

**Status Report: Stream Velocity and Discharge at the  
Intersection of the San Bernard River and the Gulf  
Intracoastal Waterway, near Rivers End, Texas, October 2003  
– September, 2004**

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TWDB Contract Number 2004-483-516

# FY2004 Study of the lower San Bernard River / Cedar Lakes Estuary

## Background

In the spring of 2004, the U.S. Geological Survey (USGS) agreed to assist Texas Water Development Board (TWDB) in a study of flow dynamics near the mouth of the San Bernard River. Specifically, the USGS agreed to install and operate multiple gaging stations in and near the lower San Bernard River, proximal to the intersection with the Gulf Intracoastal Waterway (GIWW). Figure 1 shows the study area with the locations of USGS gaging stations (table 1). Data collected at each station would consist of water velocity and tidal stage. After installation of monitoring equipment, a 48-hour synoptic survey would be conducted, whereby multiple discharge measurements would be made at each location and velocity-index ratings would be developed. The ratings would then be used to determine discharge at each location for entire study period.

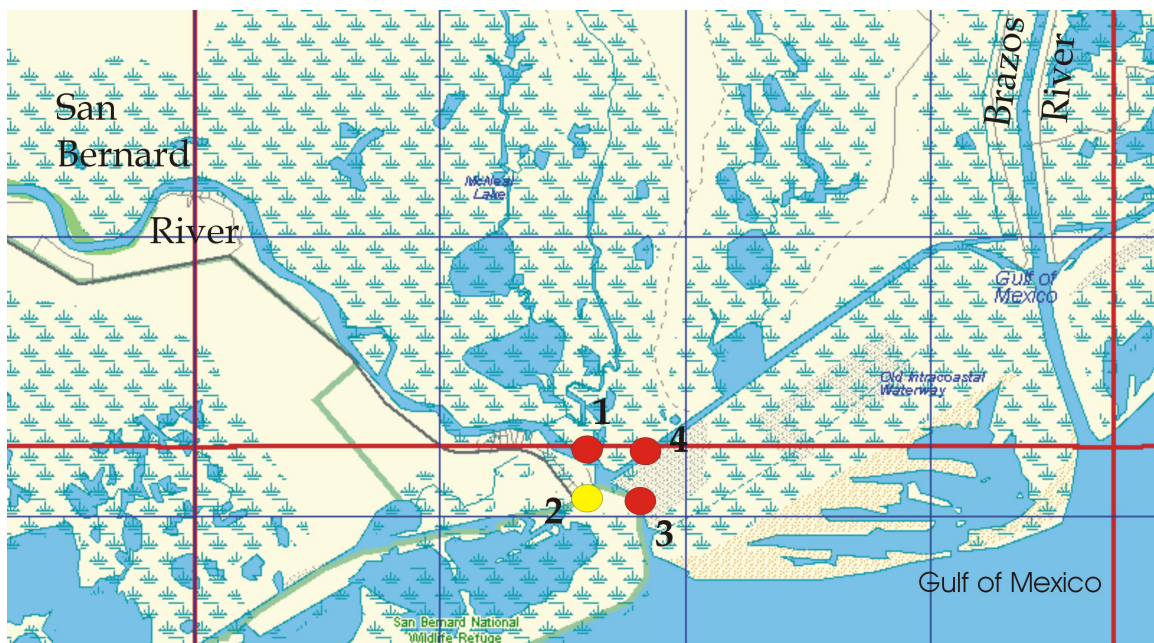


Figure 1. San Bernard River Study Area

- USGS Gaging Station
- Proposed Gaging Station

**Table 1 – USGS Gaging Stations in lower San Bernard River**

<b>Site #</b>	<b>USGS Station #</b>	<b>Station Name</b>	<b>Equipment</b>
1	08117730	San Bernard River US of GIWW	ADV w/PT
2	285203095265301	GIWW West of San Bernard River	N/A
3	08117740	San Bernard River DS of GIWW	ADV w/PT
4	285217095263001	GIWW East of San Bernard River	ADV QW Meter

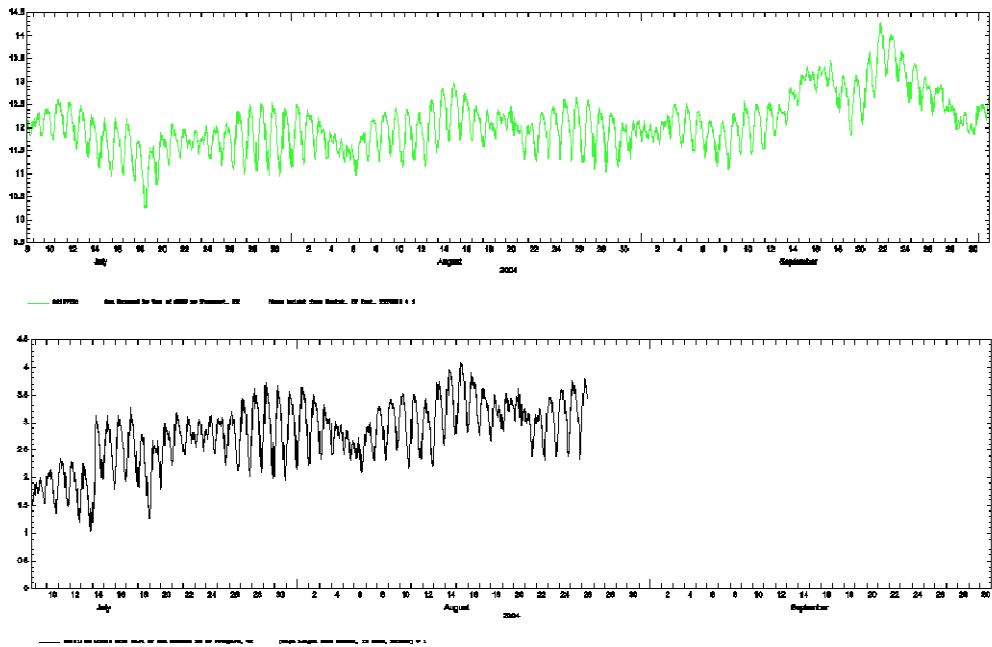
Gaging stations were installed at all four sites (figure 1; table 1) in July 2004. Equipment at each site included Acoustic velocity meters (ADV) with stage sensors, and internal data loggers. Unfortunately, the installation at site 2 (GIWW on the west side of the San Bernard River) was subsequently damaged and data were not collected. Additional efforts to re-establish the station were unsuccessful, as the meter was knocked over each time within days of re-installation. Therefore, velocity and stage data are not available for this station.

In August 2004, a multiprobe water-quality instrument was installed at station 3 (figure 1). This meter measures and records water temperature and specific conductance.

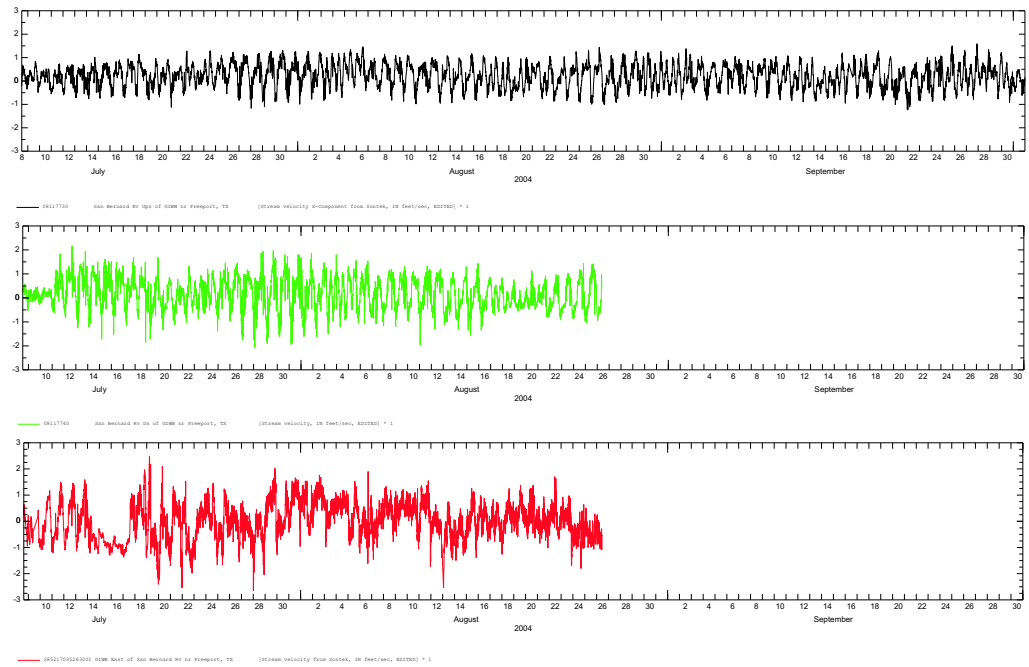
This report is intended to serve as a status report of the project for the initial contract period, October 2003 through September 2004. However, based on meteorological and hydrodynamic conditions, November 15-17, 2004 was chosen as the most suitable period to conduct the 48-hour synoptic survey. Therefore, those data, as well as the index-velocity ratings are not presented in this document.

### **Tidal Stage and Water Velocity Data**

During the period July 8 – September 30, 2004, tidal stage and water velocity data were collected at all three USGS stations (1, 3, and 4) in the lower San Bernard River. However, stage data for site 3 appeared unreasonable, most probably due to clogging of the pressure transducer. Therefore, reliable stage data are only available for stations 1 and 4 (figure 1; table 1). However, due to their close proximity to one another, stage data collected at stations 1 and 4 should be representative of conditions experienced at station 3. Figure 2 provides a plot of these stage data. For station 4, some data have not been pulled from the data logger so the time series ends in August instead of September. Similarly, water velocity data are provided in figure 3. Once again, data for stations 3 and 4 have not been extracted from on-site data loggers so the time series for these stations ends in August on these plots. During subsequent site visits, these data will be retrieved and processed.



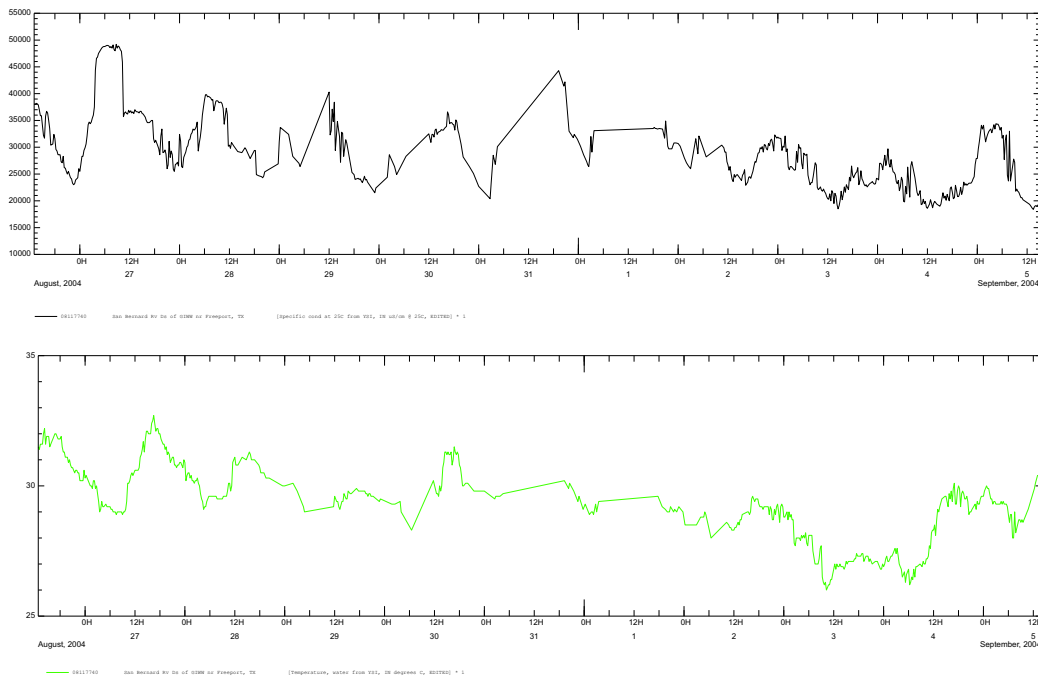
**Figure 2 – Tidal stage data for stations 1 and 4 in the lower San Bernard River**



**Figure 3 – Water velocity data for three stations in the lower San Bernard River**

## Water Temperature and Specific Conductance Data

In late August, a multi-probe water-quality meter was installed at station 3. Data for 10-day period in late August and early September are provided in figure 4. During future site visits, sensor data will be extracted and processed, before being provided to the TWDB.



**Figure 4 – Specific conductance and water temperature at Site 3**

## References

- Dunn, D.D., Solis R.S., and Ockerman, D.J., 1997, Discharge measurement in tidally affected channels during a hydrographic estuarine survey of Sabine Lake, Texas: U.S. Geological Survey Fact Sheet FS-157-97, 6 p.
- East, J.W., Solis, R.S., and Ockerman, D.J., 1998, Computed discharges at five sites in lower Laguna Madre near Port Isabel, Texas, June 1997: U.S. Geological Survey Fact Sheet FS-167-98, 6 p.