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Title: The Total Flood Risk Approach to Unmapped Hazards in Rural Texas

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Abstract

Oil and gas drilling and production frequently occurs in rural areas. FEMA floodplain maps are not available in several of the most heavily-drilled counties in rural Texas. This presents the dilemma of an unknown "unknown" for the oil and gas industry, since the risk is undetermined. An absence of FEMA flood data may be perceived as the absence of flood risk.

In addition to flash floods, South Texas has experienced historical flooding along the Nueces and Frio River systems. Large-scale flooding typically occurs as a result of tropical weather activity during the summer months. A major flood event with fluid pit interaction could have devastating effects on the energy industry as well as environmentally-sensitive drinking water systems located downstream.

We describe the use of large-scale flood mapping technology in the South Texas Eagle Ford Shale Region. The basis is a total flood risk modeling workflow which can be used by the energy industry to avoid flood-related damage to drilling and production operations and to protect downstream surface water systems. The end product is detailed flood hazard information (velocity, flow rate, and depth) at random locations throughout an entire watershed. The results are based on hydrodynamic modeling which simulates the rainfall-runoff process using the latest available digital elevation models (DEM's). The computer models can be used as the basis of more extensive environmental studies which address surface water availability, detailed 100-year base floodplain mapping, and to examine potential effects on downstream surface water systems.