

## **Recommendation for: Storage Routing with HEC-HMS in Harris County (Revised 02/13/2002)**

**Goal:** To determine whether the Harris County traditional backwater approach of determining storage/discharge relationships for Modified Puls stream routing can be enhanced by using LIDAR and a series of triangular integrated networks (TINs) based on water surface profiles and calculating the volume between the LIDAR surface and the water surface TIN.

**Recommended Procedure:** It is recommended that the traditional approach be utilized for the reasons stated below.

**Assumptions:** LIDAR with its detailed information can provide a three-dimensional representation of the ground surface. It is possible that flood plain storage may be better defined through the use of LIDAR data as opposed to using traditional surveyed cross sections in a hydraulic model to define the storage.

**Testing Procedure:** In order to evaluate this alternative, four reaches in the Brays Bayou watershed were examined to determine the differences in storage produced by the LIDAR method and the traditional approach. The four reaches under consideration follow.

- Keegans Bayou (D129-00-00): Mouth to Station 6182.
- Brays Bayou (D100-00-00): Station 85773 to Station 101967.
- Brays Bayou (D100-00-00): Station 65193 to Station 74086.
- Brays Bayou (D100-00-00): Station 22782 to Station 38160.

For each of these reaches, the latest hydraulic model for Brays Bayou was used to determine the water surface profiles for various discharges in the system. The relationship between the storage and discharge for each method was compared to determine the differences.

**Test Results:** The attached graphs indicate that there is some difference between the two methods. However, it also appears that there is no consistency between the two methods (i.e., in some cases the LIDAR produced greater volume at a given discharge, in other cases it was lower, and in still others it was about the same).

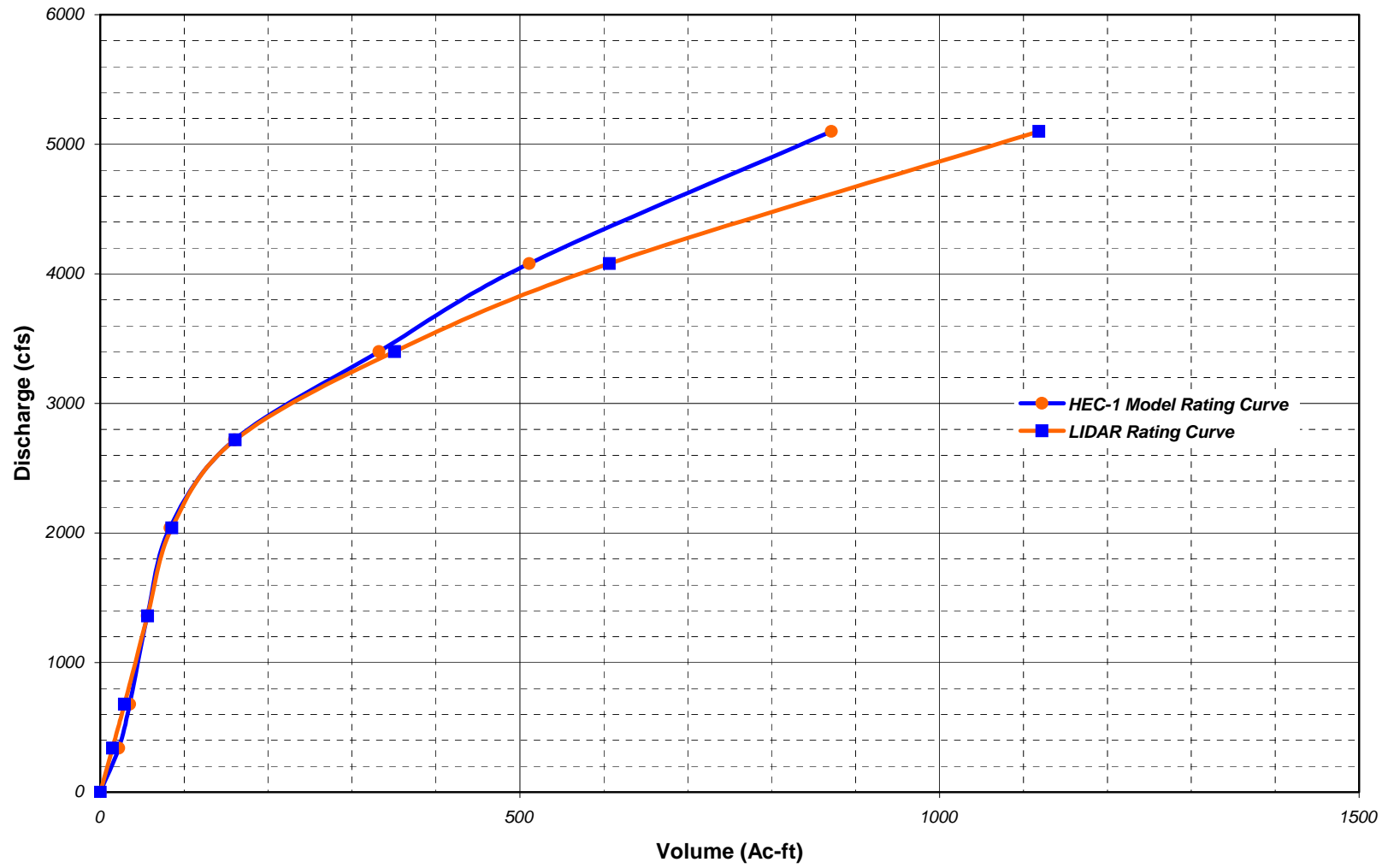
There are two significant aspects regarding the use of LIDAR for flood plain storage definition which tend to make this process less advantageous to use than the traditional approach. First, the use of this process requires a considerable amount of engineering judgement (e.g., Should backwater in a small tributary channel be considered storage or not? At a major confluence, how much of the flood plain should be attributed to each stream). Secondly, the process of creating the water surface TIN over the LIDAR data and calculating the volume between the two surfaces is a fairly tedious process (i.e., two to four hours per reach). With these problems in mind, and the fact that the results of the comparison between the two methods were inconsistent, the traditional approach would appear to be the better alternative.

**Final Notes:** No additional notes.

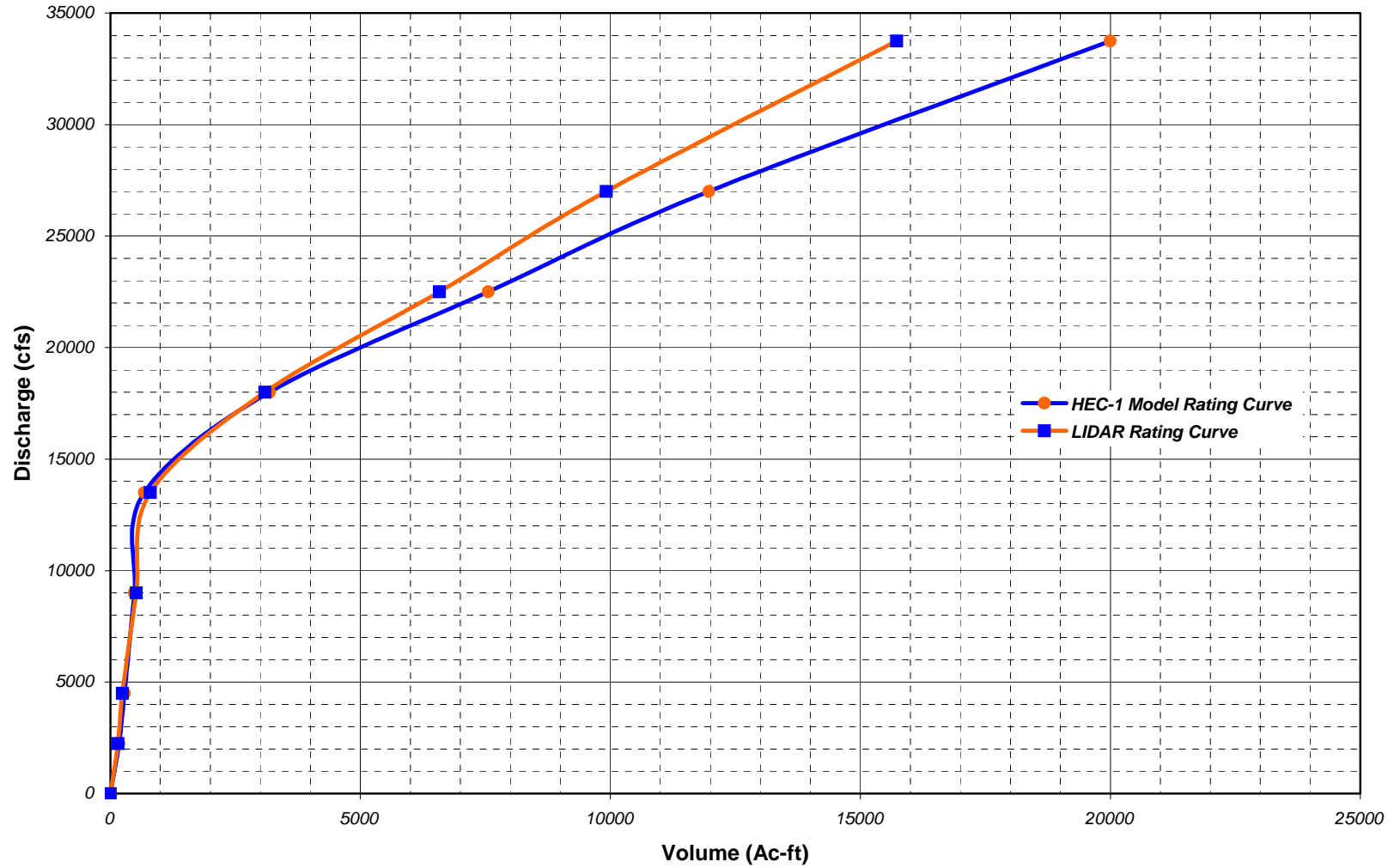
**Committee Resolution:** Use traditional approach.



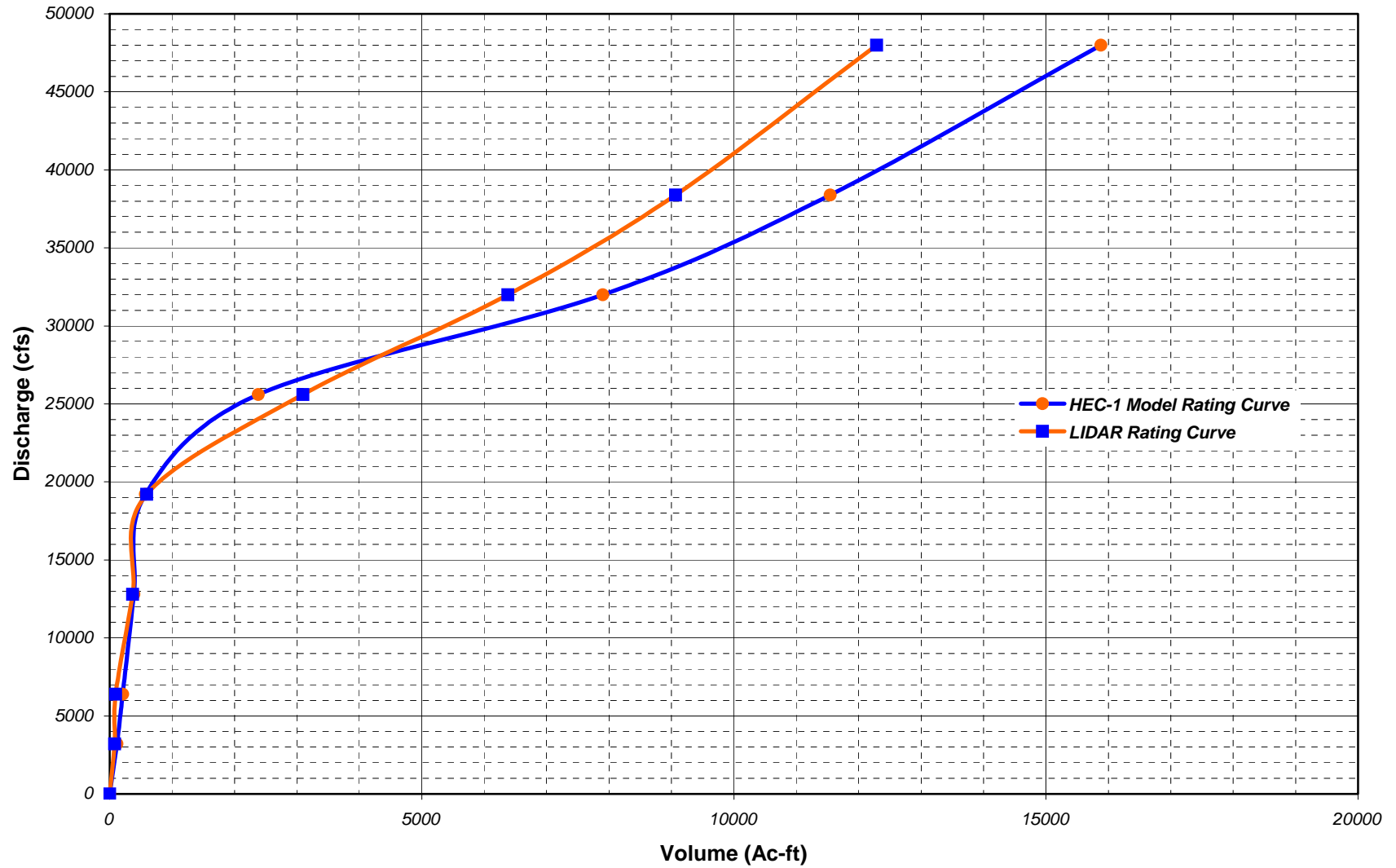
**Keegans Bayou (D129-00-00)**  
**Mouth to Station 6182**



**Brays Bayou (D100-00-00)**  
*Station 85773 to Station 101967*



**Brays Bayou (D100-00-00)**  
**Station 65193 to Station 74086**



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