Hurricane María

The experience of Hurricane Maria in the University of Puerto Rico Law School Library: dealing with disaster

SEAALL
Nashville, April 14, 2018

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University of Puerto Rico
Law School Library
Nobody in Puerto Rico will ever forget Hurricane María.
March, 2017
Student Strike
March 21 – June 5, 2017

September
Hurricane María
September 20, 2017

November
Law Library Partially Open
November 21, 2017,

June 2016
Fiscal Board
PROMESA Act.
June 30, 2016

September
Hurricane Irma
September 7, 2017

October
Law School Classes Resumed
October 30, 2017

Puerto Rico

TIMELINE of Events
Before and After Hurricane María, this is what happened in the University.
Puerto Rico is located in the Atlantic Ocean, right at the front door of hurricane alley.
Puerto Rico was placed on hurricane warning, it was now in hurricane Irma’s path.
Emergency Preparations

✓ Computers were covered in plastic and disconnected

✓ Nothing was left in the floors that could get wet with flooding

✓ Doors and windows secured

✓ Water drains cleared
On September 7

Big scare for
Puerto Rico

Path of destruction in
the Caribbean
It took a few days to partially restore power and water service and clear fallen trees from the roads.
Emergency aid for the neighboring islands
We were so happy to be back!
But five days later

Another threat

We started to experience history repeating itself.

Tropical storm Maria was rapidly intensifying in the Atlantic Ocean.

But this time Puerto Rico was directly in its path.
Preparing for María, that was now a hurricane

Nothing on the floors
These areas were flooded once and we knew what needed to be done.

Block water flow
This was one of the library doors affected by a flood two years ago.

Protection of personal items
Protection of computers, files, and personal belongings.
We prepared for the possible flooding of the Library.
Category 5

Strongest hurricane in 89 years.

- From category 1 to category 5 in just one day.

- Sustained winds of 155 mph

- Landfall – September 20

- The eye of the hurricane crossed the island diagonally destroying everything in its path.

- Worse than we ever imagined
Aftermath

All services collapsed

No water

No power

No telecommunications

Blocked roads

No postal service
Total blackout and island-wide devastation
Figure I: Ten biggest blackouts in US history

Million customer-hours of lost electricity service

- Hurricane Maria (2017): 1,248
- Hurricane Georges (1998): 1,050*
- Hurricane Sandy (2012): 775
- Hurricane Irma (2017): 753
- Hurricane Hugo (1989): 700*
- Hurricane Ike (2008): 683
- Hurricanes Katrina (2005): 681
- Northeast Blackout (2003): 592
- Hurricane Wilma (2005): 515
- Hurricane Irene (2011): 483

Source: DOE, National Academies, NERC, news reports and Rhodium estimates. * Rough approximation based on available news reports. We had a particularly difficult time estimating the impact of the 1938 New England hurricane. It may belong on the top 10 list, though we are confident it does not rival Maria for the number 1 slot.
Figure 2: Major global blackouts

Million customer-hours of lost electricity service, rough estimates based on available data. Not a definitive ranking. Selection of some of the largest, and some of the most well-known blackouts.

Typhoon Haiyan (2013) 6,100
Hurricane Maria (2017) 3,393
Typhoon Bopha (2012) 3,200
India Nationwide Blackout (2012) 2,500
Cyclone Sidr (2007) 1,900
Hurricane Georges (2008) 1,050
Hurricane Sandy (2012) 775
India Nationwide Blackout (2001) 660
Bangladesh Nationwide Blackout (2014) 270
Pakistan Nationwide Blackout (2015) 270
Brazil/Paraguay Blackout (2009) 140
Cyclones Lothar and Martin (1999) 46

Source: DOE, National Academies, NERC, news reports, government statistics, academic literature and Rhodium estimates.
This was our reality

Dealing with disaster
Homes destroyed
Apartments torn apart
Electrical infrastructure destroyed
Retail centers destroyed
Bridges collapsed
Drastic Measures
Impassable roads
Blocked by Trees
Floods
Entire communities
The aftermath of Hurricane Maria, in a sense, proved to be worse than the hurricane itself.
Clearing roads
Lines for fuel
Lines for gas
Lines for ice
Lines for Water
Lines for ATMs
Lines for construction supplies
Empty shelves
Crops destroyed
Supplies stuck at Puerto Rico port
Massive migration
Many groups have participated in the recovery efforts for Puerto Rico:

- Main Government
- Municipalities
- Religious organizations
- Non-profit organizations
- Citizens
- U.S. Power Companies

Still, the recovery has been very slow, thousands of Puerto Ricans still lack electricity in their homes.
## Statistics

### Progress in Puerto Rico

<table>
<thead>
<tr>
<th>Signs of recovery</th>
<th>1 DAY</th>
<th>30 DAYS</th>
<th>45 DAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cell service</strong></td>
<td>5%</td>
<td>61%</td>
<td>92%</td>
</tr>
<tr>
<td><strong>Potable water</strong></td>
<td>44%</td>
<td>69%</td>
<td>83%</td>
</tr>
<tr>
<td><strong>Patients cared for</strong></td>
<td>--</td>
<td>6,100</td>
<td>33,165</td>
</tr>
<tr>
<td><strong>Open ATMs</strong></td>
<td>114</td>
<td>1,047</td>
<td>1,160</td>
</tr>
<tr>
<td><strong>Generators</strong></td>
<td>10</td>
<td>148</td>
<td>423</td>
</tr>
<tr>
<td><strong>Gas Stations</strong></td>
<td>40%</td>
<td>78%</td>
<td>84%</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>0%</td>
<td>21%</td>
<td>41%</td>
</tr>
<tr>
<td><strong>Installation of Blue Roof</strong></td>
<td>0</td>
<td>439</td>
<td>5,975</td>
</tr>
</tbody>
</table>

*# of days after Maria made landfall*

Statistics as of 11/6
Source: status.pr and FEMA situational report
### Statistics Progress in Puerto Rico

**Hurricane Maria Update**

<table>
<thead>
<tr>
<th>Signs of Recovery</th>
<th>30 Days</th>
<th>60 Days</th>
<th>90 Days</th>
<th>120 Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell Service</td>
<td>61%</td>
<td>96%</td>
<td>96%</td>
<td>98.5%</td>
</tr>
<tr>
<td>Potable water</td>
<td>69%</td>
<td>90.63%</td>
<td>86%</td>
<td>98.82%</td>
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<tr>
<td>Patients cared for in hospitals</td>
<td>6,100</td>
<td>35,777</td>
<td>38,037</td>
<td>38,037</td>
</tr>
<tr>
<td>in hospitals by federal workforce</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open ATMs</td>
<td>1,047</td>
<td>1,300</td>
<td>1,586</td>
<td>1,586</td>
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<tr>
<td>Generators</td>
<td>148</td>
<td>645</td>
<td>933</td>
<td>708</td>
</tr>
<tr>
<td>Gas Stations</td>
<td>78%</td>
<td>85%</td>
<td>84.3%</td>
<td>88%</td>
</tr>
<tr>
<td>Power Generation</td>
<td>21%</td>
<td>49%</td>
<td>65.4%</td>
<td>80.3%</td>
</tr>
<tr>
<td>Installation of Blue Roof</td>
<td>439</td>
<td>11,196</td>
<td>23,455</td>
<td>55,692</td>
</tr>
<tr>
<td><strong>Numbers of days after Maria made landfall</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**FEMA**

Statistics as of 2018

Source: Status Jr and FEMA situational report
Puerto Rico after Hurricane Maria is like this huge tree that fell in the middle of the road, but is still trying to survive. It keeps growing leaves even though its branches were cut off and its roots were damaged. Still, it will never be able to grow strong if we leave it in the middle of the road.
UPR Río Piedras Campus

• Of the 11 campuses, this was the 2nd most affected in terms of cost of damage.
Hurricane Irma and Maria Impact to the UPR

Damage Assessment by Campus / Unit ($000's)

- Carolina: $1,121
- Arecibo: $2,982
- Catay: $3,683
- Bayamon: $6,731
- Humacao: $12,226
- Ponce: $2,830
- RCM: $13,503
- Rio Piedras: $30,032
- Aguadilla: $423
- RUM: $654
- Utuado: $2,672

Working Draft – Subject to Material Change