

North Central Texas
Council of Governments

Project Update Meeting

Breakout Station 1: Pilot Studies
September 2024

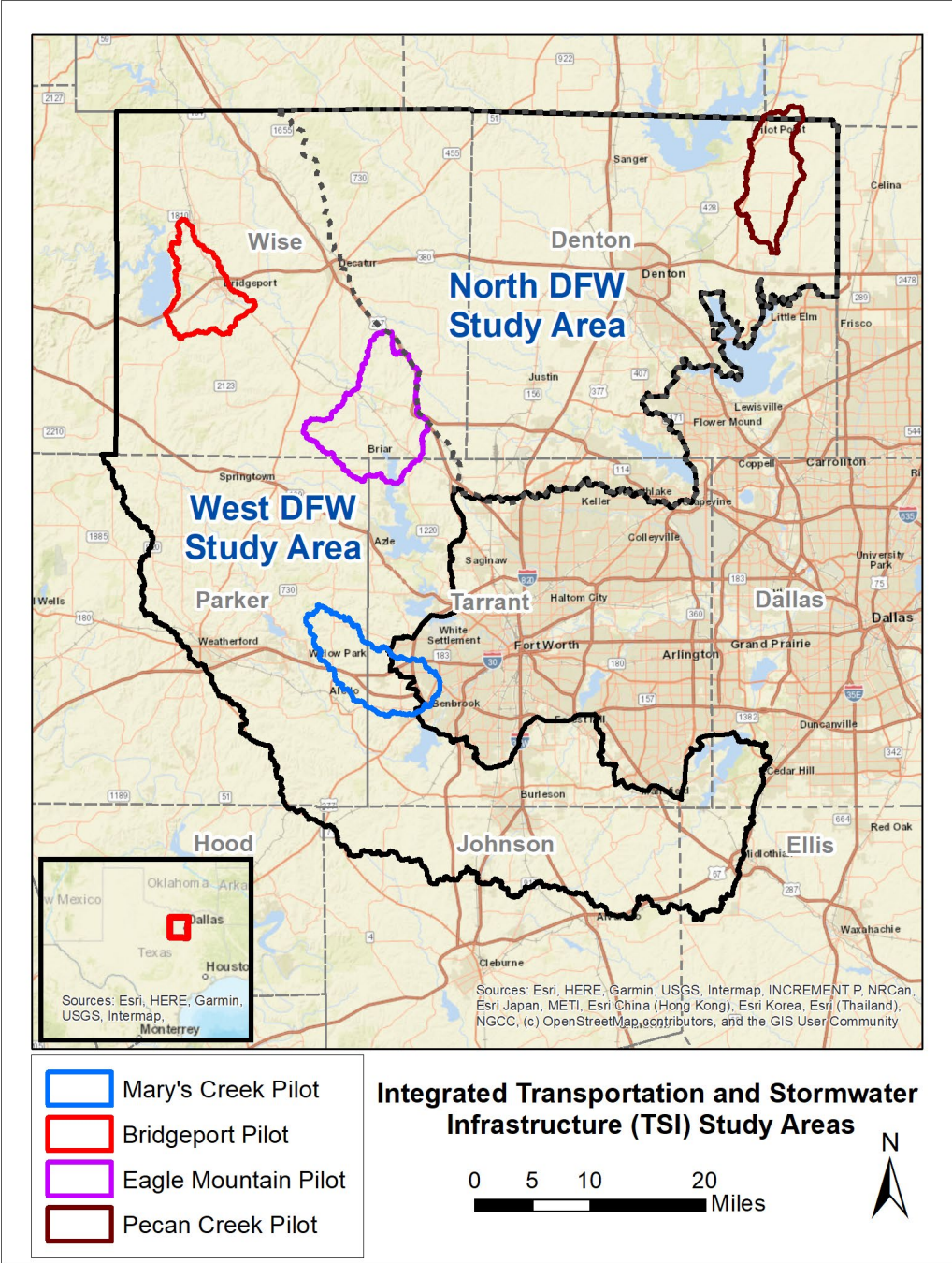


Funded by the Texas General Land Office,
Community Development Block Grant,
Disaster Recovery Program.



Also Funded by the Texas Water Development Board
and Texas Department of Transportation.

TSI Pilot Studies

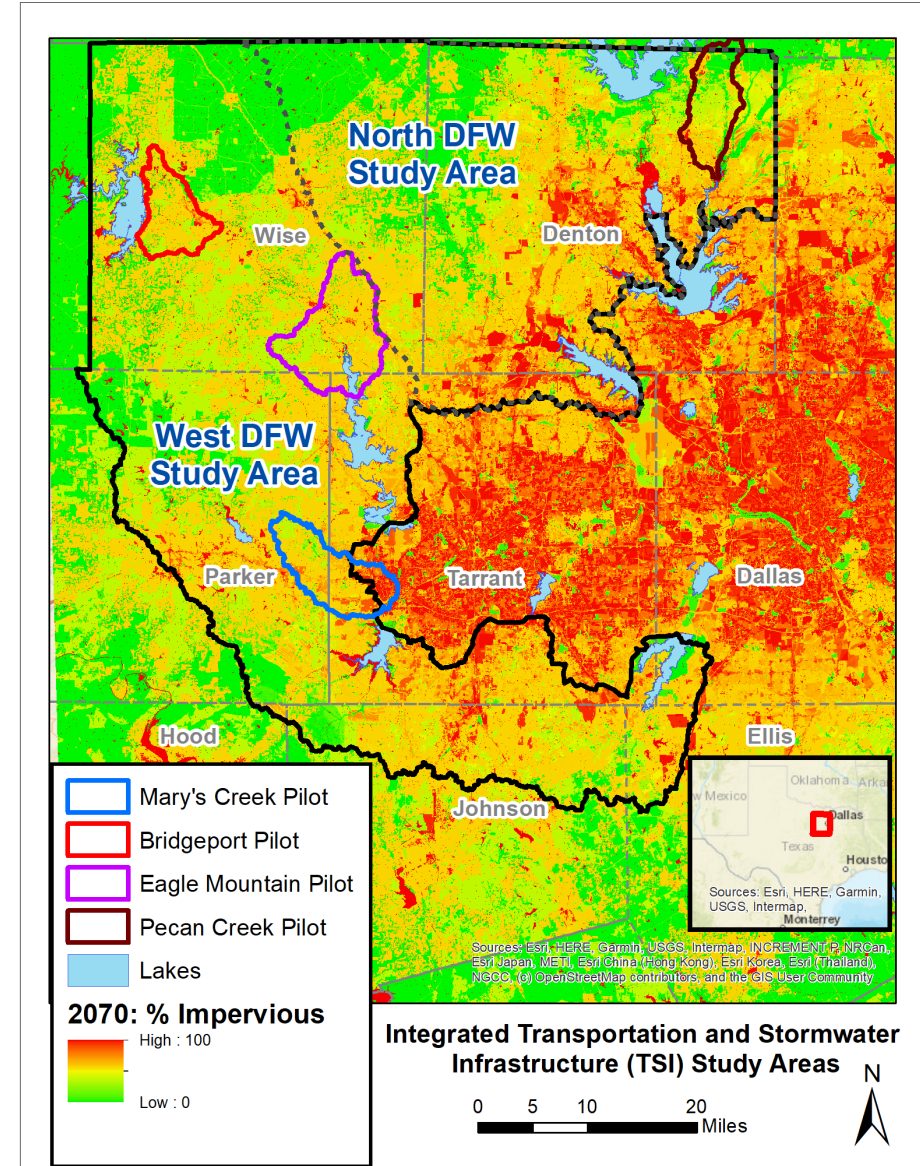
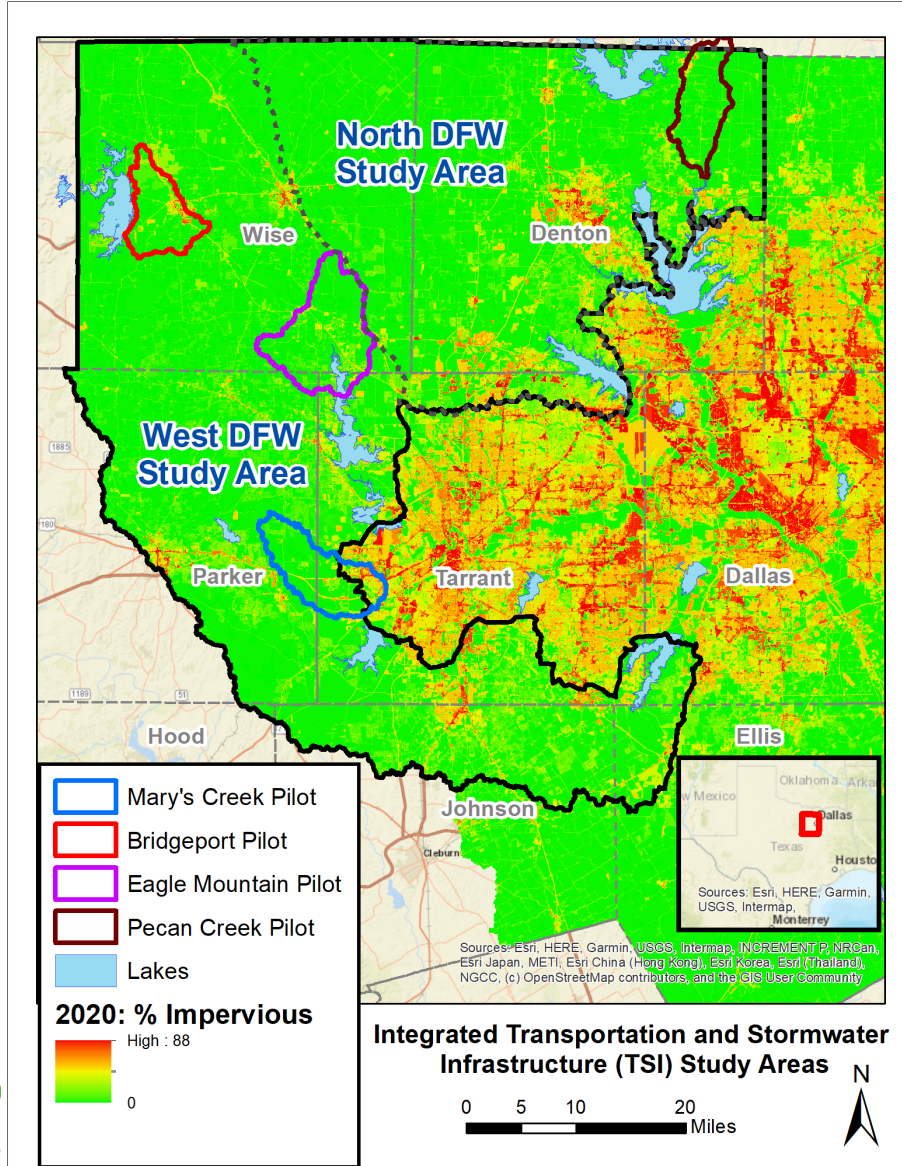


Land Use: Current vs. Future Analysis

2020 (6.4% Impervious)



2070 (35.2% Impervious)



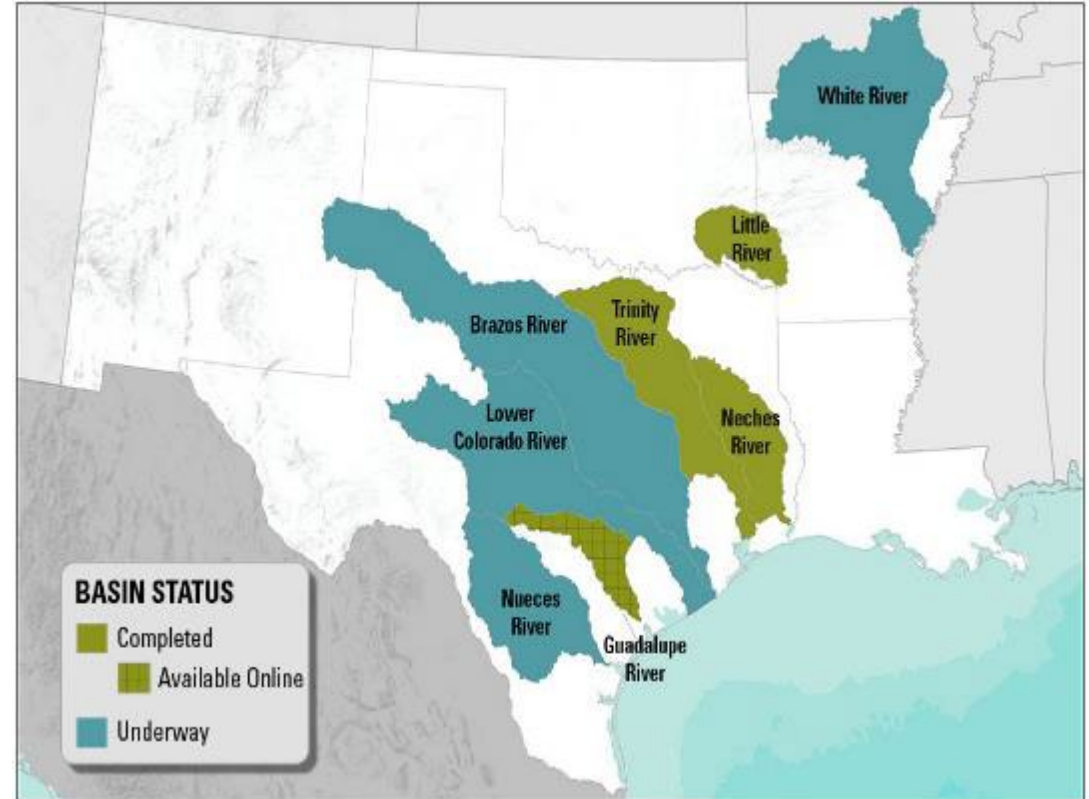
Hydrology Data Source: Watershed Hydrology Assessment (WHA)

What? State of the art estimate for the potential of flooding

- Hydrology study (i.e., determines how much water) for large rivers and streams
- **Multi-method analysis to reduce uncertainty**
- Statistical data & numerical data is incorporated into larger modeling efforts
- Incorporates NOAA Atlas 14 point-precipitation rainfall totals
- Accounts for regulated flow from dams

Why?

- Hydrology remains the single largest source of **uncertainty** in our understanding of flood risk
- Available hydrology information is generally dated and obsolete

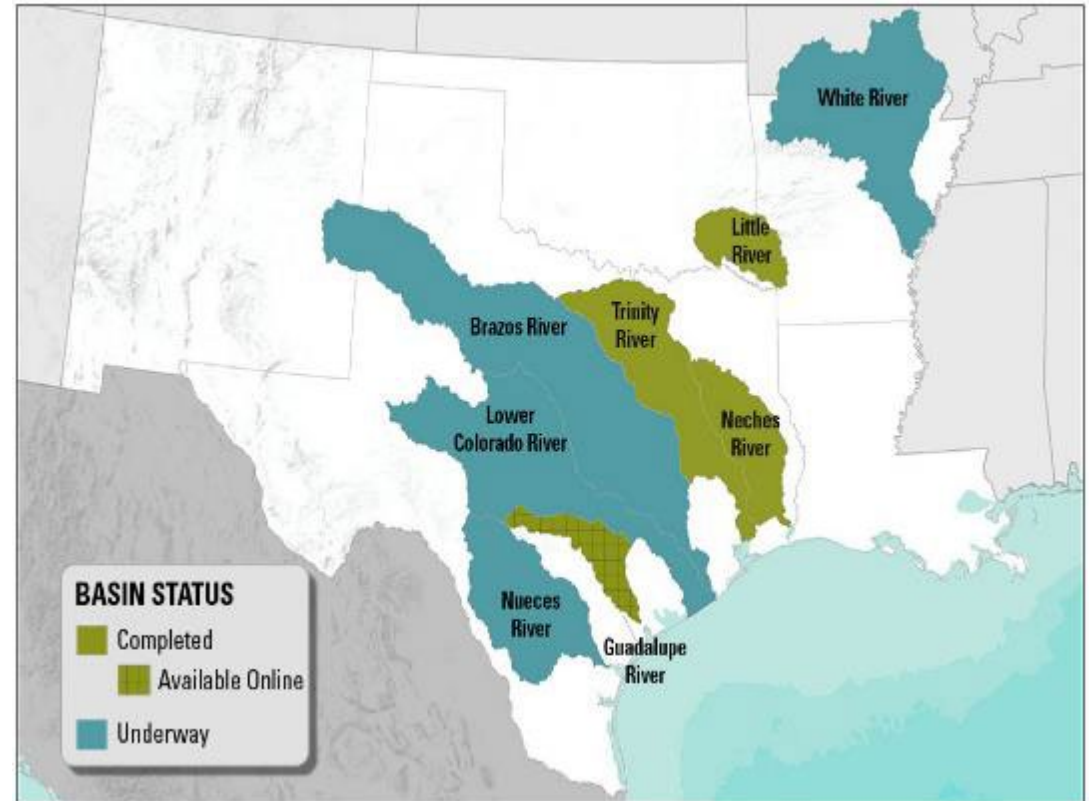


<https://webapps.usgs.gov/infrm/whav/>

Hydrology Data Source: Watershed Hydrology Assessment (WHA), cont.

Outcome:

- WHA produce consistent 100-yr and other frequency flows across the river basin, based on all available hydrologic information
- Provides design data and suggests areas where flood hazard information may need to be updated
- **Trinity River Watershed Hydrology Assessment**
 - Objective: Recently completed high quality hydrology study of 700-mile-long Trinity River Basin (18,000 square miles)
 - Outcome: Innovative and quality information for use in regional flood studies



<https://webapps.usgs.gov/infrm/whav/>

Hydrology

Developed SOP and enhancing hydrology (including new flow locations) in pilot areas and larger West area:

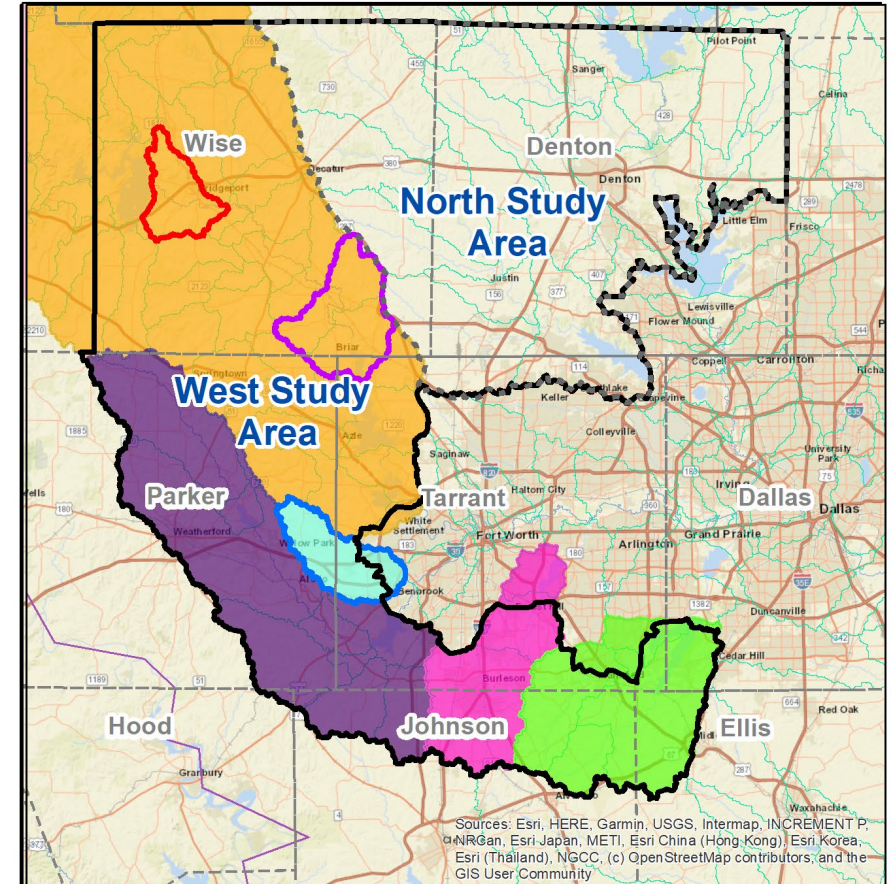
- Mary's Creek
- Village Creek
- Mountain Creek
- Clear Fork
- West Fork

TSI Project
West Study Region
HEC-HMS Model Development SOP

May 2024

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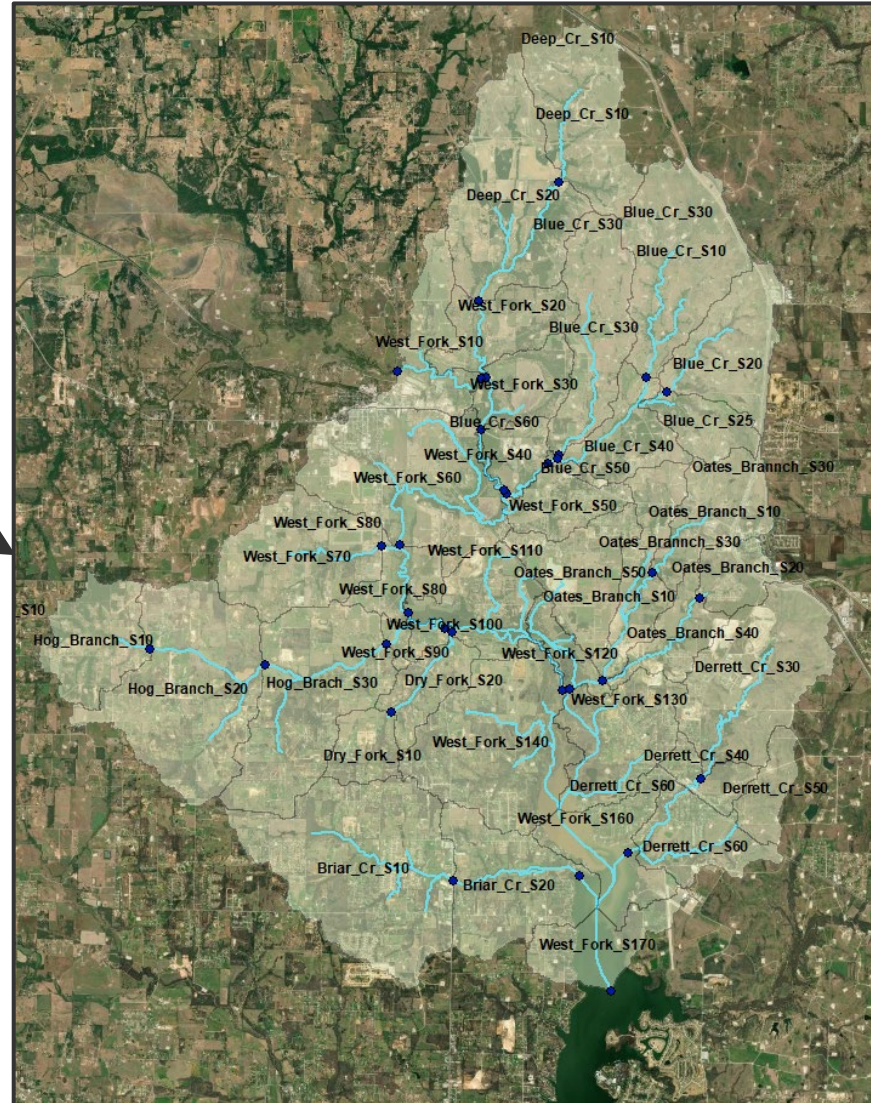
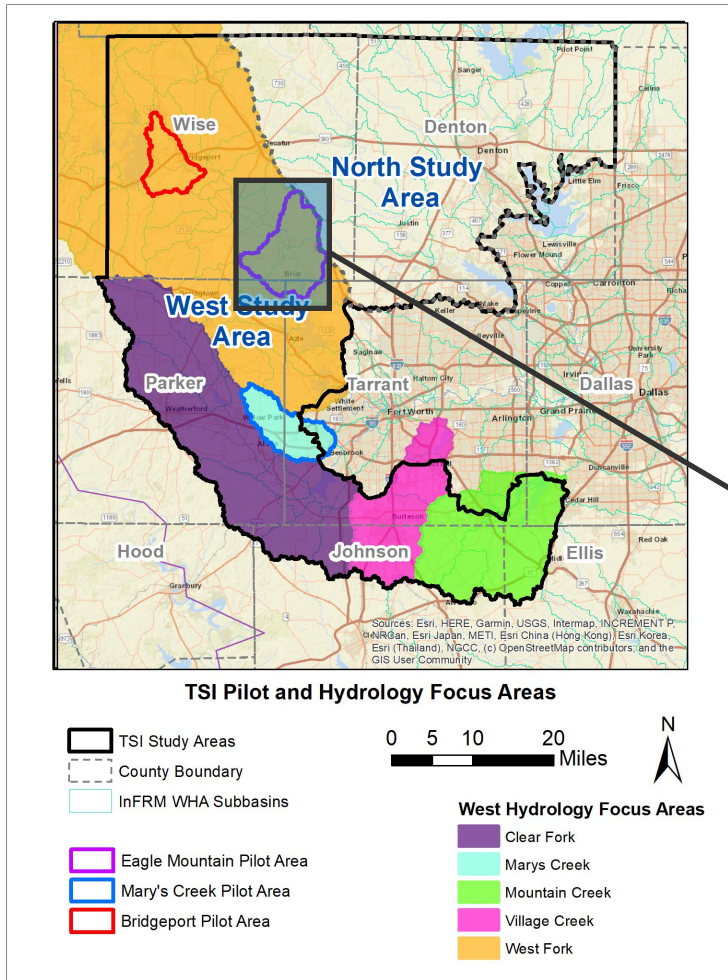
1. Delineate additional subbasins in HEC-HMS
2. Update HMS element names and descriptions
3. Calculate initial HMS parameters
4. Calibrate to InFRM WHA results
5. Update the HMS basin model for TSI current and future conditions
6. Run TSI storm scenarios
7. Model documentation
8. Submit final HMS model for review and use for team members



TSI Pilot and Hydrology Focus Areas



Hydrology Enhancement Example: Eagle Mountain Pilot



Final hydrology delineation for TSI Eagle Mountain Pilot Area

Hydraulics Data Source: Base Level Engineering (BLE)

What?

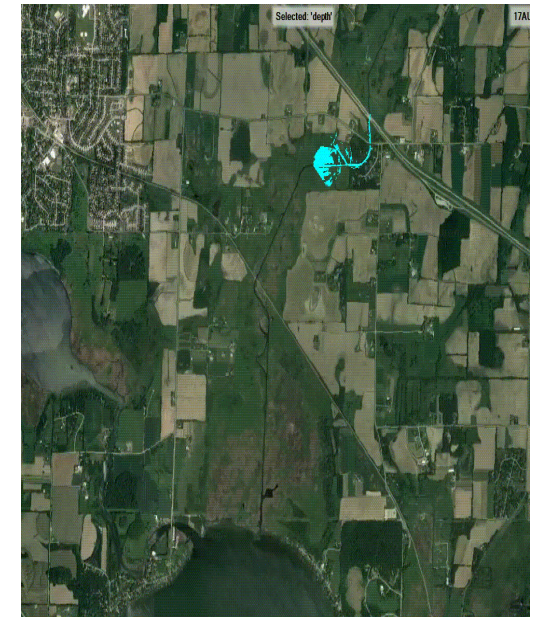
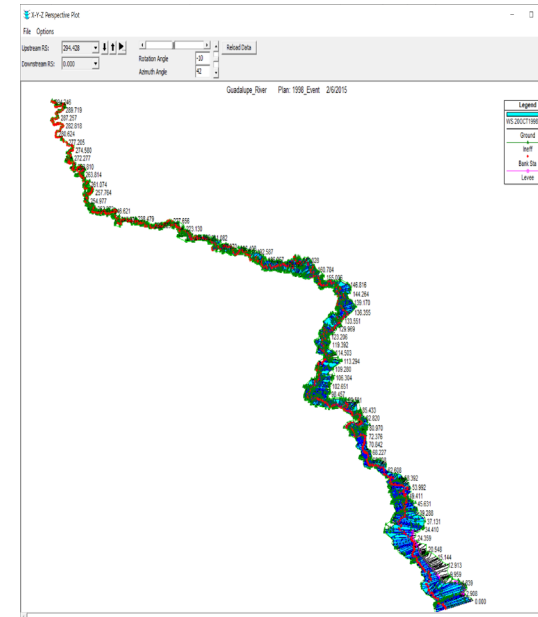
Watershed-wide engineering modeling method that leverages high resolution ground elevation, automated model building techniques, and manual model review to prepare broad and accurate flood risk information.

Why?

Centralized and available flood hazard analysis to support floodplain management activities and development review, while increasing risk awareness for individuals.

Outcome:

- Quickly determine the flood risk for various events throughout multiple watersheds at various recurrence intervals (i.e., 10yr, 100yr, 500yr).
- Allows Federal, State, and local governments, as well as individuals, to access and use flood risk information.



Hydraulics

Developed SOP and enhancing hydraulic models to inform flooding considerations:

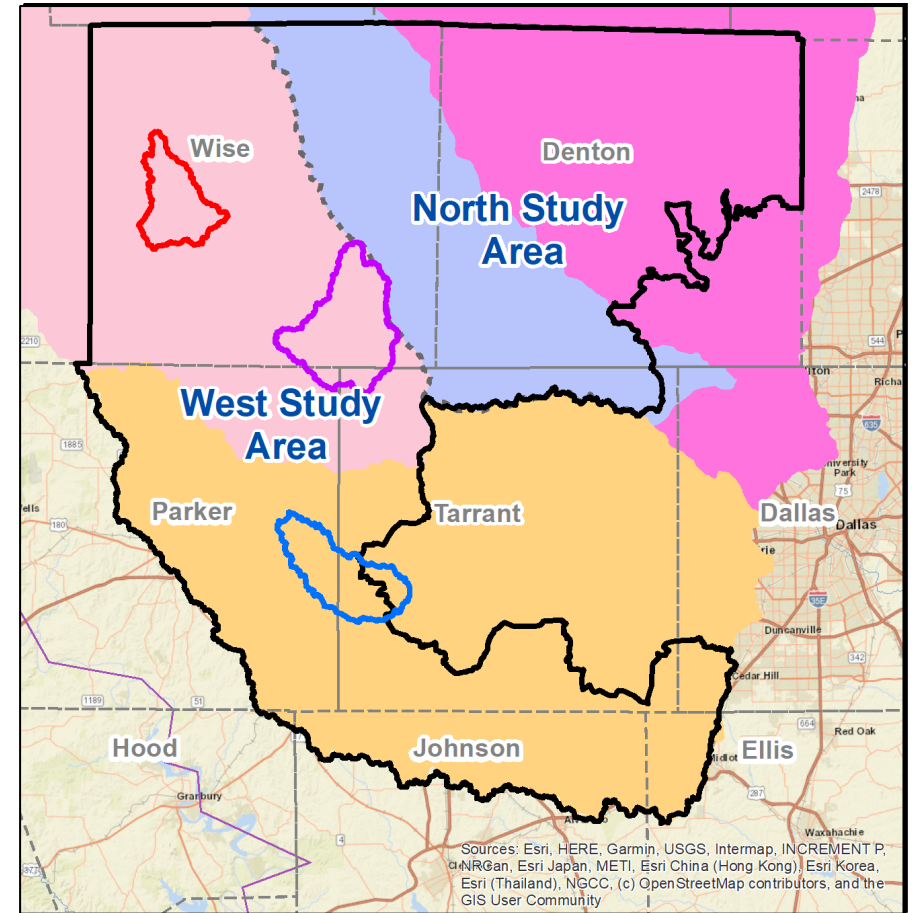
- Defining approach for enhancing Base Level Engineering (BLE)
 - Exploring 1D vs 2D model considerations
 - Testing approaches, adding detail, urban drainage, determining environmental constraints, establish recurrence intervals, incorporate current/future flows, optimization scripting, etc.

TSI Project
West Study Region
HEC-RAS Model Development
May 2024

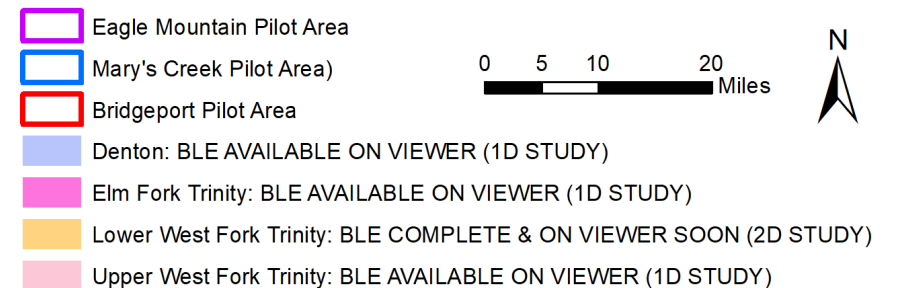
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Defining TSI HEC-RAS Modeling Process for:

- 1D Individual Models
- 1D Combined Models
- 2D Modeling

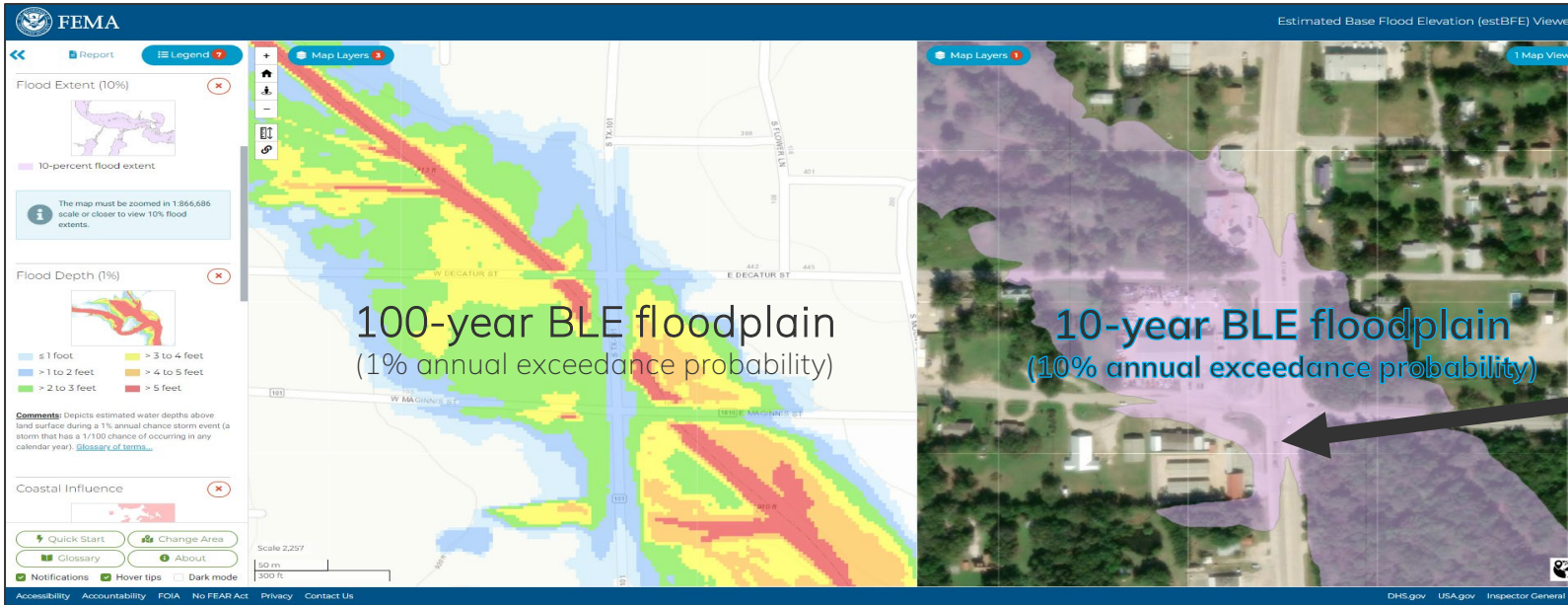


TSI Pilot Areas with BLE (as of FEB 2024)



BLE Viewer Link: <https://webapps.usgs.gov/infrm/estBFE/>

Hydraulics Example: TSI-Area Flooding with BLE (Chico, Texas)

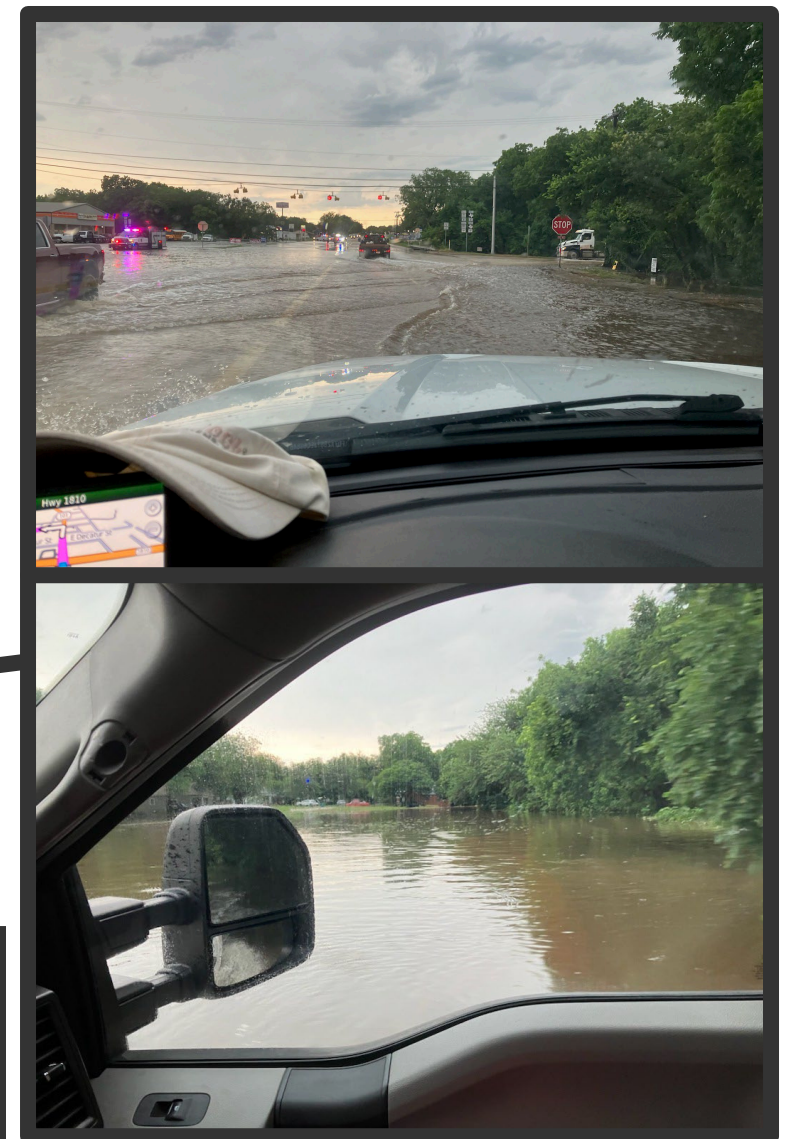


Source: InFRM Estimated Base Flood Elevation Viewer: <https://webapps.usgs.gov/infrm/estBFE/>

NOWData - NOAA Online Weather Data							
Climatological Data for DECATUR MUNICIPAL AIRPORT, TX - May 2024							
Click column heading to sort ascending, click again to sort descending.							
Date	Temperature				HDD	CDD	Precipitation
	Maximum	Minimum	Average	Departure			
2024-05-28	80	63	71.5	M	0	7	2.40

Source: NOAA Climatological Data: <http://www.weather.gov/climate>

Precipitation Duration	Recurrence Interval (years)
15-min	500
30-min	50
60-min	10
2-hr	5
6-hr	1



Dry Creek: May 28, 2024

Source: Tarrant Regional Water District

Source: NOAA Atlas 14 Point Precipitation Frequency Estimates for ~2.4" in Chico, Texas: https://hdsc.nws.noaa.gov/pfds/pfds_map_cont.html

North Study Area: Pecan Creek Pilot Study

Pecan Creek Pilot Study

The purpose of this Pecan Creek H&H Pilot study is to establish a technical approach and provide foundational analysis that can be expanded through the larger North DFW TSI study. This includes investigation, data collection, and H&H model enhancements for existing and future conditions within the Pecan Creek Area.

Deliverables:

- Enhanced hydrologic modeling for the Pecan Creek Area of the Trinity River Watershed Hydrology Assessment (WHA) study
- Enhanced hydraulic modeling for the Pecan Creek Area of the FEMA Base Level Engineering (BLE) study
- Coordination with planning, transportation, and environmental reviews
- Retrieval and documentation of existing H&H information for inclusion in literature review
- Summary of findings and recommendations for expanded services

