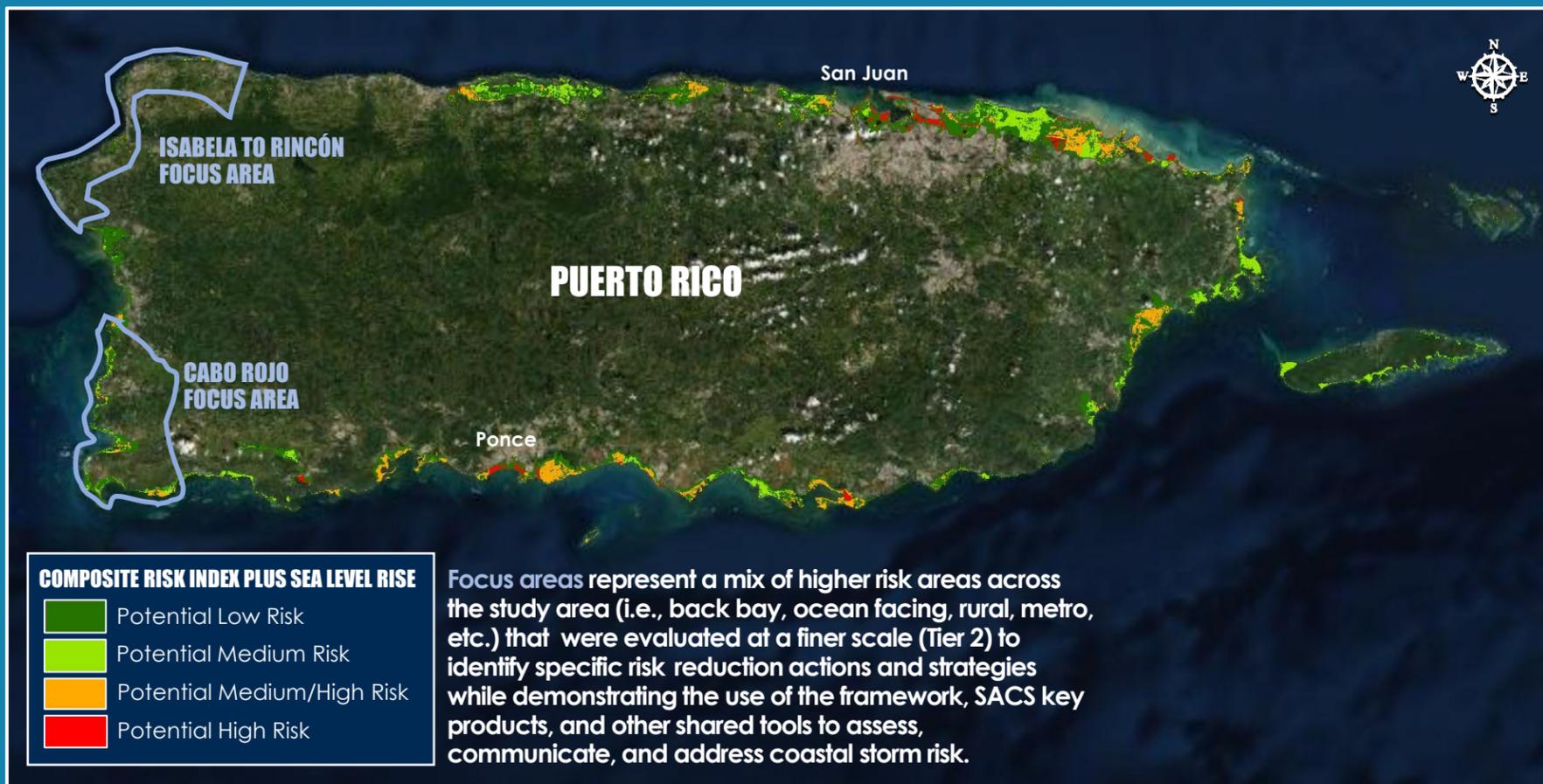


PUERTO RICO AND U.S. VIRGIN ISLAND SUMMARY

Puerto Rico has the seventh highest potential economic risk in the study area, with most of the risk located in the San Juan and Cataño municipalities. The risk is dispersed to the lower lying areas along the Puerto Rican coastline, and in the San Juan back bay areas. Nearly half of the risk is distributed to more rural coastal areas under existing conditions. However, 2.3 feet of sea level rise is projected to increase the proportion of the risk in more populated areas from 51 percent to 68 percent.

TIER 1 COMPOSITE RISK ASSESSMENT MAP (PLUS SEA LEVEL RISE): PUERTO RICO



PUERTO RICO SACS SNAPSHOT

<p>12 Hurricane Strikes (1851-2021)</p>	<p>4 Deep Draft Harbors</p> <p>Annual Dredge Volume: 200,000 Cubic Yards</p>	<p>More Than 1,000 Miles Of Tidally Influenced Coastline</p>
<p>50,750 Estimated Population Within High Socially Vulnerable Communities</p>	<p>50,750 Estimated Vulnerable Structures Footprint: 500 year Floodplain + 3 Feet Sea Level Rise</p>	<p>26 Priority Environmental Areas (PEAs)</p>
<p>0 Beach Nourishment Projects Federal and Non-Federal</p>	<p>36 High-Risk Locations Future Condition with 3 Feet Sea Level Rise</p>	<p>76% Increase in Economic Damages from the Existing to the Future Condition (with 3 feet Sea Level Rise)</p>

OTHER:

- \$106.2B Disaster Event Recovery Cost From Hurricane Irma
- Jobs and Federal, State, and Local Revenues at Risk

- Sources (rows, left to right):
- | | |
|--|---|
| 1) NOAA HURDAT Database | 6) SACS Appendices |
| 2) 2020 RSM Optimization Report | 7) SACS SAND Report |
| 3) NOAA Environmental Sensitivity Index (ESI) Guidelines | 8) SACS Tier 1 & Tier 2 Risk Assessments |
| 4) 2016 CDC Social Vulnerability Index | 9) SACS Tier 2 Economic Risk Assessment |
| 5) National Structure Inventory | 10) NOAA National Centers for Environmental Information, 2017 |



RECOMMENDATIONS

The Coastal Storm Risk Management Framework, SACS key products, and other shared tools were used to assess and communicate risk across the SACS Study Area, and ultimately to address the assessed risk with a series of recommendations. The entire process was implemented with input from stakeholders across federal, state, and local public and private sectors. Recommendations to manage coastal storm risk are grouped into six categories, as illustrated in the icon graphics below, and are further grouped by timeframe : near term (< 5 years), mid term (5 10 years), and long term (> 10 years), as well as by responsible party (multi agency, USACE, and Congress).

<p>Activities and Areas Warranting Further Analysis</p>	<p>Address Barrier Preventing Comprehensive Risk Management</p>	<p>Design and Construction Efforts</p>	<p>Recommendations on Previously Authorized USACE Construction Projects</p>	<p>Regional Sediment Management Practices</p>	<p>Study Efforts</p>
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RECOMMENDATION CATEGORIES DEFINED

- Activities and Areas Warranting Further Analysis:** This category includes development of tools, data collection, and multi-agency efforts such as those undertaken by Silver Jackets teams, which bring together multiple state, federal, and sometimes tribal and local agencies to manage risk from flooding and other natural disasters.
- Address Barriers Preventing Comprehensive Risk Management:** This category advances opportunities to address the multiple barriers preventing comprehensive risk management identified in the SACS report.
- Design and Construction Efforts:** Examples include recommendations that support design and construction of tentatively selected or recommended plans from USACE CSRSM studies conducted separately from SACS.
- Recommendations on Previously Authorized USACE Construction Projects:** This category includes recommendations that maintain and/or adapt existing USACE CSRSM projects to continue providing storm risk management as sea level rises.
- Regional Sediment Management Practices:** This category supports a systems approach for more efficient and effective use of sediments in coastal environments, ranging from agency collaboration on sand source identification to leveraging the beneficial use of dredged material with emerging natural, nature-based features (NNBF).
- Study Efforts**
Examples include USACE feasibility study recommendations, studies that may be led by other stakeholders, and studies that fall under existing USACE authorities, such as the Continuing Authorities Program (CAP) and Planning Assistance to States (PAS).

PUERTO RICO RECOMMENDATIONS

The recommendations to the right include:

1 REGIONAL RECOMMENDATIONS APPLICABLE TO PUERTO RICO

Regional Priority Recommendations may be applicable to the entire region, such as improving understanding and application of compound flooding effects, or they may be location-specific recommendations to address areas with the most significant risk relative to the entire study area.

2 PUERTO RICO-SPECIFIC RECOMMENDATIONS



PUERTO RICO RECOMMENDATIONS

CATEGORY	TIMING*	TYPE**	RECOMMENDATION	ASSIGNED TO	NEXT STEP
Activities /Areas Warranting Further Analysis	Long-Term		Coral Reef Health Assessment and Risk Management in Cabo Rojo	Multi-agency	Stakeholder Collaboration
Address Barriers	Long-Term		Coastal Program Policy Enforcement and Improvement.	Multi-agency	Stakeholder Collaboration
	Long-Term		Compilation of a repository of existing construction regulations.	Multi-agency	Identify Likely Lead Stakeholder(s)
	Long-Term		Coastal hazard modeling guidance.	Multi-agency	Stakeholder Collaboration
	Long-Term		Develop a concentrated, joint stakeholder effort to provide data consistent with that available for the continental United States.	Multi-agency	Stakeholder Collaboration
	Near-Term		Improve methodology for quantification of OSE, EQ and RED benefits during feasibility phase to assist USACE teams during plan formulation.	USACE	Guidance/Policy
Design and Construction	Near-Term	RP, TRP	San Juan Back Bay CSRSM Feasibility Study Recommended Plan.	Congress	Construction Authority
	Mid-Term	TRP	Puerto Rico Coastal Study Feasibility Study Recommended Plan (pending).	Congress	Construction Authority
Regional Sediment Management	Mid-Term	RP	Use of dredge material for creating submerged aquatic vegetation habitat or filling dredge holes.	USACE	Funding
Study Efforts	Long-Term	RP	Creation of a comprehensive coastal improvements plan.	Multi-agency	Stakeholder Collaboration
	Long-Term		San Juan Metro Compound Flooding Study.	Congress	Funding
	Mid-Term		Restoration of Mangrove Hydrology in Cabo Rojo Salt Flats.	USACE	Identify Non-federal Sponsor (USACE Study)
	Mid-Term		Coastal Storm Risk Management near Laguna Joyuda.	USACE	Stakeholder Collaboration
	Near-Term		Complete Puerto Rico Hurricane Evacuation Study.	USACE	Stakeholder Collaboration

ADDITIONAL REGIONAL PRIORITY RECOMMENDATIONS APPLICABLE TO ALL STATES AND TERRITORIES

CATEGORY	TIMING*	TYPE**	RECOMMENDATION	ASSIGNED TO	NEXT STEP
Activities/Areas Warranting Further Analysis	Mid-Term	RP	Advance ongoing interagency work to improve understanding and application of compound flooding effects on existing and future coastal storm risk.	Multi-Agency	Stakeholder Collaboration
	Near-Term	RP	SACS key products should be maintained and updated by USACE and utilized, as applicable, by USACE and stakeholders to support consistent, efficient, and effective analyses. Additionally, other agency-led data and tools should be supported to facilitate use of consistent, up-to-date information for decision making. Examples of such agency-led efforts include the Bureau of Ocean Energy Management (BOEM) Minerals Management Information System (MMIS) and the National Oceanic and Atmospheric Administration (NOAA) Coastal Change Analysis Program.	Multi-Agency	Funding
	Near-Term	RP	A multi-agency and collaborative approach should be used to develop methods that account for environmental benefits in traditional habitat units and economic quantities (monetized) in order to acknowledge and consider environmental benefits as a factor in deciding on a recommended plan in all future CSRSM studies.	Multi-Agency	Guidance/ Policy
	Near-Term	RP	Develop streamlined and vetted methods to quantify and incorporate risk management benefits to Regional Economic Development, Environmental Quality, and Other Social Effects to ensure Federal interest determinations consider benefits other than National Economic Development.	USACE	Guidance/ Policy
Address Barriers	Near-Term	RP	Develop streamlined and vetted methods to quantify and incorporate risk management benefits to Regional Economic Development, Environmental Quality, and Other Social Effects to ensure Federal interest determinations consider benefits other than National Economic Development.	USACE	Guidance/Policy
	Near-Term	RP	Ongoing and future federal and nonfederal studies recommending beach nourishment should explicitly incorporate adaptive capacity to improve project resilience.	Multi-Agency	Guidance/ Policy
Regional Sediment Management	Near-Term	RP	Promote partnerships and collaboration on beneficial use of dredged material opportunities.	Multi-Agency	Stakeholder Collaboration
	Near-Term	RP	Develop regional prioritization of strategies to address sand needs.	USACE	Funding

* Near-Term: < 5 Years / Mid-term: 5 – 10 Years / Long-term: >10 Years / ** RP: Regional Priority / TRP: Territory Priority

