

# A Monteverde Conservation League Master Plan for the *Bajo del Tigre* Reserve



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# Executive Summary

Getting outside and experiencing nature is extremely beneficial, especially for children, as physical activity in nature leads to a stronger immune system and reduced stress levels in children. Our sponsor, the Monteverde Conservation League (MCL), aims to encourage children to enjoy their time in nature while learning about the importance of preserving the natural world. The MCL wishes to make their reserve, *Bajo del Tigre*, a place where children, families, tourists, and locals can learn about, explore, and enjoy nature. Our team identified the areas of expansion of the reserve's current offerings and created a master plan for future development.

Many studies have determined that being in and around nature is beneficial for children. Nature has a marked benefit on cognitive and physical ability (Koynova, et al., 2018). Since nature has such a beneficial impact on children's development, it is important to design spaces that encourage them to get excited about nature. There are many ways to do this, but the most common are natural education centers (Louv, 2011). Such centers provide children with many different forms of activities such as natural play spaces, discovery yards, and teaching gardens.

These spaces offer areas where children can develop their motor skills while also engaging with nature (White, 2004, p.5).

Nature reserves often include different attractions such as interpretive visitors' centers, interpretive trail systems, all access trails, and workshops. Interpretive trail materials provide the visitor with information while they are experiencing nature. They often include easy to comprehend signage and information that makes the reader think about the subject. Interpretive visitors' centers create a similar experience, providing those who cannot access the trails the same information as those who

can (Nez Perce People, 1999). Visitors' centers, with easily comprehensible displays, provide visitors with the tools to understand the environment and get them excited to learn (Allen, 2004). For those who prefer to learn in a classroom setting, workshops provide a more structured way of learning that is beneficial to some (Self-Directed Learning: A Four-Step Process, 2018). Finally, all access trails ensure that people of all physical capabilities have access to nature and the environment. By combining all of these aspects, a reserve ensures that people of all ages, learning styles and physical abilities will have a fun and educational nature experience.

In order to develop a more successful reserve, all aspects must be addressed. This can be done by developing a strategic plan with a phased implementation. This is the case for *Bajo del Tigre*, a nature reserve in Monteverde, Costa Rica that seeks to improve its visitation from children and families. To do this, the management has requested that we design a master plan that encompasses all aspects of the best family friendly nature reserves.

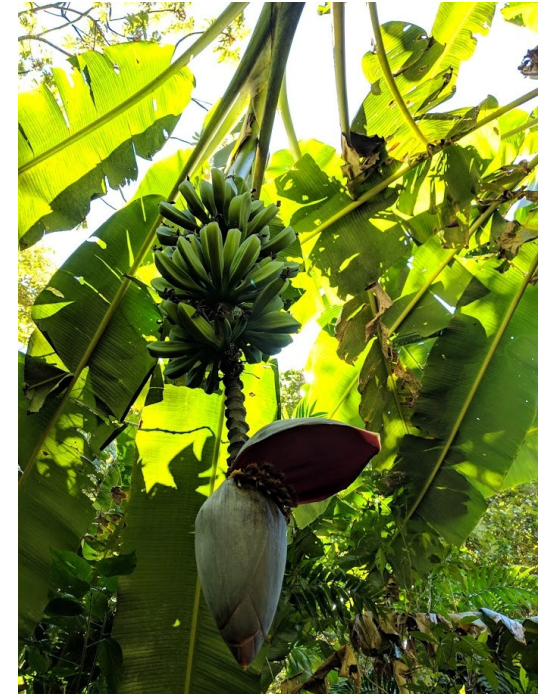
## Objectives

**Objective 1: Observe the current offerings and daily operations of the *Bajo del Tigre* reserve**

**Objective 2: Understand the strengths and weaknesses of other similar family-oriented attractions**

**Objective 3: Gain employee perspectives on the reserve's current state and what they want to improve in the future**

**Objective 4: Develop a multiphase master plan with employees of *Bajo del Tigre***



Upon arrival in Monteverde, our team used observation to gain understanding of the overall situation at the reserve. Through a soft systems analysis, we identified aspects of the reserve that pertained to our project. After analyzing *Bajo del Tigre*, we toured the reserve accompanied by our sponsor and a naturalist guide to identify different landmarks. The team used a drone to take pictures of the landmarks for cataloging and later digitized mockups. From this objective, we learned that the reserve's main goal is the preservation of the natural environment, but they have the space to expand and create more educational materials for children and adults.

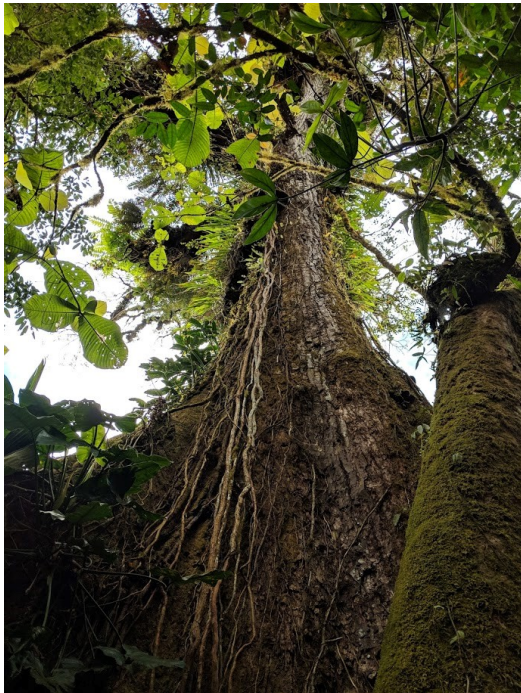
Our team then observed other nature reserves in the area to understand what they may be doing differently from *Bajo del Tigre*. Through the use of a standardized investigation sheet, we noted common features, notable exhibits or activities, and additional features that were not expected. Our team analyzed our investigation sheets in order to identify the best improvements to propose to *Bajo del Tigre*. From this objective the team learned that it is important to have the parking lot adjacent to the visitor's center, the lack of interpretive materials in Monteverde, and the importance of accurate trail maps denoting features in the park.

Next, we interviewed employees, board members, and naturalist guides through semi-structured interviews to gain their perspectives on the current state of the reserve and their vision for its future. The information was coded to highlight common themes that arose during the interviews. The team learned that employees, board members, and naturalist guides were not interested in changing the trails. However, they were excited to make improvements to their marketing and community outreach, educational offerings, and the layout of the reserve.

Lastly, we separated our data into six potential areas for improvement, and conducted a workshop with two employees, and three board members to

gauge their opinions on the priority of the different recommendations. In this workshop the employees ranked each potential area for improvement as well as each specific improvement within an area based on what they believed the reserve could realistically accomplish. We found that while employees were passionate about the long term projects, they understood that the short term improvements were more realistic in order to have an immediate impact. We determined five phases for the park development and digitized the layout using aerial footage and GPS. This was paired with mockups, sketches and a conceptual layout to guide the employees in the implementation of the recommendations for future growth.

Phase 1, to be completed in 3-6 months, is comprised of the simplest and lowest cost improvements that can have an immediate positive impact on visitation to *Bajo del Tigre*. We suggest placing more flowering plants around the visitor's center in order to attract more butterflies and hummingbirds. This ensures that visitors can see wildlife as soon as they arrive, which will help to increase the appeal of the reserve. We recommend cleaning up around the strangler fig on the Children's Trail (*Sendero de los Niños*) as it has the potential to be a fun climbing structure for children. Cleaning up the small pond and greywater system near the visitor's center could create an educational experience for visitors as well as provide a place to view many bird species. The *Bajo del Tigre* reserve is in need of a new trail map including the most current trail routes, trail distances and difficulty levels, as well as icons indicating rest areas and viewpoints. We anticipate that this map will need to be updated upon the completion of each phase. The last improvement for Phase 1 is to invite local schools to *Bajo del Tigre* for field



trips. This will cost the reserve no money and help to promote visitation by the local community.

The recommendations within Phase 2, to be completed in one year, are also relatively low cost but require more time to accomplish. Our first suggestion is to develop new interpretive signage for the Children's Trail. Next, we recommend making the parking lot safer by grading it to ensure that cars do not get stuck and adding security cameras to discourage car break-ins.

Phase 3 recommendations, to be completed in three years, will take longer to complete, because they require more money and *Bajo del Tigre* does not know when they would receive donations. Our first suggestion is to clear out small plants in an open area on the Arboretum Trail to provide a new rest area. This could be a costly improvement, unless the reserve is willing to enlist the help of volunteers. The next recommendation is to begin scheduling monthly workshops and talks. This could appeal to both locals and tourists, and potentially have a significant positive impact on visitation. Our final suggestion is to begin working on an interpretive layout in the current visitor center. The back room of the visitor center is not being used, and has plenty of space for interpretive materials as well as other displays regarding the history of the BEN. The goal of this space within the interpretive

center is to help visitors gain a deeper appreciation for the reserve, and potentially encourage donations to help support its mission.

Phase 4, to be completed in five years, includes a high cost improvement. This phase includes the most recommended improvement, to build a new visitor center adjacent to the parking lot in order to create a more pleasant visitor admission process. The current visitor center is located about 150 meters from the parking lot, which enables visitors to enter the reserve's trails without paying. The other problem with the current location is that visitors are often confused when they arrive

and do not see where to pay so they can begin their hike. The new visitor center would include a ticket desk, bathroom facilities, office space for employees, an adaptive screen showing photos of children who have donated, as well as maps and other informational materials.

The improvements suggested in Phase 5 are also high cost, and cannot be completed until Phase 4 had been completed. Once the new visitor center is built, the front room of the old visitor center could be revamped so that the building could become the new interpretive center. This would include auditory exhibits that could teach families which sounds to listen for in the forest. After this is completed, we suggest that *Bajo del Tigre* next create an all access trail. This would be located in the small portion of forest between the parking lot and the interpretive center, making the reserve more inclusive to people of all physical abilities. Finally, we suggest developing new trailhead signage that includes a map of the trail system. This will help make the reserve easier for families to navigate.

After analyzing *Bajo del Tigre*, observing similar reserves, and speaking with employees, we discovered which types of improvements needed to be included in our master plan for the reserve. We learned that the reserve's top two priorities are wildlife conservation, and creating an interpretive educational experience respectively; these priorities were influential in our decision making process when designing the phases for the master plan. We believe the recommendations we included in the master plan are the best way to help move the *Bajo del Tigre* reserve toward its goals.



# Master Plan

Over the course of the next chapter, we discuss our recommendations for future expansion for the *Bajo del Tigre* reserve. We present a five phased master plan based on employees' priorities of the viable and important features that were discussed in Objectives 1-4. Based on the data collected regarding employees' preference, we analyzed all of the options in order to create the best possible phases to impact the future of the reserve. All time periods labeled on phases represent their estimated completion from the beginning of the master plan implementation. Phase 1 begins with the short term, low cost items. These items become more costly and time consuming as it transitions to Phase 4 where the long term, high cost items happen. Finally Phase 5 is the finishing touches that cannot occur until after Phase 4. Full justifications for each improvement may be seen in the attached appendix.

## Phase 1: 3-6 months after start

The goal of this short-term phase is to make immediate changes to the reserve. Phase 1 improvements include less expensive and easier alterations and improvements to *Bajo del Tigre*. These recommendations are generally small additions, adjustments, or repairs that will have a fast turnaround.



Figure 1: Map of Phase 1 improvement locations

## 1. Add sweet flowers around the Visitor's Center to attract butterflies and hummingbirds

The addition of sweet flowers at the location shown in Figures 1 and 2, will attract butterflies and hummingbirds, guaranteeing that visitors will see wildlife near the visitor's center. These flowers are inexpensive and would only take about a day to plant. Additionally, these flowers will have minimal to no upkeep.



Figure 3: The strangler fig



Figure 2: Location for adding sweet flowers

## 2. Cleanup around the strangler fig and small pond/greywater filtration system

### Strangler Fig

Figure 3 displays a large downed strangler fig on the Niños trail that is a fun spot for kids to play while walking on the trails. Its location is marked by a star in Figure 1. Minimal brush cleanup is needed around the tree. A sign prompting visitors that they may climb on the tree can also be added.

## Small pond and greywater system

The small pond located near the visitor's center is not currently given much attention and is not regularly maintained as shown in Figure 4. The greywater system near the visitor's center has also been broken for a while without repair. However, both of these features, which can be seen as a triangle in Figure 1 have easy, inexpensive fixes. One of the greywater system pipes needs to be fixed in order to restore the system. The pond needs to be cleaned and should be regularly maintained. If possible, the two features should be linked so that the greywater system acts as a water supply for the pond. Figure 5 shows signage explaining the greywater system's function that is already present outside the Visitor's Center. When the overall system is improved, this area will provide a space for visitors to see various species of birds as well as an opportunity to learn about greywater treatment.

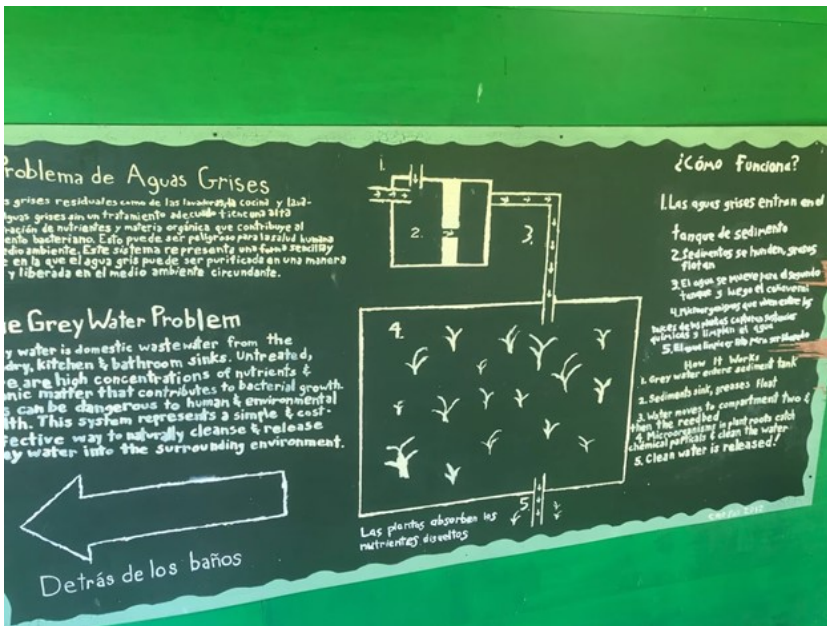


Figure 5: Greywater system informational poster

## 3. Update trail map and print additional copies of Informational booklet

The current trail map is missing some features and needs some general updating. Trail connections and icons indicating the locations of rest areas and viewpoints should be added to the maps. Additionally, more copies of the informational booklet shown in Figure 6 need to be printed to replace damaged copies.



Figure 4: The small pond's current condition

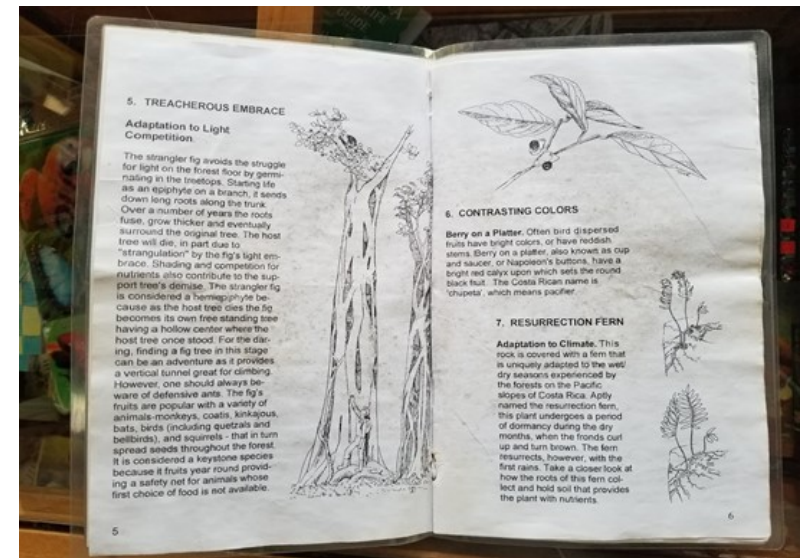


Figure 6: Informational booklet

#### 4. Invite local schools for field trips

Field trips will reinforce the environmental education that local children are receiving in school. This may also encourage local students to bring their families back for future visits. Because local children already experience environmental education programs in school, visits will likely include hands-on activities rather than lectures. A brief history of the BEN may be discussed in the classroom or in the *Casita de los Niños*, shown in Figure 7, then groups may enter the trails to hike. Field trips may be organized as community service trips where older children help staff to do general maintenance of the trails, such as raking.



Figure 7: Children at the *Casita de los Niños* (Masters, 2018)

### Phase 2: 1 year after start

The goal of this phase was to suggest improvements that will improve the visitation to the reserve in the short-term, but require more time and money than those in Phase 1. These recommendations are general improvements that will improve the educational materials and overall visitor experience.

#### 5. Develop new interpretive signage for the *Sendero de los Niños*

For this improvement, we propose new locations and material for the interpretive signage on the Children's Trail (*Sendero de Los Niños*). It is suggested that specific locations are found based on the knowledge of the naturalist guides. These locations should be noted and new signage developed in the style of the old interpretive signage. The signage should then be made using sustainable materials such as recycled plastic in order to maintain the sustainable style of the trails.



## 6. Improve parking lot

As seen from Figure 8, the parking lot has many potholes and areas where cars can be caught. To remedy this, we suggest grading the parking lot, making it more uniform and friendlier to all types of vehicles.

We also recommend putting security cameras in the strategic locations shown in Figure 9. These cameras should be wireless, so that it is not necessary to run video cables back to the visitor's center. These two locations will provide full coverage of the parking lot so that all cars will be protected. This will provide more security for those who use the parking lot and make visitors feel safer leaving their valuables in their cars.



Figure 8: Current parking lot conditions

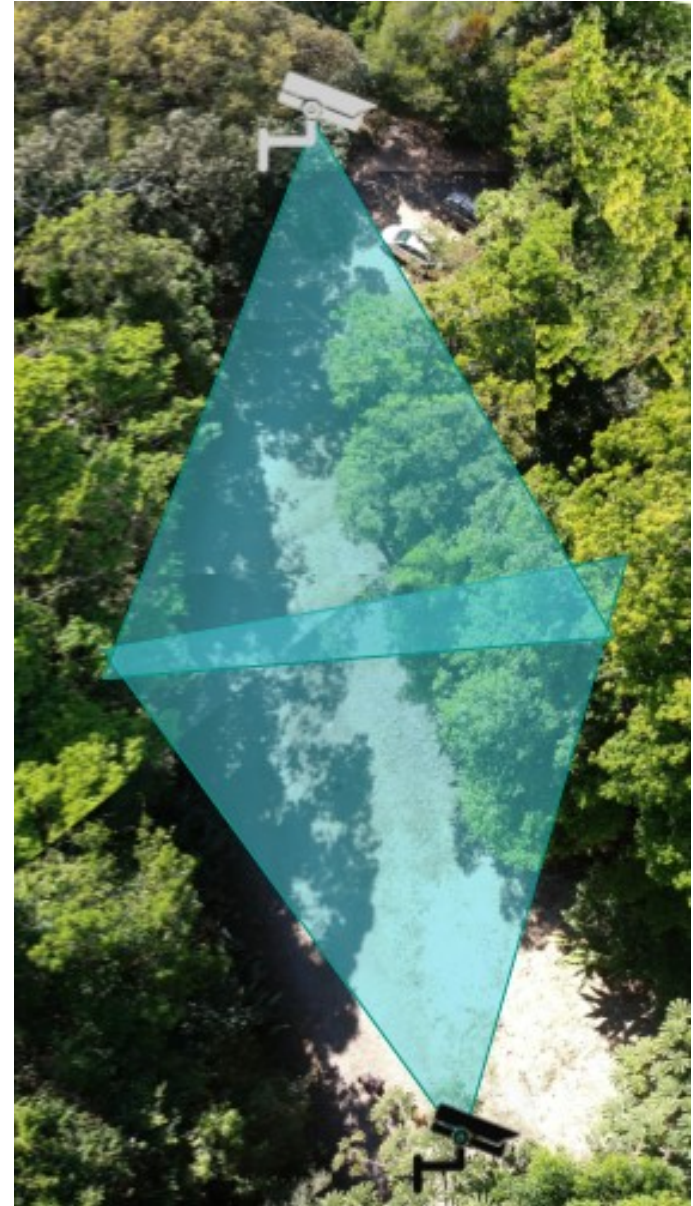


Figure 9: Locations for placing security cameras

## Phase 3: 3 years after start

The goal of this phase is to make large changes to the reserve that will take three years to complete after the start of the plan. Phase 3 includes improvements that range from low to high cost, but are of low to medium time required. These improvements will create a more family-friendly atmosphere that will affect all who visit.

### 7. Clear out the open area on the Arboretum Trail



Figure 10: Open area on *Arboretum* location

On the Arboretum Trail there is an opening that is just slightly off the trail. This opening consists of tall grass and a few banana plants which are not indigenous to the natural environment of Bajo del Tigre. Figure 10 highlights the location of the open area.



Figure 11: Open area on *Arboretum*



Figure 12: Open area on *Arboretum* panorama

## 8. Monthly workshops

These workshops could be informational or interpretive. Informational workshops could be lectures that are given by field experts. Interpretive workshops would involve a hands-on approach of teaching through the use of demonstrations or activities. Several examples of workshops that could be implemented are how to identify plants or animals, how to plant an organic garden, and teaching about recycling through creating art. These workshops could be geared toward children, adults, and families as a way to provide an educational component to the reserve. Workshops for children could be held in the *Casita de los Niños* and this space is shown in Figure 13. Workshops for adults and families could be held in the classroom and this space is shown in Figure 14.



Figure 13: *Casita de los Niños*



Figure 14: The classroom

## 9. Begin interpretive layout in the current visitor's center

The interpretive layout in the current visitor's center will be broken into two separate phases. The first phase will remodel the back room of the existing visitor's center where the table is currently located, as seen in Figure 15. This area will have a full wall exhibit explaining the history of the BEN and *Bajo del Tigre*. This exhibit will allow all visitors to immerse themselves in the history and gain a deeper appreciation for the BEN and *Bajo del Tigre*. Learning the history of the BEN may encourage people to donate to the reserve. Families may feel especially encouraged to donate because their children may have an emotional connection to the history. Figure 16 is a rendering of what this space may look like when it is transformed. The second phase will not occur until the new visitor's center is created and the employees are fully moved out. As such, it will be discussed in Phase 5.



Figure 15: Current back room of the Visitor's Center



Figure 16: Rendering of the interpretive layout

## Phase 4: 5 years after start

This phase encompasses the most highly suggested and largest goal of the *Bajo del Tigre* reserve -- building a new visitor's center. This will happen sometime within a five-year time period from the start date of the master plan because the reserve cannot predict when they will receive a donation large enough to begin the project.

### 10. Build a new visitor's center

Figure 17 is a sitemap showing the new location of the visitor's center, adjacent to the parking lot. It will be a two-story building with a ticket desk, seating area, and bathroom facilities on the first floor, and offices for *Bajo del Tigre* employees on the second floor. The reception area will feature an adaptive screen displaying photos of children who have donated to the reserve in the past, which may inspire children and families to donate during their visit. There will be maps, pamphlets, and other informational materials for visitors to look at while purchasing tickets. The first floor of the visitor's center will also include a large selection of souvenirs, which will increase their visibility and appeal. Additional souvenirs may include new shirt designs, or jewelry/mementos created by local artists. Building this new space will open up the old visitor's center to become the new interpretive center, thereby creating innumerable learning opportunities for all who visit.

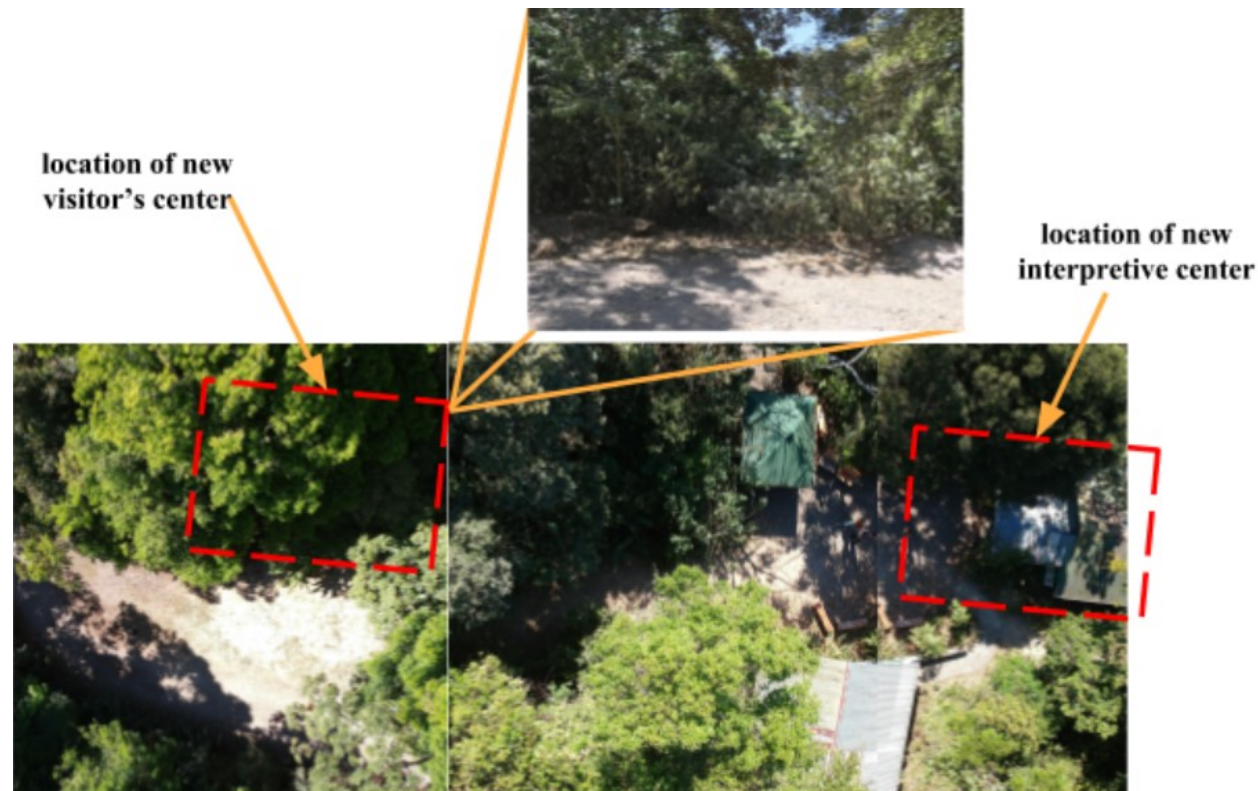


Figure 17: Site map of the new visitor's center

## Phase 5: 5+ years after start

The goal of this phase is to complete the layout of the old visitor's center, now the interpretive center, and make the reserve more accessible. Phase 5 improvements include elements that need to be started after the completion of the new visitor's center as well as finishing touches to the reserve. These recommendations also include developing an all access trail, and creating an updated trail map.

### 11. Complete the interpretive layout in the old visitor's center

The second phase of the interpretive layout will be placed in the existing visitor's center where the tickets and souvenirs are currently sold, as seen in Figures 18 and 19. A more open and cohesive floor plan may be created by knocking down the wall separating the two main rooms of the building. This new space will include audio exhibits and other types of displays. Audio exhibits may include sounds of different animals that are on the trails, so that visitors can identify them while hiking. Displays can include animal tracks or bones that have been found on the trails, which could potentially spark visitors' interest in learning about the different animals that are located in the reserve. Another form of display could include different types of pottery that have been found on the trails, allowing visitors to see the local culture that was at *Bajo del Tigre* prior to its creation as a private reserve. This activity may also inspire visitors to read more about the history of the BEN and *Bajo del Tigre*, as they will be able to see that the land was previously used as farmland. Figure 20 displays the floor plan of the interpretive center, showing where the exhibits and displays can be placed in the front room.



Figure 18: Rendering of the interpretive layout



Figure 19: Rendering of the interpretive layout

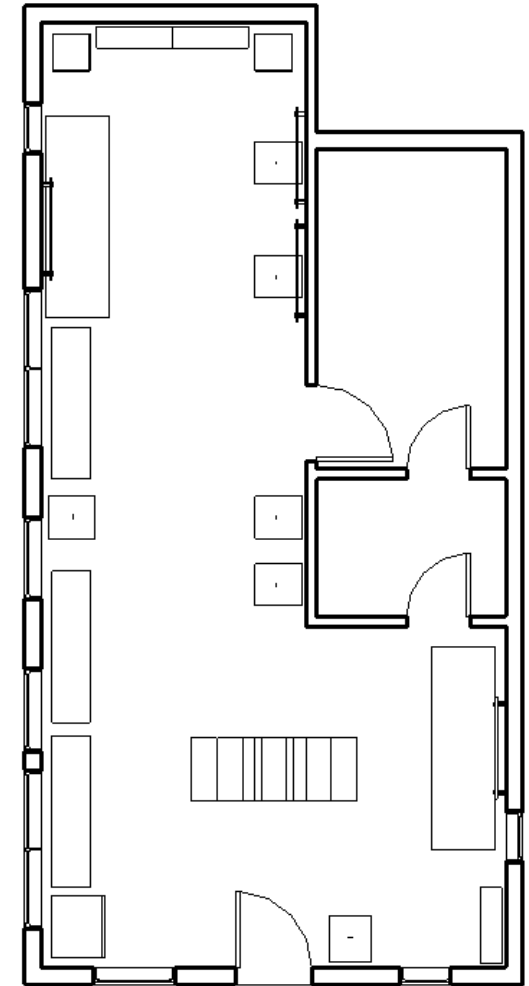


Figure 20: Potential floor plan of the interpretive center

## 12. All access trail

An all access trail will allow people of varying physical abilities to experience the wildlife of the BEN, including families with small children as well as individuals with disabilities. This is an experience that is not currently offered at similar reserves in Monteverde and will likely draw more guests. We propose that the trail should be added in the general area displayed in Figure 21, but the exact trail path should be chosen by identifying the flattest route possible. Additionally, this trail will likely need to be paved to ensure that those with mobility issues or strollers do not have issues maneuvering the trail.



Figure 21: proposed location of the all access trail

### 13. Develop new trail signage

A rendering of the new trail signage that we recommend is displayed in Figure 22, this signage will be constructed out of recycled plastic and will include a map with location markings to display where you are in the trail system. This should eliminate the need for paper signs.

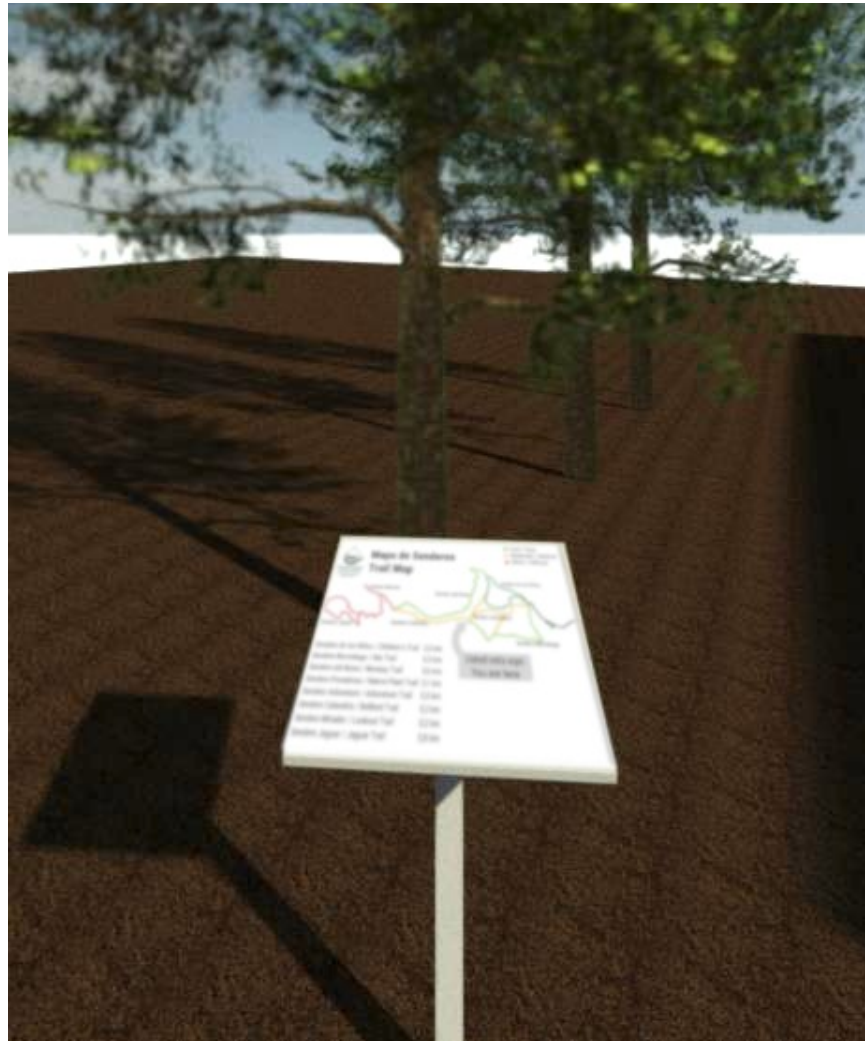


Figure 22: Mockup of new trail signage



# Appendix: Reasonings for Recommendations

Recommendation	Justification
<b>Phase 1</b>	
1. Add sweet flowers around Visitor's Center	The addition of sweet flowers will attract butterflies and hummingbirds, ensuring that visitors will see wildlife when they arrive at the reserve. This was recommended to us in interviews with a board member and a naturalist guide.
2. Cleanup strangler fig/small pond/greywater filtration system	These cleanup jobs are simple, but will add to the overall experience of visitors by providing a more diverse set of attractions. These improvements were collectively suggested to us by a board member and a naturalist guide.
3. Update trail map and print additional copies of informational booklet	We observed the current maps in Objective 1 and learned that the current maps do not include all attractions of the reserve.
4. Invite local schools for field trips	An employee suggested in an interview that local schools be invited to the reserve to increase their hands-on understanding of the environmental education they receive in school.
<b>Phase 2</b>	
5. Develop new interpretive signage for the <i>Sendero de los Niños</i>	It was observed during Objective 1 that the Niño's trail contains interpretive signage, but the content is not specific to the environment and the signs are wearing down. It was also stated by the naturalist guides that the signs do not correspond to the environment and can be done better. We propose making new signage based on environmental factors on this trail and out of recycled materials that will last longer.

6. Improve parking lot	It was observed during Objective 1 and noted during employee interviews that the parking lot has a lot of potholes and divots that make cars get stuck. It was also stated during interviews that people are sometimes uncomfortable with the lack of safety in the parking lot, so security cameras would remedy this problem.
<b>Phase 3</b>	
7. Clear out the open area on the Arboretum Trail	This was observed in Objective 1 and confirmed during an interview a board member specifically mentioned that he believed that this area should be cleared out to provide a rest area for visitors that are on the trail system.
8. Monthly workshops	Seven out of eight employees suggested to include these at the reserve. They currently have buildings that could house these workshops.
9. Begin interpretive layout in current visitor's center	Currently there is no signage describing the history of the BEN or <i>Bajo del Tigre</i> and as this is a huge selling point of the reserve it is crucial to market this to all visitors. This needs to occur in 2 phases as they will still be using the front area of the visitor's center to sell tickets and souvenirs.
<b>Phase 4</b>	
10. Build a new visitor's center	Building a new visitor center adjacent to the parking lot will help to eliminate confusion for visitors, prevent tour groups from entering the reserve without paying, and improve the security of the parking lot. Additionally, a larger and more enticing display for souvenirs will help to improve sales, which in turn will help the reserve to gain publicity.
<b>Phase 5</b>	
11. Complete the interpretive layout in the old visitor's center	This improvement is the first recommendation in Phase 5 because the new visitor's center will have to be created before this can occur. Since the first part of this layout has already been created it will be important to finish it as soon as possible to have a complete interpretive center.

12. All access trail	The creation of an all access trail was suggested to us by our sponsor. This was an idea that was supported in our Employee Workshop, held in Objective 4.
13. Develop new trail signage	It was observed during Objective 1 that some intersections lack proper signage on the trail system. We are proposing a new style of sign that will not require a physical map to navigate the trails.

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