Middle Kansas Working Group Workshop

Middle Kansas Watershed RiskMAP Project

Kansas Division of Water Resources

THANK YOU FOR COMING!

- This meeting is the Kickoff to a project to replace the remaining invalid floodplain mapping in the Middle Kansas Watershed.

- Community participation is important because the results of **this project will affect your communities for many years (maybe decades?).**

- **Working Groups are not required.** Manage your groups as you see fit.

- **This should be informal and interactive.**

INTRODUCTIONS

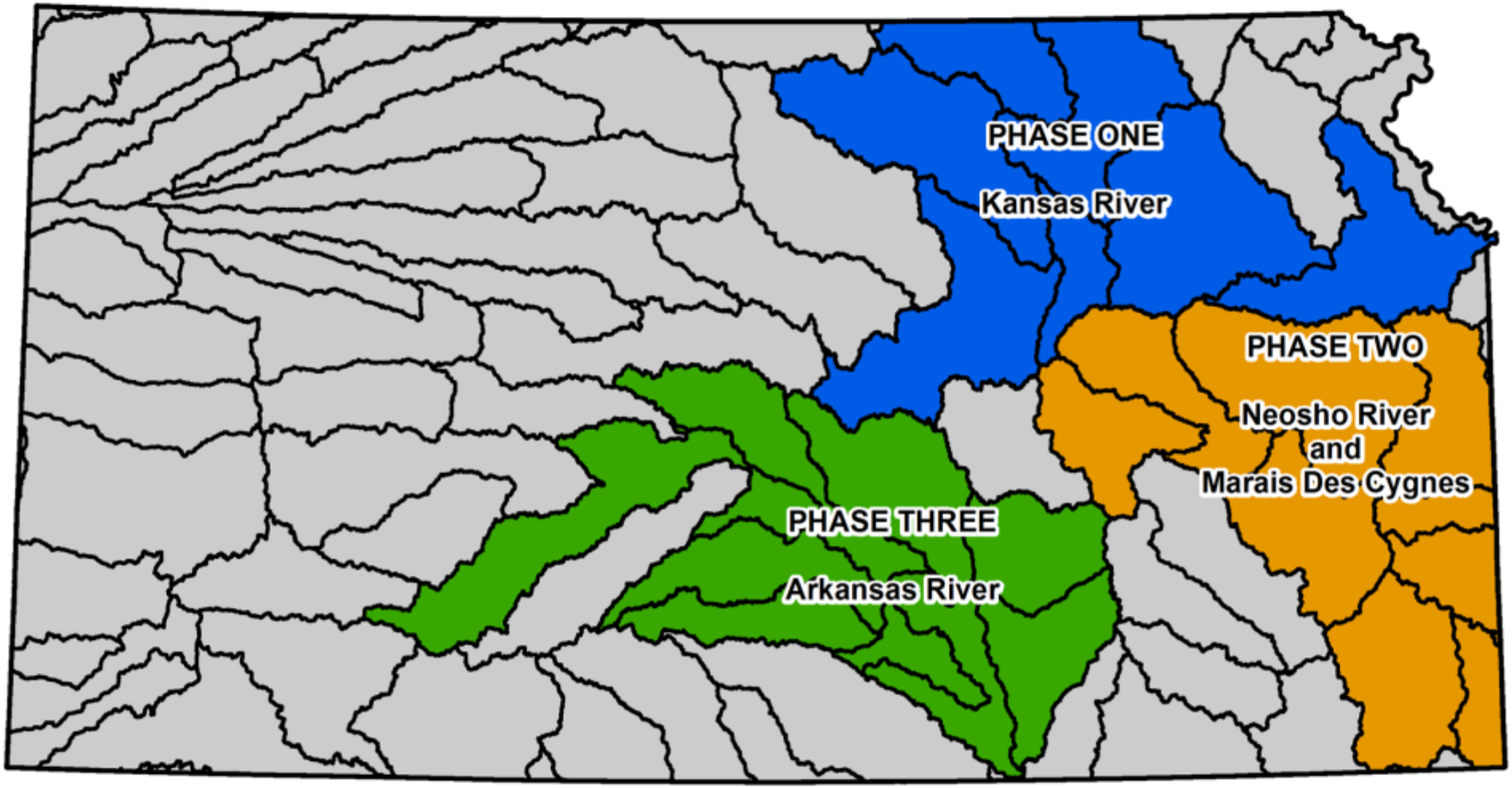
AGENDA

- Intro
- Floodplain Mapping 101
- Project Overview
- Project Timeline
- Working Group Tasks
- Q&A

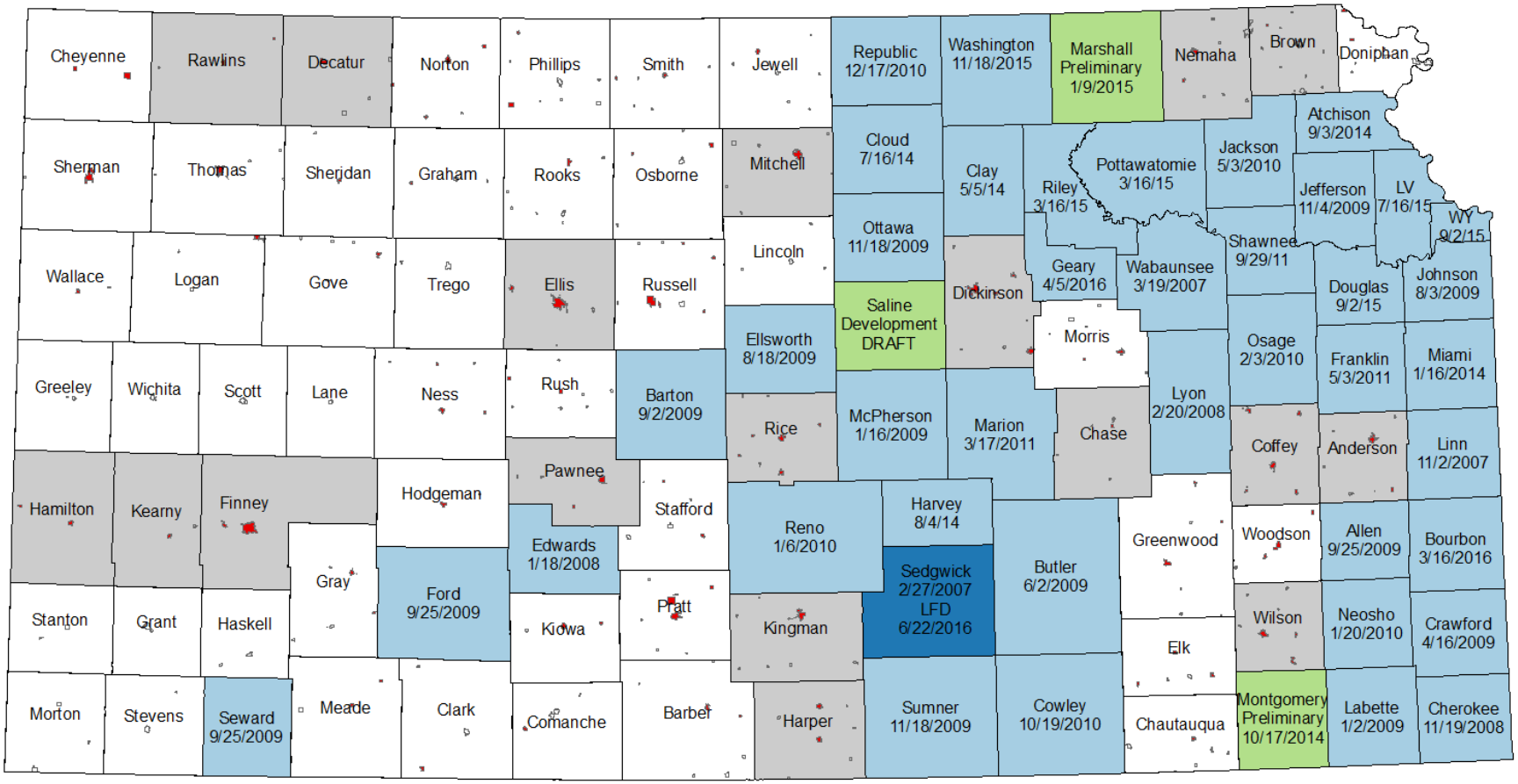
WHY?

- **Watershed "Discovered" in 2015**
  - Discovery Meeting – Nov 19, 2015 - Wamego
- **Outdated Engineering**
  - LiDAR (Wabaunsee County)
  - Hydrology
  - Invalid in CNMS (FEMA database)(Wabaunsee County)
- **Community Involvement** – City of Wamego, Wabaunsee County
- **Fits into our Risk MAP phased approach**

RiskMAP Phased Approach



Kansas Floodplain Mapping Status



WHY? – Purpose Of Project

- 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.

What Is Risk MAP?

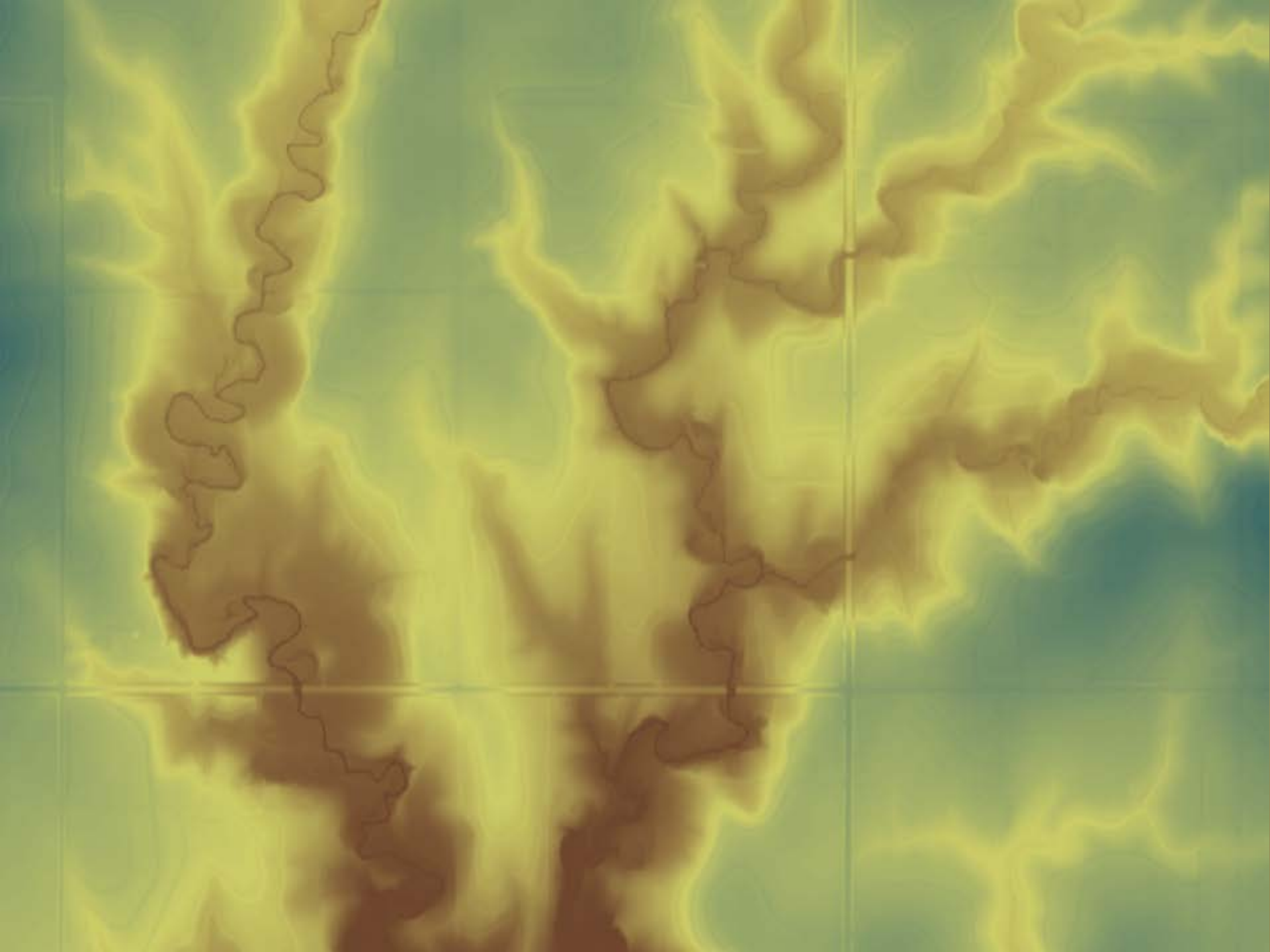
- Risk Mapping Assessment and Planning
- Federal Emergency Management Agency (FEMA) Program that provides communities with flood information and tools they can use to enhance their mitigation plans and take action to better protect their citizens.
- It's what they call the floodplain mapping program at the moment

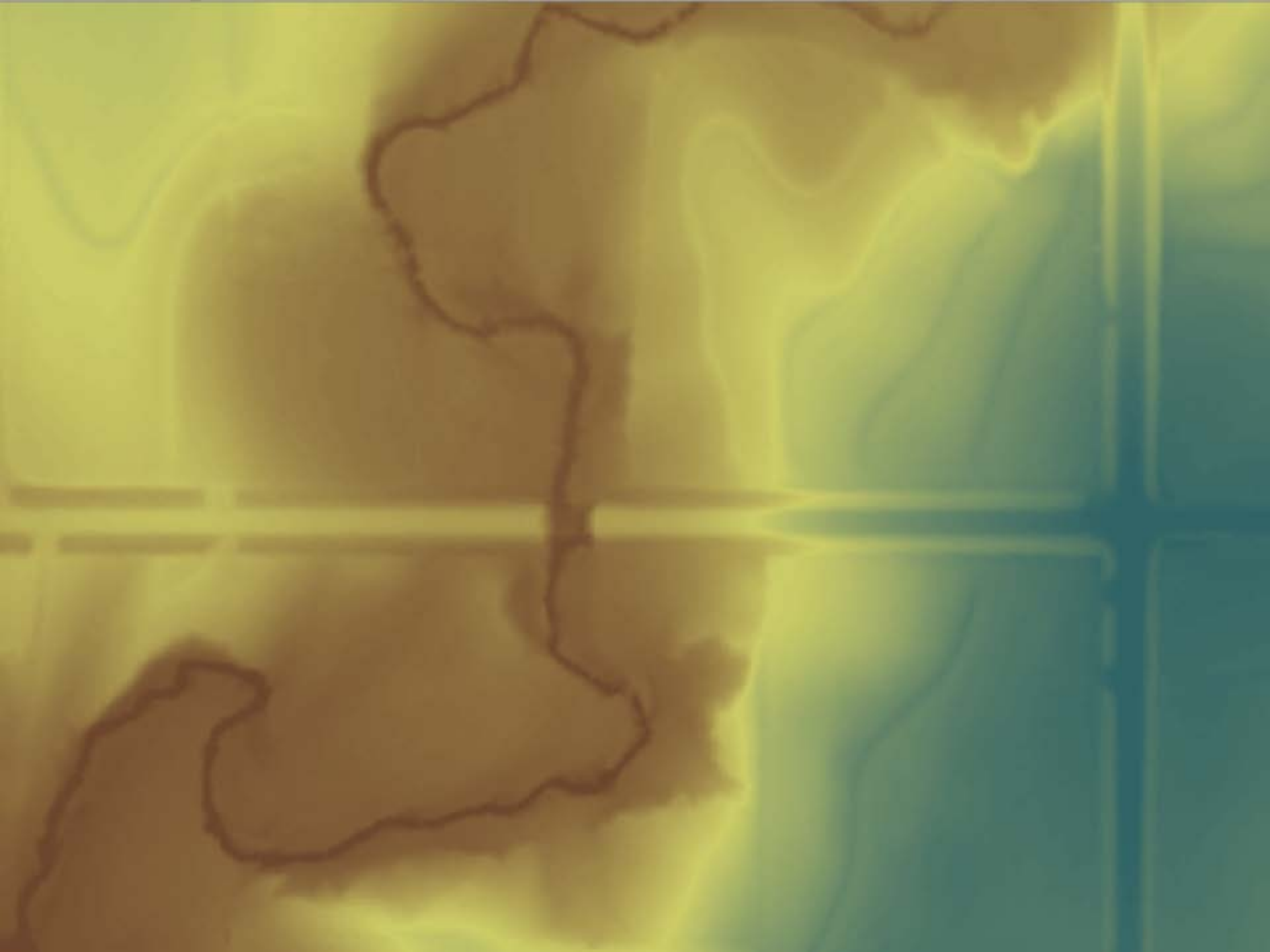
Why Working Groups?

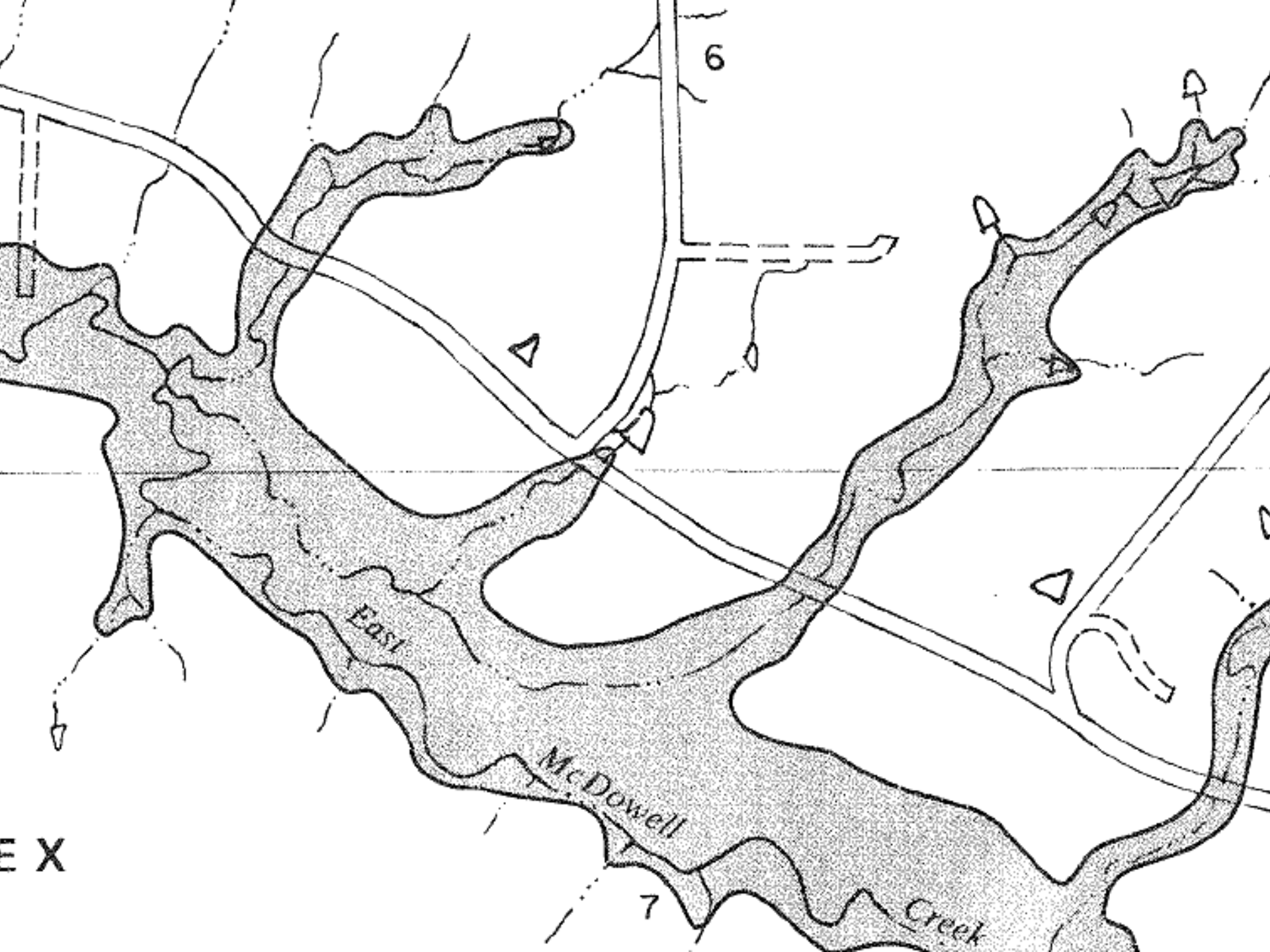
- To ensure your community is represented
- To ensure your residents are aware
- To make the best map possible
- To provide local knowledge and input
- To address problems or inaccuracies early
- To ensure **YOU BELIEVE THE MAP**
- To work towards mitigating risk
- To improve floodplain management locally

How Will This Map Be Different?

- **All New Engineering**
  - All streams in the Middle Kansas watershed within Wabaunsee County
  - East Unnamed Tributary (City of Wamego)
  - Modern methodology
- **LiDAR Topography**
- **Non-Regulatory Products**

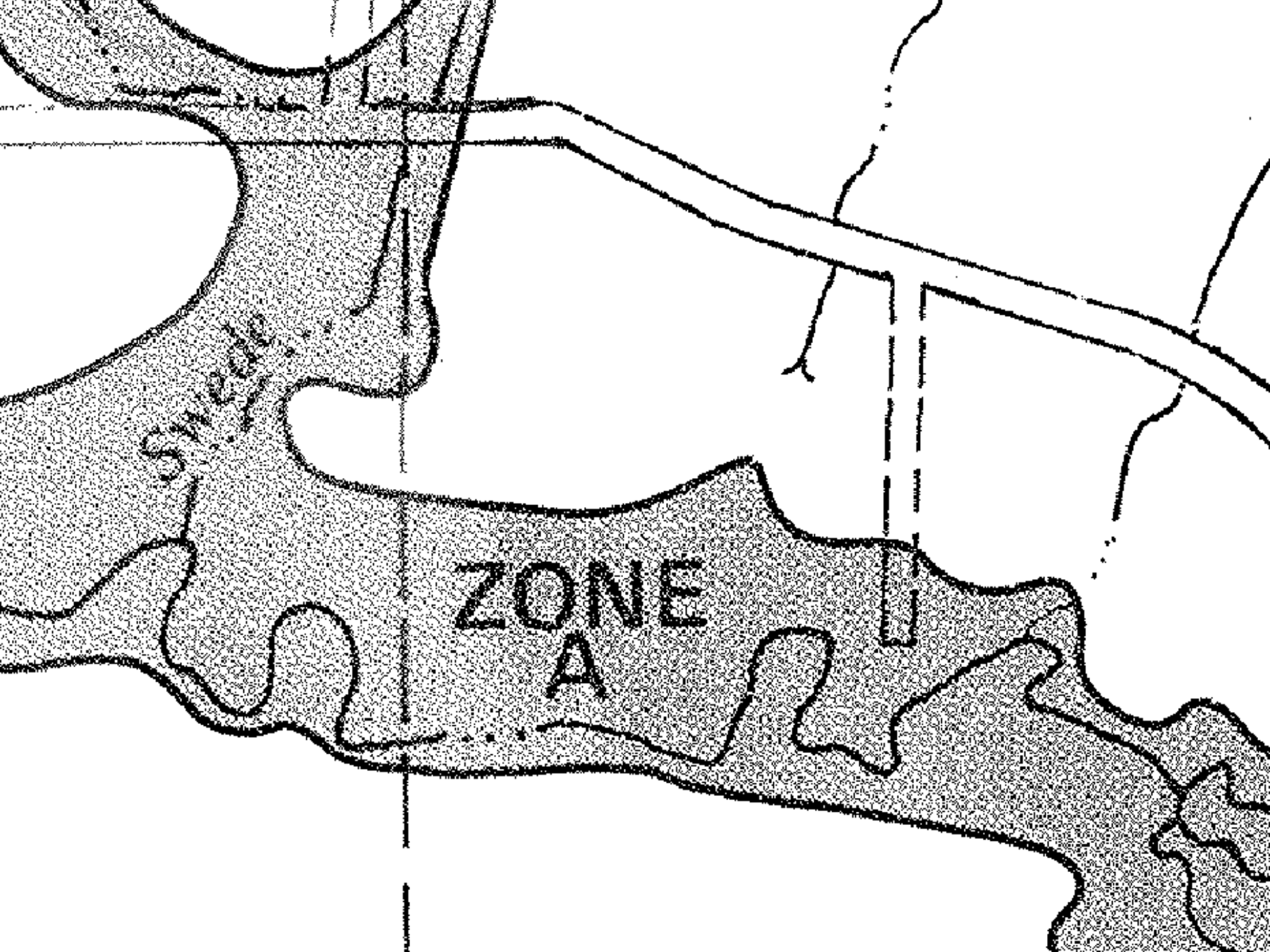






EX

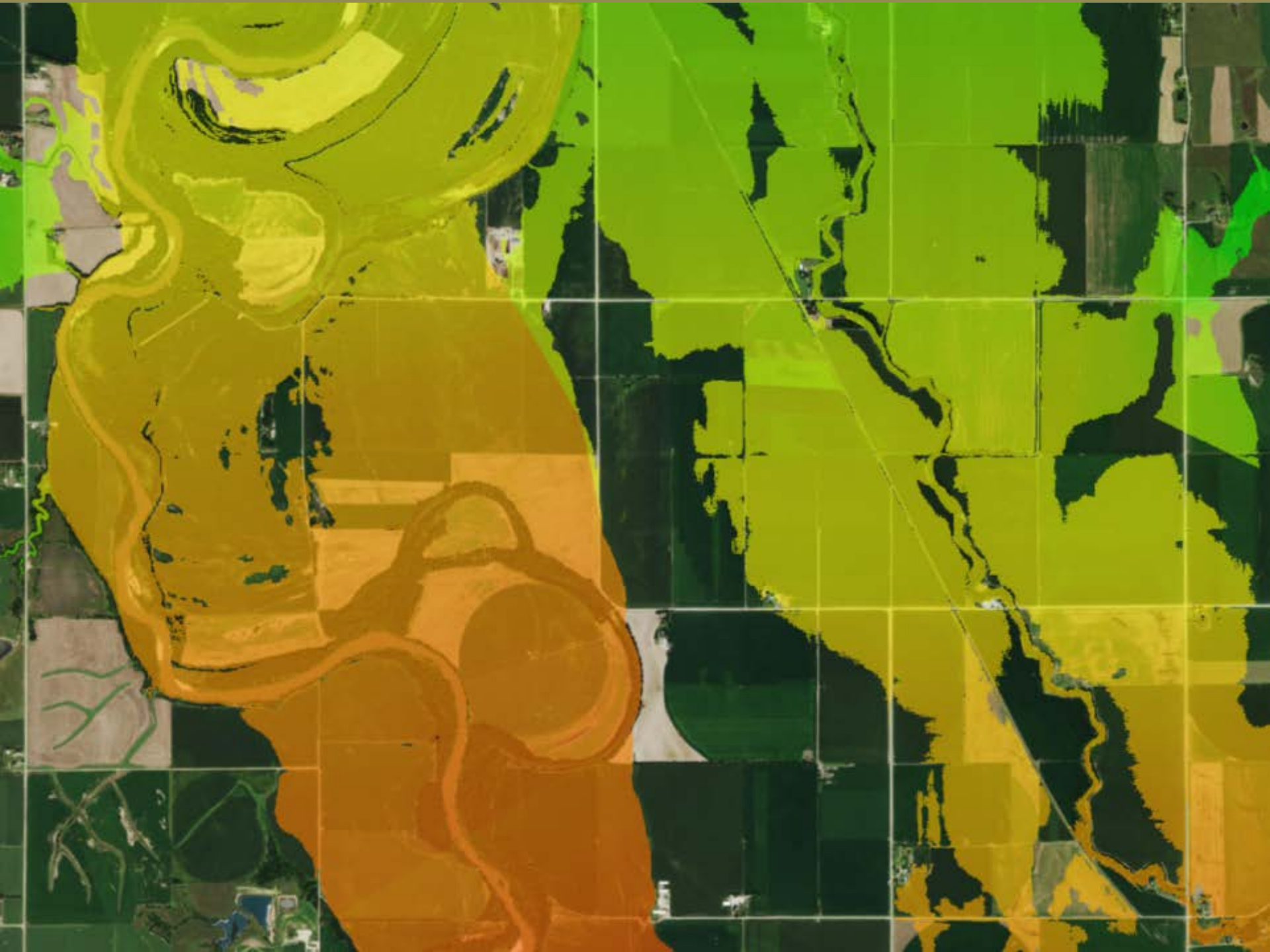
1220.1
1250.3
1198.2
1188.3
1179.3
1181.7
1182.7
1223.2
1219.6
1205.5
1200
1185.3
1190.8
1191
1214.3
1202.9
1199.8

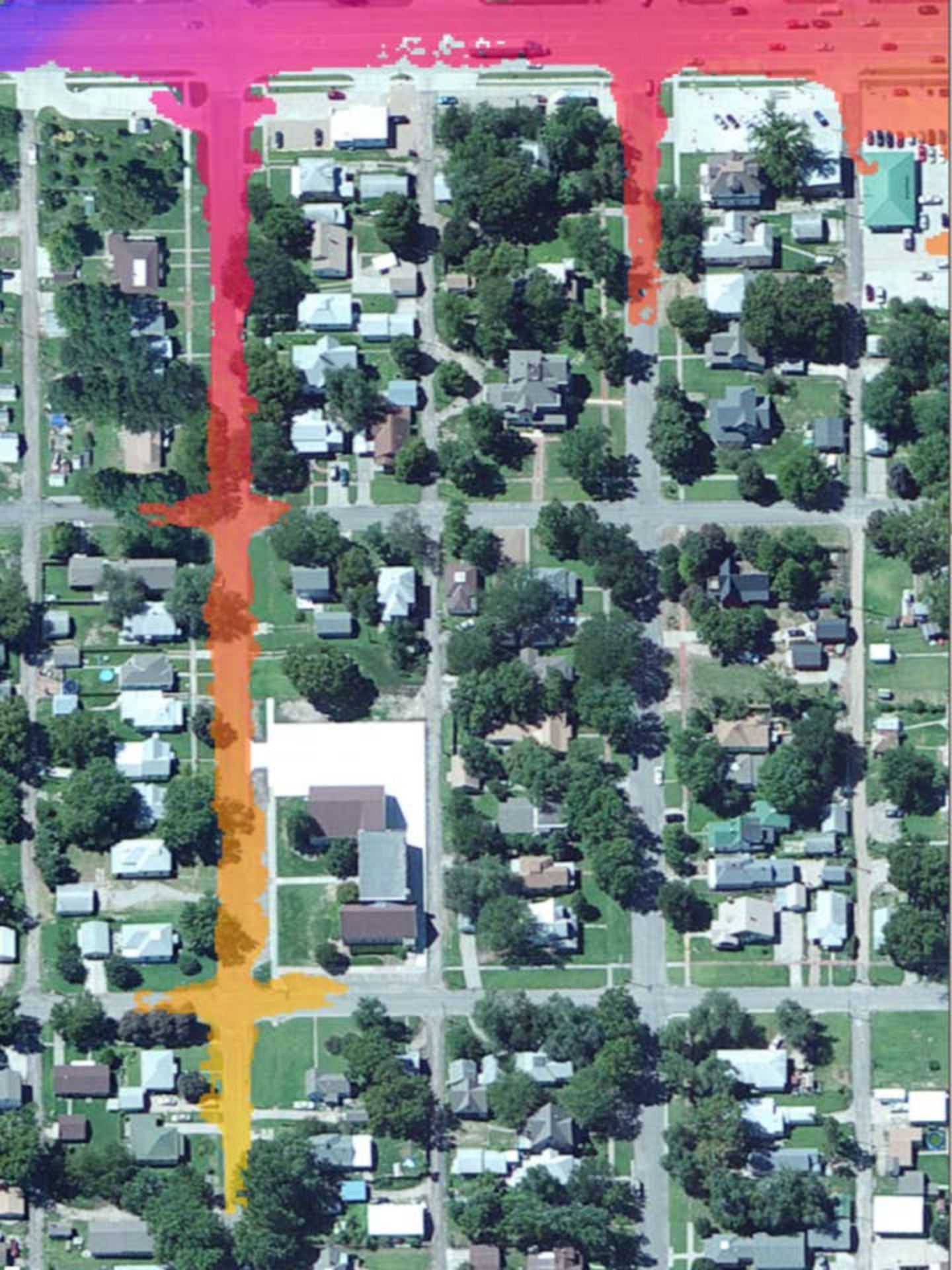

ZONE
A

1181.4
1176.2
1171.9

1171.3
1172.7
1173.9
1177.1
1179.3

1177.1





Floodplain Mapping 101

Basic Terms

- **Base Flood Elevation (BFE)** – The top of water elevation of the 1% flood in a specific location.
- **Flood Insurance Rate Map (FIRM)** – FEMA flood insurance maps
- **Flood Insurance Study (FIS)** – Documents information about flood hazard and the methods used to create a FIRM.
- **Special Flood Hazard Area (SFHA)** – The Regulatory Floodplain (1% Floodplain)

Basic Terms (Cont)

- **1% Flood (100 year flood)** – Flood with a 1% annual chance of occurring.
- **.2% Flood (500 year flood)**
- **Zone A –** Flood Zone developed with approximate methods.
- **Zone AE –** Flood Zone developed with detailed methods.
- **Zone AH/AO –** Shallow flooding areas from sheetflow or ponding.

Basic Terms (Cont)

- **H&H** – Hydrology and Hydraulics
- **HEC-RAS** – Hydraulic modeling software developed and updated by the US Corps of Engineers
- **Discharge** – Quantity of water flowing within a stream. Measured in CFS
- **CFS** – Cubic Feet per Second (ft^3/sec)
- **Topography** – Ground surface. Determines the shape of floodplains
- **Floodway** – Area reserved for flood conveyance

Data Development Tasks

- Acquire Base Map
- Acquire Topography
- Perform Field Survey
- Develop Hydrologic Data (Hydrology)
- Develop Hydraulic Data (Hydraulics)
- Perform Floodplain Mapping
- Develop DFIRM Database

Hydrology

How Much Water

The Hydrology study determines the peak discharge for the 1% event.

So…..how much water is flowing down the stream during the 1% flood.

Hydrology Methods

- **Detailed Hydrology**
  - **Gage Analysis**
    - Statistical analysis of a stream's flow history.
    - What has happened in the past.
  - **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)
      - HEC-HMS (software used for hydrologic modeling)

Hydrology Methods

- **Approximate Hydrology**
  - **Regression**
    - Uses equations developed for specific regions to estimate stream discharge.
    - Variables include Drainage Area, Soils, Annual Precipitation
  - **Weighted Regression**
    - Uses same equations as regular regression
    - Result is compared to results of detailed hydrology in same location or similar location
    - Result is weighted to match detailed results.

Hydrology

Storage

- Where will storage be considered in detailed hydrologic modeling?
  - Purpose-built flood control structures
  - Behind County/City owned elevated roadways
  - Where inherent in the methodology
    - Valley storage (gage), Routing Methods(rainfall runoff), unsteady modeling, 2D modeling
- Where will it not be considered?
  - Farm ponds
  - Behind private elevated features

Hydraulics

How High The Water Will Get

The Hydraulic study determines the water surface elevations on streams during the 1% event.

So…….hydraulics models the interaction between the water and the channel/ground surface.

Hydraulics

Cross Sections of stream channels are developed at regular intervals along streams and at locations where the channel varies or changes

Variables that will affect the conveyance of water are considered in the model

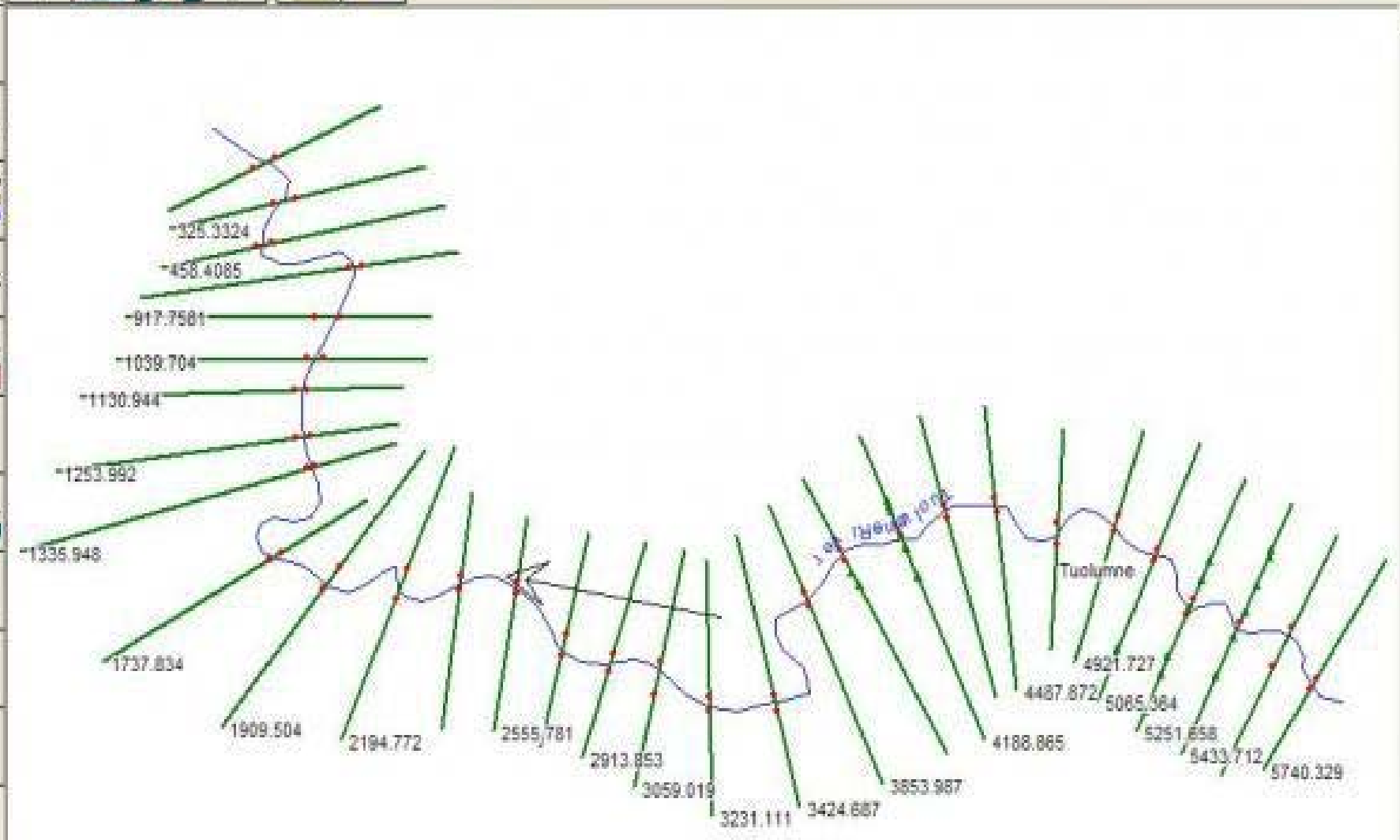
- Slope, Friction, Structures (culverts and bridges)(detailed studies), Sinuosity, Areas of Non-Conveyance (ineffective flow)

Geometric Data - TuolumneGeometry

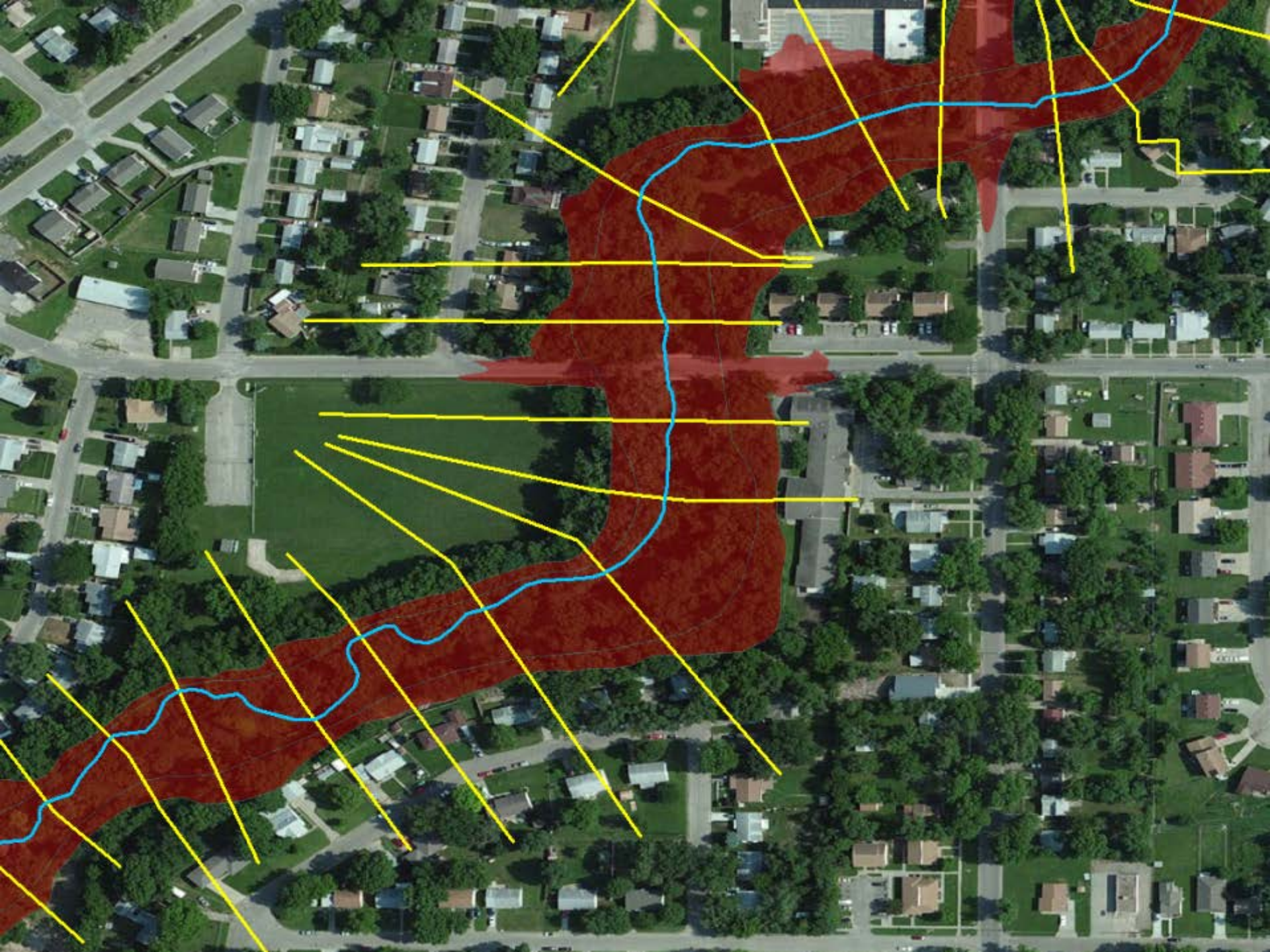
File Edit Options View Tables Tools GIS Tools Help

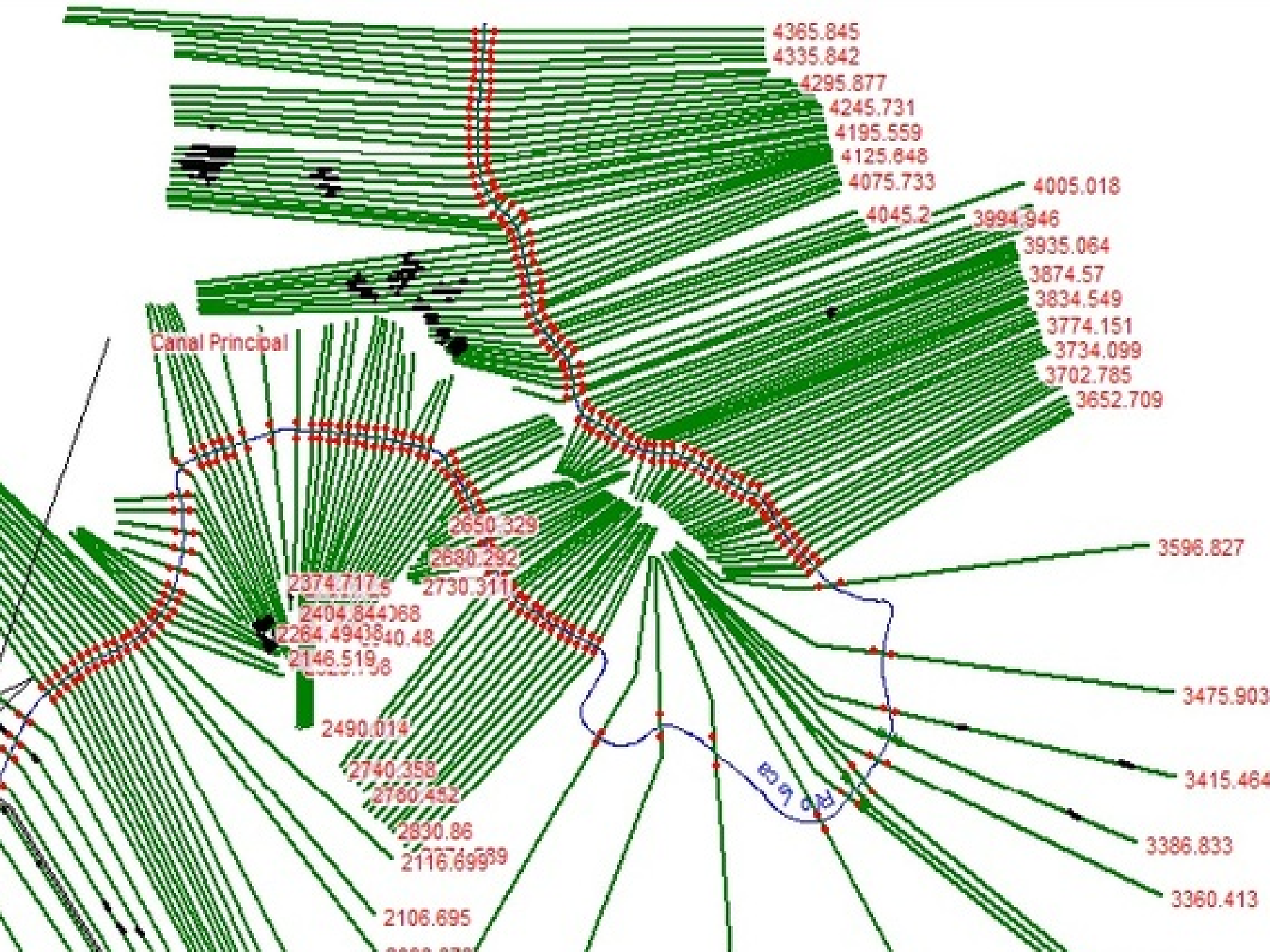
Tools Editors | River Reach | Storage Area | S.A. Conn. | Pump Station | RS 1298 | Description : | Plot WS extents for Profile

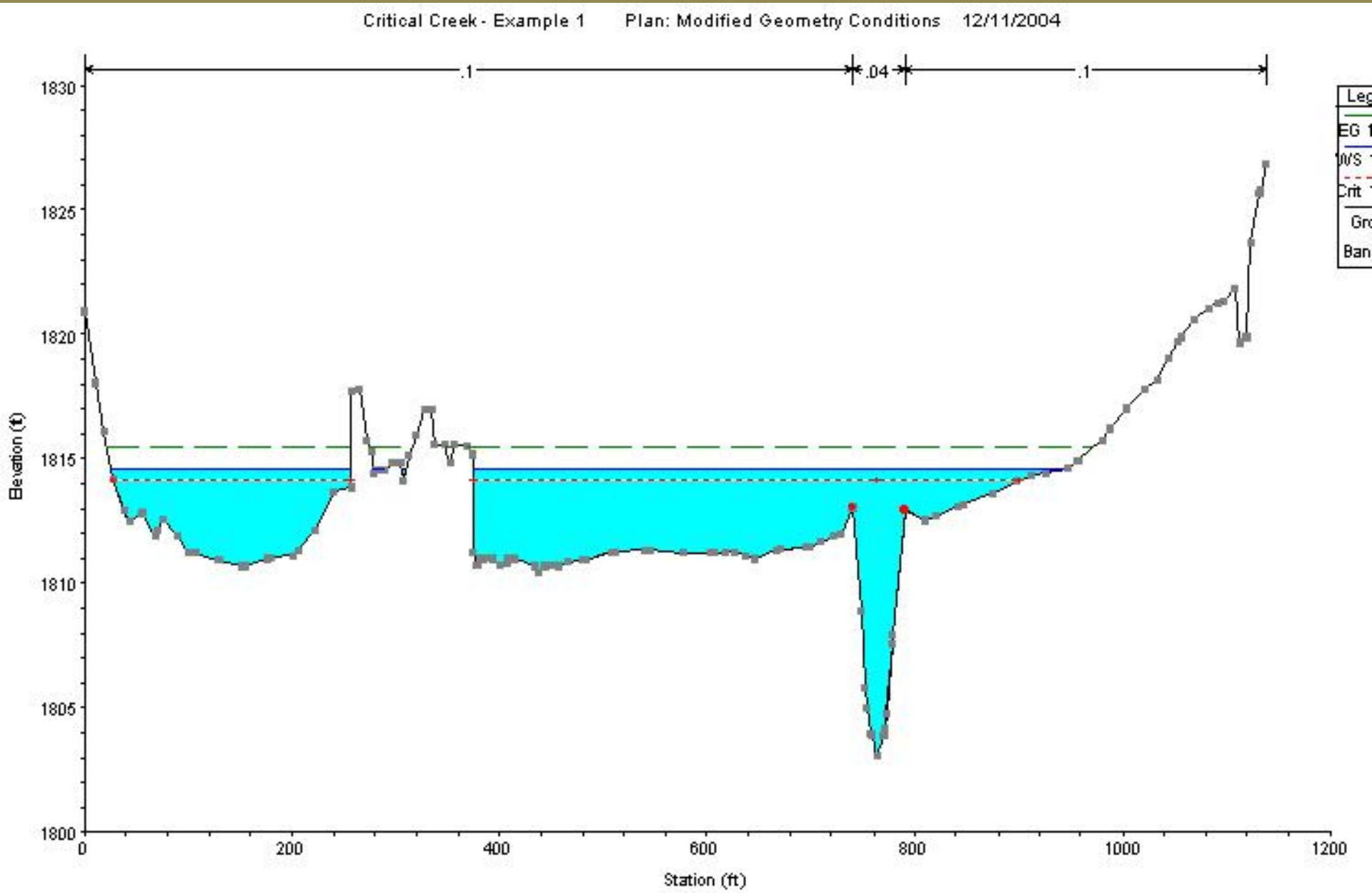
Junct. | Cross Section | Bridg/Culv | Inline Structure | Lateral Structure | Storage Area | Storage Area Conn. | Pump Station | Hfab Param. | View Picture

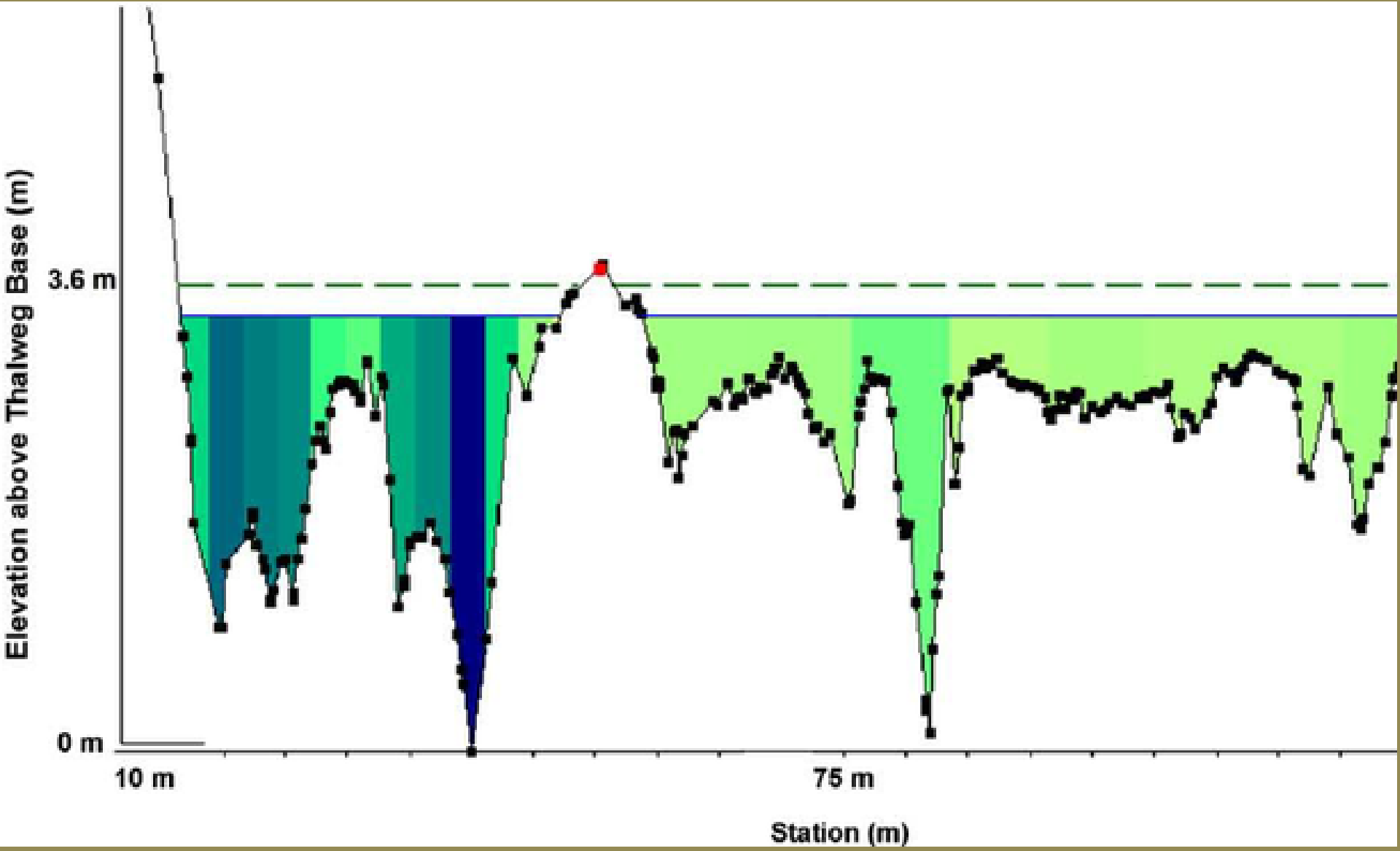


293207.26, 4196046.61




4365.845
4335.842
4295.877
4245.731
4195.559
4125.648
4075.733
4005.018
4045.2
3994.946
3935.064
3874.57
3834.549
3774.151
3734.099
3702.785
3652.709
Canal Principal
2650.329
2680.292
2730.311
2374.717
2404.844
2264.49
2146.519
3596.827
3475.903
2490.014
2740.358
2760.492
2830.86
2116.699
3415.464
3386.833
3360.413
2106.695


Critical Creek - Example 1 Plan: Modified Geometry Conditions 12/11/2004
.1
.04
.1
Elevation (ft)
1830
1825
1820
1815
1810
1805
1800
0
200
400
600
800
1000
1200
Station (ft)


Elevation above Thalweg Base (m)
3.6 m
0 m
10 m
75 m
Station (m)

Hydraulic Methods

- **Detailed Hydraulics**
  - Include more Cross Sections (higher density)
  - Structure elevations are surveyed
  - Typically in urban areas
  - Expensive
- **Limited Detailed Studies**
  - Structures are field measured
  - No Floodway on map
- **Approximate Hydraulics**
  - Fewer cross sections
  - Structures not included in models
  - Typically in rural areas
  - No Floodways

Middle Kansas Project Overview

- Wabaunsee County
  - Zone A - 688
    - Gage – 44 miles
    - Rainfall Runoff – 451
    - Weighted Regression - 190
    - Enhanced Zone A – 3 (City of Paxico)

- City of Wamego
  - Detailed Study – 3 miles
    - Rainfall Runoff
    - Floodway
    - Modeling decisions to be made

Middle Kansas 2016 Mapping Updates

New Zone AE
New Zone AE study will be developed for this stream.
(Wamego)

New Zone AE - LDS
Rainfall-Runoff Hydology will be performed for this stream, and calibrated with local gage information. Survey data will be collected. No floodway will be shown on map.
(Mill Creek, Near Paxico)

Rainfall-Runoff Hydology will be performed for these streams. Survey data will be collected. No floodway will be shown on map.
(Near Paxico)

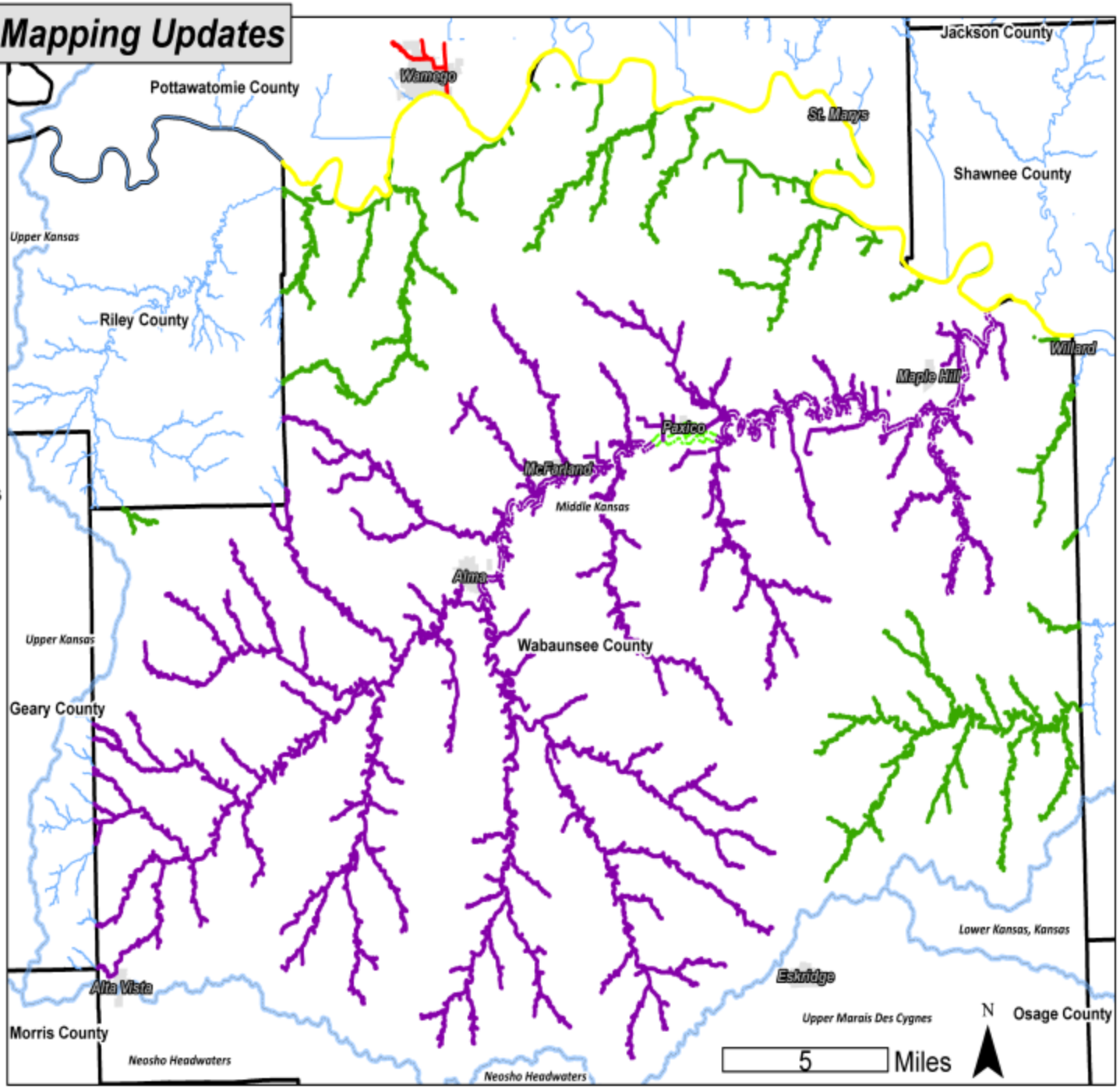
New Zone A - Gage Analysis
Gage Analysis hydrology will be preformed.
(Kansas River, Wabaunsee Co.)

New Zone A - Enhanced Hydrology, Rainfall Runoff
Rainfall-Runoff Hydology will be performed for this stream, and calibrated with local gage information.
(Mill Creek, Dry Creek)

Rainfall-Runoff Hydology will be performed in this watershed to develop localized regression equations.
(Mill Creek Watershed)

New Zone A - Enhanced Hydrology
Localized regression will be used developed from nearby Mill Creek watershed.

No Proposed Studies
Recent studies preformed for these streams, and no new mapping is proposed.



Middle Kansas 2016 Mapping Updates - Wamego

New Zone AE
New Zone AE study will be developed for this stream.
(Wamego)

New Zone AE - LDS
Rainfall-Runoff Hydology will be performed for this stream, and calibrated with local gage information. Survey data will be collected. No floodway will be shown on map.
(Mill Creek, Near Paxico)

Rainfall-Runoff Hydology will be performed for these streams. Survey data will be collected. No floodway will be shown on map.
(Near Paxico)

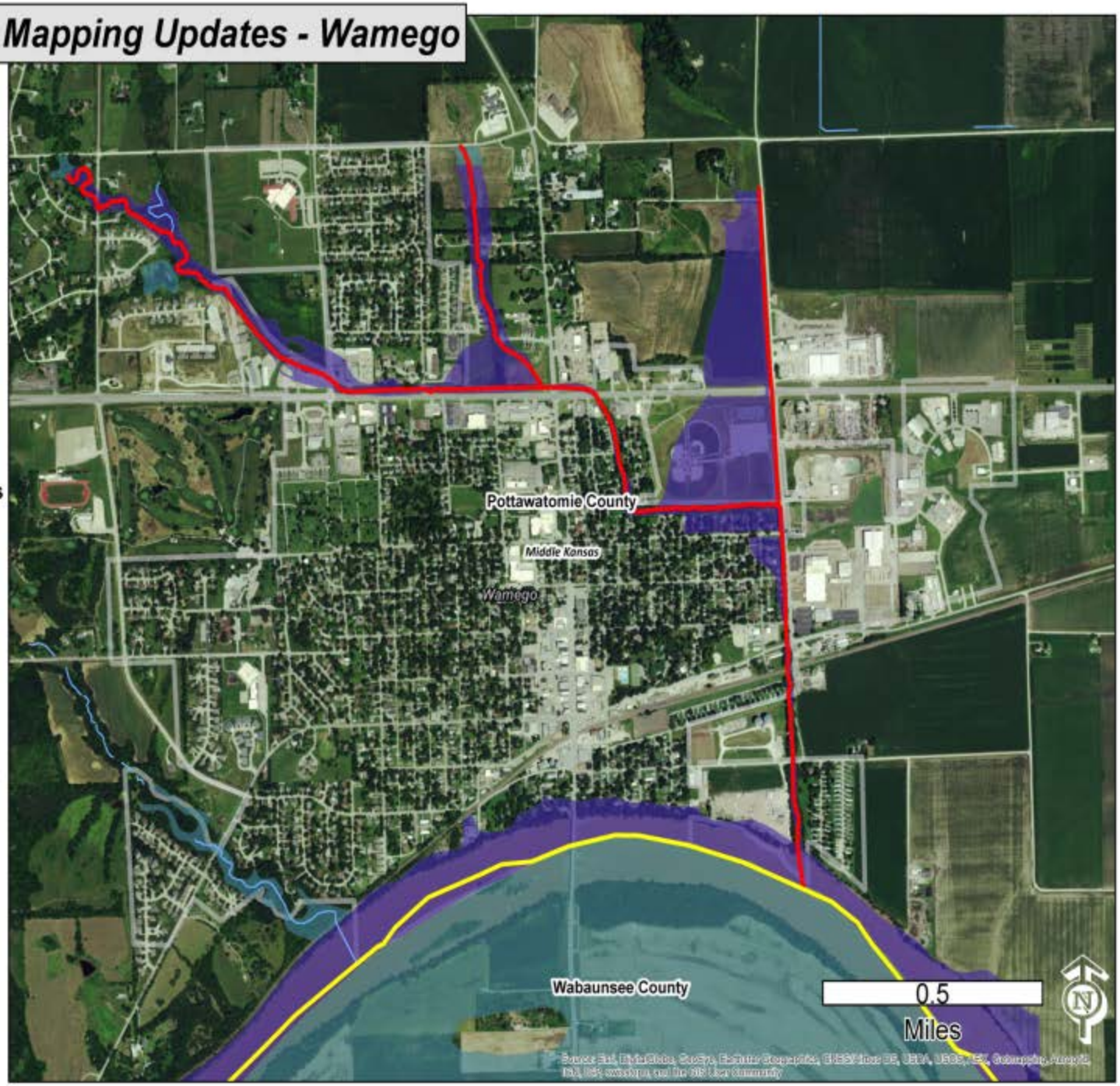
New Zone A - Gage Analysis
Gage Analysis hydrology will be preformed.
(Kansas River, Wabaunsee Co.)

New Zone A - Enhanced Hydrology, Rainfall Runoff
Rainfall-Runoff Hydology will be performed for this stream, and calibrated with local gage information.
(Mill Creek, Dry Creek)

Rainfall-Runoff Hydology will be performed in this watershed to develop localized regression equations.
(Mill Creek Watershed)

New Zone A - Enhanced Hydrology
Localized regression will be used developed from nearby Mill Creek watershed.

No Proposed Studies
Recent studies preformed for these streams, and no new mapping is proposed.



Middle Kansas 2016 Mapping Updates - Paxico

New Zone AE
New Zone AE study will be developed for this stream.
(Wamego)

New Zone AE - LDS
Rainfall-Runoff Hydology will be performed for this stream, and calibrated with local gage information. Survey data will be collected. No floodway will be shown on map.
(Mill Creek, Near Paxico)

Rainfall-Runoff Hydology will be performed for these streams. Survey data will be collected. No floodway will be shown on map.
(Near Paxico)

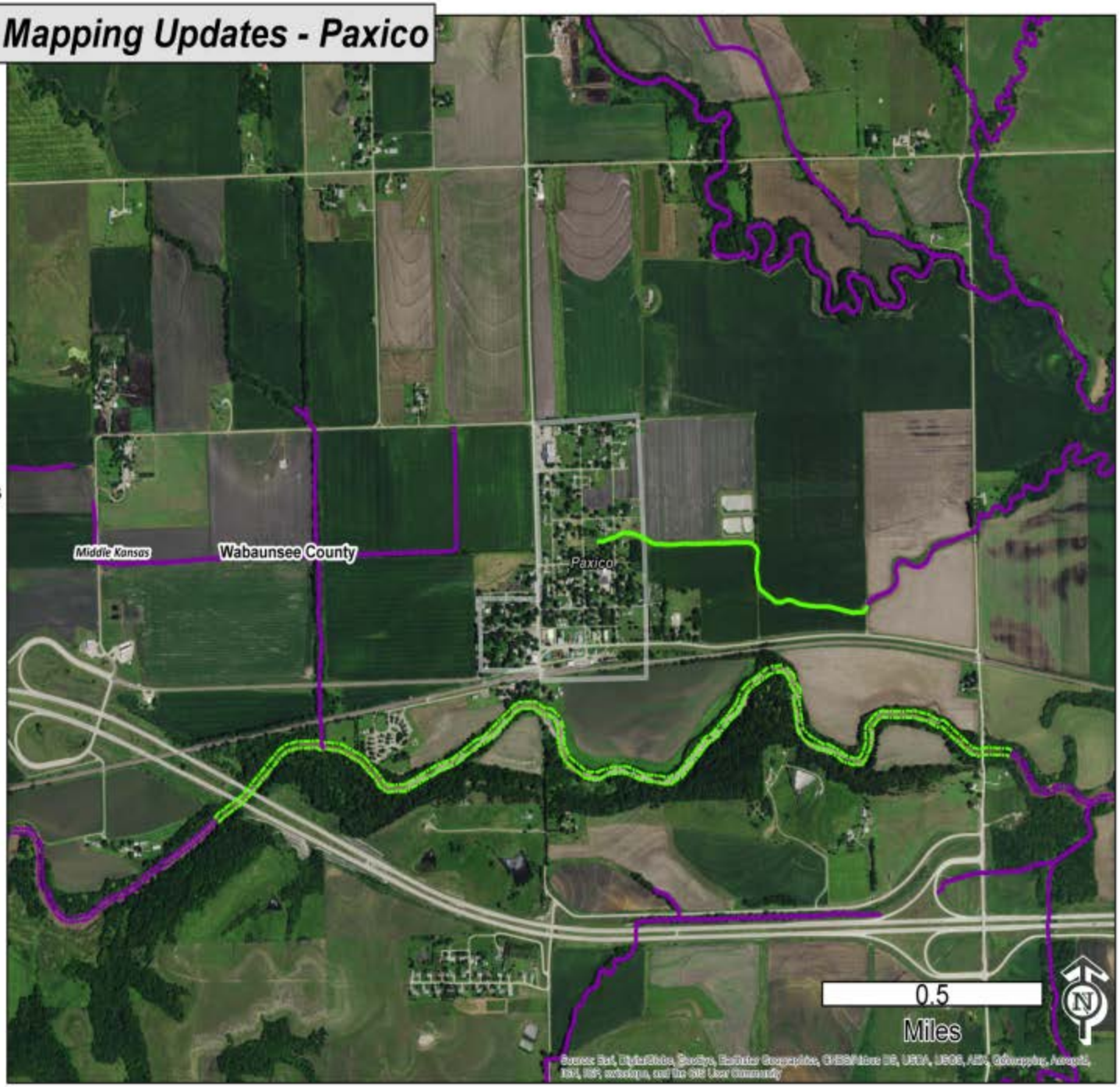
New Zone A - Gage Analysis
Gage Analysis hydrology will be preformed.
(Kansas River, Wabaunsee Co.)

New Zone A - Enhanced Hydrology, Rainfall Runoff
Rainfall-Runoff Hydology will be performed for this stream, and calibrated with local gage information.
(Mill Creek, Dry Creek)

Rainfall-Runoff Hydology will be performed in this watershed to develop localized regression equations.
(Mill Creek Watershed)

New Zone A - Enhanced Hydrology
Localized regression will be used developed from nearby Mill Creek watershed.

No Proposed Studies
Recent studies preformed for these streams, and no new mapping is proposed.



Project Scope Review

- Look at and understand the scope planned for your community.
- You have a 30 day period to review and comment on the scope if necessary.
- Is the scope appropriate?
- Are we missing anything?

Project Phases

- **Information Submission**
  - What do you have that we can use???
  - Now
- **Data Development**
  - Fall 2016 thru Fall/Winter 2017
- **Community / Public Review**
  - Winter / Spring 2018 thru Summer 2018
- **Preliminary and Post-Preliminary**
  - Fall 2018 to late 2019/early 2020

What Should Working Groups D0?

- Stay aware and answer questions
- Identification of Areas of Concern (first task)
- **ENGINEERING AND MAP REVIEW**
- **PUBLIC REVIEW NOTIFICATION**
  - Inform public of map review opportunity
  - Encourage public participation
- **PLAN PUBLIC OUTREACH**
  - Public Open House
    - When, where, how, get the word out
  - Long Term Outreach

Preliminary Map Status

- **VERY IMPORTANT!!!!!**
  - Things change when status changes from DRAFT to PRELIMINARY.
- **DRAFT = OUR MAP**
  - Changes can be made to mapping through simple cooperation.
- **PRELIM = FEMA's MAP**
  - Changes can only be made through official appeal
- **NEED TO BE SOLID BEFORE PRELIMINARY**
- Preliminary Date Estimate
  - Summer/Fall 2018
  - We have control over Prelim Date (within reason)

Post-Preliminary Process

- Post-Prelim lasts 15-18 months in general
- Changes to mapping can only happen during a 90-day appeal period following Prelim status.
- Official meetings with community officials to explain timeline and appeal period. (CCO)
- Letter of Final Determination (LFD)
  - Point at which no more changes can be made
  - “Pencils Down” – map is final
- 6-month official adoption period between LFD and the Effective Date.

Post-Prelim Working Group Tasks

- Community Outreach
  - Appeal Period Notification
  - Answer Stakeholder Questions
  - Insurance Outreach
    - Newly Mapped Procedure
- Mitigation Planning
  - Community Rating System (CRS)
    - Flood Insurance Discounts
  - Can your community take action to reduce flood risk?
    - Projects?
    - Grant Applications?

Communication to Working Groups

- Email List
  - Get me 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
  - In person as needed
- Provided Project Material
- **DON’T HESITATE TO CALL, WE ARE AVAILABLE**

If You Only Remember A Few Things

- Process is going to take time
  - Maps will not take affect until 2019 or 2020
- **Get it right before Preliminary!**
  - Foster public review this fall
  - Get out the word and encourage participation
- You need ownership of your regulatory map
- I am available to answer your questions

Q & A

Dane Bailey
Floodplain Mapping Coordinator
Kansas Department of Agriculture
Division of Water Resources
785-296-7769
dane.bailey@kda.ks.gov