PUERTO RICO’S RECOVERY PROCESS THROUGH AN INTEGRATED FLOOD RISK MANAGEMENT LENS

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OVERVIEW

INTEGRATED FLOOD MANAGEMENT

OVERVIEW OF PUERTO RICO BEFORE HURRICANES IRMA & MARÍA

IMPACT OF HURRICANE MARIA

RECONSTRUCTION PROCESS: FLOOD LENS

TOWARD A PUERTO RICO INTEGRATED FLOOD RISK MANAGEMENT APPROACH
Recognizes that floods have not only adverse, but also beneficial impacts and that they can never be fully constrained.

Any intervention to improve the use of the river basin assets (both in terms of water and land) cannot ignore that flood risk and its consequences (i.e. economic and human life losses) cannot be totally controlled.
INTEGRATED FLOOD MANAGEMENT

The six pillars of an IFM plan:

1. Manage the water cycle as a whole
2. Integrated land and water management
3. Manage risk and uncertainty
4. Adopt a best mix of strategies
5. Ensure a participatory approach
6. Adopt integrated risk management approaches
Cascade with potential integrated flood management measures and associated policy and management fields (adapted from Marchand et al., 2012)
INTEGRATION IN A HORIZONTAL AND VERTICAL DIRECTION

participatory and transparent approach

- An appropriate mix of strategies
- Carefully selected points of interventions
- Appropriate types of measures (structural or non-structural, short or long-term)

a cross-sectoral decision-making process
FLOOD RISK MANAGEMENT PLANS IN THE US

Source: Serra-Llobet, Resilience in flood risk management, 13 April 2018
OVERVIEW OF PUERTO RICO BEFORE HURRICANES IRMA & MARÍA
PUERTO RICO

- Total population: 3.1 million
- Size: 111 x 40 mi (3,515 sqmi /9,104 km²)
- An island territory of the United States
- 8 > cat. 3 hurricane since 1928
- 24 mths drought period (2014-16)
- 40,000 landslides (September 2017)
Federally Declared Disasters

Number of disaster declarations by municipality

37 disaster declarations by hazard type and by municipality since 1953

- **15** Hurricane
- **8** Flood
- **1** Fire
- **10** Severe Storm
- **2** Drought
- **1** Other
PUERTO RICO BEFORE HURRICANES IRMA & MARÍA: OVERVIEW

Fiscal Board and Puerto Rico bankruptcy

On June 30, 2016, with PROMESA Law, the U.S. Congress impose a seven-member Financial Oversight and Management Board (FOMB) to deal with the Puerto Rico crisis.
**PUERTO RICO: STRESSES**

- Urban deforestation and poor access to green spaces
- Improper use of the land
- Vulnerable populations in high-risk areas
- Discrimination (gender, race, sexual orientation, homelessness)
- Poor access to mental health and preventive and medical treatment services
- Lack of available safe and affordable housing
- Migration of health professionals
- Sea level rise
- Coastal and riverine erosion
- Obsolete, deteriorated, and aging infrastructure
- Increased energy production cost
- Lack of fiscal independence
- Inability to pay mortgages and foreclosures
- Ownership and tenure matters
- Lack of municipal and other organizations' participation in decision making
- Economic depression
- Loss of home and personal property
- Limited government resources to meet essential needs and services
- Personal debt and increase in cost of living
- Violence and crime
- School closures
- Losses of employment and closures of companies;
- Aging of the population and social insecurity for the retired
- Lack of preparation of individuals, communities, and the government before extreme events
- Drought
- Economic depression
- Lack of fiscal independence
- Increased energy production cost
- Sea level rise
331,322 structures within the floodplain area

5,675 NFIP insurance policies

200,000 homes within the floodplain area

488,844 population living at risk of floods

Source: Puerto Rico Planning Board, 2018
Map by Naomy Pérez-Sánchez, AECOM, 2019
NATIONAL FLOOD INSURANCE PROGRAM (NFIP) IN PUERTO RICO
Puerto Rico Planning Board:
Government agency appointed by the Puerto Rico Governor as the State coordinating agency.

Puerto Rico Floodplain Regulation:
Planning Regulation Num. 13-Special Flood Hazard Areas Regulation – 2010 version (7th review).

Law Num. 3 of September 27, 1961
Enable the PRPB to establish a regulation and maps to control the developments in flood prone areas.

Law of Autonomous Municipalities:
Provides the municipalities with the legal, fiscal and administrative authority. 11 Municipalities with the autonomy to become a NFIP Separate Community.
NFIP INSTITUTIONAL STRUCTURE

78 Municipalities / 78 Mayors

4 Municipalities (NFIP Separate Communities)

Commonwealth as a Community

PRPB as NFIP State Coordinator (State Role) and Floodplain Manager (Community Role)
NFIP MAIN STAKEHOLDERS (STATE LEVEL)

- Department of Natural and Environmental Resources
- Housing Department
- Permits Management Office
- Puerto Rico Electric Power Authority
- Puerto Rico Emergency Management Agency
- NFIP Separate Communities
Maria totally engulfed Puerto Rico on September 20.

NASA Earth Observatory images by Joshua Stevens
Hurricane María impacted Puerto Rico from east to west on Sept. 20, 2017

• **10th most intense** Atlantic hurricane on record & **3rd costliest** hurricane in US history (1st Katrina, 2005 / 2nd Harvey, 2017)
• Entire island without electricity
• Most communication channels were down
• Damaged thousands of housing units, telecommunication towers, roads & bridges, critical infrastructure and 80% of the island’s crop value

**Problems hindering immediate recovery:**
• Collapse of communication and electricity systems & faulty coordination efforts hindered recovery coordination & logistics and caused delays in emergency response and relief efforts
  o We were forced to communicate the old fashioned way—in person
  o 2 critical ports and main international airport suffered damages and disrupted services making it difficult to receive equipment and essential goods (food, medicine and batteries)
THREE WEEKS AFTER

Potable water

- Percent operating: 60%
- Percent not working: 40%

Power service

- Percent operating: 95%
- Percent not working: 5%

Telecommunication

- Percent operating: 70%
- Percent not working: 30%

Supermarkets

- Percent operating: 51%
- Percent not working: 49%

Drug stores

- Percent operating: 68%
- Percent not working: 32%

Gas stations

- Percent operating: 39%
- Percent not working: 61%
HURRICANE MARÍA AFTERMATH

HOUSING
• 527,000 households that registered with FEMA indicated they had property damage.

POWER & FUEL SUPPLY**
• Immediately after the hurricane: **100% of the power grid was inoperable**, gasoline supplies became depleted, and roughly 2/3 of gas stations were closed due to the storm.
• By the end of January 2018, from 450,000 to 460,000 houses were still without electricity.
• Took almost one year for power be restored to everyone (July 2018)
• **It is the largest blackout in US history**

WATER SYSTEMS***
• By January 4, 2018, PRASA informed that they had restored the service to 58.1% of subscribers.

TRANSPORTATION
• Immediately after the hurricane: Only 400 miles of road could be accessed/transited (out of 16,700 miles).
• Air travel was suspended for 2 days, then there were only 10 flights per day for a week.

COMMUNICATIONS****
• On January 2018, the FCC reported that 9.5% of the cell sites were out of service and that Vieques had more than 50% of its cell sites out of service.
These power and communication disruptions caused cascade effects by limiting availability, distribution, and management of food, medicine & essential supplies and diesel to operate trucks, construction equipment and auxiliary generators to power hospitals, treatment plants, storm water pumps, communication towers and nursing homes…

… resulted in an estimated 2,975 deaths

Source: Puerto Rico's government
COMUNIDADES COMPLETAS EN ÁREAS INUNDABLES

SEVERE IMPACT TO INFRASTRUCTURE
(TOA ALTA)

Source: https://storms.ngs.noaa.gov/storms/maria/index.html#10/18.2973/-66.4434
SEVERE IMPACT TO INFRASTRUCTURE (CIALES)

Source: https://storms.ngs.noaa.gov/storms/maria/index.html#10/18.2973/-66.4434
ENTIRE COMMUNITIES IN FLOODED AREAS
SEVERE IMPACT TO HOUSES

Source: JA Gonzalez-Moscoso, 2017
STORM SURGE IMPACT (HUMACAO)

Source: https://storms.ngs.noaa.gov/storms/maria/index.html#10/18.2973/-66.4434
STRUCTURES ON THE COAST (RINCÓN)
1% ANNUAL CHANCE FLOODPLAIN MAP

- 331,322 structures within the floodplain area
- 252,748 Advisory Maps homes within the floodplain area
- 200,000 homes within the floodplain area
- 488,844 population living at risk of floods
- 30,000 Sustained substantial damage as defined (NFIP)
- 5,675 NFIP insurance policies
- 245,586 FEMA applicants in the current 100-year flood boundary
- 92,180 Advisory Maps: additional structures in flood zones

Source: Puerto Rico Planning Board, 2018
Source: Puerto Rico Action Plan, 2018
Map by Naomy Pérez-Sánchez, AECOM, 2019
RECONSTRUCTION PROCESS: FLOOD LENS
Central Office for Recovery, Reconstruction and Resiliency (COR3)

- Developing, presenting and administering recovery action plans
- Financing, executing and effecting infrastructure projects related to recovery efforts
- Monitoring contracting for compliance and effectiveness purposes
- Implementing and enforcing checks and balances for procurement and approval of contracts and payments
- Coordinating and channeling all government efforts and activities of the Government related to recovery efforts
# PLANS & MAPS RELEVANT TO PR RECONSTRUCTION: FLOOD

1. ECONOMIC DEVELOPMENT AND RECOVERY PLAN FOR PUERTO RICO

2. FISCAL PLAN FOR PUERTO RICO

3. DISASTER RECOVERY ACTION PLAN

4. HAZARD MITIGATION PLANS / EMERGENCY OPERATION PLAN / PRE & POS DISASTER PLAN

5. LAND USE PLAN/ PUERTO RICO ZONING DISTRICT MAP / FLOOD ADVISORY MAPS/ RISK MAP PROJECTS

6. INTEGRATED WATER RESOURCES MANAGEMENT PLANS
Puerto Rico Recovery Plan

Foundational areas:
• Energy
• Communication/Information Technology
• Water
• Transportation
• Housing
• Public Buildings
• Education
• Health and Social Services, and
• Natural and Cultural Resources

Strategic Initiatives:
• Enhancing the Ocean and Visitor Economies
• Modernization of Emergency Services
• Agricultural Transformation
• Digital Transformation
• Transition to a 21st Century Workforce
• Entrepreneurship Expansion, and
• Reduction of Policy and Structural Barriers to Support Advanced Manufacturing

SOURCE: ECONOMIC DEVELOPMENT AND RECOVERY PLAN FOR PUERTO RICO
**Total estimated cost for the Puerto Rico Recovery Plan:**

$139.0B

**Estimated resources available to Puerto Rico for disaster recovery:**

<table>
<thead>
<tr>
<th>Source/Economic Development and Recovery Plan for Puerto Rico</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total estimated cost for the Puerto Rico Recovery Plan:</strong></td>
</tr>
<tr>
<td>$139.0B</td>
</tr>
<tr>
<td><strong>Funding known to be available:</strong> $69.1B</td>
</tr>
<tr>
<td><strong>Disaster Relief Fund (DRF)</strong></td>
</tr>
<tr>
<td>Individual Assistance (IA)</td>
</tr>
<tr>
<td>Housing Assistance Only</td>
</tr>
<tr>
<td>$0.8B</td>
</tr>
<tr>
<td><strong>DRF Public Assistance (PA)</strong></td>
</tr>
<tr>
<td>Permanent Work Only (Categories C-G)</td>
</tr>
<tr>
<td>$37.4B</td>
</tr>
<tr>
<td><strong>DRF Hazard Mitigation Grant Program (HMGP)</strong></td>
</tr>
<tr>
<td>$3.0B</td>
</tr>
<tr>
<td><strong>Community Development Block Grant – Disaster Recovery (CDBG-DR)</strong></td>
</tr>
<tr>
<td>$19.9B</td>
</tr>
<tr>
<td><strong>Private insurance</strong></td>
</tr>
<tr>
<td>$8.0B</td>
</tr>
<tr>
<td><strong>Funding for which the amount is known, but the amount that Puerto Rico will receive is uncertain:</strong> $24.5B</td>
</tr>
<tr>
<td><strong>Other from supplementals</strong></td>
</tr>
<tr>
<td>$21.2B</td>
</tr>
<tr>
<td><strong>Steady-state federal programs</strong></td>
</tr>
<tr>
<td>$3.3B</td>
</tr>
<tr>
<td><strong>Funding that will have to be sought out, but for which success remains uncertain</strong> $45.4B</td>
</tr>
</tbody>
</table>
Cost categories by sector for capital investments (in millions)

276 Call of Actions (COAs) PA: 29 / CDBG-DR:115

SOURCE: ECONOMIC DEVELOPMENT AND RECOVERY PLAN FOR PUERTO RICO
ESTIMATED NEEDED TOTAL COSTS (IN MILLIONS)

<table>
<thead>
<tr>
<th>Category</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>$30,000</td>
</tr>
<tr>
<td>PRASA infrastructure and operations</td>
<td>$15,000</td>
</tr>
<tr>
<td>Flood control infrastructure and management</td>
<td>$10,000</td>
</tr>
<tr>
<td>Non-PRASA infrastructure and operations</td>
<td>$1,900</td>
</tr>
<tr>
<td>Stormwater infrastructure and management</td>
<td>$1,500</td>
</tr>
</tbody>
</table>

ON FLOOD INFRASTRUCTURE & STORMWATER MANAGEMENT:
11,500 MILLIONS
~20 Call of Actions (COAs)

INTEGRATED WATER MANAGEMENT
2,000 MILLIONS

SOURCE: ECONOMIC DEVELOPMENT AND RECOVERY PLAN FOR PUERTO RICO
<table>
<thead>
<tr>
<th>Call of Actions: Flood</th>
</tr>
</thead>
</table>
| **WTR 18** Invest in Stormwater System Management.  
Potential total costs: $418.7 million  
Potential funder(s): PA, HMGP, CDBG-DR, EPA, USDA |
| **WTR 19** Reduce Urban Nuisance Flooding  
Potential total costs: $1.005 billion in total estimated costs  
Potential funder(s): EPA, HMGP, USDA, Government of Puerto Rico, DNER |
| **WTR 20** Relocate or Redesign Assets in Flood Zones  
Potential total costs: $1.183 billion in total estimated costs  
Potential funder(s): HMGP, CDBG-DR, DOC EDA, USDA |
| **WTR 21** Centralize Stormwater System Support and Management  
Potential total costs: $67.7 million in total estimated costs  
Potential funder(s): Government of Puerto Rico, DNER, municipal governments, USDA |

*Source: Economic Development and Recovery Plan for Puerto Rico*
<table>
<thead>
<tr>
<th>WTR 22</th>
<th>Upgrade Reservoir and Dam Safety Management</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Potential total costs: $125 million in total estimated costs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WTR 23</th>
<th>Evaluate, Repair, and Improve Flood Control Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Potential total costs: $4.667 billion in total estimated costs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WTR 24</th>
<th>Rationalize Ownership and Management of Flood Control Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Potential total costs: $339.4 million in total estimated costs</td>
</tr>
</tbody>
</table>

SOURCE: ECONOMIC DEVELOPMENT AND RECOVERY PLAN FOR PUERTO RICO
2. FISCAL PLAN FOR PUERTO RICO

Puerto Rico’s Unique Planning Challenge

EXHIBIT 3: IMPACT OF REVENUE AND EXPENSE MEASURES ON OWN REVENUES AND EXPENDITURES

Impact of measures on Government revenues and expenditures, $M

<table>
<thead>
<tr>
<th>Pre-New Fiscal Plan</th>
<th>Post-New Fiscal Plan</th>
<th>Fiscal Measures, $M</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>321</td>
<td>424</td>
</tr>
<tr>
<td></td>
<td>435</td>
<td>521</td>
</tr>
<tr>
<td></td>
<td></td>
<td>550</td>
</tr>
</tbody>
</table>

Own revenues

<table>
<thead>
<tr>
<th>FY18</th>
<th>FY19</th>
<th>FY20</th>
<th>FY21</th>
<th>FY22</th>
<th>FY23</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>356</td>
<td>1,441</td>
<td>2,422</td>
<td>2,728</td>
<td>2,926</td>
</tr>
</tbody>
</table>

Own expenditures

1 Own Expenditures includes all CW and Federally funded Medicaid expenses; pre-measures, own expenditures increase between FY20 and FY21 due to Medicaid Supplemental Funding phase out

Source: PR FOMB Certified Fiscal Plan
# 3. ACTION PLAN: CDBG-DR

<table>
<thead>
<tr>
<th>ACTION PLAN</th>
<th>ACTION PLAN 1ST AMENDMENT</th>
<th>FUTURE ACTION PLAN AMENDMENTS</th>
<th>ESTIMATED TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.5 BILLION</td>
<td>$8.2 BILLION</td>
<td>POWER GRID $1.9 BILLION</td>
<td>$19.9 BILLION</td>
</tr>
<tr>
<td>• FEDERAL REGISTER NOTICE FEB 9, 2018</td>
<td>• FEDERAL REGISTER NOTICE AUGUST 20, 2018</td>
<td>• POWER GRID MITIGATION FUNDS $8.3 BILLION</td>
<td></td>
</tr>
<tr>
<td>• ACTION PLAN APPROVED JUL 29, 2018</td>
<td>• ACTION PLAN AMENDMENT PUBLISHED FOR PUBLIC COMMENT SEPT 21, 2018</td>
<td>• THESE AMOUNTS ARE ESTIMATED AND SUBJECT TO CHANGE</td>
<td></td>
</tr>
<tr>
<td>• SIGNED GRANT AGREEMENT SEPT 20, 2018</td>
<td>• PUBLIC COMMENT PERIOD SEPT 21 - OCT 21, 2018</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• PUBLIC HEARINGS OCT 15 - OCT 19, 2018</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• ACTION PLAN AMENDMENT SUBMITTED FOR FINAL APPROVAL NOVEMBER 16, 2018</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• ACTION PLAN AMENDMENT APPROVED FEB 28, 2019</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• PENDING GRANT AGREEMENT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: PR PR CDBG-DR Action Plan
### PR Action Plan: Current Programs and Distribution

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning Portfolio</td>
<td>$484 M</td>
</tr>
<tr>
<td>Housing Portfolio</td>
<td>$3,761 M</td>
</tr>
<tr>
<td>Economic Development Portfolio</td>
<td>$1,430 M</td>
</tr>
<tr>
<td>Infrastructure Portfolio</td>
<td>$1,475 M</td>
</tr>
<tr>
<td>Multi-Sector Portfolio</td>
<td>$1,900 M</td>
</tr>
</tbody>
</table>

Source: PR PR CDBG-DR Action Plan
## FUNDING OPPORTUNITIES: FLOOD

<table>
<thead>
<tr>
<th>PORTFOLIO</th>
<th>CDBG-DR PROGRAMS</th>
<th>SUB-TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Home Repair, Reconstruction, or Relocation Program</td>
<td>$2,175 M</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Puerto Rico by Design (PR Design-Build)</td>
<td>$1,000 M</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Critical Infrastructure Resilience Program</td>
<td>$400 M</td>
</tr>
<tr>
<td>Multi-sector</td>
<td>Puerto Rico by Design (PR Design-Build)</td>
<td>$700 M</td>
</tr>
<tr>
<td>Multi-sector</td>
<td>City Revitalization Program</td>
<td>$1,200 M</td>
</tr>
<tr>
<td>Planning</td>
<td>Municipal Recovery Planning Program</td>
<td>$39 M</td>
</tr>
<tr>
<td>Planning</td>
<td>Agency Planning Initiatives</td>
<td>$50 M</td>
</tr>
</tbody>
</table>

$5,564 M

Source: PR PR CDBG-DR Action Plan
Local Hazard Mitigation Plans, Updates

Puerto Rico Planning Board and Atkins are updating the Local Hazard Mitigation Plans (Expected to be finished by 2021)

Objectives:
• Update the hazard mitigation plans of the 78 Local Municipalities.
• Maintain the eligibility of the Hazard Mitigation Grant Program
• Identify possible mitigation projects
• Increase public awareness and education.
• Maintain compliance with state and federal requirements

Hazard Mitigation Assistance, Projects Implementation

12 Month Lock in-for HMGP, 4339-DR-PR
97.039 - $ 2,999,975,000

<table>
<thead>
<tr>
<th>Sector</th>
<th>Percentages</th>
<th>Initial Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water/Wastewater</td>
<td>20%</td>
<td>$ 599,995,000.00</td>
</tr>
<tr>
<td>Power</td>
<td>15%</td>
<td>$ 449,996,250.00</td>
</tr>
<tr>
<td>Communications/IT</td>
<td>12%</td>
<td>$ 359,997,000.00</td>
</tr>
<tr>
<td>Health and Social Services</td>
<td>11%</td>
<td>$ 329,997,250.00</td>
</tr>
<tr>
<td>Municipalities</td>
<td>10%</td>
<td>$ 299,997,500.00</td>
</tr>
<tr>
<td>Transportation</td>
<td>7%</td>
<td>$ 209,998,250.00</td>
</tr>
<tr>
<td>Education</td>
<td>7%</td>
<td>$ 209,998,250.00</td>
</tr>
<tr>
<td>Public Buildings</td>
<td>7%</td>
<td>$ 209,998,250.00</td>
</tr>
<tr>
<td>Housing</td>
<td>5%</td>
<td>$ 149,998,750.00</td>
</tr>
<tr>
<td>Capacity Building</td>
<td>3%</td>
<td>$ 89,999,250.00</td>
</tr>
<tr>
<td>Natural and Cultural Resources</td>
<td>1.50%</td>
<td>$ 44,999,625.00</td>
</tr>
<tr>
<td>Economics</td>
<td>1.50%</td>
<td>$ 44,999,625.00</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>$ 2,999,975,000.00</td>
</tr>
</tbody>
</table>
5. LAND USE PLANS / FLOOD MAPS

Plans & regulations

• A Puerto Rico Land Use Plan adopted on November 30, 2015

• Puerto Rico's 2018 building code. Since these codes are aligned with the 2018 International Building Codes, the Island's codes include higher standards than those required by the NFIP

• The first Puerto Rico's Stormwater Management Regulation is in the process of being developed.

• A 5-yr strategy was developed for the Island's floodplain management program

Mapping & risk characterization

• In 2017 the Puerto Rico Planning Board (PRPB) adopted the Risk Zoning District for Open Space (R-EA) and the Risk Area Overlay District.

• Advisory Base Flood Elevations (ABFEs) were adopted in 2018 by the PRPB to replace the Effective mapping for new construction and substantial improvements purposes.

• Adoption of the The Limit of Moderate Wave Action (LiMWA) that marks the limit of the Coastal A Zone.

• Risk MAP Project started in several watersheds around the island
DEFINES THE IWRM FRAMEWORK FOR PUERTO RICO AND THE STRATEGIES FOR ITS IMPLEMENTATION.

MANAGED BY THE DEPARTMENT OF NATURAL AND ENVIRONMENTAL RESOURCES

REVISED IN 2015
MAIN PROGRAMS ADDRESSING FLOOD MGT

FEDERAL AGENCIES

- FEMA
- HUD
- USACE
- USDA

FEDERAL RECONSTRUCTION PROGRAMS

- PUBLIC ASSISTANCE
- INDIVIDUAL ASSISTANCE
- HAZARD MITIGATION ASSISTANCE
- CDBG-DR
- FLOOD RISK MANAGEMENT CONSTRUCTION
- EMERGENCY WATERSHED PROTECTION (EWP) PROGRAM

LOCAL AGENCIES

- FINANCIAL OVERSIGHT AND MANAGEMENT BOARD
- CENTRAL OFFICE FOR RECOVERY, RECONSTRUCTION & RESILIENCE (COR3)
- PR HOUSING DEPT (VIVIENDA)
- DEPT NATURAL AND ENVIRONMENTAL RESOURCES
- MUNICIPALITIES AND COMMUNITIES

manage ↔ manage/oversight ↔ oversight
FLOOD COAs IMPLEMENTERS

- Puerto Rico Aqueduct and Sewer Authority
- PR Permits MGT Office
- Municipal Government
- NOAA
- USACE
- FEMA
- USGS
- COR3
- PR Emergency MGT Bureau
- Housing Department
- USGS
- NGOS
- DEPT of Natural and Environmental Resources
- Puerto Rico Electric Power Authority
- PR MGT Bureau
- Communities
- Insurance Companies
- Private Companies
- EPA
- Puerto Rico Planning Board
Por nosotros mismos.
ReImagina promotes a strong, equitable and prosperous Puerto Rico by helping rebuild the island on a more solid, just and resilient foundation.
REIMAGINA PUERTO RICO REPORTS

77 meeting and activities
748 participants

1st Working Groups Meetings
February 2018
Public Sector Advisory Group Meeting
February 2018
Journalists Workshop
March 2018
3rd Working Groups Meetings
April 2018
Publication of the Reimagina Reports
June 2018
Results Presentations in NY & D.C.
July 2018
Reconstruction Process Working Group
November 2018

NOV 2017
Creation of the Commission

Youth Participatory Photography Program
February 2018
1st Round of Focus Groups
February - March 2018
2nd Working Groups Meetings
March 2018
Focus Group with the Diaspora
March 2018
2nd Round of Focus Groups
April 2018
Townhall Meetings
June - August 2018
Presentations to the Diaspora
September - October 2018

Reimagina NOW
A total of 97 recommendations were developed within the six sectors. Each sector produced a report that presents a goal for the sector and specific actionable recommendations. The complete set of Sector Reports, which include background, sector context and action details, are included in our website.
Our work: Implementing tools and multi-stakeholder coalitions to advance reforms and track progress of Puerto Rico’s recovery

Tracking efforts
- Developing tools to track projects
- Collaborating with relevant stakeholders
- Serving as a conduit

Advancing reforms
- Water
- Energy
- Housing
<table>
<thead>
<tr>
<th><strong>FLOOD MANAGEMENT RECOMMENDATIONS</strong></th>
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<tr>
<td>Implement an integrated flood risk management approach.</td>
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<tr>
<td>Improve Puerto Rico Dam Safety Program to ensure coordination between responsible agencies and enhance community preparedness.</td>
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<td>Develop comprehensive watershed plans using integrated water resources management to promote the sustainable use of water resources and maximize the resultant economic and social well-being.</td>
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<td>Enforce open space determinations with programs/guidelines for the dedication of lands to the creation of parks, green infrastructure projects, land conservation, or other adequate uses.</td>
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<td>Develop green infrastructure design guidelines for urban areas, and identify and implement pilot projects.</td>
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<td>Re-evaluate the design of proposed flood control projects to integrate resilience criteria and nature-based solutions.</td>
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TOWARD A PUERTO RICO INTEGRATED FLOOD RISK MANAGEMENT APPROACH
INTEGRATED FLOOD MANAGEMENT

OPPORTUNITY & CHALLENGES FACTORS

INSTITUTIONAL

SOCIOECONOMIC / ENVIRONMENTAL

TECHNOLOGICAL

PROGRAMMATIC / FISCAL

TECHNICAL / CAPACITIES

TRANSPARENCY / INCLUSIVENESS
• The adopted Advisory Base Flood Elevation Maps represent a 20% an increase of the SFHA and include a regulated Limit of Moderate Wave Action (LiMWA) zone.
• The District for FEMA Open Spaces now regulates land use development on the island.
• The Puerto Rico building codes were updated based on the IBC 2018.
• Puerto Rico 5-yr strategy for the Island floodplain management program.
• PR Housing Dept determined that CDBG-DR funds cannot be used to repair “substantially damaged structures” located in the SFHA.
• Floodplain management responsibilities in Puerto Rico are complex and fragmented.
• The Puerto Rico Disaster Recovery Plan estimates $10 billion are needed to address damages and resilience needs for flood management.
CURRENT OPPORTUNITIES

- Puerto Rico’s first Stormwater Management Regulation is in the process of being developed.
- Puerto Rico Special Flood Hazard Regulation will be reviewed for alignment with the IBC 2018.
- USACE has appropriated $2.5 billion for flood control projects on the Island.
- There are more than $8 billions from CDBG-DR and HGMP assigned to programs that could directly and indirectly address flood management needs.
- Update of the 78 municipal hazard mitigation plans.
- First Hazard Mitigation Plan at a Watershed Level: San Juan Bay Estuary Program.
- $8.3 billions of the CDBG-DR for mitigation programs.
- Risk MAP projects in several watersheds in Puerto Rico.
RECOMMENDATIONS

• Puerto Rico law related to floodplain management is from 1961. A revision should be pushed to guide the reconstruction process to balance environmental, social, economic and physical dimensions.

• Develop and adopt an integrated floodplain management policy/plan for Puerto Rico.

• Create a multi-sectoral group / task force to support the decision makers on developing a vision, addressing technical challenges, embedding a risk-based approach, facilitating effective coordination and public participation platforms, and adapting to future challenges.
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