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Temporal Variability of Pastureland Hydrology and Water Quality after an Extreme Storm Event

Assessment of water quality on spatial and temporal scales is essential for understanding water quality dynamics in the environment. This study was commenced as a result of salt water intrusion of pastureland in Hancock County, MS after Hurricane Katrina. Pastures were damaged and pond water quality affected as a result of a 3-m storm surge coupled with sediment deposition. Sediment deposited on pastureland ranged from 2 to 5 cm in thickness. Pond, river and ocean water quality were assessed for Na, Cl, Ca, Mg, NO₃, SO₄, TDS, pH, DO and turbidity. A pasture located on the dominant soil, Harleston loamy sand (Coarse-loamy, siliceous, semiactive, thermic Aquic Paleudults) in the affected area (30.32 N: 89.39 W), was instrumented to measure soil water and groundwater quality. Infiltration was measured using a tension infiltrometer in descending tensions of 15, 6 and 3 cm of water on three pastureland conditions. The treatments were: 1) pastureland with sediment deposit, 2) pastureland with sediment incorporated and 3) pastureland without sediment deposit. Results indicated relatively high concentrations of dissolved ions in pond water and were similar to the ocean water samples. The river water showed lower values of dissolved ions; however, specific conductance increased with river depth. Dissolved oxygen measurements yielded negative values in the ponds. Infiltration rate was highest in the treatment without sediment followed by the treatment with sediment incorporated. Temporal changes in soil hydrology and pond water quality and the effective management strategies to be adopted will be discussed.

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