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WHITE PAPER
AMERICAN SHORE AND BEACH PRESERVATION ASSOCIATION (ASBPA)
SCIENCE AND TECHNOLOGY COMMITTEE

“REDUCING RISK ON THE EAST AND GULF COASTS”

Report by the Committee on U.S. Army Corps of Engineers Water Resources Science,
Engineering, and Planning: Coastal Risk Reduction

Water Science and Technology Board
Ocean Studies Board
Division on Earth and Life Studies
National Research Council of the National Academies

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Background: The ASBPA Science and Technology (S&T) Committee reviewed the above report (hereafter referred to as “the NRC report”) to identify how the report supports ASBPA on the following topics:

1. Reducing coastal risk is in the national interest.
2. Storm damage reduction projects provide national economic benefits.
3. Additional research needed.

The review was conducted by a working group of the S&T Committee consisting of Greg Guannel, Tom Richardson, Julie Rosati, and Ken Willson. This white paper summarizes the findings of that working group.

Reducing Coastal Risk is in the National Interest: The NRC report does not include this explicit statement. However, the report clearly demonstrates the long history of congressional authorizations and appropriations associated with the USACE authorities relating to shore protection and coastal risk reduction, which date back to 1930 and FEMA authorities related to Coastal Risk Reduction dating back to 1968. With regard to the current state of reducing coastal risk, the NRC report focuses on several recent trends. Among them are: a) “Hurricane-and coastal-storm-related economic losses have increased substantially over the past century”, and b) “Over the past 60 years, the federal government has assumed an increasing proportion of the financial responsibility associated with coastal storms”. Together with climate projections that suggest an increase in both the strength and frequency of coastal storms, these trends imply that a comprehensive coastal risk reduction strategy is necessary.

The study defines coastal risk as “the potential for coastal storm hazards to cause adverse effects on human health and well-being; economic conditions; social, environmental, and cultural resources; infrastructure; and the services provided within a community”. The study also states that “increases in risk today may not manifest themselves in major negative consequences until

well into the future”, and “calls for the development of a national vision for managing risks from coastal storms...”. The clear implication throughout the NRC report is that coastal risk is a growing national liability that is on a dangerous trajectory of unsustainability and needs a “more systematic, proactive approach ...” to its management.

Storm Damage Reduction Projects Provide National Economic Benefits: Again, the NRC report does not say this, either explicitly or by implication. It points out that “Isolating the economic value of coastal risk reduction projects ... is difficult to accomplish because of lack of available data”, and goes on to say that “a rigorous analysis of costs and benefits is beyond the scope of this study.” Of the various risk reduction strategies studied, the NRC committee “focused substantial attention” on beach nourishment and dune building because they “are currently significant parts of the USACE’s strategy for coastal risk reduction”. The NRC report says that “A general case for the economic value of beach nourishment and dune-building projects can be made by noting the great economic costs of losses due to coastal storms and the documented reduced damages behind enhanced dunes ...”, and that “The economic benefits of beach nourishment extend well beyond coastal risk reduction”, citing the documented returns from beach tourism as a prime example. However, it concludes that “Viewpoints of the value of beach nourishment depend on whether the observer has primary interest in damage reduction, perceived retention or enhancement of property values, recreation, or environmental benefits...”, and that “Debate occurs on some of the differences in viewpoints..., especially cost-effectiveness.” The reader concludes that data are needed to quantify the economic benefits of storm risk reduction projects. General information indicates that enhanced dunes reduce leeward losses, although the benefits have only been sporadically quantified and primarily in terms of reducing storm damages. Perspectives differ as to how benefits are considered, implying that a transparent discussion is needed on defining benefit categories (e.g., storm damage reduction, economic, environmental).

Additional Research Needed: The S&T Committee working group developed the following recommendations for additional research based on statements in the NRC report:

- Basic Research
 - **Quantify the capacity of natural and nature-based features (NNBF) and hybrid measures (combined NNBF and traditional structures) to reduce storm impacts.** *“Additional research is needed to better understand and quantify the effects of natural features (other than beaches and dunes) on storm surge, wave energy, and floodwater inundation”.*
 - **Develop numerical models, data sets, and methods that integrate multiple hazards for a range of coast types and potential future storms.** *“Models are available for sandy coasts, but for other coastlines (e.g., vegetated coasts, rocky coasts, hard-structured coasts) are largely missing. Similarly, models that accurately describe the interconnections between storm surge and back-bay and river flooding are needed. Thus, it is important to continue to develop supporting data sets, methodologies, and models that integrate multiple hazards, where feasible.”*
 - **Improve consequence assessment tools.** *“Full consequence analysis depends on data that are only recently becoming available in limited areas (e.g., first-floor elevation data for coastal buildings). Consequence estimation for ecological*

systems remains in very early stages. Thus, there is considerable room for improved consequence analysis tools and data to support comprehensive risk assessment.”

- Applied Research
 - **Establish national objectives for risk mitigation and a range of baseline metrics for risk assessment; communicate objectives, metrics, and assessments.** *“...a set of baseline risk indicators would provide a useful way to monitor and examine change in risks due to a range of factors (e.g., coastal risk reduction projects, state and local land-use policies, and changing hazard exposures induced by sea-level rise).”*
 - **Assess benefits associated with risk reduction measures.** *“The USACE approach could be improved through a broader consideration of benefits and costs (as reflected in the Principles and Requirements), including life-safety, environmental, and societal benefits and costs where feasible.”*
 - **Set acceptable risk standards with public, private, federal, and academic involvement.** *“Setting acceptable coastal risk standards would, therefore, be challenging and would require extensive stakeholder engagement, including members of the public, private interests, and relevant agencies at local, state, and federal levels. All parties would need to collectively consider the risks, societal perceptions of these risks, and the willingness of all parties to pay to reduce those risks.”*
 - **Adopt a hybrid risk-constrained benefit-cost approach.** *“This hybrid approach retains the emphasis on choosing investments that increase net benefits, as in benefit-cost analysis, but puts constraints on what is considered as an acceptable outcome.”*
 - **Establish guidance for Adaptive Management of coastal risks.** *“The USACE should also look for opportunities to apply adaptive management to enhance learning and improve coastal risk reduction strategies.”*