

Toxic Tides (or A Fatal Coupling of Climate Change & Legacy Pollution)

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With the projected advance of climate change and associated extreme weather events, including intensified storm surges and elevated tide levels, coastal communities are expected to face significant challenges over the next century. A largely unexamined threat related to these developments includes the mobilization of legacy pollutants as sediment based toxins are dispersed by storm related activity. This research examines the human dimensions' impacts of the above using GIS and climate modeling tools. Though the analysis is based in the US Gulf Coast, due to the nation's large coastal populations – nearly 40% of all Americans live in shoreline counties -- coupled with an inordinate amount of the nation's economic output, along with industrial development and byproducts positioned in coastal states --- the study is applicable and findings are relevant to other locales, domestic and globally.

The research is advanced by its assessment of individual communities' vulnerability via the *toxics mobilization index* (TMI), which considers factors ranging from: storm activity, ecological variables, the chemical profile of embedded toxics along with geographic and socioeconomic concerns. This tool was designed for this project to be used by coastal management, urban planning and disaster & emergency response officials in their individual and collective efforts to create more informed programs, policy and planning. The TMI allows for a programmatic way to prioritize legacy pollution sites that acutely considers the concerns of areas prone to hurricanes, flooding and other components related to extreme storms, while simultaneously considering local human conditions and the capacity for resilience. As a result of this study, the work: i) informs actions on behalf of policy makers to promote the true identification of toxic sites, ii) allows for the ordering of priority list sites that goes beyond examining the chemical and geological profile of an area by additionally considering the vulnerability that human communities face from hotspots in the context of extreme weather and iii) acts as an impetus for emergency response officials to recognize unforeseen threats and to design response mobilization which more thoroughly considers the challenges of emergency management and response coordination.