DEVELOPMENT OF FUTURE RETURN PERIOD STILLWATER FLOODPLAINS FOR THE COASTS OF MISSISSIPPI, ALABAMA, AND THE FLORIDA PANHANDLE

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ABSTRACT
Rising seas increase the exposure, vulnerability, and thus the risk associated with storm surge flowing across the coastal floodplain (Passeri et al. 2015). This is especially true across low-gradient coastal landscapes such as Mississippi, Alabama, and the Florida Panhandle. The extent and depth of flooding will be exasperated over the long term by morphologic changes to the shoreline, dunes and barrier islands (Plant et al. 2016, Passeri et al. 2016), marsh evolution (Alizad et al. 2016, Kidwell et al. 2017, Morris et al. 2016), and land use and land cover changes (Bilskie et al. 2014 & 2016).

This presentation will describe how to incorporate biogeophysical impacts of climate change into future tide and surge models. A methodology will be presented (Bilskie et al. 2018) to down select a suite of synthetic storms from recent flood insurance studies to force hurricane storm surge models that represent present day and future changes to the coastal landscape under four sea level rise (SLR) scenarios of low (0.2 m), intermediate-low (0.5 m), intermediate-high (1.2 m), and high (2.0 m). Results of peak storm surge are used to compute the 100-year and 500-year return period floodplain and stillwater surge heights for each SLR scenario.

Details on the vast new regions that become part of the 100- and 500-year floodplains by the end of the century will be discussed. Comparisons and contrasts with present day return period stillwater floodplains will be drawn. For example, throughout most of Alabama and the Florida Panhandle, the present day 500-year return period event, in terms of inundation area and volume, becomes a 100-year event with just 0.5 m of SLR. Results indicate the need to take a system of systems approach to assess the coastal dynamics of sea level rise. The system of systems approach used herein and future enhancements to it will be elaborated.

Transdisciplinary outcomes from this research are helping plan and prepare for the effects of SLR across the northern Gulf of Mexico and other low-gradient coastal landscapes (DeLorme et al. 2016). The importance of the involvement of stakeholders from across the northern Gulf of Mexico throughout the duration of the project will be highlighted. Finally, how the stakeholder involvement is worked into the system of systems approach will be discussed.

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