

Nature-Based Solutions for a Resilient Recovery

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Local experts work mitigation strategies with the support of FEMA allocations

San Juan, Puerto Rico –The north coast of Puerto Rico is home to nearly 50 percent of the island’s dunes, which provide important services for the ecosystem: they protect hawksbill habitats, as well as communities and critical infrastructure from coastal flooding and storm surges. However, hurricanes Irma and María, the commercial and illegal extraction of sand and heavy foot traffic from beachgoers, among other factors, have reduced the size of the dunes and their ability to act as natural barriers.

Attention to this and other damage as a result of climate change is key in coordinating a long-term recovery for Puerto Rico. Aware of this, the Federal Emergency Management Agency (FEMA) works together with local organizations to find solutions that contribute to the preservation of the country’s infrastructure and natural resources.

“Long-term recovery requires us to develop projects focused on mitigation, preservation and nature-based solutions. The agency has already obligated over \$1.5 billion for mitigation measures for Public Assistance projects and approved over \$3 billion under the Hazard Mitigation Grant Program. However, citizen participation and the knowledge of local students and researchers are required to find answers that apply to our needs as a Caribbean island. Puerto Rico has the talent and FEMA provides the funds: we all work as a team for a common good,” said Federal Disaster Recovery Coordinator José G. Baquero.

To address coastal erosion, a team of students and researchers from Vida Marina: Center for Conservation and Ecological Restoration—from the Aguadilla Campus of the University of Puerto Rico— has been working together with communities on natural measures to restore the dunes of the north coast. However, the passage of Hurricane María caused serious damage to the structures that the organization worked on.



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With the support of over \$650,000 from FEMA and through a collaborative agreement with the Department of Natural and Environmental Resources (DNER), the organization will restore what are known as biomimicry matrices on Maranto Beach in Arecibo; the Nolla Farm in Camuy; and the Middles and Poza Del Teodoro beaches in Isabela. Biomimicry is the practice of designing solutions that imitate nature or natural processes. For this project, Vida Marina installed pieces of disused wooden pallets to create matrices three feet underground to promote the sand's natural accumulation.

The project also includes the reconstruction of boardwalks and fences at critical access points to reduce pedestrian impact on the dunes. Informational signs will also be reinstalled to educate the public about the dunes and to protect them from potential human damage. As part of the mitigation measures for this project, materials will be used to reinforce the structure of the boardwalks against the waves of future hurricanes.

The executive director of the Puerto Rico Central Office for Recovery, Reconstruction and Resiliency (COR3), Manuel A. Laboy Rivera, stated that “government agencies, as well as municipalities and non-profit organizations, concentrate part of their efforts on the development of projects focused on mitigating multiple risks in order to rebuild a resilient infrastructure. Complying with Governor Pedro Pierluisi’s public policy, we will continue to support this development led by the DNER and the UPR, Aguadilla Campus, which is added to other measures that the chief executive recently announced to mitigate coastal erosion through an allocation of \$105 million.”

Repairs to the facilities of the Caña Gorda Beach in the municipality of Guánica is another permanent project of the agency that incorporates nature-based solutions. There are nearly \$770,000 to address damage to the lifeguard area, offices, lightning poles and gazebos, among others. Within the mitigation measures for the project, the affected area will include a revetment with vegetation to protect the coastline. This nature-based solution provides economic, aesthetic and ecological benefits, and also mitigates erosion and damage from storm surges.

On the other hand, a \$1.5 million allocation allowed the University of Puerto Rico (UPR) to develop an assessment of the beach systems after the passage of Hurricane María. The study generated a high-precision database that presents the attributes and extension changes of the 1,285 beaches of Puerto Rico after the



storm. As part of the project, the UPR designed a story map which contains all the findings of the study and which is accessible to government agencies, entities, organizations and the public. During the disclosure of the study, 48 actions were presented to solve the problem of erosion on the island.

Puerto Ricans in FEMA Address Climate Change

To address the challenges of climate change from the agency and with a focus on the particular needs of Puerto Rico, a group of local FEMA personnel developed the *Climate Change Mitigation and Adaptation Memorandum*, which acknowledges the need to establish immediate actions that address the threats of climate change as part of FEMA's recovery efforts on the island. The memorandum is an initial effort to define and identify actions; and support those considered at the United States level in response to President Joseph R. Biden's public policy to address climate change.

Through this tool, a series of activities have been carried out to benefit over 1,000 participants. This includes FEMA personnel in Puerto Rico, municipalities, contractors, the academia and non-profit organizations. The meetings have increased awareness on climate change, in addition to presenting possible recovery measures with a mitigation and adaptation approach to address future climate threats.

To date, FEMA has allocated over \$30.3 billion in Public Assistance funds towards Puerto Rico's recovery following Hurricane María.

For more information about Puerto Rico's recovery from Hurricane María, visit fema.gov/disaster/4339 y recovery.pr. Follow us on social media at Facebook.com/FEMAPuertoRico, Facebook.com/COR3pr and [Twitter @COR3pr](https://Twitter.com/COR3pr).

