

VARIABILITY OF MARSH SOIL RESPONSE TO DROUGHT CONDITIONS: WATER BALANCE AND INTERSTITIAL SALINITIES

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Salt marshes in coastal Louisiana have been receiving below-average flows of river water and precipitation for the past 12-18 months. Coastal water levels have also been lower than the long-term average during this time. The resulting shorter durations and frequencies of tidal marsh inundation, coupled with the long-term drought, have reduced the amount of water delivered to the marsh surface and substrate to replenish water lost to evapotranspiration. The water balance and chloride concentrations in the shallow subsurface likely have been affected in ways that have contributed to the observed widespread brown marsh phenomenon in coastal Louisiana.

We have been measuring moisture content and soil salinity content of marsh soils sectioned in 3-cm or 10-cm increments at sites exhibiting differing degrees of dieback and/or stress. Grain sizes of these soil layers were also determined. Preliminary results show the amount of available soil water and soil salinity concentrations vary considerably from site to site. In some instances, interstitial salinities were higher in healthy marshes than those in adjacent dieback areas. The single highest interstitial salinity was 70 ppt, with several values above 50 ppt. Most values were around 35-40 ppt. Available water in the soil appeared more disjunct with depth in dead marshes than in healthy marshes, but not necessarily lower overall. Grain size distribution varied from creek edge to the marsh interior and from marsh to marsh. Samples are still being analyzed to determine patterns relative to marsh health.