

# Walnut Custom Watershed Floodplain Mapping Project Kickoff Meeting

December 12, 2019



**wood.**



*Your engagement in this process is important to the success of this project, so thank you for taking the time to be here today!*

# Discussion Topics

- ▶ Introductions
- ▶ Program Overview
- ▶ Project Discussion
- ▶ Community/Stakeholder Responsibilities

# Why We're Here?

- ▶ The Walnut Custom Watershed was chosen for a Discovery/ Base Level Engineering project.
- ▶ Develop a complete, current picture of your flood hazards and risks to help you better:
  - ▶ Plan for the risk
  - ▶ Take action to protect your communities
  - ▶ Communicate the risk to your citizens
- ▶ Determine the next steps for future projects.

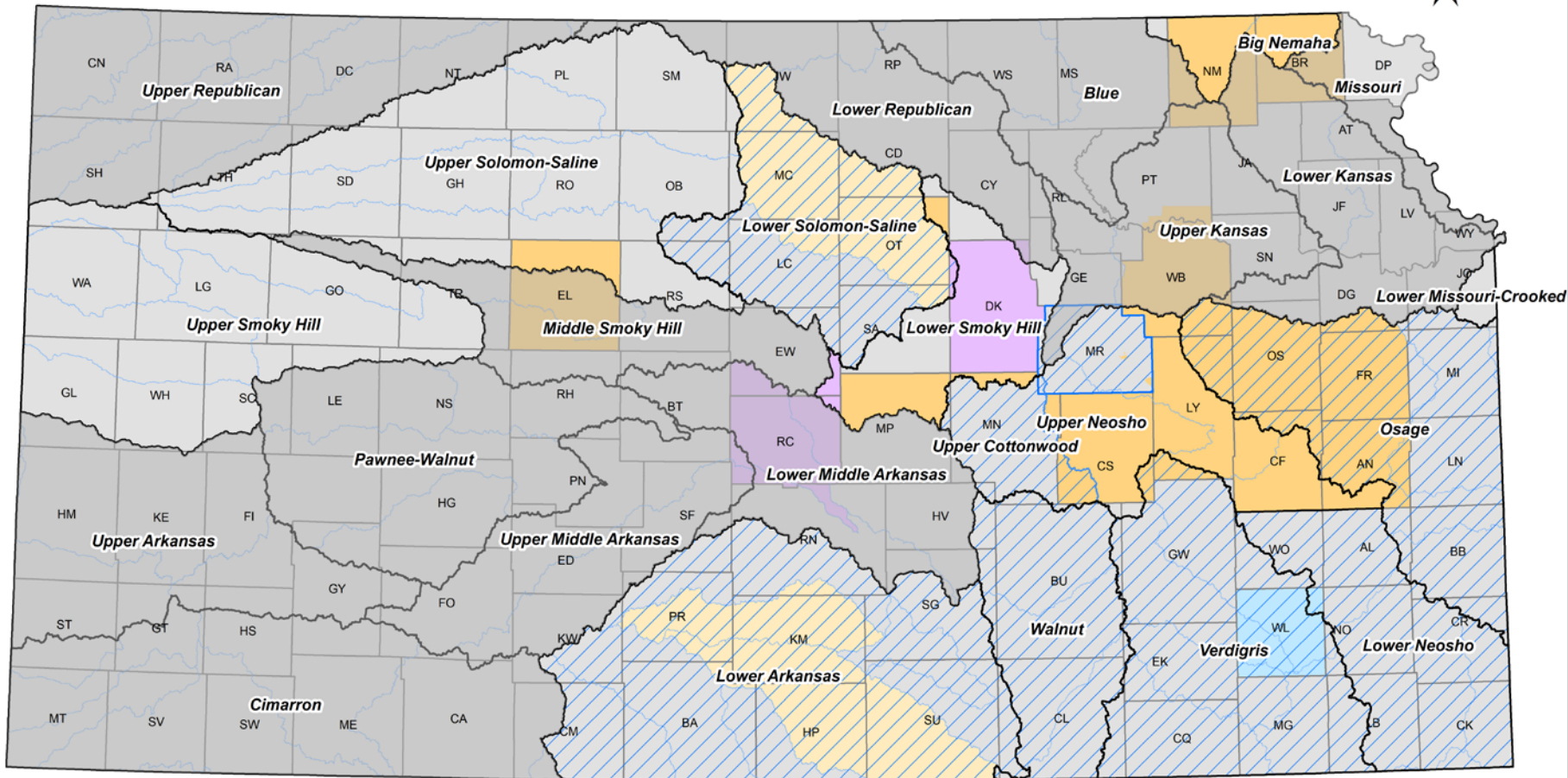
# Why Have Floodplain Maps?

- ▶ Determine where flood insurance is needed and rate its cost.
  - ▶ Flood Insurance Rate Map (FIRM)
- ▶ To provide the basis for executing community floodplain management ordinances.
- ▶ Understand flood risk so communities can make informed planning decisions.

# FEMA Floodplain Mapping Program

- ▶ Risk Mapping Assessment and Planning
- ▶ Supports the National Flood Insurance Program. Performed on a watershed basis.
- ▶ Consists of both Regulatory & Non-Regulatory Products.
- ▶ FEMA Program that provides communities with flood information and tools they can use to enhance their mitigation plans and take action to better protect their citizens.

# Current Floodplain Mapping Projects and Custom Watersheds



## Project Status

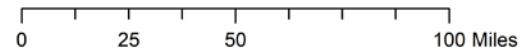
- Proposed FY19 BLE\*
- Underway
- Draft
- Preliminary
- LFD
- FOA Complete (Non-Reg Zone A)

## Watershed Projects

- Custom Watersheds (labeled)
- FY18 BLE Projects -In Development
- HUC 8 Watersheds (not labeled)

October 1, 2019

\*Not all watershed areas will be included.  
Please check with KDA for details.



# Floodplain Mapping Terms

- ▶ **Special Flood Hazard Area (SFHA)**- The regulatory Floodplain (1% Floodplain)
- ▶ **1% Flood (100-year flood)**- Flood Event with a 1% chance of occurring each year
- ▶ **0.2% Flood (500-year flood)**- Flood Event with a 0.2% chance of occurring each year
- ▶ **Zone A**- Flood Zone generally determined using “approximate” methods
- ▶ **Zone AE**- Flood Zone determined using detailed methods.
- ▶ **Zone AH/AO**- Shallow flooding areas with sheet flow or ponding determined using detailed methods

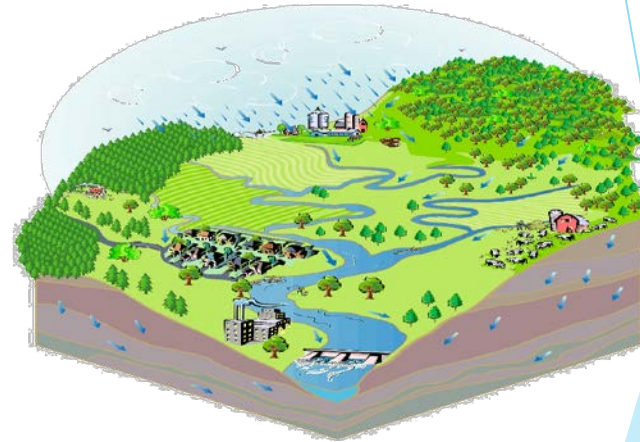


# Floodplain Mapping Terms

- ▶ **Base Flood Elevation (BFE)**- The water surface elevation of the 1% flood in a specific location
- ▶ **Floodway**- Area reserved for flood conveyance
- ▶ **Flood Insurance Rate Map (FIRM)**- FEMA flood insurance maps
- ▶ **Flood Insurance Study (FIS)**- Provides information about flood hazards and the methods used to create a FIRM
- ▶ **Topography**- Ground surface. Determines the shape of the floodplains
- ▶ **H&H**- Hydrology and Hydraulics

# What is Hydrology?

- ▶ Determines the quantity of water flowing within a stream
- ▶ Peak Discharge (flow) is determined for the:
  - ▶ 10% flood event
  - ▶ 4% flood event
  - ▶ 2% flood event
  - ▶ **1% flood event**
    - ▶ 1(+) flood event to show upper probability limits
  - ▶ 0.2% flood event
- ▶ Discharge is measured in cubic feet per second (CFS)



# What is Hydraulics?

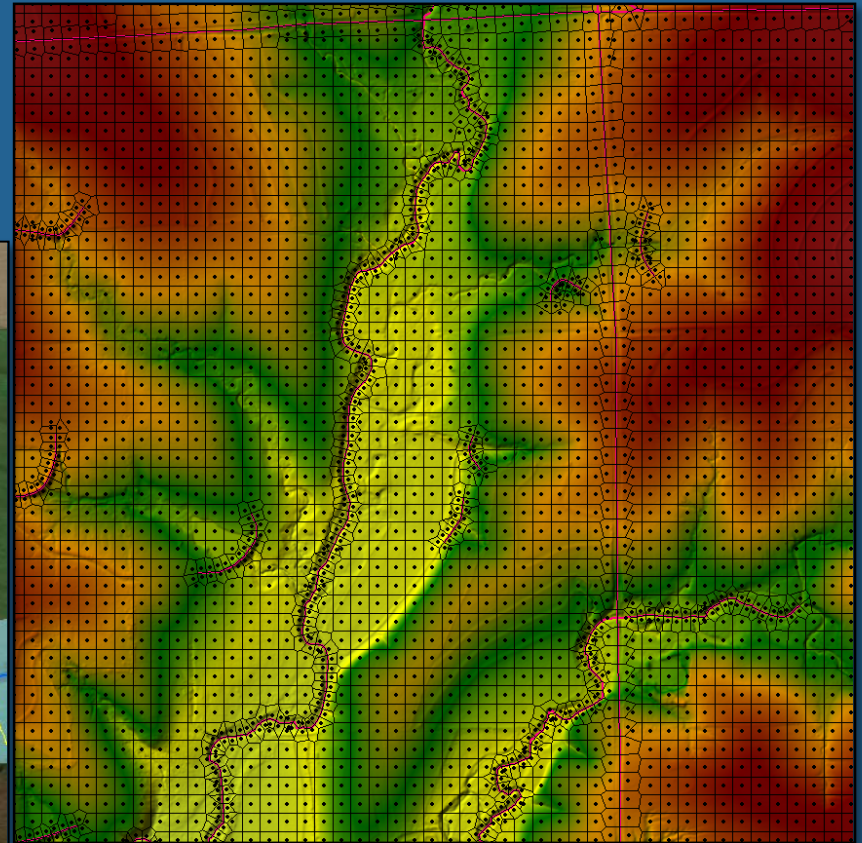
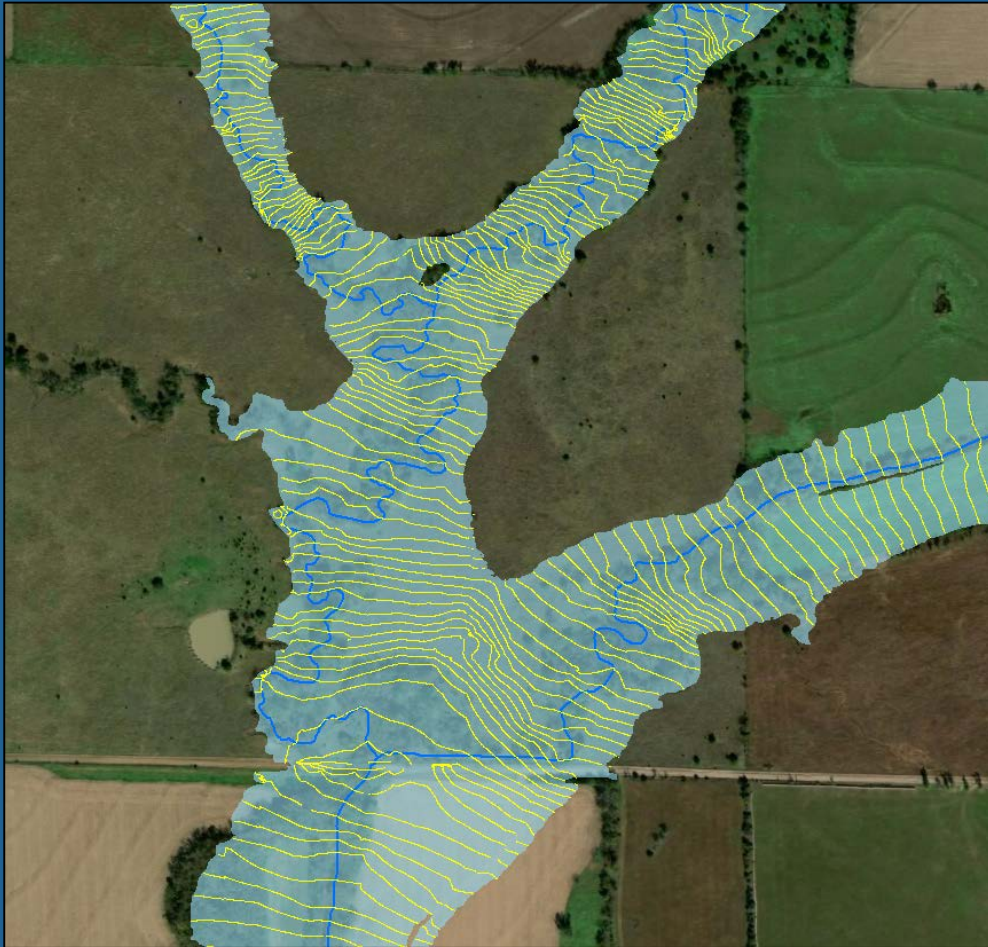
- ▶ Determines how high the water gets & where it goes
- ▶ Interaction between the water and the channel/ground surface
- ▶ Water surface elevations are determined for the:
  - ▶ 10% flood event
  - ▶ 4% flood event
  - ▶ 2% flood event
  - ▶ **1% flood event**
    - ▶ 1(+) flood event to show probability limits
  - ▶ 0.2% flood event
- ▶ BFEs are determined for the 1% Flood

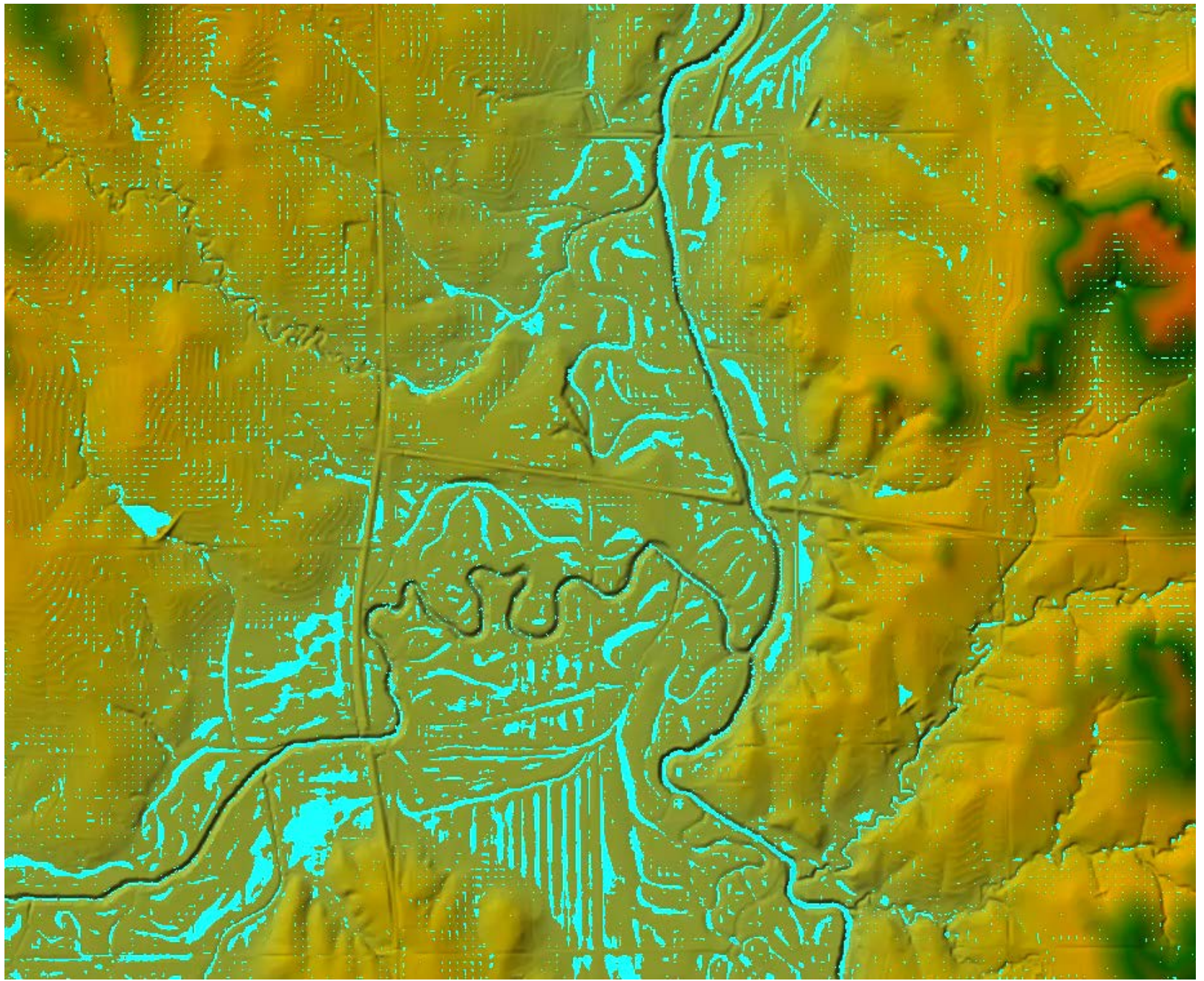


# What is 2D Hydraulics?

- ▶ Now built into HEC-Ras modeling software (developed and updated by US Army Corps of Engineers)
- ▶ Can use “excess rainfall on grid” hydrology
- ▶ Uses gridded mesh approach to allow water to flow in multiple directions
- ▶ Water Surface Elevation and Depth Grids generated from model
- ▶ Considered to be more accurate than 1D

# 2D Hydraulics

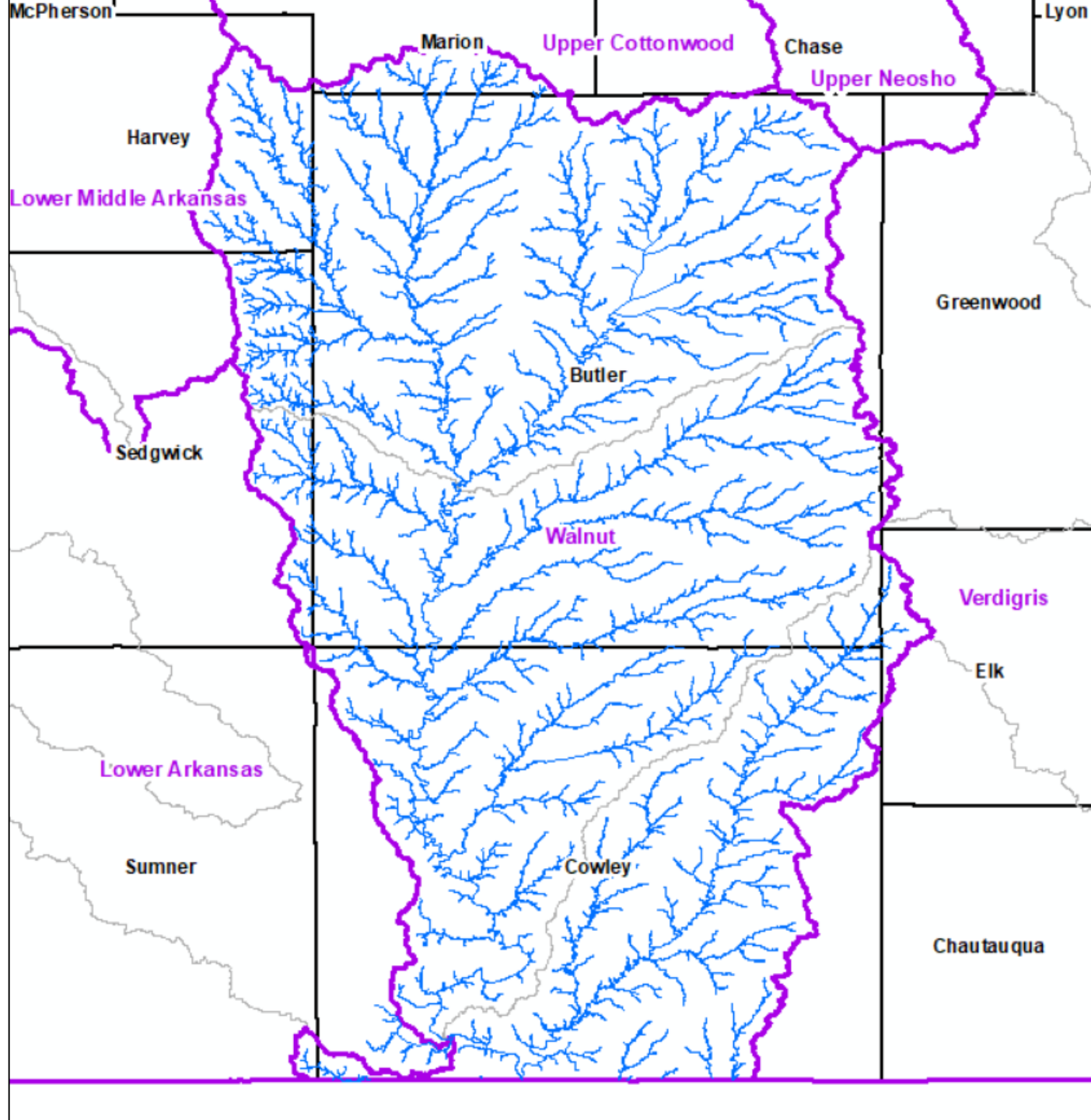




# BLE Study Area

— Study Lines

\*BLE Floodplains are Complete for this Study Area



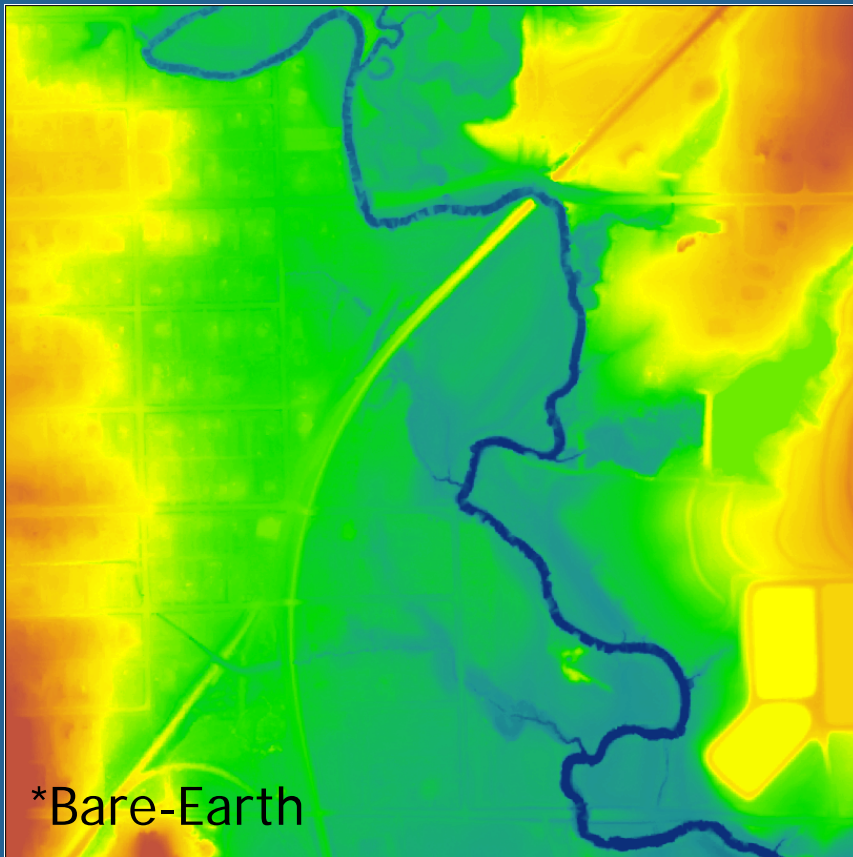
# What is Base Level Engineering (BLE)?

- ▶ Development of initial draft floodplains using all new engineering
- ▶ Based on:
  - ▶ LiDAR Topography
  - ▶ 2D HEC-RAS Methodology
  - ▶ National Weather Service (NWS) Rainfall
  - ▶ National Land Cover Database Land Use
  - ▶ NRCS Soil Information
  - ▶ USGS Gage Data Calibration
- ▶ This is the first run to produce new floodplains, which will be further refined during data development phases

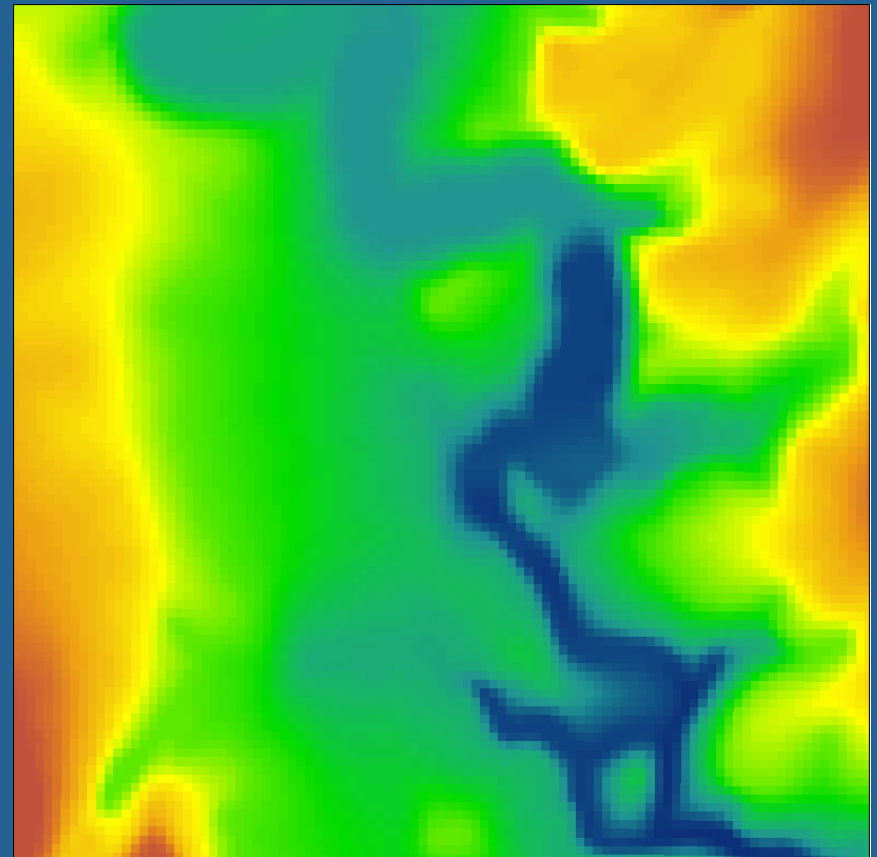


# LiDAR versus 10m DEM

LiDAR



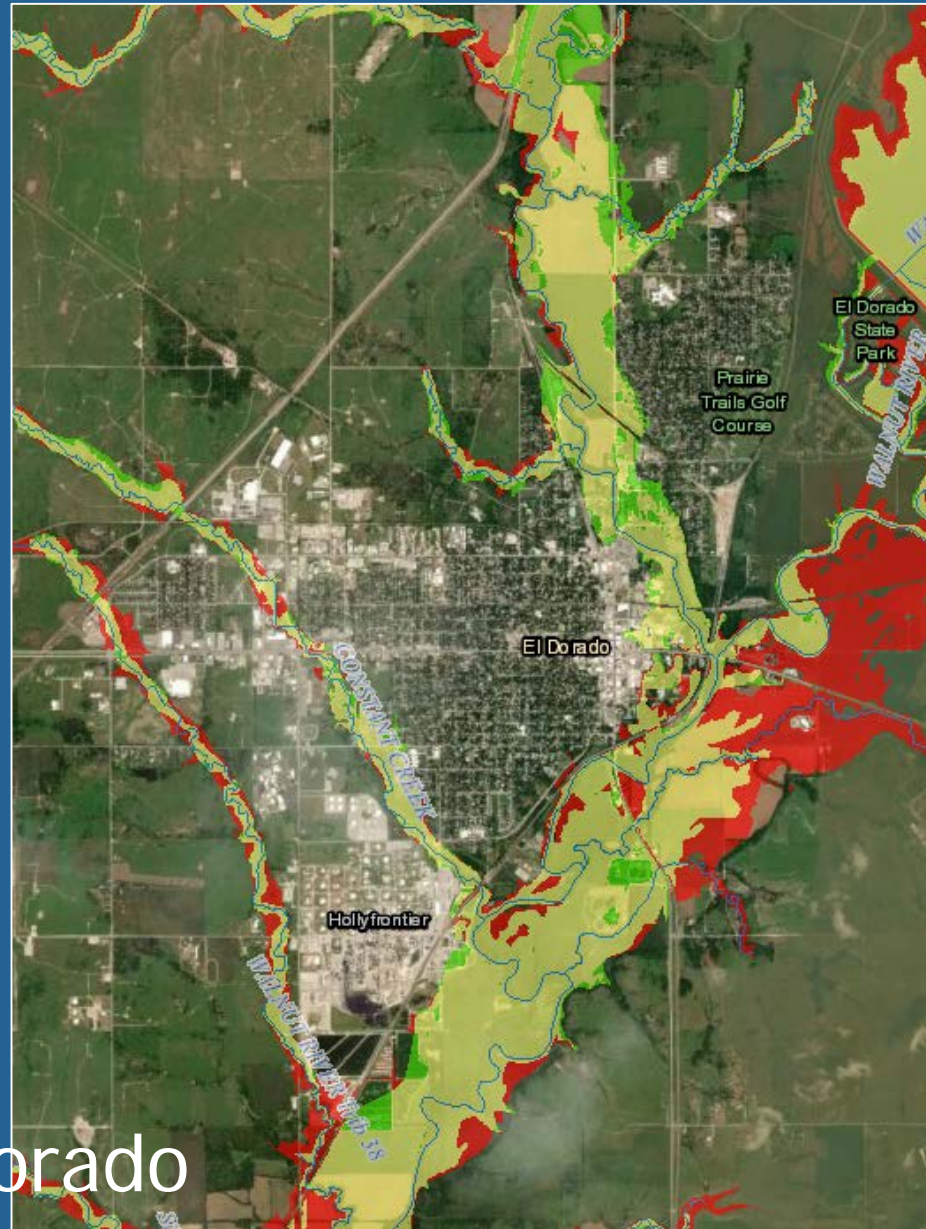
10m DEM



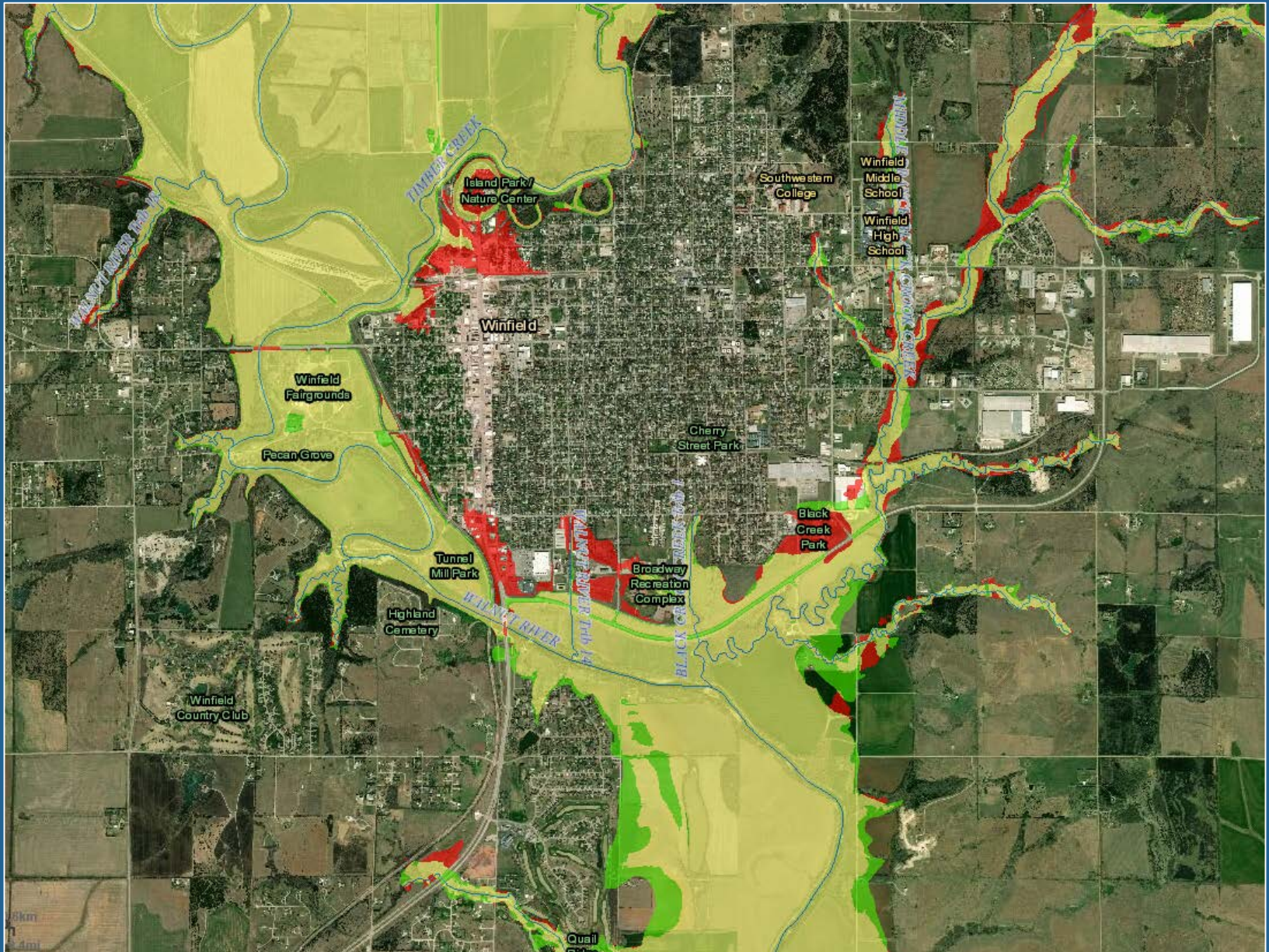
# Draft Floodplains & Changes Since Last Firm



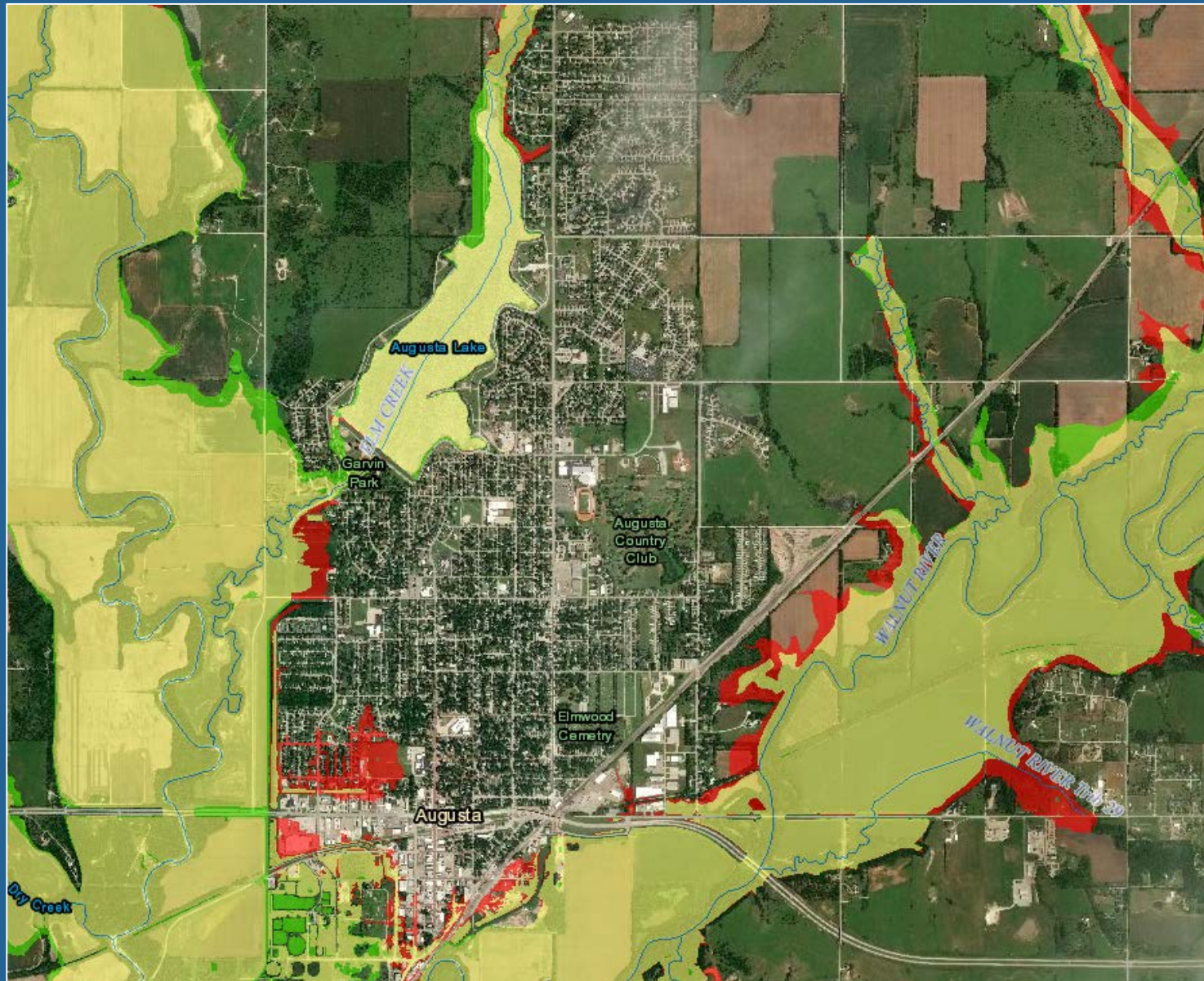
El Dorado



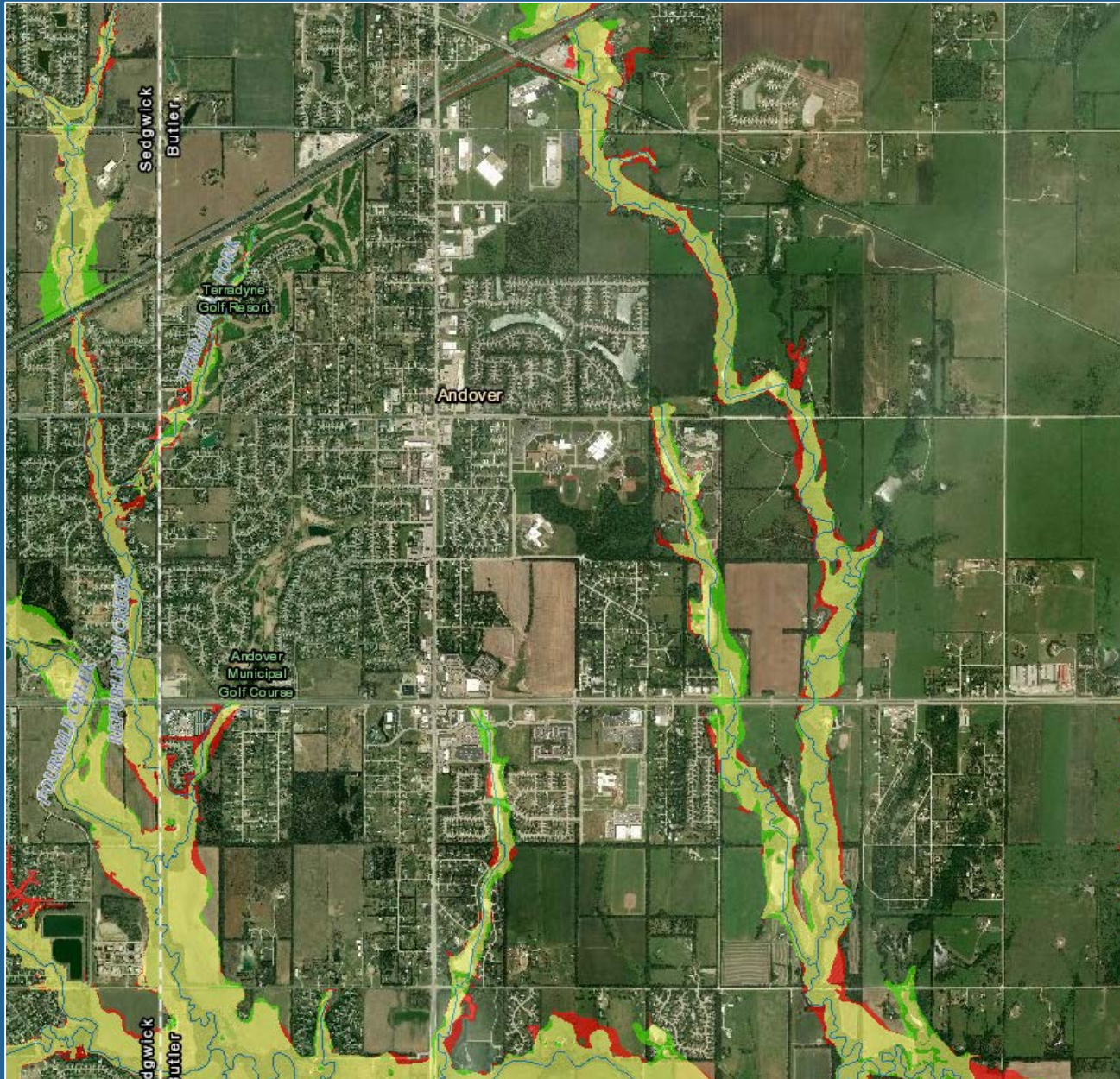
# Winfield



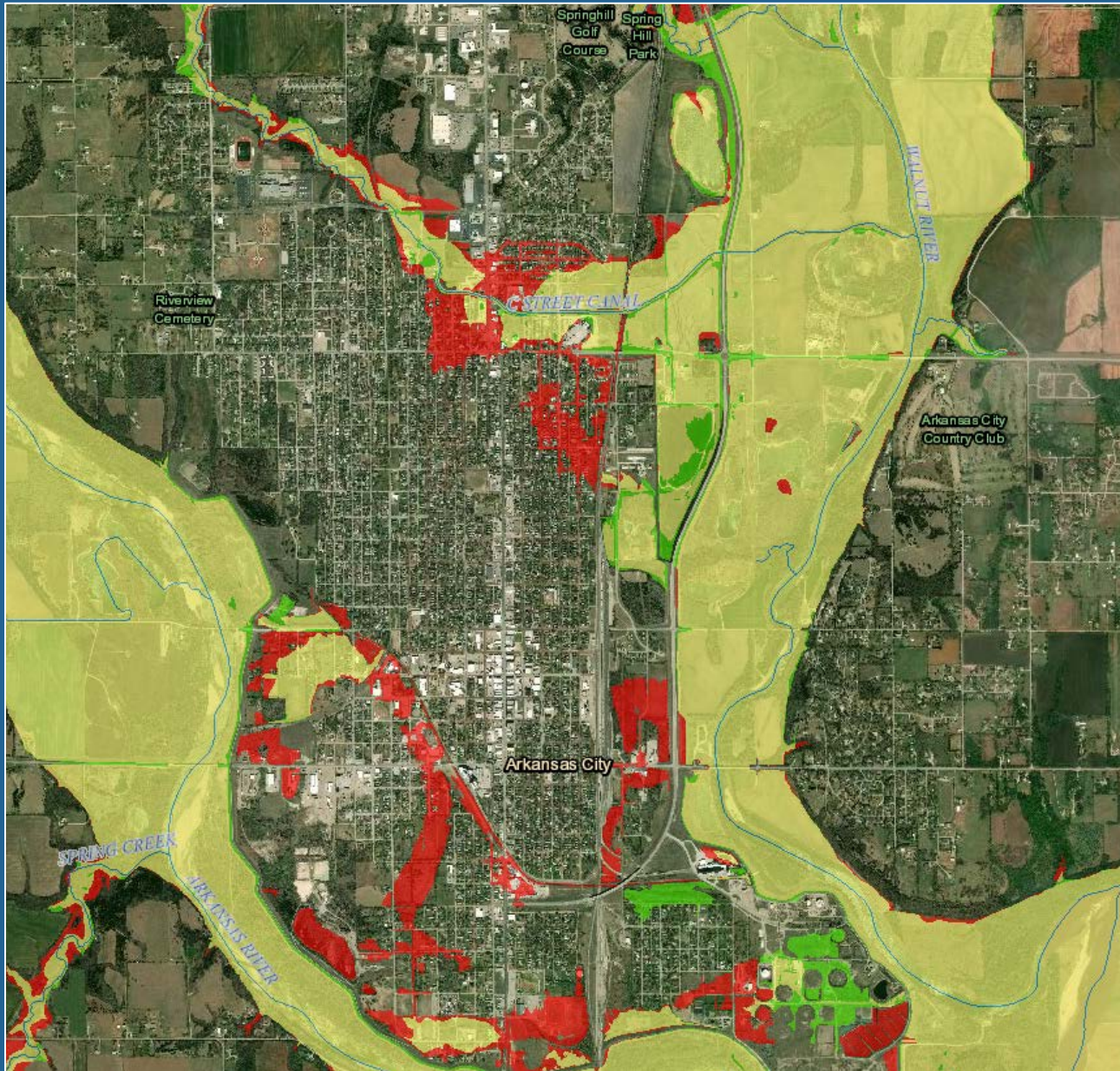
# Augusta



# Andover



# Arkansas City



# BLE Levee's

## ▶ 4 Levee Systems Initially Identified

- ▶ El Dorado, Augusta, Winfield, and Arkansas City

## ▶ Methods

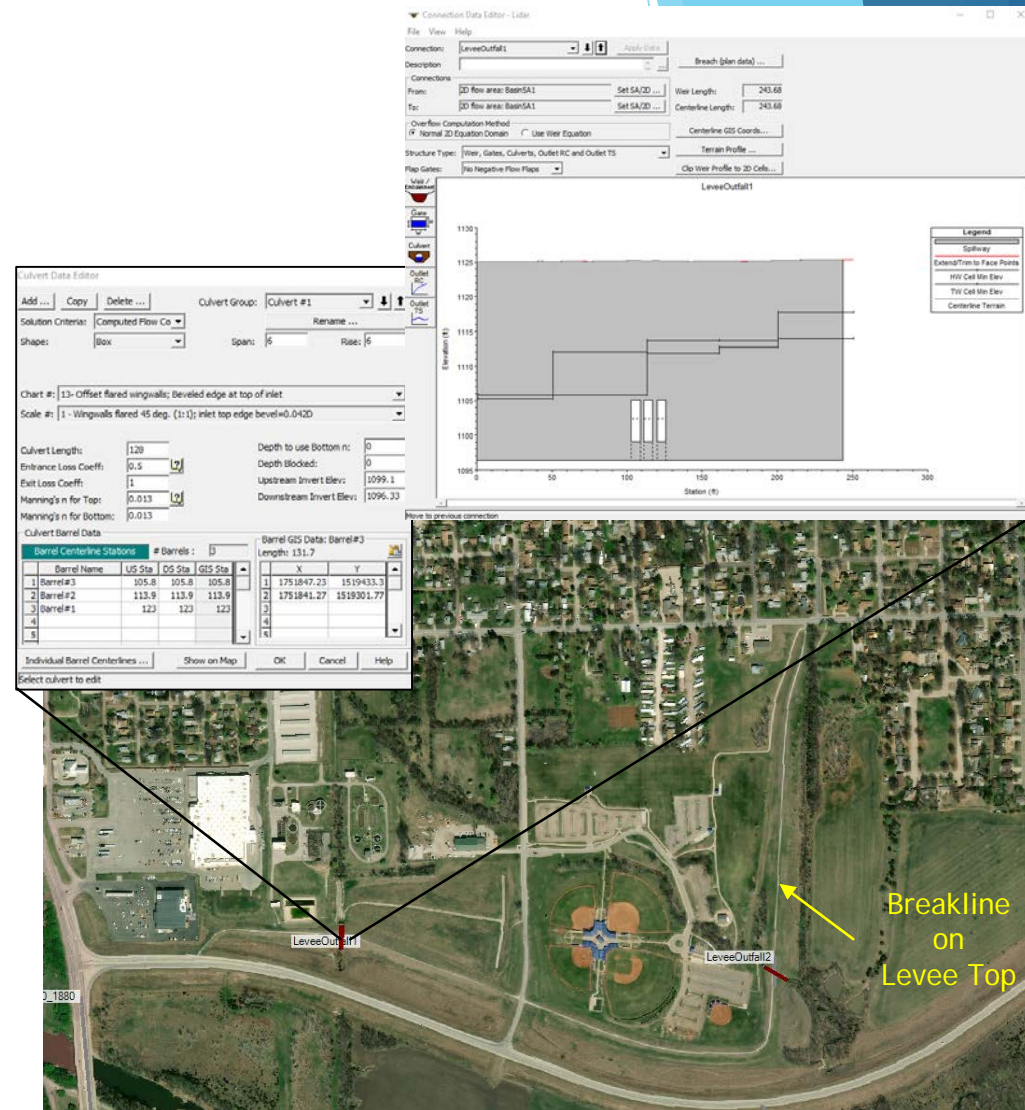
- ▶ Estimated closure structures input to prevent backwater.

- ▶ Including Floodwalls.

- ▶ Interior ponding allowed based on timing of river stages using flap gates in model.

## ▶ Future Methods

- ▶ Each levee will be further evaluated.
- ▶ Levee's may be eligible for provisional accreditation, may require recertification, or remain certified as is.



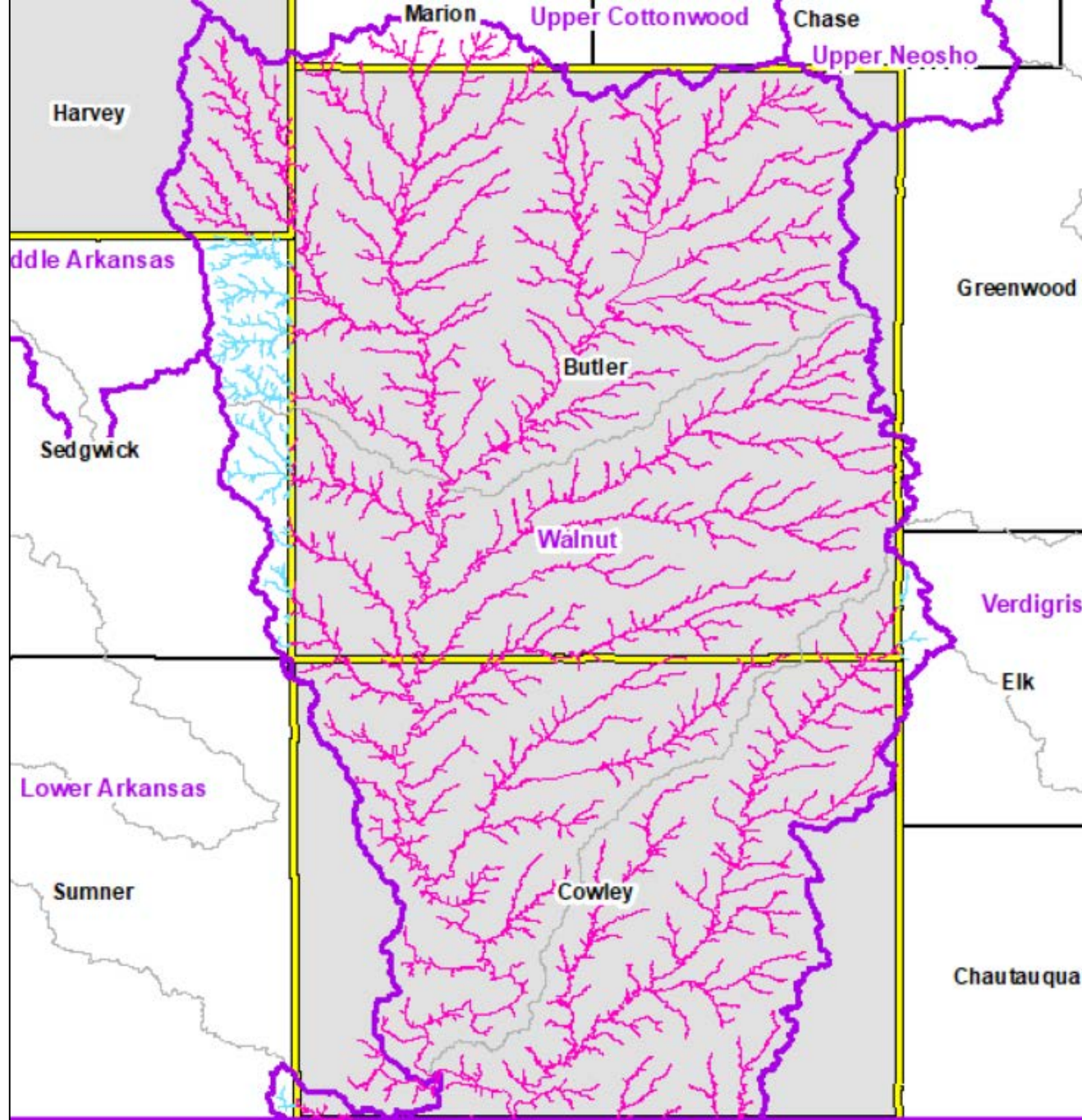
Example BLE Levee Structure

# Planned Regulatory Updates

— Planned Update

— No Planned Update

 \*County-wide Update





# What is Data Development?

- ▶ Engineering Modeling & Mapping used for Regulatory Update
  - ▶ Includes all streams with a drainage area of at least 1-square mile, or were previously mapped.
- ▶ Considerations include:
  - ▶ Enhancements to BLE, including additional model calibration
  - ▶ Additional rainfall-runoff modeling for calibration purposes
  - ▶ Consideration of historical flooding events and other local data
  - ▶ Field-measured survey of structures, where specified
  - ▶ Robust review internally and externally
  - ▶ Considers and addresses community review comments

# Hydrology Methods

## Rainfall Runoff Modeling

- ▶ Models that mimic the characteristics of a watershed.
  - ▶ NWS Rainfall History
  - ▶ Infiltration (soils, pervious surfaces)
  - ▶ Storage (dams or other sinks)
  - ▶ Timing / Routing (how fast does water get from A to B)
- ▶ Two modeling options:
  - ▶ 2D Hec-Ras model, “excess rainfall-on grid”
    - ▶ Used for BLE models
  - ▶ HEC-HMS models used for calibrating/validating 2D flow results

# Hydrology Methods

## Gage Analysis

- ▶ Statistical analysis of a stream's flow history.
- ▶ What has happened in the past.
- ▶ Used for calibrating/validating 2D flow results

## Regression

- ▶ USGS Equations
  - ▶ These were primarily used for Approximate Studies in the past
- ▶ Used for comparisons to 2D flow results

# Hydraulic Methods

**Will use the 2D BLE models as Base Model**

Modeling that considers:

- ▶ Slope
- ▶ Friction
- ▶ Structures (culverts and bridges)
- ▶ Sinuosity
- ▶ Areas on non-conveyance (ineffective flow)
- ▶ Other variables affecting water conveyance

# Data Development Scope

- ▶ Zone AE
  - ▶ Culvert and Bridge Openings are included in the modeling
  - ▶ Added detail to Breaklines and Land Cover Data in the modeling
  - ▶ Additional Calibration to:
    - ▶ Gage Analysis
    - ▶ Rainfall-Runoff Modeling (HEC-HMS)
    - ▶ Historical Information
  - ▶ Can be with or without a floodway
    - ▶ If there is a current floodway, must have a floodway
    - ▶ If there is not a current floodway, a floodway is optional

# Data Development Scope

- ▶ Zone AE
  - ▶ Base Flood Elevations (BFEs) will be shown on the regulatory map
  - ▶ Floodway, if scoped, will be shown on the regulatory map
  - ▶ Water Surface Elevation and Depth Grids will be generated
- ▶ Note that a current Zone A area could also be enhanced in similar ways to the Zone AE, but can stay a Zone A on the map (Enhanced Zone A)

# Data Development Scope

- ▶ Static Zone AE
  - ▶ Statistical analysis of:
    - ▶ Historical operation of the dam/reservoir
    - ▶ Operational information of the dam/reservoir
    - ▶ Utilizes all available sources
      - ▶ USGS Gage Information
      - ▶ USACE Information
      - ▶ Rainfall-Runoff Modeling (HEC-HMS)
  - ▶ Base Flood Elevations (BFEs) will be shown on the regulatory map
  - ▶ Water Surface Elevation and Depth Grids will be generated

# Data Development Scope

- ▶ Zone A
  - ▶ Additional Calibration to:
    - ▶ Gage Analysis for watershed
    - ▶ Rainfall-Runoff Modeling (HEC-HMS) in watershed
    - ▶ Historical Information
  - ▶ No Base Flood Elevations (BFEs) on the regulatory map, but available
  - ▶ Water Surface Elevation and Depth Grids generated



# Data Development Scope

## Hydrologic Analysis Performed

	Zone AE w/ Floodway	Zone AE w/o Floodway or Enhanced Zone A	Static AE	Zone A
Regression	For Comparison	For Comparison	N/A	For Comparison
2D Excess Rainfall on Grid	Performed	Performed	N/A	Performed
Gage Analysis	For Calibration, when Available	For Calibration, when Available	Performed, when Available	For Calibration, when Available
HEC-HMS	For Calibration, when scoped (specific area)	For Calibration, when scoped (specific area)	Performed, when scoped	For Calibration, when scoped (in watershed)

# Data Development Scope

## Hydraulic Analysis Performed & Mapping

	Zone AE w/ Floodway	Zone AE w/o Floodway or Enhanced Zone A	Static AE	Zone A
Enhancements	Breaklines, Land Cover Data, Areas of Concern per Comments	Breaklines, Land Cover Data, Areas of Concern per Comments	Statistical Analysis, Areas of Concern per Comments	Areas of Concern per Comments
Structure Data	Survey Information Incorporated	Field-Measured Information Incorporated	Field-Measured or Plan Information Incorporated	Simulated in topography
Floodway Analysis	Performed	Not Performed	Not Performed	Not Performed
Base Flood Elevations	Shown on Map	Shown on Map	Shown on Map	Not Shown on Map

# Project Timeline

- ▶ Project Kickoff & Initial Map Review
  - ▶ Meeting - December 12, 2019
  - ▶ Community Review of BLE floodplains- Until January 12, 2020
  - ▶ Community Input on Data Development Scope- Until January 12, 2020
  - ▶ Identify Community Mapping Needs and Concerns
- ▶ Walnut Discovery meeting- ~March 2020
  - ▶ Data Collection from Community
  - ▶ Mitigation Discussion
  - ▶ Identification of Technical Assistance needs

# Project Timeline

- ▶ Data Development Tasks (Butler, Cowley, Harvey Counties)- Estimated for 2021 or 2022
  - ▶ Base Map & Topography
    - ▶ Streets, PLSS, political boundaries, LiDAR
  - ▶ Perform Field Measurements on specific structures
  - ▶ Hydrology & Hydraulics (Modeling Enhancements)
  - ▶ Floodplain Mapping & FIRM Database Updates
  - ▶ Community and Public Review Periods
- ▶ Preliminary Map Products
- ▶ Post-Preliminary Processing

# Technical Review

BLE and Draft Regulatory Floodplains have:

- ▶ Wood E&IS Review
  - ▶ Engineering reviewed by separate Wood E&IS office
- ▶ Independent Technical Review (ITR)
  - ▶ 3<sup>rd</sup> party review of engineering
  - ▶ AECOM
- ▶ KDA Review
  - ▶ Visual review
  - ▶ “eye test”
  - ▶ Identify impact of the map

Draft Regulatory Floodplains also have a FEMA Review

- ▶ Formal quality review process of regulatory products

# Community Review

- ▶ This is your first opportunity to provide valuable input and to look out for your community.
- ▶ Consider coordinating Community Working Groups for this review
- ▶ A review web map has been provided for submitting comments

Comments are public facing (FYI)

- ▶ 30 day period to review and comment

# Community Review

- ▶ Review of Base Level Engineering (BLE) Data
  - ▶ Do the floodplains seem appropriate?
  - ▶ Are there areas of new development that aren't represented in the mapping (constructed after Lidar was flown)
  - ▶ Are there areas where enhancements appear to be needed for Regulatory Updates?
  - ▶ Keep in mind that this early BLE floodplain data is subject to change and we are at the very early stages of developing the data
    - ▶ Another round of Community Review will Occur after Data Development at the **Flood Risk Review (FRR) Meeting**

Legend

### Floodplain Data

Draft Changes Since Last FIRM 12-2-2019

- Floodplain Increase
- Floodplain Decrease
- Floodplain (neither increase or decrease)

### Comments



Layers (Click to expand)

Editor

Leave Comment

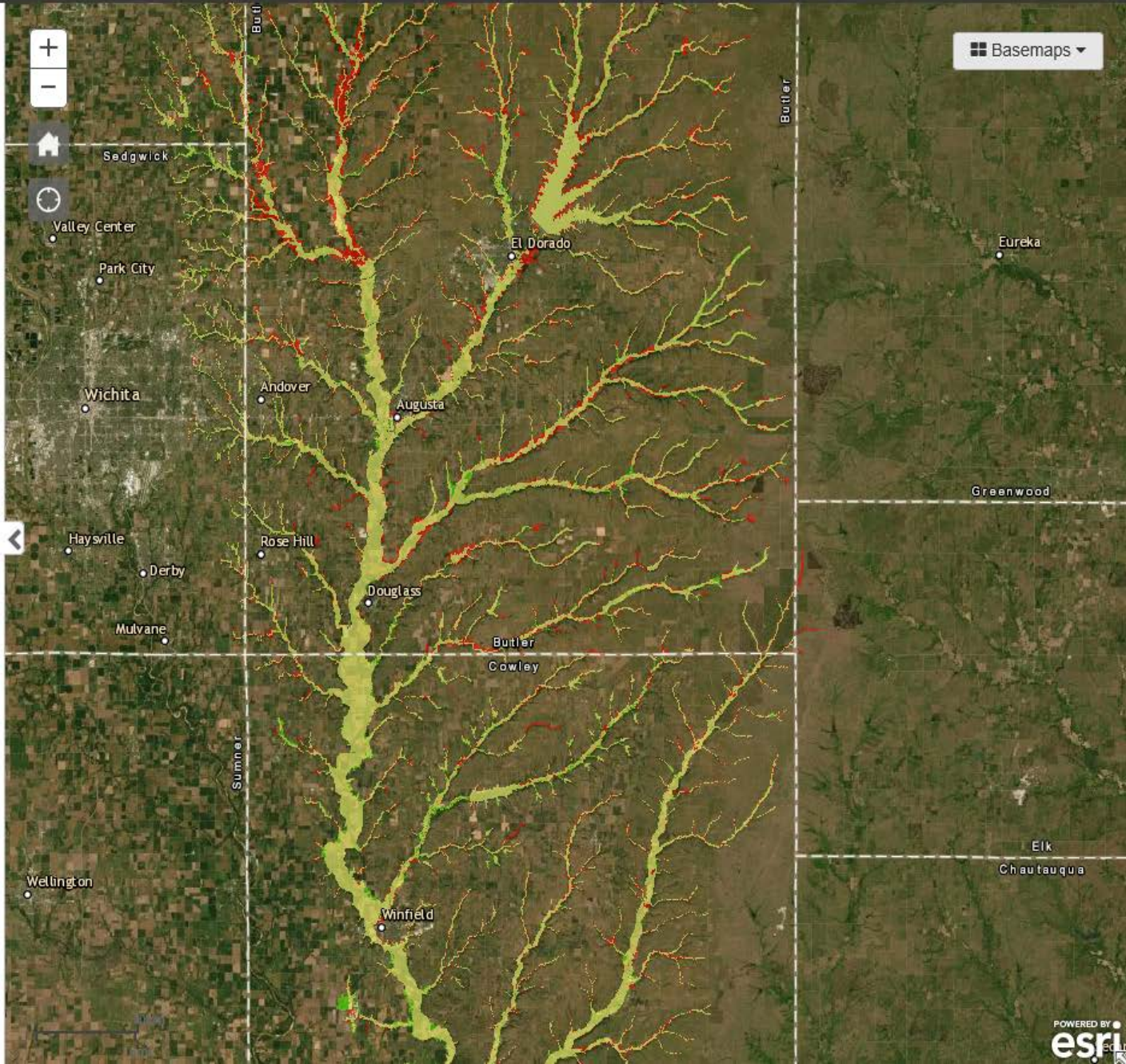
Draw →

Measurement →

Print →

Directions →

Google Street View →



Basemaps



# Base Flood Elevation Portal



## Kansas Base Flood Elevation Portal

[Home](#)[About](#)[Help](#)

### Portal Registration

First Name	<input type="text"/>
Last Name	<input type="text"/>
User name	<input type="text"/>
Title	<input type="text"/>
Phone	<input type="text"/>
Email Address	<input type="text"/>
Address	<input type="text"/>
City	<input type="text"/>
Zip	<input type="text"/>
State	<input type="text" value="Kansas"/> <input type="button" value="v"/>

For Zone A Floodplains, you can request BFE Data. Keep in mind, BLE data is subject to change.

# Ultimate Project Goals

- ▶ Update floodplains in the Walnut Custom Watershed with modern mapping (BU, CL, HV Counties new regulatory mapping).
- ▶ Leave a map that communities BELIEVE.
- ▶ Help communities and residents better understand and prepare for their flood risk.
- ▶ Identify mitigation opportunities.

# KDA Mitigation Technical Assistance

- ▶ Funding has been available in recent years from the KS CTP Grant
  - ▶ Predefined projects & pot of money to allocate when projects are identified
- ▶ Project Types:
  - ▶ Modeling infrastructure improvements to see flooding reductions in SFHA
  - ▶ Benefit-Cost Analysis (BCA)
  - ▶ Structure Based Risk Assessment
  - ▶ Community Outreach and Education - Story Maps, Virtual Reality (VR)

# KDA Mitigation Technical Assistance

- ▶ Timeline: Ideally performed during Base Level Engineering (BLE), Discovery or Data Development Phase
- ▶ Cannot fund the improvement project itself
- ▶ Website for Technical Assistance Projects
- ▶ Includes project specific information
- ▶ Link to fillable request form
  - ▶ <https://www.agriculture.ks.gov/divisions-programs/dwr/floodplain/mapping/technical-assistance>

[Kansas Floodplain Map Viewer](#)

[LOMC Search](#)

[Mapping Projects](#)

[Technical Assistance](#)

[Home](#) > [Divisions & Programs](#) > [Division of Water Resources](#) >

[Floodplain Management](#) > [Mapping](#) > [Technical Assistance](#)

## Technical Assistance

### TECHNICAL ASSISTANCE PROJECTS

- [Gypsum](#)
- [Hoisington](#)
- [Solomon](#)
- [South Hutchinson](#)
- [Topeka](#)

### TECHNICAL ASSISTANCE INFORMATION

FEMA Funds for technical assistance projects have come available in recent Cooperating Technical Partner (CTP) funding cycles. These projects do not include funding for construction of projects, but they can be utilized for modeling mitigation scenarios for possible projects. These funds can be applied for grant-related purposes, ordinance or code support, engineering and analysis, planning, outreach and education. Communities within Kansas can apply for Technical Assistance support through KDA, though priority will be given where there are active [mapping projects](#). For questions, please contact Tara Lanzrath, by phone at 785-296-2513 or [email](#).

[Technical Assistance Request Fillable Form](#)

# What Should You Do Next?

## ▶ Initial Map Review

- ▶ Review BLE floodplains and comment
- ▶ Review stream extents and comment
- ▶ Provide information on community needs or areas of specific concern.
- ▶ Provide input on scope for Regulatory Updates

## ▶ Organize Working Groups

## ▶ Consider Mitigation Projects

- ▶ Should a Technical Assistance Request be submitted?
- ▶ Should other Mitigation Projects be initiated

# Stay Informed

## ▶ Email List

- ▶ Get us names, addresses, and titles
- ▶ Will be main source of project updates

## ▶ Project Updates

- ▶ Minimum of quarterly
- ▶ When important milestones are reached
- ▶ When action is necessary (reminders)

## ▶ Meetings

- ▶ 5 planned in-person meetings
  - ▶ Kickoff, Discovery Meeting, Flood Risk Review, Open House, Post-Preliminary CCO meeting
- ▶ Others as needed

# Online Project Information

## ▶ Web Review Map -

- ▶ Initial Map Review
- ▶ [Web Map link provided to stakeholders](#)

## ▶ Story Maps

- ▶ Project Info
- ▶ "Floodplain Current": Mapping Process 'Nuts and Bolts'

## ▶ Project Website (When Available)

- ▶ Scoping Maps, Project Timeline, Meeting Presentations, Newsletters, Technical Reports, Web Review Map
- ▶ <https://www.agriculture.ks.gov/divisions-programs/dwr/floodplain/mapping/mapping-projects/lists/mapping-projects/>



# Key Takeaways

- ▶ The Process is going to take time
- ▶ The Community's Involvement will help us produce better maps!
  - ▶ Get out the word and encourage participation in this project
  - ▶ Review information as it becomes available

**DON'T HESITATE TO CALL, WE ARE AVAILABLE**

# Web Map Review and Discussion

# Q & A

Tara Lanzrath

Floodplain Mapping Coordinator  
Kansas Department of Agriculture  
Division of Water Resources

785-296-2513

[tara.lanzrath@ks.gov](mailto:tara.lanzrath@ks.gov)