

# Hydrology Project Narrative East Fork Trinity River & Trinity River Dallas, Ellis, and Kaufman County, TX

Contract #HSFE60-15-D-0003  
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**FEMA**

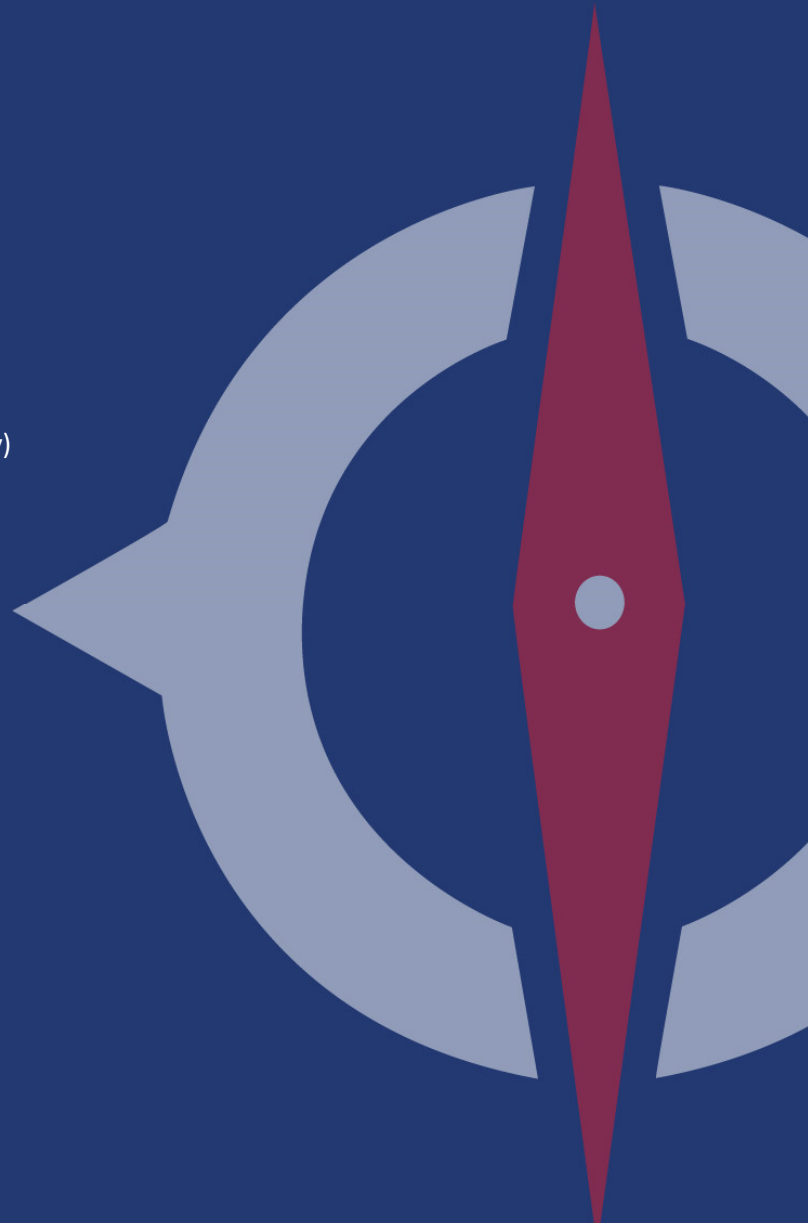


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## 01 Introduction/Project Overview

Compass prepared this document in accordance with FEMA Contract # HSFE60-15-D-0003, Task Order HSFE06-17-J-0047.

The U.S. Army Corps of Engineers (USACE) performed a hydrologic analysis of the entire Trinity River basin (HUC-4: 1203) concurrently with the hydraulic analysis performed by Compass along the East Fork Trinity River and Trinity River. The name of the USACE hydrologic analysis is the Interagency Flood Risk Management (InFRM) Trinity River Watershed Hydrology Assessment (WHA). The USACE hydrologic analysis was the basis of discharges applied to the detailed hydraulic modeling performed by Compass along portions of the East Fork Trinity River and Upper Trinity River watersheds, covering area in Dallas, Ellis, and Kaufman Counties. The hydraulic study extents along the East Fork Trinity River began just downstream of Lake Ray Hubbard and extended downstream to the confluence with the Trinity River. The hydraulic study extents along the Trinity River began at the Southside Wastewater Treatment Plant in Dallas County and extended downstream to Henderson County. Four HUC-10 watersheds impact the detailed hydraulic modeling extents: 1203010502, 1203010503, 1203010504, and 1203010605.

## 02 Scope of Work

**The scope for the hydrology task is as follows:**

Hydrologic analysis activities include independent hydrologic QA/QC of the USACE hydrologic analysis and incorporating the peak discharge results from the USACE hydrologic analysis along the hydraulic modeling extents of the East Fork Trinity River and Trinity River.

## 03 Issues

The USACE WHA produced a 100-year discharge downstream of Lake Ray Hubbard that was approximately 60,000 cfs, which is approximately 45,000 cfs lower than the effective FIS discharge along the East Fork Trinity River. The output from the effective HEC-1 model downstream of Lake Ray Hubbard appears to be based on the induced surcharge curve (gates fully open) for routing through the reservoir. The USACE WHA analysis originally used the induced surcharge curve, but the assumption was changed after obtaining the lake regulation plan and the historical operation of the reservoir. The peak 100-year Lake Ray Hubbard elevation from the effective HEC-1 model is 437.0' with a release of 105,000 cfs. Lake Ray Hubbard has exceeded 437.0' at least 3 times with the releases ranging between 20,000-55,000 cfs. The lake regulation plan has an event identified as a 50-year flood which reaches an elevation of 437.8' and releases around 50,000 cfs. The USACE WHA 100-year simulation results in a peak elevation of about 438.0' feet with a release of approximately 60,000 cfs from Lake Ray Hubbard. Using the induced surcharge curve is a more conservative assumption compared to the USACE WHA; however, the assumption to use the lake regulation plan and historical operation of the reservoir by the USACE WHA appears more representative of the 1% annual chance (100-year) event compared to the effective HEC-1 analysis.

## 04 Information for Next Mapping Partner

The source of the USACE hydrologic analysis is the Interagency Flood Risk Management (InFRM) Trinity River Watershed Hydrology Assessment (WHA). The WHA used several hydrologic methods to compare and select the best flow frequency estimates. The methods included statistical hydrology (B17C), rainfall-runoff modeling (HMS), reservoir (period of record) simulations, and reservoir studies using



USACE dam safety procedures. The final discharges for the East Fork Trinity River and Trinity River through the hydraulic study extents were selected using rainfall runoff models that were calibrated to significant observed storm events and NOAA Atlas 14 precipitation estimates. Final discharges along the East Fork were based on release rates from Lake Ray Hubbard combined with uniform rainfall results from contributing drainage area downstream of Lake Ray Hubbard to the confluence with the Trinity River. Final discharges along the Trinity River were developed using elliptical design storms in HEC-HMS. Detailed information regarding the USACE InFRM Trinity River WHA can be found in the final USACE hydrologic report, which is anticipated to be released in early 2020.

