

Middle and Lower Brazos River Study Design Peer Review

Reviewer 1

April 4, 2010

General Comments

In general the study design seems to concentrate most on what conditions are currently with little consideration or means for comparing current conditions with previous conditions or for determining desired conditions and improvement potential as alluded to in the technical overview document.

The document in general seems to be light on documentation and references for establishing what is currently know about the system. There are many references given throughout the study design, but there are also many more statements and findings given that are not referenced. It is unclear whether many statements or assertions are based on inferences and professional judgment by the authors. References should be cited. For example on page 22, paragraph 2, after the study by Folk and Ward is described, this is the last sentence of the paragraph: "Their findings are consistent with a paleo-deposit source for the gravel fraction of the bar at this location. " Did Folk and Ward find this consistency or is the consistency being inferred by authors of the study design?

The proposed study seems to generally be very comprehensive in nature, but lacks comprehensive details for how it is to be accomplished. The design remains rather conceptual in nature. Individual study design components need to be better defined, linked, and staged appropriately ahead of time so that they can be brought together in the end and synthesized into something meaningful.

Specific Comments

Page 1. Is it accurate to say that tributaries and unregulated areas downstream of Waco reduce the impacts of the reservoirs? Do they really reduce the impacts or just mask them?

Figure 1 map needs a legend or explanation. What does the green-gray-tan gradation represent? Elevation classes?

Page 31. Section 1.2.3. The unconsolidated material has not created the valley. I think it is more accurate to say that the river has carved the valley into the bed rock and deposited the unconsolidated materials which make up the alluvial aquifer.

Page 32. Section 1.2.5. States that the river is not associated with extensive riparian areas/wetlands. Is that the current condition even though "This portion of the river remains the most hydrologically intact within the basin and is one of the largest, relatively intact floodplain rivers in North America."? (Page 5). Has that always been the case? Or did there used to be more extensive riparian areas and wetlands that no longer exist because connectivity has been lost?

Page 42, Table 12. It is true that in-channel bars, specifically point bars at meander bends or in combination with opposite-bank erosion are associated with channel migration. It needs to be clarified that in-channel bars may also be present when there is accelerated erosion, sources of excess sediment, and/or altered hydrology and hydraulics which prevent the sediment that is present from being transported. In-channel bars can be a sign of an aggrading channel which may not be a normal or

desirable condition, and which certainly can have an impact on in-stream flows and habitat. The explanations in the table do not address the range of conditions that the specified indicators may actually “indicate”.

Page 48. Table 15. What is it about study reaches 4 and 5 that there is low floodplain connectivity? Is the river incised here? Is it a natural condition or has something caused floodplain connectivity to be lost? Is this a problem? Have riparian areas been compromised or somehow altered because of this? Has this impacted large woody debris recruitment?

Page 49. Reach 1 description says connectivity with the floodplain has been modified but in Table 15 indicates that Reach 1 has high floodplain connectivity in this reach.

How has it been determined that in-stream flows or at least freshwater flows are not important to the ecology of a tidally influenced reach? What is the justification?

The technical overview document says the research efforts will be prioritized to address identified knowledge gaps. In the study design plan (p. 51), reaches with little or no data (like reach 4) are eliminated from further study rather than identified as study gaps. This would be fine if the reaches to be modeled are representative of the other reaches with little or no data. However, with little or no data I’m not sure you can justify that the model reaches do represent the range of conditions that are present if what is present in those reaches is unknown.

Page 49-50. Where riparian areas are limited is it so because they were never there or has flow alteration, land use or some other change now limited them? Does it matter? What about the potential condition? Again, have there been effects to large woody debris recruitment? And how might that be linked to habitat and in-stream flow conditions?

Page 50. What are the channel connectivity characteristics described? How were these characteristics measured? Can more rationale be provided for why similar ecoregion, fish assemblage and “channel connectivity characteristics” justify the application of modeling in Reach 6 to Reach 7. Similar comment for other reaches.

What if the fish assemblages have been altered or simplified? How have native assemblages changed? And how would this change the reach delineations and the justification for extrapolating from one reach to another based on the existing fish assemblage data? What about historic and potential future assemblages? Do these reaches have the same historic and future potential?

Page 51. How will it specifically be quantified what flows were and are subsistence, base, high and overbank? How will break points be determined/measured?

Page 52. Last paragraph seems buried. The resource intensive nature of hydraulic and habitat modeling should be presented in this way earlier on to justify why it can’t be done for the entire river system or for more of the river system.

Page 53. Depending on vegetation cover, the use of LIDAR might be more efficient than ground surveys. (LIDAR is mentioned later in the Physical Processes sections so why not also mention it here in the Hydrology and Hydraulics section? Wouldn’t this be a coordinated effort? If LIDAR data are available for examining inundation and wetland areas related to the geomorphic assessment, then it certainly should

also be used for the hydrology and hydraulics rather than also ground surveying or surveying as intensively.

Page 63. Is lateral migration the only geomorphic measurement to be extracted from air photo analysis? If you are going to go to the trouble to do air photo analysis, other geomorphic measures could also be made and inform the current and possibly historic conditions. For example, channel widths, sinuosity, meander dimensions (meander belt widths, etc.).

Page 64. From this sentence: "Stream power patterns and sediment movement thresholds required to accomplish channel scale process goals will be estimated and compared to independent empirical data.", what are the **channel scale process goals**? When, where and how have these goals been or will be established?

Page 64. Last paragraph. What sediment is going to be sieved? Bed load? Suspended load? Bar deposits, active channel material, bank or floodplain deposits?

What metrics will be used for inventory and mapping of various geomorphic features mentioned? For example, will large woody debris be mapped only? Or will individual pieces and aggregates be differentiated? Will area, volume, number of pieces comprising large woody debris aggregates be measured? What will that information contribute? How will it be used? Will it be noted what habitat types the large woody debris is associated with?