

Technical Study Summaries: Middle and Lower Brazos River Connectivity Data

Connectivity with-in the study area and to areas outside the study area will be important for our study of the Middle and Lower Brazos River sub-basin. Connectivity with-in the study area includes connectivity along the river channel and between the main channel and floodplain. Connectivity with areas outside the study area includes connectivity with upstream and downstream segments, tributaries, and groundwater. Several studies related to both connectivity with-in the study area and with areas outside the study area are ongoing or have been completed and are described below.

Response of oxbow lake biota to hydrologic exchanges with the Brazos River channel (2004)

By K. Winemiller, F. Gelwick, and T. Bonner

This study examined flow dependent connectivity of ox-bow lakes with the Brazos River channel. Oxbow lakes were found to have a range of connectivity, with those formed more recently and closer to the river channel being connected at lower flows and more frequently. For more details about this study, please see the Biological Summary.

Full report:

http://www.twdb.state.tx.us/RWPG/rpgm_rpts/2003483493_2003483006_Response_Oxbow_Lake_Biota_Hydrologic_Exchanges_with_Brazos_River_Channel_with_TWDB_Work.pdf

Recent studies focus on characteristics of Brazos River alluvium aquifer (2007)

By US Geological Survey and Texas Water Development Board

The Brazos River alluvium aquifer, which extends along the river from Bosque County to Fort Bend County, has been the focus of several recent studies. These studies have determined the location and thickness of the aquifer, as well as hydraulic properties such as specific conductance, transmissivity, and hydraulic conductivity. For more information related to this topic, please see the Hydrology and Hydraulics Summary.

Freshwater inflow recommendations for the Guadalupe Estuary of Texas (Ongoing)

By Texas Parks and Wildlife Department and Texas Water Development Board

The Brazos River is the primary source of freshwater inflow for to the Brazos River Estuary, one of five minor estuaries along the Texas coast. Freshwater inflow requirements for all seven major estuaries along the Texas coast have been determined, based on a state-wide methodology. Staff from the two state agencies are now collecting data and beginning modeling work on the minor estuaries with the goal of developing flow recommendations. Modeling and data needs for the minor estuaries require that new and innovative approaches be developed and tested. In particular, data needs exist and are being addressed in coastal marshland habitats, common in Texas' minor estuaries, where inundation and dewatering must be monitored and modeled.

Full more information about the Texas Freshwater Inflows Program:

http://midgewater.twdb.state.tx.us/bays_estuaries/b_nEpage.html

Indicators: Middle and Lower Brazos River Connectivity

Connectivity Objectives

- Maintain riparian zone integrity and improve connectivity between river and riparian zone
- Maintain flows that support lateral connectivity (i.e. oxbows and backwaters)
- Maintain flows that support longitudinal connectivity

Connectivity Indicators

Category	Indicator	Explanation
Riparian zone	Total area inundated	The amount of out of channel area inundated by an overbank flow of a particular magnitude.
	Habitat area inundated	The amount of habitat area of a particular type that is inundated by a particular magnitude of overbank flow.
Lateral connectivity	Connection to river (frequency, duration, and timing)	Periodic connectivity of the river with oxbow lakes, backwaters, and other floodplain habitats is important to maintain the health of these areas and the organisms that depend on them.
Groundwater/surface water interaction	Gain or loss in section of river	Difference in the amount of water entering and leaving a specific section of the river channel. Sources of gains include inflow from tributaries, alluvial and deeper aquifers, and discharges to the river. Sources of losses include evaporation, evapo-transpiration from riparian areas, diversions, and recharge of alluvial and deeper aquifers. Indicator may be influenced by shallow groundwater surface elevation and hydraulic head of deeper aquifers.