Assessment of Landslide and Debris Flow Impacts in Puerto Rico

- Hurricane Maria generated more than 40,000 landslides in Puerto Rico, devastating infrastructure and property, hampering rebuilding and recovery efforts by changing drainage systems, and increasing risks from future storms to crews on the ground.

- USGS will assess post-storm landslides conditions and impacts, identify ongoing and potential threats to public safety and rebuilding crews, and deliver landslide hazard assessments to guide decisions on recovery and rebuilding in areas with the greatest landslide risk.

Assessment of Coastal Impacts in Florida and Puerto Rico

- Extensive hurricane damage to coastal areas from flooding, erosion, and coral deterioration increases immediate and long-term hazards to shorelines that include densely populated regions, putting critical infrastructure at risk to future flooding and erosion and causing economic losses.

- Post-storm repair and recovery investments that focus on immediate and long-term cumulative impacts will benefit from updated and expanded assessments of coastal vulnerability to storms.

- USGS will provide information that supports real-time hazard guidance during storms, emergency preparedness, and long-term management of existing or proposed engineering, infrastructure, and coastal protection systems.

Contact the USGS Hurricane and Wildfire Supplemental Team for more information:

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2018 Hurricane and Wildfire Supplemental Funding:
USGS Recovery Activities

USGS Role in Recovery

The Additional Supplemental Appropriations for Disaster Relief Requirements Act, 2018 (P.L. 115-123), was signed by the President on February 9, 2018. This funding provided $42.2 million to the U.S. Geological Survey (USGS) for equipment repair and replacement, high-resolution elevation data collection in both hurricane- and wildfire-impacted areas, and scientific studies and assessments that will support recovery and rebuilding decisions in the wake of Hurricanes Harvey, Irma, and Maria and the California Wildfires.

EXPLANATION
Supplemental activities, in millions of dollars

- Water gage replacement
- Gage data restoration
- Seismic/geomagnetic asset replacement
- Coral reef asset replacement
- Lidar acquisition/publishing
- Landslide assessment
- Coastal impact assessment

Total: $42.24 million

Pie chart values: $1.13, $4.80, $8.11, $0.19, $20.30, $3.20, $4.50
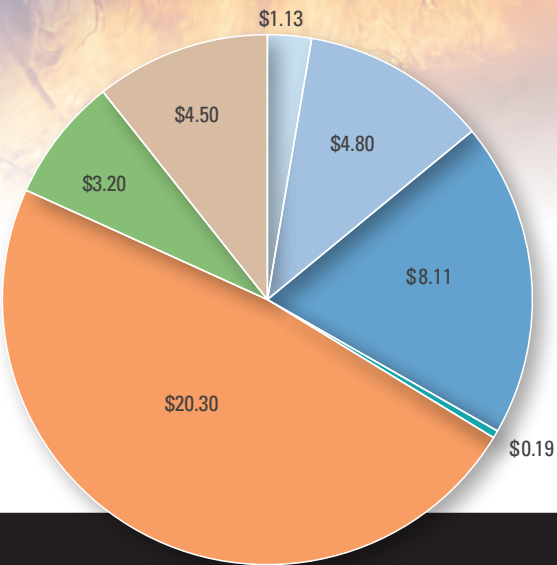
Equipment Repair and Replacement
Surface Water Gages in Texas, Florida, Puerto Rico, and U.S. Virgin Islands

- USGS streamgage network provides critical information about flood stage and streamflow.

- Gages were damaged or destroyed in Texas (20 gages), Florida (126), Puerto Rico (84), and U.S. Virgin Islands (3).

- Gage and sensor equipment will be repaired and replaced.
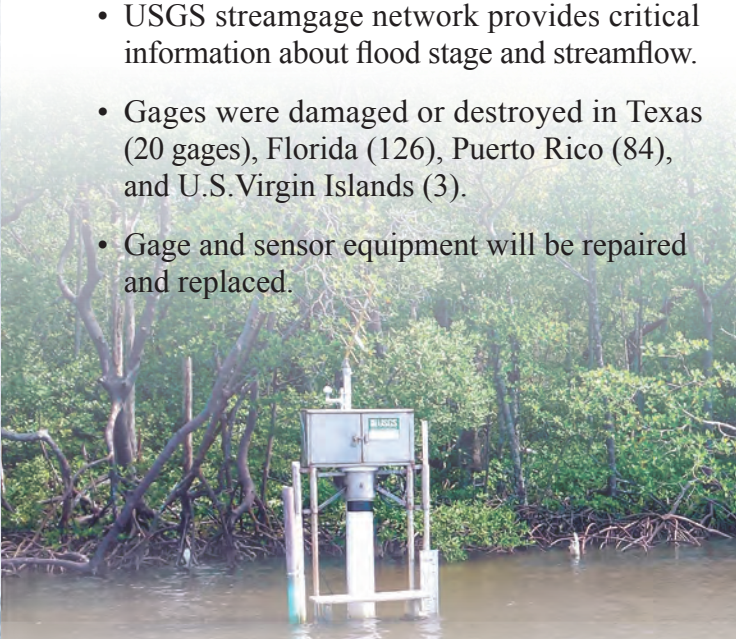
Data Restoration at Gage Locations in Puerto Rico

- USGS streamgage network provides timely forecasts to protect lives and property, manage water supplies and electric power production, and track the hydrologic recovery of storm-altered watersheds.

- Hurricane floodwaters impacted channel geomorphology and channel characteristics at multiple gages, disrupting the delivery of reliable stage and streamflow data.

- Stream stage and streamflow relations will be reestablished at gaging locations in Puerto Rico.

Equipment Repair and Replacement
Coral Reef Monitoring Equipment in Puerto Rico

- The U.S. Coral Reef Task Force has ongoing priority studies to guide watershed and coral reef restoration to reduce coastal hazards and increase the resiliency of coastal communities in Puerto Rico.

- USGS will repair, replace, and harden oceanographic and sediment sampling sensors that were damaged or destroyed by Hurricanes Maria and Irma and complete an analysis of storm hazards to coral reef-lined coastal communities with increased vulnerability following the hurricanes.

Gage Funding to Support Puerto Rico's Electric Power Authority (PREPA) and Emergency Management Agency (PREMA)

- Financial constraints on the government of Puerto Rico have limited the maintenance and operation of certain stream and rain gages in recent years. Supplemental funds support the PREPA agreement for the operation and maintenance of 52 stream and rain gages from October 1, 2017, to December 31, 2018.

- At the request of the National Oceanic and Atmospheric Administration and PREMA, the USGS will reestablish rain gages to assist in forecasting flash floods post-hurricane landfall through 2019.

Equipment Repair and Replacement
Seismic/Geomagnetic Monitoring Assets in Puerto Rico

- USGS supports public safety related to national earthquake, tsunami, and geomagnetic storm warnings.

- USGS plans to restore and harden critical earthquake and geomagnetic storm monitoring equipment in Puerto Rico and Turks and Caicos that was severely damaged by Hurricane Maria.

Acquisition and Publication of 3D Elevation Program (3DEP) Lidar Data

- The goal of 3DEP is to provide highly accurate, nation-wide elevation data for a range of critical applications including hazards response, recovery, and mitigation.

- USGS will collect and process light detection and ranging (lidar) data at priority hurricane-impacted (Texas, Louisiana, Florida, Georgia, South Carolina, Puerto Rico) and wildfire-impacted (California) locations. Supplemental funding is being leveraged with partner contributions to complete data coverage of the impacted areas.

- Data will be used in USGS landslide/debris flow and coastal impact assessments, reconstruction of infrastructure, and other recovery efforts.