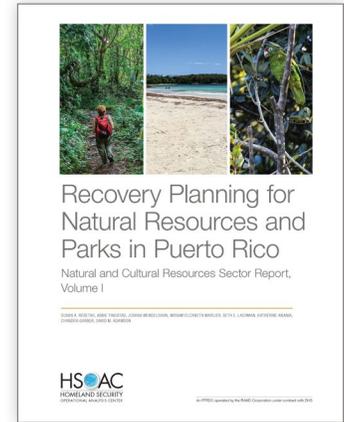


Recovery Planning for Natural Resources and Parks in Puerto Rico

Natural and Cultural Resources Sector Report, Volume I



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Hurricanes Irma and Maria stressed and destroyed significant areas of Puerto Rico's natural resources, many of which were already strained by anthropogenic effects. This report presents information on the benefits of these resources, hurricane damage, and 25 recommended courses of action for restoring natural resources, managing solid waste, renewing parks, and improving economic opportunities.

RESEARCH QUESTIONS

- What were the conditions of natural resources and parks in Puerto Rico before the 2017 hurricane season?
- What damage did Hurricanes Irma and Maria cause?
- What framework could help decisionmakers understand and shape natural resource recovery?
- What specific courses of action could help Puerto Rico recover in a resilient manner?
- What are some potential funding mechanisms for these actions?
- What else might implementers need as they move forward?

KEY FINDINGS

- Although conducting comprehensive assessments was not always possible for a variety of reasons (such as the lack of sufficient prestorm baseline information and some species' life cycles being longer than the assessment period), the completed assessments provided, when combined with local expertise, a good indication of the damage. Remote sensing capabilities and information provided valuable early Puerto Rico-wide clues on the extent of hurricane damage and needs.

- Damage to natural resources and parks was substantial in many places in Puerto Rico. For example, 11 percent of coral sites surveyed had experienced damage, some of it severe. Forests, on the other hand, experienced widespread damage. Similarly, the tremendous volume of mixed waste and debris that the storms generated only worsened landfill capacity issues.
- Working groups of experts and stakeholders developed 25 courses of action (COAs) for restoring coastal resources, forests, and wildlife species; controlling sedimentation and water quality; managing solid waste; renewing parks; and improving economic opportunities, such as alternative tourism. These COAs are grounded in known damage resulting from the hurricanes, informed by previous planning efforts, and derived from accepted ecological science and best management practices. They include potential funding mechanisms for the recommended actions.
- The collaboration within these working groups and the use of a structured goal-determination process was essential to timely and effective information gathering and overall recovery planning.

RECOMMENDATIONS

- Consider dynamic aspects and interdependencies among natural resources, ecosystems, other recovery sectors, and society to ensure that investments effectively reap human and ecological health benefits, support economic prosperity, and achieve greater resilience to future extreme events.
- Conduct ground surveys and more-refined analyses to inform recovery plans and monitor recovery progress, and use this new information with stakeholder input to adjust recovery activities when needed.
- Make solid waste management investments that increase financially sustainable and compliant landfill capacity and capability to repurpose vegetative debris; they are essential for storm preparedness and the health and well-being of Puerto Rico's residents.
- Employ strategic management approaches to natural resource recovery (e.g., adaptive land and watershed management at landscape scales for key ecosystems; conservation corridors; and indicator, umbrella, or guild species) in partnership with landowners, industry, and nongovernmental organizations.
- Leverage recovery activities to enhance community education and engagement, which can also help ensure that community priorities and needs are addressed, including environmental justice concerns.
- Make investments to enhance alternative-tourism opportunities. Establish innovative financing methods for reinvesting tourism and other economic activity generated by these assets into natural resource restoration, education, and management.
- Ensure that organizational capacity is developed and that the necessary workforces are primarily locally sourced and have access to training.
- Governance, management responsibility, compliance and enforcement accountability, and ownership are diffuse. Because of this, resilient and effective recovery requires collaboration among all stakeholders to coordinate and harmonize activities so that whole-system benefits are achieved and to share new information as recovery progresses.