

PARTICLE TRACKING TO SIMULATE THE EFFECTS OF PROPOSED HURRICANE PROTECTION STRUCTURES ON THE MOVEMENT OF LARVAL FISH BEHAVIORS INTO LAKE PONTCHARTRAIN

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August 2005 proved to be a difficult time for the people of New Orleans, Louisiana due to the after effects of Hurricane Katrina. In an effort to provide the city with a 100 year level of flood protection, a series of levees, gates, and other protection measures are being put into place along the Mississippi River Gulf Outlet (MRGO), the Gulf Intra-Coastal Waterway (GIWW), the Inner Harbor Navigation Canal (IHNC) and other waterways in the area surrounding the city and southward. Although the protection of human life is the priority, it should not be done at the casual sacrifice of the habitat that calls this area home. The effects of these protection measures on the fish population are being investigated so that options to maintain the habitat are considered during the design process. A method to utilize particle tracking techniques was developed as a means to determine the overall effect on certain behaviors of the fish population. This study utilizes a two dimensional numerical model that was previously developed to analyze the proposed structures for navigation. The model is verified to match field data and hydrodynamics are computed based on the tide, winds, and river inflows into the system. The particle tracking model is developed such that the larva enter the system in the Gulf of Mexico and are tracked as they move into the Lake Pontchartrain area. At a specified location in Lake Pontchartrain, the particles are considered to be recruited and remain in the lake. The ability to track these particles based on specific behaviors in response to the tides and flow conditions allows for the analysis of how each protection measure affects the movement of specific larva due to their different behavior patterns. This study is able to give insight into the effects generated by changes to the system and how these effects may impact the fish population.

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