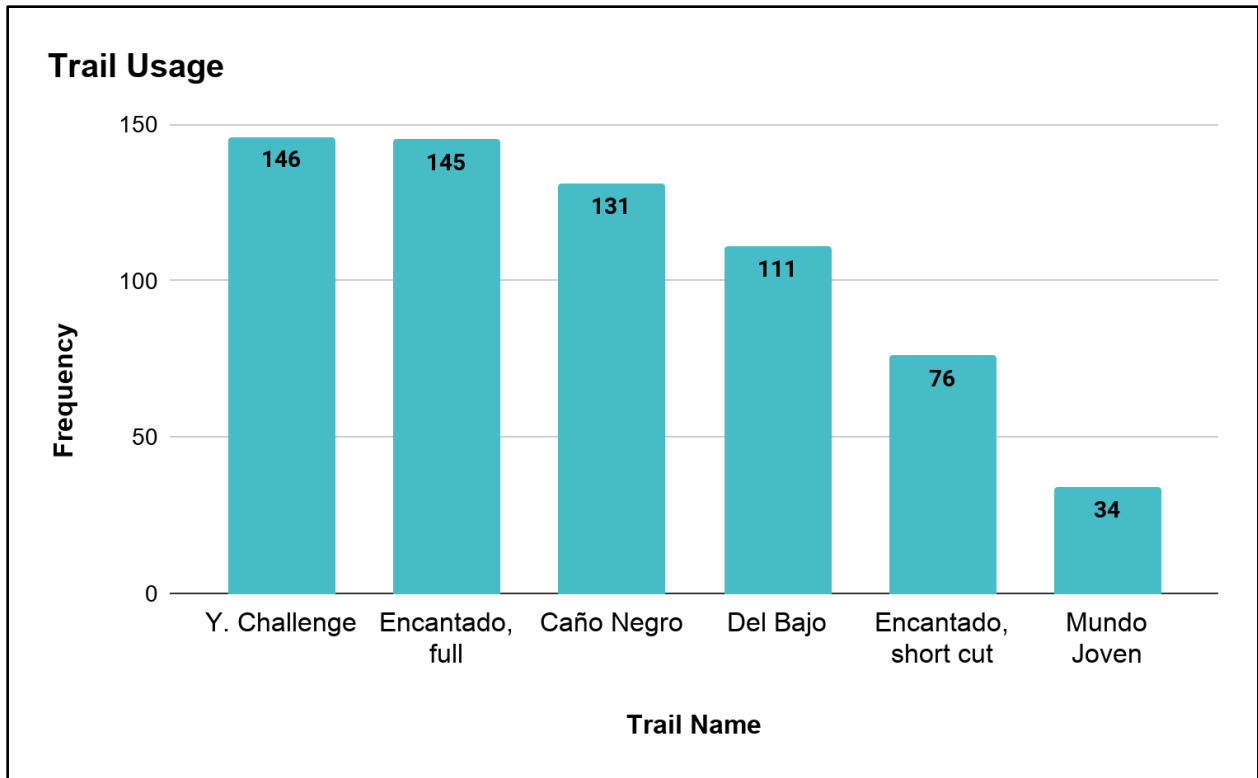


Figure 12: "Trail Usage" Bar Graph of All Responses

The questionnaire included a rating of the price of admission for the reserve. A majority of people (53.5%) believed that the price was reasonable and only 28.5% of people knew that the reserve is a non-profit organization. This question is worded to inform visitors that profits from SER contribute to investments to Santa Elena Professional Technical High School.

The survey also gathered responses regarding guided tour experiences. Fifty-four percent of respondents rated their tours 5 out of 5 (see Figure 13). The overall rating of tours was 4.22 out of 5.

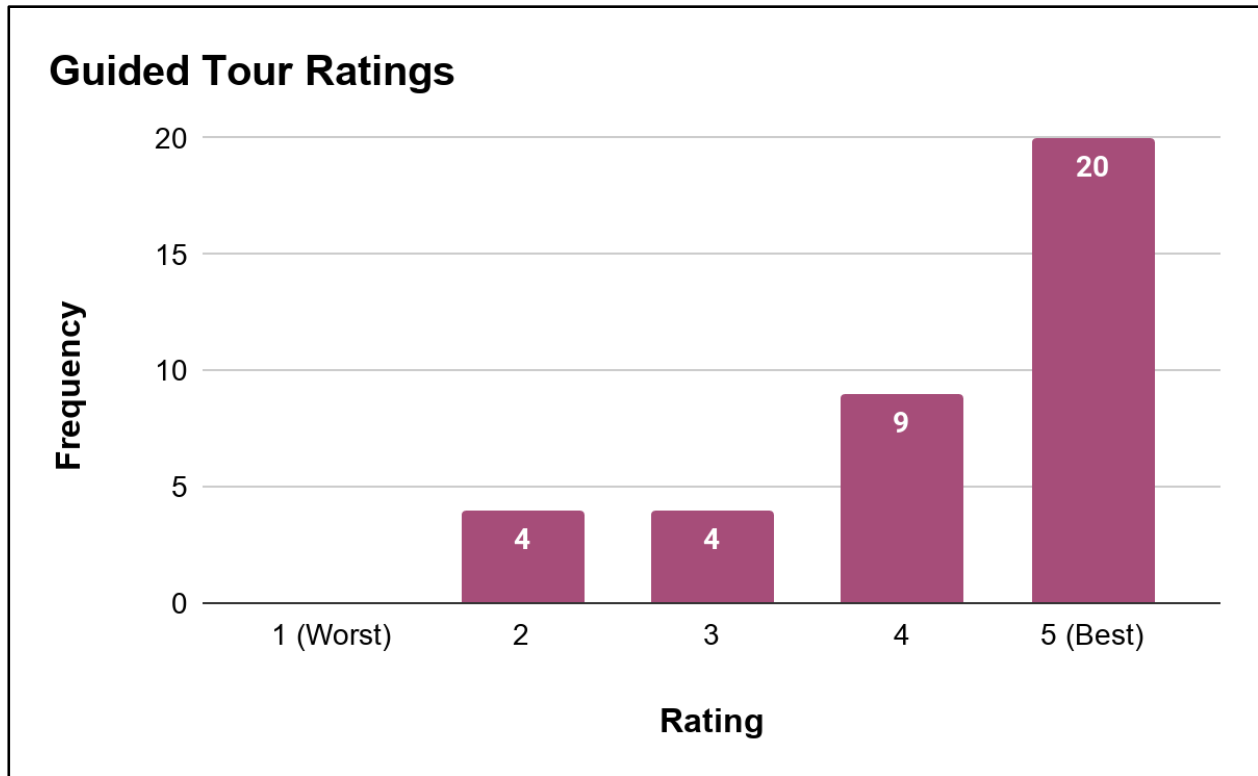


Figure 13: Guided Tour Ratings

When asked to explain the reason(s) for their rating, a significant number of people (18%) believed that their guides were very knowledgeable and willing to answer questions. There were also a few complaints. One regarded the limited languages spoken by guides giving guided tours and another asked to limit the number of people allowed in a guided tour group. A possible point of inaccuracy to note is that some people may have taken a tour but did not want to fill out the rating or comments questions, especially because it was near the end of the survey and included a question formatted as a short response. This would result in an inaccurate percentage of responders who participated in a guided tour.

A specific suggestion mentioned by 3% of visitors was a lack of signage on Caño Negro Trail. They would like more signs with exact information of where they are in order to have an

understanding of how much longer they needed to hike. Possible solutions for this could be the addition of distance markers along the trail and signs for direction with a “You Are Here” map.

The survey received 300 responses in total and provided beneficial feedback to the SER administration. Based on the findings above, we were able to make recommendations to meet SER visitors’ needs and improve their overall experience. These recommendations serve to accomplish one of our main goals of providing trail and facilities recommendations for the entire reserve. The facilities and service oriented recommendations below are based on the analysis of visitor feedback.

- *Include more animal and plant information*
  - The reserve can provide an opportunity for visitors to rent brochures. It will help visitors to get a better understanding of what unique features they can see at the reserve. This rental system could also be another way for the reserve to raise money, especially if visitors would prefer a pamphlet rather than pay for a guided tour.
  - More signs about flora and fauna can be put up throughout the park. They can help visitors to have more awareness of what could be present in a certain area and give the opportunity to spot things that would not normally be seen by the untrained eye. Figure 14 below is an example of what such a sign could look like or include.

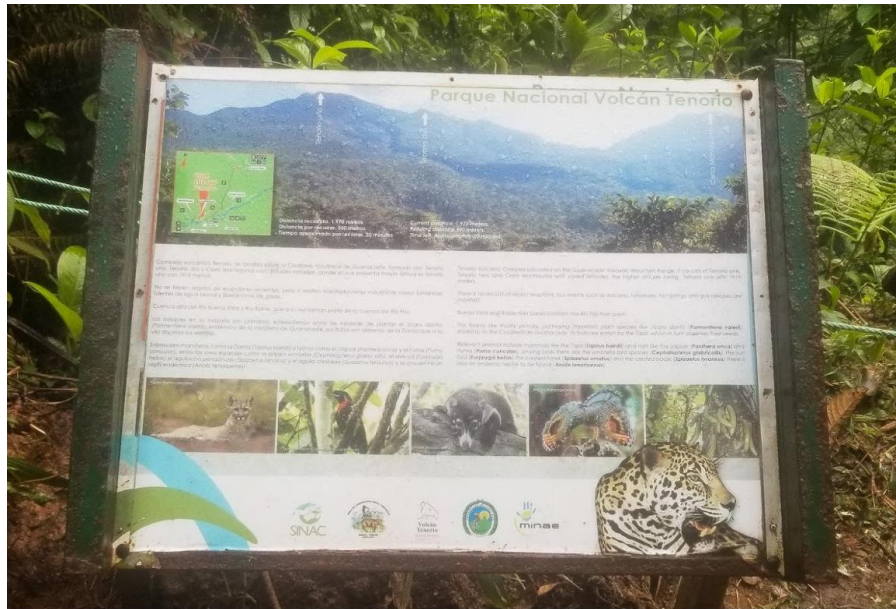


Figure 14: Example of Environmental Information Sign in Parque Nacional Volcán Tenorio

- **Better marked trails**
  - Some of the longest trails, such as Caño Negro and the full length of the Encantado, do not have enough distance markers to inform visitors of their position on the trail. Implementing more signage will help visitors to have a better understanding of how much longer they need to go. Distance markers every kilometer, or approximately every 30 minutes of walking would be effective.
  - Adding signs to point visitors in the right direction along the trail will help to avoid missing things on the trails or simply going in the wrong direction.
- **Have more than two shuttles back from SER to the center of the town**
  - There are two afternoon buses that can return visitors to Santa Elena town from the reserve: the first leaves at 1pm and the second at 4pm. The buses are often at full capacity when they return to town from the reserve. Some visitor comments also mentioned that the 1pm option does not give them enough time to fully visit the park as they would desire. Opposite this, the 4pm option is too late if they need to return to town at an earlier time or do not wish to stay at the



reserve until late afternoon. One possible solution is to add at least one more bus that could pick people from the reserve around 2:30pm.

- *Specify trail difficulty*

- Many visitors suggested listing the difficulty of the trail -- easy, moderate, or difficult -- on the trail map so they can choose and prepare for whichever trail.
- An easy trail would include trails that have minimal or no stairs, have concrete paths, are a relatively shorter distance, and are well maintained (e.g. Sendero Mundo Joven, Sendero Youth Challenge)
- A moderate trail would include stairs, are mainly covered with rocks/gravel, some inclines and declines that could be difficult to walk on, and may contain muddy areas (e.g. Youth Challenge, Del Bajo, Encantado with Short Cut).
- A difficult trail would include muddy areas, steep hills, more difficult terrain for walking, a substantial number of stairs, and switchbacks (e.g. Encantado Full Length, Caño Negro)..

- *Create more places to rest along trails*

- Rest areas could be locations where people could stand alongside the trail and could also include benches. It will give visitors an opportunity to relax, take a break and not block the main trail where other people might be walking. Benches are difficult to maintain in a cloud forest climate because they are wet from rain a majority of the time and wooden benches would become soggy and degrade within a few years. A composite material that could last longer would be ideal. Benches placed strategically along trails -- after stairs or a certain distance, or in a location with a nice view of the forest -- will improve visitor satisfaction and comfort.

- *Provide more information about park conservation efforts*
  - Park conservation efforts can be promoted through brochures that could be available throughout the park as well as distributed to hotels and agencies in the surrounding community. Advertising conservation efforts will be a strength and a tool for drawing visitors who would prefer to support the environmental protection efforts of the reserve (e.g. SER is focused on environmental conservation and education vs Monteverde Cloud Forest Reserve which is a more commercialized organization).
  - Conservation efforts could also be placed in signage. As discussed in Section 4.1, a great location to provide conservation information would be in a sign at the top of the observation tower on the Sendero Youth Challenge. The observation tower is a popular feature and an eye catching sign that the top of the tower would encourage reading about the efforts of the reserve while resting.
- *Try to make guided tours that have maximum 8 people in a group*
  - After analyzing the exit surveys that were completed by visitors, one of the complaints was that a tour group of 10 people was too big and was a detriment to the tour. Capping the number of people in a guided tour will ensure that visitors can hear the guide, be able to view points of interest without crowding, and have an opportunity to ask any questions that they may have.
- *Guides who know French*
  - According to respondents, a French speaking tour guide would greatly improve their experience at the reserve so that they can fully understand what is included in the tour. It would be beneficial to find at least one guide who would be able to give French tours to encourage inclusiveness of French visitors.

- *Increase advertisement of boot rentals*

- Many visitors did not expect the amount of mud they encountered on the trails.

The reserve currently offers boot rentals for US \$2 per day, but many visitors are unaware of this service. Advertising these boot rentals more effectively will save visitors from ruining their shoes or give individuals safer footwear options for the trails.

Most of these recommendations will be easy to finish in at least a month and would not be significantly expensive. The most expensive recommendations would most likely be the inclusion of more animal and plant information and the creation of more places to rest along trails. The costs of materials for creation of signage, brochures and bench materials and maintenance would comprise the cost of the recommendations. Because the reserve will be renting the flora and fauna laminated brochures to visitors, the cost of materials could eventually return a profit. Having a new guide that speaks French would also be expensive and the training process would be lengthy.

#### **4.2.2 TripAdvisor Review Data from Past Visitors**

To gather trail condition and SER features data from a larger sample size, we analyzed 50 TripAdvisor reviews for Santa Elena Reserve from January 2019 to January 2020. TripAdvisor provided a calculation of average ratings and the language of each of the 675 all-time reviews (TripAdvisor - Reserva Bosque Nuboso Santa Elena, 2019). English was the most frequent language being used for reviews (63.1% frequency). At the time of analysis, the overall rating of the SER was a 4.5 out of 5.0. Figure 15 shows the distribution of ratings, from

“Excellent” (5/5) to “Terrible” (1/5) on the left, and the distribution of languages for all reviews on the right.

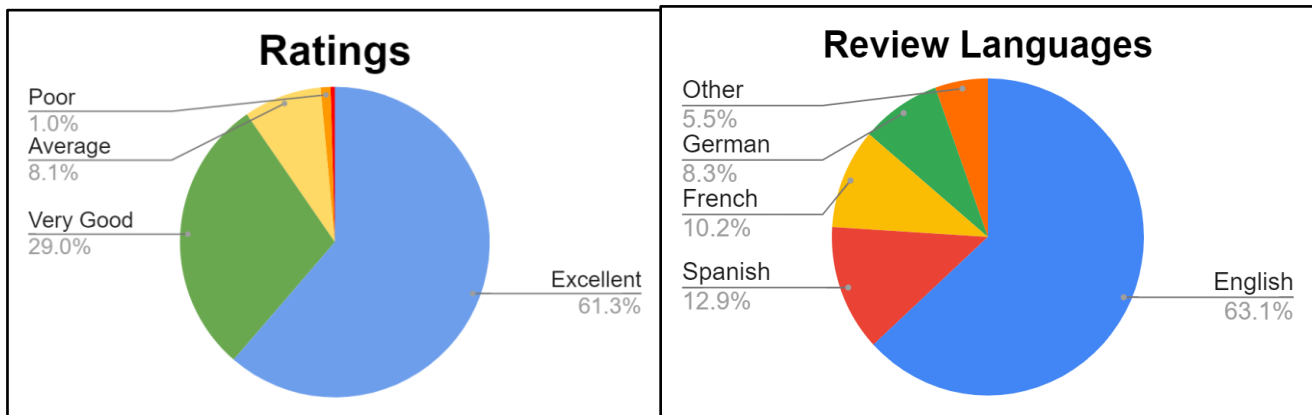


Figure 15. TripAdvisor Review Ratings and Languages (TripAdvisor, 2019): The Ratings graph on the left shows the distribution of ratings over a total of 675 reviews. The Review Languages graph on the right shows the top five most common languages used in reviews.

Based on this data, we can conclude that the majority (>90%) of visitors were satisfied with their experience at the Santa Elena Reserve. We can also conclude that the most common language of visitors who visit the reserve is English, which supports our choice to focus mainly on providing materials for the reserve in English. We also had surveys translated into Spanish, French and German to include the most frequent languages used in reviews.

To address the specific content of reviews in the past year, we categorized key phrases and noted the frequency of each in the group of 50 reviews posted in the past year that we sampled for review. Figure 16 shows the frequency of positive comments and Figure 17 shows the frequency of negative comments.

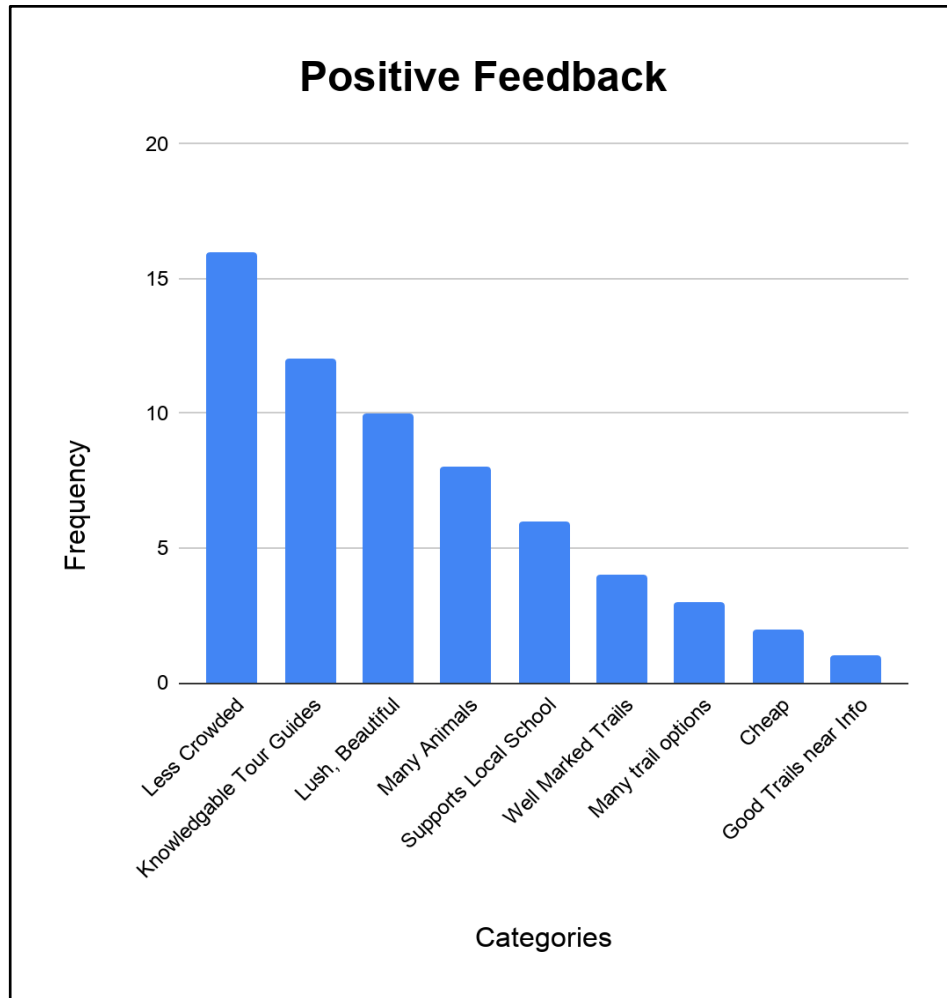


Figure 16. Frequency of Positive TripAdvisor Feedback Categories: The chart shows the frequency of mentioned positive feedback categories for SER.

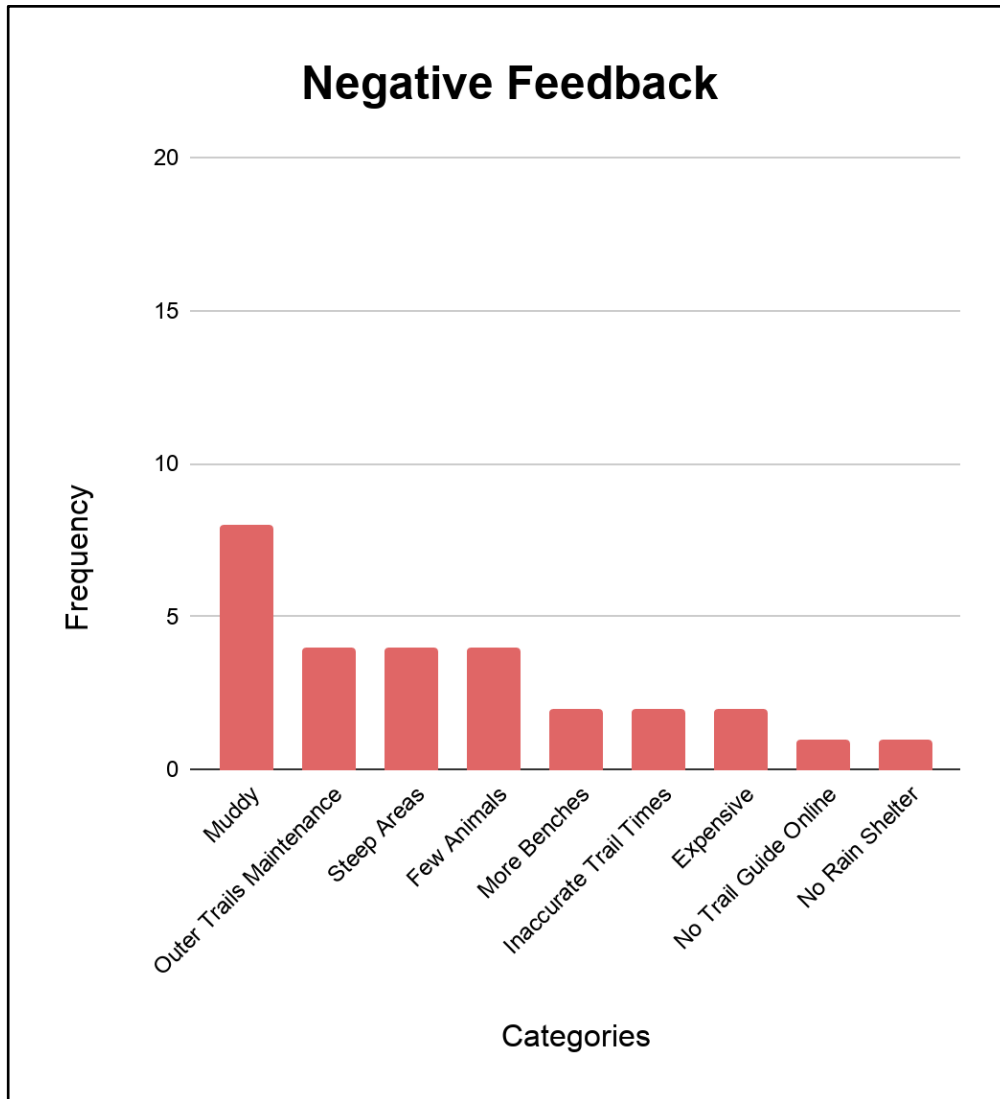


Figure 17. Frequency of Negative TripAdvisor Feedback Categories: This chart shows the frequency of mentioned negative feedback categories for SER.

Figure 16 shows that the most common positive comment is that the reserve is less crowded than others in the area. Another frequent positive comment is that the tour guides of SER are very knowledgeable, which encourages SER to continue their existing tour guide practices. Figure 17 shows that the most frequent negative comment is that trails are muddy, which ties into the second most frequent negative comment category, that the outer trails need maintenance.

Using the categorized data helped us make recommendations for trail improvements and what features contribute to positive experiences of visitors. Our suggested improvements include adding stones or wooden steps to the muddy areas so people can walk on those rather than through mud. This, along with adding distance markers along the trails to help keep hikers on track, are included in our suggestions. Steep areas can be remedied by adding more steps or made safer by adding railings or hand-holds. We also recommended adding benches and rest stops along each of the longer trails. The less frequent negative comments, such as the times provided to walk each trail being inaccurate and the lack of rain shelters, were recommended to be addressed in the future because they do not hold the same priority as others that pose a more immediate risk to the safety of visitors. Regarding inaccurate times to walk each trail: this varies from individual to individual and the reserve overestimates the time it takes for the average person to walk each trail. Comments claiming the times were inaccurate noted so because they were disappointed the trails took less time than expected.

Figure 18 shows the most common comments for both positive and negative reviews. The "Other" section includes categories with a frequency of less than 4%, which includes "Good trails near info center", "Cheap", "Many trail options", "Well marked trails", "No rain shelter", "No comprehensive trail guide online", "Expensive", "Inaccurate trail times" and "More benches".

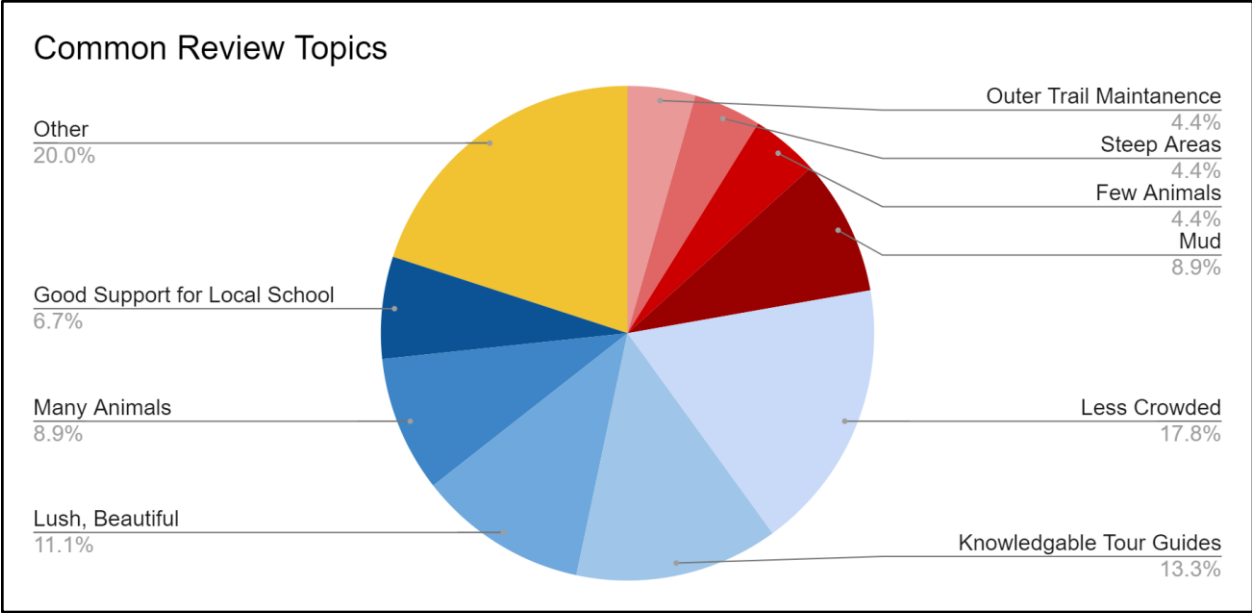


Figure 18. Common TripAdvisor Review Topics: This pie chart includes the most common categories for both positive (blue) and negative (red) comments. The “Other” section (yellow) includes categories from reviews that have a frequency of less than 4%.

Figure 18 was helpful for recognizing which suggestions should take highest priority as well as topics that are important to visitors and impact their experience. This type of analysis draws attention to what previous visitors to the reserve enjoyed greatly, as well as what they believe needs to change in SER. Combining these results with our personal observations of each trail and feedback from our visitor survey allowed us to more accurately provide recommendations for improvement to the SER administration.

Although this analysis was helpful, there are flaws within this system. To begin with, there was a noticeable discrepancy in the content of reviews between visitors who had a tour guide and those who did not. Tour guides in the reserve can be booked via TripAdvisor so visitors who use this method are encouraged to leave a review on the website. This forms a disproportionate number of reviews that are leaving a good rating because they had a tour guide who was able to show them around the reserve. Many comments that said there were “many animals” were from people who had gone on tours, and negative comments that noted



“few animals” expressed that they regretted not booking a tour guide. This trend shows a correlation between booking a tour guide and leaving a higher rating because a tour guide can add to the reserve experience, but it does reveal that there may be a less positive experience for those visitors who do not use a guide. Because of this, we also recommend that more materials and signs along the trails be installed to engage visitors without guides to focus their attention on what is in the forest more intensively, rather than hike along trails at a fast pace.

### **4.3 Determining what an effective forest bathing experience should include.**

Expert interviews, observations, pilot testing and collection of visitor feedback helped to accomplish our objective of creating a successful, self-guided forest bathing walk. The interviews, detailed in Section 4.3.1, helped us to identify and understand key aspects of a forest bathing trail. Overall, these observations gave us a frame of reference to combine our own experiences with our knowledge of the trail conditions in SER. The pilot trail allowed us to use the knowledge we had gained and to receive feedback from participants on what they enjoyed, what could be improved, and what they had learned about the practice of forest bathing. Results from pilot trail surveys and observations are discussed in Section 4.3.3.

#### **4.3.1 Forest Bathing Expert Interviews**

To begin, we conducted a formal interview with Nadine Mazzola, who is in an executive leadership position at the ANFT. She informed us of key points that are necessary along a trail and some of the important aspects of the practice itself. The entire transcript of this interview is available in Appendix T.

The aspects that Mazzola stressed are that invitations are not mandatory and can be interpreted in whatever way is most comfortable for the participant. She also informed us that a large part of forest bathing is sharing one’s thoughts and feelings after invitations. The sharing

phase is important to validate the experience and unite the group participating as they continue on their own personal journeys during the experience.

Regarding types of trails used, Mazzola said that in Acton, MA, there is plenty of space to wander off of the given trail to immerse oneself further into the forest. She brought up that this is more difficult in places like Costa Rica because cloud forests have much denser vegetation. She advised us to look for places where someone could walk off of the given path, around a tree for example, so that we could create spaces for wandering even in a very dense forest. It is also important to have places along the trail where the participants can gather for the sharing phase of invitations. This is also more difficult in a dense cloud forest. With this in mind, we chose a trail in SER that had space along the sides of the trail for participants to step off the trail to share without having to share in the trail itself and potentially block other SER visitors from passing.

Our informal interview with Marcela Morales, a certified forest bathing guide, reiterated these key points. To elaborate further on the structure of invitations, she introduced us to the acronym SOS, Simple Open Sensory. This concept was described in Section 2.2 of this report. She also provided us with further background information on forest bathing. Speaking with her reiterated what Mazzola had stressed about the essential concepts of forest bathing. These interviews added to our background research of the topic and helped us to make decisions on how to create a forest bathing program at SER.

#### **4.3.2 Observations of a Guided Forest Bathing Walk**

To get a better understanding of the practice of forest bathing, we participated in a walk with an ANFT certified guide named Marcela Morales, in Aguti Reserve in Monteverde. During our walk we went through a series of invitations that helped us connect with the nature around us (see Appendix H for detailed notes). Based on advice from her and our own forest bathing

experiences, we were able to create signs with invitations to help SER visitors participate in a self-guided forest bathing trail.

Marcela Morales informed us of the difference between the Western and Japanese practices of forest bathing. The main difference is that the Japanese practice is much more scientific and forest bathing walks are currently being used to gather data to prove the physical benefits of forest bathing, whereas the western practice is more spiritual and is intended to be enjoyed without gathering any data. She also informed us that when practicing forest bathing you should walk at a very slow pace to enhance your connection with the environment around you. This is so you are more observant and are moving in tune with the speed of nature, which is a slow process.

During our walk, she gave us insight on the ways to give invitations that would be able to be easily received by the general public. The invitations must be simple in order for all types of people to be able to understand and connect with the invitation, and to not limit it to people who have only had certain experiences. Open invitations allow people to have their own way of interpreting the invitation and to avoid guiding the participants to a certain mindset. Invitations must avoid bias and leading language in order to allow people to participate and gain their own personal connections with nature. Sensory is an essential part to invitations and the entirety of forest bathing. The practice itself focuses on immersion within nature, which is best accomplished through engaging all of the senses and making a connection between these physical sensations and how they affect feelings and emotions. The ANFT believes in 13 different senses that individuals can utilize to connect with nature and enhance their forest bathing experience. One main sense that Marcela honed in on was one's imaginary sense, where an individual uses one's imagination to feel how something might be.

During our walk we went through some invitations, each of which followed the SOS guidelines to intensify our walk. An invitation that really connected with the 3 parts of the SOS was the Pleasure of Presence. During this invitation we stood with our eyes closed and went

through different questions that each had to do with the 5 different senses we have and then also used a sixth sense, imagination. During this invitation Marcela kept the questions very simple, such as “what sounds do you hear?” to allow us to interpret our surrounding the way that is most natural to each person. This allows everyone to be able to participate in a way that will be most beneficial to them. Another invitation we included was Make a Friend, where we looked around and saw what called to us within the forest; this could be a tree, pond, rock, or anything else. This invitation asks one to practice forming a bond with a creature of nature and to mutually interact with it. It included introducing ourselves, but also “listening” to what our “friend” was sharing with us. One of our last invitations was the Sit Spot. Morales invited us to follow our “radar”, or gut feeling, to a place where we felt most comfortable. Once there, we sat for a few minutes and focused on breathing deeply and observing what surrounded us with our physical senses. This invitation resembled meditation and left us feeling at peace.

Each of these invitation examples followed SOS, which allowed us to have the optimal experience. We used these experiences to design the invitations for the self-guided forest bathing trail in SER as well as suggestions from Morales. These invitations give people with different backgrounds the ability to go through the same walk but still get a personal and effective experience out of it.

### **4.3.3 Forest Bathing Pilot Trail Results**

Combining our findings from other objectives, we decided to create our pilot forest bathing trail on the Sendero Del Bajo. We placed five invitations that we adapted from forest bathing literature along the trail. Reminders about how to maximize participant experience were included between invitations. At the beginning and end of the trail, we added areas to pick up and leave a rock for the “Support Rock” aspect of our forest bathing experience. We used baskets for these rocks so participants would not disrupt the actual rocks on the trail. The

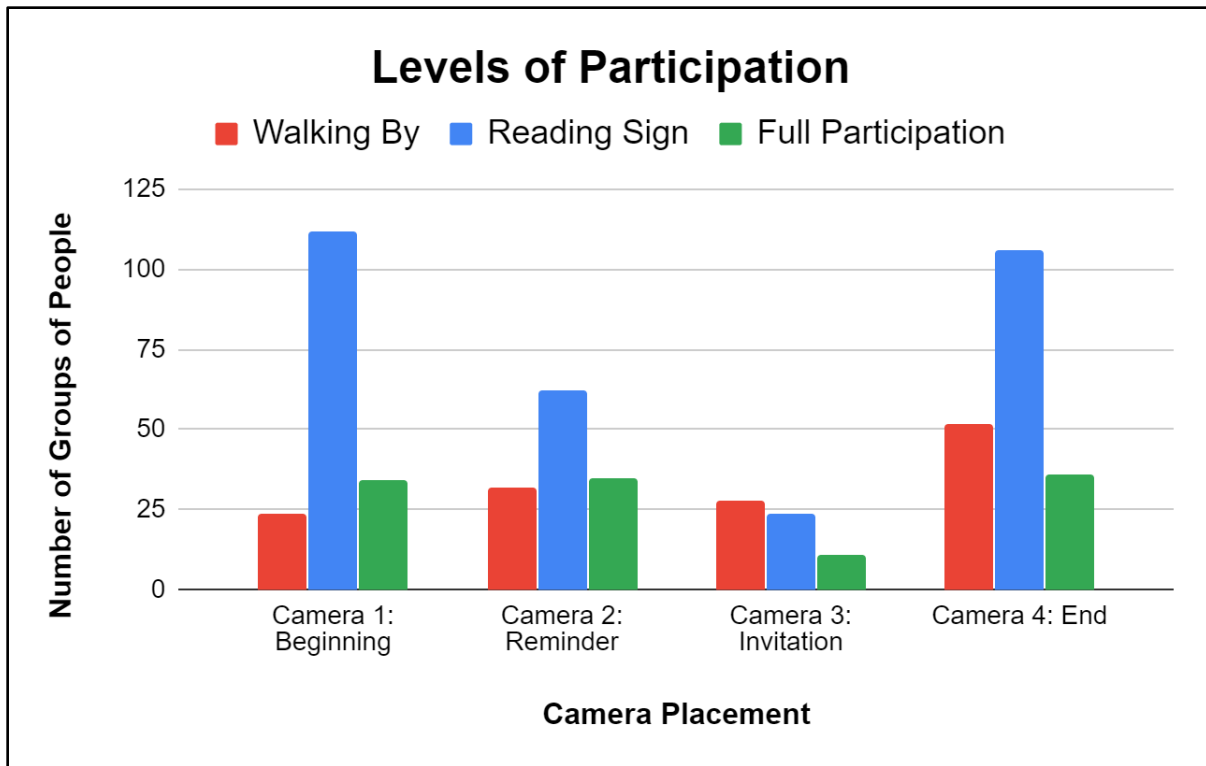
invitations we used were “Pleasures of Presence,” “Follow your Nose,” “Inner Child,” “Find a Friend,” and “Imagining Magic” (for full text of invitations and reminders, see Appendix K).

#### **4.3.3a Wildlife Camera Observations**

To meet our goal and understand how successful our *shinrin-yoku* walk was, one of our methods was to utilize wildlife cameras for observations. The main focus of analyzing the video data was to see if people are reading and participating in invitations and reminders near the cameras. These observations helped us to make adjustments and recommendations to accomplish our goal of implementing an effective self-guided forest bathing trail.

Based on the footage we analyzed from the cameras, people spent an average of 45 minutes along the trail. Walking at a faster pace results in completing the trail in a mere 25 minutes. Some people walking at a slower pace took up to 80 minutes to complete the trail. A large point of error in using the camera based observations is that not everyone who walked Del Bajo Trail, or even visibly stopped at signs, was actively participating in forest bathing. Without participant based observation, it is unclear whether visitors were fully participating in the experience or not, however, participant based observation could introduce bias to the experience or influence visitors to act in ways that they would not act on their own.

Based on footage, we estimated the range of time that people spent at the signs was between 30 seconds and 3 minutes. More specifically, near the beginning sign, people were spending around 1-3 minutes and spent around 0.5-1.5 minutes near the ending sign. The chosen invitation and reminder signs took 1-3 minutes and about 30 seconds respectively. We estimated that 24.5% of people walked by or merely glanced at the signs. Approximately 20.9% of people participated in *shinrin-yoku*. 54.7% read the signs, but did not appear to participate in the invitations. The distribution of people who walked by, read the sign, or participated at each camera are shown in Figure 19 below. When recording data, we counted groups of people who stayed together and had the same level of participation as one participant.



*Figure 19. Pilot Trail Levels of Participation*

The camera located by the waterfall spur trail showed that 74.6% of people went to see the waterfall and usually stayed for 1-2 minutes. This could suggest that those who went to the waterfall also saw our reminder there and were able to take in and appreciate the unique sensory atmosphere.

An important practice of forest bathing is to disconnect from burdens and other distractions, which can be achieved by not using phones and cameras. Around 8.6% of people used technology to take pictures or for any other use while in view of the cameras.

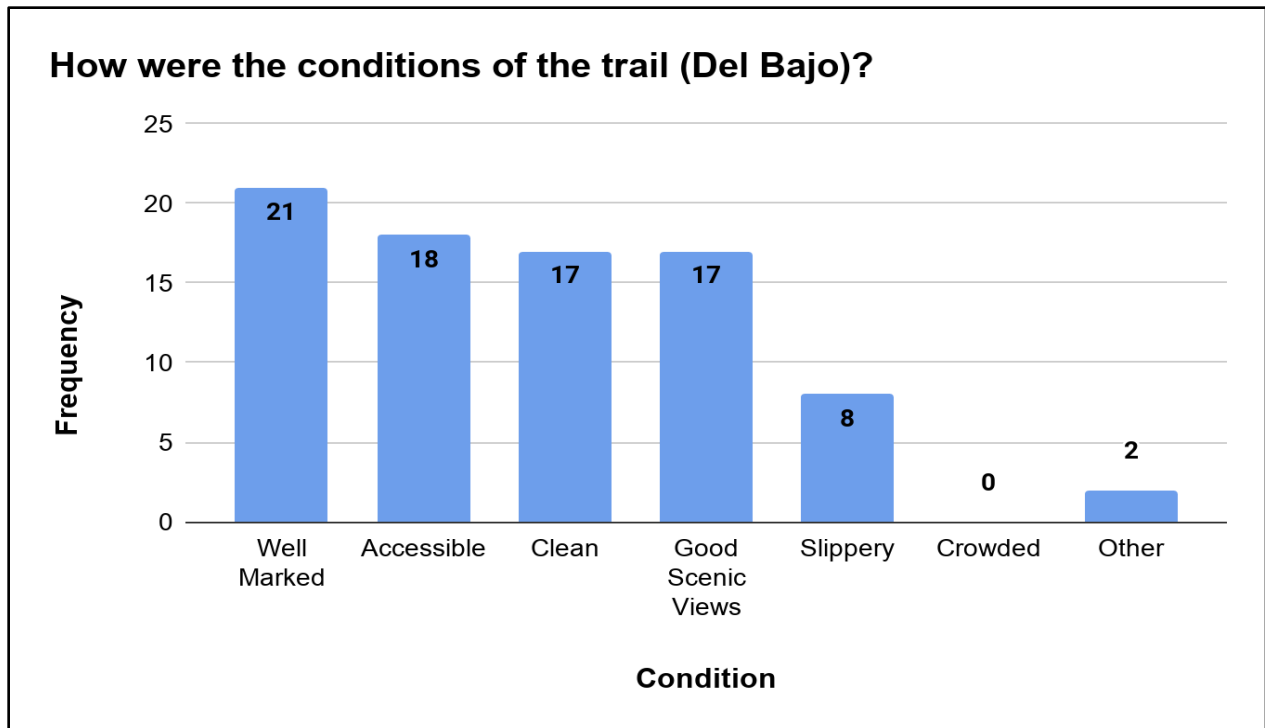
It was also important to observe how visitors behave in the reserve, more specifically, if they respect the environment and SER rules. At one instance, the cameras recorded a visitor smoking along the trail, which is both disrespectful to the environment and a rule violation.

We noticed that many people walked the opposite way than what we intended when we set up our invitations. Because of this, future development of the trail could change the signage to make the experience multidirectional. One solution for this would be adding both the

beginning and end text of the “Support Rock” invitation to both ends of the trail. Furthermore, if signs are replaced, they should be positioned in a manner that can be seen by people from both directions, and the numbering on the invitations could be removed. Lastly, invitations in the middle should be the most complex, and those near the beginning/end in both directions should gradually introduce participants to the practice so that no matter where people start, they become immersed at the same rate.

#### **4.3.3b Pilot Trail Participant Survey Results**

To gauge the success of our pilot trail, we administered a survey after participants finished the trail. Our sample size was 28 respondents. The first question asked what visitors thought about the conditions of this section of the Del Bajo Trail (see Figure 20 for full distributions of responses). The majority of respondents (75%) answered that the trail was well-marked, while 28.6% of respondents answered that it was slippery on some parts of the trail. To ensure safety and a positive experience, additional gravel and an effective drainage system should be added.



*Figure 20. Forest Bathing Trail Condition Responses*

Many people responded that they felt spiritual (35.7%), peaceful (85.7%) and connected with nature (71.4%). Zero responses were recorded for bored or stressed. The “Other” category includes the responses, “Strong”, “Surprised – we saw a bird!”, and “Full of wonder”. In a later question on the survey, participants noted that they learned that *shinrin-yoku* is a way to relax, de-stress, forget about the outside world and focus more on the nature around them. Figure 21 below shows all responses to this question.





Figure 21. Feeling/Emotional Response to Forest Bathing Graph

We also asked visitors to list what they had learned about forest bathing from the experience. This question can help participants reaffirm and remember parts of their experience and allowed us to gauge the success of our materials in providing key information about forest bathing. The responses from this question showed us that all respondents recognized and recalled the most important parts of forest bathing.

One of the questions gathered suggestions from visitors. One comment was that the experience could be improved if the reserve would have a specific guided forest bathing tour. The certification process through the Association of Nature and Forest Therapy for both a forest bathing trail and to become a guide is expensive and lengthy.

It was proposed to add more stones into the “Support Rock” basket or move the beginning sign to where there are more stones on the ground around it. We received this

comment a few days after we placed the signs along the trail and started to promote it. We added more stones later as a continuation of setting up the trail. SER staff should periodically check and supplement the amount of stones in the basket when necessary.

Lastly, a few visitors we spoke to saw the signs on Del Bajo Trail, but did not know why the signs were present or what they were for. Because of this, we increased the number of *shinrin-yoku* information sheets. We placed one at the front desk where visitors buy tickets and one at the Santa Elena Reserve office. We provided tri-fold *shinrin-yoku* pamphlets to reception for visitors to take if they desire. We placed infographics at the start and end of the trail itself so that those who come to Del Bajo Trail would be able to learn about *shinrin-yoku* and understand why the invitations along the trail are present. Figure 22 below is an example of the infographics placed at the beginning and end of the experience.



Figure 22: Shinrin-Yoku Infographic at Beginning of Pilot Trail

We gave a presentation to people who work at the reserve and explained *shinrin-yoku* to them so they would have a better understanding of what it is and could promote it to the visitors. We also took some of the tour guides and guides in training for a walk along Del Bajo Trail to introduce them to and participate in forest bathing. This gave them a unique way to experience the forest and helped them understand our project better and be able to explain it to visitors. The next step is to have the receptionists mention it as a feature of the Del Bajo Trail, so more

people who are interested could participate, and people who are not participating would be informed about the purpose of the signs.

Most of the participants (85.7%) had not done *shinrin-yoku* before. The last two questions of the survey asked if the participants would do *shinrin-yoku* again and to rate their overall experience. Having so many first time participants allowed us to gauge the opinions of average people who did not know much about it, however, it limited our ability to compare our trail to other experiences. The majority of people, 75%, responded “Yes” to doing it again, and the remaining 25% responded “Maybe”. None of the participants who took the survey responded that they would not do it again. The average rating was 4.5 out of 5, with 60.7% giving a rating of 5/5, as shown in Figure 23. These responses show that our trail was received positively by participants, and that it could be successful in the long term with a few improvements.

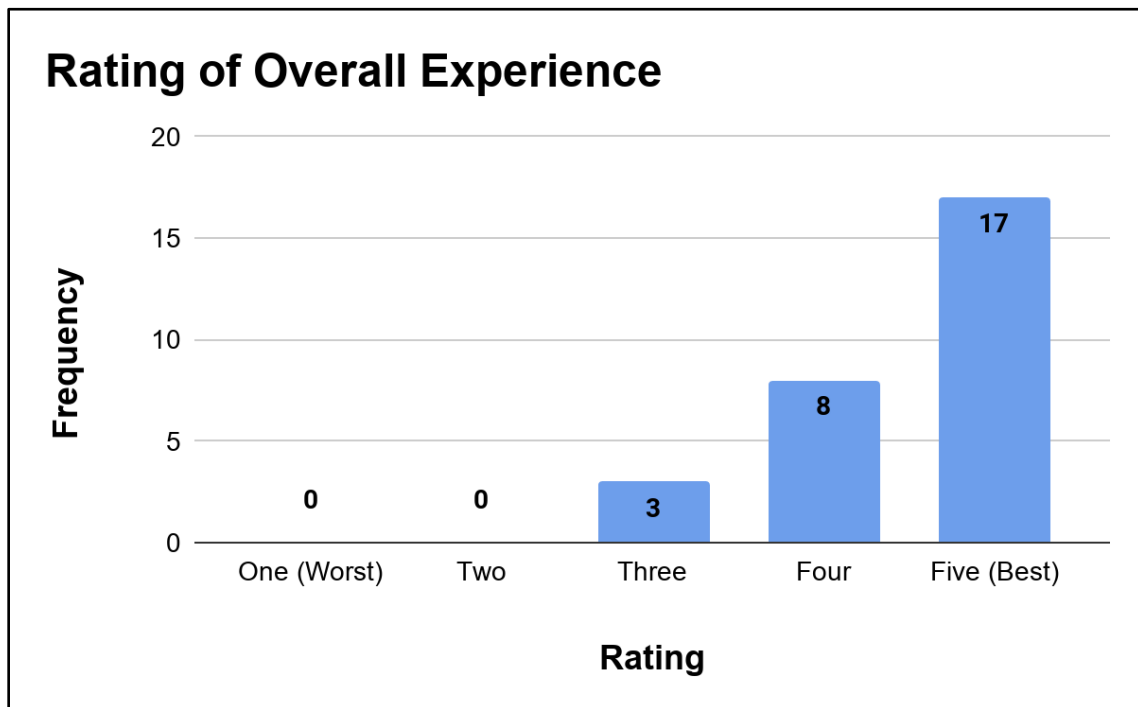


Figure 23. Ratings of Forest Bathing Experience

#### **4.4 Summary**

The above data and analysis contributed to the accomplishment of our five main objectives. The data we have gathered and analyzed has allowed us to make numerous recommendations for changes in the reserve to contribute to visitor satisfaction and has helped introduce a new forest bathing program to the reserve. Our recommendations can continue to be implemented in the future and the forest bathing program can be further developed according to what additions SER wants to make. In the next chapter, we will summarize our recommendations for the reserve as a whole and for our implemented self-guided forest bathing experience.

## 5.0 Conclusion and Recommendations

Based on our results and their analysis, we developed recommendations to give to SER for our two goals: trail maintenance and forest bathing development. We will first discuss our suggestions to improve the trails. To achieve our second goal, we provide suggestions for how to improve the forest bathing trail we introduced, based on survey responses from visitors.

### 5.1 Trail Improvement Recommendations

Based on our observations of the trails and suggestions from employees and visitors, we have created the following list of recommendations to improve the trails at SER. A map showing the locations of some of our recommendations can be found in Appendix E.

#### General Recommendations

- Continue maintaining trails with gravel
- Develop a notification system for obstacles on the trails
  - This can be signs informing visitors that if they see anything that needs to be addressed to tell SER staff
- Replace bridge signs
  - One at each end; include maximum person limit and a map to indicate where they are on the trail
- Check all bridgeways for holes or rotting wood and support them as necessary
- Stabilize loose stepping stones
- Edit visitor check-in sheet
  - Add age range category or 'traveling with children' option to sign in data sheet
  - Change wording for 'Number of People' category so everyone can understand what it is being asked for
- Recalculate times needed to complete each trail and give a range of time it would take to complete for individuals walking at different speeds
- Make a sign or addition to main trail map to show the highlights of each trail
  - Del Bajo - *Shinrin-Yoku*
  - Encantado - Birds, Possible Wildlife
  - Cano Negro - More Natural Path
  - Youth Challenge - Observation Tower
  - Mundo Joven - Accessible by All Persons

- ❑ **Youth Challenge**
  - ❑ Signs with information on views from observation tower
  - ❑ Change signs that say “Y. Challenge” to full trail name
  - ❑ Clean up and turn ‘Safety Zone’ into a rest area with signs that include information on what to do in case of an emergency or information about conservation efforts of the reserve
- ❑ **Del Bajo**
  - ❑ Replace wooden railing by the waterfall
  - ❑ Add a sign by the waterfall spur trail to help direct visitors
  - ❑ Repair steps at various locations along the trail (wooden planks in front to form the step and some cinder blocks are missing)
- ❑ **Encantado**
  - ❑ Clear paths around “interesting” trees to give visitors a better view/more path options
  - ❑ Fix wire netting on Ficus Bridge
  - ❑ Quetzal information sign needs to be replaced
- ❑ **Caño Negro**
  - ❑ Boards or stumps to provide structure in some of the muddy areas
  - ❑ One side of the Caño Negro Bridge needs replacement
  - ❑ The one bench along the trail can have something painted on the back to make it a location for a photo opportunity
  - ❑ Safety railing is needed on the section with a steep drop off

Our recommendations will help improve Santa Elena Reserve, both in regard to safety and visitor satisfaction. These changes will make the trails safer and more enjoyable for visitors to walk. The additional information we recommend adding will allow people to make a more informed decision on which trails to hike. Overall visitor satisfaction should increase after implementation of our suggestions.

## 5.2 Services and Facilities Recommendations

Based on the surveys that were given to visitors at the end of their visit, we have created the following list of recommendations to improve Santa Elena Reserve.

- *Include more animal and plant information*
- *Better marked trails*

- *Distance markers every 1 km or equivalent distance to 30 mins of walking on Caño Negro*
- *Have more shuttles from the reserve back to Santa Elena town center*
- *Specify trail difficulty on map - easy, moderate, difficult*
- *Create more places to rest along trails (can include benches)*
- *Provide more information about park conservation efforts*
- *Try to limit guided tours to a maximum of 8 people*
- *Guides who know French*
- *Advertise boot rental more*

These recommendations will hopefully help to increase the number of visitors and their satisfaction.

### **5.3 Forest Bathing Conclusions and Recommendations**

Based on the survey that were provided to visitors who participated in our forest bathing pilot trail and based on our observations from the trap cameras, we have come up with a list of recommendations for SER administration.

- More promotion
  - Web page on Santa Elena Reserve official website (Appendix J-1)
  - Reserva Santa Elena Instagram posts (Appendix J-2)
  - Keep staff working reception informed in order to promote forest bathing on Del Bajo Trail through direct communication
- If the *shinrin-yoku* trail is successful, replace existing signs with metal podiums and PVC signs
- Check and supplement the amount of stones in the “Support Rock” Invitation basket
- If very popular, find a certified guide to work in the reserve or have an existing guide be trained (ANFT)

- Pay for trail certification (ANFT)
- Benches for resting and taking in nature
- Multi-directional invitations
- Invitations and educational materials in Spanish (also helps staff to understand), French, and German
- Print invitations with larger font so they are easier to read
- Forest bathing promotional video (posted to YouTube, web page, and played at the reserve) (Appendix J-3)
- Expansion to other trails (especially Mundo Joven so it is a more accessible experience; this can be in pamphlet form if they do not want to put a lot of signs along the short trail or printable, hand-held invitations to take on other trails)

These recommendations will help SER increase the number of visitors who go to Del Bajo Trail, will better the forest bathing experience for visitors in the future and may also increase general attendance to the reserve.

#### **5.4 Summary/Final Conclusions**

After seven weeks of working with Santa Elena Reserve, we have compiled a list of general reserve recommendations and specific recommendations for each trail. In addition, our *shinrin-yoku* trail will serve as a launching point for the continued development of a forest bathing program in SER. Our recommendations for continued promotion and additions to the experience will increase awareness and participation in forest bathing. Both trail maintenance and feature recommendations and forest bathing trail development will contribute greatly to visitor satisfaction for years to come. Maintenance practices will encourage safety, accessibility, and will facilitate an enjoyable reserve experience. A successful and well-promoted forest bathing trail will help visitors to relax and connect with nature in ways that may not be possible elsewhere or in a different way than they have ever experienced. Even individuals who have



participated in a *shinrin-yoku* walk before will be able to connect with the cloud forest in a unique way and continue to draw the mental and physical benefits from immersion in the forest. Our methods and recommendations can serve as a guideline for others working on trail maintenance or implementation of a self-guided forest bathing walk.

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## **Appendices**

### **Appendix A: Sponsor Description**

Our sponsor is the Reserva Bosque Nuboso Santa Elena, also known as the Santa Elena Cloud Forest Reserve (SER) in English. Their stated mission is ecological tourism, environmental education, research, and conservation of the cloud forest for the benefit of the community, education, and natural resources of the region (Santa Elena Reserve, 2019a). It is a public organization, run mostly by the Environmental Association VIDA (2019) and Santa Elena Professional Technical High School, whose students came together to form VIDA in 1988. The Santa Elena Cloud Forest Reserve was established in 1992 and protects 310 hectares of land, which was originally leased from the Santa Elena community high school (Enter Costa Rica, 2019; Santa Elena Reserve, 2019a). Funding comes from donations and the tourism that it attracts, and these funds go toward maintaining the SER as well as benefiting the Santa Elena community high school and collaborating in environmental and cultural projects within the community. Because the organization is non-profit, the information on the money given back to the Santa Elena school and used within SER is not accessible to the public. To achieve their goals for conservation, SER works with government agencies such as the Ministry of Environment and Energy (MINAE) and the National System of Conservation Areas (SINAC). It is also located within other conservation areas: the Arenal Tempisque Conservation Area, the Arenal Monteverde Protected Zone, and the Pájaro Campana Biological Corridor (Santa Elena Reserve, 2019a). There are many other organizations that work to benefit conservation efforts in Costa Rica that contribute to the national effort to encourage sustainability, appreciation of nature, and conservation efforts. The following infographic was adapted and translated from a report published in 2017 that details some of the internal organization of staff and programs at

the SER (Villalobos, 2017). The infographic below (Figure A1) shows the organizational structure of Santa Elena Reserve:

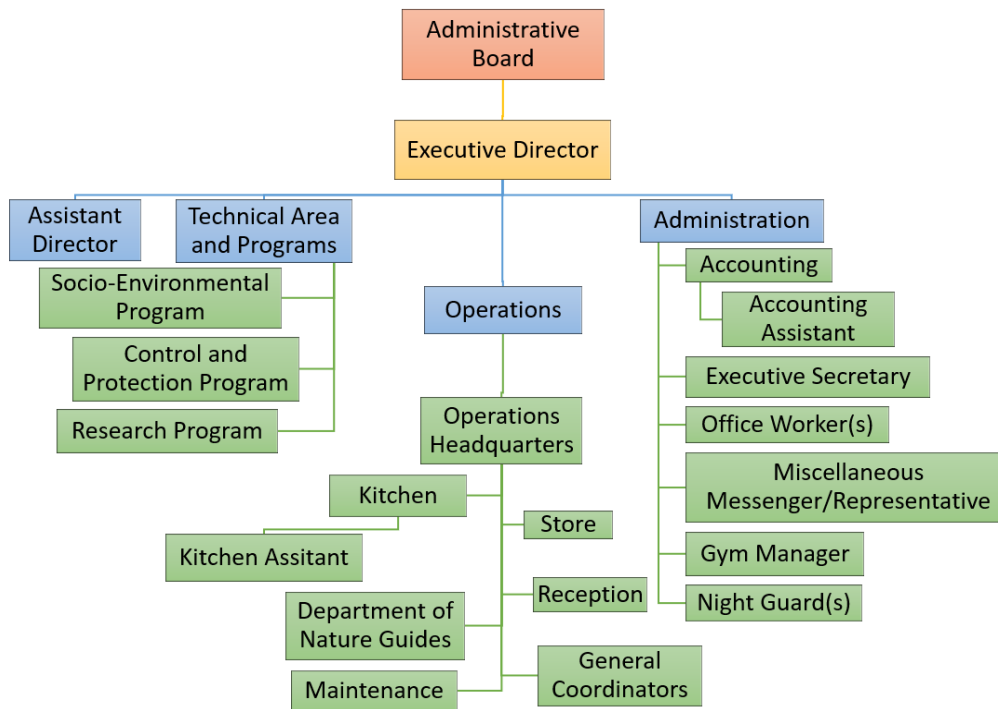


Figure A1. Organizational Structure of Santa Elena Reserve Staff. Adapted from Villalobos, W. B., Núñez, Y. M. A., & Padrón, V. M. (2017).

There are approximately 30 civil service employees working for the SER (Villalobos, 2017). This includes the director, administrative assistant, receptionists, guards, asset protection, accounting, maintenance, nature guides, kitchen department, general office workers, and a souvenir salesperson. Volunteers help with some of the trail maintenance and programs that run at the SER as well. The official Santa Elena Reserve Website (2019c), lists and describes the following programs: Environmental Education, Friends of the Environment, Reforestation, Volunteering, Control and Protection, Investigation, Science Exchange, Social Management and Interinstitutional Support, Donations, and Monteverde Christmas Bird Count. The SER also offers daily tours, one at 7:30 am and another at 1:00 pm, which lasts for 3 hours (Monteverde Travel Guide, 2019). For our project, we will mostly focus on working with the director, assistant administrator, environmental education department and nature guides. The

organization will be able to provide us with their knowledge of the SER and the community, as well as provide maps of the trails we will be working on.



## Appendix B: Trail Conditions Checklist

Observation	Data	Frequency (Tally)	Notes
Obstacles blocking the trail	Branches		
	Large rocks		
	Other		
Water/Erosion	Pools of water		
	Water run-off ruts in soil		
	Other		
Steepness	Extremely steep areas (Estimate/Measure Angle of Incline)		
Clearance	Less than 4 ft wide		
	Less than 8 ft high		
Litter	If present, tally and make notes of type of litter		
Soil/Boardwalk Condition	Slippery (from water, mud, leaves, algae growth, etc)		Take Note of Which Trails and Specifics
	Uneven Surface		
Trail Markings	Difficult to Read Trail Signs		

	Poorly Marked/Confusing path		
Trail Signage	<b>How often are trail signs placed?</b>		
	< 10 meters apart		
	~ every 10 meters		
	> 10 meters apart		
	Number of signs per trail (Note # for each trail)		
Signage Content	Map(s)		
	Pictures/Scenery		
	Natural History/Plant/Animal Info		
	SER Program Info		
	Trail Info (difficulty, distance, points of interest, etc)		
	Language	English	Spanish

Additional Observations:

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## Appendix C: Trail Observations Table

	<b>Mundo Joven</b>	<b>Youth Challenge</b>	<b>Del Bajo</b>	<b>Encantado</b>	<b>Caño Negro</b>
<b>Positives</b>	wheelchair accessible (if we had a pamphlet/ materials for forest bathing, people could participate on this trail if they cannot do the others), flexing arm tree would be good for pictures	hobbit tree, observation tower, second lookout point, highest point in the reserve	waterfall area; less traffic on average	Big tree near end that is good for pictures (clear around it a little bit); scenic bridge/ stream; big tree near beginning with path around it (muddy, but could add stones); good places to stop and listen to birds and rushing water; good rest spot after restricted area sign/a few places where a bench could fit	isolation from the rest makes animal sightings more likely; challenging conditions can be fun; viewpoint; multiple bridges; tree stump bench is nice, should have SER sign on it/painted
<b>Obstacles</b>	branches across path	none	a few branches on the trail	a few branches on the trail	multiple spots with branches across the trail, some of them very large that block the entire trail
<b>Puddles/ Flooding</b>	no large puddles	minor puddles that could be solved by leveling surface with rocks or drainage system; lots of mud around second view point that covered existing stones	a few puddles	lots of water/ mud on back section	some wet areas
<b>Erosion</b>	n/a	minor	not too bad	lots of water/ mud on back section	muddy/ eroded sections

<b>Steep Areas</b>	none		lots of stairs (especially coming back to information)	steep switchbacks (not terrible), lots of stairs back to info	a few large steps
<b>Clearance</b>	always >4 ft wide x >8ft vertical	mostly >4 ft wide x >8ft vertical	mostly >4 ft wide x >8ft vertical	a few low hanging plants	not always >4 ft wide x >8ft vertical
<b>Litter</b>	candy wrapper (1)	none	plastic wrapper on bench, (something else) (2)	none	napkin (1)
<b>Path Condition</b>	concrete, good condition	places without many rocks were squishy/ slippery	wobbly, unsecure stones, warning for ants,	generally good until the back section	lots of mud, even on a drier day; unsafe ledge with very thin rope as only protection; SUGGESTION - add a few boards to the muddy areas;
<b>Signs</b>	maps, arrows, quetzal and butterfly signs (could add one for hummingbirds near the special flowers)	Maps, directional arrows, before the viewpoint there is a map that hides the fact that there is a viewpoint on the map, so you don't know how far it is.	map with "you are here," directional arrows; bridge names and capacity, bridge signs in need of replacement	map with "you are here," directional arrows; bridge names and capacity, quetzal info sign in need of replacement (after exit of shortcut), La Saca Bridge signs in need of replacement	map with "you are here," directional arrows; bridge names and capacity, bridge signs in need of replacement
<b>Additional Observations</b>		loose stones; SAFETY ZONE can be turned into something fun; 4-5 benches, broken steps. should inform people that at the map that is the highest point in the park; need signs/fence/		loose stone/tree stump/cinder blocks --> tripping hazard; wooden/pallet bridge with broken segments; caution tape areas (block with better materials or	

		chain to block off out of use steps instead of caution tape; observation tower sign to give info on the volcanos		signs); Puente la Gata has branches on it; BIG hole near small water drop, clearing would be good for forest bathing or bench/rest; sign with *graffiti* opposite of a great view; fix wire netting on Ficus Bridge	
--	--	------------------------------------------------------------------------------------------------------------------	--	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--

Other General Observations:

- Notification System: Is there a way for visitors to tell staff that there is a problem on the trails that should be addressed (ex large branch blocking the trail)?
- Moss and plants on trees make painted blazes impractical
  - Trails are not hard to follow even without blazes, besides some places that should have distance markers
  - Don't want to distract from natural beauty

**Appendix D: Trail Conditions Example Photographs**  
**Muddy/Slippery Areas**



*Figure A2. Mud, Encantado, Far Section*



*Figure A3. Caño Negro, Mud Near View Point*



*Figure A4. Del Bajo, Mud on Trail*

**Flooding/Standing Water**



*Figure A5. Trail Flooding, Del Bajo*



*Figure A6. Trail Flooding, Encantado*

**Trail Debris/Blockages**



*Figure A7. Debris, Puente La Gata, Encantado*





*Figure A8. Fallen Branch, Caño Negro*



*Figure A9. Fallen Branch, Encantado Main Trail*



*Figure A10. Fallen Branch, Mundo Joven: This branch was removed within 3 hours of this picture being taken.*

## Signs that Require Repair/Replacement



*Figure A11. Warped Sign, Del Bajo*



*Figure A12. Sign with Graffiti, Encantado*



*Figure A13. Quetzal Information Sheet, Encantado*



*Figure A14. Quebrada/Puente El Peligro Signs, Caño Negro*



Figure A15. Puente Caño Negro Sign, Caño Negro



Figure A16. Puente La Planta Signs, Del Bajo



*Figure A17. Puente Del Bajo Signs, Del Bajo*

### **Bridge Damage**



*Figure A18. Unnamed Bridge, Del Bajo*



*Figure A19. Puente La Planta Broken Railing, Del Bajo*

### Trail Borders or Stairs in Need of Repair



*Figure A20. Loose Cinder Blocks, Encantado*



*Figure A21. Trail Border, Encantado: Trail border is damaged, causing erosion and loss of structure and gravel on trail.*



**Miscellaneous**



*Figure A22. Broken Bench Near View Point, Caño Negro*

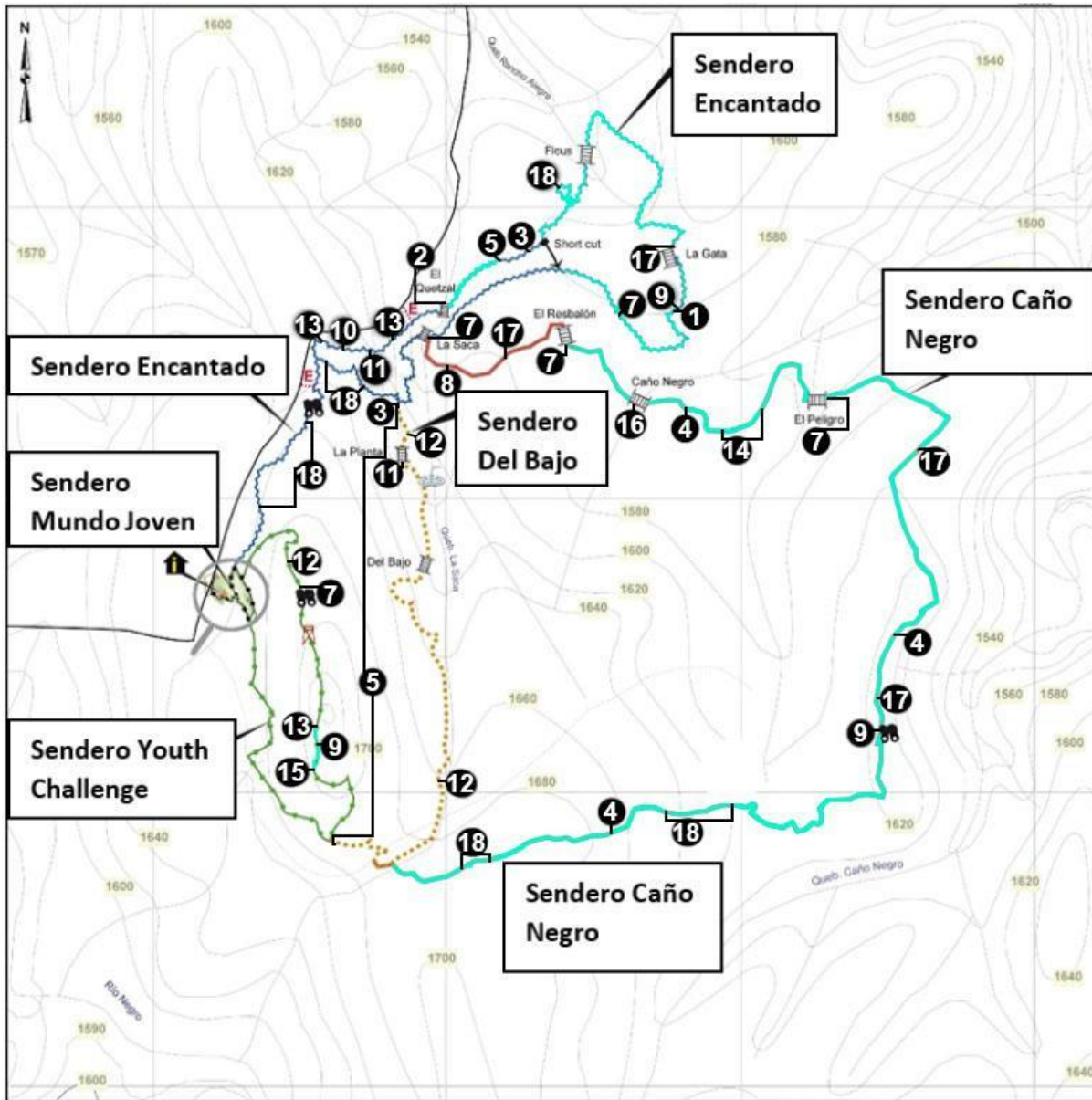


*Figure A23. Steep Drop Near Trail, Caño Negro: A steep drop near the trail as pictured requires a safety railing.*



*Figure A24. Caution Tape, Combination Del Bajo and Encantado: Replace caution tape with a 'No Entry' sign, or similar, to stop visitors from walking there*

## Appendix E: Trail Recommendations Map



**Color**: Muddy Area/Needs More Gravel

- |                                        |                                       |                             |
|----------------------------------------|---------------------------------------|-----------------------------|
| 1. Bags of Rocks Near Trail            | 7. Sign Replacement                   | 14. Safety Rope Needed      |
| 2. Block Path to the Stream [optional] | 8. "Do Not Enter Sign" (Old Trail)    | 15. Safety Zone             |
| 3. Damaged/Vandalized Sign             | 9. Old/Broken Bench                   | 16. Slippery Bridge         |
| 4. Mile Marker Needed                  | 10. Old stairs need to be blocked off | 17. Trail Blocked by Branch |
| 5. More Gravel                         | 11. Repair Bridge                     | 18. Unstable Stones/Stumps  |
| 6. Needs Sign                          | 12. Repair Stairs                     |                             |
|                                        | 13. Replace Caution Tape              |                             |

## Appendix F-1: General Visitor Survey

**1. Have you visited Santa Elena Reserve before?**

- Yes
- No

**2. Why did you travel to Monteverde? Check all that apply.**

- Adventure Activities (hanging bridges, zip-lining, ATV tours, etc.)
- Hiking
- Scenic Views
- Bird Watching
- Climate Change Research
- Other: \_\_\_\_\_

**3. Why did you choose to visit Santa Elena Reserve? Check all that apply.**

- Hiking
- Scenic Views
- Wildlife
- Bird Watching
- Shinrin-Yoku* / Forest Bathing
- School or Work Related
- Cost
- Other: \_\_\_\_\_

**4. How did you find out about Santa Elena Reserve? Check all that apply.**

- Social Media
- Santa Elena Reserve website
- Tourist organization
- Brochure
- Recommendations from friends or family
- Other forest reserves
- Hotel / Hostel
- Other: \_\_\_\_\_

**5. Which trail(s) did you use? Check all that apply.**

- Del Bajo Trail
- Encantado Trail, Full length
- Encantado Trail, Short cut
- Youth Challenge Trail
- Mundo Joven Trail
- Caño Negro Trail

6. How were the conditions of the trail(s)? Check all that apply.

- Clean
- Crowded
- Well-marked
- Slippery/Muddy
- Good scenic views
- Lack of Foliage (Greenery)
- Dense Foliage (Greenery)
- Other: \_\_\_\_\_

7. What did you think of the prices? Mark only one oval.

- Cheap      1      2      3      4      5      Expensive  
                 ○      ○      ○      ○      ○

8. Did you know that all proceeds from Santa Elena Reserve benefit the Santa Elena Professional Technical High School?

- Yes
- I did not know before, but now I do!

9. Please rate your overall experience. Mark only one oval.

- Bad (would never come back)      1      2      3      4      5      Amazing (would definitely come back)  
                                                 ○      ○      ○      ○      ○

10. If you participated in a guided tour, please rate your experience. Mark only one oval.

- Poor      1      2      3      4      5      Excellent  
                 ○      ○      ○      ○      ○

Explain the reason(s) for your rating and include the name of your tour guide.

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11. Do you have any suggestions for Santa Elena Reserve?

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## Appendix F-2: Encuesta para Visitantes Generales

1. **¿Ha visitado antes la Reserva Santa Elena?** *Marque sólo un óvalo.*
  - Sí
  - No
  
2. **¿Por qué viajó a Monteverde?** *Marque todas las que apliquen.*
  - Actividades de aventura (puentes colgantes, tirolesa, excursiones en Todoterreno, etc.)
  - Excursionismo
  - Vistas panorámicas
  - Observación de aves
  - Investigación sobre el cambio climático
  - Otra: \_\_\_\_\_
  
3. **¿Por qué eligió visitar la Reserva Santa Elena?** *Marque todas las que apliquen.*
  - Excursionismo
  - Vistas panorámicas
  - Plantas y animales
  - Observación de aves
  - Shinrin-Yoku* / Baño de Bosque
  - Escuela o trabajo
  - Costo
  - Otra: \_\_\_\_\_
  
4. **¿Cómo se enteró de la Reserva Santa Elena?** *Marque todas las que apliquen.*
  - Medios de comunicación social
  - Sitio web de la Reserva Santa Elena
  - Organización de turismo
  - Folleto
  - Recomendaciones de amigos o familiares
  - Otras reservas
  - Hotel / Hostel
  - Otra: \_\_\_\_\_
  
5. **¿Cuál(es) sendero(s) usó?** *Marque todas las que apliquen.*
  - Sendero Del Bajo
  - Sendero Encantado, longitud total
  - Sendero Encantado, Atajo
  - Sendero Youth Challenge
  - Sendero Mundo Joven
  - Sendero Caño Negro

6. ¿Cómo fueron las condiciones del sendero/de los senderos? Marque todas las que apliquen.

- Limpio
- Concurrido
- Bien marcado
- Resbaladizo/Fangoso
- Buenas vistas panorámicas
- Follaje escaso
- Follaje denso
- Otra: \_\_\_\_\_

7. ¿Qué piensa de los precios?

Barato      1      2      3      4      5      Caro  
                 ○      ○      ○      ○      ○

8. ¿Sabía que todos los ingresos de la Reserva Santa Elena benefician a la preparatoria de Santa Elena? Marque sólo un óvalo.

- Sí
- No sabía antes, pero ¡ya lo sé!

9. Por favor, califique su experiencia general. Marque sólo un óvalo.

Malo (nunca volvería)      1      2      3      4      5      Increíble (definitivamente volvería)  
                                         ○      ○      ○      ○      ○

10. Si participó en un excursión guiada, califique su experiencia. Marque solo un óvalo.

Pobre      1      2      3      4      5      Excelente  
                 ○      ○      ○      ○      ○

Explique el(los) motivo(s) de usted calificación y incluya el nombre de su guía.

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11. ¿Tiene alguna sugerencia para la Reserva Santa Elena?

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## Appendix F-3: Enquête des Visiteurs

1. **Avez-vous visité de la Réserve de Santa Elena avant?**
  - Oui
  - Non
  
2. **Pourquoi avez-vous voyagé à Monteverde?** *Sélectionnez toutes les réponses applicables.*
  - Activités d'aventure (les ponts suspendus, tyroliennes, tours de VTT, etc.)
  - Randonnée
  - Vues Panoramique
  - Observation des oiseaux
  - Recherche sur le changement climatique
  - Autre: \_\_\_\_\_
  
3. **Pourquoi avez-vous choisi de visiter la Réserve de Santa Elena?** *Sélectionnez toutes les réponses applicables.*
  - Randonnée
  - Vues panoramiques
  - Plantes et animales
  - L'observation des oiseaux
  - Shinrin-Yoku* / Baignade de Forêt
  - Lié à l'école ou la travail
  - Le coût
  - Autre: \_\_\_\_\_
  
4. **Comment êtes-vous vous renseigné la Réserve de Santa Elena?** *Sélectionnez toutes les réponses applicables.*
  - Médias sociaux
  - Santa Elena Réserve site web
  - Organisation touristique
  - Brochure
  - Recommandations de amis ou famille
  - Autres réserves forestières
  - Hôtel / Foyer
  - Autre: \_\_\_\_\_
  
5. **Quels sentier(s) avez-vous utilisé?** *Sélectionnez toutes les réponses applicables.*
  - Del Bajo Sentier
  - Encantado Sentier, Version complet
  - Encantado Sentier, Version court
  - Youth Challenge Sentier
  - Mundo Joven Sentier
  - Caño Negro Sentier



6. **Comment étaient les conditions de ces sentier(s)?** *Sélectionnez toutes les réponses applicables.*

- Propre
- Bondé
- Bien marqués
- Glissant / Boueux
- Bonnes vues panoramiques
- Manque de feuillage (Verdure)
- Dens feuillage (Verdure)
- Autre: \_\_\_\_\_

7. **Que pensez-vous des prix?** *Marquez un seul ovale.*

Bon marché      1      2      3      4      5      Cher  
                         ○      ○      ○      ○      ○

8. **Saviez-vous que tous les produits de la Réserve de Santa Elena bénéficient de Santa Elena lycée?**

- Oui
- Je ne savais pas avant, mais maintenant je le sais!

9. **Evaluez votre expérience en général s'il vous plaît.** *Marquez un seul ovale.*

Mauvais (ne reviendrait jamais)      1      2      3      4      5      Incroyable (serait certainement revenir)  
                                                         ○      ○      ○      ○      ○

10. **Si vous avez participé à une visite guidée, évaluez votre expérience s'il vous plaît.** *Marquez un seul ovale.*

Pauvre      1      2      3      4      5      Excellente  
                         ○      ○      ○      ○      ○

**Expliquez la raison(s) de votre note et incluez le nom de votre guide touristique.**

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11. **Avez-vous des suggestions pour la Réserve de Santa Elena?**

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## Appendix F-4: Abschlussumfrage für allgemeine Besucher

1. **Haben Sie das Santa Elena Reservat schon einmal besucht?**
  - Ja
  - Nein
  
2. **Warum sind Sie nach Monteverde gereist? Zutreffendes bitte ankreuzen.**
  - Abenteuerhafte Aktivitäten (Hängebrücken, Zip-Lining, ATV-Touren usw.)
  - Wandern
  - wundervolle Aussichten
  - Vögel beobachten
  - Klimawandelforschung
  - Andere: \_\_\_\_\_
  
3. **Warum haben Sie sich für das Santa Elena Reservat entschieden? Zutreffendes bitte ankreuzen.**
  - Wandern
  - wundervolle Aussichten
  - Tierwelt
  - Vögel beobachten
  - Shinrin-Yoku* / Baden im Wald
  - Durch die Schule oder die Arbeit
  - Kosten
  - Andere: \_\_\_\_\_
  
4. **Wie haben Sie von dem Santa Elena Reservat erfahren? Zutreffendes bitte ankreuzen.**
  - Sozialen Medien
  - Santa Elena Reserve Webseite
  - Touristische Organisation
  - Broschüre
  - Empfehlungen von Freunden oder der Familie
  - Andere Waldreservate
  - Hotel / Herberge
  - Andere: \_\_\_\_\_
  
5. **Welche Trails haben Sie benutzt? Zutreffendes bitte ankreuzen.**
  - Del Bajo Weg
  - Encantado Weg, in voller Länge
  - Encantado Weg, Abkürzung
  - Youth Challenge Weg
  - Mundo Joven Weg
  - Caño Negro Weg

6. **Wie war der Zustand der Strecke (n)? Zutreffendes bitte ankreuzen.**

- Sauber
- Überfüllt
- Gut Ausgeschildert
- Rutschig / Schlammig
- Schöne Anblicke
- Mangel an Flora
- Stark ausgeprägte Flora
- Andere: \_\_\_\_\_

7. **Wie empfanden Sie die Preise?** Bitte setzen Sie nur ein Kreuz.

	1	2	3	4	5	
Günstig	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Teuer

8. **Wussten Sie, dass alle Einnahmen aus dem Santa Elena Reservat der Santa Elena High School zugute kommen?**

- Ja
- Ich wusste es vorher nicht, aber jetzt weiß ich es!

9. **Bitte bewerten Sie Ihre Gesamterfahrung.** Bitte setzen Sie nur ein Kreuz

	1	2	3	4	5	
Schlecht	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Erstaunlich
(würde nie wiederkommen)						(würde definitiv Komm zurück)

10. **Wenn Sie an einer Führung teilgenommen haben, bewerten Sie diese bitte.** Bitte setzen Sie nur ein Kreuz

	1	2	3	4	5	
Schlecht	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Ausgezeichnet

**Erläutern Sie die Gründe für Ihre Bewertung und geben Sie den Namen Ihres Reiseleiters an.**

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11. **Haben Sie Vorschläge für das Santa Elena Reservat?**

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## Appendix G: Full Exit Survey Responses

Table 1: SER Prior Visitation Data

Have you visited Santa Elena Reserve before?	
Yes	15
No	285

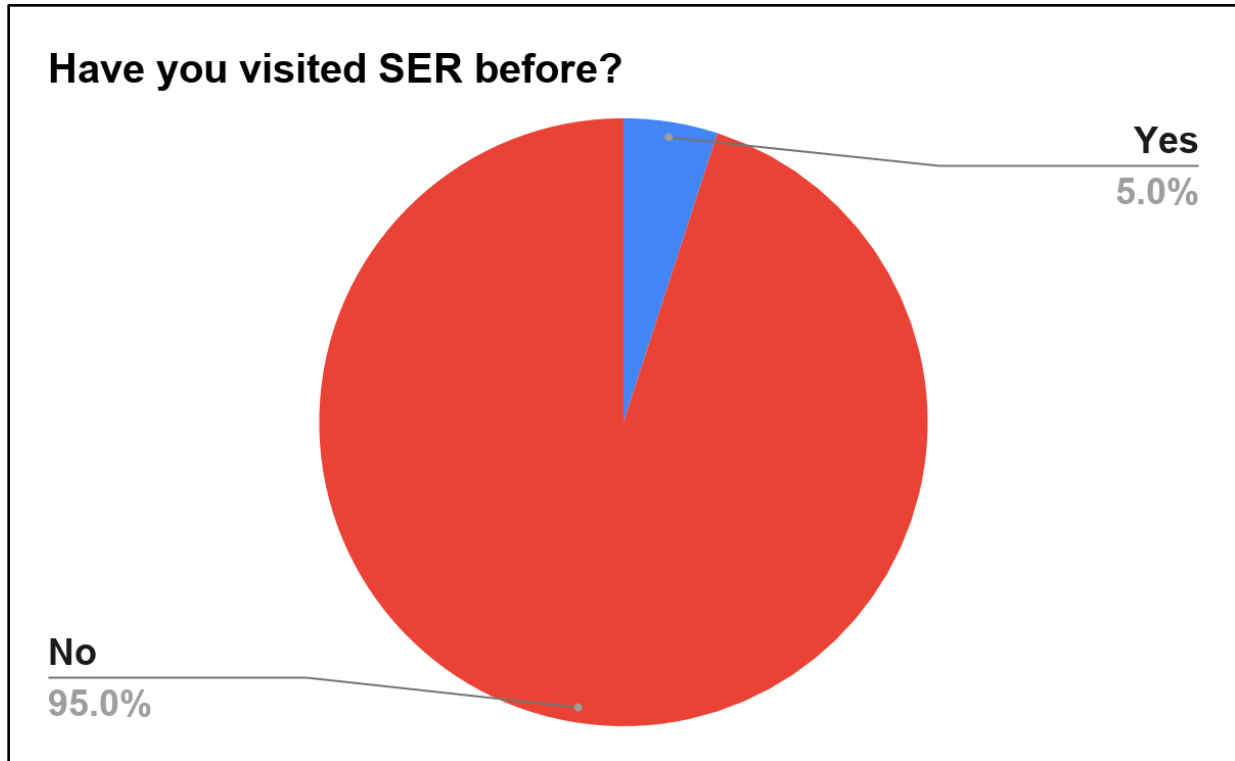


Figure A25. SER Prior Visitation Pie Chart

Table 2: “Why Travel to Monteverde” Data

<b>Why did you travel to Monteverde?</b>	
Hiking	220
Scenic Views	184
Bird Watching	101
Adventure Activities	99
School/Work	12
Climate Change Research	12
Nature	11
Flora and Fauna	7
Other	8
Other Category Responses: round trip (1), photography (1), to live for weeks (1), people (1), visit friend (1), travel (1), vacation (1), relief from heat (1)	

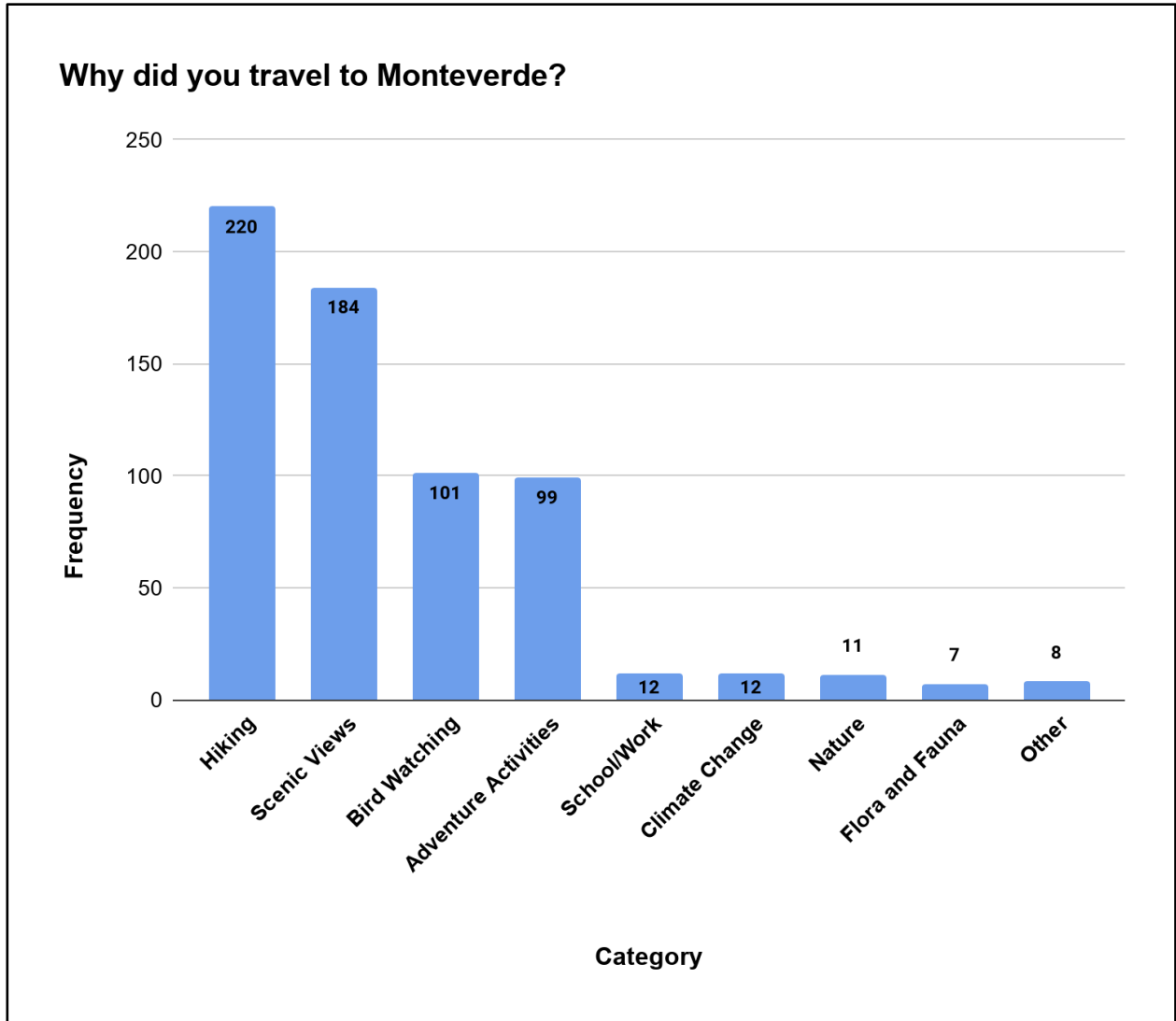


Figure A26. "Why Travel to Monteverde" Bar Chart

Table 3: "Why Visit SER" Data

Why did you choose to visit Santa Elena Reserve?	
Hiking	229
Wildlife	175
Scenic Views	163
Bird Watching	72
<i>Shinrin-Yoku</i>	47
Cost	32
Less people than Monteverde Reserve	21
Other	14
School or Work Related	6
Other Category Responses: nature reserve, different forest than rest of country (1), higher altitude/continental divide (1), explore (1), work (1), round trip (1), photography (1), plants/flora (2), nature (1), most reserved area (1), recommendations from hostel (1), fits in schedule (1), cloud forest (2)	

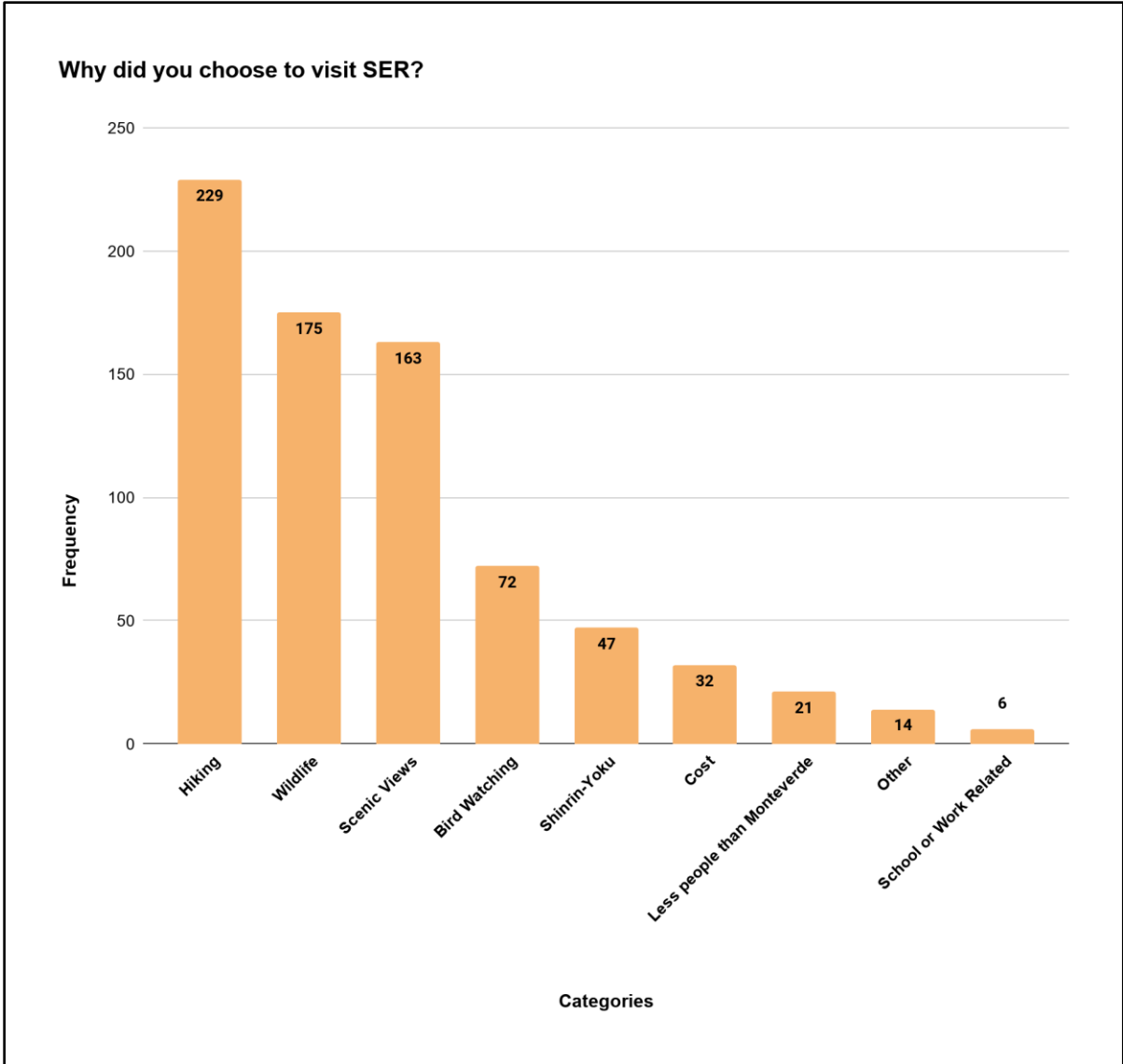


Figure A27. "Why Visit SER" Bar Graph



Table 4: “Find Out About SER” Data

How did you find out about Santa Elena Reserve?	
Recommendations from Friends/Family	82
Hostel/Hotel	73
Social Media	60
Travel Book <i>Lonely Planet</i> [28] <i>Travel/Guide Book</i> [21] <i>Le Routard</i> [4]	53
Tourist Organization <i>TripAdvisor</i> [ 3] <i>Santa Elena Tourist Center</i> [1]	52
Brochure	43
SER Website	31
Internet Research	26
Other Forest Reserve <i>Aguti</i> [1]	10
Blog <i>Mytanfeet.com</i> [3]	9
Guide Group	2

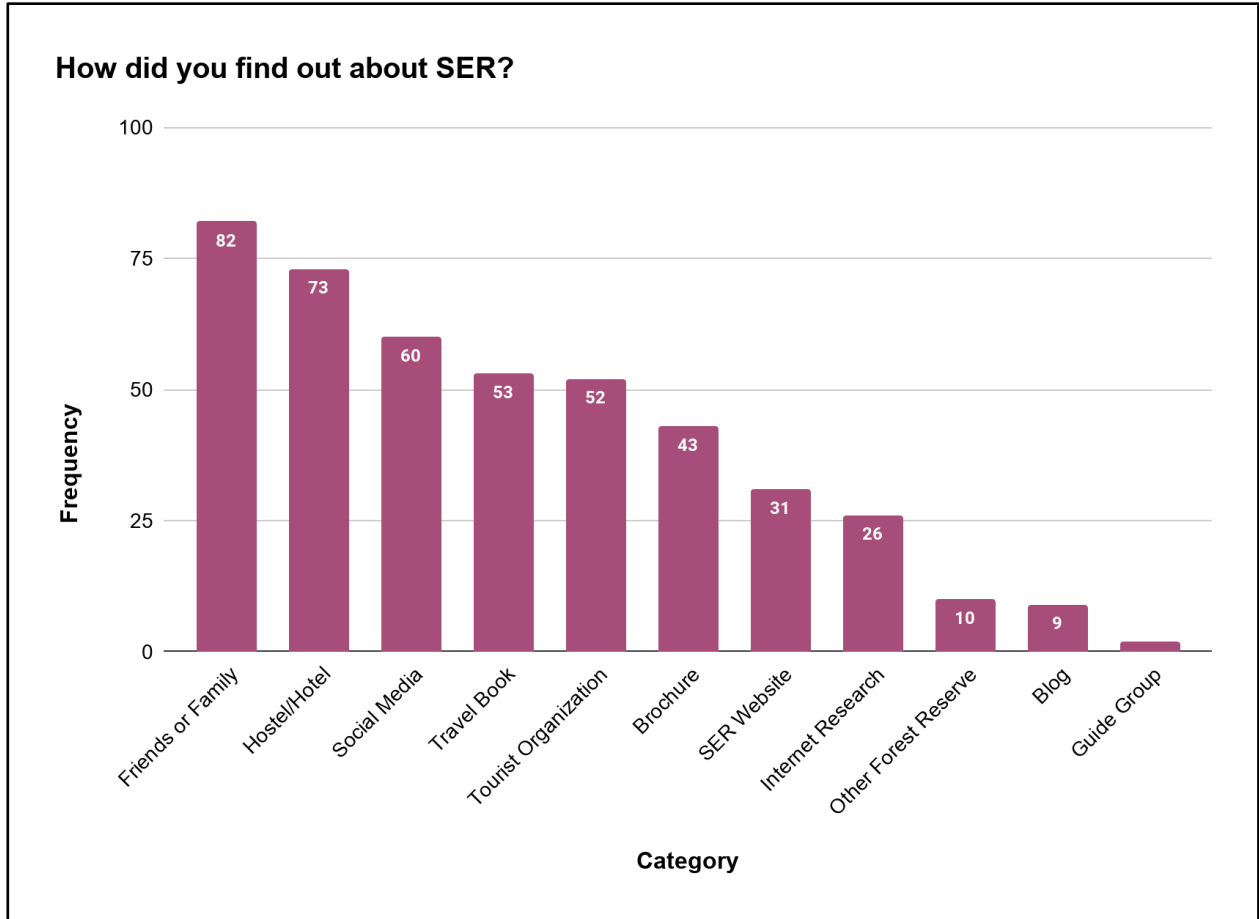


Figure A28. "Find Out About SER" Bar Graph

Table 5: Trail Usage Data

Which trail(s) did you use?	
Youth Challenge	146
Encantado, Full Length	145
Caño Negro	131
Del Bajo	111
Encantado, Short Cut	76
Mundo Joven	34

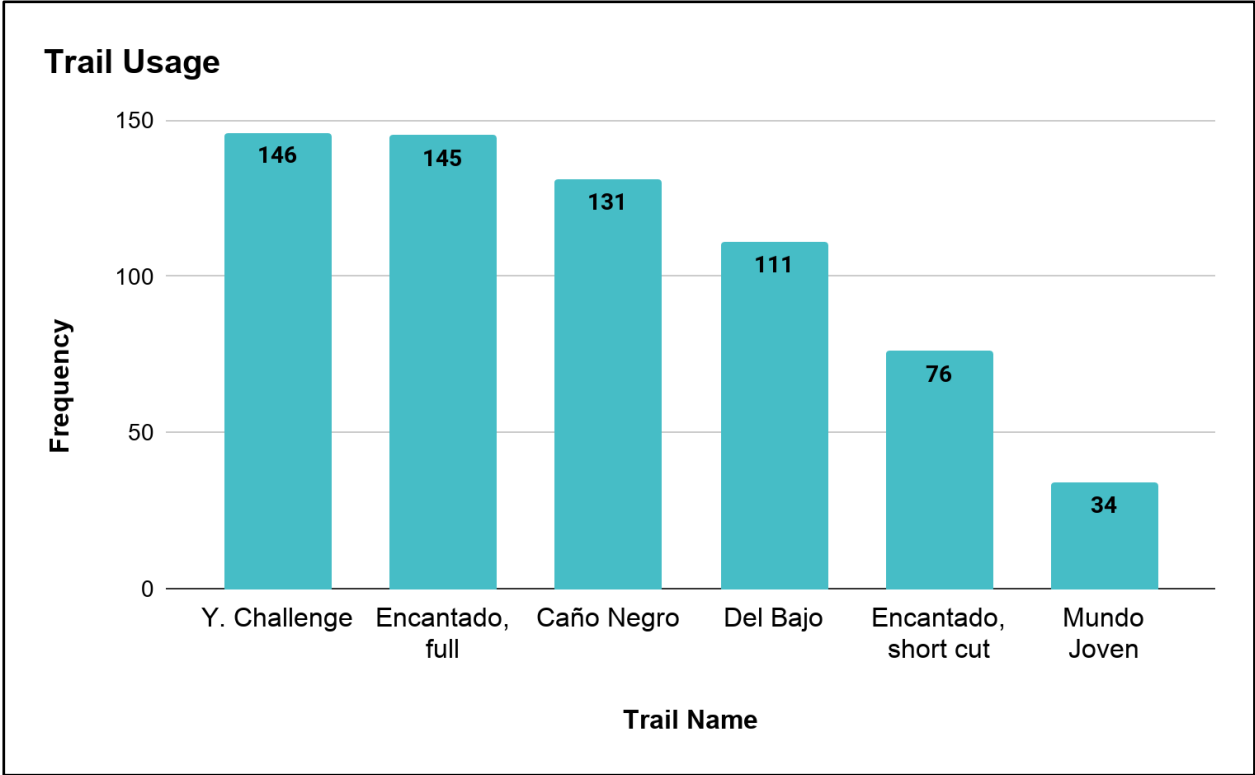


Figure A29. Trail Usage Bar Graph

Table 6: Trail Conditions Data

How were the conditions of the trail(s)?	
Well-Marked	219
Clean	196
Slippery/Muddy	146
Good Scenic Views	128
Dense Foliage	126
Other	14
Sparse Foliage	7
Crowded	5

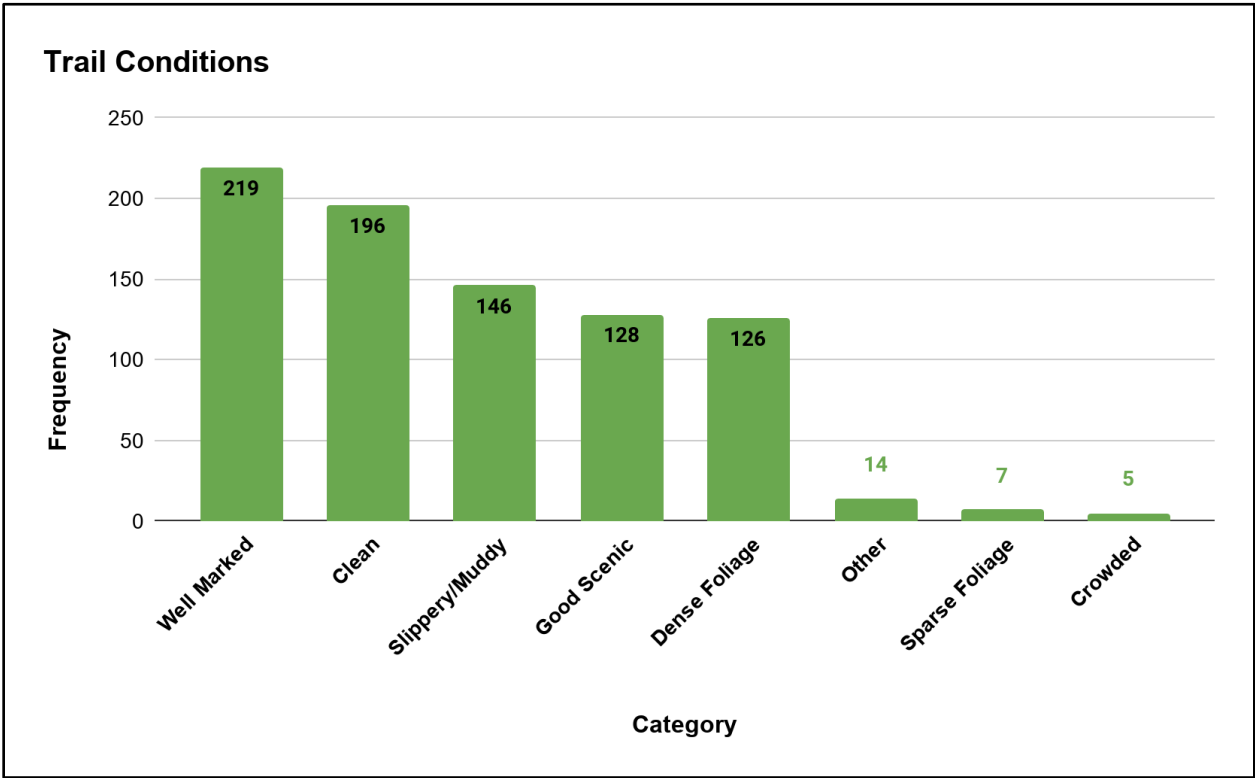


Figure A30. Trail Conditions Bar Graph

Table 7: Price Ratings Data

What do you think of the prices?	
1 (Cheap)	15
2	56
3	152
4	47
5 (Expensive)	14
<b>Average</b>	<b>2.96</b>

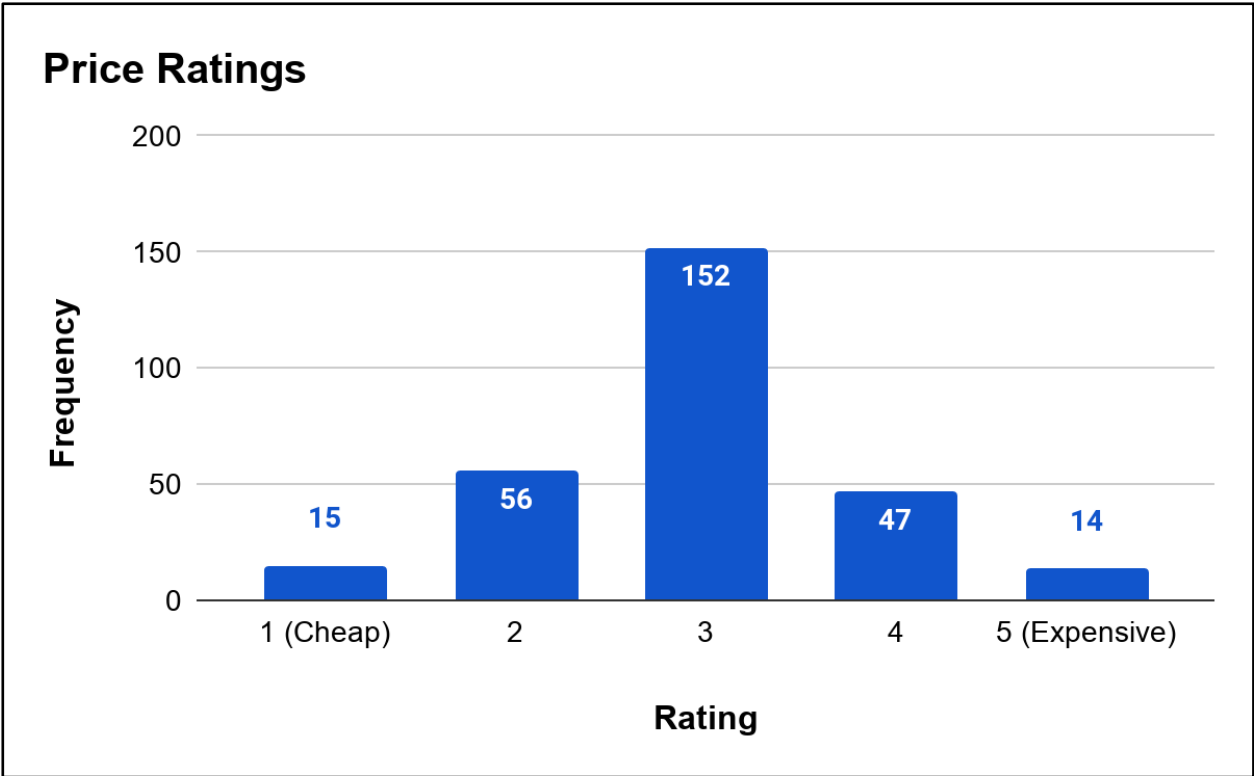


Figure A31. Price Ratings Bar Graph

Table 8: SER Funding Data

Did you know that all proceeds from Santa Elena Reserve benefit the Santa Elena Professional Technical High School?	
Yes	83
I did not know before, but now I do!	208

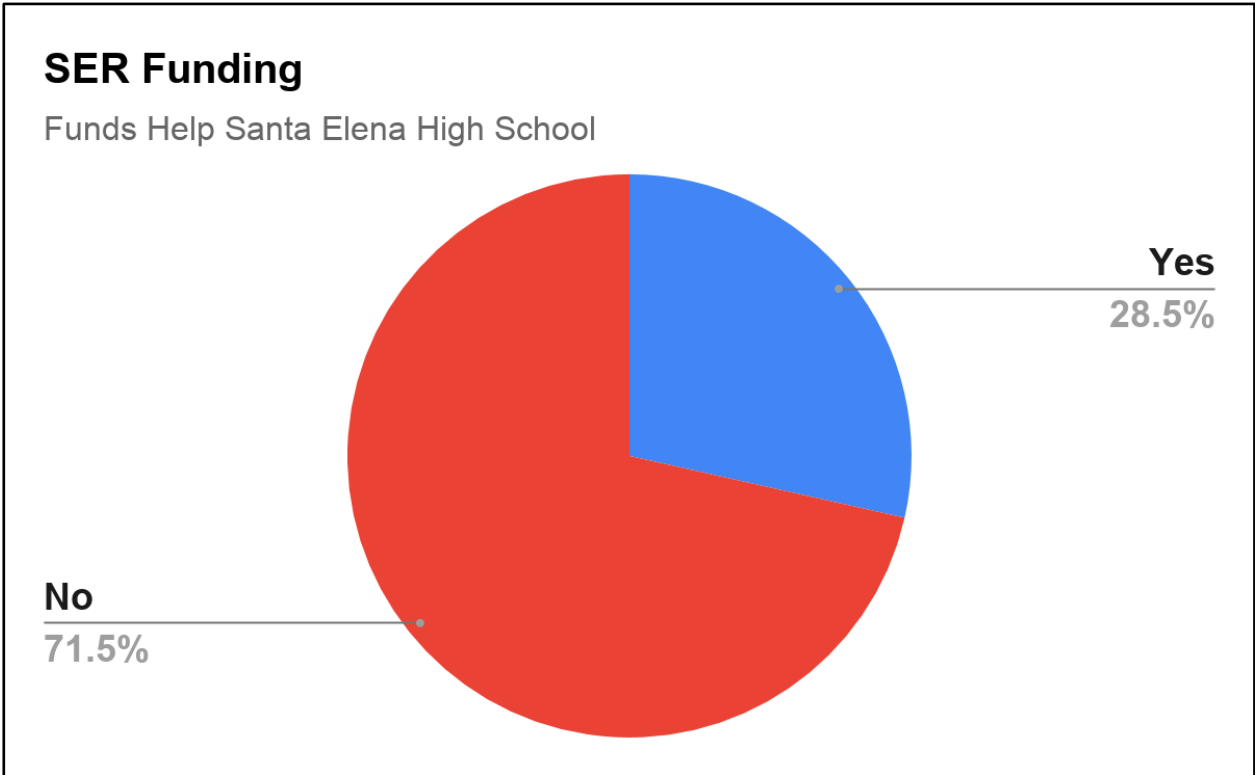


Figure A32: SER Funding Pie Chart

Table 9: Overall Ratings Data

Please rate your overall experience.	
1 (Worst)	0
2	5
3	39
4	120
5 (Best)	121
Average	4.25

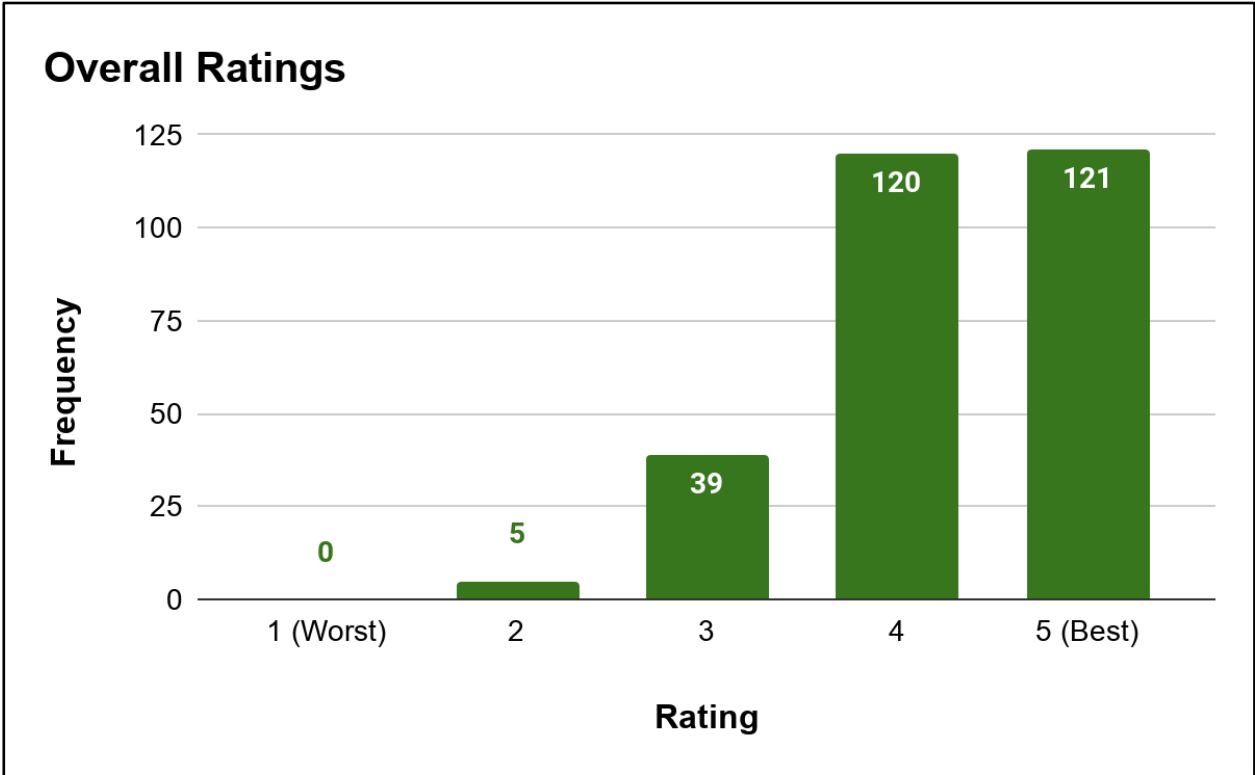


Figure A33. Overall Ratings Bar Graph

Table 10: Guided Tour Ratings Data

If you participated in a guided tour, please rate your experience.	
1 (Worst)	0
2	4
3	4
4	9
5 (Best)	20
Average	4.22

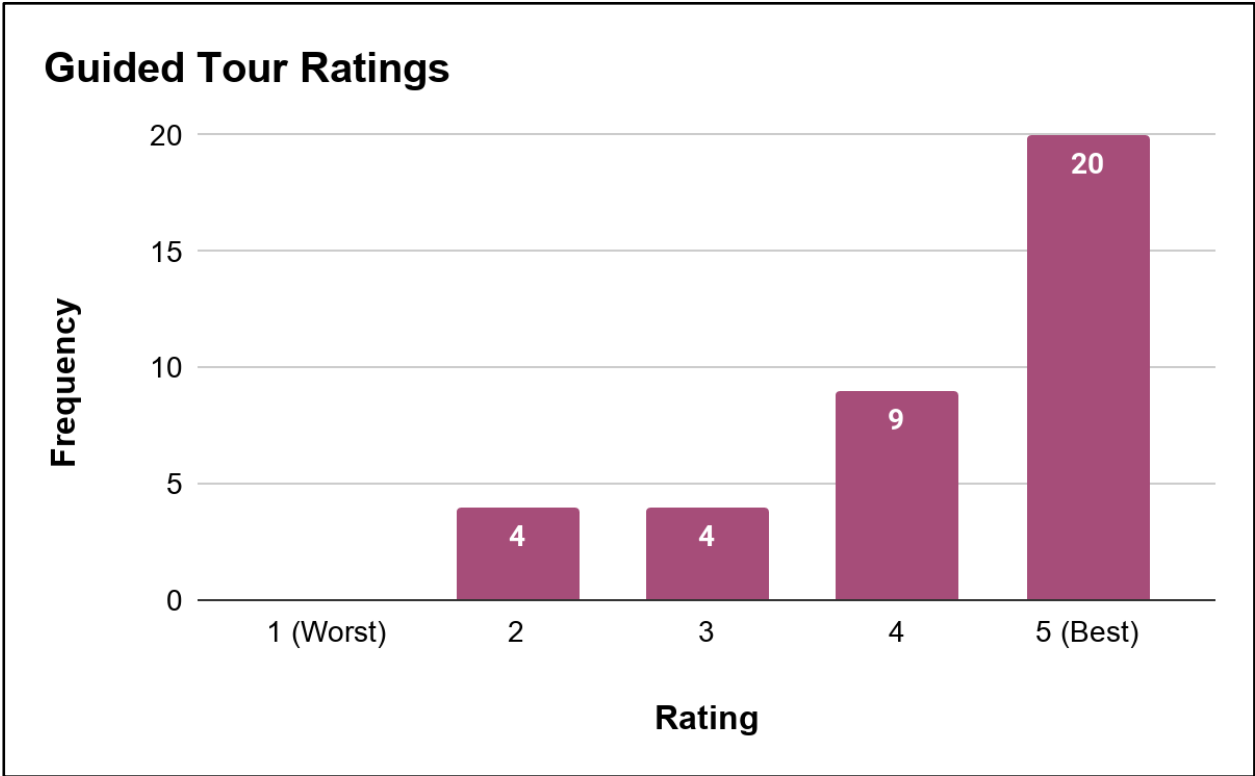


Figure A34. Guided Tour Ratings Bar Graph



**Explain the reason(s) for your rating and include the name of your guide.**

*List of all responses:*

1. Explain the reason(s) for your rating and include the name of your tour guide.
2. Johnathan explained and answered all questions
3. too much talking about things I wasn't interested in
4. too much time explaining the somethings
5. had a big group (-)
6. Jonathan, was very knowledgeable and well versed in scientific terminology and biological processes
7. Jonathan- informative, wouldn't have seen much on our own
8. Great visit. Disappointed not to see more wildlife.
9. Good explanations! Guide with glasses
10. Jonny (John). Because he explains everything and answered all questions.
11. Jonhy. Very good knowledge of the forest. He was happy to share it with us.
12. Excellent. It was really interesting.
13. Don't know tour guides name. He was very knowledgeable but felt a bit rushed.
14. Jonathan is very good guide and fun.
15. Our guide was Jonathan- he was very knowledgeable, I would like to have seen more wildlife.
16. He was very interesting and friendly (Guillermo)
17. Guillermo: he is so knowledgeable about the path and everything it contains. We learned so much about the area.
18. Guillermo was our guide. It was good that we pointed out many cool things we would not have seen.
19. Guide: Diener. Very instructive, very well explained, very nice and communicative. We have seen animals, insects and beautiful plants.
20. Johnathan- a lot of information about animals and plants.
21. Tonnes of information!
22. Great knowledge of flora and fauna. Relaxed atmosphere.
23. Jasdiel- the best guide!
24. Jasdiel
25. Jasdiel- very knowledgeable guide
26. Johnny- impressive knowledge + good English, easy to understand.
27. Guillermo- we value his knowledge of the park and his willingness to answer all the questions.

## Do you have any suggestions for Santa Elena Reserve?

### *List of all responses:*

1. Lower the prices of the souvenirs so tourists could buy more.
2. Keep buying up the land + restarting it! Educate as many people as possible.
3. Keep going like this! so pleasant.
4. love it!
5. no, it is perfect!
6. Advise more when it is not practicable when it rains and its muddy to estimate the effort.
7. really nice views!
8. some trails have to be in a better condition when it is raining, because it is to muddy!
9. please add vegan food to the cafe.
10. Rename "Youth Challenge" trail - adults may feel insecure if can't complete advertise need for reservation. More stairs/ wood in muddy (esp. steep) steps.
11. sometimes more signs
12. Keep up the great work!
13. Give information about the clothing that is required.
14. All is already perfect! Thank you!!! (I just hope you will recycle this paper)
15. Better shop for generating more money fro the reserve. Better audio visual!
16. The 2 trails I did took only half of the time that was said. That is why we did a 2nd trail when I knew before I would have done the longest trail!
17. Keep up the good work!
18. Do not let it be damaged!
19. Wet weather, walking would be better with improved trails, very muddy. We were advised against walking on some trails due to mud.
20. Lovely nature, lots of green. Introduction how to spot birds and other animals.
21. Perfect, beautiful, will remember forever. Cant do anything about the rain!
22. Very cool! 2/5 rating due to being wet and cold. I also ADD and it was not the most exciting time. Enjoyed myself.
23. Mile markers on the trails, maybe more sites labeled (like the bridges were)
24. Great to have a hot chocolate included in the personalised guided tour.
25. More information about animals and plants.
26. Keep water off the trail
27. More drainage and more information on trails.
28. Keep your good work further. Education is a must!
29. More information about flora and fauna.
30. More information about absolute muddy and slippery trail. Caño Negro- almost cannot walk sometimes. At the entrance= give me the information I could hire boots! 16 dollars to walk in a forest is a kind of robber for an entrance fee we expected well maintained trails (Caño Negro)
31. Never let too many people on trails at any time (similar to Monteverde Cloud Forest Reserve). Make it clear how entrance fee is used (for HS). More signs on all trails to help visitors have a better experience about what they are observing
32. Railings on trails. Repair some areas

33. The trails (mainly Caño Negro) were extremely muddy. Our boots got stuck and one person fell, so it would be helpful to have better drainage or more rocks. Also, halfway through trail signs and better signage at other paths.
34. Caño Negro is REALLY muddy and slippery
35. There were some areas that were extremely muddy, I almost lost my shoe more than once. I would recommend putting logs or something on top of the mud
36. More rocks or planks in muddy sections, more trail signage
37. Railings on trails, repair some areas"
38. Wish we were on a tour, much better this way
39. Mile markers on Caño Negro
40. Make it easier to book shuttle bus
41. More stalls in the bathrooms for when large tour groups show up
42. Improved signage to get to the reserve from Santa Elena
43. Railings on trails, repair some areas
44. trash cans/bins at every map point along the route
45. some more info on the way
46. some information on the way about plants/animals

## **Appendix H: Guided Forest Bathing Walk with Marcela Morales Notes**

**Guide: Marcela Morales**

**Location: Aguti Reserve, Monteverde, CR**

### Introductory notes:

Marcela Morales is a certified forest bathing guide who works for the Association of Nature and Forest Therapy (ANFT) and is a mentor for other guides in training. She helps her mentees through their 6 month long practicums after they complete 1 week of intensive guide training.

Today, forest bathing is different in Japan because they are doing more concrete research to find proof of benefits. Researchers measure heart rate, blood pressure, cortisol and amylase levels in saliva, and use electrodes to measure prefrontal cortex activity. Research has shown that phytonocyttes, released from trees, greatly boost the immune system and exposure increases white blood cell count. The way we practiced forest bathing and the practice that is more common is the “western style”. We know the physical benefits based on previous research, but this style is more about what you personally and emotionally gain from the experience.

### Forest Bathing Good Practices:

Invitations are the basis of forest bathing. They are offerings to participate in unique ways of connecting with the forest. The participants can decide whether they want to partake in the invitation, when to begin the invitation, how they partake and when they wish to end the invitation. For all invitations, wording is important. They cannot close people off to the experience nor direct them in any direction, so open wording of invitations is important. It is also essential to not impart any bias into the invitation. They are meant to be adaptable to any person willing to participate and be able to give them a fulfilling experience that impacts them personally.

Another key aspect is sharing after invitations, if the participant are in a group. The sharing phase is important for people to refocus on how the invitation made them feel and how the experience impacted them. Sharing is also a very flexible and open practice. Participants can share through words, song, poetry, dance, silence or other. Any form of sharing is welcome. One person shares at a time and expresses themselves truthfully and from the heart. The other

members of the group must be silent when it is not their turn to speak and listen with an open heart and mind.

The entire forest bathing experience should occur at a very, very slow pace. This is to ensure participants are taking the time to engage all of their senses while in the forest and be able to reap the physical benefits of the forest atmosphere. It is also described as “moving at the speed of nature”, which is slow, flowing, and serene.

We were told to turn off our phones to limit distractions during our walk. Outside distractions pull participants out of the immersion with the forest and break the connections and bonds *shinrin-yoku* is trying to form between the individual and the environment.

Marcela recommended the following books to continue our research into forest bathing and help us continue to develop the self-guided forest bathing trail in SER:

- Quen Li "Forest Bathing"
- Amos Clifford "Little Book on Forest Bathing"

#### Experience / Walk Notes:

During our 3 hour long walk with Marcela, our invitations included:

- Pleasures of Presence
  - After walking slowly into the forest and becoming immersed in this environment, she invited us to step off the trail and stand in a circle. Here, she told us to close our eyes and listen to everything around us. We also smelled the air, our hands and our clothes. We felt the texture of our hands and arms. Next, we were invited to sway and stretch our body in any way that was comfortable and move at the speed of nature. With our eyes closed, we were invited to slowly rotate until our internal radar, or gut feeling, felt most comfortable and we stopped in this place for a moment. We were invited to imagine roots emerging from the soles of our feet. What do the roots see? What do they feel? Later, we opened our eyes, and looked at everything on all levels - low, mid-range and all the way up in the canopy - around us as though we had never seen it before. Once finished, we sat in a circle on the forest floor. Marcela used a leaf as a speaking token. Offering

the leaf to anyone who wanted to share first. Each of us shared one at a time, what we felt, our thoughts and how the forest is impacting us.

- Movement of the Forest
  - We continued walking in silence at a very slow pace and were asked to notice everything that moved around us. Periodically, Marcela would ring chimes that would indicate for us to stop and do a full turn to see what is moving all around us, not just what is in front of us. We continued this until our next invitation.
- Gifts of the Forest
  - We were invited to wander through the forest and place whatever items called to us into a brown paper bag. After collecting gifts for about 10 minutes, we reconvened and split into pairs. With a partner, we presented our gifts in turns. The first person to share a gift would choose whichever gift to share. The recipient would close their eyes and hold their hands out to receive the gift. The recipient, with their eyes still closed, would feel and smell the gift and say how they feel on the outside and then how they feel on the inside (ex. If the gift was a leaf, they could say “On the outside I feel flexible. On the inside I feel renewed”). Each person would take turns giving and receiving about 6 gifts each, then all of the gifts are gathered between the pair. Next, we selected which item we related to and explained why to our partner.
- Make a Friend
  - We were invited to wander about and “make a friend” of the forest. This friend would be whatever called to us, a tree, a leaf, vines, a rock, a spider, etc. We were invited to introduce ourselves to this being and give it time to introduce itself to us. We were to listen to what our forest friend shared with us. After spending time with our friend, we paired up and each individual introduced their friend to their partner.
- Kiss the Earth
  - For this invitation, it was suggested that we take off our shoes and walk barefoot through the forest to focus on a lot of feelings and textures that we miss when we wear shoes. We were also invited to physically kiss the earth beneath us to show

our gratitude and connect further with the environment around us. We were also invited to touch anything else that caught our attention and to really hone in on how it felt.

- Sit Spot

- After walking, we were invited to find a place that called to us. We were to sit in this place that we were guided to by our gut feeling and take in this environment for a moment. Sitting and just enjoying nature around us was the main focus of the invitation. It was a set time for us to not have to think of anything and simply enjoy the rare occasion of being allowed to do nothing.

- Tea Ceremony

- After all of our invitations, we gathered around a place mat set up in the path, adorned with leaves from the forest. There were 5 tea cups on the place mat, one for each of us present and the first cup is for the forest itself. Marcela brewed and brought tea made from guava leaves with her. Five cups of tea were poured and we shared closing thoughts and our gratitude for what the forest had given us the opportunity to experience. The cup of tea for the earth was poured onto the ground as a show of gratitude and giving back to the forest that we had gained so much from. We drank our tea as a way to take in the forest and to taste it, because all of our previous invitations involved mostly external observations. There were fruits, nuts, and various cakes to snack on as well as we continued to discuss *shinrin-yoku* and ask Marcela questions about her introduction to forest bathing and her practice.

## Appendix I-1: *Shinrin-Yoku* Informational Sheet

# *Shinrin-Yoku*

## Relax with Forest Bathing

### *What is it?*

The word contains two parts: the first part *Shinrin* means "forest" and the second word *Yoku* means "bath". This phrase directly translates to Forest Bathing. More specifically, you can describe it as taking in the forest's atmosphere through your senses, such as smell, sight, sound, taste and touch, to bring mental, physical and emotional wellbeing.



### *How do you do it?*

This is not an exercise-based activity; it is meant to be a slow walk through the forest where you can connect with the environment around you. During this, please be careful where you walk and be aware of your surroundings.

You may walk in any direction along the trail, but please stay on the trail and openings that are provided for this experience. Remember that you are in a forest and be aware of animals on trees and the path (e.g. snakes).

## *Connect with Nature*

Try not to think about any outside thoughts that would distract you from connecting to the nature around you. To have the best experience, we suggest putting away your camera and turning off your phone or putting it on airplane mode. It is also beneficial to refrain from talking during invitations.

### *Invitations - Del Bajo Trail*

There will be invitations for *Shinrin-Yoku* along **Del Bajo Trail** that you can choose to participate in. It is your choice whether to participate or not, and you can do them in any way that feels most comfortable to you. You can choose when you want to do the invitation, whether right away or further down the path, and you can choose the duration of each invitation depending on your preference.

### *Walk at a Very Slow Pace*

While going through the *Shinrin-Yoku* walk, you should walk at a slow pace to closely observe the environment around you with all of your senses. This will allow you to fully receive the benefits of the practice and make a deeper bond with the forest.

### *If in a Group*

We encourage you to share with each other at the end of each invitation. The best practice for this is to gather in a small circle together and share your thoughts and feelings from the experience. You can choose to share in any for that feels most comfortable to you, which can be with words, a song, a dance, a poem, or with silence. It is suggested to do this with only one person talking at a time and the rest of the group is silent while they share. Then continue to share in a circular motion until all group members have had a chance to speak.



## Appendix I-2: *Shinrin-Yoku* Informational Sheet Trail Start



**What is it?**

The word contains two parts: the first part Shinrin means "forest" and the second word Yoku means "bath". This phrase directly translates to Forest Bathing. More specifically, you can describe it as taking in the forest's atmosphere through your senses, such as smell, sight, sound, taste and touch, to bring mental, physical and emotional wellbeing.

**Shinrin-Yoku**  
Relax with Forest Bathing  
Del Bajo



**HOW TO:**

Walk slowly through the forest so you can connect with the environment around you.

Please stay on the trail and openings that are provided. Remember that you are in a forest and be aware of animals on trees and the path (e.g. snakes).

**IN A GROUP:**

If in a group, we encourage sharing at the end of each invitation. Gather in a small circle together and share your thoughts and feelings from the experience. One person talks at a time and the rest of the group is silent while they share. Continue to share in until all group members have had a chance to speak.

**We Suggest**

-  Do **not** use a camera
-  Do **not** use your phone
-  Only talk when sharing after invitations.

**Invitations**

There will be invitations for Shinrin-Yoku along **Del Bajo Trail** that you can choose to participate in. It is your choice whether to participate or not, and you can do them in any way that feels most comfortable to you.

## Appendix I-3: *Shinrin-Yoku* Informational Sheet Trail End





### What is it?

The word contains two parts: the first part *Shinrin* means "forest" and the second word *Yoku* means "bath". This phrase directly translates to Forest Bathing. More specifically, you can describe it as taking in the forest's atmosphere through your senses, such as smell, sight, sound, taste and touch, to bring mental, physical and emotional wellbeing.

This is the end of the experience. If you are entering Del Bajo Trail here, feel free to participate.



### Shinrin-Yoku

Relax with Forest Bathing Del Bajo

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### HOW TO:

Walk slowly through the forest so you can connect with the environment around you.

Please stay on the trail and openings that are provided. Remember that you are in a forest and be aware of animals on trees and the path (e.g. snakes).

### IN A GROUP:

If in a group, we encourage sharing at the end of each invitation. Gather in a small circle together and share your thoughts and feelings from the experience. One person talks at a time and the rest of the group is silent while they share. Continue to share in until all group members have had a chance to speak.



### We Suggest

-  Do **not** use a camera
-  Do **not** use your phone
-  Only talk when sharing after invitations

---

### Invitations

There will be invitations for *Shinrin-Yoku* along **Del Bajo Trail** that you can choose to participate in. It is your choice whether to participate or not, and you can do them in any way that feels most comfortable to you.

## Appendix I-4: *Shinrin-Yoku* Informational Pamphlet

### Walk at a Very Slow Pace

While going through the *Shinrin-Yoku* walk you should walk at a slow pace to closely observe the environment around you with all of your senses. This will allow you to fully receive the benefits of the practice and make a deeper bond with the forest.



### *Shinrin-Yoku* as a Group

If in a group, we encourage you to share your observations with each other at the end of each invitation.

The best practice for this is to gather in a small circle together and share your thoughts and feelings from the experience. You can choose to share in any way that feels most comfortable to you, which can be with words, a song, a dance, a poem, or with silence. It is suggested to do this with only one person talking at a time and the rest of the group is silent while they share. Give everyone the chance to speak.

References  
Andrews McMeel Publishing. (2019). *The Little Book of Forest Bathing: Discovering the Art of Japanese Self-Care*. Summersdale Publishers Ltd. ISBN: 978-1-5248-5198-9.  
Li, Q. (2018). 'Forest Bathing' is Great for your Health. Here's how to do it. Retrieved from <https://time.com/5259602/japanese-forest-bathing/>  
Schwartz, M. (2017). *Shinrin-Yoku the Medicine of Being in the Forest* Life out of Bounds.

## *Shinrin-Yoku*

### Del Bajo Trail

#### What is it?

The word contains two parts: the first part *Shinrin* means "forest" and the second word *Yoku* means "bath".

The name directly translates to "Forest Bathing". More specifically, you can describe it as taking in the forest's atmosphere through your senses, such as smell, sight, sound, taste and touch, to bring mental, physical and emotional wellbeing.



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#ReservaSantaElena

### How do you do it?

This is not an exercise activity; it is meant to be a slow walk through the forest where you can connect with the environment around you. During this, please be careful where you walk and be aware of your surroundings.

You may walk in any direction along the trail, but please stay on the trail and openings that are provided for this experience. Remember that you are in a forest and be aware of animals on trees and the path (e.g. snakes).



### Connect with Nature

Try not to think about any outside thoughts that would distract you from connecting to the nature around you. To have the best experience, we suggest to put away your camera and turn off your phone or put it on airplane mode. It is also beneficial to refrain from talking during invitations.

### Invitations


During this walk, there will be invitations along Del Bajo trail that you can choose to participate in. It is your choice whether to participate or not and you can do them in any way that feels most comfortable to you. You can choose when you want to do the invitation, whether right away or further down the path, and you can choose the duration of each invitation depending on your preference.

*"And into the forest I go, to lose my mind and find my soul."  
-John Muir*

Appendix I-5: *Shinrin-Yoku* Informational Banner

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## Relaxing with Forest Bathing on Del Bajo





*What is Shinrin-Yoku?*  
You can describe it as taking in the forest's atmosphere through your senses, such as smell, sight, sound, taste and touch, to bring mental, physical and emotional wellbeing.

**Invitations**  
There will be invitations for *Shinrin-Yoku* along Del Bajo Trail that you can choose to participate in. It is your choice whether to participate or not, and you can do them in any way that feels most comfortable to you.

**We Suggest:**

-  Do **NOT** use a camera
-  Do **NOT** use your phone
-  Only talk when sharing after invitations

**How To:**  
Walk slowly through the forest so you can connect with the environment around you. Please stay on the trail and openings that are provided.



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#ReservaSantaElena

RESERVA BOSQUE NUBOSO  
**Santa Elena**

## Appendix J-1: *Shinrin-Yoku* Promotional Webpage

Link: <https://www.reservasantaelena.org/ForestBathing.html>



### *Shinrin - Yoku*

*Forest Bathing*

*Del Bajo Trail*



#### *What is it?*

The word contains two parts: the first part *shinrin* means "forest" and the second word *yoku* means "bath". This phrase directly translates to Forest Bathing. More specifically, you can describe it as taking in the forest's atmosphere through your senses, such as smell, sight, sound, taste and touch, to bring mental, physical and emotional wellbeing.

#### *How do you do it?*

This is not an exercise-based activity; it is meant to be a slow walk through the forest where you can connect with the environment around you. During this, please be careful where you walk and please stay on the trail and openings that are provided for this experience. Remember that you are in a forest and be aware of animals on trees and the path (e.g. snakes).



#### *Walk at a Very Slow Pace*

While participating in *shinrin-yoku*, walk at a slow pace to closely observe the environment around you with all of your senses. This will allow you to fully receive the benefits of the practice and make a deeper bond with the forest.



### Connecting with Nature

Try not to think about any outside worries or stressors that would distract you from connecting to the nature around you. To have the best experience, we suggest **putting away** your **camera** and turning off your **phone** or putting it on airplane mode. It is also beneficial to refrain from talking during invitations.



### Invitations - Del Bajo Trail

There are numerous invitations for *shinrin-yoku* along **Del Bajo Trail**. It is your choice whether to participate or not, and you can do them in any way that feels most comfortable to you. You can choose when you want to do the invitation, whether right away or further down the path, and you can choose the duration of each invitation depending on your preference.

### If in a Group

We encourage you to share with each other at the end of each invitation. The best practice for this is to gather in a small circle together and share your thoughts and feelings from the experience. You can choose to share in any form that feels most comfortable to you, which can be with words, song, dance, poetry, or even silence. It is suggested to do this with only one person talking at a time and the rest of the group is silent and listening intently. Continue to share in a circular motion until all group members have had a chance to speak.



"Conservación para la Educación"

1992 - 2020

Creado por: Bello Villalobos

Figure A35. Shinrin-Yoku Web Page on Santa Elena Reserve Website

## **Appendix J-2: *Shinrin-Yoku* Promotional Instagram Posts**

**Post 1:** [with a picture of the forest, of invitations, of someone in the forest, or anything similar]

### ***Shinrin-Yoku***

The word contains two parts: the first part *shinrin* means "forest" and the second word *yoku* means "bath". This phrase directly translates to Forest Bathing. More specifically, you can describe it as taking in the forest's atmosphere through your senses. This is not an exercise-based activity; it is meant to be a slow walk through the forest where you can connect with the environment around you.

There are numerous invitations for *shinrin-yoku* along Del Bajo Trail. It is your choice whether to participate or not, and you can do them in any way that feels most comfortable to you. You can choose when you want to do the invitation, whether right away or further down the path, and you can choose the duration of each invitation depending on your preference.

### ***Shinrin-Yoku***

Esta expresión contiene dos partes: la primera palabra *shinrin* significa "bosque" y la segunda palabra *yoku* significa "empaparse" o "sumergirse". La expresión puede ser descrita como absorbiendo el ambiente del bosque a través de sus sentidos. No es una actividad de ejercicio; tiene la intención a ser un paseo lento en el bosque donde usted se puede conectar con el ambiente alrededor de usted.

Hay numerosas invitaciones *shinrin-yoku* a lo largo del Sendero Del Bajo. Usted puede participar o no, y usted puede hacerlos en la manera que siente más cómodo. Puede elegir cuándo quiere hacer la invitación, inmediatamente o más tarde el sendero, y puede elegir la duración de cada invitación dependiendo de su preferencia.

**Post 2:** [picture of touching a leaf, touching trees, moss, etc]

### **Touch**

Take time to fully experience everything around you. While in nature, use this opportunity to feel the many different textures of the forest. There are many things to connect with: soft mosses, delicate ferns, smooth leaves and much more. How do each of these things make you feel?

### **Toque**

Tome tiempo para sentir lo que está alrededor de usted. Mientras está en la naturaleza, use esta oportunidad para sentir las diferentes texturas del bosque. Hay muchas cosas para conectarse – suaves musgos, delicados helechos, hojas lisas y mucho más. ¿Cómo le hace sentir cada una de estas cosas?

**Post 3:** [flowers preferably]

### **Smell**

Stop and smell the roses! Or rather, stop and smell the orchids. What sweet smells will you discover if you walk slowly and pay full attention to the forest around you?

### **Huela**

¡Deténgase y huela las rosas! Mejor dicho, deténgase y huela las orquídeas. ¿Que aromas descubrirá si camina lentamente y toma atención del bosque alrededor de usted?

**Post 4:** [video of waterfall, video of forest while it's raining, video of forest with birds in background, etc]

### **Listen**

There are many things to see in the cloud forest, but what can you hear? While in the forest, take time to close your eyes and listen to everything going on around you. From the wind and birds in the trees, all the way to the water flowing in streams and small frogs hiding in the leaves, the forest is speaking to you. Will you listen?

### **Escuche**

Hay muchas cosas que ver en el bosque nuboso, pero que puede oír? Mientras está en el bosque, tome tiempo para cerrar sus ojos y escuchar todo lo que está ocurriendo alrededor de usted. Desde el viento y las aves en los árboles, la manera que el agua está cayendomen las quebradas, y las ranas pequeñas escondiéndose en los hojas, el bosque le está hablando. ¿Escuchará?

**Post 5:** [any picture of the forest]

### **Physical and Mental Wellbeing**

Humans are meant to exist within a natural environment. Time spent relaxing in the forest is known to reduce blood pressure, reduce heart rate, lower stress and boost the immune system. Visiting the forest to slow down and escape the worries of everyday life helps to clear one's mind and helps the body recover from stress.

### **Bienestar Físico y Mental**

Los humanos están destinados a existir en un ambiente natural. Es bien sabido que pasar tiempo relajándose en el bosque reduce la presión sanguínea, reduce el ritmo del corazón, baja el estrés, y apoya ella sistema inmune. Visitar el bosque para frenar y escapar las ansiedades de la vida diaria ayuda a despejar la mente y ayuda al cuerpo a recuperarse del estrés.



**Appendix J-3: *Shinrin-Yoku* Promotional Video**

Link: <https://youtu.be/etKLbaKGpR0>



*Figure A36. Shinrin-Yoku Promotional Video Screenshot*

## Appendix K: Invitations and Reminders

### Support Rock: The Beginning

Before we start the *Shinrin-Yoku* walk, look around for a small rock that calls to you. Pick it up and ask permission for it to be your rock during the upcoming experience. This rock will serve as support throughout your journey. Hold the rock near your heart with both hands and ask the rock to keep all your thoughts and worries. Bring the rock with you and if negative thoughts come up during the walk, remember to ask the rock to hold them for you.

*Shinrin-Yoku*



References  
LL, Q. (2018). 'Forest bathing' is great for your health, here's how to do it. Retrieved from <https://www.5288692.com/que-es-bathing/>  
Schwartz, M. (2017). *Shinrin-Yoku: The Medicine of Being in the Forest*. Retrieved from [https://www.lifescoutofounds.com/wp-content/uploads/2018/09/LOGO\\_SHINRINTOKU1\\_E8006.pdf](https://www.lifescoutofounds.com/wp-content/uploads/2018/09/LOGO_SHINRINTOKU1_E8006.pdf)

### Reminder

Let yourself relax and take several long and deep breathes.

Think about the air around you. What does it feel like?

*Shinrin-Yoku*



References  
LL, Q. (2018). 'Forest bathing' is great for your health, here's how to do it. Retrieved from <https://www.5288692.com/que-es-bathing/>  
Schwartz, M. (2017). *Shinrin-Yoku: The Medicine of Being in the Forest*. Retrieved from [https://www.lifescoutofounds.com/wp-content/uploads/2018/09/LOGO\\_SHINRINTOKU1\\_E8006.pdf](https://www.lifescoutofounds.com/wp-content/uploads/2018/09/LOGO_SHINRINTOKU1_E8006.pdf)

### Invitation #1 – Pleasures of Presence

#### Step 1

Walk around a bit and find a place that calls to you. Stand comfortably and close your eyes. Now take 5 deep breaths and center yourself in your surroundings.

Imagine that your toes are roots and are growing through your shoes into the earth. If these roots had senses, what would they feel, see, and smell? How do the roots feel?

*Shinrin-Yoku*



## Invitation #1 – Pleasures of Presence

### Step 2

With your arms out and palms facing the sky, what do you feel? Can you feel the elements, such as the wind, rain, sun or anything else around you? Move with the elements you are feeling.

As you move with the elements, feel the forest around you. Slowly start to connect and feel yourself become welcomed into the forest.

*If you are in a group, share your thoughts and feelings with your group members.*

*Shinrin-Yoku*



References  
Li, G. (2018). 'Forest bathing' is great for your health, here's how to do it. Retrieved from <https://dailycall.com/2018/02/06/forest-bathing/>  
Schwartz, M. (2017). Shinrin-Yoku: The Medicine of Being in the Forest. Retrieved from [https://www.iforestbosque.com/wp-content/uploads/2018/08/COB\\_SHINRIN-YOKU\\_EBOOK.pdf](https://www.iforestbosque.com/wp-content/uploads/2018/08/COB_SHINRIN-YOKU_EBOOK.pdf)

## Reminder

Remember to walk slowly. Look around you. What can you see or hear? How do you feel right now? What does it feel like to be here?

*Shinrin-Yoku*



References  
Li, G. (2018). 'Forest bathing' is great for your health, here's how to do it. Retrieved from <https://dailycall.com/2018/02/06/forest-bathing/>  
Schwartz, M. (2017). Shinrin-Yoku: The Medicine of Being in the Forest. Retrieved from [https://www.iforestbosque.com/wp-content/uploads/2018/08/COB\\_SHINRIN-YOKU\\_EBOOK.pdf](https://www.iforestbosque.com/wp-content/uploads/2018/08/COB_SHINRIN-YOKU_EBOOK.pdf)

## Invitation #2 – Follow your nose

### Step 1

Take a moment, find a place to stand that is comfortable to you, and close your eyes. With your eyes closed, what you can smell around you? Get close to things and pick them up if you want. What does the smell remind you of? Where do you think it is coming from? Can you identify the direction?

When you find where the smell is coming from, try to touch its source. What does it feel and look like?

*Shinrin-Yoku*



## Invitation #2 – Follow your nose

### Step 2

Try to find another smell. How is this one different from the one before? How does it make you feel? Can you see where this one is coming from as well?

Repeat finding different smells for as many times as you want. How does each smell make you feel?

*Shinrin-Yoku*



## Invitation #2 – Follow your nose

### Step 3

When you are done with your second invitation, think about how you feel. Which emotions do you feel in this moment? How is the environment making you feel?

*If you are in a group, share your thoughts and feelings with your group members.*

*Shinrin-Yoku*



References:  
Li, Q. (2018). 'Forest bathing' is great for your health, here's how to do it. Retrieved from <https://www.fox.com/259602/health-forest-bathing/>  
Schwartz, M. (2017). Shinrin-Yoku: The Medicine of Being in the Forest. Retrieved from [https://www.lifesoftfoundations.com/wp-content/uploads/2018/09/LOOK\\_INVITATION1\\_EBOOK.pdf](https://www.lifesoftfoundations.com/wp-content/uploads/2018/09/LOOK_INVITATION1_EBOOK.pdf)

## Reminder

Take a moment and pay attention to birds around you. Can you see or hear them? Are there different types? How far are they from you? What do you think of them?

Every time you hear a bird, they are trying to send a message or share their thoughts or ideas. What do you think they are trying to say right now?

Experience this process for as much time as you want

*Shinrin-Yoku*



References:  
Li, Q. (2018). 'Forest bathing' is great for your health, here's how to do it. Retrieved from <https://www.fox.com/259602/health-forest-bathing/>  
Schwartz, M. (2017). Shinrin-Yoku: The Medicine of Being in the Forest. Retrieved from [https://www.lifesoftfoundations.com/wp-content/uploads/2018/09/LOOK\\_INVITATION1\\_EBOOK.pdf](https://www.lifesoftfoundations.com/wp-content/uploads/2018/09/LOOK_INVITATION1_EBOOK.pdf)

## Invitation #3 – Inner Child

### Step 1

Think about your childhood. Can you remember any times when you were in nature?

How did you feel when you were in nature?

As a child, what did you do in nature?



RESERVA BOSQUE NUBOSO  
**Santa Elena**  
Manabí - E.C.

*Shinrin-Yoku*

## Invitation #3 – Inner Child

### Step 2

Imagine that you are a child again. Look around you and see what calls to you and turn your body in that direction.

In the direction that calls to you, what do you see? Try to notice all of the small details in that direction. What do they mean to you?



RESERVA BOSQUE NUBOSO  
**Santa Elena**  
Manabí - E.C.

*Shinrin-Yoku*

## Invitation #3 – Inner Child

### Step 3

For a moment, try to find something around you that reminds you of your childhood. It can be a leaf, plant, stone or anything else. Why did you choose it? What does it remind you of?

*If you are in a group, share how your thoughts and feelings with your group members.*

Thank the forest for the gift it showed you.

Please do not disturb the forest and put back anything you have moved back where you found it.



RESERVA BOSQUE NUBOSO  
**Santa Elena**  
Manabí - E.C.

*Shinrin-Yoku*

References:  
Li, Q. (2018). 'Forest bathing' is great for your health. Here's how to do it. Retrieved from <https://Asia.com/2018/02/26/health-benefits-forest-bathing/>  
Schwartz, M. (2017). Shinrin-Yoku: The Medicine of Being in the Forest. Retrieved from [https://www.foresttherapy.com/wp-content/uploads/2018/09/0006\\_SHINRYATOKU\\_EBOOK.pdf](https://www.foresttherapy.com/wp-content/uploads/2018/09/0006_SHINRYATOKU_EBOOK.pdf)

## Reminder

Remember to walk slowly and take a moment to enjoy the forest around you.

*"Looking at beauty in the world is the first step of purifying the mind"*

- Amit Ray

*Shinrin-Yoku*



References  
Li, G. (2018). "Forest bathing" is great for your health, here's how to do it. Retrieved from <https://www.foxnews.com/2018/02/08/forest-bathing/>  
Schwartz, M. (2017). Shinrin-Yoku: The Medicine of Being in the Forest. Retrieved from [https://www.lifesouthofboston.com/wp-content/uploads/2017/09/0906\\_ShrinYokuBook.pdf](https://www.lifesouthofboston.com/wp-content/uploads/2017/09/0906_ShrinYokuBook.pdf)

## Invitation #4 – Find a Friend

### *Step 1*

Look around you and see if anything is calling to you. It could be a tree, leaf, stone, or anything else that draws your attention. Stay on the path and go towards it to introduce yourself.

Once you have introduced yourself to them, allow them to introduce themselves back to you.

If you would like, you can tell them something about yourself, such as a story of your family line. Allow them a chance to respond back to you.

*Shinrin-Yoku*



## Invitation #4 – Find a Friend

### *Step 2*

If in a group, split up into pairs and bring your partner over to your new friend. Introduce your partner to your friend and share what you learned about them. Allow your partner to ask questions and to get to know your new friend.

Listen closely while your partner introduces their friend to you.

*Shinrin-Yoku*



References  
Li, G. (2018). "Forest bathing" is great for your health, here's how to do it. Retrieved from <https://www.foxnews.com/2018/02/08/forest-bathing/>  
Schwartz, M. (2017). Shinrin-Yoku: The Medicine of Being in the Forest. Retrieved from [https://www.lifesouthofboston.com/wp-content/uploads/2017/09/0906\\_ShrinYokuBook.pdf](https://www.lifesouthofboston.com/wp-content/uploads/2017/09/0906_ShrinYokuBook.pdf)

## Reminder

Using all the senses in your body, stop and think about how the forest feels: is it warm, cold, happy, sad, calm, excited, or something else? Walk around and try to notice the differences in how the forest feels. Why do you think those changes are happening?

*Shinrin-Yoku*



References  
Li, Q. (2018). 'Forest Bathing' is great for your health, here's how to do it. Retrieved from <https://www.2025002.com/en/forest-bathing/>  
Schwartz, M. (2017). Shinrin-Yoku: The Medicine of Being in the Forest. Retrieved from [http://www.institutoforestal.com/wp-content/uploads/2018/08/08\\_SHINRYOKU\\_INVITACION\\_ERBOS.pdf](http://www.institutoforestal.com/wp-content/uploads/2018/08/08_SHINRYOKU_INVITACION_ERBOS.pdf)

## Invitation #5 – Imagining Magic

### Step 1

Look around you and find a spot that catches your eye. In this spot, look at what you can see, from the trees, to the animals, to the insects and more. Try to photograph what you see in your mind, whether it is one single point or a large scenic view.

Now use your imagination and look past that point further into the forest. What else do you see when you do this?

*Shinrin-Yoku*



## Invitation #5 – Imagining Magic

### Step 2

With the same spot in mind, use your imagination and look past that point to further into the forest. What does it look, sound, and smell like? Can you see wildlife within your vision? How does the new view speak to you? Does it remind you of anything?

*If you are in a group, share your thoughts and feeling with your group members.*

*Shinrin-Yoku*



References  
Li, Q. (2018). 'Forest Bathing' is great for your health, here's how to do it. Retrieved from <https://www.2025002.com/en/forest-bathing/>  
Schwartz, M. (2017). Shinrin-Yoku: The Medicine of Being in the Forest. Retrieved from [http://www.institutoforestal.com/wp-content/uploads/2018/08/08\\_SHINRYOKU\\_INVITACION\\_ERBOS.pdf](http://www.institutoforestal.com/wp-content/uploads/2018/08/08_SHINRYOKU_INVITACION_ERBOS.pdf)

## Reminder

*"I felt my lungs inflate with the onrush of scenery -  
air, mountains, trees, people. I thought, 'This is what it is  
to be happy.'"*

*-Sylvia Plath*

*Shinrin-Yoku*



References  
Li, Q. (2018). 'Forest bathing' is great for our health, here's how to do it. Retrieved from <https://www.fox.com/2018/02/08/forest-bathing/>  
Schwartz, M. (2017). Shinrin-Yoku: The Medicine of Being in the Forest. Retrieved from [https://www.forestofsound.com/wp-content/uploads/2018/09/08\\_SHINRYOKU\\_BOOK.pdf](https://www.forestofsound.com/wp-content/uploads/2018/09/08_SHINRYOKU_BOOK.pdf)

## Reminder

Listen closely.  
Breath deeply.  
What is the water saying?  
How does it make you feel?

*Shinrin-Yoku*



References  
Li, Q. (2018). 'Forest bathing' is great for our health, here's how to do it. Retrieved from <https://www.fox.com/2018/02/08/forest-bathing/>  
Schwartz, M. (2017). Shinrin-Yoku: The Medicine of Being in the Forest. Retrieved from [https://www.forestofsound.com/wp-content/uploads/2018/09/08\\_SHINRYOKU\\_BOOK.pdf](https://www.forestofsound.com/wp-content/uploads/2018/09/08_SHINRYOKU_BOOK.pdf)

## Support Rock: The End

As a conclusion, say thank you to your rock that was  
holding your negative thoughts for you during the walk.  
Also thank the forest for giving you permission to hold  
the stone and return it back to its environment.

*Shinrin-Yoku*



References  
Li, Q. (2018). 'Forest bathing' is great for our health, here's how to do it. Retrieved from <https://www.fox.com/2018/02/08/forest-bathing/>  
Schwartz, M. (2017). Shinrin-Yoku: The Medicine of Being in the Forest. Retrieved from [https://www.forestofsound.com/wp-content/uploads/2018/09/08\\_SHINRYOKU\\_BOOK.pdf](https://www.forestofsound.com/wp-content/uploads/2018/09/08_SHINRYOKU_BOOK.pdf)



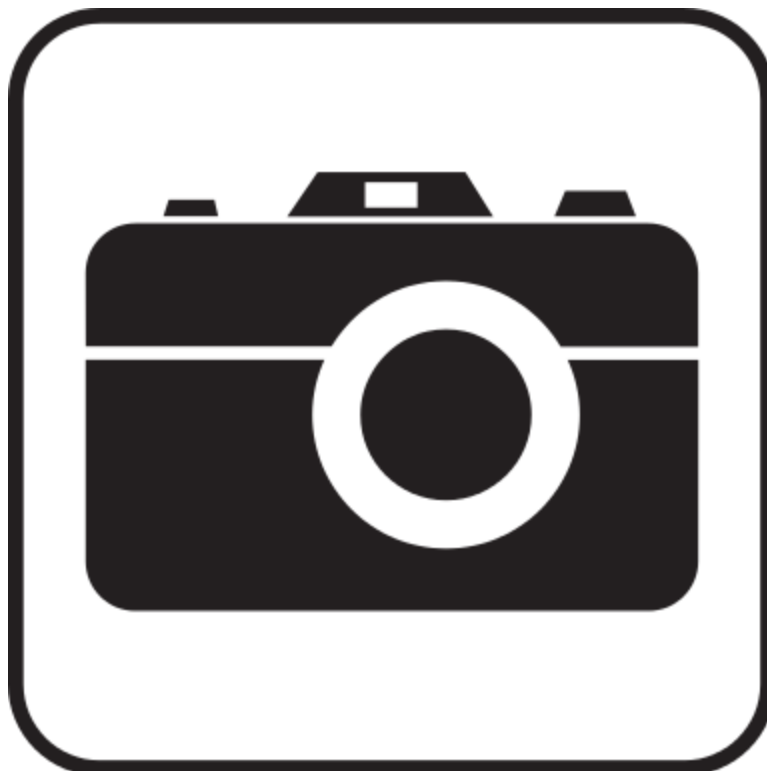
## Appendix L: Pilot Trail Observations Tally Chart

Observation	Data	Frequency (Tally)		Notes
Estimated Time Stopped at Specified Checkpoints	Does not stop			
	<1 minute			
	1-3 minutes			
	>3 minutes			
Follows Invitations on Signage along trail (e.g. Close your eyes for a moment and listen to the sounds of the forest)	To the observer's knowledge, the visitor participated in the listed invitation			
Pace of Walk	Slow (meandering, possibly indirect path of walk)			
	Average (relaxed, direct walk)			
	Fast (quickly moving through trail)			
Respect	Respecting the environment and SER rules (e.g. no littering)	Yes	No	

**Additional Notes:**

---

There are trap  
cameras present  
along the trail to  
observe and record  
wildlife.



## Appendix N: Exit Survey for Pilot Trail

1. How were the conditions of the trail? *Check all that apply.*

- Clean
- Accessible
- Crowded
- Well-marked
- Slippery
- Good scenic views
- Other: \_\_\_\_\_

2. Have you ever participated in *shinrin-yoku* or forest bathing before? *Mark only one oval.*

- Yes
- No
- Maybe

3. How did the *shinrin-yoku* / forest bathing experience make you feel? *Check all that apply.*

- Relaxed/Peaceful
- Spiritual
- Connected with nature
- Tired
- Bored
- Stressed
- Other: \_\_\_\_\_

4. If you have done *shinrin-yoku* before, how does this walk compare to the others? *Mark only one oval.*

- Better
- Worse
- The same
- First time
- Other: \_\_\_\_\_

5. Did the pamphlet and/or signs help you learn about and practice *shinrin-yoku*? *Mark only one oval.*

- Yes
- No

**6. How many times did you refer to/follow along with the pamphlet or signs along the trail? Mark only one oval.**

- Never
- Occasionally
- Sometimes
- Often
- Always

**7. What did you learn about *shinrin-yoku* from this experience?**

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---

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**8. How could the experience be improved?**

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**9. Would you participate in *shinrin-yoku* / forest bathing again? Mark only one oval.**

- Yes
- No
- Maybe

**10. How was your overall experience? Mark only one oval.**

	1	2	3	4	5	
Bad (would never come back)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Amazing (would definitively come back)

## Appendix O: Full Pilot Trail Survey Responses

Table 11: Pilot Trail Conditions Data

How were the conditions of the trail (Del Bajo)?	
Well Marked	21
Accessible	18
Clean	17
Good Scenic Views	17
Slippery	8
Crowded	0
Other	2
Other Category Responses: muddy (1), well marked refers to trails not signs (1)	

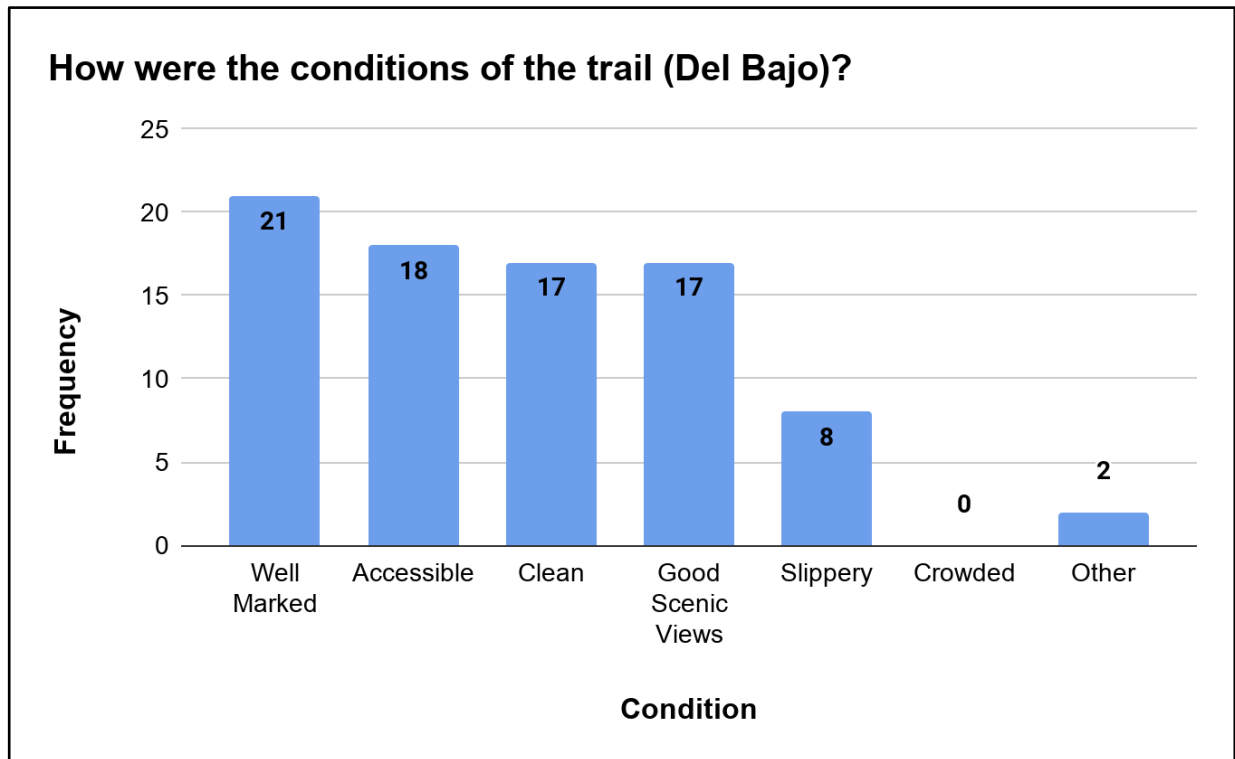


Figure A37. Pilot Trail Conditions Bar Graph

Table 12: Prior Shinrin-Yoku Experience Data

Have you ever participated in <i>Shinrin-Yoku</i> or forest bathing before?	
Yes	4
No	24
Maybe	0

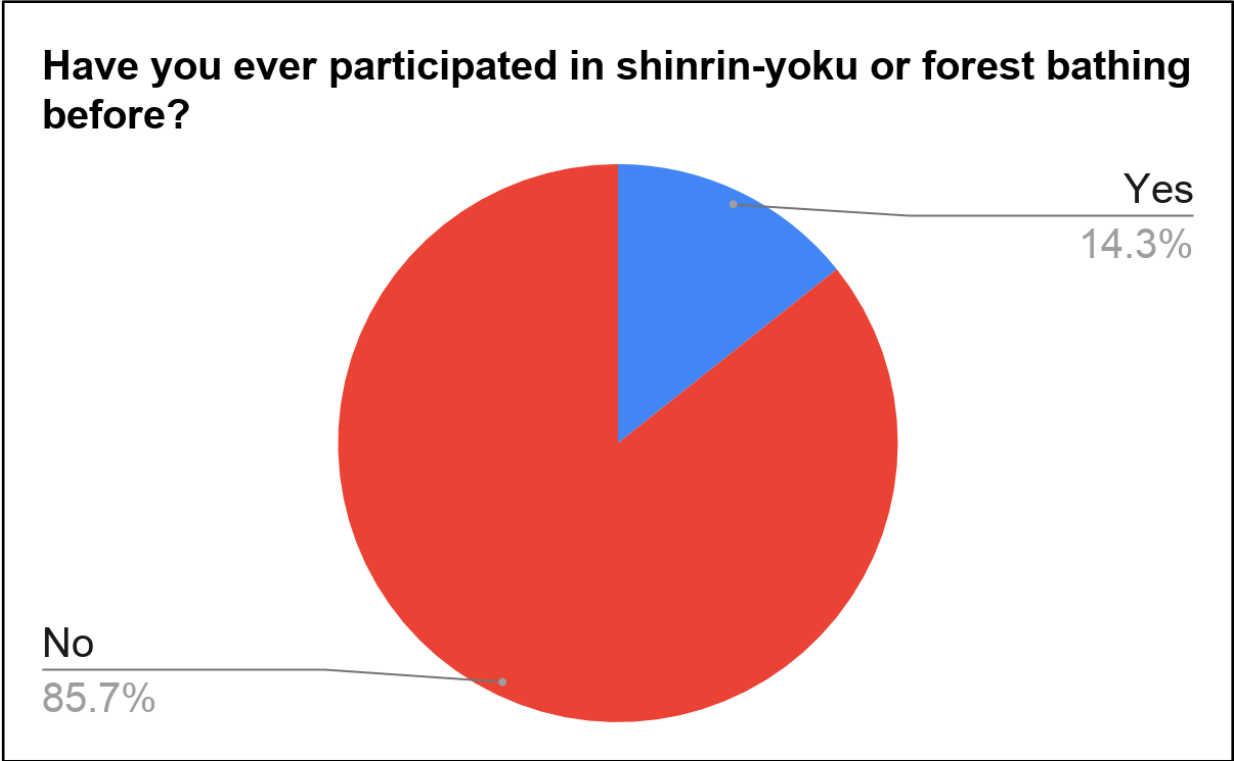


Figure A38. Prior Shinrin-Yoku Experience Pie Chart

Table 13: Emotional Response to Forest Bathing Data

How did the <i>Shinrin-Yoku</i> / forest bathing experience make you feel?	
Relaxed / Peaceful	24
Connected with Nature	20
Spiritual	10
Tired	3
Bored	0
Stressed	0
Other	3
Other Category Responses: full of wonder (1), strong (1), surprised, saw a bird (1)	

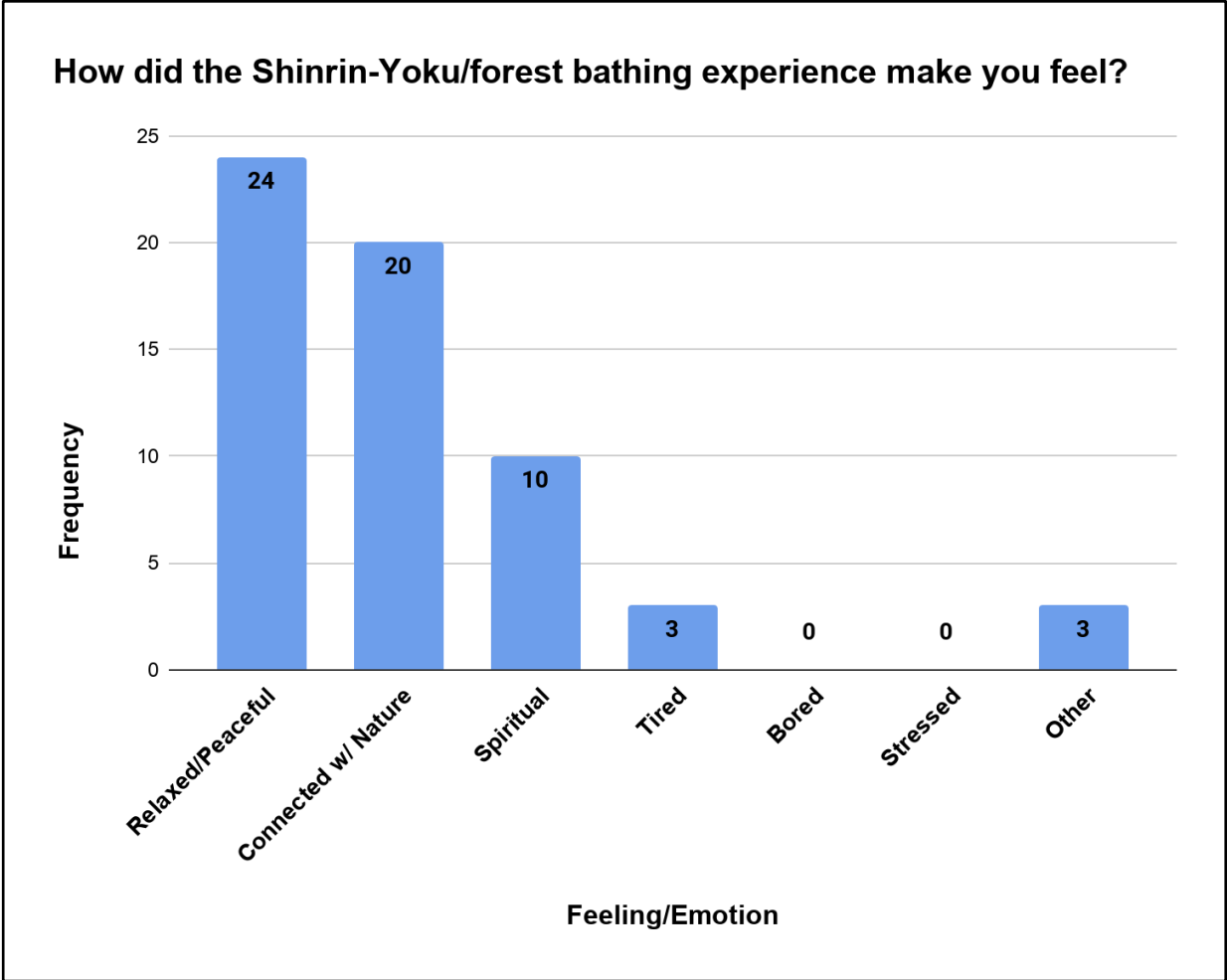


Figure A39. Emotional Response to Forest Bathing Bar Graph



Table 14: Comparison to Prior Walk Data

If you have done <i>Shinrin-Yoku</i> before, how does this walk compare to the others?	
Better	1
Worse	1
The Same	2
First Time	21

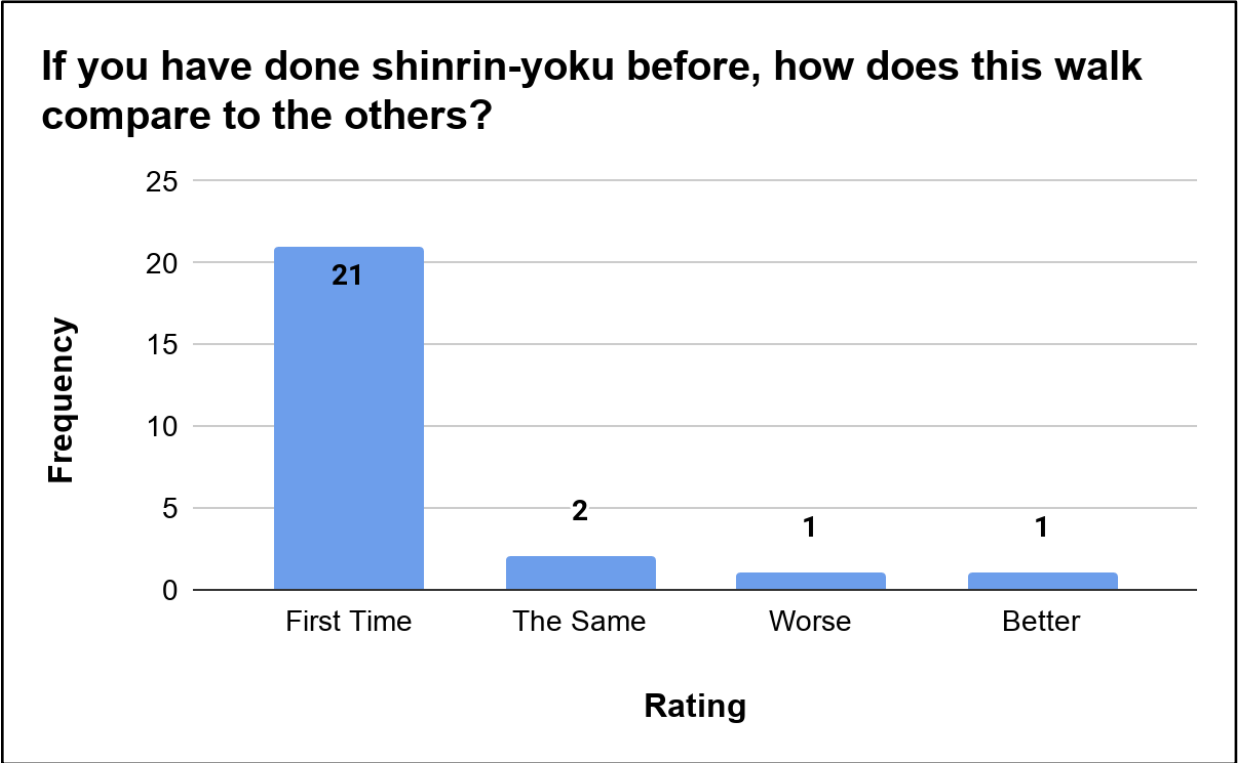


Figure A40: Comparison to Prior Walk Data

Table 15: Learn from Pamphlet/Signs Data

Did the pamphlet and/or signs help you learn about and practice <i>Shinrin-Yoku</i> ?	
Yes	28
No	0

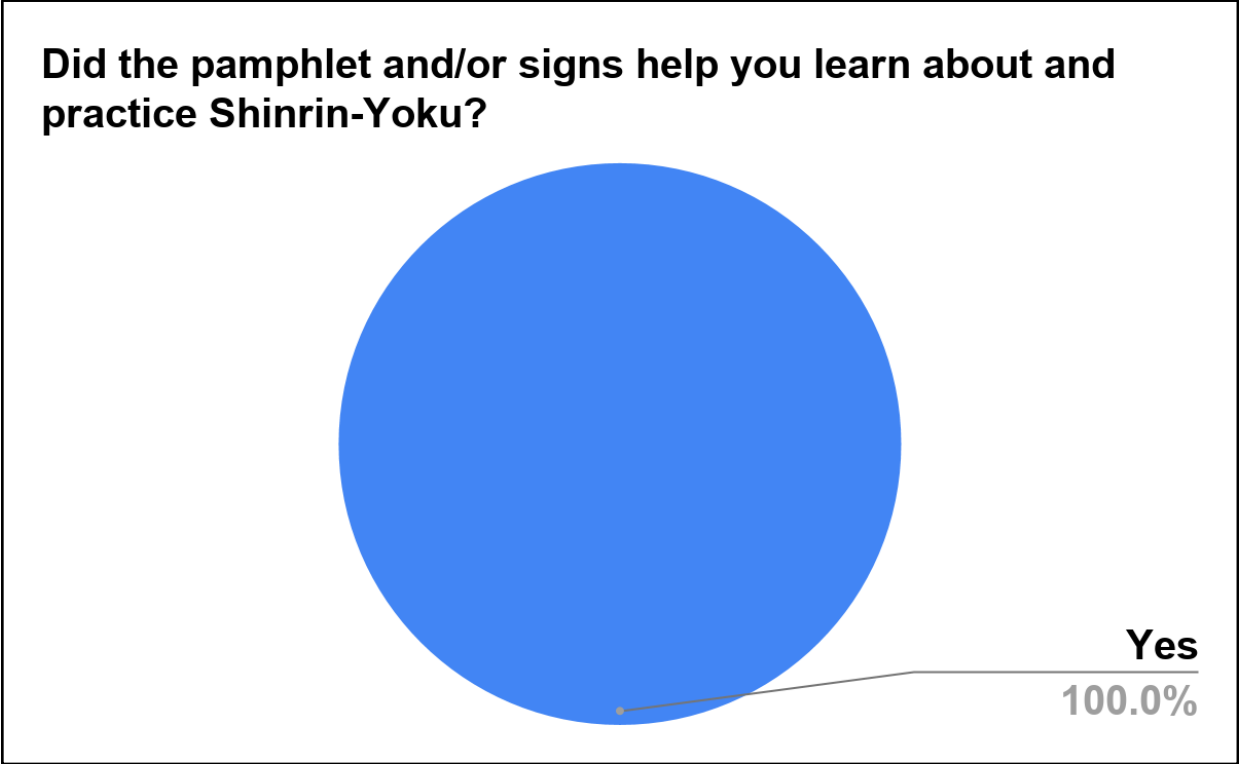


Figure A41. Learn from Pamphlets/Signs Pie Chart

Table 16: Refer to Pamphlet/Signs Data

How many times did you refer to / follow along with the pamphlet or signs along the trail?	
Never	0
Occasionally	2
Sometimes	3
Often	23

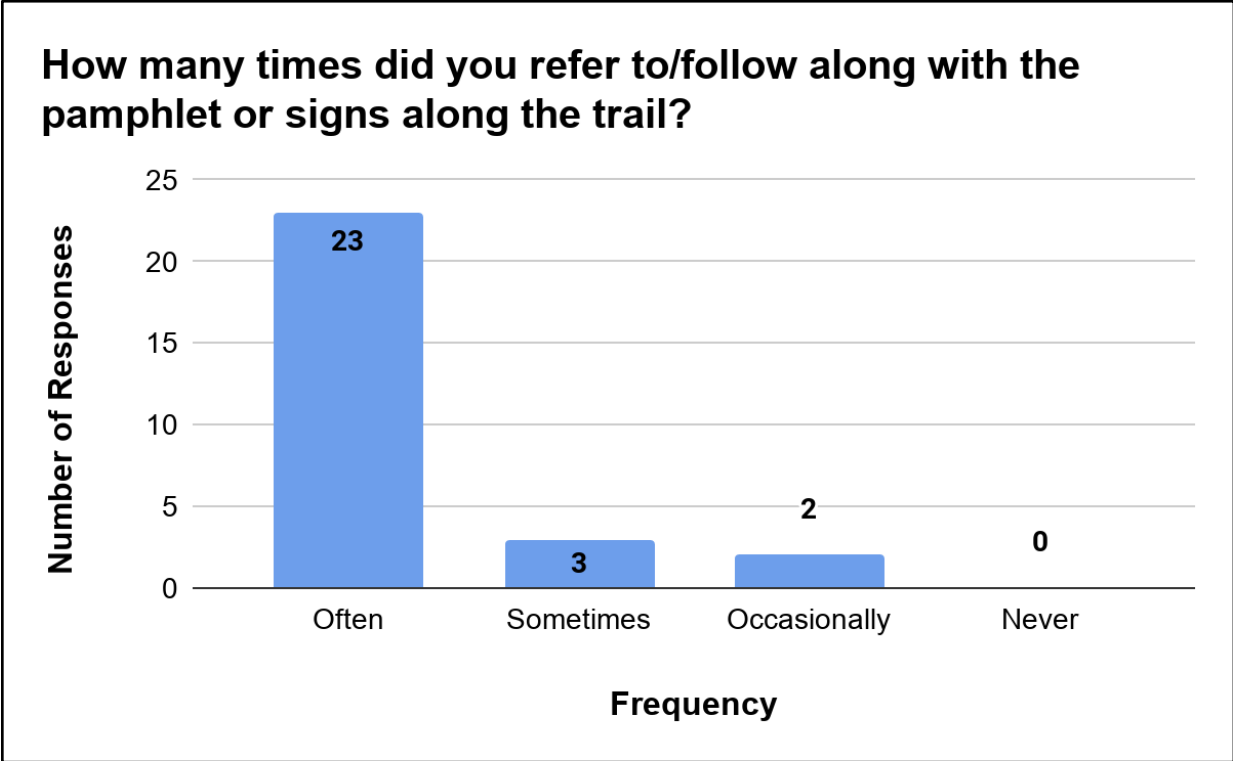


Figure A42: Refer to Pamphlet/Signs Bar Graph

## What did you learn about *shinrin-yoku* from this experience?

### *List of all responses:*

1. Take time, use all your senses to experience nature. Check your breathing. At the same time we try every hike here to use all our senses to experience the forest/ animals.
2. It is a formal way of drawing me into a better, more total experience of the forest.
3. A connection with nature than just physical.
4. Sometimes it is good to stop appreciate stuff and how you feel about it and yourself.
5. I learned how to connect with nature and some additional things about myself.
6. it is very relaxing and peaceful
7. It is a very relaxing experience that many natural trails could benefit from.
8. It is an easy way to relax and be more connected with nature. It is a good for de-stressing and forgetting about outside world.
9. It can be a cheap and easy experience to teach people to interact with nature in a different way
10. The invitation about imagining was creative and a good experience
11. It made me stop and experience the forest more fully. It also prompted discussions/thoughts/conversations about experiences. It is a creative experience and exercise.
12. Nature is amazing if humans let it be. Never rush through nature. Use all your senses to experience nature. Be as quiet as you can be when in nature
13. It really helps in immersing you in nature. It was very relaxing.
14. Nature is fun. And when you calm down when you close your eyes nature actually becomes more sense-able
15. Benefits of the practice, how it works
16. I knew little about it before so I learned everything from the signs. I liked the quotes a lot especially
17. It is an easy way to relax and be more connected with nature. It is a good for de-stressing and forgetting about outside world.
18. To walk slowly, appreciate our surroundings and connect with nature
19. i understood how many details of nature you can pick up by just listening
20. The experience is very relaxing and connected with nature
21. Walk slow, look around
22. Appreciate the details of the forest
23. I've learned to enjoy/appreciate nature
24. To be mindful and tools to help you be mindful
25. It is an easy way to relax and be more connected with nature. It is a good for de-stressing and forgetting about outside world.
26. it somewhat helped with the stress, everyone experiences it in different ways
27. it is an experience that tries to connect you more with nature. To slow down and "smell the roses" so to speak
28. I learned that it's a full-body connective experience with nature

## How could the experience be improved?

### *List of all responses:*

1. Use a guide to enhance the experience
2. I should have grabbed a pamphlet or would have liked to know more before I started the hike.
3. The pamphlet claimed we could follow the trail either direction, but it really felt like we did it backwards.
4. The signs could be better. We started from the finish line so it should be precise where to start.
5. Make sure that you specify that the track is one way. Put more rocks!
6. It was good! Maybe point out specific views/ trees/ rocks
7. Maybe a bag of rocks to choose from at the beginning...
8. Some of the trail was flooded/ muddy which was annoying. Maybe more invitations.
9. An initial sign/instructions/introduction is needed, some invitations could be improved because they are confusing, some signs are too close (ones near the waterfall)
10. Some of the trail sections need repair
11. Perhaps more invitations along the trail. Have copies of invitations (used and not yet used) to hand out (to take away) to visitors for their use on future walks elsewhere
12. Indicate which side to start on in the brochure/signs/map in the future
13. Sometimes the signs said "step one", so I would spend less time at the sign and keep walking because I thought there would be a "step two"
14. It might be good if the baskets w/ the rocks gas an option for beginning and end on either side because a lot of people were going backwards and might not have understood the rock thing. Also when the invitations said "find a spot that calls to you" I was not sure if we were allowed to go off the path or not so maybe making that more clear from the signs
15. Some of the trail was flooded/ muddy which was annoying. Maybe more invitations.
16. Having a special guide for this
17. make certain tasks more down-to-earth and less spiritual (or just 2 variants per task) --> easier to take it seriously
18. It's very nice
19. Going with a guide is better
20. Nothing, it's good
21. Well, I don't know, I think it's good
22. Some of the trail was flooded/ muddy which was annoying. Maybe more invitations.
23. more signs of things to do along the trail
24. Have a sign at the beginning of the trail to tell people to be quiet and courteous of those trying to participate in Shinrin-Yoku
25. more signage at the beginning that it's a peaceful/ calming trail, some people that walked by were super loud

Table 17: Participate Again Data

Would you participate in <i>Shinrin-Yoku</i> / forest bathing again?	
No	0
Maybe	7
Yes	21

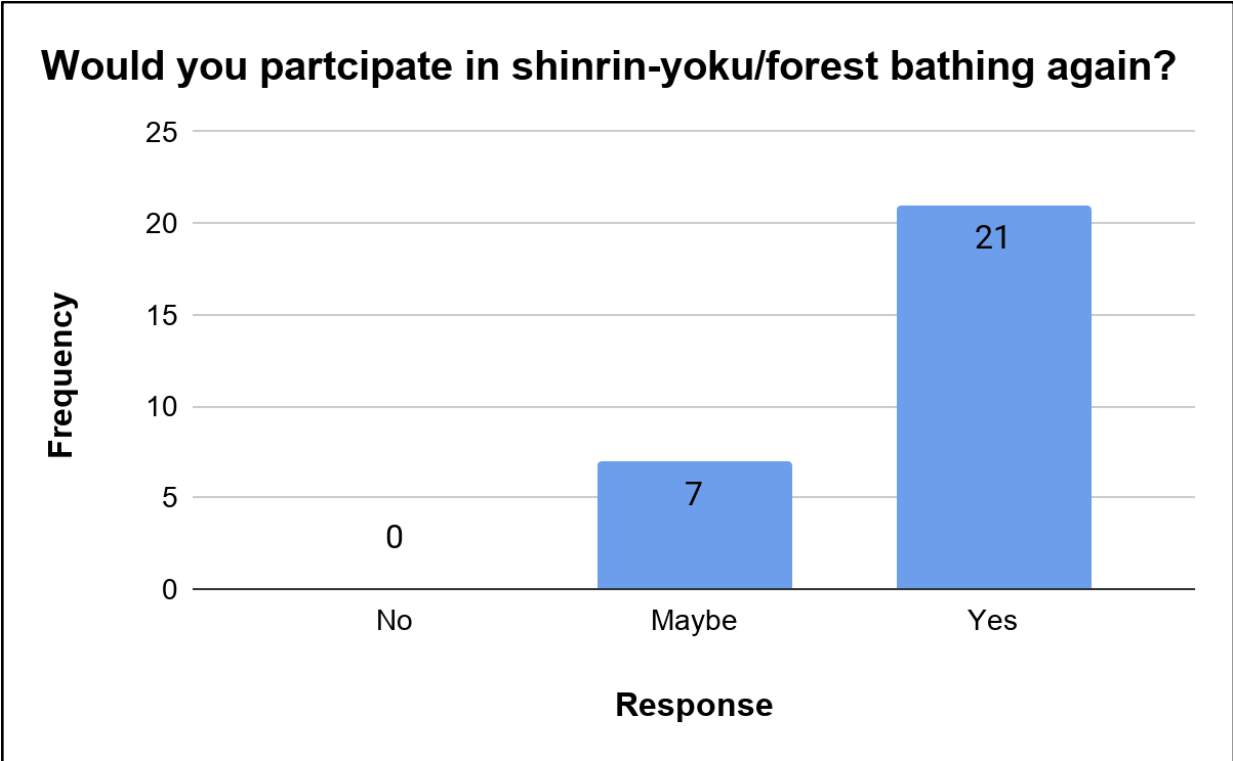


Figure A43: Participate Again Bar Graph

Table 18: Ratings of Overall Experience Data

How was your overall experience?	
One (worst)	0
Two	0
Three	3
Four	8
Five (best)	17
<b>Average</b>	<b>4.5</b>

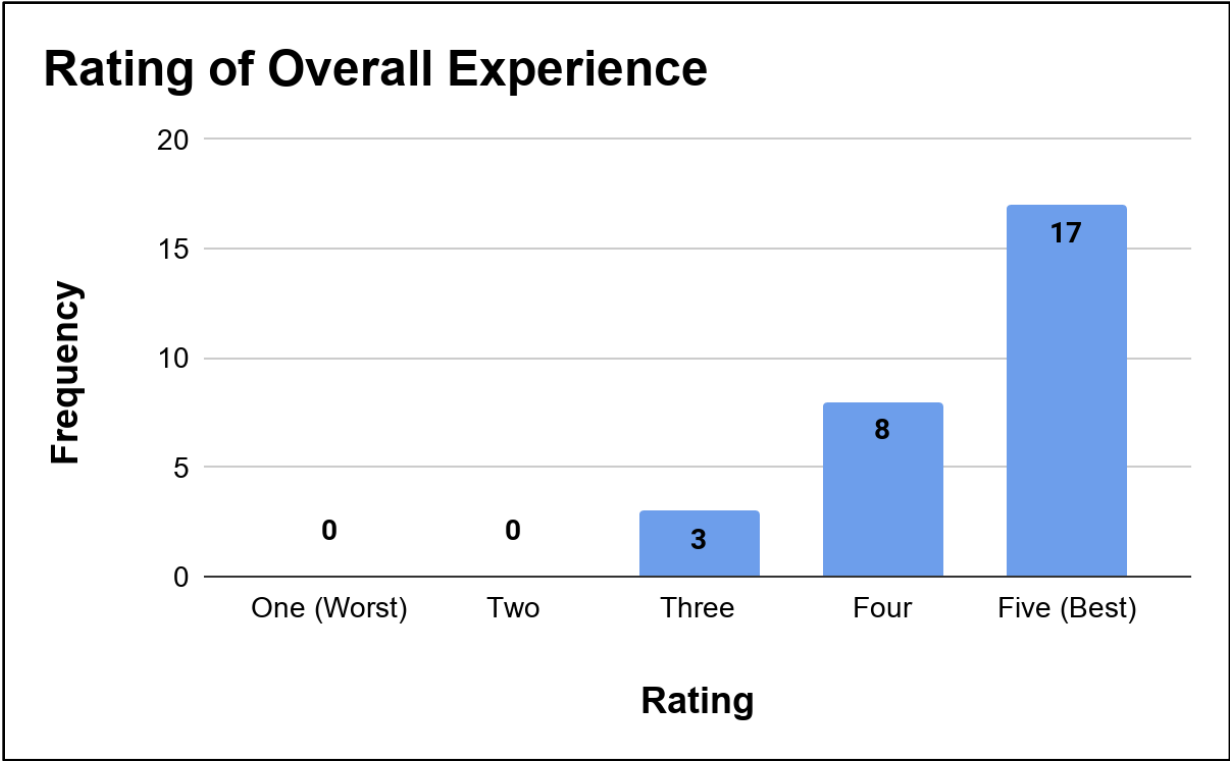


Figure A44: Ratings of Overall Experience Bar Graph

## Appendix P: Funding Informational Sign

### SANTA ELENA CLOUD FOREST RESERVE



**Fundings:** Funding that comes by ticket sales, go toward maintaining Santa Elena Reserve, as well as benefiting the Santa Elena Community High School and collaborating in environmental and cultural projects within the community. Our Reserve Belongs to the Santa Elena Public High School.





## Appendix Q: Interview Consent Form

### Santa Elena Reserve Project

#### **Consent Form**

Please Check off Each Box if Applicable

- I ..... consent to be interviewed for this project.
- I understand that anytime during the interview I can choose to stop it for any reason and there will be no consequences of any kind or questions asked.
- I understand that I have the ability to withdraw my interview within one week after the interview; if done the material will be deleted.
- I have had the purpose and nature of the project explained to me and I have had the opportunity to ask questions about the project.
- I agree to have my interview tape-recorded.
- I understand that all the information I provide during the interview will only be used for this project and will be published on Worcester Polytechnic Institute's website.
- I understand that in the project report my identity will be disclosed.
- If I wish to remain **anonymous**, I have the choice to do so either during the interview or one week after. This will be done by removing my name, disguising details that may share who I am or anyone I speak about.
- I understand that anything I say in the interview could be quoted in the Santa Elena Reserve project proposal and report.
- I understand that my signed consent form and audio recordings (if applicable) will be kept until the project is complete and will be deleted afterward.
- I understand that I have the ability to contact anyone from the project team to ask more questions for clarification and information at any time.

Kylie Arnold, Biomechanical Engineering, Undergraduate at Worcester Polytechnic Institute,  
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Garrett Hughes, Mechanical Engineering, Undergraduate at Worcester Polytechnic Institute,  
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*Signature of Interviewee*

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Signature of Interviewee

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Date

*Signature of Interviewers*

I believe that the interviewee is provided with all the necessary information and it voluntarily participating.

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Signature of Interviewer

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Signature of Interviewer

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Date

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Date

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Signature of Interviewer

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Signature of Interviewer

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Date

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Date

## **Appendix R: Interview Protocol for Forest Bathing Experts**

### **Introduction:**

Hello, thank you for coming. We are students at Worcester Polytechnic Institute hoping to learn more about forest bathing and nature therapy. We will be traveling to the Santa Elena Reserve in Monteverde in January to make recommendations to incorporate a forest bathing experience. The purpose of this interview is to learn more about forest bathing and your experience with it.

### **Consent:**

Do you feel comfortable with us to tape recording this interview? If not, may we take notes and use your responses in our project proposal and project report? The purpose of this so we can get all the details of the interview. Do we have your consent to feature your name and credentials in our project report? This is to show credibility to our findings for this project.

### **How We Learned About Them:**

One of our project advisors provided us with your information to try to establish contact with you to get an expert opinion on the forest bathing aspects of our project. [Subject to change, dependent

### **Questions:**

- Where did you grow up?
- Please tell us about your background.
- How would you describe forest bathing?
  - When did you first learn about it and how?
- What does forest bathing mean to you?
- Please tell us a bit about your job.
  - Could you describe your typical day?
  - What are you working on right now?
  - Do you have other responsibilities other than giving walks, and if so what are they?
  - Do you have a specific project that you are working on? If so, please describe it.
  - Could you describe all the different projects you have worked on?
  - What do you do on a tour?
  - What are the most important parts to emphasize for tourists?
- How does your job benefit others?
  - Why did you decide to be a guide?
  - What drew you to forest bathing?
  - What was the process to become a guide?
- Do you have research done on forest bathing/forest therapy or a similar topic?
  - What was the goal?
  - Where did you work on it?
  - When was it done?
  - What did you find out/ What conclusions were drawn from the study?
  - What was your role?
  - What made you want to research forest bathing?
  - Would you be able to tell us where we can read the report developed from your research?
- Do you have any suggestions for forest therapy in the following areas:
  - Trail conditions (how to make them good, accounting for weather and erosion)
  - Self-guided tours

- Marking trails
- The brochure - what should we include?
- Survey- what should we ask?
- Accessibility
- Do you have any ideas on how forest bathing can be improved? Please explain.
- Do you have any questions for us?

**Conclusion:**

Thank you so much for your time. Do we still have your consent to use your answers and your name in our project report? (If a tape recording was taken) Do we have your consent to keep the tape recording until our project is completed? It will not be posted on any public forums and will only be used for the purposes of this project.

## **Appendix S: Interview Questions for SER Employees**

### **Administration (sponsor or on-site liaison)**

1. How long have you worked here?
2. Where are you from?
3. Why did you choose to work here?
4. What are your responsibilities?
5. What are some challenges you face in this position?
6. What is your busiest season at the SER and why?
7. How do you promote the SER?
8. How do you work with other reserves, hotels, airports, etc?
9. Do you have any advertising brochures? May we see them?
10. Do you do any promotional events? What are they?
11. How do you interact with schools in the area?
12. Do you have programs with the kids for nature awareness? If so, what are these programs?
13. Do you have any special tours for them? If so, please explain what they are.
14. What are some of your favorite parts of your job?
15. What are you hoping to improve here in the future?

## Appendix T: Nadine Mazzola Interview Transcript

Date: Friday, November 15, 2019

Type of Interview: Telephone Call

Interviewee: Nadine Mazzola

Conducted by: Sylvia Thomas

Witness and Note Taker: Kylie Arnold

Mazzola's responses are recorded in **bold**, questions and comments from Sylvia and Kylie are recorded in *italics*. Highlighted sections are used/referenced in the main report.

*Sylvia: Hi, Nadine this is Sylvia and I'm calling about the forest bathing project for Santa Elena Reserve in Monteverde.*

**Mazzola: OK**

*S: Do you have time for an interview?*

**M: I do, yes.**

*S: Awesome I'm here and I also have one of my partners here, her name's Kylie.*

*Kylie: Hello.*

**M: Hi, Kylie.**

*S: So thank you so much for participating. Again we're students at Worcester Polytechnic Institute and we're hoping to learn a little bit more about forest bathing and nature therapy. We will be traveling to Santa Elena Reserve in Monteverde in January to make recommendations to incorporate forest bathing experiences there. The purpose of this interview is just to learn a little bit more about forest bathing and your experience with it. We have sent over a consent form over email, sent yesterday, for you to look over and fill out and return at your earliest convenience. Also, do you feel comfortable with us recording this interview?*

**M: Yes.**

*S: Thank you. To start, we have some general background questions. Where did you grow up?*

**M: Massachusetts.**

*S: Can you tell us a little bit about your background?*

**M: Where to start? Before forest bathing I was working in business and marketing in a small company. And before that I was a professional pocket billiards player. I've always been a rather entrepreneurial person and I enjoy working with small companies or doing my own business. Before that I was in college and although it was not my major I became really interested in marketing. In terms of nature, I wasn't studying it in school or into ecology or anything, but I've always enjoyed gardening and spending time in the woods. It has been a part of my family practice. We always had outings and time outdoors.**

*S: Interesting, so what exactly drew you to forest bathing? Was it just your family experiences?*

**M: No, it was a very specific set of events. I was receiving treatment for breast cancer in 2014. In early 2015, I literally overheard a conversation of someone saying "Forest bathing. You like walking in the woods with your dog, don't you? You should check it out." So, I went home and googled an article about it and that just lead me from one article to the next and I think right at the point where I was in post-treatment, I was just about to not be seeing my doctors every three weeks and starting to move into less frequent visits, which is a wonderful point in post-treatment, but it is also really scary. During treatment, you are very focused on white blood cells and keeping you white blood cell counts up and when I happened on some of the research and some of the articles about how the phytoncides boost white blood cell counts was just astonishing to me.**

There is nothing else that I have ever come across, even through asking my doctors, that could actually boost white blood cells. It's not like red blood cells where you can take some iron. So within 2 or 3 weeks of hearing that conversation and started to Google and read, I found the Association of Nature Therapy Guides and Programs. They were having a training in a couple of months in North Carolina and after going to their website I think I just knew this was something I needed to do. Both for myself and this idea of being a certified forest therapy guide, I was also probably at a point in my life where I was looking for something new to do or new asset to have, being the entrepreneurial spirit I am, and that very much appealed to me.

*S: Wow, so that was very much a spontaneous, kind of, series of events. What do you think caused that, exactly to jump from never seeing it before, to thinking, "Wow, I really feel like this is my passion now"?*

**M:** I think it is actually something I see now working for ANFT and becoming a trainer for them some years later, I hear the story over and over again, where people just know this is something that they need to do. What I attribute to that, is that there is a deep knowing within us. Something feels very right about being in that relationship with nature, and that we don't have that in our modern society. When we start to stumble upon things that start to awake that in us, it is just like, "Yes, yes, yes! This feels right, this feels intensely right." And we are drawn to it like a moth to a flame or a bee to honey.

*S: So, could you tell us a little bit about your job?*

**M:** Sure, well I got certified in the end of 2015 and started my own practice as a certified forest therapy guide here in Acton, Massachusetts and set about doing that. Probably about a year later, not exactly sure about the timing, I decided it was time to leave my other job. Without having a total plan, just made that decision and trusted that it would out, with the support of my husband. He was very encouraging. So I did that and shortly thereafter, some work became available in the association of nature and forest therapy in assisting the director of certification. I started doing that work and within 8 months, I became the director of certification. I was responsible for running the entire practicum program for the ANFT. Then after doing that for a couple years, this past April, I stepped into an executive leadership role, there are three of us in executive leadership roles as a joint effort. I was also still running the practicum arm of the ANFT.

*S: In the executive position you have now, are you still able to do guided walks?*

**M:** Yes, I still have my own guide practice it is a very important part for me personally and part of our ethics as a company that everybody should be actively guiding and still doing all the different parts. I have my guiding practice in Acton and surrounding area. I guide probably 25 walks a year in this area. I also am still doing some mentoring and actively attending trainings as a trainer.

*S: Could you describe your typical day?*

**M:** Oh, probably too much email (laughs). I'm lucky enough to have a dog in my life, so this inspired me to write a book about forest bathing, which was just published in September, called "Forest Bathing with Your Dog". It is about forest bathing practice will your dog or incorporating your dog into forest bathing practice. I'm often spending time out in the woods with my dog every day or a couple times a day. Other than that, calls, meetings, emails, projects, just typical work.

*S: Are you working on any projects right now?*

**M:** Yeah, there is always work with the organization and keeping that running, so that is always a big project. We've got a variety of different research projects and collaborations that people are always calling us about, and so the ones that are really a good fit for us, we will collaborate with in some way or help support them. Most of the time it is really just listening or doing an interview or having some presence. We just finished a collaboration with the US Forest Service and a non profit called Corazón Latino, both of which are based in Washington, D.C., with the ANFT. We did a training down in Puerto Rico, which was a grant funded training for Spanish speaking people and bringing forest therapy to them to certify a fair amount of guides in Puerto Rico to support some of the healing and reestablishing nature connection down there for the population that has been so devastated by Hurricane Maria and other challenges. So that's been really exciting in terms of diversity, which is something we are trying to look into and get more involved in. We just revamped ourselves and our policy to offer 12 free scholarships each year to help specifically with underserved individuals who want to bring forest therapy back to their communities. Other than that, I think we are really just growing ourselves as an organization, having good balance. One of the things we really pride ourselves on is taking good care of our employees and taking care to build an organization that supports them with good benefits and the like so they can thrive in those good working conditions.

*S: So what do you do when on a guided walk?*

**M:** So it depends on what kind of event it is. A typical walk that we train people on how to do is a 3 hour or half day session. One of the things that ANFT that is unique to us is that we train people in a standard sequence that has a great amount of flexibility and creativity woven into it, while nonetheless being a standard sequence that is highly effective and replicable. On walks, really, we are taking people and holding walks in different places and taking them through a series of invitations. We use the word "invitations" specifically instead of activity or exercise. The things we are offering are invitations and if people want to adapt it in any way, that's really welcome. Basically, however you do the invitation as a participant is exactly the right way. So we want people to feel that freedom, so that's why we call it an invitation. Another thing that is unique is that between invitations we come back and share a few words. This is very light-touch. However people want to share is welcome. Silence can be a welcome form of sharing, if somebody doesn't want to say anything. It could be with words, poetry, or songs. Words are the most common, but we make it clear to people that however they like to share is welcome. That really helps build the entire process, talking about at the beginning why people are drawn to this process and talking about sensing this kind of awakening as individuals with that land that is just so powerful to people in many different ways. For some people it is highly spiritual, for others it is just a safe place or feels really relaxing. There is no one right way to go through or describe the experience. Doing the walk in the format that we do as guides or the ANFT really enables people to deepen into their own experiences and I think, one, it is interesting to hear how different participants share and I think it also builds everyone's connectedness, both with nature and with each other and also with themselves.

*S: I'm not sure how many people are considered tourists for your forest bathing walks, but we're mainly going to be working with tourists coming into the Reserve and going through the forest bathing process. What do you think would be the most important part to emphasize for them?*

**M:** How long are you going to have with them?

*S: We're not sure. We haven't developed the full program yet. We need to contact our sponsor a bit more to find out what they want exactly.*



**M: And this is Monteverde in Costa Rica?**

*S: Yes, Monteverde, Costa Rica.*

**M: So, what is most important to focus on. So the time is most important for what you can do. I guess the main thing other than that regarding forest bathing, or forest therapy as we call it in the Association, forest therapy really focuses on and prioritizes sensory connections versus intellectual connections. So we are all on the phone here, but if you guys just close your eyes and relax for a moment, and think about being in Monteverde or any place that feels beautiful, and we are walking down a trail, and we are looking at different flowers, and I'm saying "Oh, this is this. It blooms here, it has this color, these different species are similar to it" and chatting away, and "Oh, over here, look at this. See this bird? This is the kind of bird" versus if you just again, slow down and relax and we are going down the trail and engaging with these flowers. I may say, "What are you noticing about these flowers, what do they smell like? What do they feel like? What are the sounds that you're hearing?" Just letting go of naming things. And just letting that have a chance to soak in. That is what is powerful for people. It can be interesting to know the names of things, but also, noticing that as soon as I say "This is a hibiscus flower", there's a tendency to just dismiss that and move on, rather than this lingering relationship with this interesting flower with an amazing scent or that is so incredibly soft, and just letting that live inside us.**

*S: That's really interesting to hear because the Reserve mainly does tours of identifying plants and animals, and I think that is one of the reasons why they are leaning towards nature therapy.*

**M: Yeah, it's incredibly powerful. There are places at the end of our walks where there is time for chatting about birds, and flowers, and naming something, but always starting from a place of sensory connection is hugely powerful.**

*S: Your job as a guide is to immerse people into nature. How else does your job benefit others?*

**M: I think they come on a walk and will take whatever has impacted them during the walk with them. Sometimes people are just very relaxed and enjoy the experience, so they are taking that with them and their renewed sense of deep relaxation. Or, sometimes people have incredibly profound experience that they take with them. It's not the guide that brings any of that, it's the forest, it's the land. One of our [ANFT] mottos is, "the forest is the therapist, the guide opens the doors". We are really guiding a walk, holding a container for people, but it is their experience in the forest and slowing down that takes them to a spot that can be anything from deeply relaxing to deeply powerful and deeply healing.**

*S: What is the process to become a certified guide?*

**M: There is a 7 or 8 day training, with locations all over the world, followed by a 6 month practicum. And then people have to also become certified in wilderness first aid.**

*S: What does the practicum entail?*

**M: It is a combination of practicing guiding, holding walks, and there is also some personal nature connection that people do to enhance their personal nature connection because it is really important to guide from a place of authenticity. So, helping people to continue their development in that and also trying to bring in what we call a business track, which is helping people think about how they might want to bring their forest therapy practice into their community, or starting a business, or incorporating it into something they already do, like if they are a teacher.**

*S: Interesting, so how was the practicum helpful for you?*

**M:** What you learn in theory in training becomes real. You do it, you gain confidence in it. For the guiding track, you gain confidence in it and the business track you gain clarity about what you want to do, and for the nature connection track, I use that word authenticity, it is the joy of increasing your own nature connection and building your own relationship that informs your guiding practice and makes it much more authentic, which is hugely important in doing this kind of work.

*S: Are there any improvements that have been implicated recently or that you believe should be implicated, in the training process?*

**M:** We are always refining and tweaking things and getting better at how we teach things. We are always in inquiry about that and I can't point to anything specifically. I know that one thing we do is really partly a self-guided learning process during the practicum, so people are really invited to bring themselves and their own learning styles and creativity into the practicum. Some of the innovation you are asking about comes right from the participants themselves as they are creating things in a way that works for them.

*S: Is there a renewal time for certification?*

**M:** Right now, we have an annual fee, or membership chip. We have a couple different levels depending on what people are interested in. One, to just be listed on our map, and we also have a member gateway that has a lot of different stuff on it. Depending on what people want access to, they can renew at the highly level, or they can just maintain membership if they aren't interested in all the bells and whistles, they can have a lesser renewal fee.

*S: What does the Member Gateway entail?*

**M:** It is a member portal that has all kinds of features: recorded calls, professional development calls, and the three tracts: business, nature connection and guiding. There's different pro deals and information to connect guides together. There's pictures and guides sharing resources. There's different business support tools, a lot of stuff like that.

*S: Is there different training criteria for different locations? For example, you want to Puerto Rico, would it be different if they trained in Massachusetts?*

**M:** You mean, like in the practicum and stuff?

*S: Yeah, the 7-8 training and then the practicum.*

**M:** No, it is exactly the same, for the most part, between locations.

*S: Could you tell us more about your book, Forest Bathing with your Dog?*

**M:** Sure! So on the back of the book, I call it partly a practical guide on forest bathing with your dog and also a bit of a love story about reconnecting with one's relationship with nature and also the love we share with our dogs. I don't know if either of you have a dog, but this can be a very powerful relationship. Dogs have the most amazing ability to sense and predict or read our human body language and they are also in, like we were talking about, focused in sensory mode. They are almost always in their sensory mode, so as a partner in forest bathing or forest therapy, they are really amazing and bring a lot to it. There are several parts, and it is partly written in my voice and the voice of my dog, which brings some fun to it and tells our stories. Then there is a section on "What is forest bathing?" Then there is a section on getting down to practical tips on how to make forest bathing work with your dog, because your dog may be pulling on the leash all the time, or running around or just different things to help make people successful. Then there is a section where I share bits from other people with dogs that go forest bathing,

so it is kind of sharing circle of just people doing different things with their dogs which will give some insight to people and it's just fun to read. There is a quick field guide of what to do with your dog in a forest bathing session from start to finish. There are a few other reflections and resources and stuff.

*S: What was your inspiration to write this?*

**M: I took the training [in North Carolina] and came home and immediately realized what an amazing forest bathing partner my dog was. I think since 2015, I thought I have to write a book. And it finally came together this year. It started and stopped, and changed into something a little different. About a year and a half ago, I got really serious about it and a year ago I hired a coach and editor to help bring it to the final stages. This was really incredible and I really needed that support and someone to help me structure things well and let me know I was on the right track, which was really great.**

*S: So, I assume you haven't been to the Santa Elena Reserve, which is where we will be working at, but what are some things that you think are essential for forest bathing?*

**M: Well, before I forget I want to say that there are a couple guides in Costa Rica. I think there is maybe even somebody who lives in Monteverde named Marcela.**

*S: Yes, we have reached out to her.*

**M: Great. Also there is another guide, Manuela.**

*S: Yeah, we have also reached out to her.*

**M: Okay, great. So I think what's really challenging in Costa Rica, is that, ideally, if I'm here in Acton, what I really want is to have some trails that are wider, that I could walk side by side with you, or walk past you and have some places where people can wander off the trail a bit. Sometimes that can be more challenging in a jungle type forest. Also, there is sometimes a clearing, which can be really useful so people can gather together together in the clearing, but also radiate outward if they want, and go around the perimeter or wander down a trail a little bit then come back to the clearing, so that's really helpful. You can do it anywhere, but it is harder or more difficult, rather, if you are on a narrow trail. We stop and gather between invitations so having places along the trail wide enough for this or having clearings to do this, depending on how many people are with you, is important.**

*S: Our sponsor is looking at having the experience be mostly self-guided. Do you think not having a guide is something that is practical?*

**M: Yes, I think that is fine, but it is a different experience. For example, it is difficult to go to a yoga class than doing yoga at home. It is different being in a room with people and being lead. You can really relax when someone is leading you through the savasana stage at the end and everyone is just chilling and you're instructor is keeping track of the time for you, so you can really let yourself go. Undoubtedly, having guided walks is an amazing experience that brings different levels to it. That being said, you can absolutely do forest bathing by yourself. I think the field guide in the back of my book speaks to this a little bit. We also, through the Association of Nature and Forest Therapy, have a certified trails program, where people are trained as certified trail consultants and Manuela is a certified trail consultant. They not only partner with places to certify the trails, because we have an application process through the ANFT, but they can also help create that self-guided segment, whether it is a brochure or things on signs, or whatever, but they are trained in that, so self-guided walks can happen but it is a different experience.**

*S: Have you done any research yourself on forest bathing or a similar topic?*

**M:** I have not myself, but that's one of the biggest things that the association is involved with, is people wanting to do research projects. There's the project that the US Forest Service is doing based on what makes a good forest therapy trail. We are about to consult on a project that is going to study the psycho-social aspects of forest therapy. There are many research projects going on around the US and the world focusing on the more medical aspects of forest therapy. We don't have an active study going now, but we'd like to have some kind of study on how forest bathing would affect a corporate setting and the well-being of people in corporate culture. We don't find these studies, but we certainly consultant and network and help connect people. We support things in whatever way we can.

*S: Again, we are working on incorporating nature therapy in, as you described it, a jungle. What, other than the width of the trail, would you think would be helpful for our project?*

**M:** I think, one, that there's places where people can wander off the trail. So even if it were jungle-like, and I've never been to Costa Rica, but I've heard through trainings that it can be difficult because most of the trails are narrow, so maybe in places have the trails widened out a bit. Not necessarily stripped of everything, but maybe have some space around a tree, or a rock or someplace, where there are these moments where people can stop and wander and interact with things. The trail may be on a boardwalk, so that may also be a very different thing that we may have here in New England, where we can walk and there's open space underneath the trees where we can wander. So I think, just spots along the way where people can pause and sit, so maybe benches or rocks would be helpful.

*S: Off of self-guided walks, what are some things that you would suggest to incorporate to make that a more feasible plan?*

**M:** Keep it relatively simple. Have clearly identified places where people can stop along the way and having time for people to sit and distinguishing between sensory interactions and intellectual, and making that distinction that this is different.

*S: You mentioned a brochure earlier, do you think this would be helpful for a self-guided walk?*

**M:** I don't know. I know some trails we have certified have self-guided brochures, others have signs. I think it is up to the individual place. You think of how a naturalist goes through different things. Sometimes there's signs along the way, sometimes there's a map with stuff on it. So I think it could be anything. There is a lot of stuff to consider, so I really hope you are able to connect with Manuela and Marcela, who may want to be involved in the project, so I think it would be great if you could bring them in as a consultant. So I don't want to share their whole training with you and say "Yeah, this is what you guys need to do" because they've paid and gone to school and learned this expertise, so there is a lot behind it.

*S: Of course. We really hope to get in contact with them soon. Our sponsor also wants to work on accessibility on trails. What do you usually do for accessibility regarding the elderly, children, people who may be physically disabled, and other such situations?*

**M:** You guys are in Worcester, right?

*S:* Yes.

**M:** Okay, so thinking of a lot of parks or conservation land around here, where you might arrive and there's a parking lot and then an open space with trails branching off from that, but in the open space there may be benches. So someone who has kids, or maybe the elderly, who can't go far, this trail head is a good place to wander and interact with

the forest or the jungle on the perimeter of the open space, which is good. I think a really good trail is wide and level, so people can walk easily. The Acton Arboretum has a lovely, level, stone path around part of the Arboretum and also board walks through some of it and other paved paths for accessibility along with off trails that are much more rugged. A variety like this is good. I know Walden Pond has a really cool, and surely expensive wheelchair, that people can use as a kind of off road wheelchair for people who want to see Thoreau's cabin. So I think an option is to make trails more level and wider normal is good. I think if there are nooks and crannies along the trail, places for people to stop and interact with things, making sure these places are accessible and wide enough for a wheelchair, so you don't have places where you say "oh, sorry you have a wheelchair, you can't go through here", because that is sucky. I do have to say I have to go in a couple minutes.

*S: We're just about to wrap up, I was just about to ask if you have any questions for us.*

**M: Well, what level project is this for? What are you guys doing this in relation to?**

**So we are working on our junior year project, so we are both undergrads. Our school does a program where most students go abroad for one term to help someone else. Most projects are social science projects where you get to help the community in some way. And how are you connected with Monteverde? How did that connection come about?**

*S: So, our school picks different sponsors in different locations that are willing to have students help work on the projects with them. Monteverde is one of the project sites. I believe our school operates in 6 continents, all but Antarctica, where we have project centers where students go to help people in those communities.*

**M: That's amazing, that's great. And what are your degrees or programs that you guys are enrolled in?**

*S: I'm getting my degree in chemical engineering.*

*Kylie: And I'm getting mine in biomedical engineering.*

**M: Okay, great. So this is a wildly nature connected project, so how does that come up?**

*S: The projects are normally different from students majors, to kind of get them out of their comfort zones and they are also to incorporate project work, because we follow a project- based curriculum. So basically, they reach out to see what organizations want our help and sponsors will respond back with what problems they want help with and different projects will arise from this and students choose from there.*

**M: Interesting, well good luck you guys. I will send that consent form along and feel free to be back in touch with any questions.**

*S: Awesome, thank you so much.*

## **Appendix U: Walter Bello Villalobos Interview Transcript**

Date:, December , 2019

Type of Interview: Skype Video Call

Interviewee: Walter Bello Villalobos, Santa Elena Reserve Environmental Education Coordinator

Conducted by: Sylvia Thomas, Kylie Arnold, and Garrett Hughes

The transcript has been edited to include only key points of information for the project report and has been edited for grammar.

### **What are your responsibilities within the reserve?**

Well, I have been working in the park for about 9 years already and now my responsibilities are working with the environmental education program and we have a citizen science project called Amigos Del Ambiente. We are trying to engage the students from the area, from 12-17 years old in the reserve and to create smaller projects like our trap cameras project and wildlife projects, and bird watching and things like these. I am also a guide for the park, so if the park is full I work as a guide. Today, there was a reforestation program where we planted some trees. We have replanted about 5,000 trees per year.

### **We really want to fully understand our project and what your priorities are, especially regarding forest bathing.**

I was talking with the current manager of the park, Yaxine, about this idea and how to make it. It is quite a new concept for me, but it is a new way that people come to Monteverde. Not only are they bird watching or there for the trails, they want to come and have a different experience. They want to go and really engage with the forest and gain a feeling of cleansing themselves and it is more like a reflection for themselves, as I understand it. I feel like it has been growing recently so we as part of the community and as a reserve are trying to join this movement so that the people who come looking for that can find a place for it in the reserve so they can feel better and benefit from the experience. I tried to have Yaxine join in the interview because she has a better idea of it and could probably explain it better, but she doesn't have the time today.

### **So what is our main goal with this? Are we going to be implementing forest bathing within the reserve?**

I understand that the priority will be to look and create a diagnosis of the trails in the entire park and also see which are the best places to implement this kind of therapy. SO trying to look for those places that would be best for it. From Yaxine, she also wants to look for some places in the park where we could get some recommendations and feedback on whether the trails are fine or what could be improved in those areas.

### **And for improvements, is it conditions wise or is it more towards accessibility, because both were in the project description.**

It will be a little bit of both, we are trying to promote accessibility in the whole park so we have a small trail which is about 500 meters, so it is a small trail that is completely concrete for people who need to use a wheelchair or have walking difficulties, they can still access the park. But the rest of the trails, some are being maintained using rocks and we're trying to make them a little easier to walk. We still want some of these trails to be made accessible to the people. For example, how do we get rid of the steps and maybe also there will be space for openings along the trails where we could have maybe viewpoints or places where people can rest.

### **Is there anywhere along the trails for resting points? Like a bench or rocks that people could rest at.**

There are only two places where they can rest in the whole park. There is one bench in the encantado trail and one in the Caño Negro trail. We have an observation tower with a bench at the top, but that's it. Have you guys already been in the cloud forest or in a rainforest?

**No**

Okay this place is very humid, it is raining a lot of the time and we have a lot of precipitation, which is great, but it makes it difficult to find ways to make these things for people to rest, so if we wanted a bench we would also need to build a whole structure for it. The rain is nice but it has its drawbacks.

**There was also a section of the project description about a demographic survey that we will be implementing as well. We were wondering what the survey is going to be used for so we know how to tailor it towards what you want and also if there is anything specific you want in it.**

We have many different questions with this. For me one of the first things we want to know is, how are the people perceiving the reserve? First of all, how are they getting up to the reserve? Like, are there people from town, if they have seen the reserve on google or etc, or if it was a recommendation, how were they managing or able to get to the park. The other thing is, once they are in the forest, how do they perceive it? One of the questions I like to ask the tourists is, how do they think the park is? These lands for the reserve, they used to be grasslands for cows, it used to be a farm and everyone in the town, they don't call it Santa Elena Reserve, they call it the Farm of the High School. So this is one of the things we want to know. How are people perceiving the forest, because it has completely changed. Also compared to the Monteverde Reserve, what are the similarities or differences between both forests. We want to know if the services we are providing in the reserve are good for them, maybe we need to improve some things. We also want to know, if for some reason they hear about one of the relationships we have in town and with people of the community. We want to know if they are aware of this social part and involvement we have. We want to know if our projects are known in the town and our connection between our projects and the community. Do you guys know our connection to the community?

**We don't know a lot, we know some, but if you could elaborate that would be great.**

Maybe when you guys are here we can discuss it a little bit more. We were created a few years ago. The lands were gotten by the high school to be able to give land to the students. So once they graduate from high school, they can begin to farm on those lands. The project did not work, so people decided to create an environmental project in the form of the reserve. We don't own the lands, they belong to the government, specifically the National System of Conservation Areas, the same system that owns all of the National Parks in Costa Rica. We have a special agreement with Santa Elena Professional Technical High School who is the one in charge and who manages it. All of the money produced by the eco-culturism goes back to the high school. All the people that work for the park actually work for the high school. All of the money goes back to the high school. And it's the administration board of the high school who decides when to invest in the reserve, the community, or the high school. All of the people in the community have worked at the reserve at one point, possibly as volunteers. Some people like it, others don't like it.

**For working with the high school, do you guys also work with lower grades of younger children as well?**

Mostly with the high school, but we also visit 6 or 7 different primary schools as well and then if the private schools asks us for workshops, for example on recycling or trees or anything like that, we go work with them. Also we are part of the local government, so the local government

can ask us to go under a special commission to talk about the water system of the community, about the environmental education of the community or anything related to our labor, we go and work there. We have an interesting network of people here. Every time we try to do something, there are like the three reserves of the area, the government, the water system company, we are trying to do things all together.

**With that, do you all use each other for promotion? How are you promoting the reserve?**

Okay, well, we are pretty bad at promoting the reserve. We don't have a marketing department at this moment. We promote through our website, through our instagram page, where I manage both. When there are times when there are a lot of companies and agencies in one place, like a conference, we go to represent the reserve and publicize that way. We need to work on promoting the reserve. Still, we are receiving about 43,000 visitors per year.

**When is the busy season for the reserve?**

The high season for us will be February to April. May it goes down. June and July it goes up again, and it's a little bit crazy. At this point, we are starting the beginning of the high season, it's warming up, but still not super busy. December will get a little more visitors because of festive days and vacations, but still not high season.

**When people visit, do you give them brochures or any educational materials?**

Usually, we give them a map. It has a little bit of info along with the trail map, but it isn't a lot. This is the only thing that we give to them. It has key points of interest on the map. Other than this, they can ask us for more information. We are trying to work on a self-guided walk with numbers and stuff. There have been efforts for it, but it has not been completed.

**Is there any place where they could read more about the reserve, like a big sign at the entrance building? Is there anything like that to give more information?**

There is the main reception where we give the map and can provide information. After reception there is a cafe area. In the same building, there is a classroom with a big screen where we can give explanations. But there are few things here, but there is not a lot of information. There are microscopes and a few things, but not a lot. We were thinking of making a general video for the reserve that we could play on the screen in there throughout the day, every 30 minutes to an hour. I was trying to do it, but I haven't had the time. So maybe that will be one thing where we can get a plan going and how to get that going. If you guys can help us with that, that would be great, if not, you don't have the time, that is okay too. He have cameras and recording equipment, so we have the means but haven't had the time.

**You also mentioned the self-guided tours that were also in our project description. Are you guys looking more towards numbering and other trail markings or something else? What was the thought process?**

We have a few things going on with that. One of the issues with the visitors is, for example in the long trail (Caño Negro), sometimes they say it is too long and feel that it is neverending because there are no marking to tell them where they are on the trail or how far they have walked and how much longer they need to walk. It is only 5 km but the muddy conditions, especially if it is raining make it last much longer. So one of the things we wanted to do, would be to mark the trails, "point 1" or "point a" or something like that to keep track of where they are. Another idea is a small book to match the marking system. An example is, at point 1 you are seeing a ficus tree, and so and so. And it would also have directions. There are some interesting points on the trail that can be discovered, but visitors need to be led there by



something. That they can say “Okay we can stop here and see this plant which is interesting because this, this and this”.

**We saw that most of your guided tours are educational, where you give information on the plants and such. What do your tours normally consist of?**

We usually take the visitors for about 2.5 hours and try to educate them on the importance of the cloud forest. We talk about the plants, we have about 3,000 different species of plants that grow in the park so we try to emphasize these things. We try to emphasize avocados, for example. We have about 96 species of avocados in the park. Not all of them can be eaten. They are the principal food of the quetzal, the bell bird, and many others. The interesting thing about avocados is that these birds eat the avocado, put it all the way in their throat, they take the fruit and throw out the seed, completely ready. If the avocado seed was not introduced to the acids that are in the throats of the birds, they would not be able to germinate. So it's an interesting interaction between them. We try to go to places where we can show people the birds and we take them to the observation tower. We try to teach them about how climate change is changing the cloud forest and how the continental divide and different interactions affect the forest. We can also see 4 volcanoes from the observation tower. We try to do a general explanation of everything we have and there's so many plants to talk about.

**Your website also said that if someone asks for a tour with a specific focus that you guys can accommodate that. What are some tour requests that are asked for often?**

The main one is for bird watching. There are many tourists who come to see birds, and they pay ridiculous amounts of money to try to see birds. We have about 400 species of birds in the town. In the park, we have a list of about 198. At the moment we have a lot of migratory birds from North America. People can see them all over the country. When they come to the country, they come to one point and you can see up to 60 species in an hour. So birds are a popular topic. We also have a lot of people come looking for photography tours. But plant, insect and landscape photographers are becoming more frequent, so we try to offer that. Also we have people who study biology who want to go looking for specific plants. One thing we have offered to some specific groups was to have a tour to the trap cameras project, so we take them into the woods, some small groups, no more than 8, we take them off the trail to set up trap cameras for a month, which we leave there and then look at for any results and send them the pictures of what they got. Some people are lucky and get an ocelot or a puma, others just get a raccoon or things like that.