

Gary E. Everhardt Park Break Program Final Report

Community-Based Tourism:

A 'Step Zero' analysis of recreational assets, community perceptions, and future opportunities for the southwestern El Yunque National Forest

November 2, 2022



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Acknowledgements

We would like to give thanks for the USDA Forest Service and its staff for opening up a space and funding this research. Additionally, we want to thank both the Institute for Parks at Clemson University and Gary E. Everhardt Park Break Program for coordinating, facilitating, and funding this experience. We are grateful to the faculty and staff at both Clemson University and Kansas State University for guiding us through this research. Finally, we want to thank the people and natural environment of Puerto Rico for the warm welcome and inspiration for this report.

Please note that this report is limited by the short duration of the experience as well as the cultural biases, gaps in contextual knowledge, and perceptions of local political, social, and economic factors of the authors.

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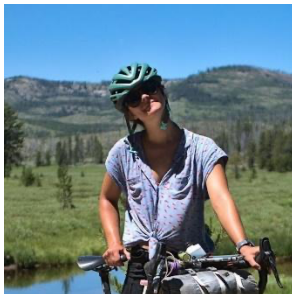
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List of Acronyms for the Report

CBT	
Community-based tourism	13-19, 36-37, 43
EWI	
EplerWood International	11-12, 33, 44
EYNF	
El Yunque National Forest	9, 10, 20-22, 30-39
NGOs	
non-governmental organization	28, 36-37
NVUM's	
National Visitor Use Monitoring	32
SES	
social-ecological system	15-19, 20-29, 30
USFS	
United States Forest Service	12-19, 22-29, 31-39, 40

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Executive Summary

El Yunque National Forest (EYNF) is a protected area of great significance to Puerto Rico and United States conservation. It is the only tropical rainforest in the US Forest Service, containing rare wildlife and vegetation. Located in EYNF are also headwaters that supply 20% of Puerto Rico's water to its residents, demonstrating the Forest's important role in providing services to communities throughout the island. Still, perhaps EYNF's most recognized benefits are the ample recreational opportunities in the forest for residents and visitors alike, through activities such as hiking, swimming, and photography. While providing revenue and economic activity for EYNF and its municipalities, visitation and tourism strains the forest infrastructure and disruption to local communities. These burdens have only become more challenging to manage as natural disasters, such as Hurricane Maria and Fiona, and the COVID-19 pandemic has led to significant fluctuations in tourism and damage within popular recreational areas of the forest.

In May 2022, ten graduate students from universities based in Puerto Rico and the United States convened in Puerto Rico to provide a 'Step Zero' assessment of sustainable community tourism opportunities for EYNF to manage such challenges. Drawing from visits to EYNF and surrounding municipalities, conversations with community leaders, municipal mayors and US Forest Service staff, and each student's expertise in relevant disciplines, we identified three overarching interventions. The goal of these interventions is to transition tourism in EYNF from the current setting in which EYNF tourism results in susceptible communities, to a community-based tourism model that supports sustainable, adaptive management for communities:

1. Utilize tourism and community knowledge to support EYNF as a robust tourist attraction
2. Integrate EYNF actors into a unified polycentric system to promote equitable participation in EYNF management
3. Effectively manage EYNF assets and infrastructure for tourism activity

These interventions were developed to complement the updated 2012 Forest Plan, which emphasizes adaptive land and resource management and public involvement. If adequately implemented, we believe that these steps will move EYNF and its communities toward a sustainable pathway.

Resumen Ejecutivo

El Bosque Nacional El Yunque (EYNF) es un área protegida de gran significación con un papel destacante en conservación de Puerto Rico y de los Estados Unidos. Siendo el único bosque pluvial tropical en la Sistema Nacional Forestal de los EE.UU., EYNF sostiene vegetación y vida silvestre excepcionales. Además, es el sitio de donde origen las cabeceras que proveen 20% del agua a los habitantes de Puerto Rico. Así EYNF provee los servicios cruciales hacia las comunidades de la isla. Aun, quizás los beneficios más conocidos del EYNF son sus amplias oportunidades de recreo para los visitantes (locales o turistas), incluso caminatas, fotografía, y recreo en pozos de agua y las cataratas. Aunque el turismo y la visitación proveen actividad económica y ingresos para el EYNF y sus comunidades, al mismo tiempo ellos estresan la infraestructura forestal y brindan trastorno hacia las comunidades vecinas. Esta carga fue amplificada siguiendo los desastres naturales como huracanes María y Fiona. Además, la pandemia de COVID-19 ha traído unas fluctuaciones importantes en turismo a pesar del daño al dentro de áreas de recreo populares del bosque.

En Mayo 2022 diez estudiantes graduados de universidades en Puerto Rico y Estados Unidos han convenido en Puerto Rico con el objetivo de prestar la evaluación 'Punto Zero' sobre las oportunidades de turismo sostenible comunitario para el manejo de estos desafíos. El grupo ha hecho visitas al EYNF y a las municipalidades vecinas, ha tenido conversaciones con jefes comunitarios, alcaldes y el personal del Servicio Forestal. Teniendo en cuenta estas visitas y conversaciones, así que usando las habilidades y conocimientos en disciplinas pertinentes, el grupo identifico tres intervenciones comprensivas. Estas intervenciones tienen por objetivo el traslado del turismo en el EYNF desde el modelo actual cual contribuye a la susceptibilidad de las comunidades hacia el turismo comunitario, un turismo cual apoya la gestión sostenible y adaptada para las comunidades:

1. Usar el turismo y los conocimientos comunitarios para apoyar el EYNF como una atracción turística fuerte.
2. Integrar los actores del EYNF adentro de un sistema polycentrico promoviendo así la participación equitativa en la gestión del EYNF
3. Gestionar con eficacia los activos y la infraestructura del EYNF para las actividades del turismo.

Estas intervenciones están de complemento al Plano Forestal 2012 actualizado. Este plan acentúa gestión adaptativa de tierras y de los recursos, así que la participación pública. Una implementación adecuada de estas medidas va a ser, en nuestra opinión, un paso hacia la ruta sostenible para EYNF y sus comunidades.

Introduction

Hundreds of inches of rain fall within El Yunque National Forest each year. These waters create lush tropical rainforest ecosystems that contain a diversity of flora and fauna, some of which are endemic only to Puerto Rico. Flowing down the Luquillo Mountains into dozens of rivers and cascading waterfalls, these waters form sites throughout the forest that are ideal for touristic and local recreational use, such as hiking and swimming (Fig. 1). These attractions within El Yunque National Forest provide an alternative tourist experience in Puerto Rico and can complement the “mainstream sun and sand” attractions of the island, and the Caribbean more generally (EWI, 2018, p.4). However, a combination of factors has caused El Yunque management to take pause and explore ways to more effectively develop and incorporate strategies for the forest, sparking the impetus for this report.



Fig. 1: One of the many streams inside EYNF. Taken May 2022. Photo credit for this and next photos: Tatiana Iretskaia.

Following the devastation to the island from Hurricane Maria in 2017, the US-based firm EplerWood International (EWI) was hired to craft an Economic & Disaster Recovery Plan for

Puerto Rico (EWI, 2018). Economically, the overall growth of tourism to Puerto Rico over the last decade, and the associated decline of revenue per tourist, have produced changes to the tourism industry on the island (EWI, 2018). Prior to COVID-19, these changes were shown to be caused by tourists coming to El Yunque from cruises and spending a limited amount of time and money on the island. When these tourists dock at the island, they count as tourists and are associated with Puerto Rico’s tourism growth, however, because they stay for short durations of time, the value that Puerto Rico could receive from these tourists is reduced. The cruise tourists to El Yunque have additionally created carrying capacity and overtourism issues and concerns as the main entrance point to the forest regularly becomes congested from the buses of tourists entering the forest each day. The goal of the EWI report was twofold: 1) to encourage tourists to spend more money on the island because of “well preserved natural and cultural assets” (EWI, 2018, p.7; Onofri & Nunes, 2013); and 2) to develop avenues for alternative tourism attractions in order to reduce the impacts of the invisible burden of tourism (Epler Wood et al., 2019). Within their report, EWI outlines the tourism demands associated with the island and describes ways in which alternative tourism markets, such as ecotourism, adventure tourism, agritourism, cultural tourism, and gastronomic tourism, can be developed.

The invisible burden, or “the unaccounted for destination costs to provide local infrastructure and the protection of eco and socio-cultural systems for tourists and local people” (Epler Wood et al., 2019, p.7), is no less important in this post-COVID-19 era, though the context has changed. The pandemic caused a rapid reduction of inbound tourists to Puerto Rico, which dramatically reduced tourism employment for local people. Tourism’s contributions to the gross domestic product were reduced by 38.6% and over 36 thousand jobs were lost (WTTC, 2022). While these figures rebounded in 2021, they are still below what they were in 2019 (See **Table 1**). Clearly, tourism is important to thousands of people within Puerto Rico from the economic gains it produces, however, the fluctuation of tourism demand on the island has impacts on the sustainability of the island’s people and natural assets (EWI, 2018; USDA, 2018). For two primary reasons, the United States Forest Service (USFS) has begun to push for a more even distribution of tourists: first, so that the economic benefits of tourism can be realized for more communities around El Yunque, and second, to limit the impacts of overtourism associated with the visitation of the Forest.

	2019	2020	2021
Contribution to GDP	5.6%	3.6%	3.8%
Number of Jobs	109,700	73,500	82,600

Table 1: GDP and Jobs Summary in Puerto Rico, 2019-2021

To address the challenges of overtourism, or the “excessive growth of visitors leading to overcrowding in areas where residents suffer the consequences of temporary and seasonal tourism peaks, which have enforced permanent changes to their lifestyles, access to amenities and general well-being” (Milano, Novelli, & Cheer, 2019, p.354), the USFS has a number of specific goals for the South and West Geographic Areas of El Yunque. Tourism development within these areas of the Forest peripheries is intended to increase visitation along a more southern route, Route 186, in order to reduce visitation pressures on the more popular Route 191. Trails, roads, and facilities along Route 191 experienced significant damage during Hurricane Maria in 2017 and some attractions, including the highly visited La Mina waterfall, are currently closed to the public. Consequently, the USFS is hoping to develop additional recreational, natural, and cultural experiences in other parts of El Yunque in order to repair damages on Route 191 and to disperse visitation. Furthermore, the USFS hopes to foster community development and sustainable tourism assets within proximal communities to the southern route, Route 186. To meet these goals, management of El Yunque seeks to partner with community members, local leaders, scientists, practitioners, decision-makers, and other stakeholders who live nearby, work within, and visit the Forest to push for a shared stewardship model. Therefore, to address overtourism and the continued impacts from Hurricane Maria, the USFS seeks to disperse tourists from congested areas and effectively promote a community-based tourism model.

Community-based tourism (CBT) is an alternative form in tourism development that strives to maximize benefits to local communities (as opposed to outside investors), as well as minimize their costs (Blapp, 2015; Tomomi, 2019). In other words, it is the local communities, their perspectives, and their interests that are put at the forefront of all tourism planning, implementation, and day-to-day management within a CBT model. CBT can be defined as:

“[S]mall-scale [tourism that] involves interactions between visitor and host community, [and is] particularly suited to rural and regional areas. CBT is commonly understood to be managed and owned by the community, for the community. It is a form of ‘local’ tourism, favoring local service providers and suppliers and focused on interpreting and communicating the local culture and environment” (Asker et al., 2010, p.2).

CBT crafts tourism to benefit communities within larger tourist destinations for the purposes of “community development, capacity building, local control and local enterprise development, sustainable livelihoods and poverty alleviation” (Cole, 2006; Dangi & Jamal, 2016, p.10; Hall, 1996; SNV, 2007). A key part of the CBT is placing the community at the center of the decision-making process of how tourism should be developed. Thus, each CBT project is inherently different due to unique socio-environmental-geographical and cultural characteristics of each community. Since the 1990s, there have been multiple successful CBT case studies around the world in destinations that could be comparable to Puerto Rico in terms of their island geography

and desired mechanisms for post-colonial tourism development, such as the islands of Bali (Briliyanti, 2021; Manaf et al., 2018), Jamaica (Giampiccoli et al., 2015), and Timor-Leste (Tolkach, 2013), as well as Botswana (Sebele, 2010) and Thailand (Kontogeorgopoulos et al., 2014).

Community based tourism (CBT) is akin to other types of tourism that focus on the economic, social, and environmental sustainability of a destination, although CBT is crafted from a more local perspective and understands how the community desires tourism to be developed (Dangi & Jamal, 2016). This approach to tourism development requires a “systems perspective of community tourism” to understand the overall landscape of how tourism impacts not only the people, but also the environmental and economic resources within a destination (Dangi & Jamal, 2016, p.10; Jamal & Getz, 1995; Murphy, 1985). In addition to social and economic aspects, political and cultural objectives are also included in the systematic approach to CBT (Dangi & Jamal, 2016). As tourism is developed from a relational perspective between the community, the destination, and the tourism industry, there are implications for equity and justice for local residents and resources within the tourism space (Higgins-Desbiolles, 2008). Placing the community at the center transforms the process from a global and international perspective to a local and resident perspective. This shift in foregrounding a community understanding of tourism development is especially important when considering previously colonized destinations, given that the notions of sustainability and sustainable development that are led by organizations such as the UNWTO are embedded in Western and dominant notions of development (Smith & Duffy, 2003).

In order for tourism to contribute to the USFS goals of shared stewardship and capacity building within El Yunque National Forest, the intersections of social, cultural, political, environmental, and economic contexts are considered in a systems perspective within this report as they contribute to a localized and community-based tourism development approach. Currently, the Forest Service is exploring sustainability from a variety of angles, including: management capacity, waste management, maintenance, and funding and fees (Ellison, 2022). There are opportunities within aspects of scalability, adaptability, education, and demand, but the process of transforming tourism in and around El Yunque National Forest is still evolving. The current push is to prioritize and support community-based tourism initiatives around El Yunque National Forest and cultivate inclusive and collaborative possibilities for collective community management of not only the forest, but also the ways in which the forest can plan a supporting role in social, economic, and political opportunities for peripheral communities. There is an emphasis now to understand El Yunque as part of a symbiotic relationship between the local people, tourists, and the potential benefits the sustainability of this relationship can produce. The interconnected nature of these factors necessitates a systems-thinking approach to tourism, one that prioritizes the local people of the island and responds to the tourist demands and benefits with a more collective voice.

The following report outlines the experiences of ten graduate students from universities based in Puerto Rico and the United States as they met with local community members and managers within and along the periphery of El Yunque National Forest. Sponsored through a cooperative agreement between the USDA Forest Service and the Institute for Parks at Clemson University, this Gary E. Everhardt Park Break Program was facilitated by professors from Clemson University and Kansas State University with the intention of producing ‘Step Zero’ analysis of recreational assets, community perceptions, and future opportunities for the southwestern portion of El Yunque as a resource system that is co-managed by both the USFS and local communities. The term ‘Step Zero’ implies the nascency of this project and serves as a jumping off point for the first steps to be taken by USFS. Students on the Park Break program toured the southwestern portion of Route 186 and adjacent areas extensively over the course of seven days in May 2022 (Fig. 2). In addition to surveying the physical landscape and existing USFS infrastructure, the students also met with community leaders, business owners, and residents in the forest-adjacent municipalities of Canóvanas, Juncos, and Las Piedras to learn more about local perceptions regarding USFS, their sentiments towards increased visitation, and future desires for their communities. To this end, this report presents an adapted social-ecological system (SES) framework that can guide a holistic, sustainable, and community-based ecotourism plan for El Yunque’s southwestern region that aligns with the USFS’ vision of shared stewardship and adaptive management for capacity building and collaboration, as outlined in the Revised Land Management Plan (USDA, 2018).



Fig. 2: ‘Work in progress’. Map of El Yunque NF and the adjacent communities visited by the authors in May 2022.

Literature Review

El Yunque National Forest is a tropical forest on the Eastern side of Puerto Rico. El Yunque “is the only tropical forest in the National Forest System” and comprises over 29,000 acres of land (USDA, 2018, p.6). The Forest is a unique asset for both local residents and international visitors that “provides environmental, social, and economic benefits to local and regional communities, as well as to people across the Nation” (USDA, 2018, p.6). The Luquillo Mountains within the Forest provide millions of drinking water per day for the island while the recreational opportunities allow for a variety of activities, such as hiking, swimming, and photography. These recreational activities produce more than \$3 million in revenue annually (USDA, 2018). El Yunque also “contributes to human health and well-being... and many other socioeconomic and cultural benefits” as the Forest is intricately linked with Puerto Rican history (USDA, 2018, p.7).

Historical, Cultural, and Geographic Context

Like many aspects of Puerto Rico, the etymology of El Yunque reflects its complex history through Indigenous Taíno heritage and subsequent colonization. Although the word *yunque* means ‘anvil’ in Spanish, invoking the resemblance to anvil-shaped mountains, other meanings are rooted in terms used before the period of Spanish colonization. *Yuké* and *Yukiyú/Yúcahu* are possible derivations from the Taíno language. The former means ‘white land’, an allusion to the cloud-covered nature of the mountain peaks, while the latter is the name of the Taíno deity who is said to have lived atop these mountains.

First proclaimed a reserve by King Alphonso XII of Spain in 1876, the portion of the Luquillo Mountains that forms the core of the present-day El Yunque National Forest is one of the oldest forest reserves in the Western Hemisphere. After Spain ceded Puerto Rico to the United States in 1898, this area was first renamed Luquillo Forest Reserve in 1903, then Caribbean National Forest in 1935, and was given its current name in 2007. Although seemingly protected throughout its colonial history, El Yunque National Forest was utilized extensively for sugarcane, coffee, and timber production. Today, the Forest is used primarily for recreational purposes and research.

Nine municipalities border the Forest in Puerto Rico. These include Canóvanas, Ceiba, Fajardo, Juncos, Luquillo, Naguabo, Rio Grande, Las Piedras, and Humacao. The focus of the following report is on the municipalities within the South and Western regions of El Yunque’s peripheries, specifically Canóvanas, Juncos, and Las Piedras (Fig. 3). The reason for the focus on these municipalities is due to their proximity to the desired scenic byway, PR Route 186, or Management Area 9. This scenic route is identified as a potential alternative for tourism development that will draw tourists from the main entry point to El Yunque along PR Route 191

to promote community-based enterprises within these municipalities. A collaboration between these municipalities and the USFS is seen as a key way to bring locals, municipal governments, and the USFS together for the purposes of adaptively managing the shared stewardship of El Yunque.



Fig. 3: Central square of Juncos – one of municipalities that were part of the study. May 2022.

Management of El Yunque National Forest

In 2012, the USFS updated their planning regulations for every forest and grassland in the National Forest System, including El Yunque National Forest (USDA, 2018). The new planning framework sought to consider evolving needs, changing national policy, and shifting public perceptions, and was a significant departure from the previous set of regulations introduced in 1982. While both the 1982 and 2012 Planning Rules are based on approaches of multiple use and ecological, social, and economic sustainability, the updated regulations also required forest plans to adopt adaptive land and resource management, use a science-based approach that considers climate change and ecosystem services, and incorporate public and stakeholder involvement (Nie, 2019). Additionally, the revised planning regulations redefined the Responsible Official for forest plans, shifting significant decision-making authority away from Regional Foresters who manage USFS lands across multiple states and territories, to individual Forest Supervisors within their respective territories (McGinley, 2017).

Following the issuance of the 2012 Planning Rule, El Yunque was chosen by the USFS, along with seven other national forests, as an ‘early adopter’ of this new planning approach. In 2018,

the Forest completed its Revised Land Management Plan under the 2012 Planning Rule (USDA, 2018). In this plan, El Yunque identified desired conditions, goals, and standards for its management, with the following comprehensive vision to guide forest management:

“Maintain a healthy, accessible, and sustainable forest that integrates multiple uses; provides economic, ecological, and social opportunities; promotes education, environmental justice, cultural and environmental identity and awareness for the conservation of its natural resources; and adaptive forest management that is inclusive and collaborative” (USDA, 2018, p.8).

To meet the 2012 Planning Rule requirement of a strategic and integrated management framework, the Forest delineates management approaches through a) Geographic Areas (sub-regional, spatially contiguous portions of the planning area); and b) Management Areas (sub-regional portions of the planning area with the same planning features, and not always spatially contiguous). Within El Yunque’s planning area, there are three Geographic Areas (East, North, and South and West), and nine Management Areas, which each denote unique uses and plan components. Because the planning area consists of both the established USFS-managed area of El Yunque and the municipalities that border it, the Geographic and Management Areas can consist of USFS and/or municipal land.

The uses and Management Areas within the South and West Geographic Area are of particular relevance to the new Planning Rule themes of adaptive and collaborative management, as the Desired Condition of the Area is “community-based use of the Forest [that] focuses on environmental education and community-based enterprises in the western and southern municipalities of Canóvanas, Juncos, Las Piedras, Naguabo and Humacao” (USDA, 2018, p.19). Most of the South and West Geographic Area within El Yunque’s jurisdiction consists of two types of Management Areas: Management Area 5, El Toro Wilderness; and Management Area 4, Community Interface Resource Management Area (CIRMA). The remaining areas are Management Area 9, Scenic Byway Management Area; and Management Area 6, Research.

Community Based Tourism

Drawing from the Desired Condition of community and collective stewardship of El Yunque, community based tourism (CBT) is seen as a favorable tourism development strategy for USFS management. As noted previously, the development and organization of CBT will inherently be different in each tourist destination due to each community’s unique characteristics. While acknowledging minor differences, most scholars agree that community participation, local ownership of, and local control over the tourism development ‘from initiating, implementing, evaluating and benefit sharing’ are at the core of CBT (Briliyanti, 2021; Vajirakachorn, 2011,

p.3). Ultimately, it is intended to improve community members' quality of life, strengthen local leadership, and help with conservation of cultural heritage and natural resources (Blapp, 2015).

Based on various scholars' definitions of CBT, Martokusumo (2015) outlines the essential and optional components of the concept:

“[T]he essential components of CBT: (1) equitable participation in the decision-making and sharing of the benefits, including sensitive to gender; (2) local ownership; (3) local control; (4) empowerment; (5) sustainable livelihoods enhancement and diversification; (6) use of local resources and knowledge; and (7) bottom-up approach. The optional components are: (1) community development and cohesion; (2) improved quality of life; (3) low leakage; (4) community well-being; (5) conservation of the environment and natural resources; (6) preservation of cultural heritage; (7) small-scale; (8) enhanced host-guest interactions; and (9) quality visitor experience” (Martokusumo, 2015).

Buhalis (2000) and Daging et al. (2019) note that tourists attracted to CBT communities tend to prefer a type of destination that enables them to interact directly with local communities, and Briliyanti (2021) states that tourists increasingly want their travel to bring benefits to local communities, as well as contribute to environmental conservation. There is thus a strong market for CBT destinations from the perspective of responsible tourists who are willing to directly engage with communities.

However, CBT development can have both positive and negative effects on 'host' communities. Benefits from case studies globally include strengthened economic and social linkages among local product artisans (Martokusumo, 2015); increased communities' knowledge about their own culture (Blapp, 2015); provision of alternative livelihoods and improved communities concerns about nature and culture preservation (Sebele, 2010; Manaf et al, 2018); expanded pride in destination cultures and living areas (Dolezal, 2015); and increased collective assets and strengthened community capacity and cohesion (Martokusumo, 2015). Negative effects of mismanaged CBT, on the other hand, can include tensions between groups linked to inequitable distribution of benefits (Tolkach, 2013); threats to local natural resources and scenery, and increased emissions due to growth in transportation activity (Tasci et al., 2013); as well as congestion in certain areas, littering, and depreciation of local infrastructure (Briliyanti, 2021). Such negative impacts of CBT often result from ignoring, neglecting, and/or not properly addressing certain factors during the implementation and development stages of tourism. Specifically, conflict within the community and hostility towards tourists and local environment degradation may come about when the following items are not accounted for: power disparity, information asymmetry, lack of transparency, and/or lack of local capacity (Asker et al., 2010).

This implies that for successful CBT implementation to be realized, it is crucial that the local community (as an entity embedded in a network of internal and external actors) adopts a systemic lens in all planning and development efforts. Given the interrelated nature of socio-cultural and ecological factors of El Yunque National Forest, its management, and its impact on the daily lives of residents within Puerto Rico, the adapted social-ecological system framework is determined to be an effective model for understanding the current management of the Forest, as well as a lens through which to think about future management strategies for shared stewardship and sustainable community based tourism.

Social-Ecological System Framework

Current management practices and opportunities in El Yunque are rooted in complex historical, economic, ecological and social contexts and bound by social norms, values, and policies. In order to outline a sustainable community-based tourism and management approach that is attuned to local needs, responsive to ecological objectives, pushes for shared stewardship of the Forest, and is pragmatic to USFS management capacity, an adapted social-ecological system (SES) framework will be utilized (Ostrom, 2009). SES are “interdependent and linked systems of people and nature that are nested across scales” (Bouamrane et al., 2016, p.1; Colding & Barthel, 2019; Folke, 2006; Ostrom, 2009; Ratzlaff, 1970). For this report, we applied the SES framework to El Yunque to conceptualize the Forest and its surrounding communities as a system, identifying related conditions, interactions, and outcomes, and ultimately, serving as a planning tool for the USFS to transition to a co-managed sustainable community-based tourism and development model (See **Figure 4**).

The SES framework is a model that provides a structure for understanding how regional and global settings interact with local management systems (Colding & Barthel, 2019; Folke & Berkes, 1998). The framework has implications for sustainability within a given context, as the systems-thinking approach requires the linking of interdependent management units and sub-systems to be integrated into desired outcomes (Ostrom, 2009). The intention is to allow the framework to be flexible and adapted to the local context, and therefore has been developed and graphically illustrated many different ways over the past few decades. Overall, the core of the framework allows for an in-depth examination of system interactions and management outcomes within a social (human) and ecological (biophysical) system (Harrington et al., 2010). These interactions and outcomes are impacted vis-à-vis the resource system (RS), governance system (GS), resource units (RU), and users/actors (UA). Finally, the system is also seen as embedded within wider social, economic, and political settings. As the outcomes are observed within the system, interventions for future management may be outlined as a guide to sustainable development (Evans, 2012). Within the context of El Yunque National Forest, the primary goal for community based tourism and shared stewardship is to support the development of

sustainable communities around the peripheries of the Forest. The following sections describe each of these interrelated categories.

Contextual Settings: Social, Political, and Economic

The social, economic, and political settings within the SES framework are the wider contexts within Puerto Rico that interdependently impact the specific resource systems, governance systems, resource units, and users/actors within the examined system of El Yunque. Although these external settings, such as demographic trends and political stability, exist outside of the focal system, they are critical in providing a comprehensive perspective to SES problems. For example, considering these external settings in a study of the Weihe River Basin in China demonstrated the significance of the basin to ecological and economic conditions in the country (Wang, et al. 2022). In the case of EYNF, we found that Puerto Rico's contextual settings were particularly essential to understanding the system's dynamics.

The population on the island of Puerto Rico has declined from 3.726 million people in 2010 to 3.286 million in 2020 (Census, 2020). The decline, which is connected to Hurricane Maria in 2017, has caused "increasing vacancy rates for housing units, lower growth rates in child population, and school closures throughout the Island" (Hinojosa, Meléndez, & Severino Pietri, 2019, p.1). Puerto Rico was recently struck by Hurricane Fiona in September 2022. Similar

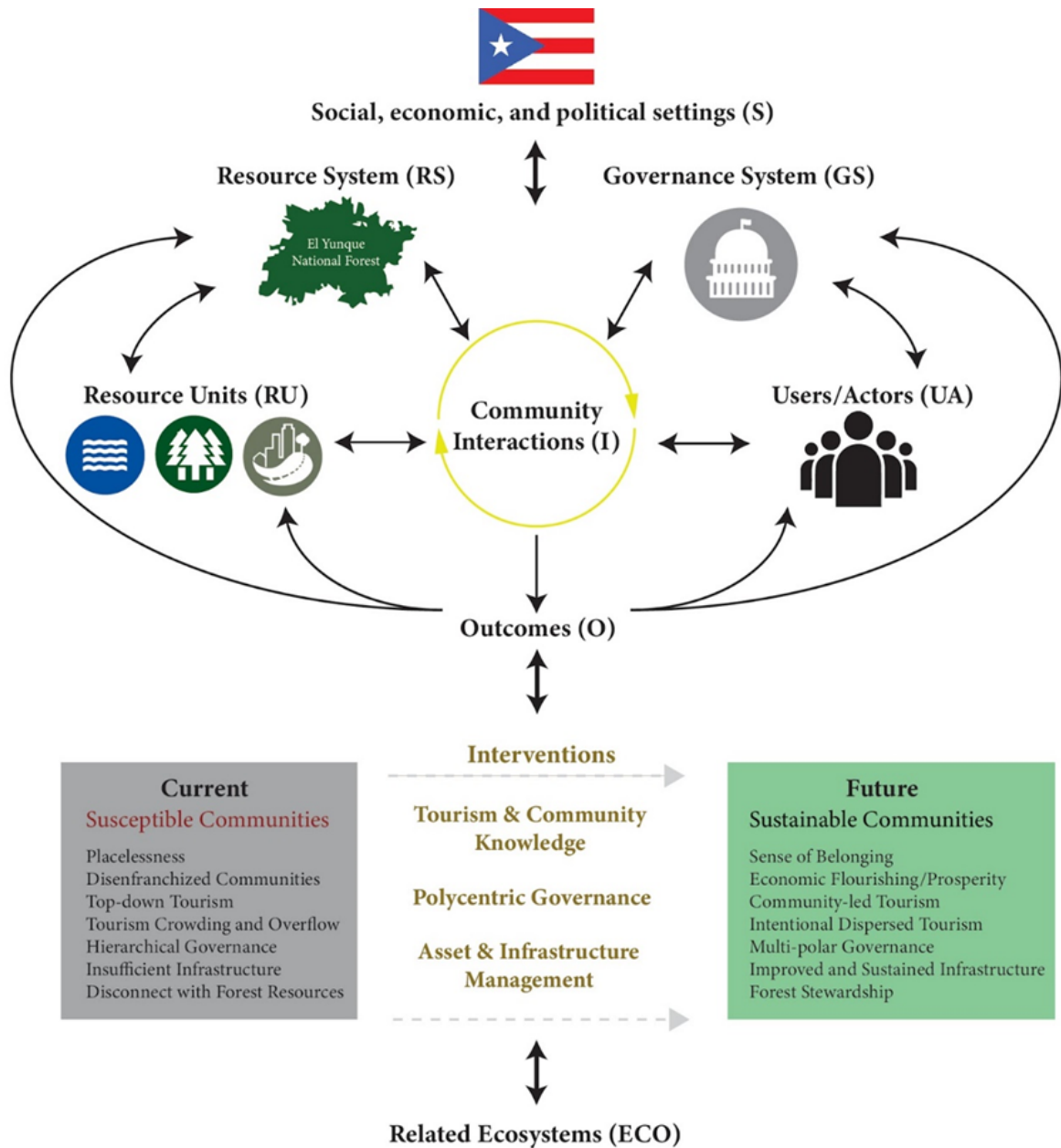


Fig. 4: Adapted SES Framework for El Yunque National Forest.

trends could continue due to extended rebuilding efforts, but what is definite are the current power outages and interruptions of running, clean water to many on the island (McSorley, 2022). There is, however, evidence of bonding, bridging, and linking social capital between communities and community organizations within these conditions that adds to the relative levels of resiliency and resource mobilization within the island (Delilah Roque, Pijawka, & Wutich, 2020). Two authors who grew up on the island reflect on the socio-cultural appreciation of natural resources through their educational upbringings. They state that these resources, including El Yunque, are generally respected by local community members. However, given that

the United States federal government manages the forest, this can cause a disconnect between the management and the sentiments of local ownership and belonging with the forest.

Puerto Rico is a country that has been subjected to successive political regimes of colonialism since the 15th century, beginning with the arrival of the Spanish in 1493 (Grande, 2018). Colonialism under Spain ended in 1898 when Puerto Rico passed into the hands of the United States after the Spanish-American War. In 1917, the Jones Act granted American citizenship to Puerto Ricans, yet the ability to appoint governors of Puerto Rico remained in the hands of the United States federal government until 1950. At this time, the passage of Law 600 enabled Puerto Rico to have its own constitution and an autonomous government with a governor elected by the people. Puerto Rico's current political status within the United States is that of an *Estado Libre Asociado*, Spanish for Commonwealth, and although the island's citizens enjoy rights similar to citizens of American states, they do not receive political representation at the federal level (Barreto, 2016). Over the years, it has been widely argued that this limited representation implies that Puerto Rico remains a colony, and it was the authors' observation that many residents of the municipalities surrounding EYNF utilized the terminology of colonialism to describe their relationship to federal entities, including the USFS. In 2016, when the PROMESA law was created in order to restructure and manage the country's finances, Puerto Rico lost a substantial degree of financial autonomy (Cabán, 2018).

In addition to the financial and economic context that surrounds the colonization debate within Puerto Rico, there is a significant degree of unemployment, especially within the Southern and Western municipalities. According to the 2020 Census, the employed labor force is at 44%, the median household income between 2016-2020 is \$21,058, and the poverty rate is 40.5% (Census, 2020). Puerto Rico is currently facing an economic crisis that has resulted in deep budget cuts to a range of social services, including healthcare and education (Benach et al., 2019). These economic circumstances are themselves rooted in the ongoing Puerto Rican public debt crisis, which, as described above, is being gradually addressed based on the process outlined in the PROMESA law. Thus, the economic status and the political debate of how to manage this debt are interconnected. As recently as March 2022, the debt adjustment plan was approved, which reduces the debt to 73 billion (Murphy, 2022). This restructuring plan prescribes the reduction of municipal government services, increased taxes on the energy, and the reduction of teachers' pensions. The fiscal crisis has caused an exodus to the United States, as shown previously.

Resource Systems

The Resource System within this SES Framework is El Yunque National Forest itself. The forest system, formerly known as the Caribbean National Forest, has a dual designation as El Yunque National Forest and the Luquillo Experimental Forest. As the only tropical rainforest in the

National Forest System, El Yunque is located in the Sierra de Luquillo Mountains in the northeastern region of Puerto Rico, just 25 miles southeast of San Juan, Puerto Rico. The Forest contains 29,000 acres of rugged topography with elevations ranging from about 330 to 3,533 feet above sea level (USDA, 2018). The USFS administrative offices are located at Headquarters and El Portal Visitor Center on Route 191. Research within El Yunque is overseen and conducted primarily by the research scientists, professionals, and technicians at the International Institute of Tropical Forestry (IITF or the Institute). The Institute's offices are located on the grounds of the University of Puerto Rico's Botanical Garden in Rio Piedras, Puerto Rico, and the Sabana Field Research Station in Luquillo, Puerto Rico. This report will focus on parts of the Southern and Western regions of the El Yunque Forest as part of the resource system.

Governance Systems

As a social-ecological system, the SES framework's governance system (GS) for El Yunque is composed of levels of management that are associated with both forest and people. The GS is influenced by several political forces that result in a mainly hierarchical structure. Although actors in each level have opportunities to interact with actors in other levels, the current structure results in uneven participation in policy-making and management decisions between the scales. The units that interact with El Yunque's governance system come through federal, state and regional, municipal, and community spaces. The following information came through conversations with local management and reports, specifically Revised Land Management Plan (USDA, 2018).

Federal/Forest Service: The dominant federal force in the El Yunque system is the United States Forest Service (USFS), which is the authority responsible for management of the areas within the Forest and its Proclamation Area. The Forest is guided by federal government regulations and mainly funded through appropriations from US Congress; however, the 2012 Planning Rule shifted significant decision-making authority to the Forest Supervisor, allowing El Yunque staff the opportunity to share stewardship with local municipalities and communities (USDA, 2018). Additionally, because of the Forest's unique features compared to other USFS lands, such as its location on an island territory, its unique climate/ecosystem and few extractive activities produces a flexibility that is beneficial in implementing management decisions that are specific to the El Yunque context. Though the Forest leadership has authority on management decisions within El Yunque, management is influenced by 1) federal USFS guidelines; 2) objectives of El Yunque leadership; 3) objectives of state and particularly municipal leadership; and 4) needs of local communities. In the CIRMA areas of the South and West region, there is increased focus on developing local consensus on forest management and development decisions (USDA, 2018).

State/Regional: State or regional input into El Yunque appears to have the least significant influence on decision-making and outcomes in the South and West. This gap is likely because El

Yunque is federal land, and the people living within or nearby the boundaries of the Forest are more likely to depend on their local municipal governments for development and tourism decisions. Perhaps the most salient large-scale governance influence for El Yunque is the Puerto Rico Tourism Company, which plays a role in supporting the Forest as a major tourism destination for local and non-local visitors. Also, permits for most development activities within municipal land must be approved by the Puerto Rican permitting office in the island-wide commerce department.

Municipal: Because Puerto Rico does not have county or regional level governance, municipal governments are responsible for providing a number of services to constituents that are not managed by the Commonwealth of Puerto Rico. As such, residents rely on municipal leadership to represent and implement their needs and interests. Residents elect municipal mayors every four years, and many mayors' staff are politically appointed, so leadership can change often. There are nine municipalities bordering El Yunque: Canóvanas, Ceiba, Fajardo, Juncos, Luquillo, Naguabo, Río Grande, Las Piedras, and Humacao. The municipalities in the South and West area are Canóvanas, Juncos, Las Piedras, Naguabo and Humacao, although this report only provides recommendations for Canóvanas, Juncos, and Las Piedras, as these municipalities include or border Route 186 and the Western corridor. The overall goal of the mayors and other leadership in these municipalities is local economic and human development, although there are discrepancies in how much this goal is tied to both USFS and community priorities.

Community: The residents of Canóvanas, Juncos, and Las Piedras make up the community level of governance in the El Yunque. These communities are mainly low-income and elderly. Communities participate in governance through municipal and island-wide elections, as well as other less formalized interactions such as community meetings. While the El Yunque areas of CIRMA require community input into planning and management, it does not appear that there is a formal process for community participation.

Resource Units

The Resource Units of El Yunque National Forest are the natural and cultural assets through which community based tourism and shared stewardship may be realized (See **Figure 2**). El Yunque and the communities that surround it host a wide variety of assets that hold tremendous tourism potential, but are in highly variable states of readiness for increased visitation. While some waterfalls or restaurants could easily welcome an influx of tourists, other sites that the authors visited are in a dilapidated state and have been nearly completely consumed by the forest. This section will briefly summarize the broad categories of assets that the authors evaluated. Please refer to the **Appendix** and **ArcGIS StoryMap** for further detail on specific assets.

Natural Assets:

- **Water Features:** These are public-access assets such as rivers or waterfalls which offer both aesthetic and recreational value to local and off-island tourists alike. Because there are numerous rivers that originate from El Yunque, the research team identified several such assets across the forest's western and southern borders.
- **Scenic Overlooks:** These are viewpoints, frequently along roadways such as Route 186, which offer exceptional opportunities to experience the sight and sounds of El Yunque (Fig. 5).



Fig. 5: El Yunque national rainforest as seen from the Yokahu observation tower. May 2022.

- **Forest, as Mediated by the Forest Service:** Through the construction of both hiking trails and roads such as Route 191, which provide direct entry into El Yunque, visitors are able to experience and interact with the forest's flora and fauna.

Built Environment Assets:

- **Forest Service Buildings and Infrastructure:** Since the early 20th century, the Forest Service has been erecting structures within El Yunque. Examples of sites that hold high

potential for redevelopment or refurbishment include historic guard houses and abandoned plant nurseries.

- Food and Drink: The communities surrounding El Yunque host a number of excellent places to eat and drink. The assets highlighted within this report present a highly incomplete picture of the breadth of opportunities, although those highlighted have high touristic potential.
- Cultural Sites: Ranging from archeological sites to abandoned sugar mills, the cultural sites within the communities surrounding El Yunque have potential to offer visitors a Puerto Rican experience that goes far beyond a rainforest visit.

Users/Actors

The following section aims at providing an overview of the users and actors identified as the main potential and current stakeholders within the management and use of El Yunque. The list includes residents, community organizations, visitors, non-governmental organizations, mayors, planners, local enterprises, tourism directors, tourism enterprises, and developers and investors.

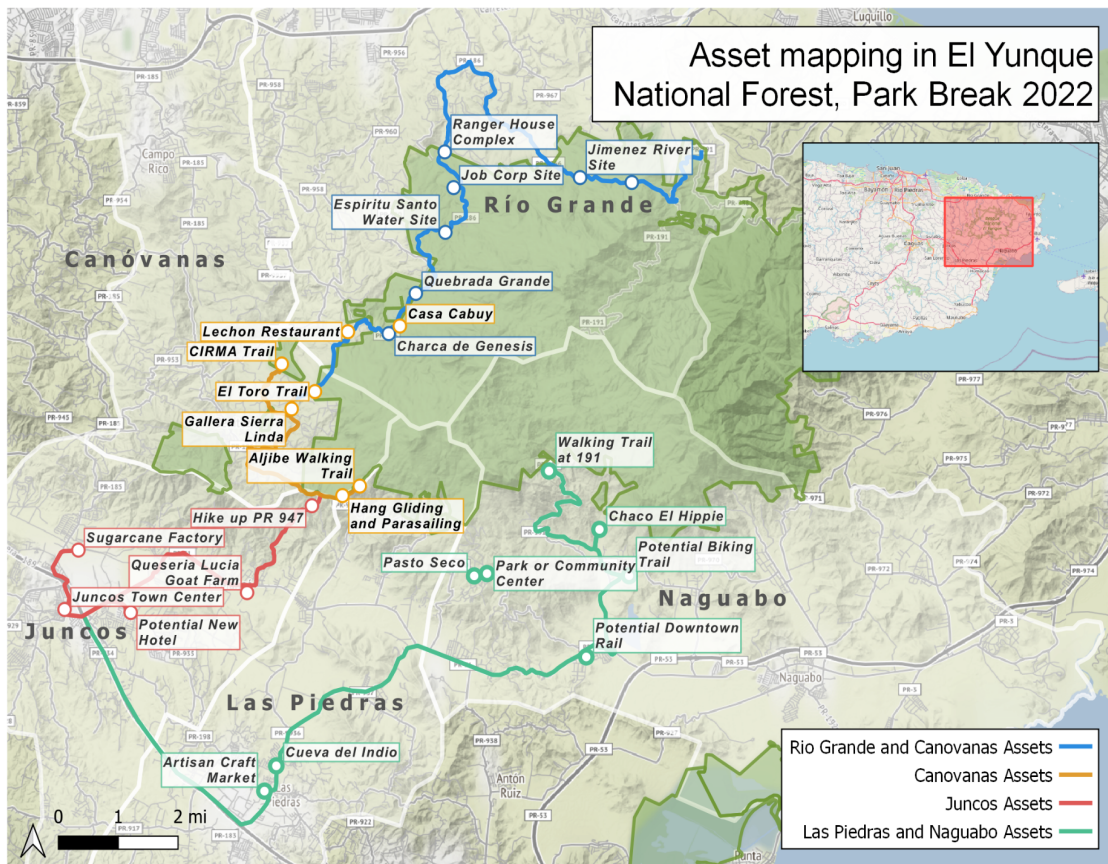


Figure 6: Asset mapping in El Yunque National Forest

Residents: The predominantly rural and low-income population surrounding El Yunque is characterized by a steep decline in younger residents (25-29 years old) and a large population of elderly (>65 years old) since 2010, according to the World Bank (2022).

Community Organizations: The only identified and formal community organization that is focused on El Yunque as a driver of either opportunity or marginalization in the areas visited was Naguabo Somos Todos, an organization of community leaders representing 14 neighborhoods in Naguabo. The organization acts as co-manager of one area of El Yunque. It is important to note that most of the communities use Facebook and other forms of social media as the primary means of communication.

Visitors (Local and Off-island): According to the most recent report (USDA Forest Service, 2016), Puerto Rico's visitor demographics are: 24% of visitors were from Puerto Rico, 33% were from the mainland U.S., with 12% from an "unknown origin". There are more local Puerto Ricans visiting in the summer months and more out-of-state and international tourists visiting in the winter months. Anecdotal accounts suggested that local within-island tourism increased markedly during the pandemic.

Non-governmental Organizations: Amigos de El Yunque, Vitrina Solidaria, Para La Naturaleza, Love in Motion, Mission Continues, and Corazon Latino are all non-governmental organizations associated with El Yunque.

Mayors: Mayors serve four-year terms in Puerto Rico, but can be re-elected indefinitely. Las Piedras Mayor Miguel A. "Micky" López Rivera has held office since 2009. Juncos Mayor, Alfredo "Papo" Alejandro Carrión has held office since 2000. Canóvanas Mayor Lorna Soto has held office since 2014 when she succeeded her father who served for eight 8 years prior. Naguabo Mayor, Miraidaliz Rosario Pagán, started in 2020. Rio Grande Mayor, Ángel "Bori" González has held office since 2014. There are two main political organizations for these leaders: Puerto Rico Mayors Association (representing mayors from the Popular Democratic party, who advocate to continue self-governance as part of the United States Commonwealth) and Puerto Rico Mayors Federation (mayors from the New Progressive Party, who advocate statehood and currently hold the seat of the governor).

Planners: The Centro para la Conservación del Paisaje collaborates on watershed restoration and land acquisition efforts, while town planners manage development within the municipalities.

Local Enterprises: Along Route 186 and its surroundings, there are several small business owners who operate restaurants, artisanal goods retailers, and agrotourism and ecotourism operations. Many of these enterprises have little or no social media footprint or advertising

presence, meaning that visitation is driven by word-of-mouth accounts and is skewed toward on-island visitors.

Tourism Directors: Brad Dean is the head of Discover Puerto Rico and Carlos Mercado Santiago is the Director of the Puerto Rico Tourism Company. Both destination marketing organizations promote Puerto Rican tourism.

Tourism Enterprises: There are several larger tourism enterprises that work with the tourism directors and organizations, including: Eastern National, Caribbean Environmental Films, Corredor Ecológico del Noreste, and Wyndham RioMar.

Developers/Investors: The Puerto Rico Builders Association, which has been active since 1951, is the association representing leaders in the housing, commercial, industrial, and tourism sectors, and works in Puerto Rico's real estate development and construction industry.

The resident population around El Yunque is characterized by an older population. Formal community organization is not common within these communities as identified here. However, there is one active such organization (Naguabo Somos Todos) which could serve as an example to showcase the benefits of such organizations among other communities. The majority of visitors to El Yunque are either Puerto Rico natives or US nationals with a clear trend in visitation marked by a majority of Puerto Rico natives during the summer months and US nationals during the winter. The fact that there are several planners, NGOs, and small business owners along the bordering communities of El Yunque points to the opportunity of developing synergies through collaborations that could increase local community well-being and sense of belonging regarding El Yunque, while also enriching visitor experience to the area.

Methods

In order to apply the SES framework to the specific context of El Yunque National Forest and its Community Interactions, Outcomes, and Interventions (Current and Future), the on-site research team carried out research in May 2022 over a week-long period (Fig. 7). Qualitative research methods included observations, open interviews, and bibliographical and document research, although the nature and scope of the research did not involve systematic research methodologies (Creswell & Creswell, 2018). Rather, each team member took various notes and photographs each day, and a collaborative discussion at the end of each day was held to discuss the main iterative findings. Prior to beginning the research, the management team of the Park Break program gave students an introduction to the project, which included the intentions for the time spent in Puerto Rico, as well as access to various documents associated with El Yunque management in order to familiarize the students with the local context. Upon arriving in Puerto

Rico, there was an information session that was organized by El Yunque's management team. Within this session, students were given additional information and were able to ask questions about the research process for the week.



Fig. 7: Looking down on the research team's shoes after an afternoon of field sites exploration. May 2022. Photo credit: Robert Powell.

The research team then carried out visits to scenic byways Route 186, Route 191, and other relevant sites for tourism and conservation within three municipalities in the southwestern side of El Yunque: Canóvanas, Juncos, and Las Piedras. The team met with approximately 50 people living close to the Forest, ten public officials working for local municipalities, and five staff of the USFS. The interviews with local community members were impromptu and provided useful insight into local conditions and interactions with the Forest that added depth to the policy documents reviewed prior to the trip. Several sites that were relevant for community-based tourism development were visited and documented, in addition to the intersections between local assets and local use of the assets and the Forest, in general. Additionally, debrief sessions between the research team members were conducted at the close of each day to discuss insights from the day and connect these findings to the wider program and intentions of the research. There were several limitations to this process of documenting outcomes and forest assets. Primarily, the graduate student team was unable to methodically sample community members, leaders, and business. Instead, the team leveraged existing community connections between relevant stakeholders and El Yunque. Accordingly, the outcomes outlined below are not fully

representative of any group of stakeholders, but rather reflect the subjective perspectives of valued community members and leaders. A systematic data gathering process may be a useful part of the follow-on ‘Step One’ research that is set to occur upon this current report.

Findings

The following findings provide a roadmap to future research collaborations with community members and El Yunque management, and outlines the Community Interactions, Outcomes, and Interventions (Current and Future). These results fall in line with the primary intention of the research, which is to illuminate a ‘Step Zero’, or entry point for shared stewardship and community-based tourism, and how future research and USFS management may nurture, grow, develop, and strengthen community collaboration through El Yunque.

The following sections outline the observed outcomes, both current and future, as well as the inflection point of change, shown here as the possible interventions for El Yunque. The interventions of: Tourism & Community Knowledge; Polycentric Governance; and Asset & Infrastructure Management are described as potential ways to move communities and their interactions with El Yunque from a place of susceptibility to a space of sustainability. Tentative limitations and progressive future work are then examined to identify empowering directions for the management of El Yunque to move from ‘Step Zero’ to ‘Step One’ by supporting El Yunque as a cultural and regenerative force alongside communities living within Puerto Rico, especially those living on the Southern and Western peripheries of the forest.

Community Interactions

The heart of El Yunque National Forest, is neither the trees nor the waterfalls, but rather the communities and their cultural interactions with the place, as shown through the SES Framework (**Figure 4**). However, the relationship between El Yunque and communities mimics the naturalistic properties of trees and water. The forest provides protection, food, and safety, as trees do for most of nature, while the communities cleanse, nurture, and replenish the forest, similar to how water is the source of life. These exchanges between communities and El Yunque are impacted by the five anchors of 1) social, economic, political settings, 2) resource system, 3) governance system, 4) resource units, and 5) users and actors. Refocusing and grounding the source of power from the existing hierarchy to a horizontal and multi-polar governance structure, as envisioned in El Yunque’s latest Forest Plan, will allow a more holistic management system to be realized within the local context.

Placing the people at the center realigns how these five anchors interact with the community, answering from, back to, and with the community through an interlinking and inter-related system. In a practical way, in the words penned by la paperson (2017), the community becomes the “scyborg”: rewiring and tinkering with the machinated systems interactions, exchanges, and relations. In other words, empowering communities to decide how they choose to utilize El Yunque ensures that the cultural (re)production of the place aligns with the values of the people living within the space. Thus, the community would have the power to choose how to use the forest and its assets residing within the forest to their benefit, whether that is recreational, touristic, fundamental needs, such as water harvesting, or a balanced combination of the various uses.

Current Outcomes

Drawing from the wider SES Framework for EYNF, this section focuses on the current outcomes associated with susceptible communities and outlines the potential interventions that could lead to future outcomes of sustainable communities, through the assets shown in **Figure 2**.

Disenfranchised Communities: Local communities’ sense of place has been influenced by a sense of disenfranchisement and exclusion from the EYNF. Literature on conservation has widely documented how the creation of protected areas causes different forms of conflict, land-use changes, and how it changes communities’ relationship to local landscapes (Redford & Fearn, 2007; West, Igoe & Brockington, 2006). Within this body of work, a significant number of cases have focused on analyzing processes of displacement and communities’ alienation of local natural resources as a result of “imposing wilderness” (Neumann, 2002). The case of EYNF does not, however, fit entirely within these accounts. While injustices associated to the creation of protected areas elsewhere have resulted in individual people and communities experiencing a general lack of attachment and sense of placelessness (Relph, 1976; Benoni, 2010), amongst local communities in EYNF there is still an enduring sense of attachment to the forest.

At the same time, conversations with local communities on the southwestern side of EYNF did reflect that their relationship to the forest has been heavily shaped by a sense of disenfranchisement. We understand disenfranchisement as a process whereby local peoples are shut out from local decision-making of natural resources valuation strategies (Rodriguez Goyes & South, 2019). As Peluso notes, in context of desired preservation of natural resources, “valuation strategies for resource territories frequently disenfranchise local people who have long histories of local resource use and may have played significant, though unrecognized, roles in creating ‘wild’ habitats” (Peluso, 1993, p.201). For example, a local spokesperson mentioned that “*todo lo de los Federales no es nuestro*” [“Everything that the Federal government owns is not ours”]. This type of commentary indicates an enduring sense of social and environmental

exclusion amongst some rural dwelling communities as a result of the centralized institutional management of EYNF. This is partly the result of a long-standing history of institutional territorialization where the USFS has engaged in “ambiguous and conscious and unconscious tendencies to eradicate the genius loci of El Yunque, and its meanings as a place representative of the Puerto Rican culture, the nation’s collective memory [and] national identity” (Maldonado, Valdés-Pizzini & Latoni, 2000, p.89).

It would be unfair to claim, however, that current USFS staff are not aware of the disconnect between local communities and the forest landscape. As the literature has shown, this is not an issue experienced only in EYNF; it corresponds to broader debates about the colonial roots of conservation, contesting notions of citizenship and nature, and the challenges faced by present-day state authorities trying to amend, repair, or build beyond the unequal power relationships in places with long-standing conservation efforts (Adams & Mulligan, 2003; Randini, 2007). The way local authorities decide to reverse the harms of conservation agendas that do not cater to local people’s needs should not respond to overall generalizations, but must be analyzed from a situated lens. For the EYNF, there is strong will and concrete efforts by USFS staff underway to amend fractured or uneven relationships with the EYNF’s communities. For example, the research team had the opportunity to speak with the spokesperson of a community currently engaging in a co-management initiative with the USFS of an area of the forest used for different sustainable tourism activities. The USFS has identified that, for the specific context of the EYNF, co-management of certain areas of the forest has the potential to foster community empowerment while advancing community-led conservation. This type of efforts supports communities’ agency and fosters local social capital needed for favorable conservation outcomes.

Partly associated with communities’ sense of disenfranchisement, there is a demographic transformation occurring wherein many surrounding communities host aging populations with very few youth and young adults. Like other young adults in the island, many of those living around EYNF have migrated either to San Juan or mainland United States, and few periodically return to their communities around EYNF. As an elderly community member mentioned in one conversation, “*acá estamos nosotros, los bosques y la soledad*” [“Here we are, along with the forests, and loneliness”]. The lack of youth in the area is a growing issue amongst local community leaders who do not have younger generations to whom they can relay community stewardship responsibilities and cultural knowledge.

Disconnect with Forest Resources: Related to the feelings of placelessness and disenfranchisement, there is insufficient use of and connection to forest resources by local communities. As a U.S. National Forest, El Yunque is managed under the Multiple Use and Sustainable Yield Act, which declares that forest resources should be “utilized in the combination that will best meet the needs of the American people” (Multiple Use and

Sustainable Yield Act of 1960, p.2). In the case of El Yunque, the “American people” both refers to local communities and tourists alike, given that the forest is utilized by locals and American tourists. El Yunque’s ability to serve American tourists has continued to improve and expand; consider the new El Portal Visitor Center on highway 191, for example. Additionally, the National Visitor Use Monitoring (NVUM’s) most recent survey indicated that a vast majority of visitors were “satisfied” or “highly satisfied” with their visit to EYNF (USDA Forest Service, 2016). However, interactions with local communities demonstrated that EYNF is not meeting the needs of local Puerto Ricans to its fullest extent.

Specifically, this work identified that the southwestern El Yunque proximate communities do not feel empowered to utilize and/or harvest forest resources and participate in forest and tourism planning. The disconnect and alienation from forest resources is partly the result of the historical exclusion of local communities from the management by the USFS and others of EYNF (Berman Santana, 1996). Previous research has already outlined how the USFS’s actions, many times unknowingly, deepen the disconnect between local communities and forest resources. This included the relocation of local communities to the outskirts of the Forest as the USFS acquired more land and added it to Federal property, the introduction of Forest species unfamiliar to local peoples, and the introduction of cultural elements of American culture into the peasant population through, for instance, the Civilian Conservation Corps (CCC) program of the 1930s (Maldonado, Valdés-Pizzini, & Latoni, 2000).

Top-Down Tourism and Hierarchical Governance: Community members and municipality officials offered a general dissatisfaction with “top down” tourism efforts, or efforts and strategies that are first defined by global or national leaders, and require lower levels of organization (local communities, in this case) to develop and enact without the appropriate resources or support. Municipality officials mentioned that this situation has improved in recent years because certain sources of federal funding have provided more autonomy to formulate and implement projects and public policies. Nonetheless, there seems to be a gap between the priorities identified by municipalities and their overall capacity to pursue and fulfill them. Interviews with local community members suggest that capacity to apply for and fully utilize funding are lacking at a local level. Thus, this is a capacity issue because of a hierarchical governance structure that historically has not included local communities within the decision-making processes of how to implement resources at the local level.

Some community members expressed concerns about municipalities’ intentions to increase tourism around EYNF. Lands purchased by unknown buyers have fueled fears of gentrification in certain areas, based on the authors’ observation of one community meeting. Further, changing social dynamics such as increases in traffic and loud noise associated with tourists have led to concerns about tourism’s impact in local people’s everyday lives.

Tourism Crowding and Overflow: Visitation to EYNF has increased substantially over the past decade that has exceeded the global average in terms of arrivals (EWI, 2018). EYNF tourism is condensed in the highway 191 corridor, which has insufficient parking and facilities to accommodate this recent rise in visitation. The destruction caused by Hurricane Maria has exacerbated the issue, leading to road and facility closures, further crowding existing trails and attractions along highway 191. Interestingly, crowding is perceived differently based on visitor identity. A recent study found that Hispanic/Latino visitors from Puerto Rico were less likely to perceive crowding as an issue, and occasionally, seeing other visitors at a site enhanced their recreational experience whereas mainland U.S. and international visitors were more likely to report dissatisfaction after experiencing a crowded place (Buta et al., 2014).

Insufficient Infrastructure: Infrastructure challenges dominate both the existing tourist corridor (highway 191) as well as the potential corridor of highway 186. Highway 191 was significantly damaged during Hurricane Maria in 2017 and many of the main attractions, including the popular La Mina waterfall, remain closed due to a large landslide that destroyed sections of the highway (Fig. 8). Highway 186 lacks a 2-wheel drive appropriate road, functional restrooms, sufficient parking, and developed recreational opportunities.



Fig. 8: Barriers indicating road closure. Taken on highway 191. May 2022.

Future Outcomes

The future outcomes outlined below are dependent upon the actions and interventions taken by the USFS to move EYNF from ‘Step Zero’ to ‘Step One’. These future outcomes represent and describe an improved relationship between the community and the Forest, and are outcomes towards which possible actions could be taken.

Sense of Belonging and Forest Stewardship: A sense of place or place attachment is vital for achieving sustainable tourism that benefits both local ecosystems and communities alike. Research suggests that place attachment contributes to the development of community via participation in collective actions that serve a broader purpose (Benoni, 2010). Local communities, including individuals, businesses, and relevant institutions feel welcomed and honored through intentional planning and actions taken by the relevant stakeholders in the management of EYNF. It is suggested that place attachment influences one's sense of belonging in community; affecting their participation and positionality within them (Benoni, 2010). As a result, youth and young adults increasingly sense they can experience prosperous and fulfilling lives alongside EYNF. This relationship with the Forest reproduces sentiments and actions of place attachment and stewardship (Devine-Wright, 2013).

Community-led Tourism, Multi-Polar Governance, & Economic Flourishing and Prosperity: Local communities actively and more recently participate in EYNF tourism planning and implementation. Community based tourism is also called “bottom up” tourism, where narrow and achievable goals are set by lower levels of organization hierarchy, such as local communities (in contrast to state, national, or global institutions) (Archer, 2019; Diener, 1984; Pollock, 2019). By shifting the representation, communities feel their life ways and customs are not drastically altered or negatively impacted by tourism, and are confident that tourism provides a viable, economically prosperous, and sustainable form of livelihood and territorial stewardship. Local communities have developed a stronger sense of economic security through the diversification of their income sources and the economic benefits of participatory-based and sustainable tourism. Better jobs and sources of income opportunities emerge in the EYNF area.

Intentionally Dispersed Tourism: Tourist attractions within EYNF are spread out geographically, offering opportunities for tourism on the currently well-traveled Highways 186 and 191. Alternative modes of transportation including public transportation and van systems should be utilized to reduce traffic along Highway 191 and disperse tourists along Highway 186 (Interagency Transportation Assistance Group, 2007). Municipal and Department of Transportation grants may provide an opportunity to finance such projects. Additionally, tourist attractions should represent a broad array of activities at varying cost and time commitment levels, similar to the concept of the recreational opportunity spectrum (Clark & Stankey, 1979).

Tourists engage with both natural assets and culturally-based assets, recognizing the importance of EYNF for local communities and Puerto Ricans, in general.

Improved and Sustained Infrastructure: Infrastructure throughout EYNF requires improvements, maintenance, and continued support. The existing infrastructure along highway 191 needs repair, as EYNF knows (Fig. 9). In order to promote tourism and dispersal throughout EYNF, highway 196 must be paved in addition to parking lots, restrooms, and EYNF staff presence throughout the corridor. Literature suggests that specific goals of place-based tourism must be identified in order to promote economic and social benefits and reduce the likelihood of “mass tourism,” a phenomenon that occurs when destinations become too similar (Slattery, 1983). Working towards the goals of fostering a sense of belonging, forest stewardship, community-led tourism, multi-polar governance, economic prosperity, dispersed tourism, and improved infrastructure will benefit both El Yunque and those who are connected to it.



Fig. 9: example of a building overgrown with tropical vegetation. It was unused since hurricane Maria in 2017. Taken inside EYNF in May 2022.

Interventions

This report is meant to provide a ‘Step 0’ for USFS staff’s efforts to realize the Forest Plan’s vision of co-management of Forest resources while concurrently shifting the typical touristic experience of El Yunque from one that is unipolar in its orientation around Route 191 to one that is multipolar. Accordingly, rather than providing detailed prescriptions for future activities, this section instead is meant to provide a framework or lens through which the USFS might evaluate opportunities to engage with specific stakeholders or manage certain assets, such as this appended in the Asset Summary. Ideally, this section should guide USFS management from the Current to Future Outcomes outlined above and provide foundations upon which to direct tangible and intangible resources and assets.

Building on the above, a systematic effort to grow capacity in a variety of tourism-related knowledge and skills is essential to enable the community as a whole to engage effectively in tourism markets (Michael, 2009). Specifically, it should be recognized that successful tourism development does not depend solely on community participation. Strategic location, availability of infrastructure and supporting transportation services, accommodations, food and drink, entertainment produced by community members through small- to medium-sized enterprises, guides, tourist information, as well as safety and health services also should be considered (Armstrong, 2012; Briliyanti, 2021; Ernawati, 2015).

Tourism & Community Knowledge: A tourism destination can be described using the so-called ‘6As framework’ (Buhalis, 2000). The six aspects of this framework are: 1) attractions (natural, cultural, as well as events); 2) access (transportation and infrastructure); 3) amenities (food, accommodation, etc.); 4) available packages (pre-arranged itineraries, offers and tourism experiences by tour operators or local communities); 5) activities available to tourists (from swimming in waterfalls and cooking classes to, for example, milking the goats); and 6) ancillary services (police, medical aid, telecommunications, etc.). It is the combination of all the elements and their interaction with others that produces the overall experience to tourists (Dewi et al., 2018). The following are recommended categories and questions to garner tourism and community knowledge of El Yunque.

1. Envision sequences of touristic engagement with assets
 - What does a full day trip from San Juan, or a half-day following a trip up 191, look like?
 - What are the entry points?
 - How do tourists learn about opportunities?
 - Are there options for strenuousness of outdoor activity?
 - Where might visitors eat or drink?

2. Seek opportunities to authentically highlight cultural heritage and local history
 - How might local artisans be included and elevated?
 - How to balance the imperative to protect archeological sites and to use them to educate visitors?
 - Which historical landmarks or museums could be partners or stopovers in and around the Route 186 corridor?
3. Deeply consider accessibility, in the many senses of the word
 - Are the roads passable?
 - Can locations and other information about assets (including, for example, the lechonera in Canóvanas), be found online via Facebook or Google Maps?
 - In which languages will these assets be presented?
 - Do contemplated sequences of engagement provide opportunities for visitors with limited mobility to appreciate El Yunque?
4. Embrace local legends such as the chupacabras, but do so strategically and with Butler's Tourism Product Life Cycle in mind (Butler, 2006) (Fig. 10)
 - How can local enthusiasm for cryptids and aliens be communicated to tourists without being overly-gimmicky?
 - What mechanisms can be put into place to limit potential overtourism to new assets and tourist activities?



Fig. 10: Locally-made information signs highlighting the El Yunque's natural history and the chupacabra legend. May 2022.

5. Leverage existing infrastructure to attract active adventure and thrill-seeking visitors (allocentric type) (Litvin, 2006)
 - Can multisports events like 5k, half-marathons, and endurance races be organized? The landscape with elevation changes and routes like 947 seems made for these.
 - How can additional activities for thrill-seekers be introduced to Puerto Rico's tourism image?
6. Utilize existing platforms to direct tourists toward these new opportunities
 - Are there tour operators who might be interested in crafting itineraries around these assets?
 - Are there appropriate marketing and advertising strategies to accomplish these new plans?
 - Who will be managing and tracking the tourists?

Polycentric Governance: To make CBT successful, a local community must have an entrepreneurial spirit and a good understanding of the tourism industry (Armstrong, 2012). However, it should also be recognized that most success stories of communities who have established CBT successfully did not do so autonomously. In other words, they were not entirely self-initiated, but there were often external actors who initially saw business potentials in villages (Armstrong, 2012; Iorio & Wall, 2012).

Research conducted on other CBT projects around the world highlights the support of governments, NGOs, private businesses and academic institutions as foundations for smooth implementation of CBT. For example, governmental entities may establish regulatory and policy frameworks that support development of CBT (Manaf et al., 2018) and legitimize the communities' right to manage their CBT enterprises (Sproule, 1994). Further, both NGOs and academic institutions can assist by providing training and education related to tourism systems and skills to communities. Additionally, NGOs may be involved in providing advocacy, funding and technical assistance (Tosun, 2000), while academic institutions can provide research-backed recommendations and serve as tourism development mentors and mediators for the communities (Manaf et al., 2018). Last but not least, private businesses, tour operators, tourism marketing organizations, and destination management companies via their marketing and sales efforts strongly influence the volume of tourist traffic to a particular site. Having them and their inputs as part of the initial planning and implementation process is highly recommended.

Since they may not have experience with tourism, individual community members, as well as the community as a whole, may lack one or more of the following: capacity in needed knowledge and skills to tackle a given goal (Armstrong, 2012), financial resources (Giampiccoli et al.,

2015), awareness and knowledge about the tourism industry or professional tourism skills (e.g., language, entrepreneurial, managerial skills) (Sebele, 2010; Dolezal, 2015), self-confidence (Dolezal, 2015), participation and sense of ownership (Sebele, 2010), and information access (Sebele, 2010). In particular, lack of skills can be a major inhibitor to CBT development, because CBT relies on community members having the required skills to pursue the collective goal of tourism operations (Sebele, 2010). Further, lack of skills and resources makes villagers dependent on stakeholders having higher financial and tourism capabilities, thus increasing their vulnerability to being appropriated by local elites or external stakeholders (Dolezal, 2015). This warrants interventions such as running a series of workshops on building skill capacity and knowledge needed for processes necessary to run CBT.

The following categories of questions should guide these efforts:

1. Identify and cultivate supportive relationships with keystone members of each community
 - Who is the analogue in each community to Mariny in Naguabo?
 - How can these individuals and their organization be drawn into EYNF decision-making?
 - What resources are necessary to ensure efficient channels of communication, responsibility, and accountability?
 - How can the community networks be further developed and strengthened?
2. Seek to build systems of governance and engagement that will last beyond the leaders
 - How much does co-management hinge on interpersonal relationships, versus on (newly) and institutionalized processes?
 - What role could informal (non-political) leaders, such as educators, play in the development of polycentric governance with EYNF?
 - Could youth organizations play a role in educating the younger generation?
 - Are there teachable moments for tourists and locals alike, through activities such as learning traditional crafts and cultural skills?
3. Remain visible and accountable
 - How can the USFS staff work every day to manifest their commitment to co-management?
 - Are there daily, monthly, annual goals that could be set to ensure a forward direction for certain interventions?
 - Where should the Forest Supervisor be seen and heard?
 - Where, conversely, should USFS staff seek to hear the voices of communities?

Asset & Infrastructure Management: As the USFS management knows already, the assets within and through El Yunque are somewhat dispersed, outside of the main visitor areas. Additionally, the infrastructure on the southwestern side of the forest can be developed in a way that is conducive to tourism (Buhalis, 2000). Nevertheless, in accordance with the other two categories of interventions, the following questions may guide the conversation with local communities and other partners to refine the alignment of goals and strategies of the USFS.

1. When seeking new ideas, speak first with local community members, and partner with them wherever possible
 - The authors identified local community members who aspired to build everything from luxury eco-hotels to artisan creameries, so the more challenging question is: to which projects should USFS lend extra support?
 - Are there ways to leverage existing products in a digital system that could provide for streamlined communication and collaboration between EYNF and communities, and communities with each other?
2. Thoughtfully leverage partnerships to overcome budget constraints
 - Who can the USFS work with to manage assets?
 - How can the community be more deeply engaged?
 - How could the capacity be built through local businesses to sustainably capitalize on increased tourism?
 - Is there a possibility of a staged approach to prioritizing core transportation and information infrastructure?
 - How could touristic narratives be transformed into intangible assets?
3. Pursue an integrated asset (re)development strategy alongside municipal partners, where feasible
 - How can the USFS serve as a convener of various municipalities?
 - Where should the USFS engage heavily with municipal projects, and where should it take a more hands-off approach?
4. Explore opportunities to appeal to specific groups of visitors
 - How might USFS craft specific sets of experiences for interest groups?
 - How can traditional types of visitors such as swimmers, hikers, birders, photographers, and campers be utilized and/or combined with additional groups of visitors for a depth of experience?
 - What about endurance athletes who might enjoy a destination event?
 - What opportunities are there to learn about and experience the local food system and/or Puerto Rican gastronomy?

- Is there space for the historic agricultural, landscape, and forestry practices to be included and explained as part of a given tour?
5. Develop both assets for locals and off-islanders, acknowledging the unique interests of each group
- How do locals use or enjoy EYNF differently than off-islanders?
 - Is the decision-making process for investment in assets inclusive of local perspectives?
 - What lessons can be learned from past mistakes (i.e., abandoned, overgrown sites on 186)?

Implications for Future Work and Research

Forests can be living laboratories where scientists can observe, ask questions, and conduct research. In El Yunque, scientists conduct research ranging from large-scale studies of landscape-level changes affecting the local ecosystem to studies of tiny organisms. The Forest is also home to a rich history that includes several archaeological sites of great cultural and historic importance. Ensuring that El Yunque will survive intact for future generations remains an immense challenge. Forest visitation is predicted to continue to increase and the USFS faces unprecedented needs to better understand the public's values, attitudes, and behaviors in relation to the Forest (USFS, 2018).

Due to this increase, developing state-of-the-art visitor management techniques and learning more about the communities and regions adjacent to forest lands is even more crucial to achieving their goals for the future. Understanding visitors means studying people and conducting research in the social sciences. Studying these social groups, organizations, and communities, with human behavior as its central concern, can explain demographic trends, visitor behavior, and public opinion regarding forest policies. Though a very general idea of the typical visitor-type exists, further research is necessary to develop a deeper understanding of improved management strategies.

Visitor related research opportunities for the future include:

1. Who is visiting El Yunque?
2. When do they visit, where do they come from, and what do they look for?
3. Who does not visit, and why?
4. How do visitors affect El Yunque resources?
5. How does El Yunque management affect the visitors' experience?

6. How does El Yunque relate to their surrounding communities?
7. How do visitors affect local, regional, and national economies?
8. How can threats to forest resources be minimized or reduced?
9. How effective are USFS educational efforts such as museum exhibits and guided hikes?
10. How can USFS educational and interpretive efforts be improved?
11. How can the El Yunque natural and cultural resources be managed more effectively?
12. What factors are responsible for visitors' noncompliance with USFS resource regulations?

Moving forward, future Park Break programs should keep in mind that the USFS and its partners are at ‘Step Zero’ in the planning phase and that the goal is to achieve small incremental progress. In order to fully visualize the proposed route as an integrated system, in addition to identifying potential assets in the following report, the group should follow up on previously identified potential assets. Many of the assets identified in the current Park Break program are in the planning phase and are not prepared to receive visitors. Interviewing the actors (Forest Service, mayors, community leaders, etc.) will give a clearer picture of what is achievable in the short-term and what may be possible in the long-term.

Concluding thoughts

In many ways, the Forest’s past and present namings mirror the undercurrents of the contemporary context of management by the United States Federal Government and the Forest’s use by both Puerto Rican and off-island recreationists. Western naming within colonized spaces “has been likened by Paulo Freire to claiming the world and claiming those ways of viewing the world that count as legitimate” (Freire & Macedo, 1987; Smith, 2021, p. 94). Visitor and land manager interactions with assets throughout the Forest are filtered through the power of the authority that named the place and named the assets. In other words, when an asset is named for tourist and/or local consumption, there is an inherent implication of power associated with the directional orientation of who decides on the resource, who gets to use it, and how is it used to solidify or change existing power structures and systems of a place.

While Puerto Rico is currently designated as an unincorporated territory of the United States, many argue that there is a neocolonial relationship between the island and the United States, given that the political, economic, and representational power ultimately resides with the hands of the United States Federal Control Board (Diaz, 2021). Therefore, the naming and renaming of El Yunque National Forest itself and the assets described within this report by our collective powers and administrations are tied to the ownership of the place within the Western context (Fig. 11).



Fig. 11: Official sign that marks the boundary of El Yunque NF. It is in English only. Taken on highway 191 in May 2022.

There is now talk to localize forest management and rename it as *Bosque Nacional El Yunque* to align with the prevalence of the Spanish language spoken within the island, as opposed to the English language of the American government. The push for El Yunque and its assets to be co-managed and renamed alongside local communities therefore symbolizes more than just a change in the name. It represents an opportunity to empower Puerto Ricans to decide the future management and stewardship of their place – touristic, recreational, or otherwise. The act of returning power to the local people within spaces confronted by past and present consequences of colonialism shifts the ownership of a place back to those living within and alongside it, thereby allowing the ownership to be answerable to formerly (or presently) colonized people, land, places, and spaces (Grande, 2018; Patel, 2016). Power, therefore, flows back to and through the place and its residents, running in opposition to the current systems and structures associated with and perpetuated by colonization.

Though the act of renaming may appear to be a small adjustment, it fits into a deeper and wider discourse regarding sovereignty in Puerto Rico. *Bosque Nacional El Yunque* and redefining assets throughout the forest exemplifies a potential and tangible step towards the reversal of centuries-old known, felt, and physical disempowerment related to and (re)produced by Puerto Rican colonization. The decision to develop anew will have consequences, but working alongside community will bring restored hope, dignity, and possibilities.

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Appendix

List of EYNF and community assets visited by the research group in May 2012:

Rio Grande district:

- Iguaca site
- Jimenez River site
- Ranger house complex
- Job Corp site
- Espiritu Santo water site

Canovanas district:

- Casa Cabuy
- Lechon restaurant
- El Toro trailhead
- Gallera Sierra Linda
- CIRMA trail
- Hand gliding / parasailing site
- Aljibe walking trail
- La Condesa area
- Palma Sola community

Juncos district:

- Sugarcane factory
- Ex-college, now hotel property
- Queseria Lucia (goat cheese production)
- Uphill segment of ruta 947

Las Piedras district:

- 191 road walking segment
- Park/community center
- Pasto seco
- Cueva del Indio
- Central market with local crafts and workshops
- Downtown museums (from outside)

Naguabo district: waterfall Charco El Hippie.

GPS coordinates and a basic SWOT analysis is available for these sites upon request.