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**Classification of Holocene Foraminifera  
bio-facies within transgressive saline  
influenced lower Lafourche headland and  
prograding fluvial influenced Balize delta,  
Louisiana**

Foraminifera are reliable indicators of paleodepositional environments that can be used to develop stratigraphic correlations and to construct detailed paleodepositional models. The goal of this research is to enhance the knowledge base of Holocene Mississippi River delta stratigraphy by investigating microfossil assemblages within modern depositional environments. This study includes analysis of lithofacies, elevation and relative sea-level as

paleoenvironmental indicators. The research constitutes a seminal attempt at incorporating improved preparation techniques, modern taxonomy, and replicate sampling to enhance the use of marsh microfossil assemblages as paleoenvironmental indicators. Specifically, this research will quantitatively investigate the relationship between foraminiferal assemblages and environmental variables known to affect their distribution within two end-member marsh environments. These coastal Louisiana locations include a transgressive, saline environment within the lower Lafourche headland; and a fresher-water, fluvial-influenced environment of a recent crevasse splay within the Balize delta. Marsh surface samples will be taken along transects from highest high water, marsh interior, levee crest, marsh edge, intertidal mud flat, subtidal channel margin, and distributary channel in both of the environments. At each sample location, precise elevation surveys will be conducted and replicate samples will be taken for foraminifera, sediment grain size, organic carbon content, pore water salinity, and sediment and air temperatures. Improved methods for processing foraminifera will include: (1) keeping the foraminifera moist to minimize post-collection destruction of agglutinated forms, (2) the application of modern, stabilized taxonomy, and (3) the use

of a smaller sieve size fraction ( $> 45 \mu\text{m}$ ) to collect a larger proportion of the assemblage (4) numeric counts of individuals and assemblages will be identified, picked, stored and each species assemblage will be photographed. Foraminifera will be tabulated and compared using quantitative analysis. Statistical and multivariate analyses will provide a comprehensive assessment of the population variance as a function of the variables that influence their distribution. Analysis of the variables also characterizes the lithofacies and, in combination with microfossil assemblages, can be used to interpret the depositional environments of subsurface facies. Microfossil assemblages and sedimentary data collected during this research will be incorporated into an ongoing University of New Orleans and US. Geological Survey effort to develop Louisiana sedimentary database (LASEDS), a comprehensive geologic database for the coastal zone of Louisiana. LASEDS will furnish coastal researchers with sedimentary data that is essential to theoretical and applied coastal zone research of paleo-sea levels and fluvial, deltaic, and marine depositional systems. Additionally, this work will provide the basis for further research of Holocene relative sea-level rise across the delta plain by providing a database that relates microfossil assemblages to high-resolution elevation surveys. The intent is to apply this knowledge to subsurface stratigraphic relationships and enhance our knowledge of the regional relative sea-level curves.