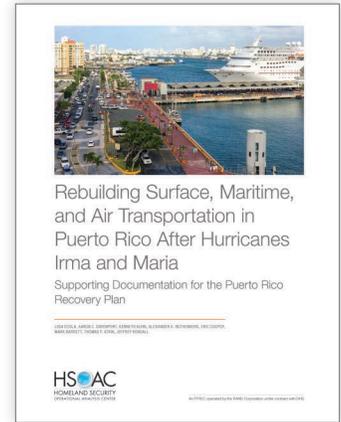


Rebuilding Surface, Maritime, and Air Transportation in Puerto Rico After Hurricanes Irma and Maria: Supporting Documentation for the Puerto Rico Recovery Plan



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The Homeland Security Operational Analysis Center was tasked with developing a long-range recovery plan for the damage caused in Puerto Rico by Hurricanes Irma and Maria. This report provides a comprehensive evaluation of the transportation sector and includes a description of prestorm transportation conditions; descriptions of damage and estimated costs to repair it; and 22 proposed courses of action across all transportation modes.

RESEARCH QUESTIONS

- What was the status of Puerto Rico's transportation sector before the hurricanes?
- What damage was produced to the transportation sector as a result of the hurricanes?
- What repairs are needed?
- What resilience upgrades could be performed to help protect Puerto Rico's transportation infrastructure from extensive damage in future hurricanes?
- What are the estimated costs for repairs and resilience upgrades?

KEY FINDINGS

The authors found that Puerto Rico's transportation sector was suboptimal even before the hurricanes, suffering from a lack of resilience and numerous other problems.

- Before the storms, transportation was marked by roads and bridges in only fair condition, a public transportation system with low service provision and declining ridership, a high reliance on one seaport and one airport, declining cargo movements, and significant fiscal solvency concerns.
- Puerto Rico is very dependent on shipping for food and fuel, and cargo shipping is highly centralized at the Port of San Juan; planning efforts do not fully address the possible effects of the loss of shipments via San Juan in the event of a major storm or other disruption.
- There is an apparent lack of coordination among multiple operators in the various transit systems; the sheer number of owners, operators, and other stakeholders may complicate recovery and resilience efforts.
- The lack of an existing asset management system means that standardized information may not be available.
- Overall, the transportation infrastructure must be designed to be more resilient to future storms.
- The hurricanes produced widespread damage to the transportation sector, totaling an estimated \$1.8 billion in repair costs and another \$1.1 billion in recommended resilience upgrades. Although almost all facilities had reopened for service by the spring of 2018, many still require additional permanent work to bring them to a state of good repair.

RECOMMENDATIONS

Transformation and Innovation in the Wake of Devastation: An Economic and Disaster Recovery Plan for Puerto Rico provides 22 proposed courses of action for transportation:

- Refine and enforce design standards for roads and bridges.
- Harden vulnerable transportation infrastructure.
- Redevelop Rafael Hernández International Airport.
- Repair damage to all airports.
- Create a road maintenance and repair program.
- Update Airport Emergency Plans.
- Incentivize a variety of mobility options.
- Improve bus service.
- Develop an intelligent transportation system.
- Develop redundant seaport capacity.
- Support infrastructure asset management.
- Repair damage to ports and ferry terminals.
- Reassess the Marine Transportation System Recovery Plan.
- Enact long-term planning to develop the Port of Ponce as a regional transshipment hub.
- Consolidate port ownership.
- Repair damage to the surface transportation network.
- Provide high-capacity transit service to Luis Muñoz Marín International Airport.
- Provide high-capacity transit service between Caguas and San Juan.
- Extend highways PR-5 and PR-22, and complete highway PR-10 (three separate courses of action).
- Increase port facility resilience.