Assessment of Shore Protection Project Performance Following the 2004 Hurricane Season

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During the 2004 hurricane season, four hurricanes made landfall within the U.S. Army Corp of Engineers' (USACE) South Atlantic Division. The season was extraordinary considering that these multiple storms were geographically clustered over a 6-week timeframe. Hurricane Charley made landfall on the southwest coast of Florida on August 13, 2004. Hurricane Ivan made landfall near Gulf Shores, Alabama, on September 16, 2004. Hurricane Frances came ashore on the central east coast of Florida on September 5, 2004 and was followed by Hurricane Jeanne on September 25, 2004 with a nearly identical point of landfall. Cumulatively, these storms caused varying degrees of wind, wave, inundation and erosion damage in the vicinity of numerous Federal and non-Federal shore protection projects. The Military Construction Appropriations and Emergency Hurricane Supplemental Appropriations Act, 2005 (Public Law 108-324) was passed in response to these unusual occurrences. It authorized an assessment of shore protection project performance and provided emergency supplemental funds to both the Construction, General and Flood Control and Coastal Emergencies Program accounts for emergency repairs to flood control and Federally authorized shore protection projects.

The assessment of project performance, known as the Shore Protection Project Performance Improvement Initiative (S3P2I), is an $11M program to evaluate the full spectrum of project performance including economic, environmental, physical response and social effects. The program's mandate is evaluation of performance, not policy, although it supports companion USACE efforts to clearly define the Federal role in coastal management including shore protection, with a focus on improving frameworks for project formulation, design and decision support. So, it is possible that program outcomes may have policy-related ramifications. Therefore, all performance assessment activities including technical methodologies, communications and technical transfer strategies and work area implementation plans are developed in coordination with representatives of the Coastal Engineering Research Board, National Shoreline Management Study, the Planning Center of Expertise for Hurricane and Storm Damage Prevention and other USACE activities as appropriate.

Presently, S3P2I has three major focus areas: Performance Assessment, Design and Formulation Improvement, and MORPHOS-3D Development. The Performance Assessment focus area's emphasis is to quantify and qualify in an objective and defensible manner damages prevented by Federal shore

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protection projects during the 2004 hurricane season, and identify environmental, social and regional benefits/impacts as specified in the "Planning in a Collaborative Environment" Engineering Circular (EC 1105-2-409). The focus area capitalizes on information derived from the "Project Implementation Report" effort undertaken by the USACE Jacksonville District following each hurricane, and time sensitive data collection and analysis by the Corps, and other Federal and non-Federal agencies. In addition, work within the Performance Assessment focus area will characterize storm affects as a watershed-scale event. A hurricane may cause flooding, influence water quality and move sediment. These inland impacts may have an immediate and long-term effect on the coastal system.

There are few opportunities to identify how these projects respond to extreme events, how they respond over an extended duration, and to integrate these findings into future project design and formulation. The Formulation and Design Improvement focus area of S3P2I will use outcomes of the current performance assessment activities and previous studies (e.g., Hurricane Isabel) and provide recommendations and guidelines for improved storm damage reduction project formulation and life-cycle implementation. The focus area is conducted in collaboration with other ongoing national efforts including development of the Coastal Storm Damage Reduction Economic Model (Beach-fx), National Shoreline Management Study, and Regional Sediment Management Demonstration Program. Recommendations will be made in the context of establishing and maintaining a consistent framework for design and formulation of projects and improving the effectiveness of Regional Business Centers within the Corps.

Acting on prior recommendation by the Coastal Engineering Research Board, the objective of the third focus area of S3P2I to initiate development of an operational and validated physics-based hydrodynamic-sediment transport model. The initial goal is to assimilate existing state of the practice technologies into a common framework to provide accurate predictions of hurricane-induced morphology change along open coastlines. The framework, named MORPHOS-3-D, will be developed and model performance demonstrated for the 2004 hurricane season at selected locations along the Florida coast. It will serve as the foundation for improved Corps predictive and assessment capability. Designed in a modular fashion, it will allow future enhancement of technologies and applications. In the long term, MORPHOS 3-D will provide an improved community model for project planning and design of coastal storm damage reduction projects and other applications. Of significance, development is coordinated and leveraged with Office of Naval Research, U.S. Geological Survey, Federal Emergency Management Administration and National Oceanic and Atmospheric Administration. The multi-agency effort will result in the Federal community acceptance of the technology.

Central to all activities under S3P2I is the implementation of a communications or outreach plan to develop and disseminate program information about interim and final products in a focused and

systematic manner. The method of this education process will be determined based on the needs and interests of various stakeholders and audiences. Work from all S3P2I focus areas and other related efforts will be integrated into products that expand stakeholder relationships and refine and focus investment decisions related to the Federal role in shore protection.

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