

# CONSERVATION, OUTDOOR RECREATION, AND NATURAL DISASTER RESILIENCY STRATEGIES FOR THE ISLAND OF CULEBRA

# CONSERVA CULEBRA





CONSERVATION, OUTDOOR RECREATION, AND NATURAL DISASTER  
RESILIENCY STRATEGIES FOR THE ISLAND OF CULEBRA

# CONSERVA CULEBRA

<b>INTRODUCTION</b>	<b>4</b>
<b>EXECUTIVE SUMMARY</b>	<b>7</b>
<b>PROJECT PARTNERS</b>	<b>8</b>
<b>SITE VISITS</b>	<b>10</b>
<b>COMMUNITY OUTREACH AND ENGAGEMENT STRATEGIES</b>	<b>12</b>
<b>EXISTING CONDITIONS AND PUBLIC PERCEPTION</b>	<b>14</b>
<b>ENGAGING CULEBRA'S ENVIRONMENTAL LEADERS</b>	<b>16</b>
<b>PROJECTS IN PARTNERSHIP</b>	<b>18</b>
TREE CANOPY AND MANGROVES MAPPING	19
OUTDOOR RECREATION ENHANCEMENTS BY THE TXCC	
<b>SITE STUDIES</b>	<b>26</b>
BEACHES AND KEYS	27
SAFE ROUTES AND CONNECTIVITY	27
PARKS	28
PLAZAS	30
KEYS	32
CULEBRITA ISLAND	40
PUNTA SOLDADO	50
CULEBRA NATIONAL WILDLIFE REFUGE OFFICE	53
<b>SUMMARY</b>	<b>54</b>
<b>RECOMMENDATIONS</b>	<b>56</b>



## INTRODUCTION

Culebra, a small island municipality of Puerto Rico, is a hidden gem in the Caribbean Sea known for its pristine beaches, vibrant marine life, and serene landscapes. Culebra was initially inhabited by the Taíno people before Spain's colonization in the 1880s. The island later served as a military site for the United States Navy during the 20th century where they had a bombing range and site for military-training exercises.

Culebra has faced significant challenges due to hurricanes, particularly hurricanes Irma and Maria in 2017, which devastated much of Puerto Rico. The island's infrastructure and natural habitats suffered extensive damage, highlighting the urgent need for conservation efforts. However, the resilience of Culebra's community has been remarkable, with local efforts focusing on rebuilding and protecting its unique environment.

In recent years, Culebra has seen an influx of tourists, which poses a threat to the island's delicate ecosystems. The surge in tourism has brought negative effects, including increased trash and pollution, as well as a rise in rentals which has reduced the available housing for locals. The conservation of Culebra is paramount, not only to preserve its natural beauty and biodiversity but also to maintain the balance between tourism and the resident's way of living. Protecting this island ensures that residents can continue to enjoy its charm and learn from its rich historical and cultural heritage.

As the community plans to restore and strengthen their built infrastructure, they want to ensure the protection of Culebra's natural resources by implementing environmentally sustainable projects that promote biodiversity and minimize pollution from increased tourism. They also want to increase access to outdoor recreation so that everyone, from the island's youth to senior citizens, can enjoy.

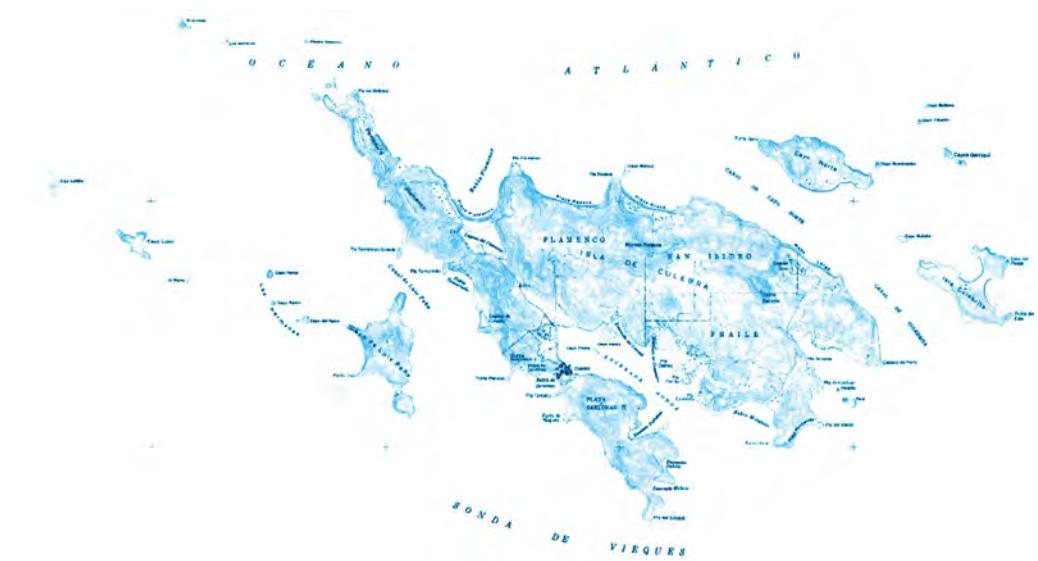
In September 2022, a team from the **National Park Service – Rivers, Trails, and Conservation Assistance program (NPS-RTCA)** worked with Culebra's Municipality Planning Director to identify conservation and outdoor recreation projects across the island. Following that initial meeting, NPS-RTCA collaborated with organizations and local leaders of Culebra to finalize the project list that would lead to the development of a comprehensive master plan aimed at conservation and enhancing outdoor recreation. This collaborative effort involved community meetings, interviews, and feedback sessions, ensuring that the voices and needs of residents were integral to the planning process. The resulting master plan focuses on preserving Culebra's unique natural habitats, protecting its diverse marine and terrestrial ecosystems, and promoting sustainable tourism practices. By incorporating community input, NPS-RTCA has created a strategy that balances conservation with outdoor recreation, ensuring that both locals and visitors can enjoy and protect the island's pristine beauty for generations to come.



## Executive Summary

This project began as an analysis of conditions and resilience planning opportunities on the Island of Culebra, following hurricanes Irma and Maria. Over the course of two years, an NPS-RTCA team conducted four site visits to Culebra for analysis, relationship-building, planning, and community engagement. Collaborating closely with local community members, the municipality, local nonprofit partners, and community leaders, the team identified the community's priorities and key projects through interviews, public meetings, oral history collection, and facilitated meetings. Funding for key on-the-ground improvements was secured through a partnership with the Texas Conservation Corps. Additionally, a mangrove and tree canopy analysis was conducted in collaboration with the Green Infrastructure Center.

The outcome of this project is a comprehensive report that outlines conservation, outdoor recreation, and natural disaster resiliency recommendations and strategies for the Island of Culebra. This report provides a roadmap for future improvements and highlights the importance of community engagement in conservation efforts. The community's support for this project is a testament to the power of collaboration and the significant impacts that can be achieved when planners and stakeholders work together towards a common goal.



# PROJECT PARTNERS

As part of the recovery efforts from hurricanes Irma and Maria which made landfall only two weeks apart in 2017, the Municipality of Culebra requested assistance from the **Federal Emergency Management Agency (FEMA)** and the **National Park Service – Rivers, Trails, and Conservation Assistance program (NPS-RTCA)** to help identify resilient recovery strategies for the island.

In addition to developing strategies to enhance the island's resilience to future natural disasters, the Municipality of Culebra sought support from NPS-RTCA to identify and convene partners, engage community members in the planning process, scope and prioritize conservation and outdoor recreation projects in Culebra, and implement an on-the-ground demonstration project. NPS-RTCA could not have completed this report without the help and support from the incredible project partners.

*Additional thanks to the organizations, programs, and residents who shared their time, expertise, and feedback with us: Departamento de Recursos Naturales y Ambientales, Sociedad Ambiente Marino, Líderes Ambientales Culebrenses, Museo Histórico de Culebra, Abbie's Ecological School, Escuela Ecológica de Culebra, and el Centro de Envejecientes Marcelina Díaz Pellet.*



The **Municipality of Culebra** provided project assistance and input primarily through the Municipality Planning Director.



The **U.S. Fish and Wildlife Service's Culebra National Wildlife Refuge** strives for ecosystem sustainability through preservation, conservation, enhancement, and restoration of habitats essential for the long-term viability of the fish, wildlife, and plants in the Caribbean.



**Mujeres de Islas** is a community organization that promotes the emotional health, cultural, environmental, and socioeconomic development of Culebra through programming that is driven by community interests and needs.



**Fundación de Culebra** is a nonprofit organization, incorporated in 1994, whose mission is to preserve, promote, and protect Culebra's history, culture, environment, and community.



**Asociación Pesquera de Culebra** is a nonprofit organization focused on reintroducing fishing on the island to nurture the community's well-being and create a sustainable economic livelihood.



The **Federal Emergency Management Agency Community Assistance Recovery Support Function (CARSF)** enables local governments to effectively and efficiently carry out community-based recovery planning and management in a post-disaster environment. CARSF also supports state or territorial governments in developing programs of support for local recovery planning.



The **National Park Service – Rivers, Trails, and Conservation Assistance program (NPS-RTCA)** supports locally-led conservation and outdoor recreation projects and assists communities with natural disaster recovery across the United States. NPS-RTCA assists communities and public land managers in developing or restoring parks, conservation areas, rivers, and wildlife habitats, as well as creating outdoor recreation opportunities and programs that engage future generations in the outdoors.

# SITE VISITS

The NPS-RTCA team assessed Culebra's current conservation and outdoor recreation resources, challenges, and opportunities through on-the-ground site visits and meetings, virtual conversations with partners, and review of the island's history and existing conditions. These efforts culminated in the development of this report, which provides recommendations and relevant resources to help Culebra realize its potential for outdoor recreation. Over the course of four visits, NPS-RTCA developed partnerships and engaged with the community to gather input and identify priorities for the island.

In **September 2022**, NPS-RTCA staff visited Culebra for the first time and met with the Municipality's Planning Director who shared some of the challenges the island faces as well as opportunities for conservation and outdoor recreation projects. NPS-RTCA spent the day visiting several sites and began identifying potential projects and partners.

In **March 2023**, NPS-RTCA staff returned to Culebra and began meeting with several community organizations and institutional contacts within Mujeres de Islas, Asociación Pesquera de Culebra, Culebra National Wildlife Refuge, and the Municipality of Culebra to compile a list of projects and priorities on the island. NPS-RTCA conducted additional site visits of the project areas, including nearby keys, and co-created community engagement strategies with local representatives.

In **May 2023**, NPS-RTCA staff spent 10 days in Culebra to gather feedback on outdoor recreation and conservation priorities from the community. The visit included community meetings and interviews with residents on the island. In collaboration with Fundación de Culebra, NPS-RTCA concluded the visit with a public celebration and presentation of findings and feedback at the local historic museum. The feedback process and results can be found in the following sections.

The last visit, in **March 2024**, focused on gathering final feedback and working on prioritized improvements to public areas with the support from the Texas Conservation Corps. Enhancements to the camping areas at Punta Soldado and the development of a trail at Culebra National Wildlife Refuge, along with tree canopy and mangrove maps from the Green Infrastructure Center, inspired the community to continue advancing other identified projects in collaboration with internal and external partners.



# Community Outreach and Engagement Strategies

---

The list of potential conservation and outdoor recreation projects in Culebra led to the development of intentional community outreach and engagement strategies. During initial visits, NPS-RTCA gathered valuable insights from the municipality and community organizations who identified challenges, opportunities, and shared personal stories about their connection to their land, culture, and resources. These early visits revealed access and capacity limitations. Some community members were heavily involved in numerous projects, while others lacked transportation, making it difficult to attend meetings. Understanding these challenges, NPS-RTCA focused on fostering individual connections while also hosting community workshops.

Key engagement strategies included building trust and meaningful connections with project partners through consistent in-person and virtual meetings, engaging with community members at their preferred locations (including their job sites or homes), and creating a formal agreement with Mujeres de Islas to assist with the development and implementation of public engagement events.

Inspired by these interactions, NPS-RTCA began an oral history project that captured interviews focused on conservation and outdoor recreation with residents of all ages. Titled *Voces Culebrenses* (Voices from Culebra), NPS-RTCA held interviews at schools, the elder care center, businesses, homes, and the museum, all of which helped guide the strategies outlined in this plan.

In response to community feedback expressing a desire for tangible outcomes from their participation, NPS-RTCA partnered with the Texas Conservation Corps, which brought a team to Culebra to implement a community-inspired pilot project focused on conservation and outdoor recreation. Improvements to the camping areas at Punta Soldado and the development of a trail behind the Culebra National Wildlife Refuge Office were direct results of the community's commitment to enhancing public spaces. Additionally, in response to concerns about canopy and mangrove loss, NPS-RTCA engaged the Green Infrastructure Center to develop a strategy that equips residents with tools to support long-term restoration efforts.



# EXISTING CONDITIONS AND PUBLIC PERCEPTION

During the community engagement process, from September 2022 to March 2024, the following comments and sentiments highlighted the numerous challenges the island faces due to overtourism and other local issues.

## EXISTING CONDITIONS

### OPPORTUNITIES AND ATTRACTIONS

Camp sites at Punta Soldado, Playa Larga, and Flamenco

Horses and deer (double-edged sword)

Coral reefs

New Year's Eve events

Encouraging visitors to go to the Museo Histórico de Culebra (Historic Museum of Culebra)

Culebra and Luis Peña – nearby keys managed by the U.S. Fish and Wildlife Service's Culebra National Wildlife Refuge

Nightlife

Outdoor market

Farmers market

Tamarindo Grande beach

Bird watching

Dakiti Bay

Fishing (as a hobby)

Zoni Beach and nearby forest

Cayo Pirata, a municipality managed key that was once a fun family picnic area with gazebos and fire pits, but after Hurricane Hugo destroyed the pier in 1989 it has been very hard to access the site

It is said that there are 28 beaches in Culebra

Mosquito Bay

### ISSUES AND CONCERNS

A lack of capacity to manage the conservation and outdoor recreation sites in Culebra and nearby keys such as Luis Peña

Excessive use of the Culebra Key

Low lighting

Coastal development near the Culebra National Wildlife Refuge

Excessive jeep and golf cart rentals around the island

Trash on the beaches of Culebra

Safety concerns: reckless drivers, low lighting, narrow sidewalks, and areas without sidewalks

Lack of garbage cans at beaches

Deforestation

Illegal docks

Some beaches are difficult to get to due to road conditions or lack of accessible ramps

A lack of centralized public education for visitors about how to help protect the island

Ferry: it is difficult for workers and residents to use the ferry because of the hours it operates

Idea is to suggest preferred hours to encourage the ferry to change their schedule

Need more public transportation options for locals

Construction and implementation codes

Regulations: there are no agencies to control illegal construction which causes problems such as a construction truck falling into a critical conservation/habitat area

Lack of housing options for residents because of increased rent prices and surge of short-term rentals

No hospital

No bike lanes

Wagons and shopping carts to carry groceries are difficult to move around because of the narrow and bumpy sidewalks

The area surrounding Playa Brava needs to be cleaned

Use of styrofoam containers at restaurants that end up in the landfill

Lack of diverse activities for youth to enjoy

Overpopulation of wild chickens, cats, horses, deer, and goats that get into trash and sometimes homes

Increased cost of living

Lack of information about the recycling process on the island

Pharmacy hours (closes at 3 p.m.)

Shopping options are limited

Road erosion

Limited amount of signage for unexploded ordnances, making them a big hazard

Unsustainable packaging for imported products

Excessive seaweed on some beaches

## SUSTAINABILITY

In 1987, the United Nations Brundtland Commission defined sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs."

### WHAT DOES SUSTAINABILITY MEAN TO YOU?

Make correct use of the natural resources without putting them at risk

Interdisciplinary sustainability on the island; Ecology could continue to be integrated into the community to help the island support its needs

### HOW CAN WE CREATE A MORE SUSTAINABLE ISLAND?

Improve conditions at the landfill

- Install barriers and nets to avoid the trash sliding into the ocean
- Develop higher standards
- Work with the landfill to create some space where Mujeres de Islas can establish a composting area

Involve the community in conservation and restoration projects, as well as clean-up efforts

Create affordable housing for locals

Encourage tourists to support local businesses by eating at the restaurants rather than bringing in their own food

Recycle

Avoid large-scale development

Become a solar powered island

Compost 100% of plant materials

Plant seeds and trees

Education

Form alliances and collaborating with nonprofit organizations and programs with similar goals

Implement sustainability initiatives to help protect Culebra's natural and cultural resources for future generations.

Consider creating a repair shop for appliances to reduce waste and prevent unnecessary disposal

## COMMUNITY PRIORITIES

### CONSERVATION AND RESTORATION

Implement red lighting to protect turtles near beach areas

Plant mangroves and other native trees

Enforce fines for environmental violations

Ensure illegal contracts are not approved

Prioritize coral reef conservation to help with coastal protection

Organize coastal clean-ups

### CLEAN ENVIRONMENT

Strategically install trash cans at popular recreation areas and ensure regular collection

Improve landfill garbage management

Implement a recycling system or program

Establish stations for separating waste (plastic, glass, etc.), as all waste is currently mixed

Promote the reuse of items that would otherwise be discarded

Recognize animals, even wild ones, are a valued part of the community

### ACCESS

Install proper lighting throughout the island

Improve sidewalks to make them safer for pedestrians

Add road and directional signage

Identify streets and key locations

Enhance beach access.

Consider trolleys for public transportation

Close streets for walking or public biking days

Improve access to public transportation and make it free for residents

### FACILITIES

Clean, maintain, and provide access to Cayo Pirata

Create and maintain trails that lead to beaches and campsites

Create facilities for the fishermen of Culebra

Address the lack of parking

Install bathrooms and picnic tables at public recreation areas

Maintain campsites at Punta Soldado.

Revive the Culebra Challenge, a triathlon which was discontinued due to high costs. Could be a fun community event with food and drinks

Promote aquatic sports, Zumba, or other forms of exercise

### TOURISM

Implement regulations for short term rentals

Mitigate and try to control tourism to avoid overcrowding

Encourage nature-based and responsible tourism that aligns with conservation efforts

Find a balance between tourism and community needs

Ensure beach safety through signage

Provide information to tourists about trash and Leave No Trace principles

Prepare for peak tourism season which is from November to February

Create educational materials that can be shared with tourists about the island, its history, the wildlife that call it home, and how to protect its natural and cultural resources

Share maps with tourists and inform them about dining options and hours of operation

### OTHER PRIORITIES

Develop and implement sustainable tourism practices

Add facilities and amenities that can be easily maintained at beaches such as trash cans, tables, and rinsing areas

Create new recreational areas and parks.

Mitigate tourism to help conserve the Luis Peña Canal Natural Reserve

Conduct a community survey to learn about what conservation and recreational assets they would like to see implemented on the island





# Engaging Culebra's Environmental Leaders

Recognizing the importance of including youth in the planning process, NPS-RTCA participated in a meeting hosted by the Fundación de Culebra (Foundation of Culebra) with the Líderes Ambientales Culebrenses (Environmental Leaders of Culebra). By listening to the island's young leaders, NPS-RTCA gained invaluable insights into their experiences and their vision for Culebra's future. Their perspectives on conservation efforts and out-

door recreation opportunities were instrumental in shaping this report. Their reflections on the past and hopes for the future underscored the need to provide recreational opportunities in diverse settings and to develop a plan that protects the places they cherish most. This section highlights their memories, favorite places, concerns, and ideas for the future of Culebra, all captured during an engaging workshop.

## MEMORIES OF NATURE AND OUTDOOR ACTIVITIES

Participants recalled vivid childhood memories, such as planting gardens at school, celebrating birthdays with their family at the beach, playing tag, marking leatherback turtle nests, searching for animals underwater, and swimming at Larga Beach. They also remembered falling asleep at the beach during New Year's celebrations, playing hide and seek, and running track.

## FAVORITE PLACES IN CULEBRA

When asked about their favorite locations, responses included boat trips to Culebrita, as well as time at Tamarindo and Melones beaches. They also enjoy visiting SEVA\*, the basketball court, town, and Muelle Coral – the public dock.

*Sede de Experiencias Vivas de Aprendizaje (SEVA) is a space that uses the old public school's building to welcome community members who want to participate in a variety of learning experiences and services related to art, cooking, sewing, gardening, and more.*

## CONCERN FOR CULEBRA

Concerns were centered around rowdy tourists, trash accumulation, and illegal construction on the island.

## FAVORITE PLANTS AND ANIMALS

Participants expressed admiration for the island's unique flora and fauna, including quenepa which is a native fruit to Puerto Rico, turtles, Culebra's cactus species, deer, palm trees, and native flowers.

## WHAT TO SHOW FIRST-TIME VISITORS

If showing Culebra to a friend, they would visit Flamenco Beach, Zoni Beach, and really all the beaches in general. They would also relax on hammocks, take boat trips to Culebrita and Luis Peña keys, and dine at local restaurants.

## IMAGINING CULEBRA IN 10 YEARS

Looking to the future, some envisioned an island filled with strangers and overrun by development, with too many docks and houses. Others hoped for a cleaner environment, but worried about the increasing pressure of tourism and the loss of Culebra's natural beauty.

## VISION FOR THE BEST CULEBRA

To make Culebra the best island in the world, participants emphasized the need for clean beaches, responsible tourism, proper waste management, halting construction near beaches, maintaining the island's natural environment, and educating people about conservation. They also mentioned improving roads and ensuring that the island isn't overwhelmed by new development.

## Projects in Partnership

Based on community feedback, the NPS-RTCA team identified potential pilot projects that required additional support from consultants, local experts, residents, and organizations to assist with implementation. The two key projects that emerged were the **Tree Canopy and Mangroves Mapping** and **Texas Conservation Corps Trail** projects.



## TREE CANOPY AND MANGROVES MAPPING: GREEN INFRASTRUCTURE TECHNICAL ASSISTANCE

During the public engagement process, the community expressed a strong need for urban tree canopy restoration, highlighting the heat-related impacts caused by canopy loss due to construction and development. Partners and residents also shared the importance of protecting mangroves, recognizing their vital role in preventing coastal erosion, providing habitat for marine life, and serving as a natural buffer against storm surges. To address the tree canopy loss and identify potential mangrove planting sites, NPS-RTCA engaged the Green Infrastructure Center (GIC) as a consultant to develop tools and maps that can help residents and local leaders visualize existing conditions and identify opportunities for reforestation.

GIC, through a funding agreement with NPS-RTCA, provided technical mapping assistance, resulting in several important outcomes and deliverables. GIC led a stakeholder workshop with local nonprofit organizations, the municipality, and USFWS and NPS-RTCA, to review the project's scope and gather input on natural resource issues, specifically related to tree canopy and potential reforestation areas. GIC mapped the island's land cover, including the current extent of mangroves, which were identified as a critical land cover class due to recent damage from storms and boat docks.

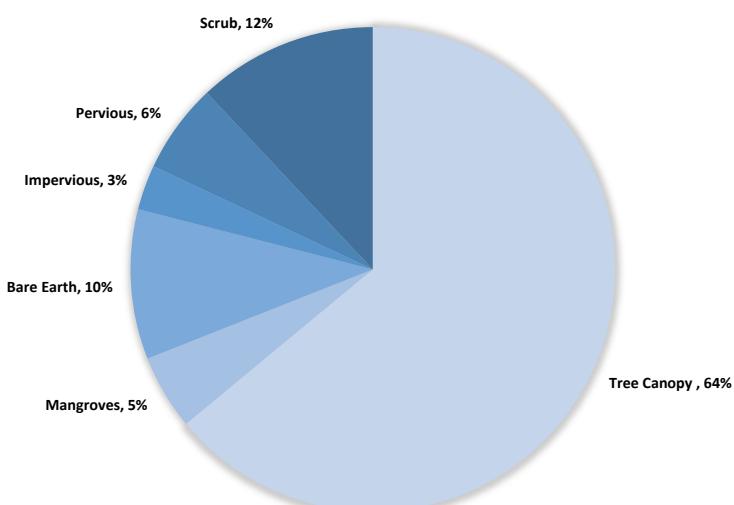
GIC and NPS-RTCA worked closely with a mangrove expert to refine the mapping model and shared drafts with stakeholders, encouraging them to provide feedback to the tree canopy, mangroves, and Potential Planting Areas (PPA) data. After incorporating the edits collected by partners, GIC modeled Potential Planting Areas and calculated the ecosystem services that trees and mangroves provide for residents, including air quality improvement, carbon sequestration, heat island mitigation, and stormwater management.

The finalized maps were shared digitally with all project partners, and printed copies were provided to the Municipality of Culebra, Mujeres de Islas, Culebra National Wildlife Refuge, and the Asociación Pesquera de Culebra. The shared maps, data, and GIS information are intended to assist local natural resource professionals in running land-use scenarios using GIC's Trees

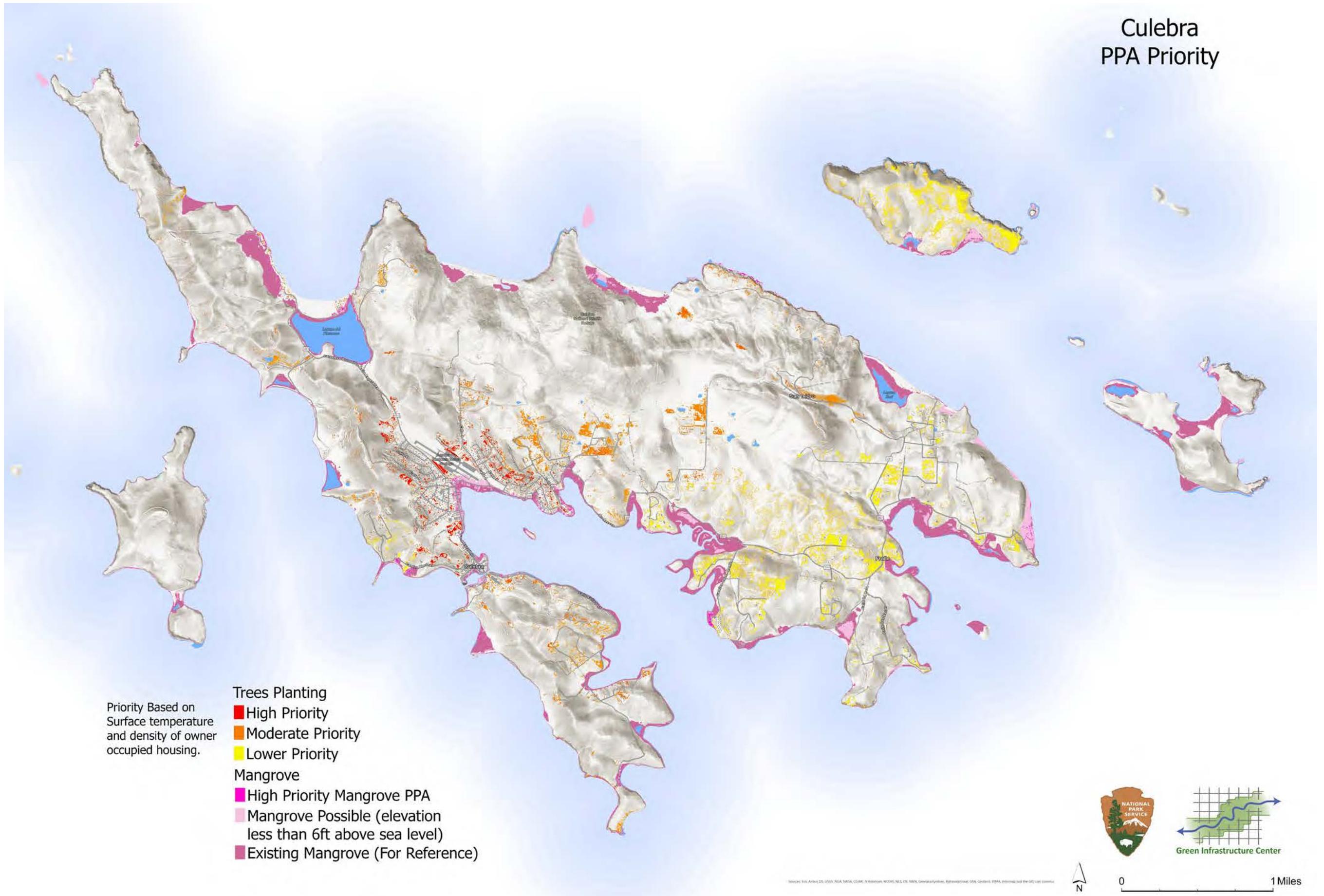
and Stormwater Calculator. This tool models the benefits of maintaining or increasing the urban canopy by analyzing land cover and soil types. In the final virtual workshop with partners, GIC demonstrated how to use the calculator and reviewed several key data points and maps, including:

- ◆ Potential Planting Areas for trees and mangroves
- ◆ Maps of Culebra's Tree Canopy, Land Cover, and Surface Temperature to prioritize areas for tree planting for shade
- ◆ An Urban Heat Island and Equity map, highlighting the hottest areas on the island that also have the highest concentration of owner-occupied housing
- ◆ Impacts of Tree Loss Stormwater Retention, showcasing the tree canopy locations that retain the greatest stormwater volumes
- ◆ Benefits of Planting Trees for Stormwater Retention, illustrating rainwater captured with added tree canopy

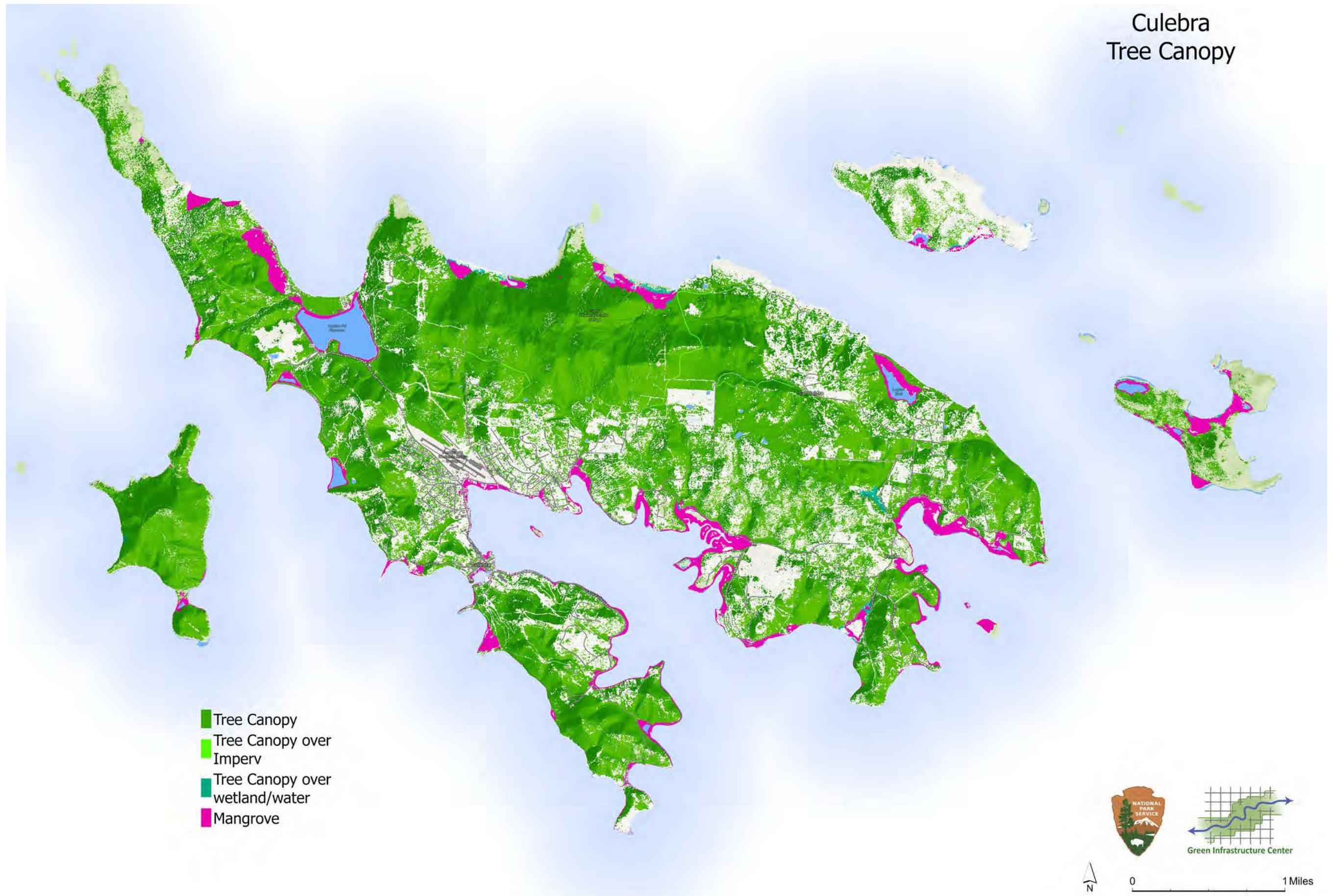
ISLAND-WIDE CANOPY\* 69% (FINAL)  
POTENTIAL TREE CANOPY 76% (FINAL)



# Priority PDA Plan Current



# Culebra Tree Canopy



# OUTDOOR RECREATION ENHANCEMENTS BY THE TEXAS CONSERVATION CORPS

In March 2024, a 10-member Texas Conservation Corps (TXCC) team visited Culebra as part of a cooperative agreement with NPS-RTCA to advance community-identified priority projects. With expertise in coastal ecosystems and trail construction in disaster-prone areas, the TXCC team focused on two key projects: improving the campground facilities at Punta Soldado, a popular site maintained by volunteers and families, and enhancing the nature trail behind the Culebra National Wildlife Refuge Office. These projects delivered essential infrastructure improvements while promoting outdoor recreation and supporting local conservation efforts.

## PUNTA SOLDADO

The community's top priority was the enhancement of the camping area at Punta Soldado. They were concerned about invasive plants, wanted to reopen and widen clogged trails, desired an accessible entry to the beach, and hoped to beautify the parking area. At this site, TXCC corps members were able to:

- ◆ Clear overgrown and invasive vegetation
- ◆ Build a ramp to improve accessibility to the beach
- ◆ Plant native species, provided by SEVA, along main road
- ◆ Host a trail building and maintenance workshop



TEXAS CONSERVATION CORPS MEMBERS BUILDING AN ACCESSIBLE RAMP AT PUNTA SOLDADO



## NATIONAL WILDLIFE REFUGE OFFICE TRAIL

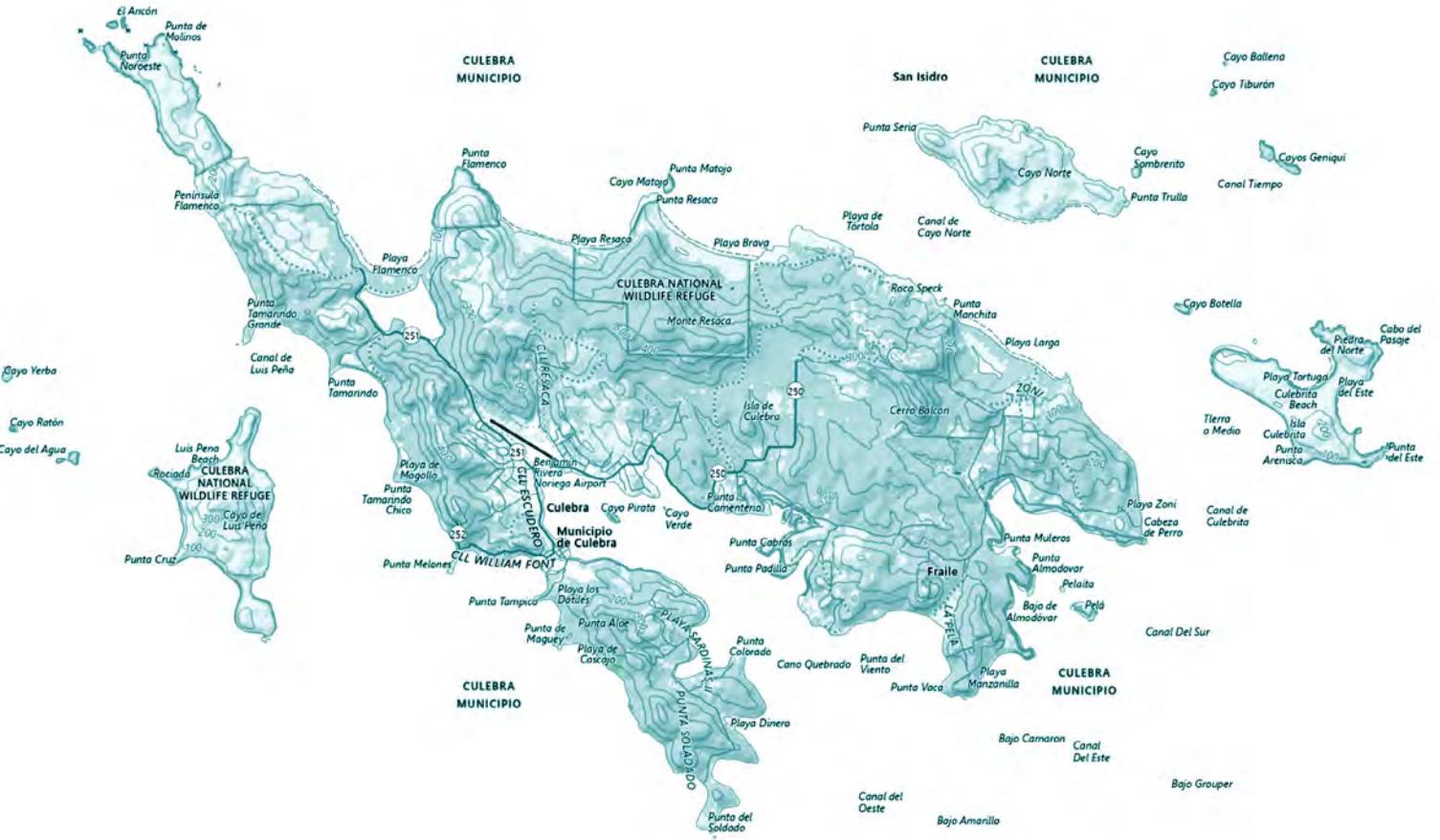
The second priority was the improvement and extension of the nature trail behind the Culebra National Wildlife Refuge Office. Located in the central area of Culebra, this trail is the island's only designated pedestrian trail. The trail serves residents, students, and visitors to the refuge and is surrounded by incredible native plant species. At this site, TXCC corps members were able to:

- ◆ Clear overgrown and invasive vegetation
- ◆ Build 500 feet of a new trail
- ◆ Create a new trailhead area
- ◆ Improve 600 feet of existing natural-surface trail
- ◆ Design and install posts for signage
- ◆ Build a bench and rest area

# Site Studies

In addition to public participation meetings, the NPS-RTCA team conducted several site visits across the island to gain firsthand knowledge of the challenges posed by tourism, natural disasters, and new construction; explore existing recreational opportunities and identify conditions that limit access to those resources; identify methods to protect natural resources while supporting recreational use; and align past studies and reports with current goals and conditions.

The NPS-RTCA team explored municipal parks close to town and residential neighborhoods, visited several beloved beaches, observed public plazas that act as casual gathering spaces, and evaluated ways to improve connectivity between neighborhoods and the downtown area. Site studies with recommendations for improving safety, usage, and accessibility for these areas are highlighted in this section.



# BEACHES AND KEYS

Culebra's beaches, each with their own unique appeal, are central to the island's recreational life for both residents and visitors. During public engagement meetings, many residents shared stories of family gatherings on the island's beaches and expressed a strong desire to preserve these cherished spaces. Of particular concern were the protection of coral reefs, sea turtle nesting areas, and the management of runoff from surrounding watersheds.

Flamenco Beach, one of the island's most popular destinations, boasts a mile-long stretch of sandy shoreline framed by tree-covered hills. It has undergone a significant restoration in recent years. In addition to reforestation, vendor kiosks and new bathroom and shower facilities have replaced older structures damaged by Hurricanes Irma and Maria. However, these upgrades were tailored to Flamenco Beach and may not be appropriate for other beaches on the island.

Numerous reports have outlined best management practices for protecting coastal habitats. Given the existing coral restoration and watershed management plans for the island, NPS-RTCA did not revisit those topics. However, with an interest in assessing the success of a 2013 beach restoration project for possible replication to other beaches, a site visit was conducted at Tamarindo Beach. That project, part of a pilot program developed alongside a watershed management plan, included reforestation of the surrounding hillsides with native

plants to reduce erosion and the addition of a gravel parking area. Accessibility was also improved through a new boardwalk that created a buffer between the parking lot and the beach. Additionally, educational signage was installed to inform visitors about the habitat and how to protect it. Although the access road to Tamarindo Beach continues to face erosion challenges, the beach restoration work has proven durable and offers a model for future improvements elsewhere on the island.

Early conversations with partners focused on potential improvements to Punta Soldado and the nearby keys: Cayo Pirata, Cayo Luis Peña, and Culebrita. Many residents shared fond memories of picnicking on Cayo Pirata and expressed a desire to enhance it as a recreational area for local use. A conceptual site plan was developed based on public input. There was also some interest in expanding recreational activities on Cayo Luis Peña and in addressing increased tourism on Culebrita. However, views about Cayo Luis Peña were mixed—some residents preferred to limit tourism, while others supported adding amenities such as restrooms, picnic shelters, and trail improvements. USFWS planning documents have proposed similar improvements for both keys. Given the limited capacity and resources available to USFWS to manage visitors to these Wildlife Refuges, the site studies identify potential enhancements but emphasize the need to first evaluate the island's visitor capacity and USFWS's ability to manage it.

# SAFE ROUTES AND CONNECTIVITY

Culebra's mountainous terrain makes traveling across the island by vehicle essential. During peak tourism, streets become crowded, parking is limited, and the narrow sidewalks often force pedestrians to walk single-file. In addition, navigating the island on a bike can be difficult without motorized assistance, even for experienced cyclists. Despite this, there is public interest in establishing bike trails. Enhancing connectivity between the east and west residential and business areas would make walking and biking more viable and provide better connections between recreational facilities. Implementing a sidewalk replacement program, improving accessibility, and adding seating and shade would greatly enhance the pedestrian experience.



## PARKS

Culebra's parks and facilities offer recreational opportunities close to town and the airport. Parque Infantil provides playground structures for a wide age range, exercise equipment, and shaded seating. Not far from Parque Infantil, El Parque de los Viejos offers a shady area to sit with views of the busy 250/251 intersection on one side and partial views of Honda Ensenada on the other. Additionally, there is a baseball field and a popular basketball court near town. On the north side of the airport, near the new theater, there is another basketball court, a tennis court, picnic areas, and a hiking/biking path.



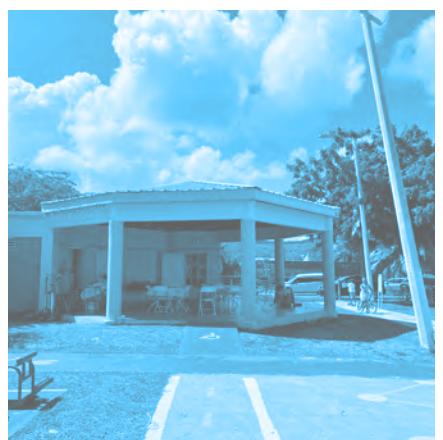
### PARQUE INFANTIL

Parque Infantil, located just north of the Escuela Ecológica, offers a range of activities for play and exercise. Anchoring the northeast corner of the park is a community building with a covered patio suitable for picnics and performances. The park is divided into sections by sidewalks painted with playground games, ensuring access to different areas. Recreational opportunities include activities for children aged 2-12 and nine exercise stations designed for teens and adults. While the slides have rubber mats at their exits, the play structures lack adequate safety surfacing. Shade is limited, though there are benches under trees as well as tables and chairs beneath the building canopy.



The park features two gated access points along its north-south walkway. From the north parking lot, a wooden platform with a cinder block step connects to the concrete sidewalk. On the south side, an accessible ramp links the park to a public sidewalk along Cll Luis Muñoz Marín, offering a narrow but functional route to the school.

Enclosing the park is a vibrantly painted concrete wall. Some sections include openings filled with white fencing, allowing street-side views into the park while ensuring a safety barrier from route 250, the island's primary transportation route.



### RECOMMENDATIONS

- ◆ Install safety surfacing at the appropriate depth under all the play structures that are more than 12 inches off the ground
- ◆ Add shade structures or plant trees to increase shaded area
- ◆ Install a pergola over the exercise equipment for partial shade
- ◆ Widen the gate from the parking lot to 4 feet and add a curb ramp to enhance accessibility

## THEATER AND PARK NEAR AIRPORT

Northwest of the Municipal Airport, the newly constructed Centro de Bellas Artes y Actividades sits on a slope, featuring a 50' x 80' plaza at its southern corner. The location offers sweeping views of the airport and harbor. The theater is accessible through a gated entry with sidewalks flanking the driveway. From the northwest corner of the theater's parking lot, visitors can access a 0.3-mile biking and hiking trail that loops across the hillside. The driveway continues uphill to an additional parking area that serves the adjacent sports complex, a 0.14-mile trail leading to picnic shelters, and as overflow parking for the theater. The sports complex includes recently renovated basketball and tennis courts with upgraded pavement, fencing, bleachers, and lighting.

The nearly 12-foot-wide asphalt trail begins at the northwest corner of the tennis court and passes a 30' x 30' building without signage. Its use should be clarified for the benefit of the public. The trail extends northwest, connecting to a series of picnic shelters spaced about 90 feet apart. Two additional structures, located closer to the woodland, feature built-in tables but no seating. Pedestrian-scaled lighting is installed between the shelters. A large retaining wall supports the hillside northeast of the first five shelters, while an undulating wall lines the trail's southwest side. The trail ends abruptly about 40 feet beyond the last shelter, with no connection to the 0.3-mile loop.

The area is very exposed to the elements since there are no shade structures or trees near the courts, picnic shelters, or along the trails. The limited shade provided by the shelters shifts throughout the day, creating an uncomfortably hot environment that likely discourages usage.

There are no play structures near the trails or sports courts. However, an [article in Primera Hora](#), titled "The Curtain is Almost Raised on the First Theater and Cinema in Culebra," mentions plans for a future park in the area. The article suggests the future park may be located at the northwest end of the 0.14-mile trail, where pedestrian and vehicular access from nearby neighborhoods is limited. If possible, the park should have inclusive play structures, adequate shade, and accessibility features to serve a broader range of ages and abilities. Its location should be in a centralized area, allowing convenient access to picnic shelters, sports courts, and parking, enabling families to enjoy multiple activities without excessive walking.

### RECOMMENDATIONS

- ◆ Install shade structures over the basketball and tennis courts
- ◆ Add seating for tables at the picnic shelters
- ◆ Plant shade trees along trails, near courts, and around picnic shelters while preserving views of the airport and harbor
- ◆ Construct a walkway to provide direct pedestrian access from the city street to the courts and picnic area, and connect the loop trail to the picnic area trail
- ◆ Ensure the future park is accessible, has activities for all ages and abilities, and features shade structures and safety surfacing



# PLAZAS

Public plazas serve as passive recreational spaces. Two plazas, Cafeteria Sanquel Plaza (Plaza de Mercado) and Plaza Publica de Culebra, are highly active gathering spots for both locals and tourists, while another plaza, across from the municipal building, has untapped potential despite its waterfront location. Plaza de Mercado features a large, covered area with tables and chairs, colorful umbrellas providing shade, and food vendors serving cafeteria-style meals during the day. At night, it is a lively gathering spot. Plaza Publica de Culebra, located near the ferry, also sees heavy pedestrian traffic and serves as a popular venue for street food vendors and nearby restaurants. In contrast, the plaza across from the municipal building, despite its beautiful view of Ensenada, lacks shade and comfort on hot days.

## PLAZA AT ENSENADA HONDA

The plaza has some very positive features. A line of bollards creates a protective barrier, separating the plaza from street traffic, while a wavy concrete wall provides a partially transparent yet effective border with nearby residential properties. Stylish concrete benches on three sides offer ample seating options. Pedestrian-scaled lighting, trees planted in pavement openings, and high-quality pavers enhance the overall aesthetic. However, certain elements detract from the plaza's appeal. The steel guardrail along the cove and the circular sitting area with a steel art piece were damaged by recent hurricanes. Additionally, the plaza becomes uncomfortably hot on sunny days. Of the four trees, three are surviving but are too small to provide sufficient shade and show signs of stress.

## RECOMMENDATIONS

- ◆ Replace the guardrail or repair the balusters using a more durable and resilient material, such as cable railing.
- ◆ Replant the missing tree with one of similar size. Expand the pavement openings around the trees to improve access to air and water, ensuring healthier growth and better shade in the future.
- ◆ Rehabilitate the steel feature in the circular sitting area. If the structure beneath the damaged steel cover is hollow, consider converting it into a raised planter to reduce the heat-absorbing impact of the pavement. Install a pergola over the area to provide reliable shade. The pergola could be designed with an opening to allow sunlight and rain to reach the plantings.
- ◆ Collaborate with local artists to incorporate public art into the pergola design to add a unique and culturally significant element to the plaza.



PROPOSED IMPROVEMENTS FOR THE PLAZA AT ENSENADA HONDA



## CAYO PIRATA

Cayo Pirata, a 2-acre island located in the middle of the northwest portion of Ensenada Honda, was once a beloved picnic destination for local residents. Community members fondly recall boating to the island to enjoy its piers, picnic shelters, community hall, and connecting trails.

Over the years, storms have significantly altered the island's landscape. Aerial images from 1994 show intact piers and structures, but by 2023, only remnants of the U-shaped pier remain. A site visit revealed deteriorated docks with missing decking, damaged building roofs, and overgrown thorny vegetation obscuring the former trails.

Many locals and community leaders envision reviving Cayo Pirata as a vibrant recreational destination. Their proposed activities and amenities include:

- ◆ Rehabilitating the community hall as a multi-use space and possible wedding venue
- ◆ Rebuilding docks and removing damaged structures
- ◆ Installing camping platforms for tents or "glamping"
- ◆ Restoring trails and picnic shelters
- ◆ Creating a playground, birdwatching areas, boardwalks, and fishing piers
- ◆ Adding a small lighthouse

Significant work is required to make Cayo Pirata safe and usable, starting with repairing at least one pier for access.

The community hall is a standout feature, with its concrete structure, stone veneer exterior, and walls interrupted with sections of floor-to-ceiling railings that offer scenic views and natural ventilation. However, the roof and ceiling are extensively damaged and need to be replaced. Additionally, the walls must be assessed for structural integrity before plans to reuse the structure are set in motion. The eight picnic structures have thick concrete walls, although some show signs of damage, including missing sections of concrete and damaged wooden roofs. While these are likely easier to repair than the community hall, there is limited local interest in restoring them.

The key's terrain supports the creation of accessible trails. The elevation rises about 14 feet, with the high point located in the southeast third of the island where the picnic shelters are located. Gentler slopes (under 5%) in the center of the island are suitable for trail development. Steeper slopes along the outer edges of the island (averaging 17%, with some as steep as 2:1) should be protected from construction activities and planted with native species where needed. The flatter interior portion of the island lacks shade and is currently dominated by jumping cacti on the rocky ground, posing challenges for trail upkeep. The vegetation along the outer edges and at the northwest point becomes thicker and more difficult to penetrate and should remain undisturbed to help protect the slopes from erosion.

The conceptual plan includes the community's ideas as well as strategies for accessibility and sustainable development.

### SUSTAINABLE DEVELOPMENT STRATEGIES

- ◆ Establish vegetation protection zones before construction
- ◆ Locate trails to avoid sensitive habitats
- ◆ Construct trails and use them for construction access
- ◆ Remove invasive species and restore disturbed areas with native plants
- ◆ Incorporate natural ventilation in all designed structures
- ◆ Install solar panels for path and building lighting
- ◆ Use durable, recycled, or recyclable construction materials
- ◆ Build structures following appropriate standards to withstand high winds
- ◆ Protect steep slopes by planting native vegetation
- ◆ Install shade structures over play areas and plant shade trees along trails, as well as near camping and picnic facilities, to enhance comfort



RECTANGULAR, SHARED FIRE PIT TO SERVE CAMPERS AND OTHER VISITORS

PLATFORMS FOR CAMPING

ACCESSIBLE HIKING TRAIL CONNECTS ALL SPACES (TRAIL IS SHAPED LIKE A SNAKE, AS NOD TO THEIR COAT OF ARMS)

RENOVATED COMMUNITY HALL FOR LARGE GATHERINGS AND EXHIBITS

PLAZA AREA PROVIDES SPACE FOR ENTERTAINMENT AND ADDITIONAL PICNIC TABLES

REBUILD DOCK

SHADE PLAY AREA WITH SAFETY SURFACING

PICNIC SHELTERS

ACCESSIBLE HIKING TRAIL

PICNIC SHELTERS SHOULD BE DESIGNED TO WITHSTAND HIGH WIND

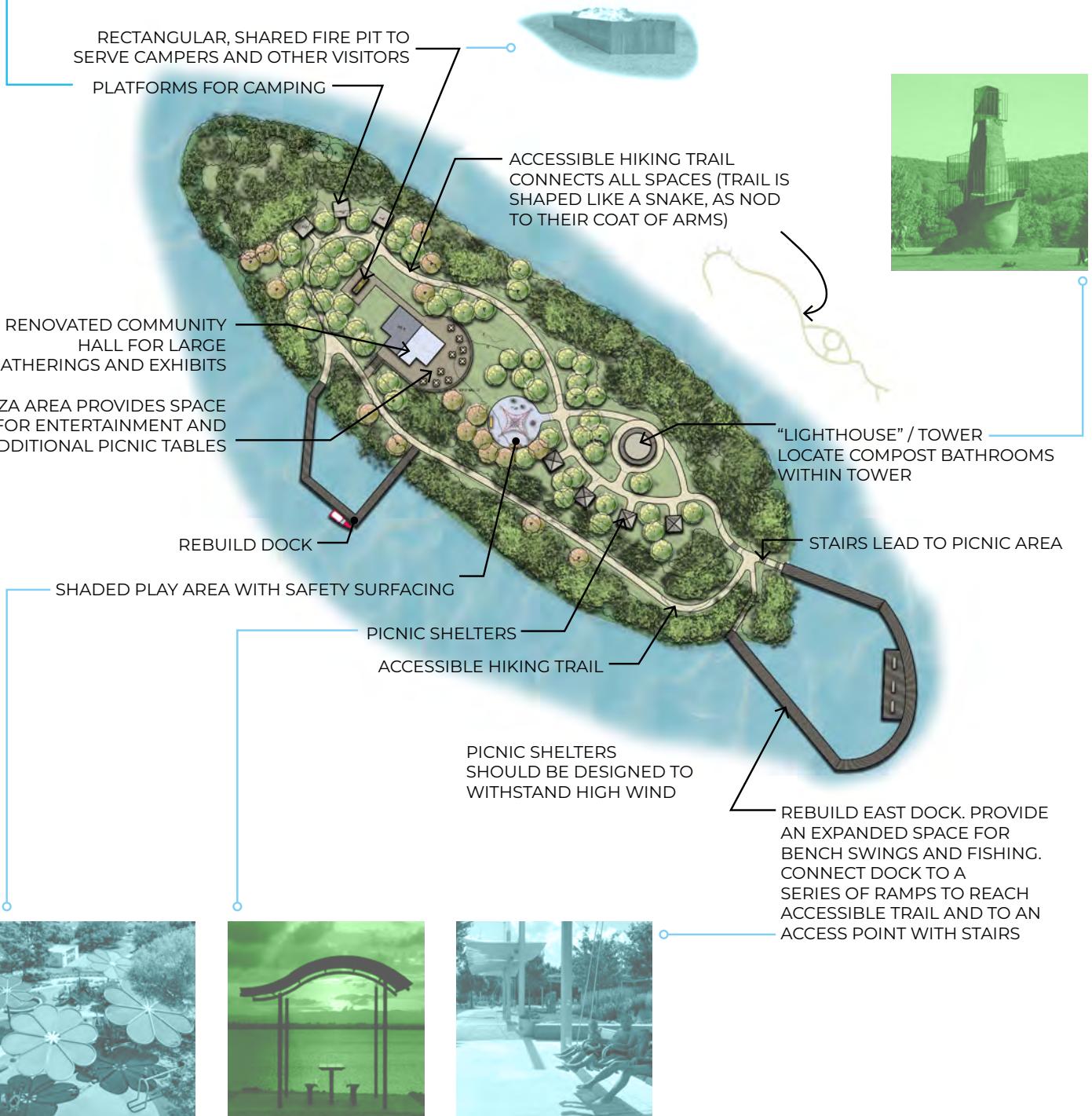


"LIGHTHOUSE" / TOWER LOCATE COMPOST BATHROOMS WITHIN TOWER

STAIRS LEAD TO PICNIC AREA

## CAYO PIRATA

### CONCEPTUAL PLAN





## CAYO LUIS PEÑA

Cayo Luis Peña, a 484-acre uninhabited key located about a quarter mile off Culebra's west coast, is part of the Culebra National Wildlife Refuge, managed by the U.S. Fish and Wildlife Service (USFWS). The waters along the island's north and east boundaries are protected within the Natural Reserve of the Canal de Luis Peña, prohibiting fishing. Cayo Luis Peña, like other areas of Culebra, was impacted by U.S. military training exercises between 1924 and 1941. A 2015 Community Relations Plan by the U.S. Army Corps of Engineers describes the investigative work undertaken to address environmental impacts on Luis Peña as of the report's date but does not clarify whether the work has been completed. Remnants of a helipad used by the military can be found on Cayo Luis Peña's hilltop.

During public outreach meetings, there was interest in expanding recreational opportunities on the island but also concern about the potential for attracting unwanted tourism. The [2012 Comprehensive Conservation Plan for the Culebra National Wildlife Refuge](#) highlights the need to balance the core mission of conserving wildlife with "opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding, and enjoyment of the refuge's wildlife, habitats, and cultural history." Objective 4-2 of the plan emphasizes public access by calling for the identification of sites for access trails on Cayo Luis Peña and Culebrita.

The west and north sides of Cayo Luis Peña feature crystal-clear turquoise waters meeting sandy beaches scattered with coral fragments, offering a tranquil escape from the island's rugged terrain. In contrast, at the base of the cliffs, boulders replace sand and provide habitat for diverse sea life. Remnants of the island's military past emerge along a short walk from the west-facing beach to the east-facing beach, where sections of an old road wind through a thicket of Seagrape. The walk ends at a seaweed-covered beach, littered with plastic bottles, fishing nets, bamboo poles wrapped in string and tangled in Seagrape branches, and countless plastic caps scattered across the sand. The smell of rotting vegetation and the beach's poor condition starkly highlight the threats facing marine habitats.

From the beaches, sandy narrow paths lead uphill to a cracked, deteriorated road that resembles cobblestones. Despite its condition, the road offers a manageable one-mile trail leading to an abandoned helipad, located 480 feet above sea level. The slope from the beach to the top varies but the exposed pavement from the old road provides a ready-made trail with a moderate grade.

As the trail ascends, the lower portions are surrounded by dense, shrubby vegetation, but taller trees soon provide ample shade along most of its length. The cone-

shaped island captures breezes that enhance the cooling effect of the shade. While some parts of the trail wind through steep terrain, other sections level out, offering open sea views and a reprieve from the climb. These flatter areas, with minimal understory and scenic vistas, would be ideal locations for picnic shelters, overlooks, benches, and a bathroom.

Currently, water taxis, tour operators, and private boats frequent Cayo Luis Peña, but the lack of a mooring system puts the ocean floor at risk. Signage indicates that the island is a managed recreation area, but there are no amenities. An official trail system with educational signage along its route could expand recreational opportunities while providing information for visitors to learn about the island's military history, cultural heritage, and ecosystems. However, careful planning is essential to balance visitor use with limited management resources, ensuring the island's natural resources are protected.

In addition to Objective 4-2 of the USFWS's Comprehensive Conservation Plan, Objective 4-4 focuses on wildlife observation and photography and identifying locations to construct observation towers and photography blinds on Cayo Luis Peña and Culebrita. The helipad area, located at the top of the island, presents a unique opportunity to enrich the visitor experience.

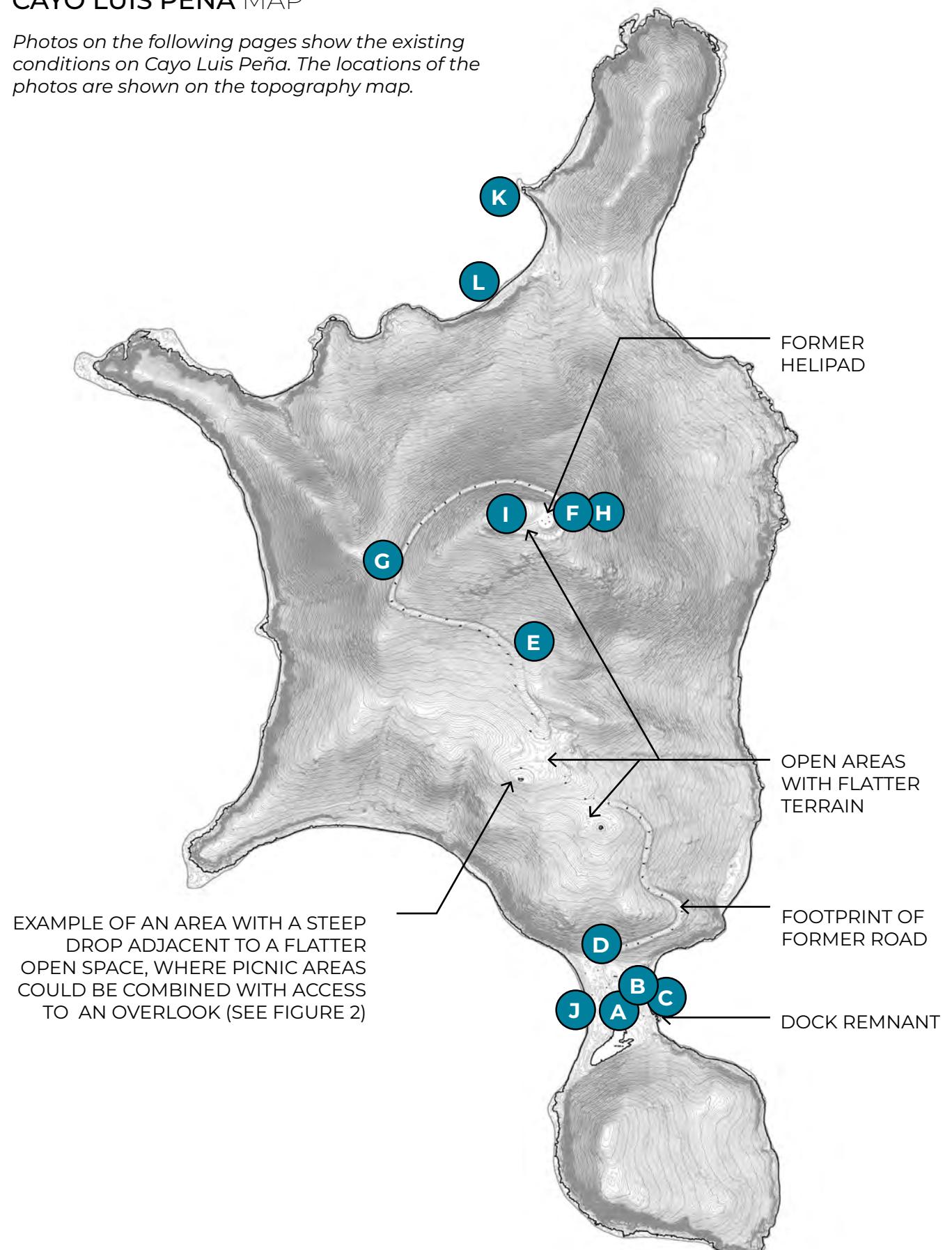
This level site could feature interpretive displays that tell the story of the island's history, culture, and ecosystems through visuals, art, and storytelling. A climbing tower at this site could elevate visitors into the treetops, offering a bird's-eye view of the surrounding environment and creating a memorable experience that blends recreation with education.

Reviewing a topographic map will provide valuable information when planning. In the GIS-generated map of Cayo Luis Peña (on the following page), the footprint of the former military road, carved into the hillside and winding to the top, is clearly visible. Rather than creating a new trail on the steep terrain, the existing road should be evaluated for renovation as a trail.

The grayscale tones on the map offer additional insights: darker areas indicate steeper terrain, while lighter regions suggest a more moderate slope. These lighter areas could serve as potential locations for bathrooms, picnic areas, or rest stops along the trail. Conversely, the steep slopes shown in darker tones are unsuitable for site improvements. However, where steep areas are adjacent to moderate regions, there may be opportunities to develop short access trails leading to an overlook.

## CAYO LUIS PEÑA MAP

Photos on the following pages show the existing conditions on Cayo Luis Peña. The locations of the photos are shown on the topography map.



**FIGURE 1**





H



I



J



K



L



L

## SUSTAINABLE DEVELOPMENT STRATEGIES

- ◆ **Visitor Management:** Determine the capacity of the island and develop strategies to maintain visitor numbers at sustainable levels.
- ◆ **Marine Protection:** Consult with the National Oceanic and Atmospheric Administration (NOAA) to determine optimal placement for mooring buoys to protect sensitive marine habitats and install the buoys in designated areas.
- ◆ **Safety Assurance:** Ensure all dangerous munitions have been removed or neutralized.
- ◆ **Habitat Protection:** Remove invasive species and use temporary fencing and signage to protect sensitive habitats during construction.
- ◆ **Trail Development:**
  - ◊ Mark the trail route and locations for overlooks, bathrooms, and picnic areas prior to construction, adjusting as necessary to avoid impacting large trees or sensitive habitats.
  - ◊ Develop new trails within the footprint of the former road, using on-site materials where possible
  - ◊ Identify potential areas of interest and extend trail access and put up signage to discourage off-trail activities.
  - ◊ Use trails for construction access to minimize additional habitat disturbance.

- ◆ **Runoff Management:** Maintain and, if necessary, improve the existing swale along the uphill side of the former road to capture and slow runoff. Install periodic outlets leading to rain gardens to reduce the risk of excess water in the swale (see Figure 2).
- ◆ **Wayfinding:** Clearly mark trailheads with information on distance, slope, and difficulty, and make this information available online.
- ◆ **Durable Infrastructure:** Construct site structures using materials designed to withstand hurricane-force winds.
- ◆ **Overlooks:** Create designated overlooks to discourage visitors from venturing off-trail in search of good viewpoints.
- ◆ **Education and Interpretation:**
  - ◊ Use signage to share the history and ecological significance of Cayo Luis Peña.
  - ◊ Promote responsible tourism by encouraging visitors to "leave no trace."
- ◆ **Amenities and Facilities:** Provide waysides with benches and picnic areas made from recycled or recyclable materials in light colors to reduce heat absorption.
- ◆ **Habitat Restoration:** Restore areas disturbed by construction.
- ◆ **Trash Management:** Remove trash from the east-facing beach and explore methods to prevent future pollution.

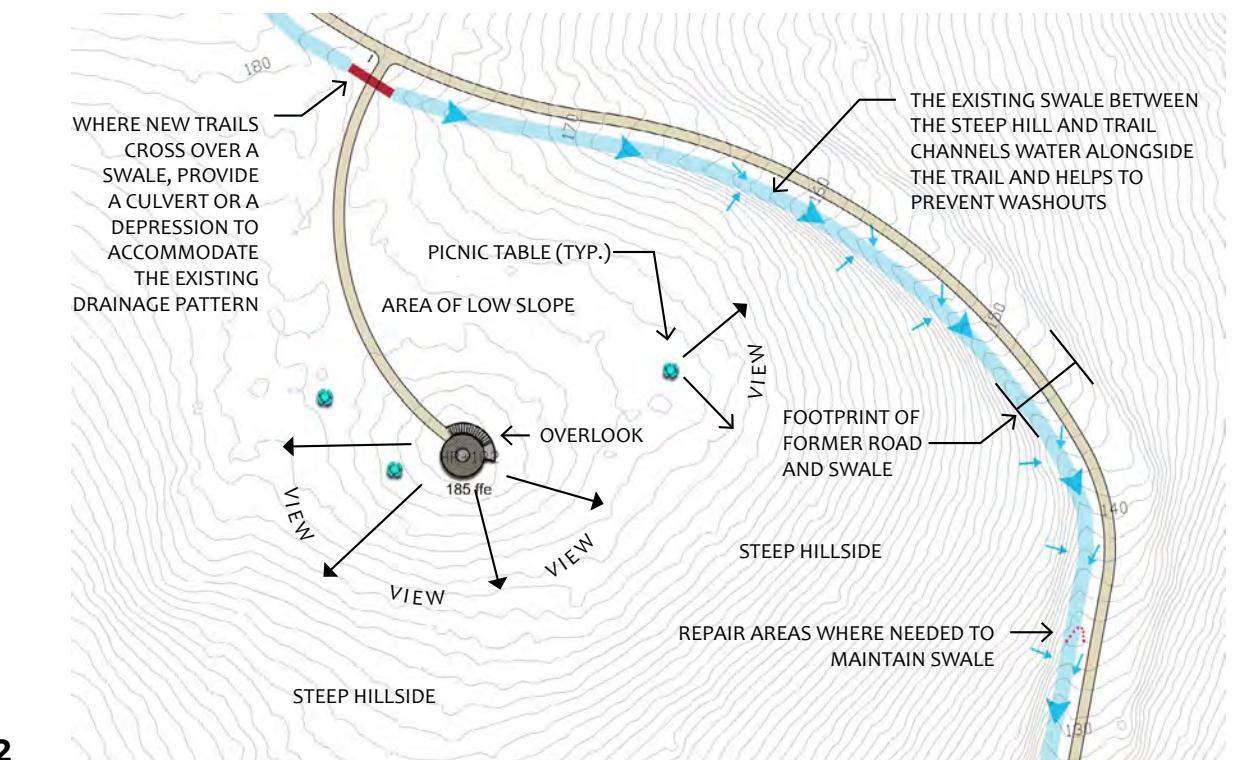


FIGURE 2



## CULEBRITA ISLAND

Culebrita shares many characteristics with Cayo Luis Peña. This 250-acre uninhabited island, located less than a mile east of Culebra, is also part of the Culebra National Wildlife Refuge managed by USFWS. Both islands were included in the 2012 Comprehensive Conservation Plan for the Culebra National Wildlife Refuge. However, Culebrita faces unique challenges due to its historic lighthouse and increasing tourism pressure. The Faro de Culebrita (the Culebrita lighthouse) and four surrounding acres were transferred from the U.S. Coast Guard to the Municipality of Culebra, requiring collaboration between the USFWS and the Municipality to create a shared vision for managing the site.

Culebrita, like much of the region, was impacted by the U.S. military who fired live torpedoes at the island during training exercises. In 2016, Culebra and its surrounding keys were highlighted in the U.S. Army Corps of Engineers Remedial Investigation Report. While munitions and fragments have been removed, it is unclear whether the cleanup is fully complete. Updated signage, installed in September 2023, warns visitors of potential hazards, provides guidelines for public use, and identifies the island as part of the National Wildlife Refuge.

Despite the absence of amenities such as bathrooms or picnic areas, visitors are drawn to Culebrita's pristine white sand beaches, unique geological features like its natural pools (also referred to as the baths), and its crystal-clear waters. The surrounding 1,200 acres of reefs and sea grass beds attract sea turtles, making the island a popular snorkeling destination.

Although access to Culebrita is only by boat, there are no docks or mooring buoys. Boats typically anchor near the beach, dropping an anchor off the stern, followed by an anchor off the bow, and visitors access the shore via dinghies or by wading through the water. This repeated activity likely harms marine habitats.

The lighthouse, perched 260 feet above sea level, is a key attraction. Though in disrepair, the 1886 structure remains largely intact, offering a glimpse into the island's history. The hilltop, covered in sparse vegetation, provides panoramic views in all directions. However, the surrounding area has debris, broken glass, and graffiti, creating safety concerns and detracting from the site's appeal. Beyond the lighthouse area, steep hillsides with precarious drops further highlight the need for caution and careful management of the site.

Trails to the lighthouse and beaches are relatively easy to follow. The trailhead from Tortuga Beach is marked by a sandy opening framed by palm trees and adorned with buoys. A post with brightly painted driftwood pieces indicate the general direction of key locations but wayfinding overall is sparse. Improved signage in the same colorful style as existing signs would help visitors navigate safely and discourage off-trail activities. Hard-to-detect trails should be marked with rocks or boulders, and signage should clearly indicate destinations, trail distances, and difficulty levels.

Culebrita's trails vary in terrain. Sandy trails near the beaches transition to clay and gravel as they ascend toward the lighthouse. The vegetation along the trails consists mainly of shrubs and small squat trees, with a few larger trees dotting the landscape and providing shade. The trail leading to the lighthouse is narrow and steep in sections but manageable for most hikers. The final 500-foot stretch gains 80 feet in elevation at a 1:6 slope, leading to a hilltop with open views and a water catchment system of check dams. The check dams, evenly spaced dams on a slope designed to temporarily hold stormwater runoff within its catchment area, are

made from mortared local rocks and have a storm pipe at the low point to capture and direct runoff away from the slope.

An award-winning report by Toro Arquitectos, completed in 2014-2015, outlined a plan for restoring the lighthouse, constructing a dock, and adding facilities like camping areas and bathrooms. The report included schematic designs, plans for new construction on the existing helipad, renovation ideas for the area around the lighthouse, and strategies for bringing water and electricity to the site. Additionally, a planting strategy by Vaccarino Associates identified native and endemic species for restoration efforts.

In 2015, the Municipality of Culebra entered into an usufruct agreement with [Para la Naturaleza](#), granting the group a 20-year period to lead restoration efforts. Fundraising efforts for the restoration are ongoing, but because there is an existing plan that includes the site immediately around the lighthouse, future efforts to improve the USFWS trails to the lighthouse should strive to be compatible with existing plans to ensure a cohesive approach to restoration and development.



The natural beauty of Culebrita makes it a popular destination, putting its fragile ecosystem at risk. If efforts to renovate the lighthouse succeed, management of construction will be needed to protect sensitive habitats. In addition, the renovated lighthouse is likely to attract even more tourists, making it imperative to assess the island's capacity and determine the resources and personnel needed to manage visitors.

Proper management includes establishing adequate mooring areas for boats and educating the public through signage and public outreach about the proper behaviors needed to protect the island and its marine habitats. The USFWS's Comprehensive Conservation Plan highlights visitor education in Objective 4-5: Environmental Education and Interpretation. The plan identified educational and interpretive services as "high priority" programs, stating that "the refuge should increase environmental education and interpretive contacts wherever possible." It also includes a strategy to "develop and install an interpretive panel on Culebrita Island."



Culebrita, with its diverse recreational opportunities, is a treasured destination for both locals and tourists. While studies are conducted to determine the island's visitor capacity, immediate actions should focus on developing educational materials, improving existing trails, and initiating procedures to protect the reef from the impact of heavy use. A 2016 publication, [An Implementation Framework for NOAA's Habitat Blueprint Focus Area in the Caribbean](#), identified Culebrita, Las Pelas, and Flamenco as locations to install Aids to Navigation (ATON) due to the damaging effects of frequent boat groundings. Priority should be given to installing mooring buoys and enforcing mooring rules to mitigate reef damage.



## SUSTAINABLE DEVELOPMENT STRATEGIES

- ◆ Visitor Capacity: Determine the island's carrying capacity and develop strategies to aid with visitor use management.
- ◆ Marine Protection: Work with NOAA to identify areas to install mooring buoys to protect sensitive marine habitats.
- ◆ Safety: Ensure the removal or neutralization of dangerous munitions.
- ◆ Habitat Protection:
  - ◊ Use temporary fencing and signage to protect sensitive habitats during construction.
  - ◊ Remove invasive species where necessary.
- ◆ Trail Improvements:
  - ◊ Repair and maintain existing trails, focusing on drainage and accessibility.
  - ◊ Use existing trails for construction access to minimize new disturbances. Restore any areas disturbed by construction.
- ◆ Clearly mark trailheads with detailed information on distance, difficulty, and destinations. Highlight this information on site and online.
- ◆ Identify potential areas of interest and extend trail access or post signs to discourage off-trail activities.
- ◆ Amenities and Facilities:
  - ◊ Identify suitable locations for bathrooms, picnic areas, and overlooks, prioritizing flatter terrain and avoiding large trees or sensitive habitats.
  - ◊ Structures should be constructed with durable materials designed to withstand hurricane force winds.
  - ◊ Use recycled or recyclable materials in light colors to reduce heat absorption.
  - ◊ Consider adding benches along the trails every 300 feet.
- ◆ Educational Signage: Install interpretive panels highlighting the island's history, ecology, and the importance of conservation.
- ◆ Trash Removal: Remove debris from beaches and implement measures to prevent future pollution.
- ◆ Overlooks: Construct designated overlooks to prevent visitors from blazing their own trails to viewpoints.

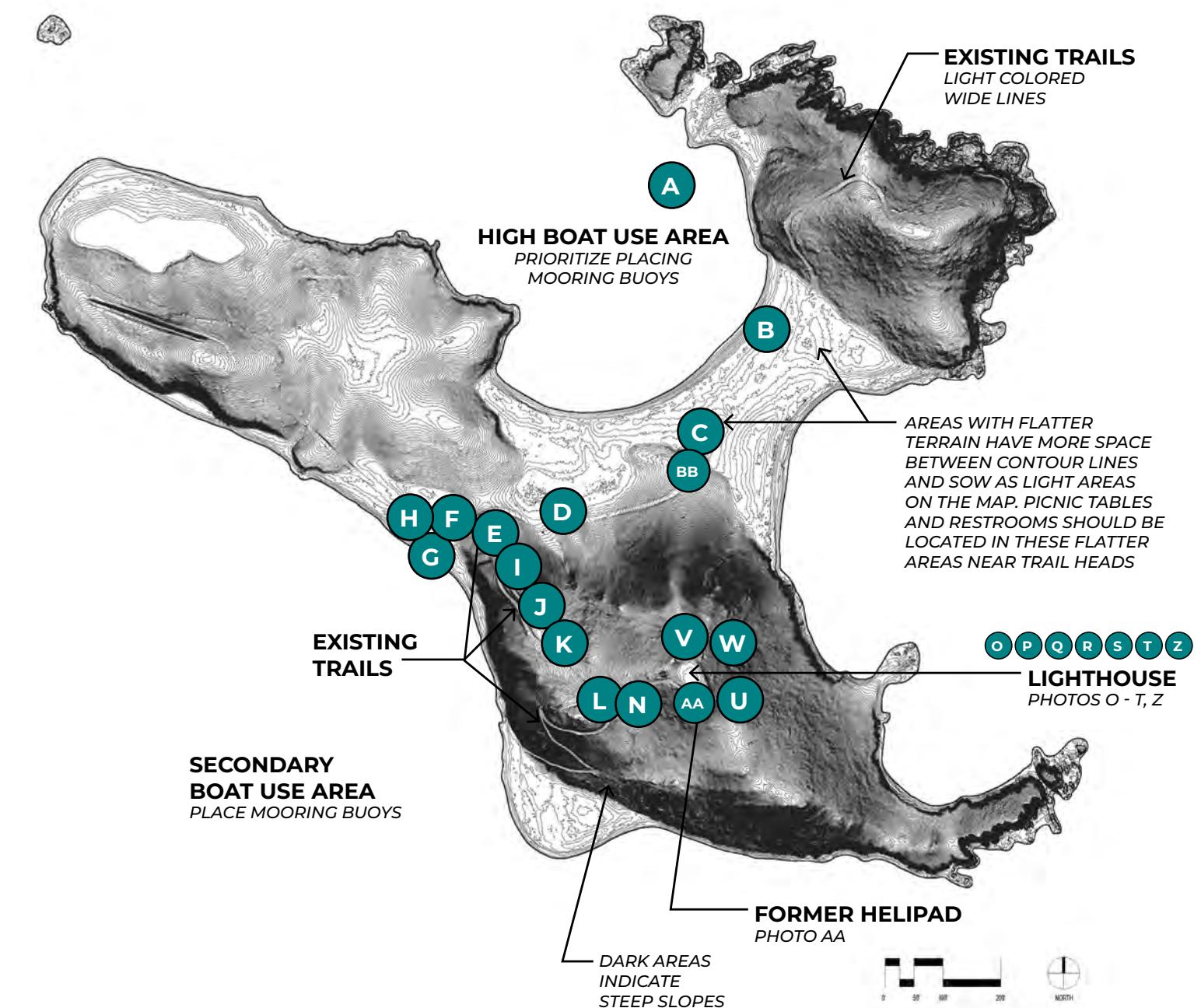
As with Cayo Luis Peña, topographic mapping provides valuable guidance for planning on Culebrita. This GIS-generated map reveals that existing trails are more visible on steeper slopes but harder to detect in flatter areas. Whenever possible, existing trails should be improved rather than creating new trails to minimize environmental disturbance.

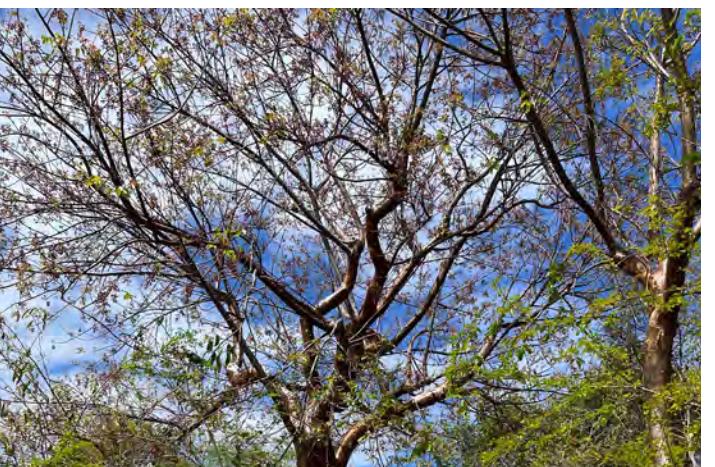
On steep slopes, closely spaced contour lines and darker tones indicate challenging terrain, while lighter areas suggest moderate slopes suitable for site improvements like picnic areas or bathrooms. Darker areas are too steep and should be avoided for development.



## CULEBRITA ISLAND MAP

Photos on the following pages show the existing conditions on Cayo Culebrita. The locations of the photos are shown on the topography map.







P



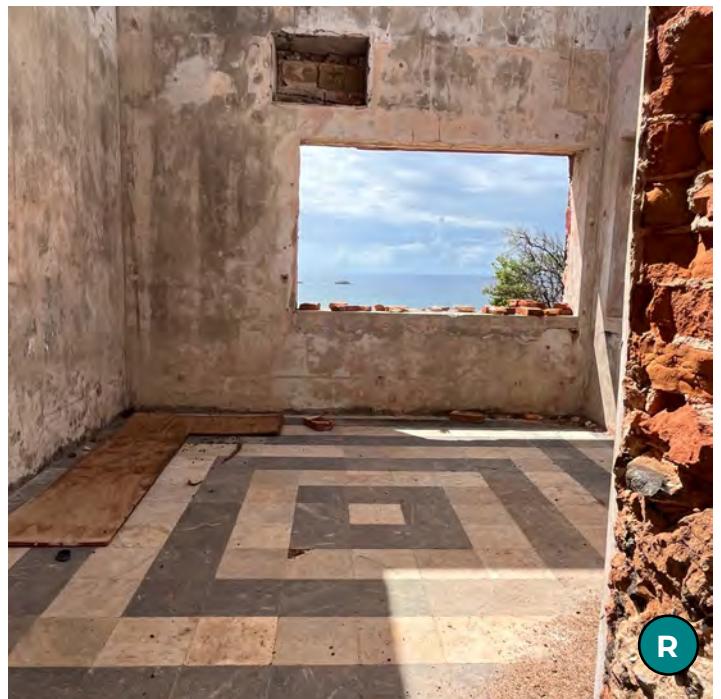
Q



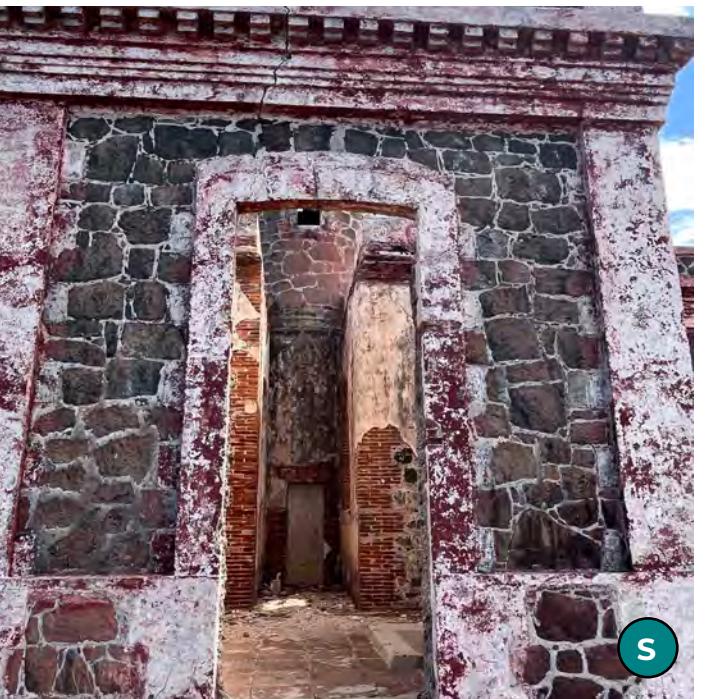
V



W



R



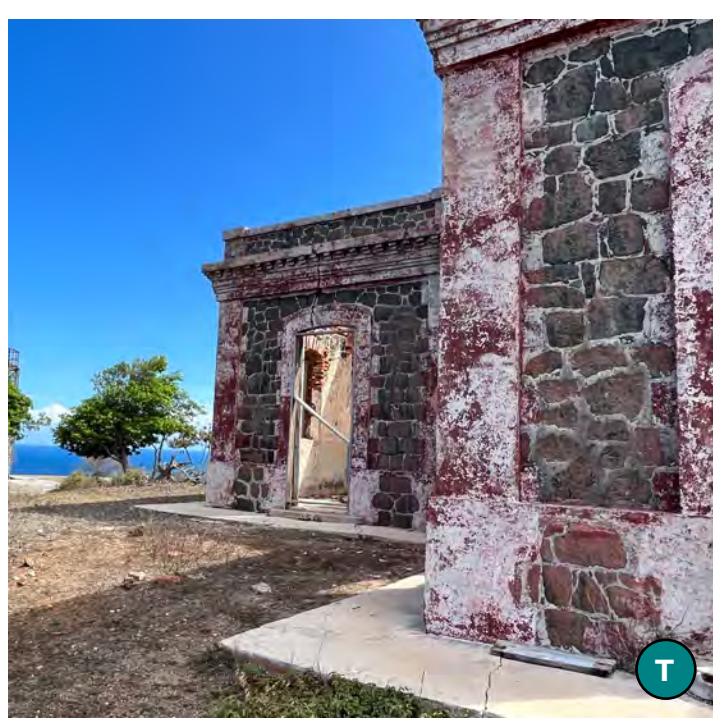
S



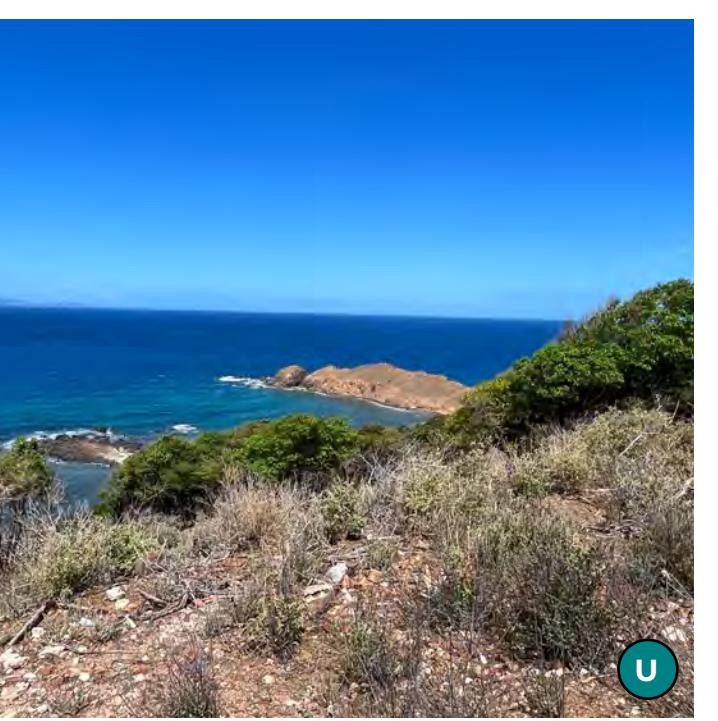
X



Y



T



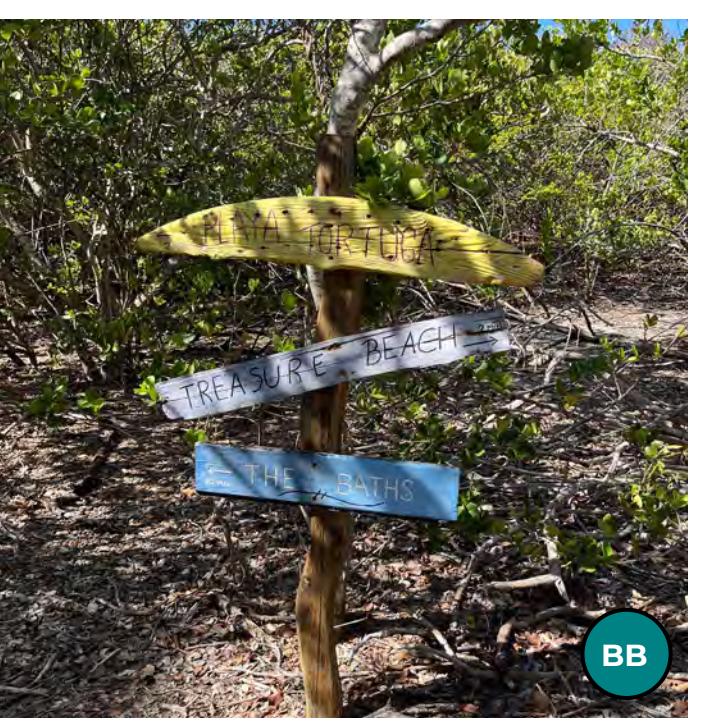
U



Z



AA



BB

## PUNTA SOLDADO

In 1982, Punta Soldado, a 328-acre area located on the southern-most point of Culebra, was acquired by the Governor of Puerto Rico from the U.S. Department of the Interior. It is managed jointly by the Municipality of Culebra and the Departamento de Recursos Naturales y Ambientales (DRNA), which translates to the Puerto Rico Department of Natural and Environmental Resources.

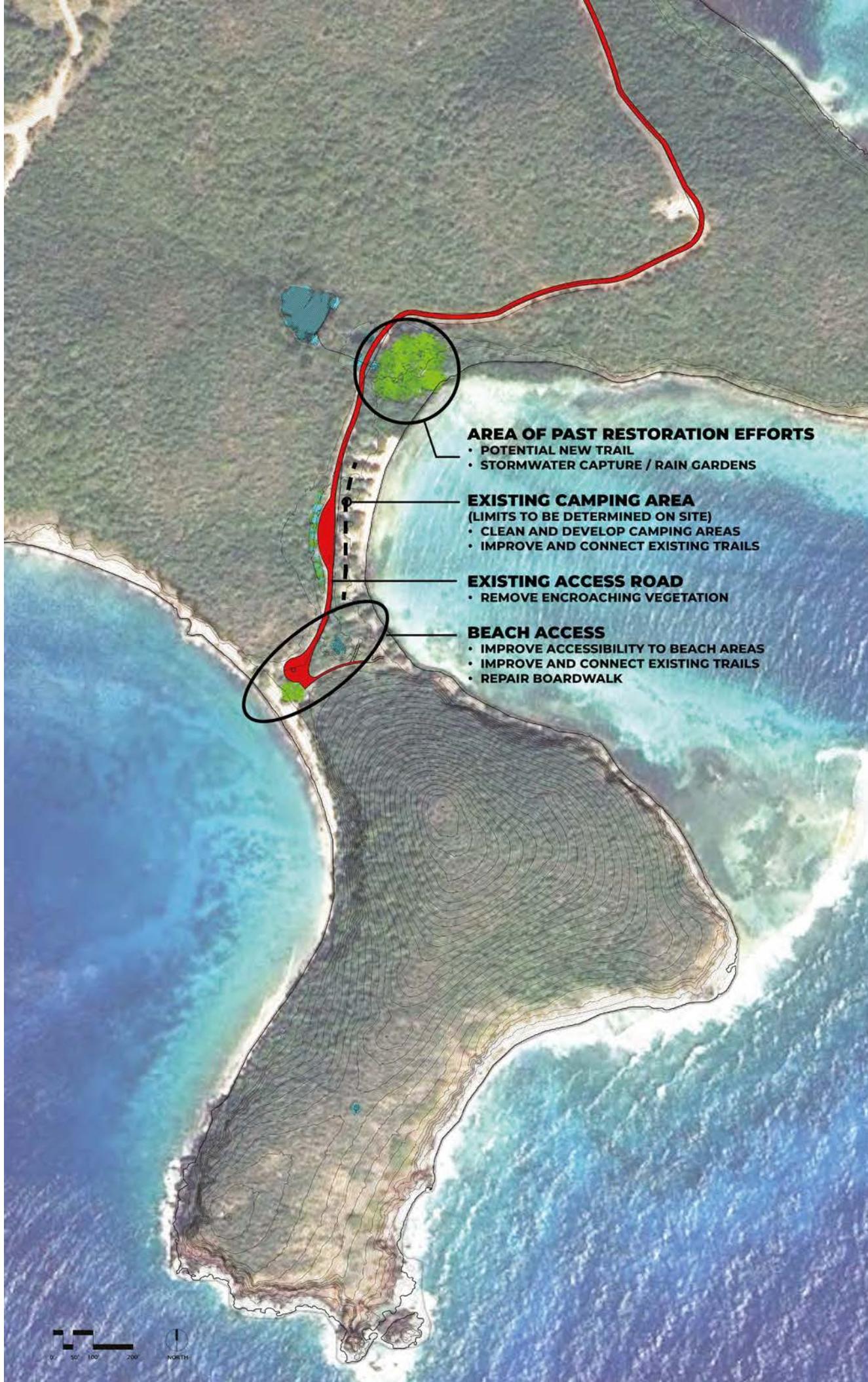
Punta Soldado is a popular camping destination, with residents often claiming areas along its eastern shore. The gated entry point, situated at the top of a steep hill 50 feet above the sea, is surrounded by pristine, steeply sloped hills covered in cacti, rising to elevations of 200 to 300 feet. After crossing the gate, the asphalt road transitions to a dirt-and-gravel surface that is prone to erosion and rutting. The 0.35-mile entry drive winds through dense vegetation, offering glimpses of the sea below, and leads to two parking areas that serve the adjacent beaches.

As with many areas of Culebra, Punta Soldado bears the designation of a "formerly used defense site." During the U.S. Navy's presence, it was used for training exercises that involved mortar firing, bombing, and strafing. While the site was slated for a Remedial Investigation and Feasibility Studies, the status of munitions cleanup remains unclear.

During public outreach sessions in Culebra, the municipality shared a conceptual plan for improvements at Punta Soldado. The plan, developed by DRNA, NOAA, Protectores de Cuencas (Protectors of Watersheds), and the Municipality of Culebra, included features such as an observation tower, informational kiosk, interpretive trails, camping areas, picnic shelters, restrooms, and locations for runoff and sediment control.

Although the date of the conceptual plan is unclear, it may have been a response to NOAA's [Culebra Community Watershed Action Plan for Water Quality and Coral Reefs](#) from 2014. Punta Soldado, already a site for coral restoration efforts, was identified as a high priority in the watershed plan. The plan recommended cost and quantity evaluations to address the bare soil parking lot, vehicle access to the shoreline, and erosion along the dirt access road leading to Punta Soldado. Additional stormwater management measures, such as rain gardens and sediment traps, were outlined in the plan.

Some portions of the conceptual plan have been implemented. A [NOAA article from 2017](#) highlights the work completed by local organizations, including the construction of a flood control pond. Additionally, approximately 800 feet (0.17 miles) of the dirt road starting at the parking area near Punta Soldado Beach has been paved with gravel and enclosed with curbs.



## PUNTA SOLDADO ENHANCEMENTS BY THE TEXAS CONSERVATION CORPS (TXCC)

With the TXCC scheduled to arrive, public meetings were held to determine how best to use their time. After multiple meetings, partners agreed that trail improvements at Punta Soldado would best serve Culebra's residents due to its easy access and clear ownership. NPS-RTCA reviewed the existing conceptual plan and proposed relocating trails to flatter slopes between the beaches and consolidating camping areas in an open space. However, after reviewing the proposed trail relocation, the partners decided against it to avoid disrupting the habitat and causing potential erosion in an otherwise undisturbed area. They opted to retain the original camping areas and instead focus on enhancing the existing amenities.

A site visit by representatives from NPS-RTCA, TXCC, US-FWS, and the Municipality of Culebra resulted in a detailed plan of action. TXCC's tasks included:

- ◆ Removing trash and clearing vegetation from the trails and driveway
- ◆ Removing invasive species
- ◆ Delineating trails to the beaches
- ◆ Creating an accessible route from the parking lot to the beach
- ◆ Planting native plants, donated by SEVA, in the parking islands

The steep dirt drive remains prone to rutting and erosion. Cost-effective erosion control methods should be identified and implemented promptly to preserve access and prevent further damage.



TRASH ON PUNTA SOLDADO



## CULEBRA NATIONAL WILDLIFE REFUGE OFFICE

The TXCC also provided support to the trail behind the Culebra National Wildlife Refuge Office in Fraile, Culebra. Located south of Route 250 and east of Muelle San Idelfonso, the building sits on a hill overlooking Ensenada Honda. It shares a driveway with the Authority for the Development and Conservation of Culebra (AC-DEC), a local government agency.

The area surrounding the USFWS office features a raised wooden deck and overlook offering stunning views of Ensenada Honda, along with an informational panel about Culebra's bird species. A small grassy parking area is located east of the overlook for visitors. Across the driveway, a kiosk provides information about Culebra's flora and fauna, complemented by shaded concrete picnic tables beneath mature trees.

The headquarters shares its space with a maintenance building and service yard, enclosed by a tall, gated chain-link fence. The administrative office has an accessible entry and a raised landscape bed with native plants.

To the south of the building lies a large open lawn that wraps around the east side of the compound, with trees scattered throughout. This area, which gently slopes between 1% and 5%, is open to the surrounding woodland where a loop trail is located. The lawn is fenced off from the USFWS housing unit to the south.

The existing trail spans approximately 600 feet, winding through wooded hillsides characterized by tall cacti, mature trees, shrubs, and steep rocky terrain. With an average slope of 30% and a 30-foot elevation change, the trail descends to the edge of a mangrove swamp before returning to the open lawn at the top of the hill.



To improve connectivity and visibility, representatives from the USFWS, NPS-RTCA, TXCC, agreed to extend the trail through the lawn to link it with the overlook and picnic area. The following improvements were implemented:

- ◆ Trail Extension: The trail was extended 384 feet to connect to the overlook and picnic tables, passing through the lawn and closing the loop of the existing trail.
- ◆ Trail Widening and Slope Management: Improvements were made to the existing trail by widening it and adding steps using onsite boulders to make steep sections more accessible.
- ◆ Benches and Signage: The TXCC installed a bench along the trail and added directional signage at key points.
- ◆ Interpretive Features: Small signs identify significant plants and habitats within the trail system.
- ◆ Trail Delineation: Marked the trail through the lawn with rocks for better definition.

To further enhance the visitor experience, the following goals have been identified:

- ◆ Install trail information signage with details on slope, accessibility, and distance.
- ◆ Add shaded seating at the trailhead.
- ◆ Convert the lawn area into a native meadow, beyond the trail edges.
- ◆ Place additional picnic tables and benches near shade trees between trailheads.
- ◆ Construct a wooden lookout for views into the mangrove swamp, with interpretive panels.
- ◆ Add directional signage at the shared driveway entrance to highlight USFWS facilities.
- ◆ Paint the chain-link fence black to help reduce its visual impact.

The work completed by the TXCC transformed the little-known trail into a recreational destination. Visitors can now enjoy scenic views of Ensenada Honda, relax at the picnic areas, and explore the woodland trail while learning about Culebra's diverse flora and fauna, as well as the efforts of the USFWS to protect them.



# Summary

Culebra, a small island municipality, is celebrated for its pristine beaches, vibrant marine life, and rich cultural heritage. Initially inhabited by the Taíno people and later the Spanish, it became a military site during the 20th century. The island has faced challenges from leftover munitions, increased frequency of hurricanes, and more recently, increased tourism, which have impacted its ecosystems and infrastructure. Conservation efforts are continually underway to protect local ecosystems from these impacts and to balance tourism with community needs.

In September 2022, NPS-RTCA began collaborating with Culebra's Municipal Planning Director to develop a plan for conservation and outdoor recreation. Over two

years, NPS-RTCA conducted site visits, community engagement sessions, and partnered with organizations such as the Texas Conservation Corps (TXCC) and the Green Infrastructure Center (GIC) to identify priorities and implement projects.

The two-year project utilized several community engagement methods to ensure residents' goals and needs were integral to the planning process. The intent was to meet the community where they were to ensure that residents of all ages and backgrounds were heard. Through the process, themes emerged that led to a series of key initiatives, including quick turnaround projects, recommendations for ongoing actions, subjects for targeted studies, and long-term projects.

In response to the community's desire for impactful actions, the following quick turnaround projects were completed within the two-year project period:

- ◆ Punta Soldado Enhancements with the TXCC: A public trail-building and maintenance workshop was held to clean up the existing camping area, remove invasive plants from trails, and create an accessible beach route.
- ◆ National Wildlife Refuge Trail with the TXCC: TXCC extended and improved trails, added benches, signage, and interpretive features.
- ◆ Mangrove and Tree Canopy Mapping with the GIC: A study of Culebra's land cover identified areas for potential tree and mangrove planting, prioritizing locations needing shade, with high temperatures, and where canopy has the greatest stormwater impact. GIC's maps and tools provide residents with essential resources to address canopy loss.
- ◆ Cayo Pirata: A conceptual plan was developed from community input to transform Cayo Pirata into a recreational destination for Culebra's residents. The plan outlines sustainable development and resilience strategies.

The following recommendations include incremental actions focused on improving the incredible recreational resources already available on the island, a proposed organizational structure to coordinate the efforts of the island's many community service groups, and topics for further study to support long-term goals.

# Recommendations

## AN ORGANIZING STRUCTURE

There is a strong presence of community leaders participating in various organizations, sometimes with overlapping goals. Human capital is often stretched to capacity, with individuals involved in a variety of projects across the island. Culebra could benefit from establishing a steering committee to coordinate efforts among residents, leaders, organizations, and government agencies working to preserve the island's natural and cultural assets through outdoor recreation, community resilience, and stewardship projects.

- ◆ Consider establishing a steering committee or alliance that is dedicated to creating accessible outdoor recreation opportunities, implementing natural disaster resiliency projects, and promoting environmental stewardship:
  - ◊ Identify a leader, organization, or agency to host and convene partners
  - ◊ Identify technical assistance support such as planners, facilitators, or organizers to support the establishment of the steering committee alliance
  - ◊ Identify key partners that should be involved in ongoing discussions
  - ◊ Develop a charter to help guide the steering committee, clarify roles and responsibilities, and outline commitments
  - ◊ Identify short- and long-term goals for implementation
- ◆ Local leaders and nonprofit organizations should actively engage the community in planning efforts to ensure inclusive decision-making and foster support for conservation initiatives:
  - ◊ Develop an engagement strategy
  - ◊ Include all age and demographic groups
- ◆ Encourage youth engagement through outdoor recreation initiatives and conservation projects:
  - ◊ Work with and dedicate a seat on the steering committee for a representative from Environmental Leaders of Culebra.

## COMMUNITY PRIORITIES

### CAYO PIRATA

Although full redevelopment will require significant investment, small improvements can enhance usability in the meantime:

- ◆ The first step should be to reconstruct at least a portion of the dock to make the island accessible.
- ◆ Organize a series of community clean-up efforts to remove hurricane debris, unsafe structures, and invasive vegetation.
- ◆ Once cleared, the municipality could build trails and plant native trees and shrubs to open the island for public use.
- ◆ Reuse existing picnic shelters until funding is secured for removal and replacement.
- ◆ Plan future additions (e.g., camping platforms, play structures) through annual budgets or grants.
- ◆ Fund larger projects (e.g., community hall, lighthouse) via a capital improvement campaign.



AN AERIAL VIEW OF CAYO PIRATA WHERE GAZEBOS AND OTHER STRUCTURES CAN BE SEEN.

### TRAILS

Despite public land covering approximately 25% of the total landmass in Culebra, there is a notable lack of a connected public trail system. Public input revealed a desire for a robust trail system on the island with access to scenic viewpoints, connections to beaches, and links to local businesses. Although public land is available that could possibly support an expansive trail system, barriers such as unexploded ordinances and restricted access to some public spaces pose difficult hurdles. Yet, other trail systems have overcome similar barriers. Next steps may include:

- ◆ Collaborate with the US Military to map cleared and hazardous areas
- ◆ Plan and host community workshops to discuss trail connection opportunities, improvements, and accessibility:
  - ◊ Map existing and proposed trails; explore connectivity
  - ◊ Identify landowners and physical barriers
  - ◊ Highlight safety concerns
- ◆ Analyze results from the desired trail system, overlaid with constraints to develop a trail master plan that highlights early achievable goals:
  - ◊ Seek formal Master Plan adoption
- ◆ Prioritize trail projects and outline next steps for construction.

## EDUCATION

While many efforts are already underway, the public engagement process revealed a desire and need to educate the public about the island's natural resources and best practices for minimizing impact and supporting conservation. Currently, signage highlighting the various island habitats and wildlife can be found at beaches, on overlooks, and in businesses. Several local organizations and schools are actively engaged in expanding environmental stewardship efforts by promoting understanding of the local ecosystem through multiple educational programs. However, despite these robust efforts, the community recognizes that the constant influx of visitors creates the need for an organized campaign to protect their valuable resources and quality of life.

Strategies to launch an **educational campaign** to provide tourists with information on Culebra's environment and conservation practices, starting with materials shared on the ferry or plane ride to the island, may include:

- ◆ Work with the steering committee on a purpose statement for the educational campaign to:
  - ◊ Identify who should lead the campaign efforts.
  - ◊ Prioritize and categorize the subjects to be promoted. Possibilities include a Leave No Trace campaign, do's and don'ts of snorkeling, turtle nesting information, and other island-wide conservation efforts.
    - ◊ Identify existing programs that support the key subjects and determine how they can be promoted to locals and shared with visitors.
    - ◊ Identify what platforms are needed for an effective educational campaign.
      - ◊ Tailor the platforms for each subject
  - ◆ Develop new educational materials, including a website, brochures, and other resources, to promote sustainable tourism.
    - ◊ Identify what materials need to be produced, who will produce them, and how they will be used to launch a successful campaign.
  - ◆ Collaborate with hotels and lodging hosts to provide guests with information about conservation practices and local businesses they can support.

## LOCALLY GROWN FOOD

Through the public engagement process, the community expressed concerns about food accessibility—both historically and looking ahead. Food resources in Culebra are scarce due to its geographic remoteness, transportation barriers, and the loss of local food growers. With improved opportunities for agriculture and gardening, the island could potentially supply fresh food to residents and local businesses while reducing the burden of transporting goods. Mujeres de Islas and SEVA are currently leading efforts in this realm and D's Garden is providing a nursery experience. However, additional efforts are needed:

- ◆ Develop an action plan for the Local Foods, Local Places (LFLP) program to support local agriculture, sustainable food systems, and community health. The LFLP program could also help boost economic opportunities for fishermen, farmers, and local businesses by fostering connections between growers, markets, and consumers.
- ◆ The steering committee should host a conversation about local agricultural practices and regenerative agriculture.
  - ◊ This conversation should include local food business owners to better understand the support they need to operate sustainably.
- ◆ Explore locations for community gardens in local neighborhoods.



"MUJERES DE ISLAS' PROYECTO SIEMBRA IS AN AMERICORPS PROGRAM THAT PROMOTES SUSTAINABILITY IN CULEBRA THROUGH COMMUNITY GARDENS, ENVIRONMENTAL EDUCATION, AND HEALTHY EATING. THE PROGRAM OPERATES OUT OF SEVA (SEDE DE EXPERIENCIAS VIVAS DE APRENDIZAJE), A COMMUNITY SPACE THAT HOSTS THE GARDENS AND OFFERS HANDS-ON LEARNING IN ART, COOKING, SEWING, GARDENING, AND MORE. PHOTOS COURTESY OF MUJERES DE ISLAS

## Recommendations

# ONGOING ACTION ITEMS

## BEACHES

Past restoration efforts at Tamarindo Beach have been successfully implemented and provide a good example of how to protect similar beaches from stormwater impacts, improve accessibility, and enhance biodiversity through native plantings.

- ◆ Develop a beach renovation schedule that lists needed maintenance.
- ◆ Revisit past coastal restoration and stormwater management studies for recommendations about specific sites and add the appropriate recommendations to the schedule.
- ◆ Review beach access points and improve them to ensure accessibility.
- ◆ Provide a vegetated separation between the beach and parking areas to capture and filter runoff.
- ◆ Public information about unfamiliar habitats is essential to their protection. In keeping with the educational campaign, provide informational panels to educate beachgoers about specific habitats, how to manage their behavior to protect them, and to carry forth the message to “leave no trace.”
- ◆ Once a comprehensive Beach Renovation Schedule is complete, prioritize where efforts need to be focused. It may be possible to hold a community-wide workshop to tackle aspects such as trash and invasive plant removal, repairing existing boardwalks, and replanting native species to stabilize slopes against erosion and align with tree and mangrove mapping priorities.

## EXISTING RECREATIONAL FACILITIES

A list of recommendations can be found on pages 30-33 to improve the user experience at the community's parks and plazas. Make ongoing, small-scale improvements to existing facilities to help transform these spaces into areas that are more user-friendly, safe, and appealing. To accommodate residents of all ages, these improvements should include enhancing accessibility, adding safety surfacing under existing play structures, and providing shade over play areas and along trails. These improvements can be added to the yearly parks maintenance plan and completed over a multi-year time frame.

## TREE CANOPY AND MANGROVE

### RESTORATION

Through the community engagement process, NPS-RTCA heard repeated concerns about the loss of tree canopy and mangroves. Residents expressed the desire to increase tree and mangrove planting and to develop a plan to protect the existing canopy as a strategy to enhance the island's resiliency to natural disasters. Organizations and residents participated in discussions with the Green Infrastructure Center to learn how to employ the mapping tools to their greatest benefit and how to use the data analysis tools. Because the scope of desired projects and needs is large, it would be useful to identify a person who can commit time and capacity to lead the restoration efforts by doing the following:

- ◆ Use the Green Infrastructure Center's Tree Canopy and Mangrove Maps to identify and list priority tree and mangrove planting areas.
- ◆ Serve as a liaison to the proposed steering committee.
- ◆ Continue developing an Urban Tree Canopy Plan to enhance green spaces and mitigate urban heat.
- ◆ Conduct research on how other cities have developed tree canopy projects, campaigns, and communication strategies (e.g., NPS-RTCA's collaboration with project partners in Honolulu, Hawaii: [Guide to Enhancing Your Urban Tree Canopy](#)).
- ◆ Present findings to the steering committee and help set annual planting goals.
- ◆ Work with community organizations to begin an ongoing tree and mangrove seedling/propagation program.
- ◆ Plan a tree planting event using the developed priority list and invite the community to participate.
- ◆ Increase mangrove restoration efforts in collaboration with the USFWS's [Coastal Program](#).
  - ◆ Work in partnership with USFWS to create a dedicated mangrove restoration program.
  - ◆ Identify funding and technical support to develop the program.
  - ◆ Implement a yearly mangrove restoration event with locals and visitors.

# HIGH PRIORITY ACTION ITEMS

## CAYO LUIS PEÑA AND CULEBRITA

Despite the desire of some for new trails and amenities on Cayo Luis Peña, there are valid concerns regarding the USFWS's ability to manage increased visitation to the island and the current lack of habitat protection measures. It is important to conduct a study to determine the island's visitor capacity and the capability of USFWS staff to manage and maintain any increase in visitors, even before considering improvements. It may be that the island is already at capacity, and steps need to be taken to reduce or maintain current levels.

Although there are similarities between Culebrita and Cayo Luis Peña, Culebrita sees a much larger volume of visitors. While the project efforts on the two keys focused on improving habitat protection in the short term and studying ways to improve the visitor experience through the sustainable development of new amenities, important findings included the urgent need to protect the marine habitats on both keys from boat traffic using known solutions such as mooring buoys. As with Cayo Luis Peña, the USFWS should study the visitor capacity of Culebrita before making any improvements that could increase use.

To that end, NPS-RTCA recommends delaying any improvements that would facilitate increased recreational opportunities and instead prioritizing the protection of fragile marine habitats and the removal of any remaining munitions while getting a clear understanding of available capacity. Because the islands are currently open to visitors, the following steps are highly recommended:

- ◆ Marine Protection: Consult with the National Oceanic and Atmospheric Administration (NOAA) to determine optimal placement for mooring buoys to protect sensitive marine habitats and install the buoys in designated areas.
- ◆ Safety Assurance: Ensure all dangerous munitions have been removed or neutralized.
- ◆ Habitat Protection: Remove invasive species and replace them with native species that help increase biodiversity on the island.

## Recommendations

## STUDIES: SAFE ROUTES, ACCESSIBILITY, AND CONNECTIVITY

There's a need within the community to identify ways to improve transportation and walkability throughout the island to connect neighborhoods to businesses and recreational areas, reduce reliance on personal vehicles, and alleviate congestion downtown. To address issues that limit residents' and tourists' mobility, independent studies may need to be performed.

A **Transportation Study** of existing transportation options and routes may be needed to determine the viability of pedestrian and bicycle accommodations on existing routes and assess whether current transportation needs are being met.

It is important to ensure pedestrians can navigate the island. Although curb ramps have been placed in high-use areas, the narrow sidewalks and streets pose challenges for accessibility that are intensified by the island's topography. The beach environment presents an additional challenge to accessibility. Where possible, design or enhance spaces to ensure they are accessible to individuals of all abilities, including beaches, trails (where possible), parks, and walkways. An **Accessibility Analysis** may be needed to identify and prioritize targeted areas.

- ◆ Conduct an accessibility analysis of all crosswalks, intersections, public access points, and beaches.
- ◆ Develop a list of strategies to improve accessibility and create a matrix of targeted areas.
- ◆ Prioritize areas for immediate and future improvements.
- ◆ Identify funding sources and applicants for ADA improvements.

Implement a multimodal transportation policy for future roadway improvements using basic principles from the 'Complete Street' philosophy, which includes:

- ◆ Ensure all users can safely navigate the streets by making general accessibility improvements, including crosswalks and bike share lanes.
- ◆ Incorporate traffic-calming measures such as roundabouts, medians, curb extensions, and curb ramps.
- ◆ Design walkways for comfort with a minimum width of 5' where feasible and include seating and shade trees or structures along frequently used routes.
- ◆ Design for convenience by identifying areas where pedestrian routes do not connect neighborhoods to key public spaces and develop plans to address the gaps.
- ◆ Design for sustainability by implementing green infrastructure to reduce stormwater runoff, such as permeable pavers, curbside rain gardens, vegetated swales, and check dams on sloped terrain.

The following steps could be taken to formalize a **Complete Street Analysis**:

Identify a leader from the steering committee to coordinate Complete Street efforts.

- ◆ Choose an audit or assessment tool that suits the community.
  - ◊ [The AARP Walk Audit Tool Kit Worksheet](#) is one example. Modify it to fit your community needs.
- ◆ Invite students and community members to participate in the walk audit.
- ◆ Based on the results, develop an analysis and a prioritized list of areas for improvement.
- ◆ Once the analysis is completed, identify specific strategies and actions the community would like to implement.

## TRANSPORTATION SURVEY

Conduct a survey to identify the transportation needs of residents and visitors, what modes of transportation are currently used, and which private or public options would best meet their needs.

- ◆ Work with the steering committee, municipality, and local businesses to discuss the survey results and generate solutions.
  - ◊ Explore the idea of a hop-on, hop-off system and identify how it could reduce carbon emissions, serve residents, and strategically guide visitors to local businesses.
- ◆ Conduct a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis of the proposed solutions.
- ◆ Identify resources needed and develop a path for implementing any new system.
- ◆ Work with the steering committee and municipality to decide on a sustainable transportation system solution.

Finally, a **Parking Study** should be conducted to optimize parking availability and reduce congestion. There is currently a heavy reliance on personal vehicles for residents and visitors alike. With limited parking in high-traffic areas, finding a space to park often requires circling blocks and neighborhoods, adding to traffic congestion.

- ◆ Set up a meeting, facilitated by a neutral third party, to discuss existing conditions, identify opportunities, and develop strategies for implementing parking improvements.
- ◆ Recommended participants for the parking study: the steering committee, municipal officials, and transportation experts.

## Recommendations

The recommendations outlined in this report were developed through a collaborative and community-driven process, ensuring that the priorities and concerns of Culebra's residents were at the heart of the planning efforts. By integrating input gathered from meetings, interviews, and public engagement sessions, the recommendations and strategies outlined in this report address key challenges related to conservation, outdoor recreation, and resilience to natural disasters. Moving forward, the continued involvement of local leaders, nonprofit organizations, and the broader community will be essential in implementing these recommendations and preserving Culebra's rich cultural and natural heritage for future generations.



## APPENDIX 1

The following maps capture areas that Culebra residents and local leaders identified as areas of concern, as well as those related to conservation, outdoor recreation, tree canopy, and reforestation.

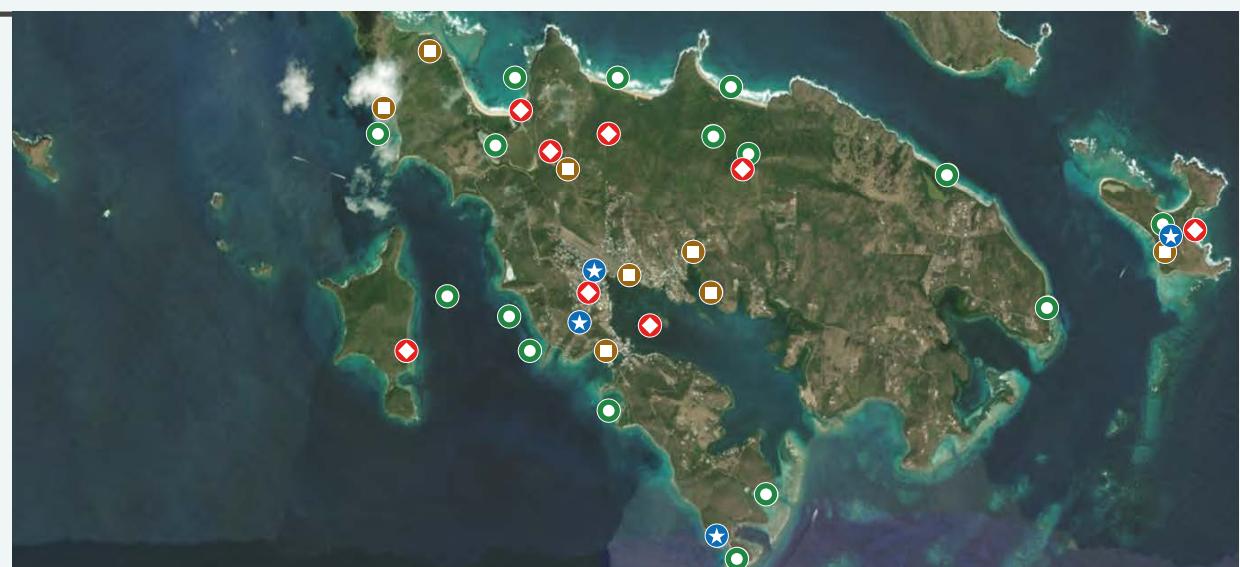
### CONSERVATION AND OUTDOOR RECREATION AREAS

WHAT ARE YOUR FAVORITE RECREATIONAL SPACES? (GREEN ●)

WHAT ARE THE MOST IMPORTANT CULTURAL SPACES FOR THE COMMUNITY? (BROWN ■)

WHAT PREVENTS YOU FROM ENJOYING THESE SPACES? (RED ♦)

WHAT IDEAS DO YOU HAVE TO SOLVE THESE PROBLEMS? (BLUE ★)

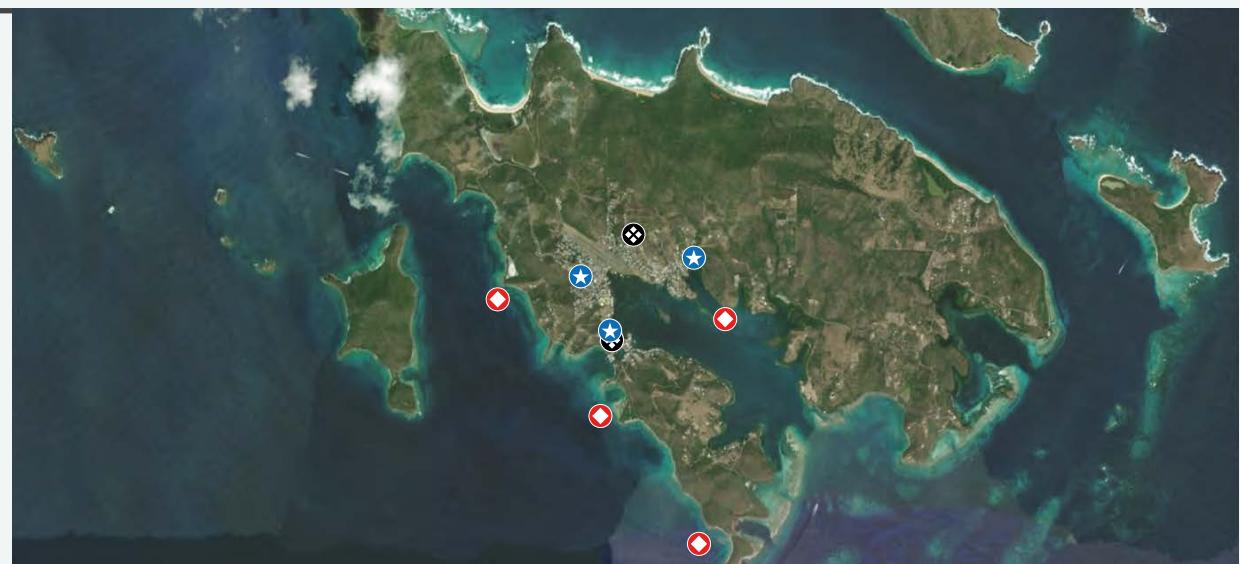


### AREAS OF CONCERN

WHAT AREAS ARE EXPERIENCING EROSION OR SOIL LOSS? (RED ♦)

WHAT AREAS SUFFERED THE WORST DAMAGE DURING THE LAST TROPICAL STORMS? (BLACK ♀)

WHAT AREAS ARE THE MOST PRONE TO FLOODING? (BLUE ★)



### TREE CANOPY AND REFORESTATION

WHAT AREAS ARE EXPERIENCING DEFORESTATION OR LOSS OF VEGETATION? (RED ♦)

WHAT AREAS WOULD YOU PRIORITIZE FOR REFORESTATION OR TREE PLANTING? (GREEN ●)

WHAT AREAS ARE APPROPRIATE FOR PLANTING MANGROVES? (YELLOW ○)

WHAT AREAS NEED TO BE PROTECTED TO CONSERVE VULNERABLE SPECIES? (BLACK ♀)

