

Examples of Sediment Transport Issues for Texas Senate Bill 3

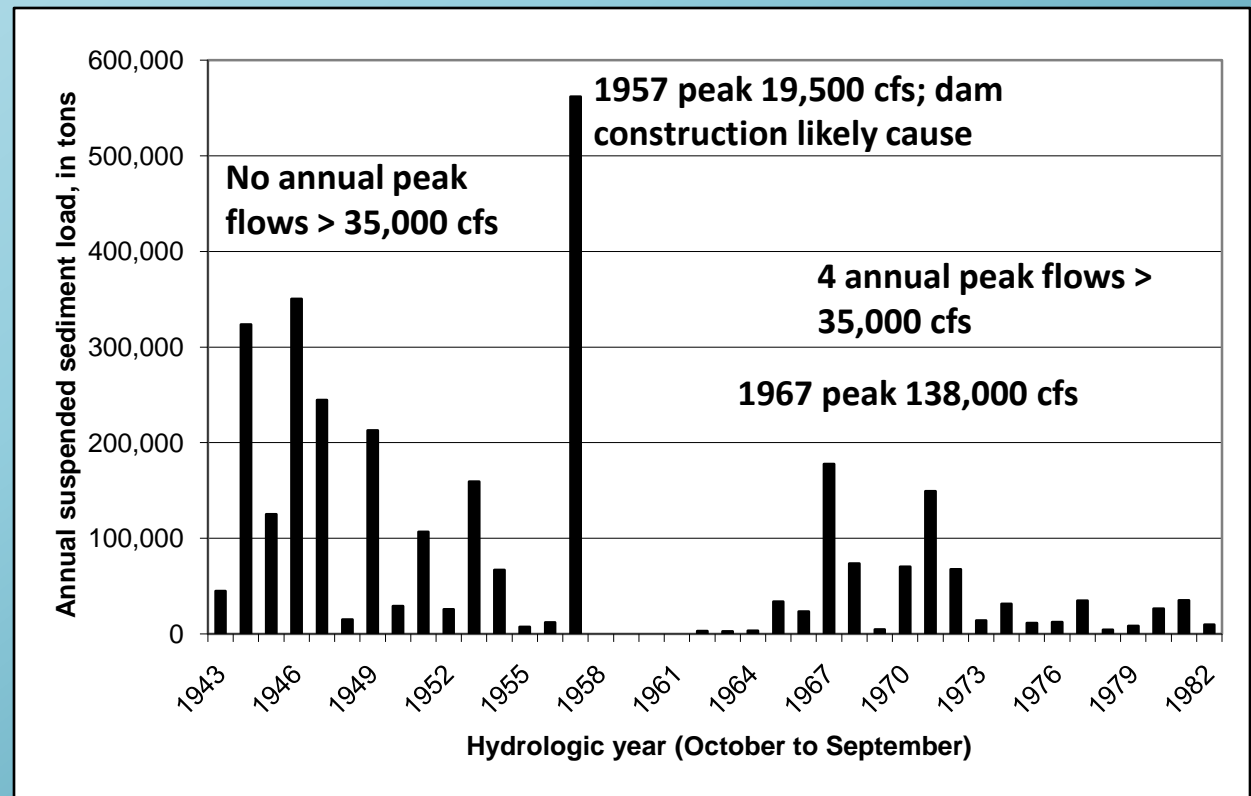
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November 2008

Historical Suspended-Sediment Load

- Historical suspended-sediment load data are available in various TWDB (and predecessor agencies) reports until the 1980s

08211000 Nueces River near Mathis, Texas

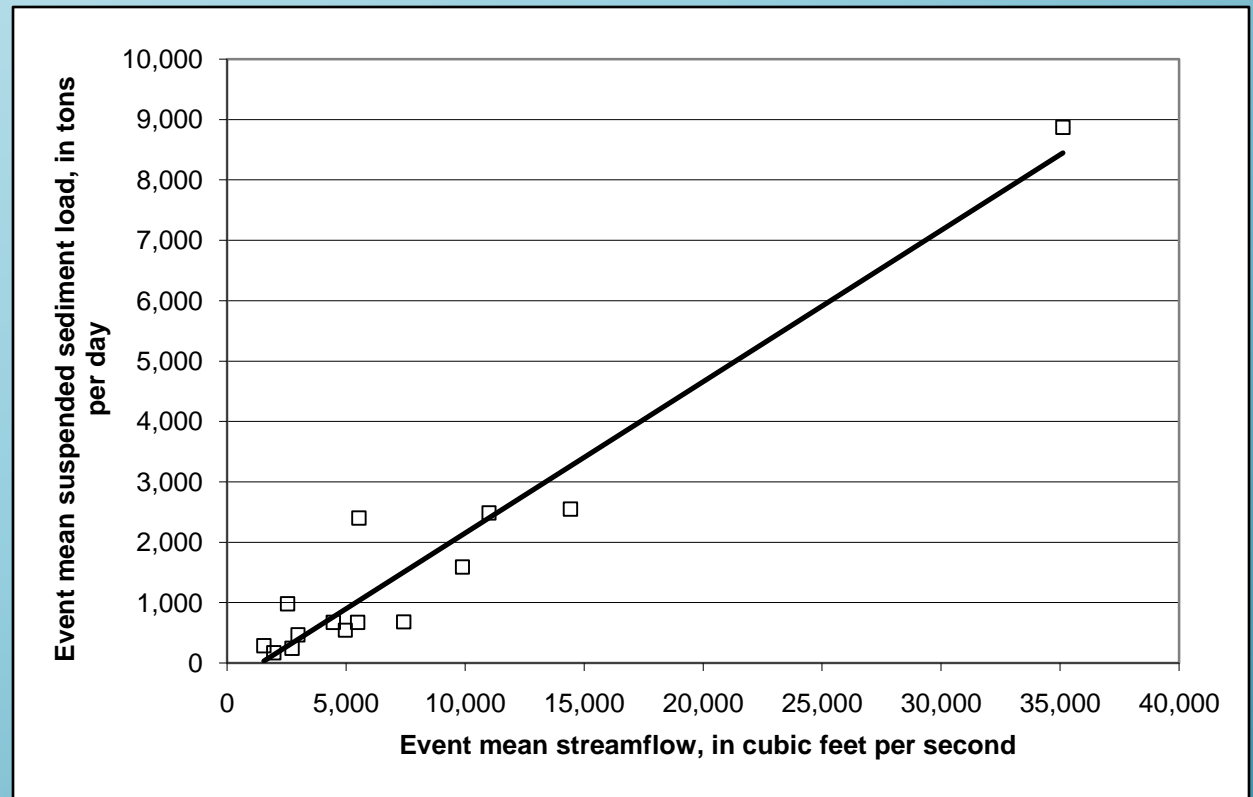


- Closure of Wesley E. Seale Dam in 1958

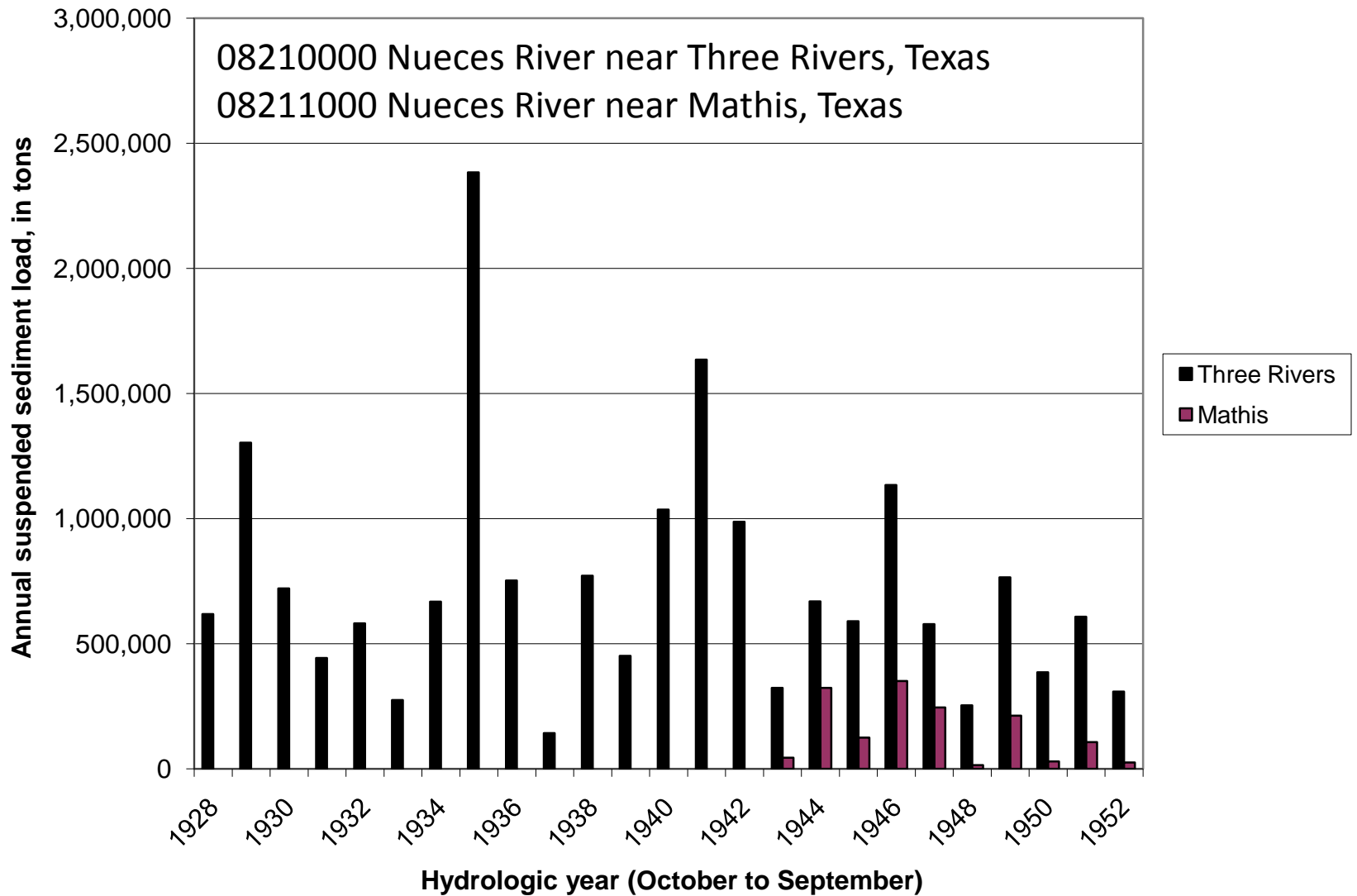
Historical Suspended-Sediment Load

08211000 Nueces River near Mathis, Texas

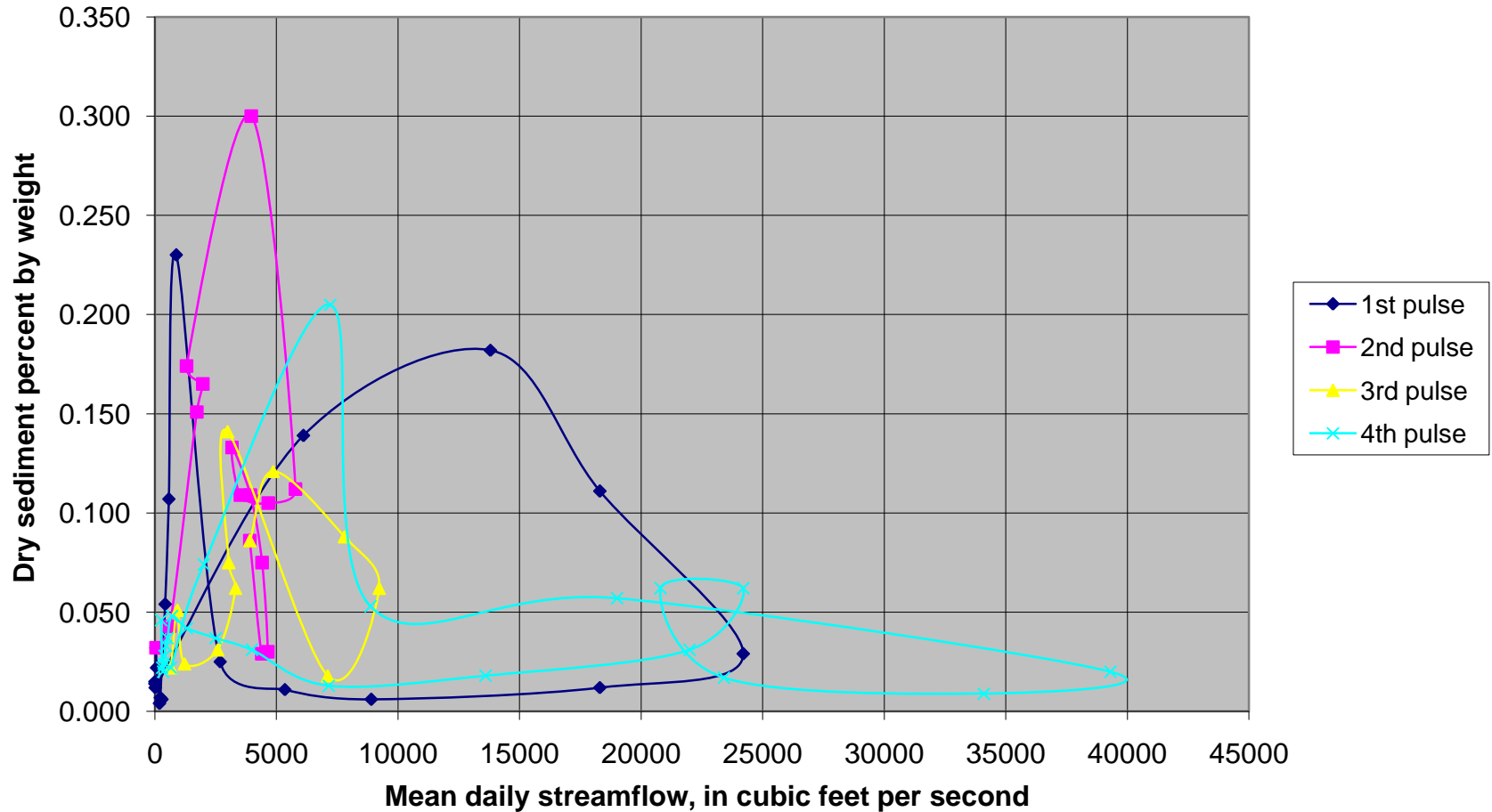
- Only considering high-flow events since 1964



Historical Suspended-Sediment Load



SSC Nueces River near Three Rivers, TX - October 1946 floods



Suspended-sediment concentration hysteresis loops

Suspended-Load Monitoring

- Suspended-sediment load monitoring (\$25–\$30k/year)
 - Includes periodic sampling and lab fees
- Equipment
 - DH-95 (rigid bottle; 15 feet max)
 - DH-2 (1-liter bag; 37 feet max)

From Davis (2005)

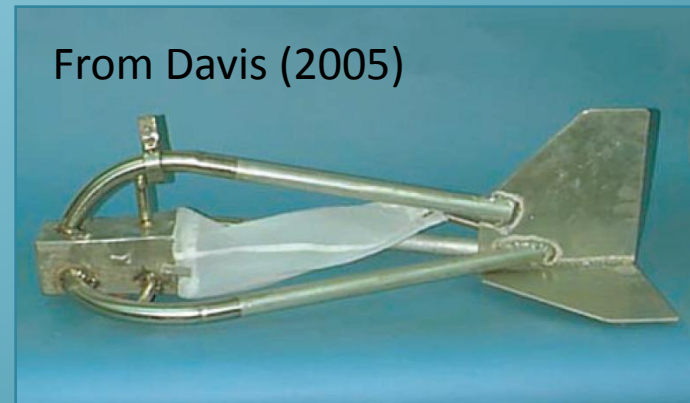
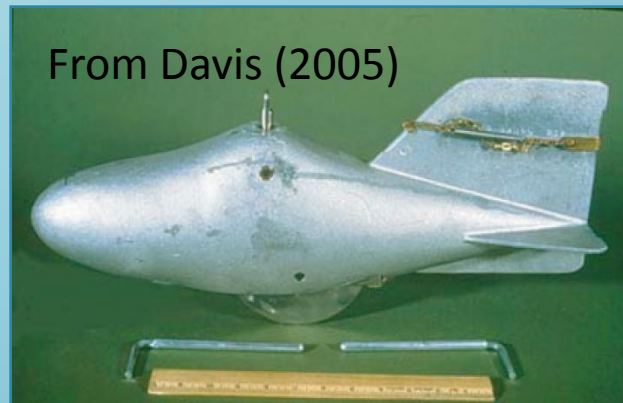


From Davis (2005)



Bedload Monitoring

- Sand-bed streams
 - Notoriously difficult to accurately measure
 - Rising limb / falling limb scour and fill processes
 - Antecedent conditions (1st flood OR 3rd of 3)
 - Recommended to only measure a couple of times per year to verify/calibrate bedload equation (e.g., Einstein model)
- Equipment
 - BMH-60 (bed material composition)
 - BL-84 (bedload)



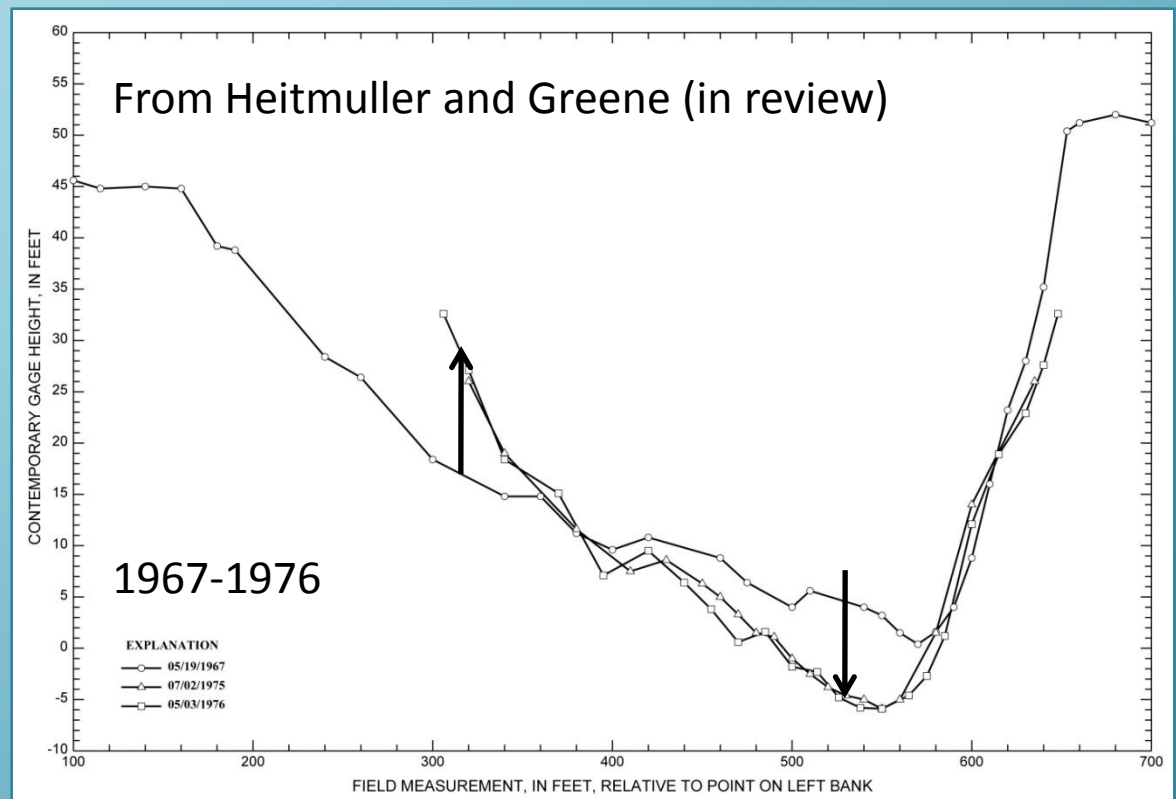
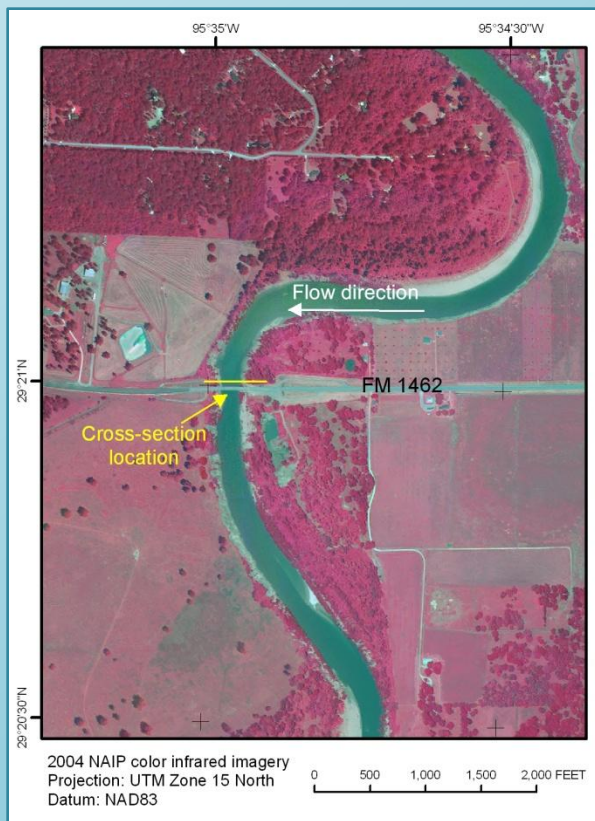
Bedload Models

- Provide estimates of bedload transport that can be verified or calibrated by field measurements
- Refer to Gomez and Church (1987), Stevens and Yang (1989), and Robert (2003)
- The Einstein model has been recommended by a colleague (Dennis Evans, personal communication, 2008) for sand-bed streams
 - Requires bed-material particle size, channel slope, and water temperature for computation

Sediment Relation to Channel and Habitat

- Changes in sediment-load and streamflow dynamics result in changes to physical channel conditions and hydraulics over time

08116650 Brazos River near Rosharon, Texas



References

- Davis, B.E., 2005, A guide to the proper selection and use of federally approved sediment and water-quality samplers: U.S. Geological Survey Open-File Report 2005–1087, 20 p.
- Gomez, B., and Church, M., 1989, An assessment of bed load sediment transport formulae for gravel bed rivers: Water Resources Research, v. 25, p. 1,161–1,186.
- Heitmuller, F.T., and Greene, L.E., in review, Historical channel adjustment in the lower Sabine and lower Brazos River Basins, Texas and Louisiana: U.S. Geological Survey Scientific Investigations Report 2009–XXXX, XX p.
- Robert, A., 2003, River processes—An introduction to fluvial dynamics: London, Arnold, 214 p.
- Stevens, Jr., H.H., and Yang, C.T., 1989, Summary and use of selected fluvial sediment-discharge formulas: U.S. Geological Survey Water-Resources Investigations Report 89–4026, 121 p.