

PLANES DE MITIGACIÓN CONTRA PELIGROS NATURALES

Resiliencia Planificada



JUNTA DE PLANIFICACIÓN

2020

Municipality of Maricao

Natural Hazard Mitigation Plan

Executive Summary

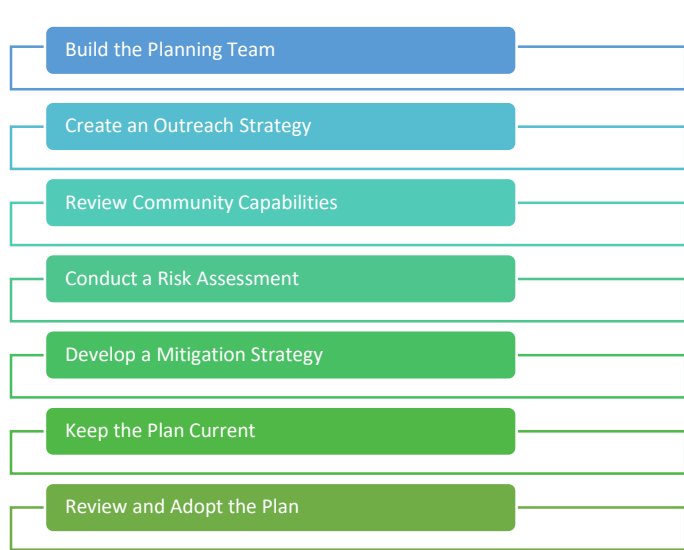


1 Introduction

The municipality of Maricao has revised its Local Hazard Mitigation Plan (LHMP).¹ This complies 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. Updating requirement offer 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 reduce the impacts of the natural hazards included in Maricao’s LHMP of 2020.

The municipality has also revised the LHMP under the authority of Act 81-1991, known as the Autonomous Municipalities Act of 1991, as amended. Section 2.004 of said 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

This Executive Summary will provide an overview on:

- Maricao’ population characteristics;

¹ Please note that the 2020 Revised HMP was written in Spanish as per agreement between the Municipality of Adjuntas, 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 § 4054

- The public participation and outreach effort with the community during the LHMP planning process;
- Maricao’ risk assessment;
- A review of the mitigation strategies, goals and LHMPs action plan; and
- Plan maintenance, and how to keep the Plan current.

2 Maricao’ Profile: Main Population Characteristics

The Municipality of Maricao is located in the southwest of Puerto Rico and belongs to the towns that make up the central mountain range. The municipal boundaries are to the east with Yauco, to the south are San Germán and Sabana Grande, to the north with Las Marías and Lares and to the west with



Figure 2 Maricao and its wards

Mayagüez. Maricao's geographic coverage is approximately 37.0 square miles (96.2 square kilometers) and has a population of 6,276 according to the 2010 US Census Bureau. Maricao is the second least populous municipality in Puerto Rico according to the 2010 Census and was founded in 1874.

The Municipality of Maricao has seven (7) neighborhoods: Bucarabones, Indiera Alta, Indiera Baja, Indiera Fría, Pueblo, Maricao Afuera and Montoso.

This municipality is part of the Cordillera Central, and is watered by rivers; Rosario, Sapo, Postrera, Bucarabones, Quebrada Palma, Prieto, Guanajibo, Guaba, Bonelli, Lajas, and Maricao River. The Guanajibo River basin originates in the Monte del Estado, area of the Maricao and Susúa Forests and its approximate area is 117 square miles. Also, the Rio Grande of Añasco basin affects some tributary rivers of Maricao and is the 5th largest basin in Puerto Rico. Maricao's topography is rugged and will be characterized by cliffy slopes and very defined slopes. The Municipality of Maricao is within the area of Subtropical Wet Forest.

Table 1: Population by age group: 2010 and 2018

Population	2010 Census	2018 ACS Estimate	% Rate of Change
Younger than 5 years age	422	289	-31.52%
5 to 19 years of age	1,318	1,110	-15.78%
20 to 64 years of age	3,729	3,671	-1.56%
65 years of age and older	807	1,132	40.27%
Total	6,276	6,202	-1.18%

Source: US Census Bureau, Census 2010; American Community Survey 2014-2018 Estimates

Maricao recorded population for the 2010 Census was of 6,276. According to the American Community Survey 2010-2018 the population of Maricao diminished by 74 persons, which represents a reduction of -1.18%.

According to the Census data, in 2010, the wards with the largest population were Maricao Afuera with 2,076 inhabitants, followed by Indiera Alta with 1,369 inhabitants. On the other hand, the ward with the least population were Bucarabones with 164 inhabitants.

This profile highlights the population that could be potentially vulnerable to natural hazards in the municipality, particularly persons with 65 years of age and older which had an increase of 40.27% in the municipality during this eight-year period (2010 to 2018). Hazard mitigation strategies and actions consider these population characteristics and its vulnerability toward natural hazards analyzed in this update. Further details, regarding the profile of the municipality, can be found in Chapter 3 of the updated 2020 LHMP.

3 Outreach and Public Participation

To serve as the engine behind the review of the LHMP, the Mayor of Maricao during the update period, Hon. Gilberto Pérez Valentín, appointed the following officials to constitute the Mitigation Planning Committee (henceforth, the Planning Committee). The Planning Committee is comprised by representatives from four (4) departments with key roles and experience in community planning, public works, and emergency management. Hence, the Planning Committee members included those with responsibility for, and expertise in, implementing mitigation projects in the Municipality of Maricao.

Table 2 Hazard Mitigation Planning Committee

Name	Position	Agency
Miguel Ruiz	Director	Municipal Office for Emergency Management
Mayra Agostini	Director	Human Resources Office
Modesto Ayala	Director	Finance Office
Lannette Miró	Director	Municipal Office for Public Works

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 Maricao LHMP 2020 draft version and incorporate such comments on the Plan.

On July 20, 2020, a notice was published on a local newspaper (Primera Hora). Said notice informed the public about the first Public Participation meeting to be held in Maricao. On October 13, 2020, a second notice was published regarding the publication of the 2020 LHMP Draft version for review providing 27 days period for review, submit comments, and the opportunity to participate in a second community meeting. A draft version of the 2020 LHMP was made available on the Puerto Rico Planning Board (PRPB) website. Due to the COVID-19 situation, a hard copy of the 2020 LHMP was not placed in the Municipality.

4 Maricao’ Risk Assessment

After reviewing the natural hazards identified as priorities on the previous Maricao’s 2014 LHMP, the Municipal Emergency Response Plan 2020, the Maricao’s Land Use Plan Draft of 2016, 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) Extreme Heat, (2) Drought, (3) Earthquakes, (4) Flooding, (5) Landslides, (6) Strong Winds (Tropical Cyclones), (7) 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 Maricao 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 Maricao.

The following table outlines the result of the risk assessment.

Table 3 Natural Hazard Ranking

Natural Hazard	Risk to people	Risk to facilities	Risk to Operations	Classification
Extreme Heat	Moderate	Low	Low	Low
Drought	Moderate	Low	Low	Low
Earthquake/Liquefaction	High	Moderate	High	High
Flooding	High	High	High	High
Landslide	High	High	High	High
Strong Winds/Tropical Cyclones	High	High	High	High
Wildfire	High	Moderate	Moderate	High

Based on the Natural Hazard Ranking table, the following hazards are considered as significant at Maricao: (1) flooding, (2) earthquake/liquefaction, (3) landslide, (4) strong winds and (5) fire.

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 “Structural Projects” with a total of 22 mitigation projects, which has LOIs submitted for at least 14 of these categories. Landslides and flooding are the natural hazards that are most addressed by the projects.

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 2014 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 Maricao 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 Maricao.

Mitigation strategies are activities, projects, measures, or processes that Maricao will adopt in order to reduce or eliminate risk to people and property from hazards. Consequently, Maricao reviewed and revised the criteria adopted in the 2014 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 Maricao 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:

- Identify the special needs of citizens and develop the evacuation and rescue procedures of the population.
- Establish municipal facilities as critical facilities that can ensure continuity of services and guarantee life and health to citizens.
- Acquisition of equipment necessary for removal of landslides, debris and cutting of trees by the municipality.
- Continue with stormwater management improvements, construction of concrete ditches in order to control sedimentation and water runoff.
- Study the vulnerabilities and needed structural rehabilitation of the Prieto reservoir.

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 Planning Committee will coordinate with other municipal dependencies, as needed, to achieve the goals and objectives stated in this LHMP. The Planning Committee, which has been appointed by the Mayor, will continue its functions as part of the Committee for its members to oversee the implementation of mitigation strategies during the term of this Plan. It is through the appointment of the Mayor that changes can be made to the components of the Planning Committee, including the functions of each of its members, to ensure the continuity of the implementation of mitigation strategies, the revision of the Plan and the involvement of citizen participation.

Finally, the municipality will promote continued public participation during the Plan maintenance by:

- Regularly surveying the public on perceived hazards, dangers and mitigation action in the municipality.
- Placing a copy for public review every time a progress report on the LHMP is prepared.
- Giving regular presentations to community groups regarding the content and progress of the LHMP.
- Having a robust education program regarding the NFIP program and NFIP recommendations.

7 Plan Approval and Adoption

The Federal Emergency Management Agency (FEMA) completed review of the Municipality of Maricao 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 January 20, 2021. Accordingly, the Municipality of Maricao, adopted said Plan on February 12, 2021 via Executive Order No. 05.

Upon receiving the record of adoption from the municipality, FEMA approved Plan by February 18, 2021 and issued an official approval letter to municipality that dates from February 18, 2021 stating the jurisdiction has adopted said Plan thus approved and eligible for FEMA Hazard Mitigation Assistance programs. The approval letter includes the expiration date 5 years from the date of approval, or until February 17, 2026.