PLANES DE MITIGACIÓN CONTRA PELIGROS NATURALES

Resiliencia Planificada

JUNTA DE PLANIFICACIÓN

2020
Municipality of Patillas

Local Hazard Mitigation Plan

Executive Summary

1 Introduction

The Municipality of Patillas 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] 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 requirements 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 and updates need to be incorporated to the Plan. This Plan complies with said regulations.

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 this LHMP involve planning efforts, capital projects, and other activities that reduce the impact of natural hazards included in Patillas' 2020 LHMP.

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.

This Executive Summary will provide an overview on:

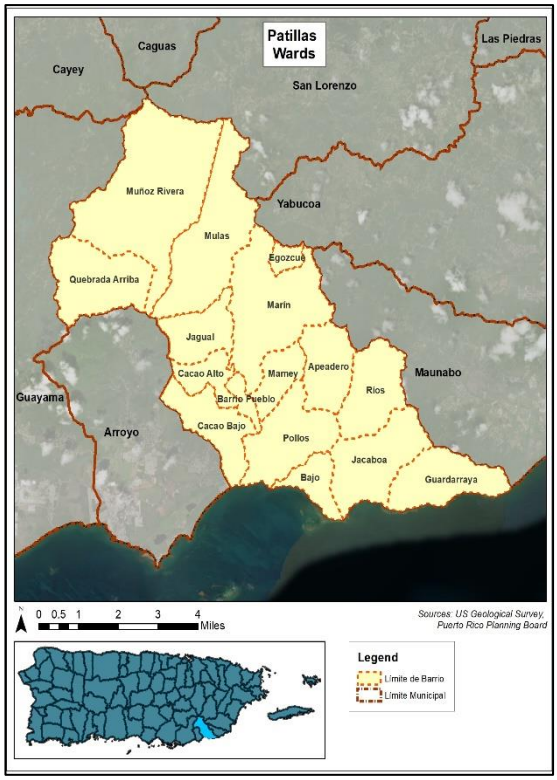
- Patillas' social characteristics;
- Public engagement, participation and outreach efforts with the community during the LHMP planning process;
- A risk assessment for the Municipality of Patillas;

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

- A review of the mitigation strategies, goals and LHMPs action plan; and
- Plan maintenance and how to keep the Plan current.

2 Patillas: Main Characteristics and Profile

Figure 1: Patillas and its wards



Source: Puerto Rico Planning Board, 2019

The Municipality of Patillas is in the southeastern coast of Puerto Rico and is currently organized in sixteen (16) wards: (1) Muñoz Rivera: (2) Quebrada Arriba; (3) Mulas; (4) Pueblo; (5) Jagual; (6) Egozcue; (7) Marín; (8) Apeadero; (9) Mamey; (10) Cacao Alto; (11) Cacao Bajo; (12) Ríos; (13) Pollos; (14) Bajo; (15) Jacaboa; and (16) Guardarraya. Its territory extends across 46.7 square miles. Patillas is bordered by the municipalities of San Lorenzo, Yabucoa, Maunabo, Guayama, and Arroyo.

Patillas has a hydrographic system which is composed of the following bodies of water: Río Grande de Patillas, Río Chico y Río Jacaboa. The Río Grande de Patillas has a longitude of 22 kilometers (14 miles) and it is categorized as the largest system between the aforementioned rivers. In terms of its geography, the municipality has a mountainous region, which is conformed of a segment from the Bosque Estatal de Carite. In addition, the municipality has a natural reserve known as the Humedal Punta Viento, located in Bajo ward, adjacent to the coast of Villa Pesquera. In the central region of Patillas, specifically between the Jagual and Cacao Alto wards, stands mount Piedra Gorda with a 1,247 (380 meters) feet above sea level.

According to the official 2010 Census, the Municipality of Patillas had 19,277 inhabitants. On the other hand, the 2017 American Community Survey (ACS) estimates a population decrease of 7.82%, thus, it is estimated that by 2017, the municipality had 17,769 inhabitants. Based on the 2010 Census, the ward with the most population is Pollos with 3,146 inhabitants. On the other hand, the ward with less population, as stated by 2010 Census, is Egozcue with 52 inhabitants. It should be noted that, in 2017, the island of Puerto Rico suffered the devastating effects of two (2) Hurricanes; Irma and Maria, which drastically affected all of Puerto Rico's municipalities, therefore, many residents of Puerto Rico chose to emigrate to the United States of America (USA). When we see the changes between the years 2010 and the trend reflected on 2017 data by age, we can perceive that although the total population decreased by 7.82%, the population over 65 increased by 20.90%. Further details, regarding the profile of the municipality, can be found in Chapter 3, Section 3.2 of the updated 2020 LHMP.

Table 1: Patillas Population Change

Population	2010 Census	2017 ACS Estimates	% Percentage change
5 years of age or <	1,156	859	-25.69%
5 to 19 years of age	4,129	3,240	-21.53%
20 to 64 years of age	11,198	10,292	-8.09%
65 years of age or >	2,794	3,378	20.90%
Total	**19,277**	**17,769**	**-7.82%**

Source: US Census Bureau, Census 2010; American Community Survey 2013-2017 Estimates

This profile highlights the population that could be potentially vulnerable to natural hazards in the municipality, particularly individuals whose age ranges from 65 or more reflecting an increase of 20.90% during the seven-year period (2010 to 2017).

3 Outreach and Public Participation

In order to guide the development of this Plan, the Municipality of Patillas appointed the following officials to constitute the Local Hazard Mitigation Planning Committee. This Committee represents various instrumentalities of the municipal government.

Table 2: Hazard Mitigation Planning Committee

Name	Position	Agency	Email
Margarita Cruz Ortiz	Federal Funds Coordinator	Municipality of Patillas	margaritamun.fema@gmail.com
Wilma Lugo	Municipal Secretary	Municipality of Patillas	wilma.lugo@municipiodepatillas.com
Mery I. Cruz	Accountant	Finance Department	mery.cruz@municipiodepatillas.com
Eugenio Rosa Ramos	Public code Manager	Municipal Police Department	coppatillas@yahoo.com
Gladys G. Lebrón	Technician	Municipal Revenue Collection Center (CRIM)	gladys.lebron@municipiopatillas.com
Juan C. Torres	Project Inspector	Municipal Public Works Office	jctorres607@gmail.com
Ryan Lebrón	Administrative Supervisor	Municipality of Patillas, Municipal Secretary Office	ryan.lebron@municipiopatillas.com
Carlos J. González	Sub Director	Municipal Emergency Management Office	donhusse47@gmail.com
Emmarie Morales	Administrative Service Supervisor	Municipal Human Resources Department	emarie.morales@municipiopatillas.com
Luz M. Madera	Director	Citizen's Assistance Office of Patillas	lmaderapagan00723@gmail.com
Gwendlyn Rampersad	Director	Federal Program Office	gwendolyn.rampersad@municipiopatillas.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 engagement, participation and outreach efforts for stakeholders at large such as the community, neighboring municipalities, governmental agencies; (5) announce the municipality's LHMP efforts to agencies, stakeholders, receive public feedback on Patillas 2020 LHMP draft version and incorporate such comments into the Plan. Accordingly, from February 22, 2019 to September 17, 2019, the Planning Committee reviewed and provided comments on the 2020 LHMP preliminary and draft versions.

On May 2, 2019, a public notice was published at the local newspaper Primera Hora informing the public about the first Community Planning Meeting to be held at Patillas. As requested by the municipality and informed in the public notice, the first community meeting was held on May 13, 2019. On July 3, 2019, a second notice was published, on the aforementioned newspaper, informing about a second Community

Planning Meeting to be held on July 17, 2019. This second notice, besides informing all readers about the second meeting, also notified the publication of the 2020 LHMP draft version for review and the 20-day term to submit comments. A digital copy of the draft version of the 2020 LHMP was made available through the Puerto Rico Planning Board's (PRPB) website (jp.pr.gov), while a hard copy was made available for public review at the Mayor's Office of Patillas from Monday through Friday from 8:00 a.m. to 4:30 p.m.

4 Patillas Risk Assessment

After reviewing the natural hazards identified as priorities on the previous Patillas 2013 LHMP, Land Use Plan Draft, 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) Climate change/sea level rise; (2) Drought; (3) earthquake; (4) flooding; (5) landslides; (6) high winds; (7) tsunami; (8) storm surge; (9) costal erosion; and (10) wildfires . Discussion of these natural hazards are included in the 2020 LHMP's Chapter 4. Furthermore, the 2020 LHMP includes a quantitative vulnerability analysis, based on the best available data, for Patillas and Puerto Rico accounting for future development to assess mitigation strategies in order to prevent repetitive and severe repetitive property loss caused by a natural disaster.

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 the 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 Committee and the residents and business owners of Patillas.

The following table shows the conclusion of the Planning Committee based on the risk assessment.

Table 3: Natural Hazard Ranking

Natural hazard	Risk to individuals	Risk to facilities	Risk to operations	Classification
Climate change/sea level rise	High	Moderate	Low	**Moderate**
Drought	Moderate	Moderate	High	**High**
Earthquake	High	Moderate	Moderate	**High**
Flooding	High	High	High	**High**
Landslides	High	Moderate	Moderate	**High**
High winds	High	High	Moderate	**High**
Tsunami	Moderate	Moderate	Low	**Moderate**
Storm surge	High	Moderate	Low	**High**

Natural hazard	Risk to individuals	Risk to facilities	Risk to operations	Classification
Coastal erosion	Moderate	Low	High	Moderate
Wildfires	Low	Low	Low	Low

The risks with the highest classification for the municipality are drought, earthquakes, flooding, landslides, high winds and storm surge. Please note that natural events, associated with high winds, such as hurricanes or tropical storms exacerbate the occurrence of landslides, flooding, storm surge and coastal erosion in Patillas. Also, an earthquake will most likely cause several landslides in the mountainous area of the municipality. These natural hazards, together with the dangers associated with the presence of numerous structures that does not meet the minimum construction standards, exacerbate the probability of loss of life and property in Patillas. Thus, these natural hazards pose a great risk for the population, buildings, stock, critical facilities and infrastructure. For example, during the hurricane María, on September 20, 2017, which brought around 37 inches of rain in a 48-time period, the municipality was impacted by natural hazards such as flooding, high winds, storm surge, landslides and coastal erosion. Consequently, the communities experienced roadblocks, destruction of railway lines and disruption of essential emergency services and communication, as well as multiple life and property losses.

The natural hazards with a moderate risk classification are sea level rise, tsunami, and coastal erosion. This does not mean that these hazards pose less risks than those mentioned above, but the impact they may have on the municipality represents a lower degree of severity as stated by the Planning Committee.

Finally, wildfire is considered the lowest risk to the municipality. Nonetheless, a future risk benchmark can provide a basis for understanding how future development can increase the impact and vulnerability of the population, structures, critical facilities and natural resources cause by these natural events.

This ranking methodology was adopted, in accordance with the risk assessment, the communities and Planning Committee's own experiences during a natural event, to develop the mitigation strategies. The mitigation strategies, included in Chapter 6, are divided into the following categories: (1) Prevention; (2) Property protection; (3) Natural Resources Protection; (4) Emergency Services; and (5) Education and Public Outreach.

5 Mitigation Strategies, Goals, and Action Plan

The municipal capabilities, together with the risk assessment, serve as a foundation for the design, development and implementation of mitigation strategies. The mitigation strategies consist of a broad local goals and strategies. Moreover, the local mitigation actions were gathered from the 2013 LHMP and were incorporated into the 2020 LHMP. The chapter also provides information about the assigned implementation mechanisms and target completion dates. The sections on Chapter 6 are designed to make the Plan strategic by identifying long-term goals, but functional, by identifying short term and immediate actions that will guide the daily local decision-making process and project implementation.

Likewise, the mitigation goals consist of general guidelines that explain what the Municipality of Patillas aims to achieve in terms of hazards and loss mitigation. Accordingly, 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 in Patillas.

The mitigation strategies are the activities, projects, measures, or processes that Patillas will adopt to reduce or eliminate the risk to people and property from natural hazards. Consequently, the Municipality of Patillas reviewed and revised the criteria adopted in the 2013 LHMP to analyze and prioritize potential mitigation strategies for the municipality. In order to develop 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 municipality's capacity 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 actions to increase the resiliency of the municipality and its residents. Hence, 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 2020 LHMP.

Most of the strategies and projects in the action plan target mostly flooding, but also include actions targeting high wind, storm surge, landslides and drought. The following summarize some of the strategies intended to mitigate these hazards:

- High wind projects including, but not limited to, installation of windows and doors shutters in all the municipality's critical facilities;
- Storm surge projects including, but not limited to, educational campaigns to inform the communities about the areas of the municipality that are at risk od storm surge, coastal erosion and tsunamis;
- Flooding projects including, but not limited to, promote the reconstruction or improvement of the Patillas dam;
- Drought projects including, but not limited to, develop a water reserve program through a water recollection system such as cisterns or other alternative water storage tools; and
- Landslides projects including, but not limited to, the review of current requests for construction to prevent the development of land vulnerable to landslides and liquefaction.

6 Maintenance to Keep the Plan Current

Chapter 7, of the revised 2020 LHMP, details the revision and monitoring process in great extent. The formal maintenance process, designed by the Planning Committee of Patillas, aims to keep the document viable and current, as it is a living document that shall reflect the hazards and realities affecting the communities. In addition, the plan maintenance process provides the procedures for evaluation and review every third quarter of each fiscal year during its 5-year life cycle. This periodical 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. In the event of a major natural disaster, affecting the island and/or municipality, an emergency meeting must be scheduled. As a result of the emergency, the municipality might choose to update or amend the 2020 LHMP if the Planning Committee determines that it is needed. The appointed Planning Committee will coordinate with the municipal dependencies, as needed, to achieve the goals and objectives stated in this 2020 LHMP.

Finally, the municipality will promote continued public participation during the plan maintenance by;

- Advising local communities about their strengths and weaknesses to deal with natural hazards and how to mitigate the associated risks;
- Advising local communities about what resources are available before, during, and after a natural disaster;

- Creating and maintaining a database of individuals that are interested in hazard mitigation in order to keep them up to date on any information that may increase their capabilities in the subject matter;
- The Local Hazard Mitigation Planning Committee shall represent the community; and
- Holding public meetings to discuss LHMP monitoring and supervision at the beginning of the last quarter of each fiscal year and/or after the occurrence of any natural disaster in the municipality.

7 Plan Approval and Adoption

The Federal Emergency Management Agency (FEMA) completed review of the Municipality of Patillas'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 June 30, 2020. Accordingly, the Municipality of Patillas, adopted said Plan on August 19, 2020 via Resolution No. 7, Series 2020-2021.

Upon receiving the record of adoption from the municipality, FEMA approved Plan by August 24, 2020 and issued an official approval letter to municipality that dates from August 26, 2020, stating the jurisdiction has adopted said Plan, thus, approved and eligible for grant programs, including the Hazard Mitigation Grant Program, Flood Mitigation Assistance, and Pre-Disaster Mitigation. Funding from these grant programs can be used for mitigation planning and projects that protect life and property from future disaster damages. The approval lasts for a period of five (5) years, or through August 23, 2025.