Extended Abstract

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St. Stephen Fish Lift Inlet Hydraulic Barrier Investigation: A Field Survey and Hydraulic Model Study

The St. Stephen Dam is located in the re-diversion canal connecting Lake Moultrie and the Santee River. The fish lift at St. Stephen dam designed and built to afford a safe passage for fish migrating upstream to spawn and permits visitors a close-up, underwater view through a glass window. Biological studies implemented before and after the construction of the fish lift indicates that total number of anadromous fish migrates upstream has never equaled the pre-re-diversion levels that occurred at the navigation lock through. Poor fish passage efficiencies were reported. Field observation and historical conditions favor the hypothesis that the hydraulic flow metrics at the tail-race and close to the fish lift inlet are not fish friendly for all range of discharge releases. Here we present a preliminary field surveys and hydraulic model studies that were made at the tailrace of St. Stephen Dam. A series of field hydrographic surveys were made using a vessel-mounted Acoustic Doppler Current Profiler (ADCP) with Global Positioning System (GPS) to map water depth as well as current vectors in three-dimensional space during various turbine releases. A two dimensional hydraulic model was developed to simulate the flow field in the tailrace under different turbine operations. The model was calibrated with observed data. The results of the field and model studies were described and discussed. The results would help to set preliminary strategy to investigate the potential for mitigation of return flow and eddies near the fish lift that would create fish friendly flow field under different turbine operations.