

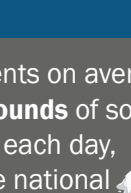
This infographic was a joint effort between EPA and FEMA, developed in collaboration with HUD, USDA and DNER



Small changes to mitigation planning can have big impacts for Puerto Rico municipalities and their communities!

Planning and developing a strong and resilient solid waste infrastructure and management system are necessary to mitigate possible hazards resulting from the disaster debris and municipal solid waste generated from disasters.

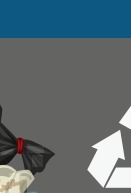
WHY NOW?



Hurricanes



Earthquakes



Pandemic

Approximately **2.5 million** tons of debris were generated by Hurricanes Irma and María.

Disaster recovery operations and day-to-day activities are expected to further reduce landfill capacity from structure demolition, construction and beyond.

The current COVID-19 pandemic has suspended or greatly reduced recycling operations and has also increased the amount of materials going into disposal facilities.

Puerto Rico residents on average dispose of **5.56 pounds** of solid waste per person, each day, compared with the national average of 4.91 pounds per person a day in the U.S.



Recycling rates on the island are low, with approximately less than 10 percent of solid waste diverted.

Disaster debris generation has greatly reduced the amount of available landfill space at disposal facilities. To determine the impact of debris generation from Hurricanes Irma and María, the U.S. Environmental Protection Agency (EPA), in collaboration with the Puerto Rico Department of Natural and Environmental Resources (DNER) and with support from the Federal Emergency Management Agency (FEMA), conducted a landfill capacity assessment in 2018. The assessment found that Puerto Rico's landfill infrastructure would reach capacity in a matter of a few years given current operations.

- Of the open dumps and landfills assessed, the majority operate with unlined areas, or with a combination of lined and unlined areas for final disposition of waste.
- Unlined, non-compliant landfill areas can release a substantial volume of contaminated leachate each year into the groundwater of Puerto Rico, much of which is a vital drinking water resource.



WHAT IS SOLID WASTE?

DEBRIS

Generally means the material and waste streams resulting from a natural disaster.

SOLID WASTE

Generally means any garbage or refuse resulting from industrial, commercial, mining agricultural operations, and from community activities. Nearly everything we do generates some kind of solid waste.

Possible solid waste/debris streams resulting from disasters:



Construction and Demolition



Household Hazardous Waste



Electronic Waste (E-Waste)



Vegetative Debris and Spoiled Food Items

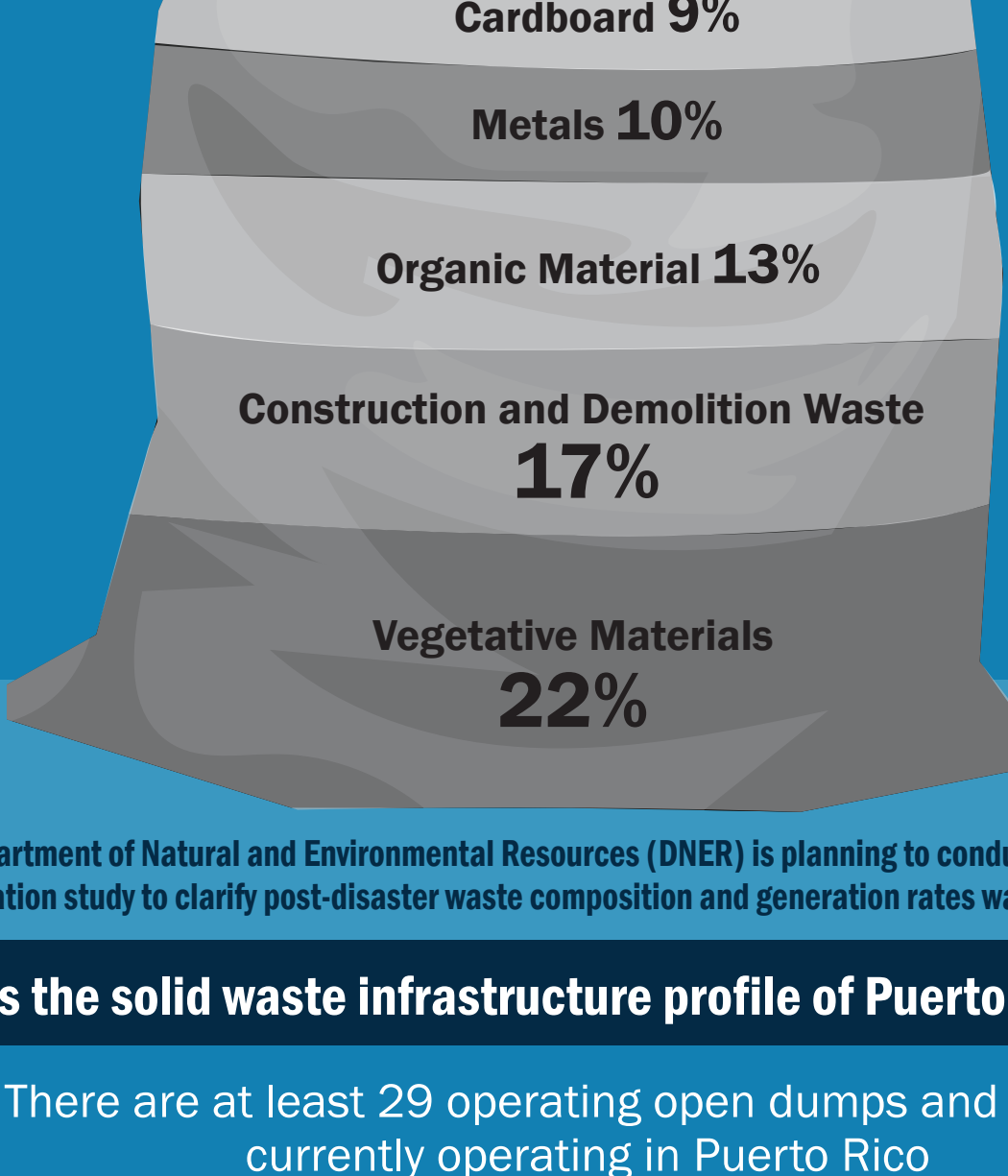


Industrial Hazardous Waste



Marine Debris

Solid Waste Composition of Puerto Rico, 2003



The Department of Natural and Environmental Resources (DNER) is planning to conduct an updated waste characterization study to clarify post-disaster waste composition and generation rates waste diversion potentials.

What is the solid waste infrastructure profile of Puerto Rico in 2020?

There are at least 29 operating open dumps and landfills currently operating in Puerto Rico

18X

At least 18 are considered to be operating open dumps (waste is in direct contact with soil and other natural resources).

12 of the 29 sites operate under closure or compliance orders issued by the federal government.

The solid waste infrastructure in Puerto Rico includes:

- At least 29 operating municipal solid waste disposal facilities
- 12 publicly-owned mini transfer stations
- 2 publicly owned transfer stations
- 2 publicly owned compost facilities
- 2 publicly owned materials recovery facilities



Most open dumps and landfills in Puerto Rico are located in areas that result in environmental conflicts and impacts including:

- 5 in the Karst region
- 4 in flood valleys
- 10 impact wetlands
- 9 potential to directly impact sources of drinking water
- 4 potential to directly impact natural reserves

All of these conflicts increase the risk of community lifelines being disrupted during and after a disaster.

Community lifelines enable the continuous operation of critical government and business functions and are essential to human health and safety or economic security. Solid waste facilities are vulnerable to relevant hazards and are needed for government operations.

Examples of Community Lifelines at risk of disruption by current landfill conditions in Puerto Rico:

- Community Lifeline**
 - Safety and Security
 - Food, Water and Shelter
 - Health and Medical
- Priority Impact Area**
 - Government Services, Community Safety
 - Safe Drinking Water Sources, Shelter
 - Public Health

The existing conflicts/conditions at open dumps and landfills may hinder the re-establishment of community lifelines after disasters. For this reason, incorporating solid waste mitigation strategies into hazard mitigation planning will help to protect lifelines and prevent and mitigate potential impacts to them.

<https://www.fema.gov/sites/default/files/2020-05/LifelinesFactSheetandPosterv2.pdf>

HOW?

Strategy and Funding Opportunities

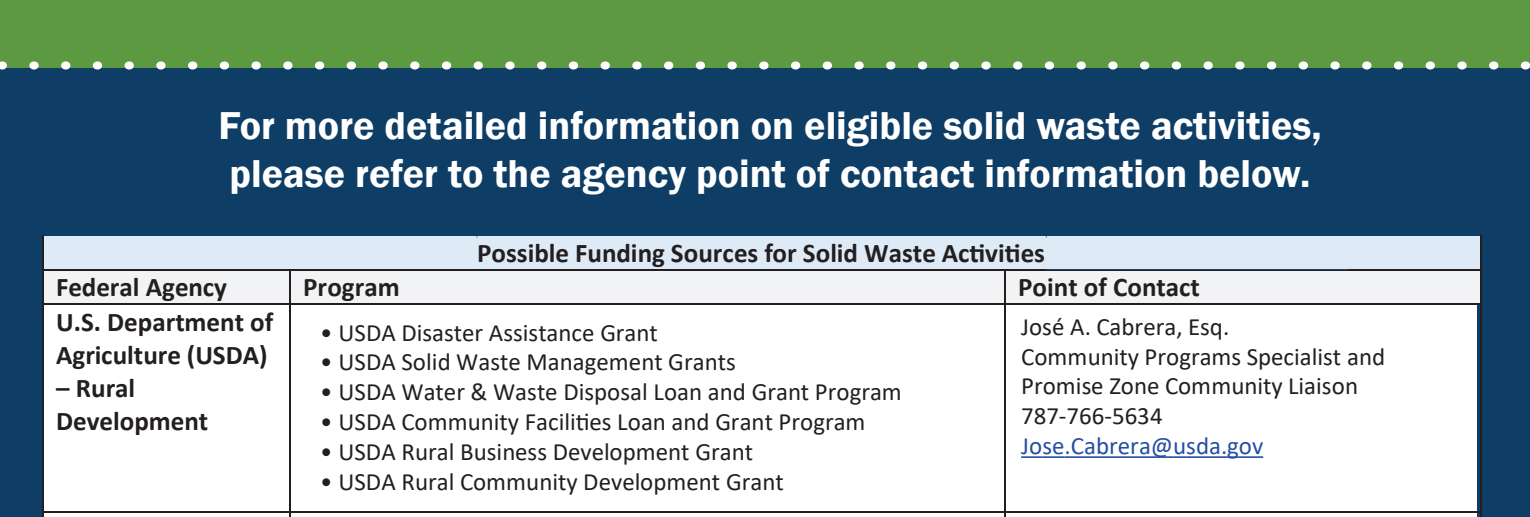
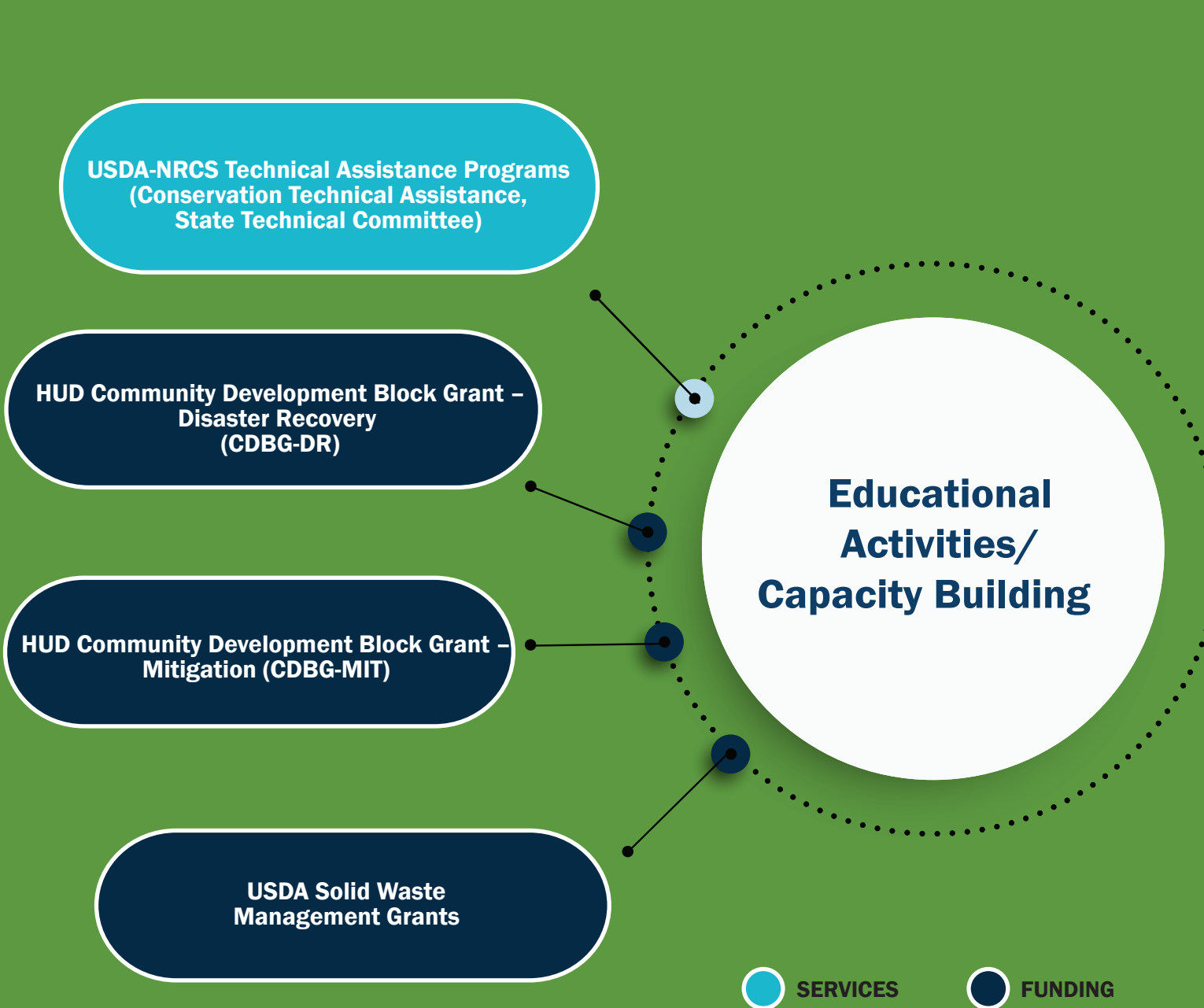
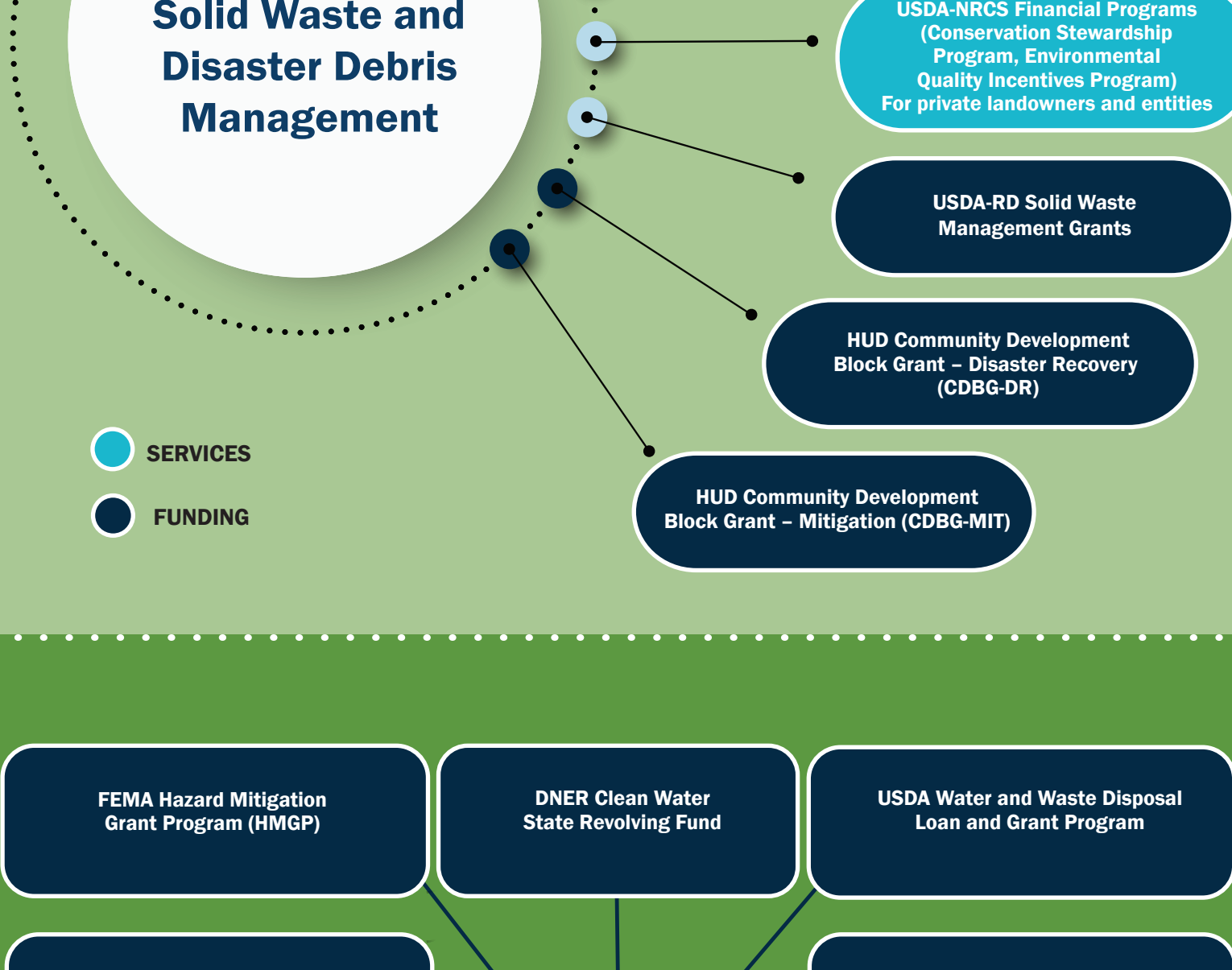
Without the inclusion of these critical solid waste strategies in the mitigation plans, mitigation funds would not be available to implement these important solid waste improvements.

Six Recommendations for Local Hazard Mitigation Plan: Investments and Strategies

- Asset Inventory** (i.e., landfills, composting sites, reuse and recycling facilities, and more)
- Solid Waste And Disaster Debris Planning**
- Landfill and Recycling Infrastructure Repairs/Improvements and Landfill Closure**
- Solid Waste Training and Certification**
- Responsible Financial Operation**
- Public Education and Outreach**

Lack of funds has been a major obstacle to solid waste and disaster debris management and infrastructure improvements for Municipalities in Puerto Rico. However, there are opportunities for Municipalities to benefit from funding sources available for solid waste investments. Additional funds may be available as other disaster recovery programs are established.

Possible Funding Sources or Services for Solid Waste Activities by Category:



For more detailed information on eligible solid waste activities, please refer to the agency point of contact information below.

Federal Agency	Program	Point of Contact
U.S. Department of Agriculture (USDA) - Rural Development	<ul style="list-style-type: none"> USDA Disaster Assistance Grant USDA Solid Waste Management Grants USDA Water & Waste Disposal Loan and Grant Program USDA Rural Business Development Grant USDA Rural Community Development Grant 	José A. Cabrera, Esq. Community Programs Specialist and Promise Zone Community Liaison 787-766-5634 Jose.Cabrera@usda.gov
U.S. Department of Agriculture (USDA) - Natural Resources Conservation Service (NRCS)	<ul style="list-style-type: none"> USDA-NRCS Landscape Planning Programs (Emergency Watershed Protection Program, Watershed and Flood Prevention Operations Program, Watershed Rehabilitation) USDA-NRCS Emergency Watershed Program (EWP-Recovery) USDA-NRCS Technical Assistance Programs (Conservation Technical Assistance, State Technical Committee) USDA-NRCS Financial Programs (Conservation Stewardship Program, Environmental Quality Incentives Program) For private landowners and entities 	Luis A. Cruz-Arroyo Caribbean Area Director Office: 787-281-4836 Cellphone: 787-405-7368 luis.cruz-arroyo@usda.gov
Federal Emergency Management Agency (FEMA)	<ul style="list-style-type: none"> FEMA Hazard Mitigation Grant Program (HMGP) 	Region 2 HMGP POC: Sharon Edwards HMA Branch Chief Sharon.edwards@fema.dhs.gov 917-561-2935 PR Mitigation Recovery HMGP POC: Antonio Busquets Lopez Hazard Mitigation Division Director Puerto Rico Inm Recovery Office FEMA DR 4339/4473-PR Antonio.busquetslopez@fema.dhs.gov 202-341-2607
U.S. Department of Housing and Urban Development (HUD)	<ul style="list-style-type: none"> Community Development Block Grant - Disaster Recovery (CDBG-DR) Community Development Block Grant - Mitigation (CDBG-MIT) 	Laura I. Rivera-Carrion Coordinating Officer for Disaster Recovery Tel. 787-274-5817/ Cel. 202-258-3929 Laura.I.Rivera-Carrion@hud.gov Puerto Rico Department of Housing is the administering agency for CDBG-DR and CDBG-MIT funds for the Government of Puerto Rico.
Department of Natural and Environmental Resources (DNER)	<ul style="list-style-type: none"> Clean Water State Revolving Fund (CWSRF) Program 	Javier Verardi Department of Natural and Environmental Resources Projects Division, Water Quality Area (787) 767-8181 ext. 3080. javierverardi@dca.pr.gov