RiskMAP
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South Dakota LSBLE: How FEMA and its Stakeholders Benefit from 2d LSBLE

FEMA

ASFPM May 2017

compass
Identify, Interpret, Integrate

Why are we here?

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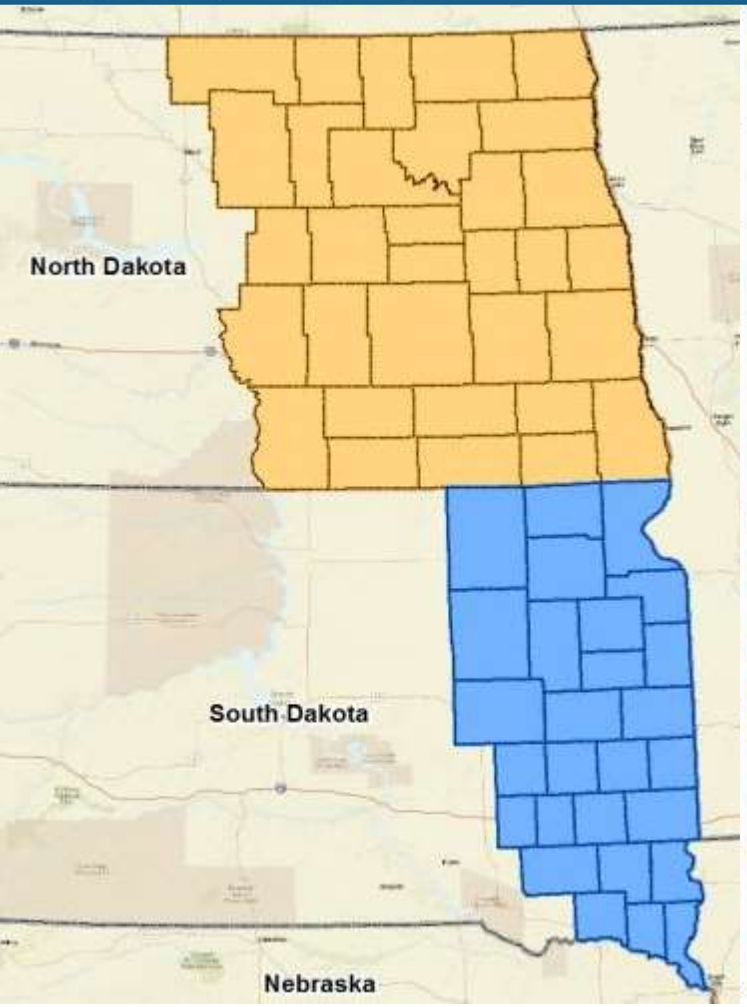
Who are we?

- **Brooke Conner, FEMA Region VIII**
- **Brian Murphy, Regional Technical Coordinator (PTS)**
- **Brandon Banks, Project Manager (PTS)**

Where are we conducting 2d LSBLE?



An overview map of all 27 county-wide initial flood risk assessment for the project area kicked off in 2016 that includes the on-going Risk MAP efforts in Union County, SD (Lower Big Sioux and Lewis & Clark Watersheds) that started in 2012. Counties with crosshatching are those proposed to move forward within the first phase of the larger South Dakota Risk MAP effort. Areas shaded in orange are included within the Union County, SD Risk MAP Project. The remaining counties will move forward in the second phase of this project in coordination with the 2016 SD Department of Environment and Natural Resources (DENR) Big Sioux Basin Study.

For more information about this project please use the arrows in the blue on the left to scroll through the story

- South Dakota Risk MAP Project Dashboard, Slide 1
- South Dakota Risk MAP Project Overview, Slide 2
- National Flood Hazard Layer, Slide 3
- Floodplain Comparison Assessment, Slide 4
- Draft FIRM Panel Scheme, Slide 5
- Flood Risk Data Enhancements, Slide 6
- Hazard Mitigation Plan Status, Slide 7
- National Flood Insurance Program Status, Slide 8
- Engineering Content Download, Slide 9
- Union County Risk MAP Project, Slide 10

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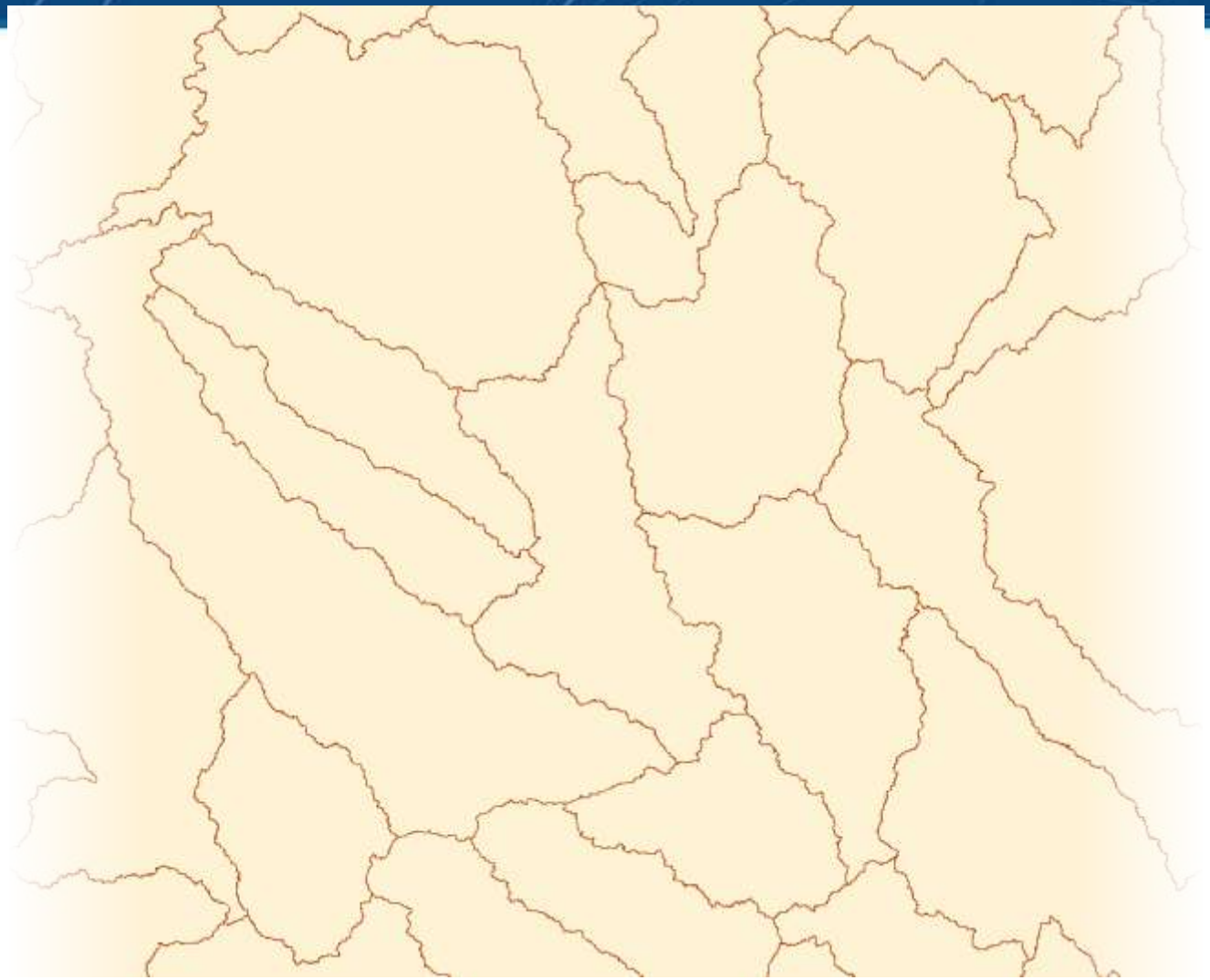
Why 2d LSBLE?

- **Short timeframe**
- **LiDAR availability**
- **CNMS Inventory Assessment Requirement**
  - 92% of flooding sources needed assessed
  - 8% were valid
    - New study or discovery data developed and compared to effective within previous 5 years
    - No significant changes were identified at assessment
      - Topo, hydrology methods, major development, etc
- **HEC-RAS 5.0 officially released**
  - Flat topography with self-contained basins
  - Cost, schedule, and more representative flood risk modeling approach

Identify Study Area



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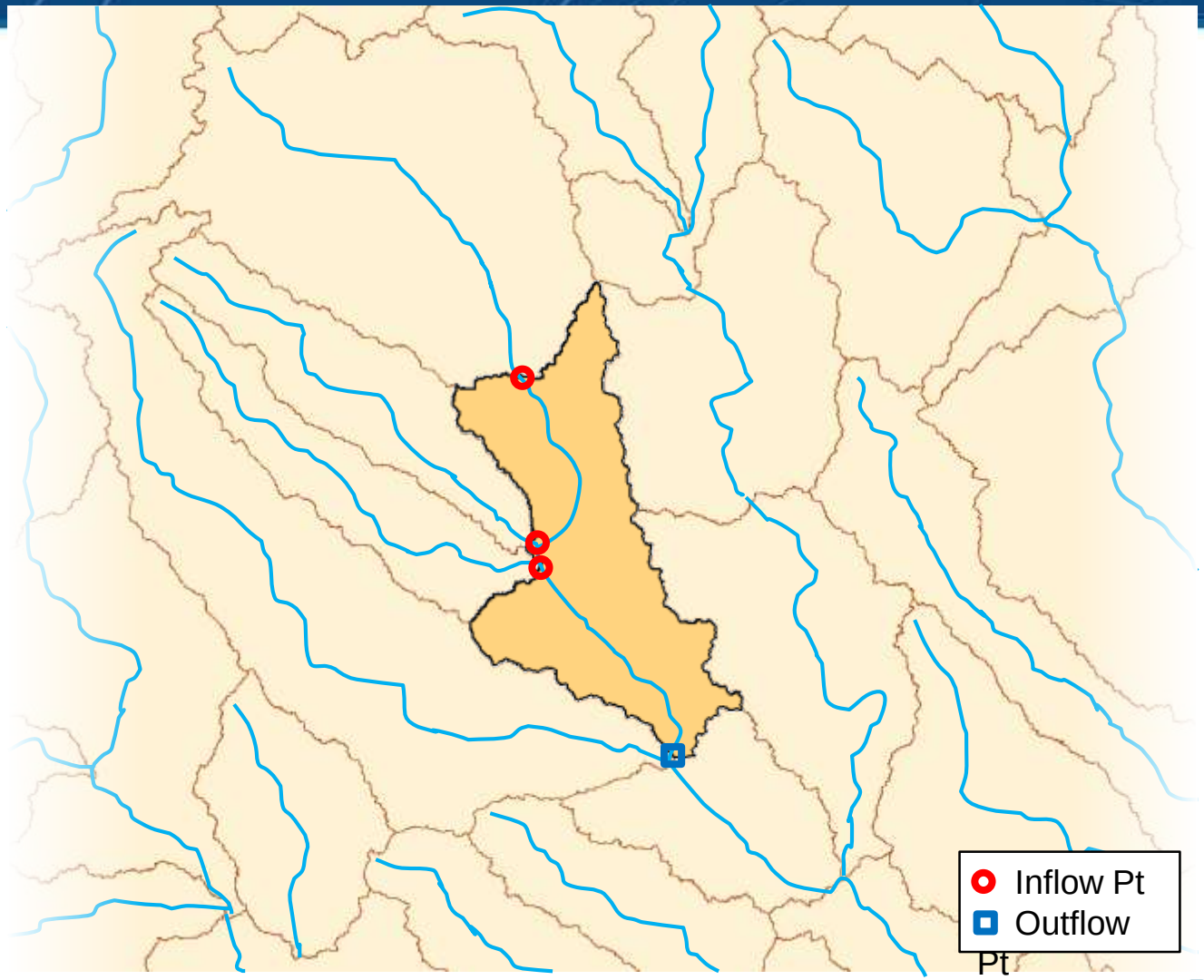
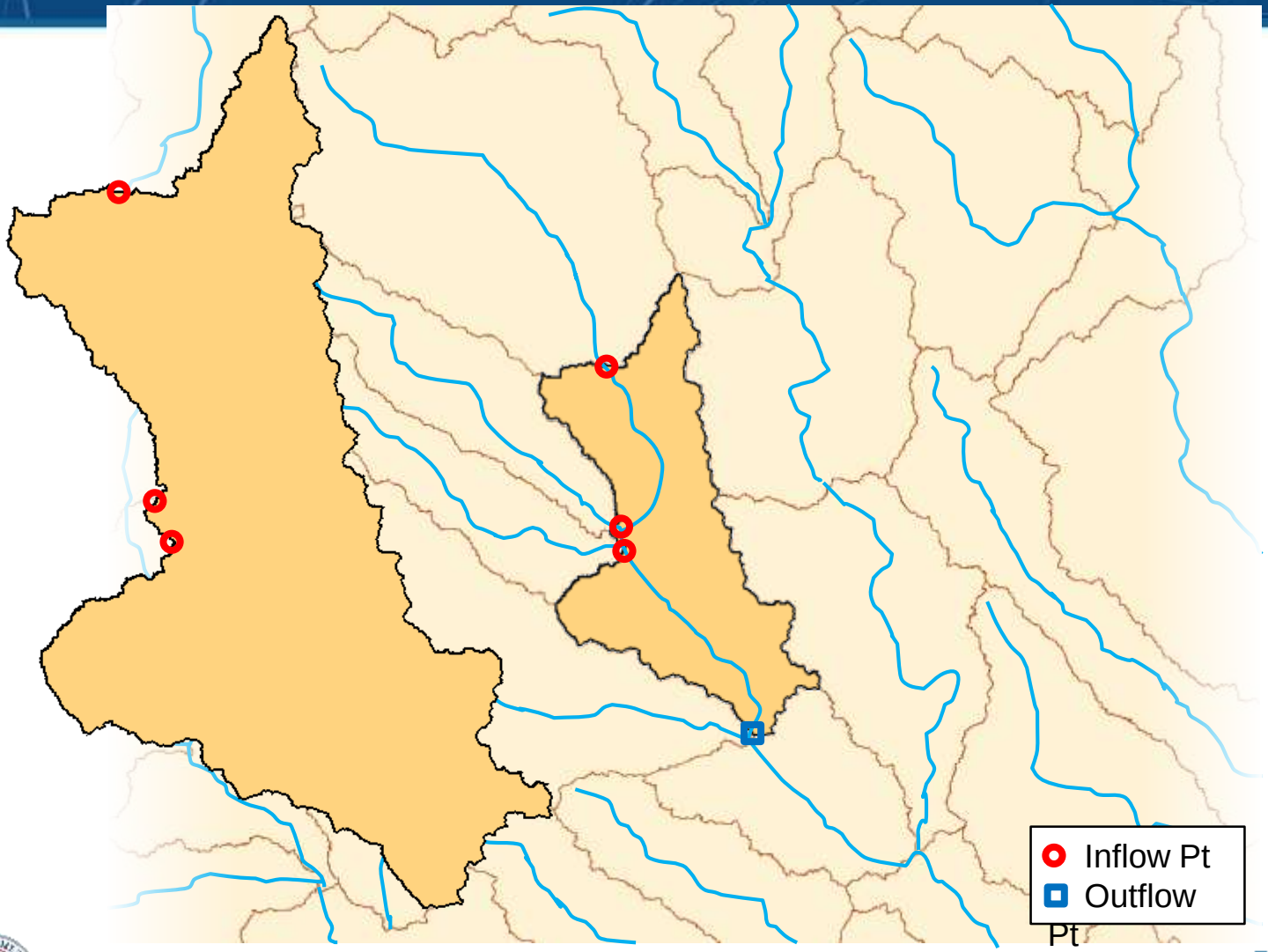
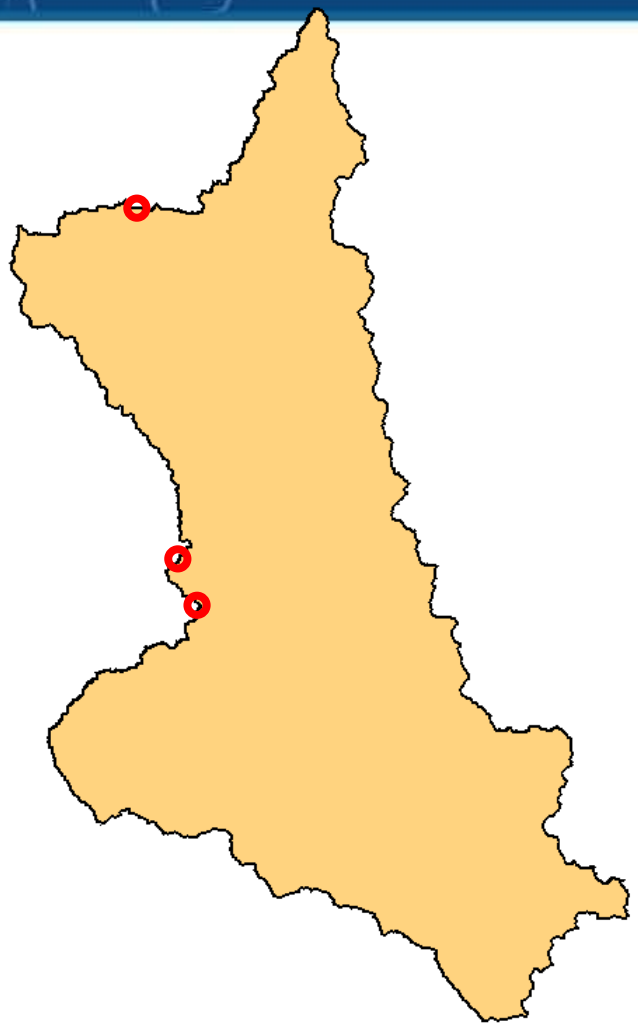


Identify Study Area

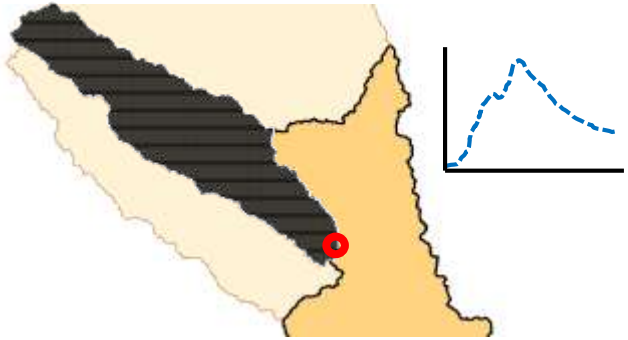


Model Inputs (Hydrology)

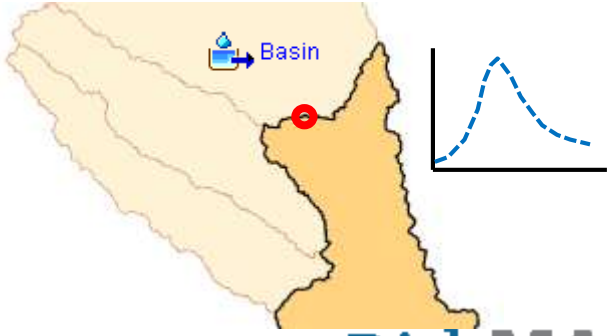


INFLOW HYDROGRAPHS

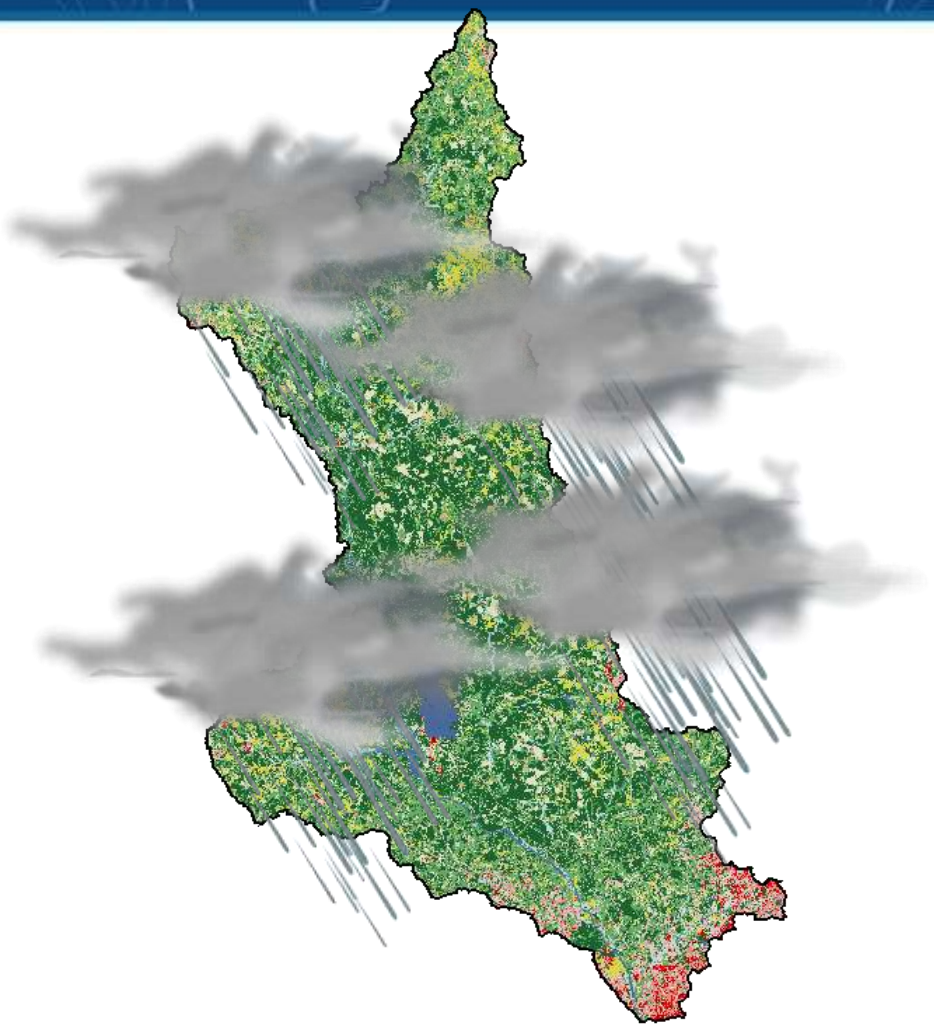
- **Option 1: Use outflow hydrographs from upstream 2D model as inflow**



- **Option 2: Generate hydrographs from simple HEC-HMS models**

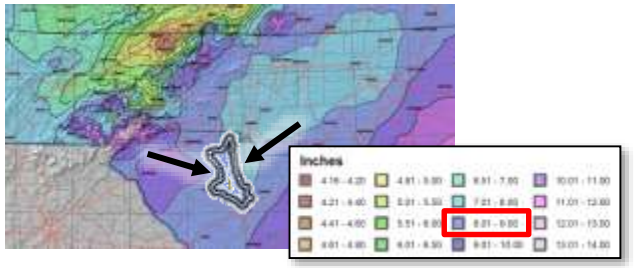


Model Inputs (Hydrology)

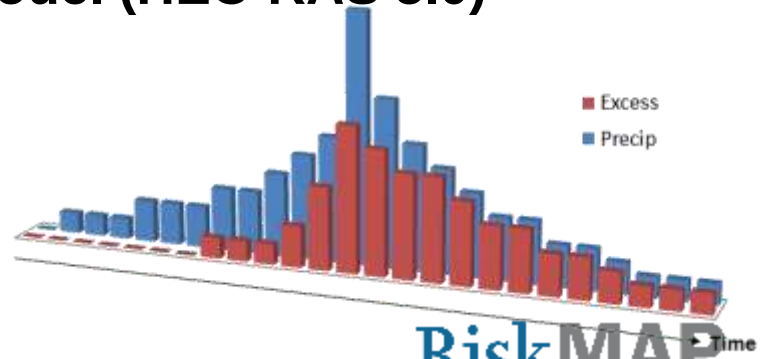


PRECIPITATION (RAIN-on-GRID)

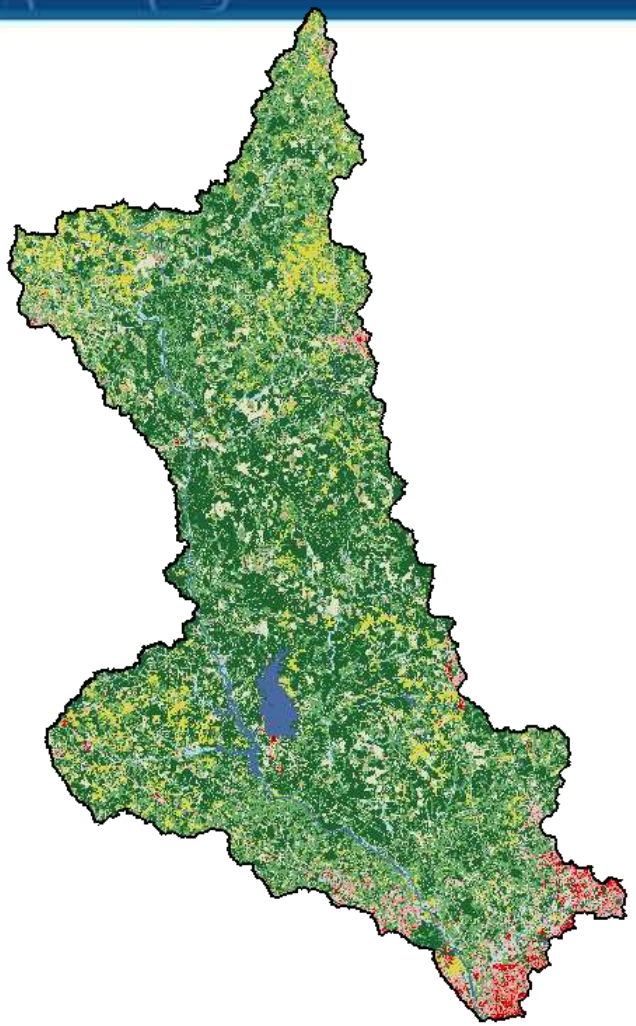
- **NOAA Precipitation Frequency Data Server or Atlas 14**



- **Simple HEC-HMS model developed to determine excess rainfall to apply within the 2D model (HEC-RAS 5.0)**



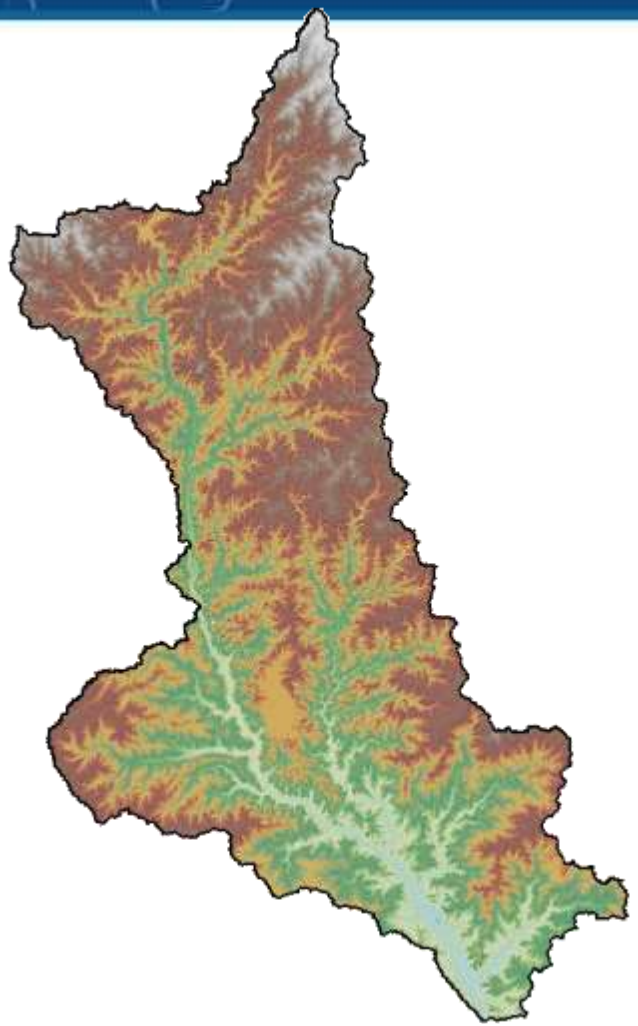
Model Inputs (H&H)



LAND USE & SOILS

- Land Use: National Land Cover Database (2011)
- Soils: NRCS Web Soil Survey
- Used as an input in all HEC-HMS models to support the calculation of Curve Numbers and Lag Times
- Also used within the 2D model to estimate roughness values

Model Inputs (Hydraulics)

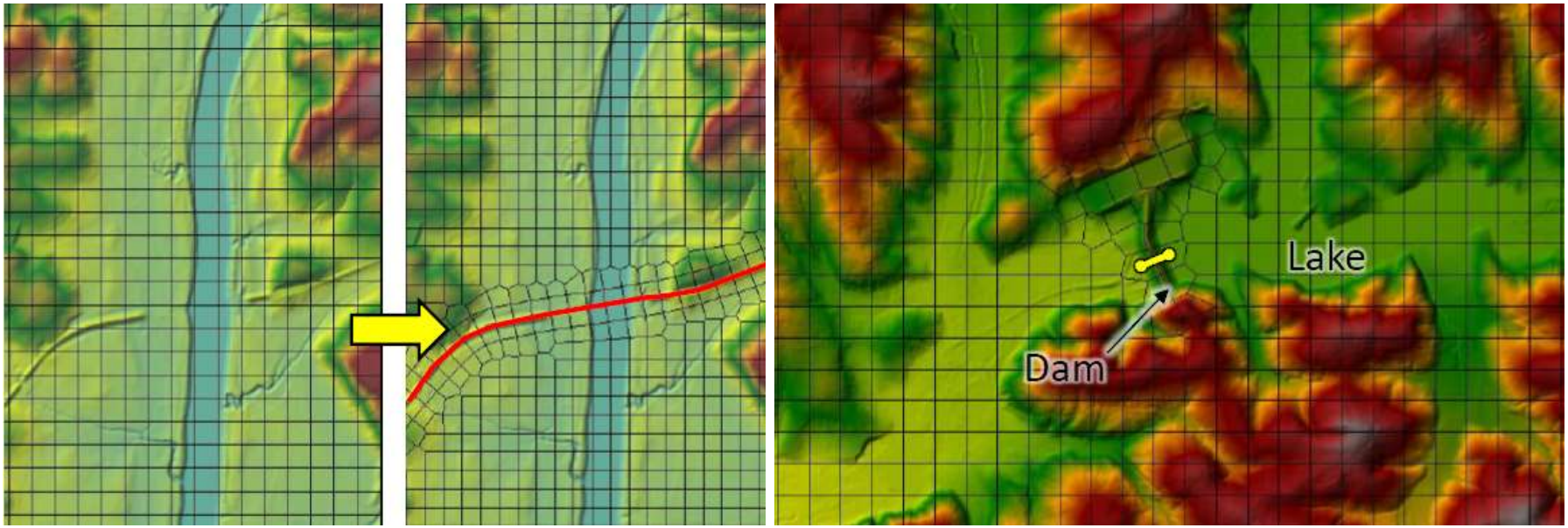


TERRAIN

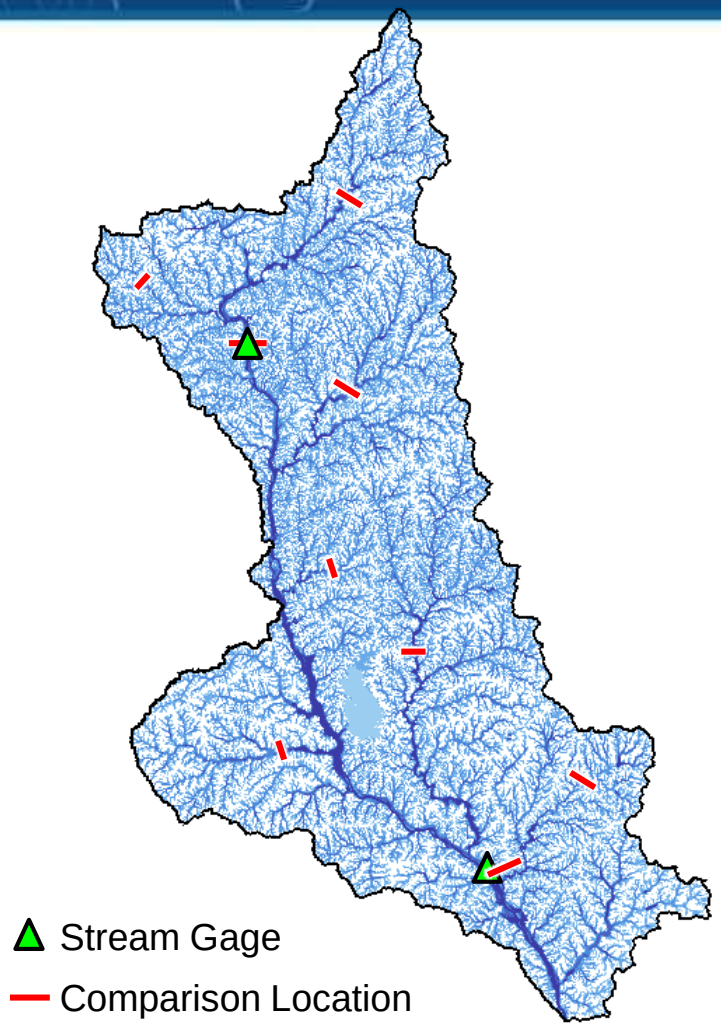
- LiDAR-derived DEM
- DEM assured to meet FEMA SID 43 vertical accuracy standards
- Critical component to carry LSBLE products through regulatory process

LSAE 2d Methodology

Model Inputs (Hydraulics)



Model Verification

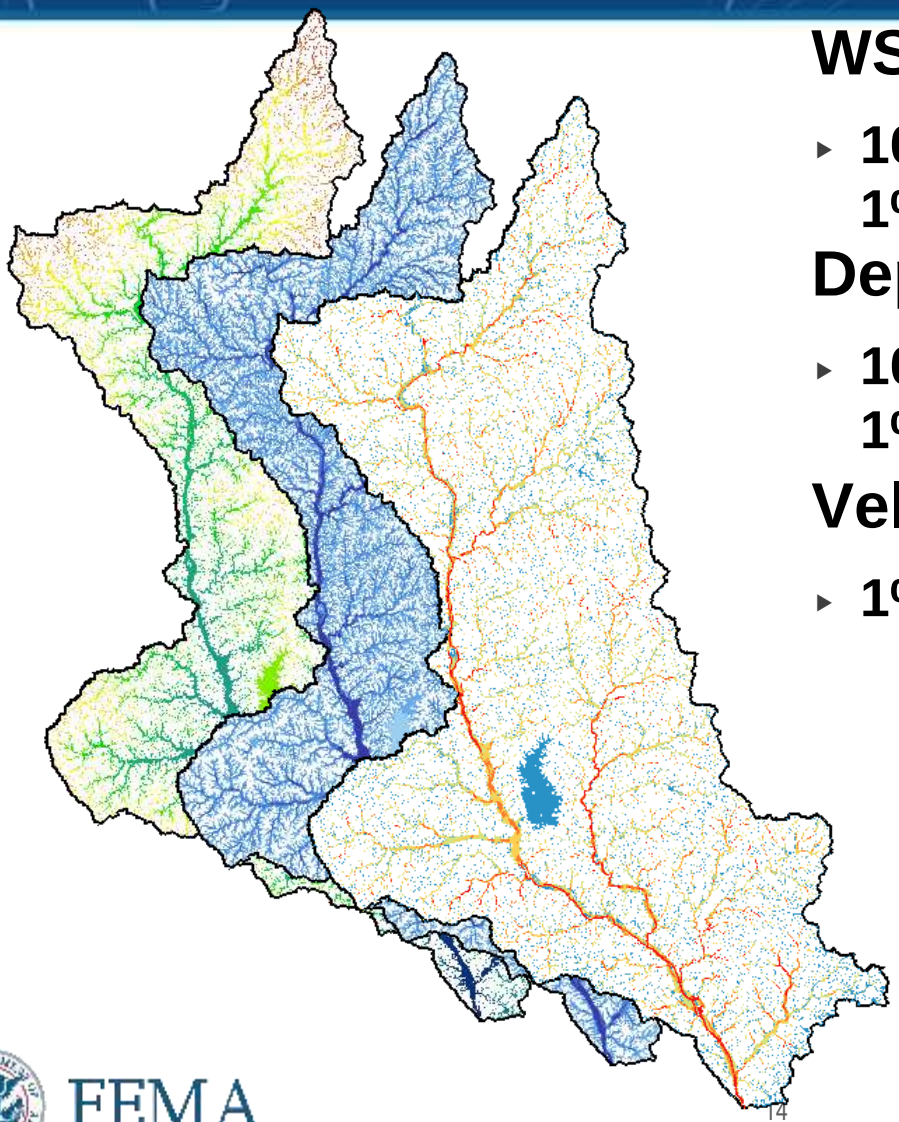


REASONABILITY CHECKS

- **Multiple comparison check locations added to the 2D model (at gages and other representative locations within the study area)**
- **1% annual chance peak discharges, WSELs, and/or flood boundaries from 2D model compared with other available data at these locations (gage analysis, regression equations, effective study*, etc.)**

  *age and level of detail of effective study are taken into consideration when weighing comparisons

Model Outputs



WSEL Grids

- 10%, 4%, 2%, 1%, 0.2%, 1%+, 1%-

Depth Grids

- 10%, 4%, 2%, 1%, 0.2%, 1%+, 1%-

Velocity Grids

- 1% (others as needed)

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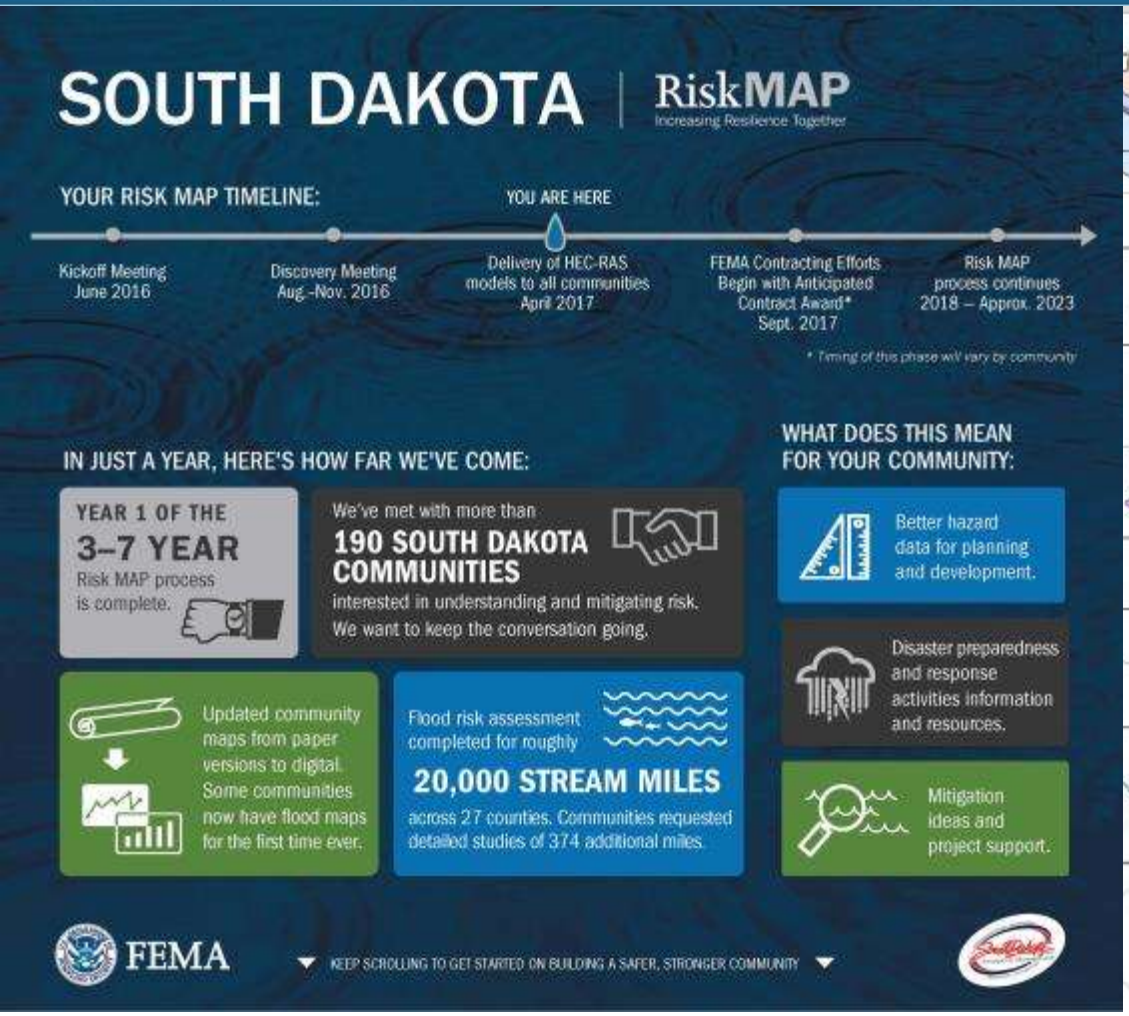
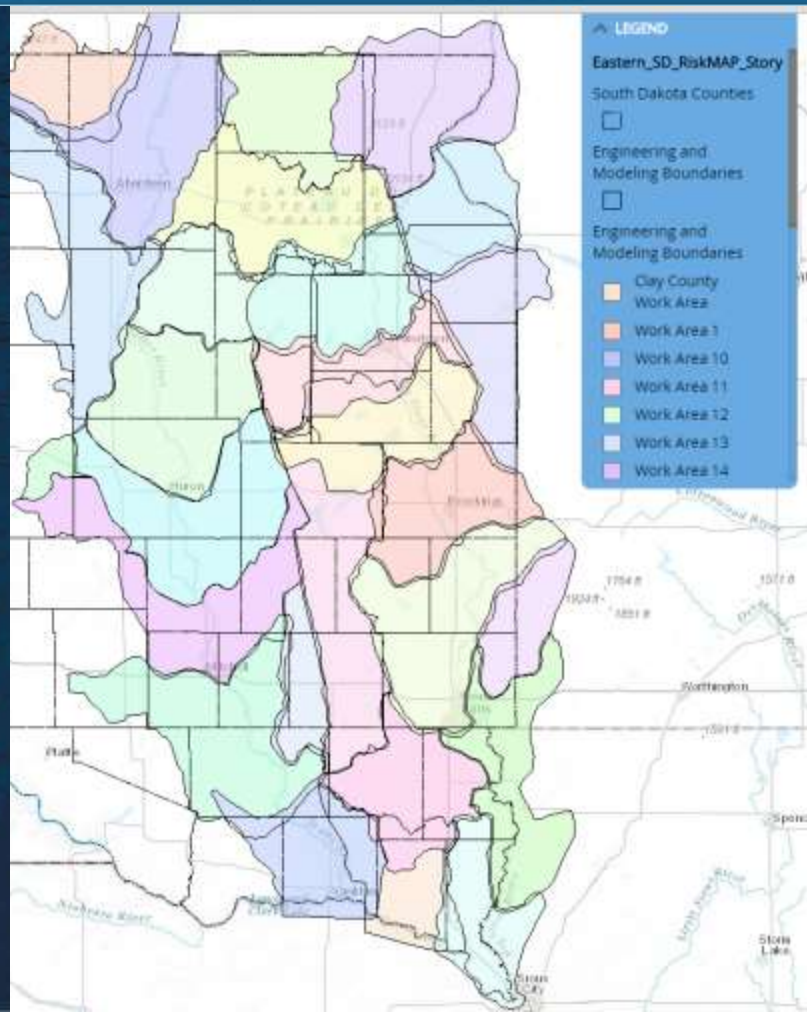
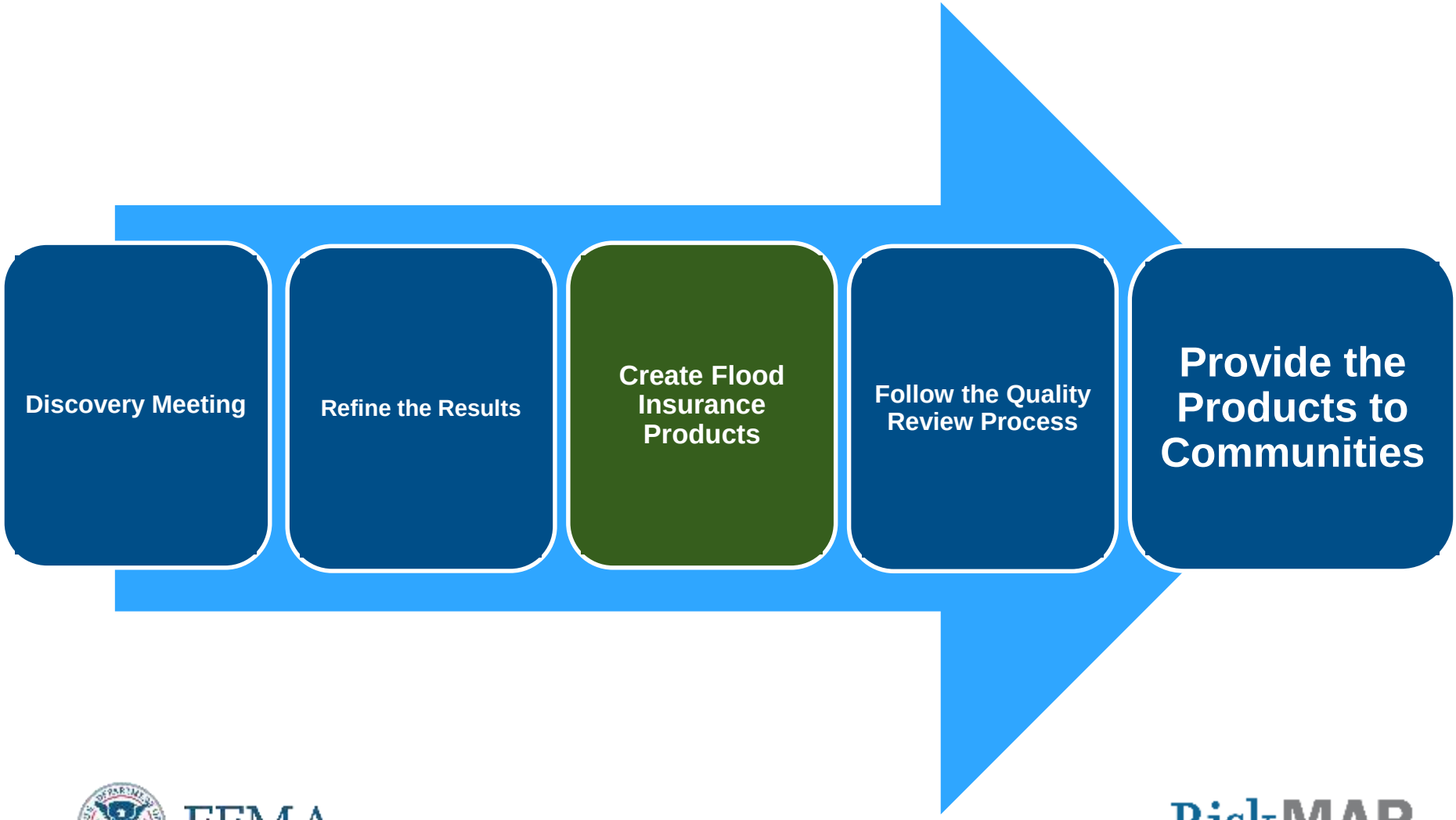
How is FEMA facilitating data accessibility?





How are the data being used in the Risk MAP Program?



Benefits to the Risk MAP Program

- **Delivering high-quality risk data**
  - Coordinated Needs Management Strategy (CNMS)
  - New, Validated, or Updated Engineering (NVUE)
- **Increasing awareness of flood risk**
  - Percent of local officials aware of flood risk affecting their communities
- **Promoting community mitigation action**
  - Percent of population acting on community planned mitigation strategies
- **Building towards TMAC recommendations**
  - Structure-based risk and flood frequency determination
  - Database driven, digital display environment
- **Reduce risk to lives and property**

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How can communities use this data?

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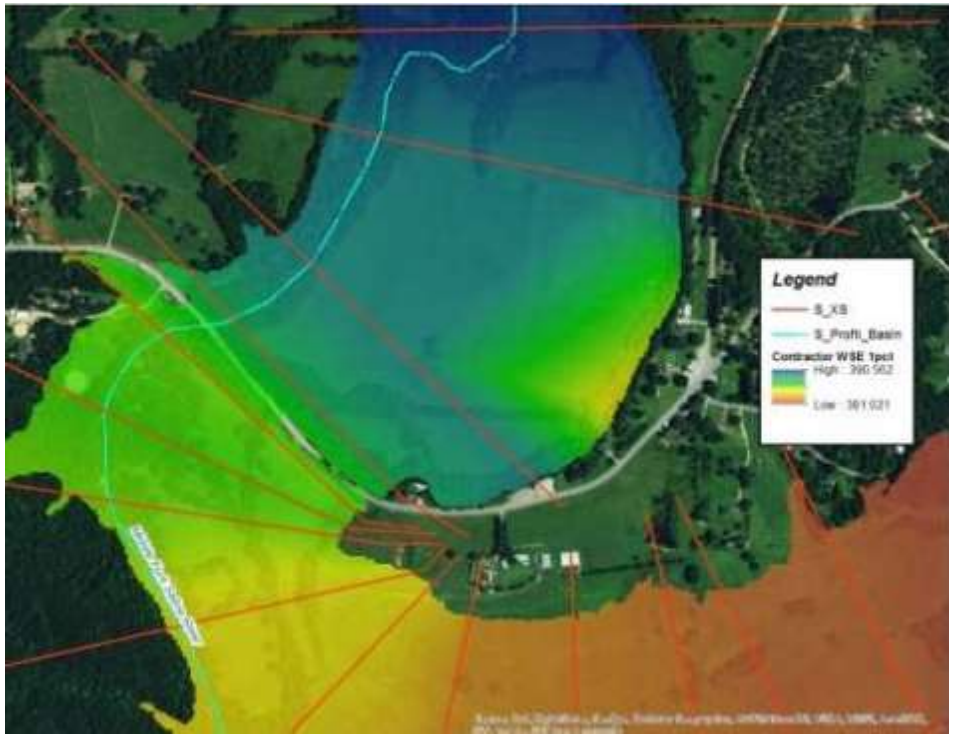
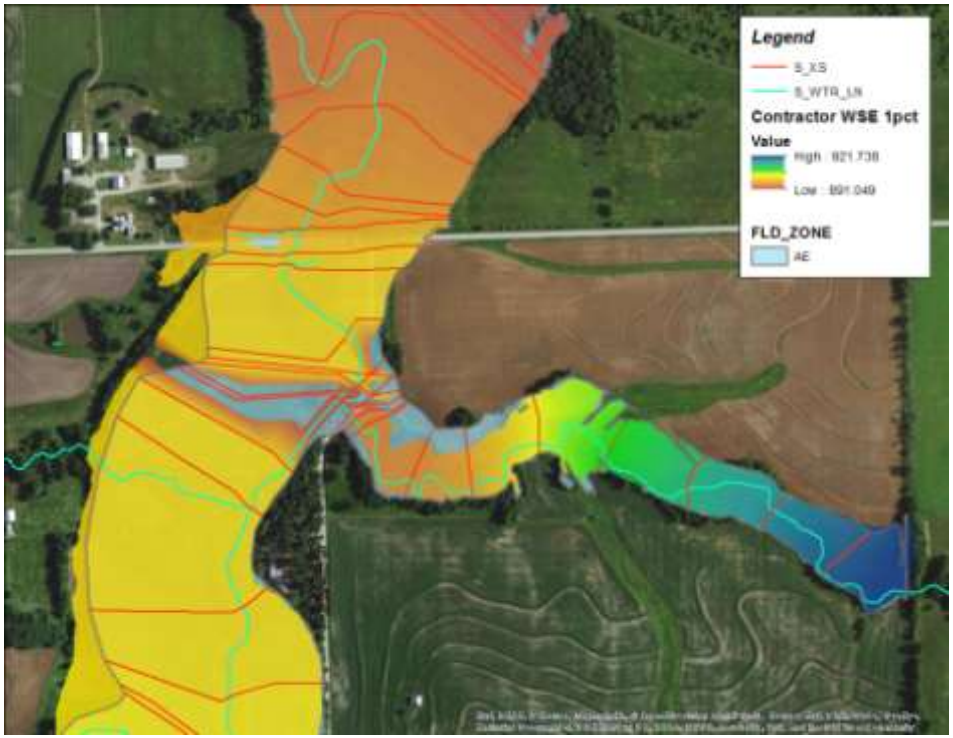
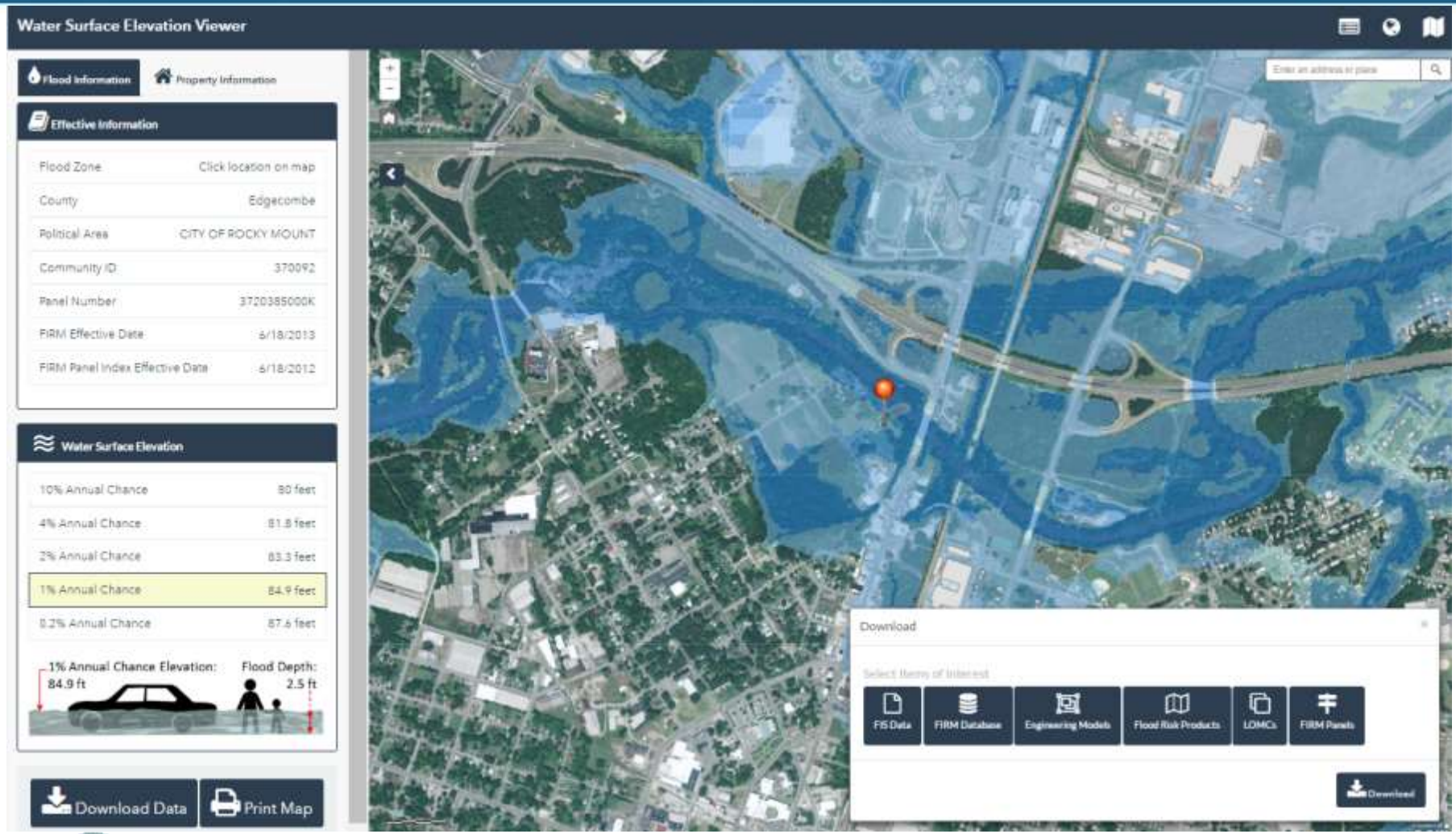
WSEL and Depth Grids

- **FIRM-Quality WSEL grid data**
  - Point and Click Elevations
  - No interpretation in between cross sections






Water Surface Elevation Viewer
Flood Information
Property Information
Effective Information
Flood Zone
Click location on map
County
Edgecombe
Political Area
CITY OF ROCKY MOUNT
Community ID
370092
Panel Number
3720385000K
FIRM Effective Date
6/18/2013
FIRM Panel Index Effective Date
6/18/2012
Water Surface Elevation
10% Annual Chance
80 feet
4% Annual Chance
81.8 feet
2% Annual Chance
83.3 feet
1% Annual Chance
84.9 feet
0.2% Annual Chance
87.6 feet
1% Annual Chance Elevation:
84.9 ft
Flood Depth:
2.5 ft
Download Data
Print Map
Download
FIS Data
FIRM Database
Engineering Models
Flood Risk Products
LOMCs
FIRM Panels

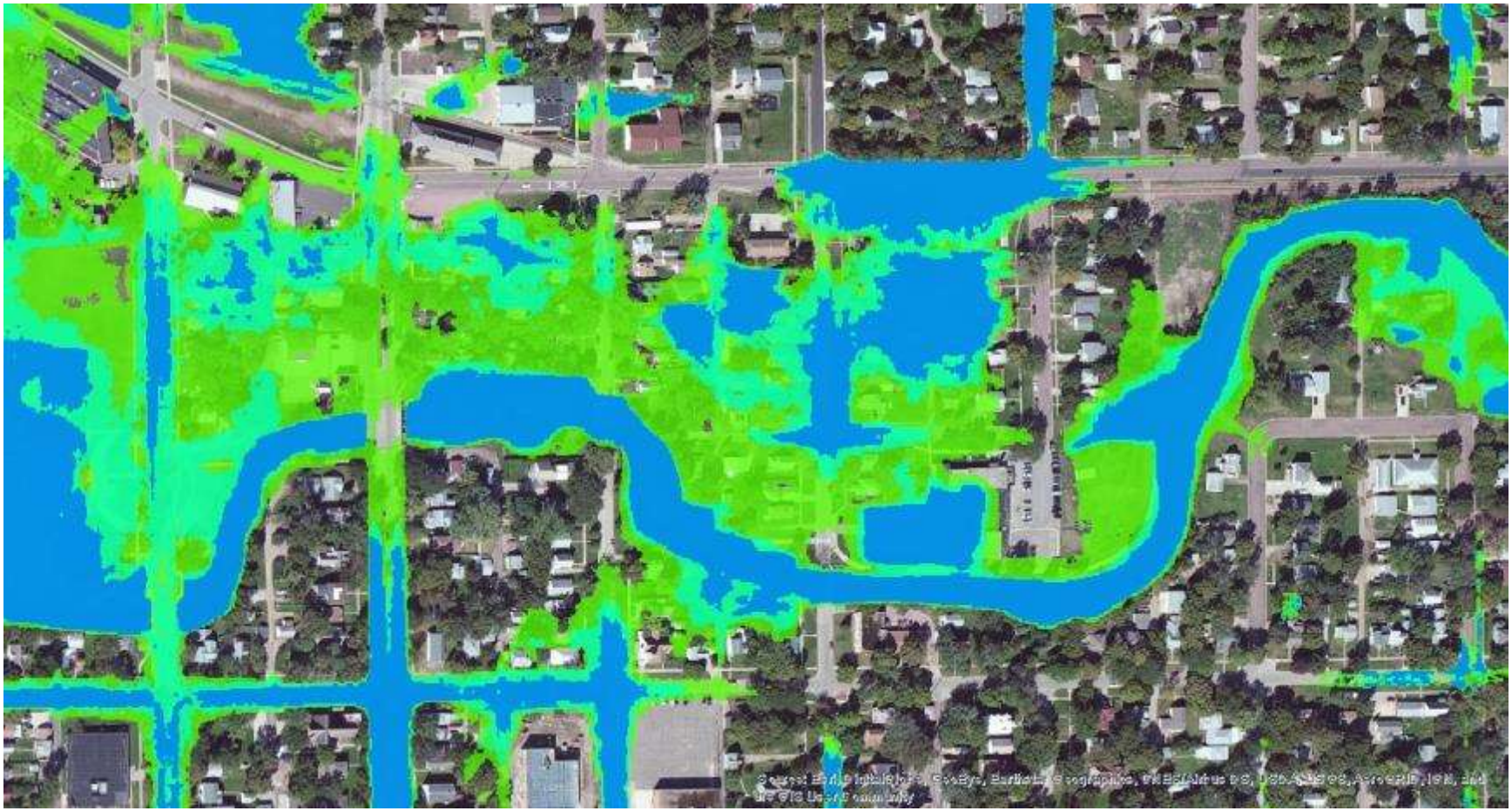
- **Model driven**
  - Confluences tied in throughout project area
  - Backwater incorporated
- **Multi-frequency products**
  - Not just a binary in-or-out perspective
- **Areas of Mitigation Interest**
  - Identify overtopped transportation networks
  - Loss assessment

Multi-Frequency Assessment

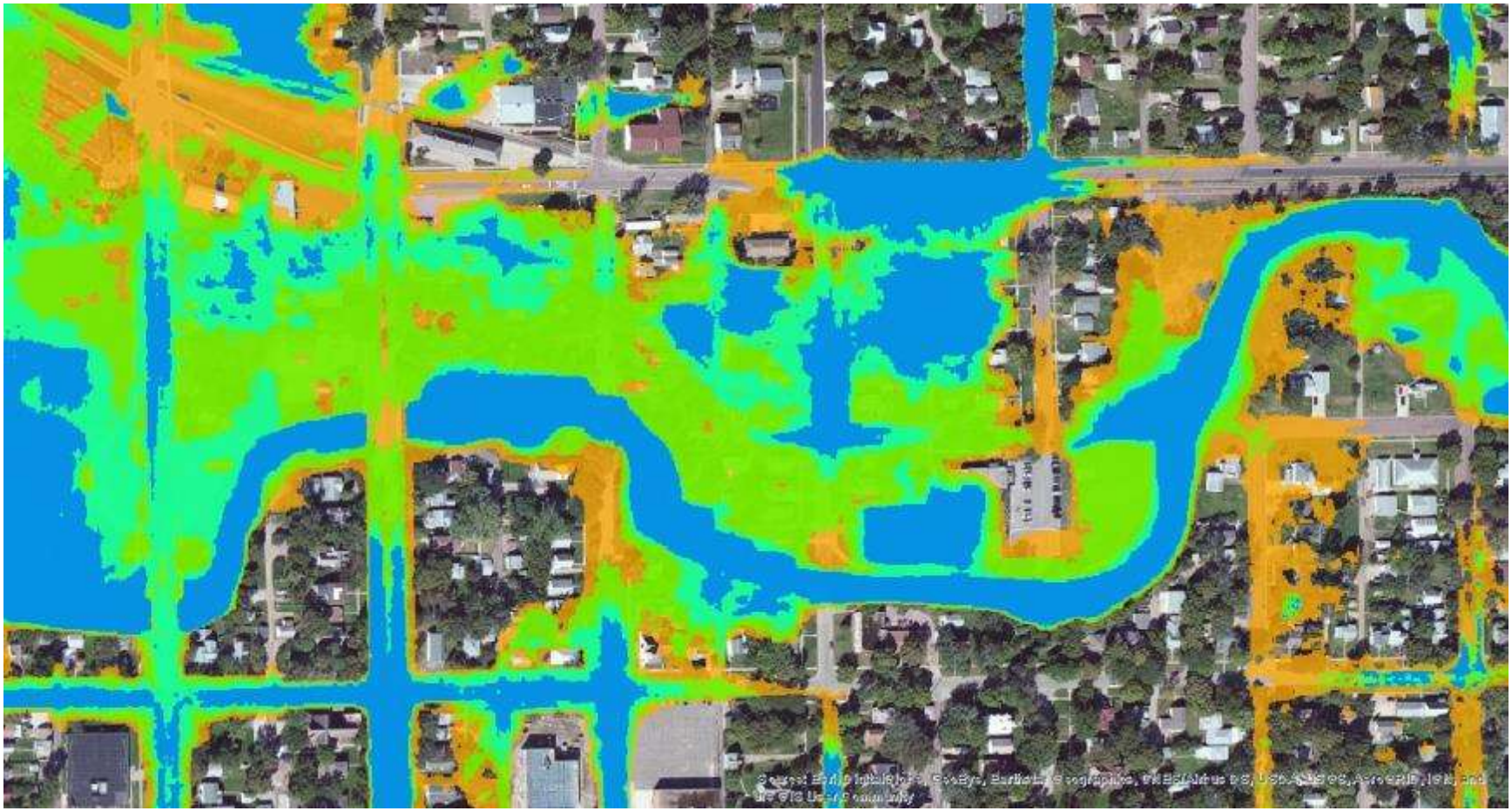
10% annual chance

4% annual chance

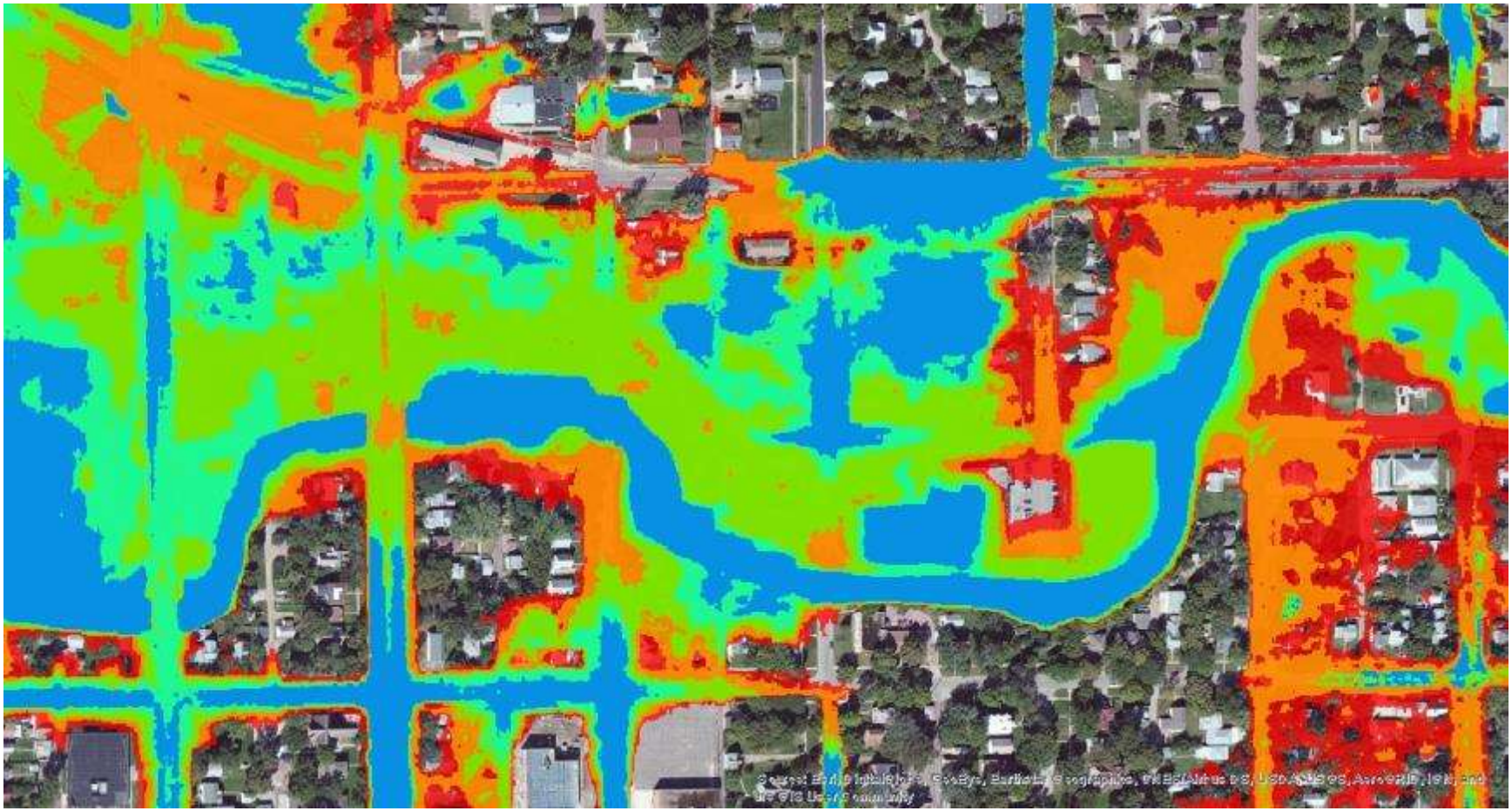
2% annual chance



1% annual chance



0.2% annual chance



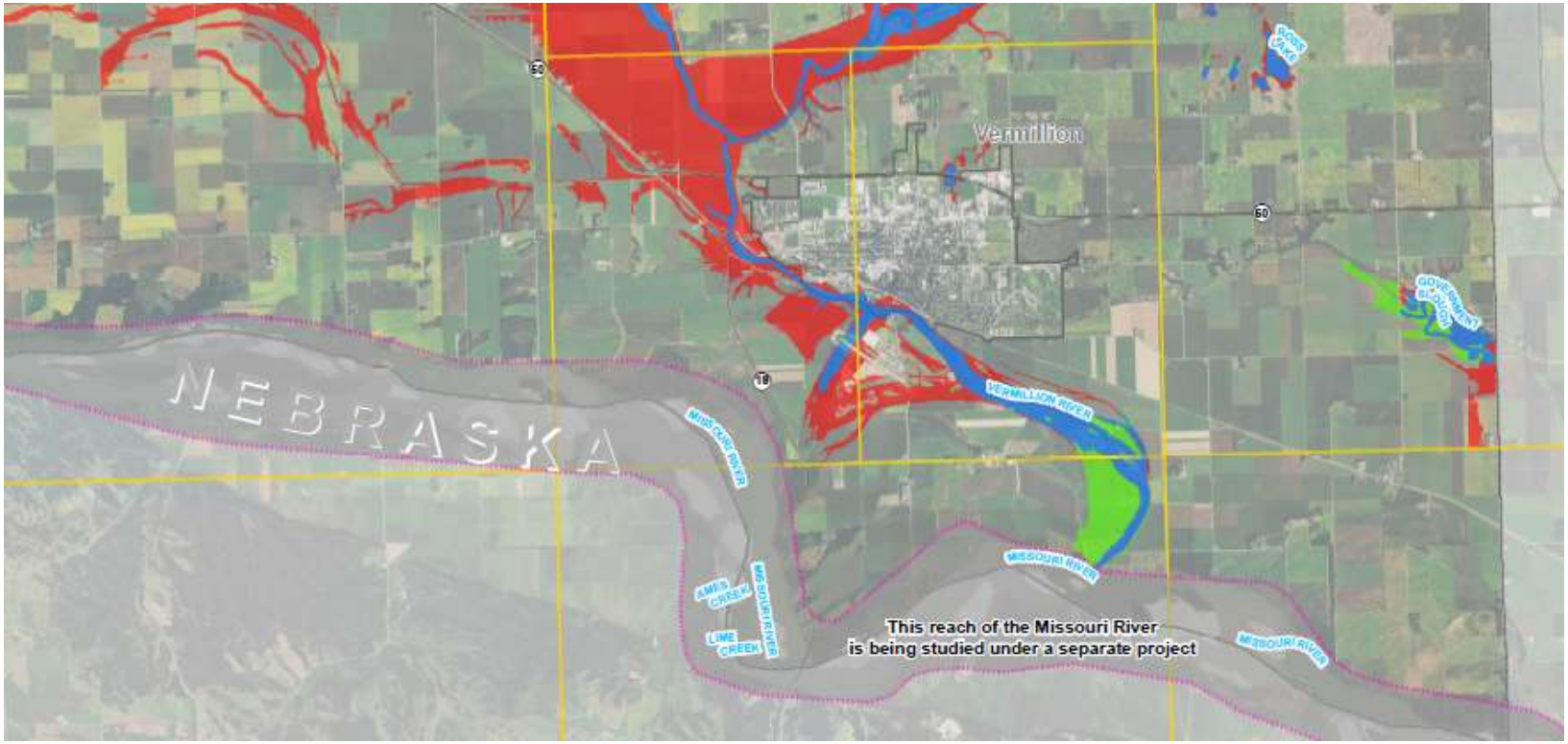
0.2% depth grid

Analysis Grids

- **Velocity (available with model data)**
  - Risk communication (three feet of swiftly flowing water is more dangerous than five feet of standing water)
- **Percent Annual Chance**
  - Percent chance of flooding at any location in the mapped floodplain using the 10, 4, 2, 1% recurrence interval data
- **Percent 30-year Grid**
  - Percent chance of flooding within 30 years (i.e. mortgage term)

Changes Since Last FIRM

- **Spatial layer used to inform communities where changes exist between new product and effective mapping**



LOMC Best Available Data Use

- **Uses**
  - Where no effective special flood hazard area (SFHA) exists
  - Where there is an effective Zone A
  - Used for LOMA, CLOMA, LOMR-F, CLOMR-F
- **Cannot Use**
  - Effective AE
  - If alternate sources have more detailed data/information
    - e.g. storm water master plan, bridge design
  - Delineating as-built floodplain for LOMR

Other uses of 2d LSBLE Best Available Information

- **Update State/Local Mitigation Plan**
- **Emergency Response**
- **Evacuation Planning**
- **Critical Facilities in or near flood hazard area**
- **Residential/Commercial Development Planning**
- **Hazard Mitigation Grant Program**

Next Steps

- **Training Communities**
  - Using the 2D LSBLE data for risk communication, risk assessment, and hazard mitigation planning
- **FEMA Regulatory Process**
  - Zone A updates using 2D LSBLE data
  - Zone AE updates using enhancements to the 2D LSBLE data
- **Use as Best Available Information**

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Questions?

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