

Flow Monitoring and Tidal Exchange Ratio Estimation for the Bahia Grande Bay and Coastal Wetland System Post-Tidal Connection Channel Widening

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The Bahia Grande (BG) is a 9,000-acre set of coastal bays and wetlands located near Port Isabel, Tx near the Gulf of Mexico (GOM) coastline. In 2005, the Carl Joe Gayman Pilot Channel was constructed to somewhat address hypersalinity concerns resulting from anthropogenically caused tidal isolation. The Texas General Land Office (GLO) increased the channel width in 2022 with the hopes of increasing tidal exchange ratios by a factor of two to three. After channel widening was complete, two SL-1500 side-looking ADCPs were periodically deployed under a channel bridge crossing (Texas Highway 48) over a 6-month period and various tidal conditions, further supplemented by periodic deployment of an S5 River Surveyor. Data from these sensors, along with a new depth-to-volume relationship for the bay system, confirmed that tidal exchange ratios increased from a previous range of 5-10% to a range of 20-25% after channel widening. Data from the deployed sensors provided the first continuous flow monitoring into and out of the BG system post-widening as well as within the last several years. Additional synoptic (point-in-time) measurements of peak ebb and flood tidal flows will be measured for the next year to confirm tidal exchange ratios are within this increased, and more beneficial range.

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