PLANES DE MITIGACIÓN CONTRA PELIGROS NATURALES

Resiliencia Planificada

JUNTA DE PLANIFICACIÓN

# 2020
# Municipality of Ceiba

## Natural Hazard Mitigation Plan

**Executive Summary**

# 1 Introduction

The Municipality of Ceiba has revised its Local Hazard Mitigation Plan (LHMP)[1] in accordance with the federal Disaster Mitigation Act of 2000 (DMA2K), which was signed into law to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988. One of the requirements that this legislation establishes is that in order for the municipality to receive federal mitigation funds, it must elaborate and adopt a Federal Emergency Management Administration (FEMA) approved LHMP.[2] Also, the DMA2K promotes that the local government, together with the State, work on pre disaster planning and encourages the development of sustainable hazard mitigation activities.

These LHMPs must be revised and updated every five (5) years to remain in compliance with regulations and Federal mitigation grant conditions. This updating requirement offers the municipality an opportunity to reevaluate recommendations, monitor the implementation of mitigation strategies included in the previous Plan, monitor the impact of mitigation actions that have been implemented, and determine if any changes to the Plan need to be incorporated. This Plan complies with said regulations.

*Figure 1 Hazard Mitigation Planning Process*


***Hazard Mitigation Planning Process***

The strategies and projects enumerated in the LHMP have the goal of reducing the loss of life and property that can result from a natural disaster. Hence, the mitigation strategies, included in the LHMP, involve planning efforts, capital projects, and other activities that reduces the impacts of the natural hazards included in Ceiba's LHMP of 2020.

The municipality has also revised the LHMP under the authority of Act 107-2020, known as the Municipal Code of Puerto Rico derogating Act 81-1991, Autonomous Municipalities Act of 1991. Section 1.010 of said Act, *supra* (former section 2.004 of Act 81-1991), states that the municipality can carry out any activity that establish programs or adopt convenient and useful measures to prevent and fight fires, aid the community in cases of emergency or natural disasters, catastrophic accidents of fires and for the civil protection in general.[3]

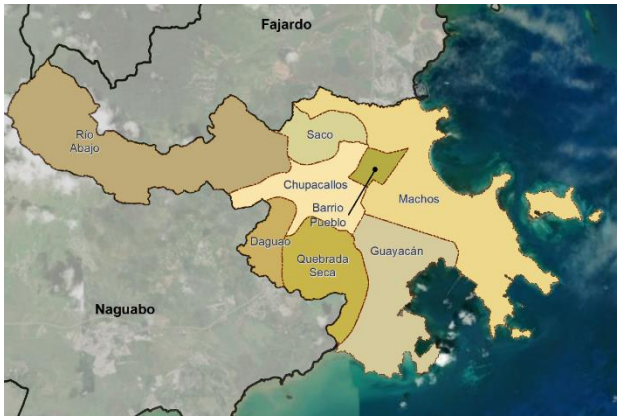
[1] Please note that the 2020 Revised HMP was written in Spanish as per agreement between the Municipality, the Planning Board, the Governor's Authorized Representative (GAR) and FEMA.
[2] 42 U.S.C 5165; 44 C.F.R. § 201.6.
[3] 21 L.P.R.A § 7015

This Executive Summary will provide an overview on:

- Ceiba's population characteristics;
- The public participation and outreach efforts with the community during the LHMP planning process;
- Ceiba's risk assessment;
- A review of the mitigation strategies, goals and LHMPs action plan; and
- Plan maintenance, and how to keep the Plan current.

# 2 Ceiba' Profile: Main Population Characteristics

*Figure 2: Ceiba and its wards*




The municipality of Ceiba is in the northeast of Puerto Rico. It is adjacent to the municipalities of Fajardo and Luquillo to the North, the municipality of Río Grande to the West and the municipality of Naguabo to the South. To the east it is bordered by the Vieques Passage. The municipality of Ceiba is located in the transition zone between the southeastern foothills of the Sierra de Luquillo and a series of small alluvial valleys that spread out towards the coast where they become part of a narrow coastal plain that extends from Ceiba to Humacao. The eastern and southeastern part of the municipality, located on the coastal plain, is susceptible to periodic floods. Its coastline is very irregular and is characterized by the presence of inlets and bays that present morphological characteristics typical of immersion coasts. These characteristics are clearly exemplified between the Ensenada Honda, Bahía de Puerca and Puerto Medio Mundo areas. In front of these there are several keys and islets including Pineros Island, Piñerito Cay, Cabeza de Perro, Cabras Island and Cabritas Cay. The Municipality is subdivided in the following barrios (wards) Chupacallo, Daguao, Guayacán, Machos, Pueblo Quebrada Seca, Río Abajo and Saco.

The Puerto Rico Planning Board, according to the most recent area delimitation, divides the island into eleven areas, grouping the different municipalities by their demographic trends and human settlements, infrastructure endowment, socioeconomic variables, sociodemographic characteristics, internal cohesion, and the resources and development potential of each. The Functional Area of Fajardo, to which the Municipality of Ceiba belongs, is composed of the municipalities of Ceiba, Culebra, Fajardo, Luquillo, Río Grande and Vieques.

*Table 1: Population by age group: 2010 and 2018*

| Population | 2010 Census | 2018 ACS Estimate | % Rate of Change |
|---|---|---|---|
| Younger than 5 years of age | 803 | 536 | -33.25% |
| 5 to 19 years of age | 2,953 | 2,038 | -30.99% |
| 20 to 64 years of age | 7,661 | 6,675 | -12.87% |
| 65 years of age and older | 2,214 | 2,604 | 17.62% |
| *Total* | 13,631 | 11,853 | -13.04% |

*Source: US Census Bureau, Census 2010; American Community Survey 2013-2018 Estimates*

According to the 2010 Census, Ceiba had a population of 13,631. The American Community Survey (ACS) of 2018 estimated that the population of Ceiba had decreased by 1,778 inhabitants. This represents a reduction of 13.04%. All barrios, except Río Abajo, had a decrease in their

populations. The barrios that had a loss of population greater than 25% are Saco (-34.77%), Chupacallos (-29.76%) and Daguao (-25.53%).

A feature that must be considered in the planning of the Municipality of Ceiba is the presence of the terrains of the former Roosevelt Roads Navy Station. This is discussed in Section 3.1.1

# 3 Outreach and Public Participation

In order to guide the development of this Plan, Hon. Angeló Cruz Ramos, Mayor of Ceiba, appointed the following officials to constitute the Mitigation Planning Committee (henceforth, the Planning Committee). The Planning Committee is comprised by representatives from several departments and citizen involvement with key roles and experience in community planning, public works, and emergency management to serve as key components in the planning process. Please refer to Section 2.5 on the LHMP.

*Table 2 Hazard Mitigation Planning Committee*

| Name | Position | Agency | email |
|---|---|---|---|
| Miguel Clemente Calderón | Municipal Auditor | Audit Office | clementecalderon213@yahoo.com |
| Jesús Marte | Director | Municipal Emergency Management Office | ommeceiba@gmail.com |
| Génesis Aponte | Director | Municipal Public Works | gaponte@ceiba-pr.com |
| Ana B. González | Consultant | n/a | agonzalez@globalconsultaspr.com |

The Planning Committee activities included: (1) updating the list of the municipality assets and local critical facilities; (2) updating the status of the previous LHMP mitigation strategies; (3) determine possible new mitigation strategies for the 2020 LHMP; (4) development and implementation of public participation and outreach activities and stakeholders at large such as neighboring municipalities, governmental agencies; (5) announce the municipality's LHMP efforts to agencies, stakeholders and public feedback for Ceiba LHMP 2020 draft version and incorporate such comments on the Plan.

An initial notice was published on a local newspaper. Said notice informed the public about the first public participation meeting to be held on September 30, 2020. This meeting was held via YouTube Live due to the restriction imposed by the Governor's Executive Order regarding the restrictions on public gathering to stem the spread of COVID-19. A second notice was published regarding the publication of the 2020 LHMP draft version for review providing 20 days period for review, submit comments, and the opportunity to participate in a second community meeting held on August 8, 2020. This second meeting as well was held via YouTube Live. A draft version of the 2020 LHMP was made available on the Puerto Rico Planning Board's (PRPB) website (jp.pr.gov).

# 4 Ceiba's Risk Assessment

After reviewing the natural hazards identified as priorities on the previous Ceiba's 2017 LHMP, the Municipal Emergency Response Plan, the municipality's disaster history, and other literature related to potential future hazards, the Planning Committee identified the following hazards in the 2020 LHMP; (1) Sea Level Rise, (2) Drought, (3) Earthquakes, (4) Flooding, (5) Landslides, (6) Strong Winds (Tropical Cyclones), (7) Tsunami (8) Coastal Erosion, (9) Strom Surge, (10) Wild Fire. Discussion of these natural hazards are included in the 2020 LHMP's Chapter 4. In addition, the 2020 LHMP includes a quantitative vulnerability analysis based on the best available data for Ceiba and Puerto Rico accounting for future development to assess mitigation strategies to prevent repetitive and severe property loss.

This assessment served as a key tool for the Planning Committee and the public to identify and prioritize potential mitigation strategies by focusing attention on areas that present the greatest risk of damages to people, critical facilities, and normal municipality operations. The analysis for earthquake, flood, landslides, and high winds was performed by assessing the potential impacts from each hazard using geographic information system data (GIS).

By ranking each section, the municipality was in position to determine an overall risk classification. It is important to mention that this classification exercise resulted from the municipality's 2020 LHMP technical risk assessment along with a capability gap analysis and the local community input, which is based on previous natural events experienced by the Planning Committee and the residents and business owners of Ceiba.

The following table provides a summary of the risk classification for each identified hazard. Part of the process of completing the next appraisal required input from the community as well as from the Committee. Beyond the risk analysis, this table presents the municipality's prioritization analysis.

*Table 3 Natural Hazard Ranking*

| Natural Hazard | Risk to people | Risk to facilities | Risk to operations | Classification |
|---|---|---|---|---|
| Sea Level Rise | 2 | 1 | 1 | Moderate |
| Drought | 3 | 1 | 1 | Moderate |
| Earthquake/Liquefaction | 2 | 1 | 3 | Moderate |
| Flooding | 3 | 3 | 3 | High |
| Landslide | 2 | 1 | 1 | Moderate |
| Strong Winds/Tropical Cyclones | 3 | 3 | 3 | High |
| Tsunami | 3 | 1 | 1 | Moderate |
| Storm Surge | 2 | 1 | 1 | Moderate |
| Coastal Erosion | 2 | 1 | 1 | Moderate |

| Natural Hazard | Risk to people | Risk to facilities | Risk to operations | Classification |
|---|---|---|---|---|
| Wildfire | 1 | 1 | 1 | Low |

Source: *Planning Committee 2019-2020* High=3, Moderate=2, Low=1

Currently, the potential risks with the highest classification or greater impact identified for the municipality are: (1) flooding, and (2) strong winds.

A ranking methodology was adopted to develop the mitigation strategies based on these risks as discussed on Chapter 6 and are divided into the following categories: (1) Prevention, (2) Property Protection, (3) Natural Resources Protection, (4) Structural Projects, (5) Emergency Services, and (6) Education and Public Awareness. The strategy category with most mitigation actions is "Prevention" with a total of 15 mitigation projects. Landslide and flooding are the natural hazards that are most addressed within the mitigation actions.

# 5 Mitigation Strategies, Goals, and Action Plan

The municipal capabilities, along with the risk assessment, serve as a foundation for the design, development and implementation of mitigation strategies. Mitigation strategies, found in Chapter 6, consist of a broad amount of local goals and strategies. The local mitigation actions were gathered from the 2016 LHMP and were incorporated into the current LHMP. This chapter provides information about the assigned implementation mechanisms and target completion dates. The sections in this chapter are designed to make the Plan strategic by identifying long-term goals, and functional, by identifying short term and immediate actions that will guide the daily local decision-making process and project implementation.

Mitigation goals consist of general guidelines that explain what the Municipality of Ceiba wants to achieve in terms of hazards and mitigation. Thus, the goals included in the 2020 LHMP, offer the Planning Committee and the communities a framework for identifying, prioritizing and implementing actions to reduce the risks associated to natural hazards at Ceiba.

Mitigation strategies are activities, projects, measures, or processes that Ceiba will adopt in order to reduce or eliminate risk to people and property from hazards. Consequently, Ceiba reviewed and revised the criteria adopted in the 2016 LHMP to analyze and prioritize potential mitigation strategies for the municipality. In order to developed the actions, the Planning Committee used the following criteria: (1) the potential of the strategy to reduce expected future damages and/or losses; (2) the capacity of the municipality to implement the action within the 5-year cycle of the Plan; (3) support from the public, agencies, municipal departments, amongst others; and (4) the potential of the action to increase resiliency of Ceiba and its residents. Accordingly, the Planning Committee adopted these criteria, the results from the risk assessment, and the feedback from local and neighboring communities to prioritize each mitigation strategy that was contained in this LHMP.

Most of the strategies and projects in the action plan target the continuity of municipality services after a hazard event. The following summarizes some of the strategies intended to mitigate these hazards:

- Installation of storm shutters on various municipal buildings
- Improvement of the stormwater collection system in the Santa María community (Ceiba Creek).

- Improvement of the stormwater collection system in the Roosevelt Gardens subdivision.
- Improvement of the stormwater collection system in the Brisas de Ceiba, Vegas de Ceiba and Villas del Pilar subdivisions.
- Acquisition of a CHP generator with all necessary components to create an electric microgrid during emergency situations.
- Construction of a vertical evacuation activity in Los Machos Beach.

# 6 Maintenance to Keep the Plan Current

Chapter 7 details the revision and monitoring process in great extent. The formal maintenance process, identified by the Planning Committee, aims to keep the document viable and current, as it is a living document that shall reflect the hazards and realities affecting its community, and how to plan and prepare ahead in the event of a natural disaster. The plan maintenance process provides the procedures for evaluation and review every third quarter of each fiscal year during its 5-year life cycle. Evaluation will include a review of the mitigation action plan implementation, continued public involvement through the Plan's life cycle, as required by federal legislation. As part of the review process, the members of the Planning Committee. In the event of a major natural disaster affecting the island and/or municipality, an emergency meeting must be scheduled, and the Plan should be updated or amended, as necessary, bypassing the 5-year term. The Municipal Administrator will coordinate with other municipal dependencies, as needed, to achieve the goals and objectives stated in this LHMP.

Finally, the municipality will promote continued public participation during the plan maintenance by, including, but not limited to (Refer to Section 7.7 of the LHMP):

- Inviting the public to the yearly review meeting of the LHMP
- Notifying the public of any proposed revision or progress report that may arise during the life cycle of the Plan.
- Giving public presentation regarding the status of the implementation of the LHMP

# 7 Plan Approval and Adoption

The Federal Emergency Management Agency (FEMA) completed review of the Municipality of Ceiba's Hazard Mitigation Plan, based on the standards pursuant to title 44 C.F.R. Section 201 as authorized by the Disaster Mitigation Act of 2000 (DMA2k). The Plan received a satisfactory rating for all required criteria and was approved as approvable pending adoption (APA) on December 21, 2020. Accordingly, the Municipality of Ceiba, adopted said Plan on December 28, 2020 via Executive Order # 2020-2021-003 signed by interim Mayor Joshua Díaz Rivera.

Upon receiving the record of adoption from the municipality, FEMA approved Plan on January 5, 2021 and issued an official approval letter to municipality stating the jurisdiction has adopted said Plan thus approved and eligible for FEMA Hazard Mitigation Assistance programs. The approval letter establishes the expiration date 5 years from the date of approval, or until December 29, 2025.