# SSCAFCA BLE MEETING

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EDAC | EARTH DATA ANALYSIS CENTER

FEMA

# SSCAFCA BLE Meeting Protocol

- Please put your name, community, email address and your interest in this meeting in the chat box.
- Please mute your line
- Type questions in the chat box
- Thank you for attending

# Agenda

- Introductions
- CTP & Risk MAP
- Base Level Engineering & eBFE Viewer
- SSCAFCA Areas of Interest
- Resources

# What's a Cooperating Technical Partner (CTP)?

- The CTP Program was created in 1999 to help FEMA stretch limited mapping dollars and increase local involvement from sophisticated partners in the creation of FIRMs and DFIRMs.

- The CTP Program is an innovative approach to creating partnerships between FEMA and participating NFIP communities, regional agencies, state agencies, tribes and universities that have the interest and capability to become more active participants in the FEMA flood hazard mapping and Risk MAP programs.

- Earth Data Analysis Center, University of New Mexico, became New Mexico Cooperating Technical Partner in 2014

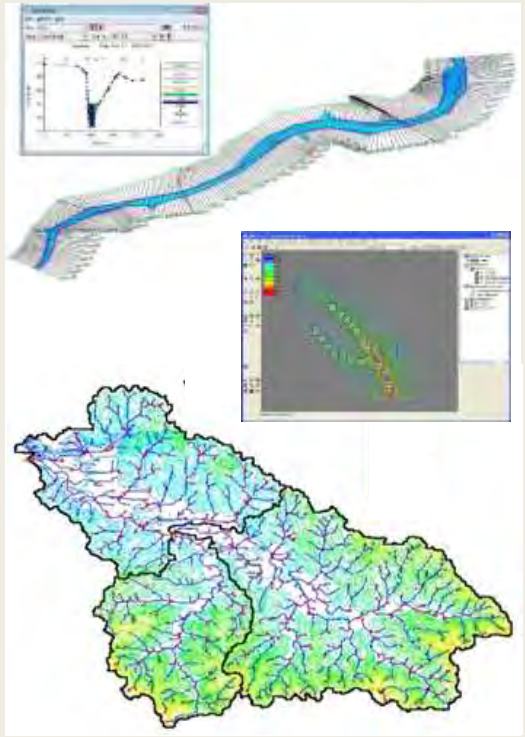
# CTP Partnerships

- New Mexico Department of Homeland Security and Emergency Management
  - *Loretta Hatch, New Mexico State Floodplain Coordinator*
    - Loretta.Hatch@state.nm.us
    - (505) 476-0612
- Local Flood Control Authorities – SSCAFCA
- Local Communities

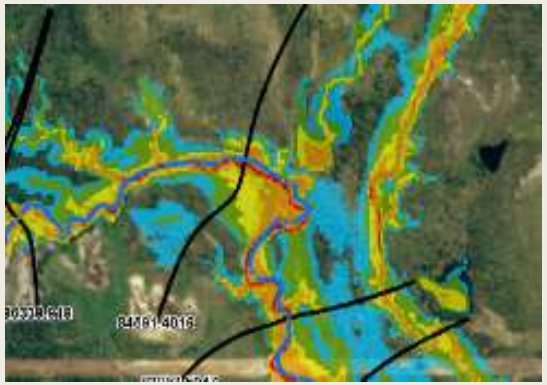
# What is Risk MAP?

- Mapping – Identification of areas of natural hazard risk
- Assessment – Review and analysis of hazard areas
- Planning – Mitigation activities to reduce risk

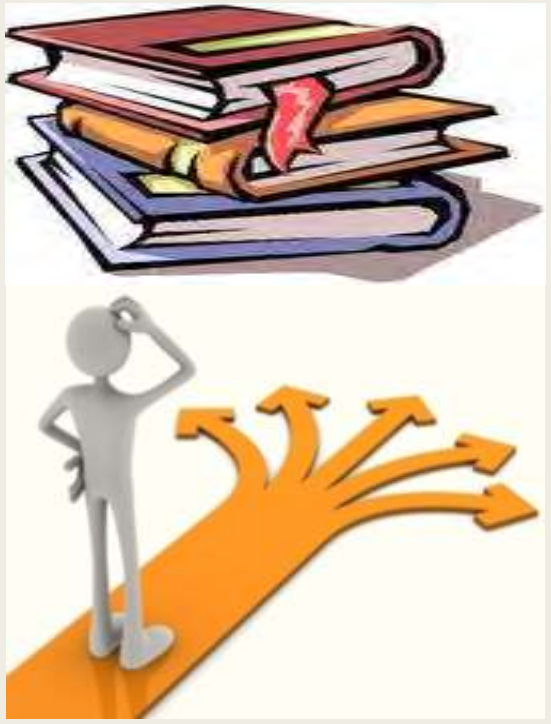
# Base Level Engineering is a programmatic evolutionary step which provides:



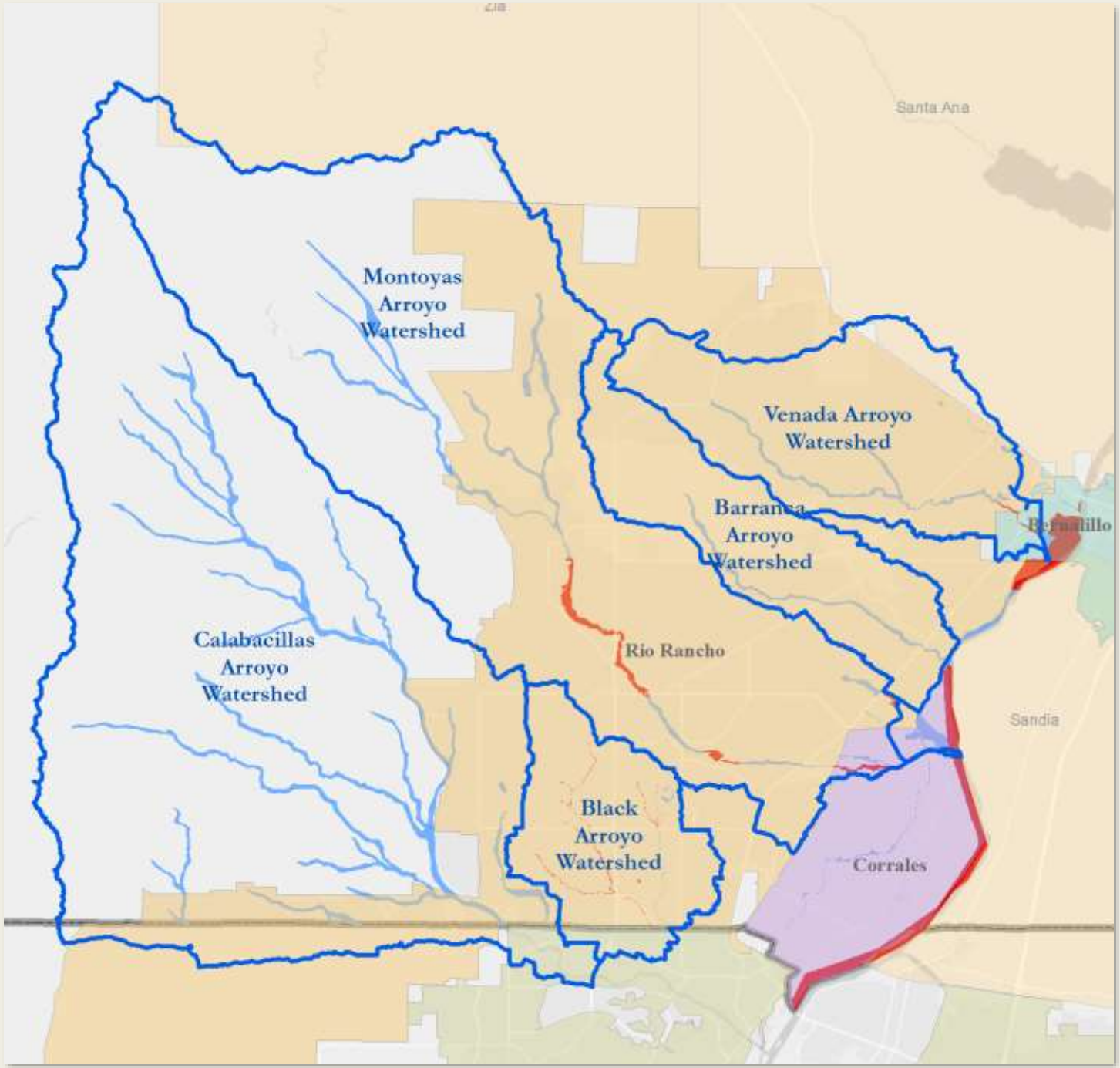
Credible engineering analysis and modeling for local communities and developers.



Estimation of flood extents, water surface elevations and flood depths



May be adopted as Best Available Information (BAI) by communities & inform development decisions.

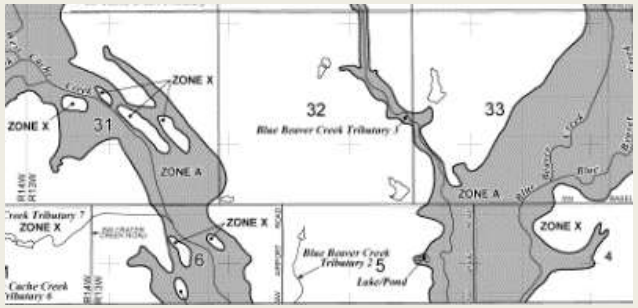

Santa Ana
Montoyas
Arroyo
Watershed
Venada Arroyo
Watershed
Barranca
Arroyo
Watershed
Bernalillo
Calabacillas
Arroyo
Watershed
Rio Rancho
Sandia
Black
Arroyo
Watershed
Corrales

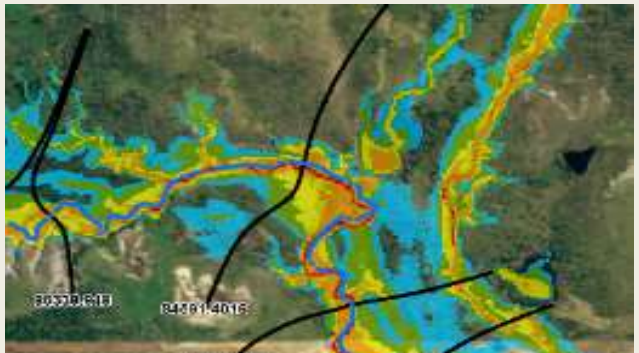
# Approach

- FEMA has devised both a 1D and 2D modeling approach
- High Resolution Ground Data required
- Manual revisions to input cross-sections or grids during modeling
- Cross-sections added near structures
- Human Investigation of results prior to FIRM mapping

# Deliverables

- Hydraulic Engineering Models (10%, 4%, 2%, 1%, 1%+, 1%-, and 0.2%)
- Estimated Flood Extents (10%, 1% and 0.2%)
- Estimated Water Surface Grids (1% and 0.2%)
- Estimated Flood Depth Grids (1% and 0.2%)
- Optional Layers also possible (Hazus Run, Point file for update potential, freeboard grids)



# Creating Base Level Engineering Data

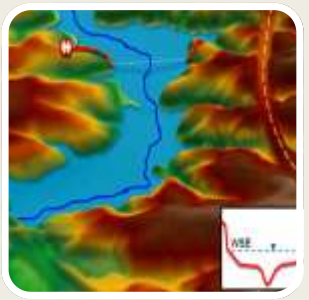
Terrain Data Collection

Is ground elevation Information readily-Available, or must it be Collected?

Hydrology

How much water are we talking about?

When will it get here?



Hydraulics

How does it react in the stream?

Floodplain Mapping

What areas are impacted?

# BLE Increases Collaboration & Transparency

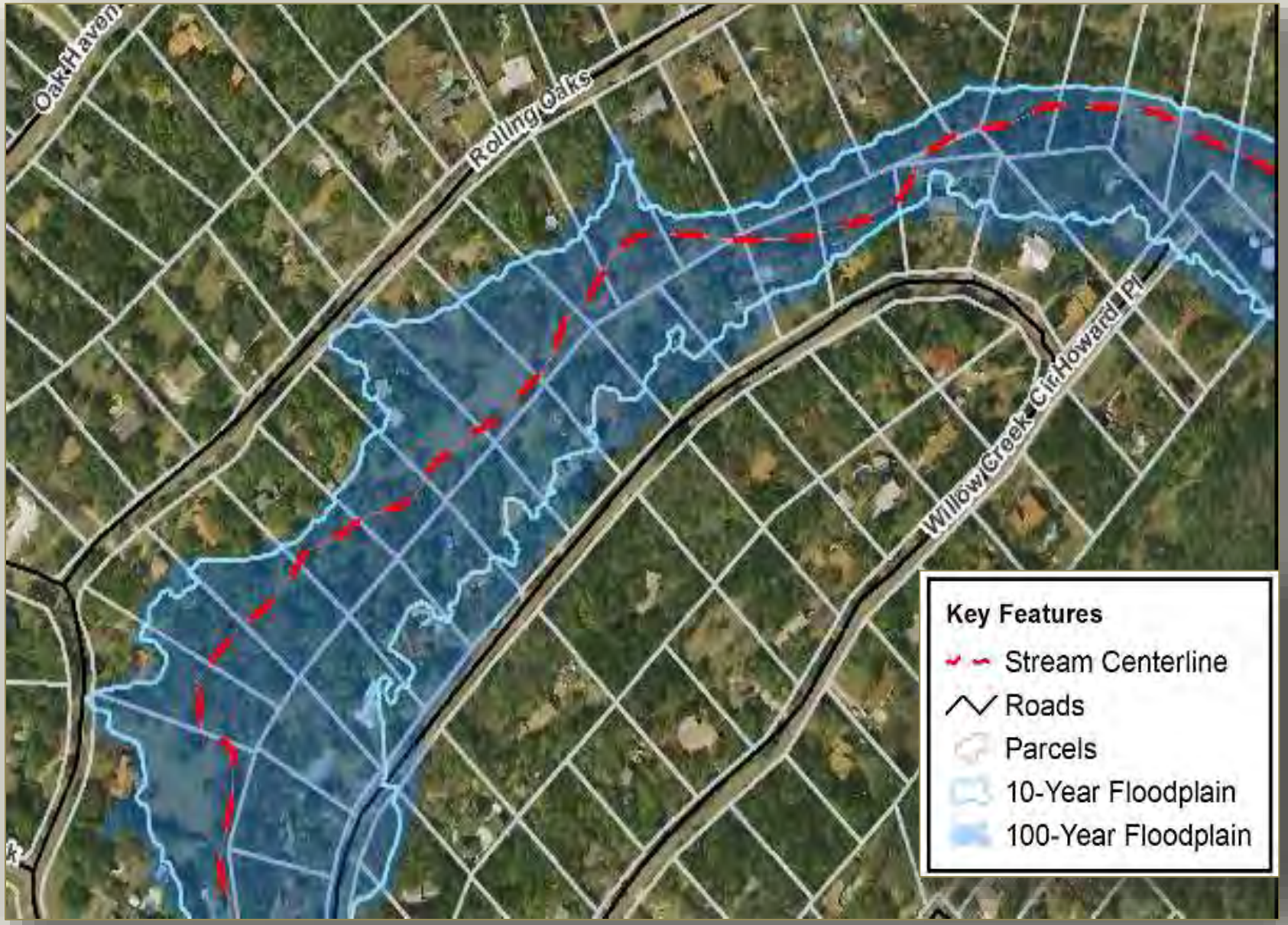
## Current Mapping Challenges

- FIRM updates take 3-5 years to update through regulatory process
- FIRMs include a subset of streams within a watershed based on current and historic updates
- FIRMs depict 1% and 0.2% annual chance events
- Insurance and In versus Out discussions
- Detailed study areas require significant resources to prepare a model communities can review

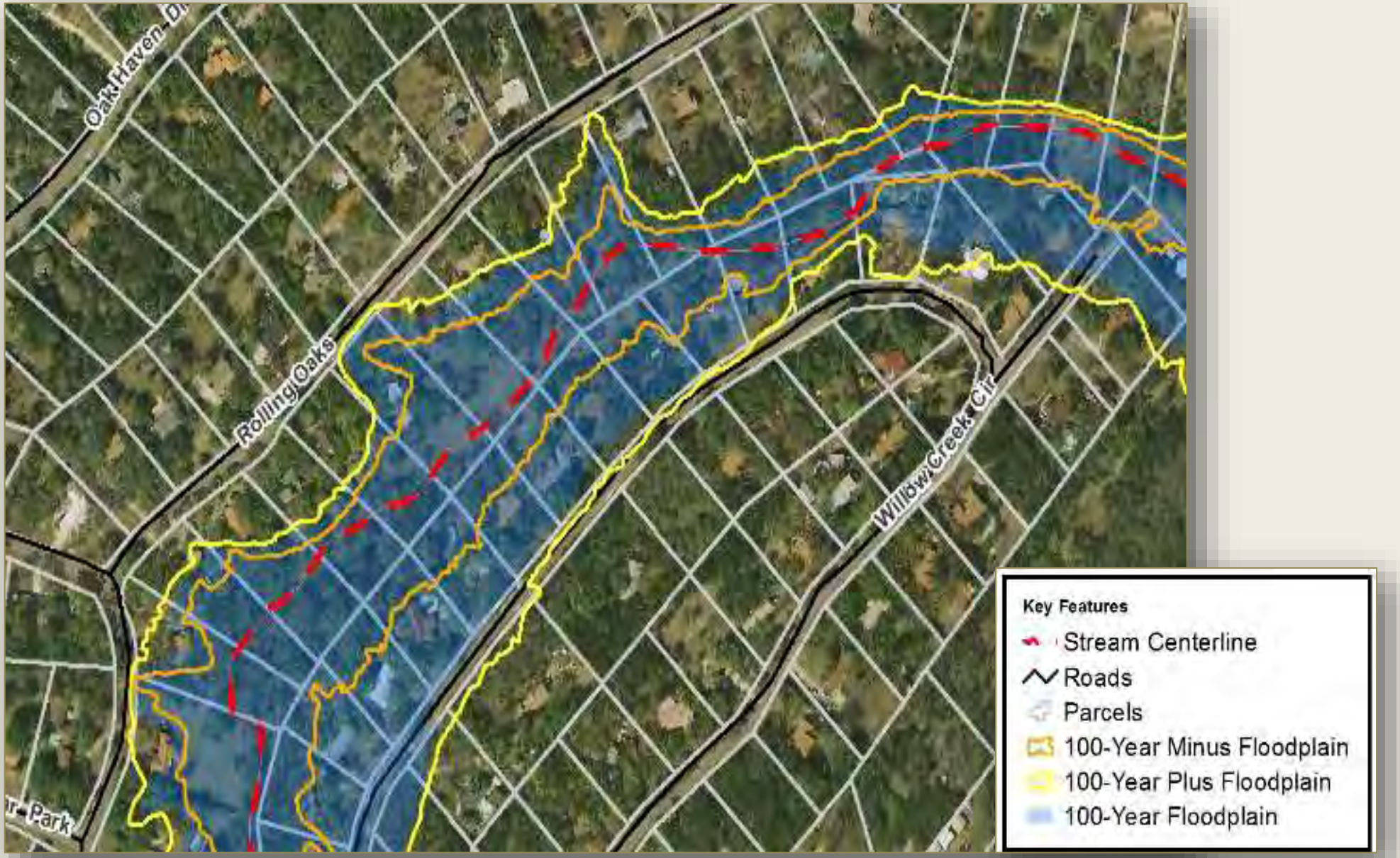
## Base Level Engineering Solutions

- BLE data can be produced and delivered to communities within 9-12 months
- BLE assessments performed at a watershed scale producing stream network of data
- Flexibility in how results are exhibited
- Discussions related to flood risks and development decisions
- Community may test drive and refine data prior to moving to a map update

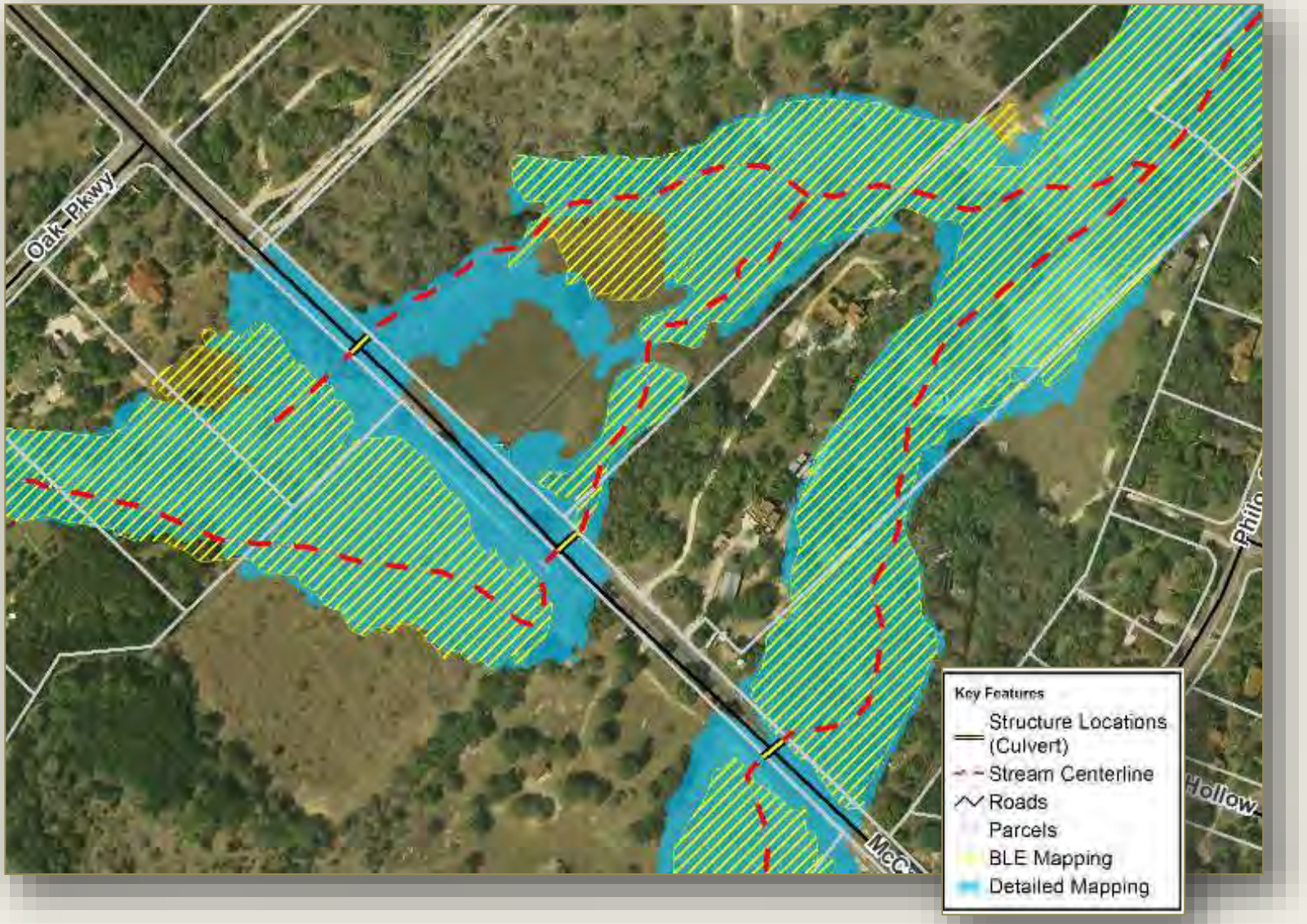
# Practical Uses for BLE Data



# Practical Uses for BLE Data



# Practical Uses for BLE Data

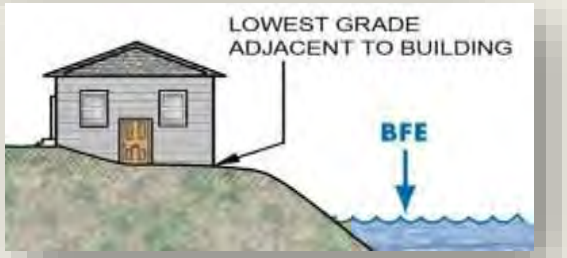


# How can I use Base Level Engineering Data?

PERMITTING

MITIGATION
PLANNING

INSURANCE
RATING




LOMAs

# Estimated Base Flood Elevation Viewer

## Estimated BFE Viewer Purpose:

- Provide engineering data in a format that allows immediate use by public.
- Federal, State and local officials to estimate a Base Flood Elevation consistently.

**www.InFRM.us/estBFE**

- Engineering Models

- Water Surface Elevation Grid
- Estimated Flood Depth Grid

- GIS features without software
- Public interaction with Results
- Site Specific Reports
- Data & Model Downloads
- Consistent BFE Estimation

# Estimated Base Flood Elevation Viewer

*Welcome to the* **Estimated Base Flood Elevation Viewer**

Base Level Engineering assessments are produced using high resolution ground data to create technically creditable flood hazard information that may be used to expand and modernize FEMA's the current flood hazard inventory.

The Estimated Base Flood Elevation Viewer allows users to:

## View Base Level Engineering Data

Access all Base Level Engineering available without GIS software.

Click **LEGEND** tab to view an explanation of all dat shown in the viewer.

Click **MAP VIEW** button to open or close a second viewing window, for side by side comparison.

Click **DATA LAYERS** to add or remove layers from the map.


## Download Dataset & Models

Our Data Download feature makes all of our Base Level Engineering data available to you for download.

Click **DATA LAYERS** and add the **DOWNLOADABLE DATA** layer. Once loaded, users can choose which datasets to save.


## Property Look Up

Where data is available, users can produce a property specific report with estimated Base Flood Elevation and Flood depth information.

Click **TOOLS** tab to create a property specific flood risk report with details in your vicinity.

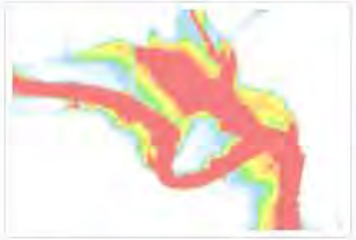
# Estimated Base Flood Elevation (estBFE) Viewer

FEMA

Report | Legend 2

## Flood Depth (1%)

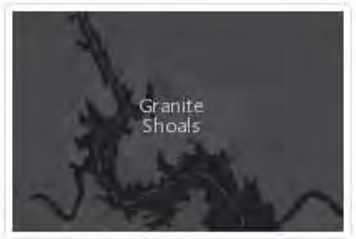
Remove



| | |
|---|---|
| ≤ 1 foot | > 3 to 4 feet |
| > 1 to 2 feet | > 4 to 5 feet |
| > 2 to 3 feet | > 5 feet |

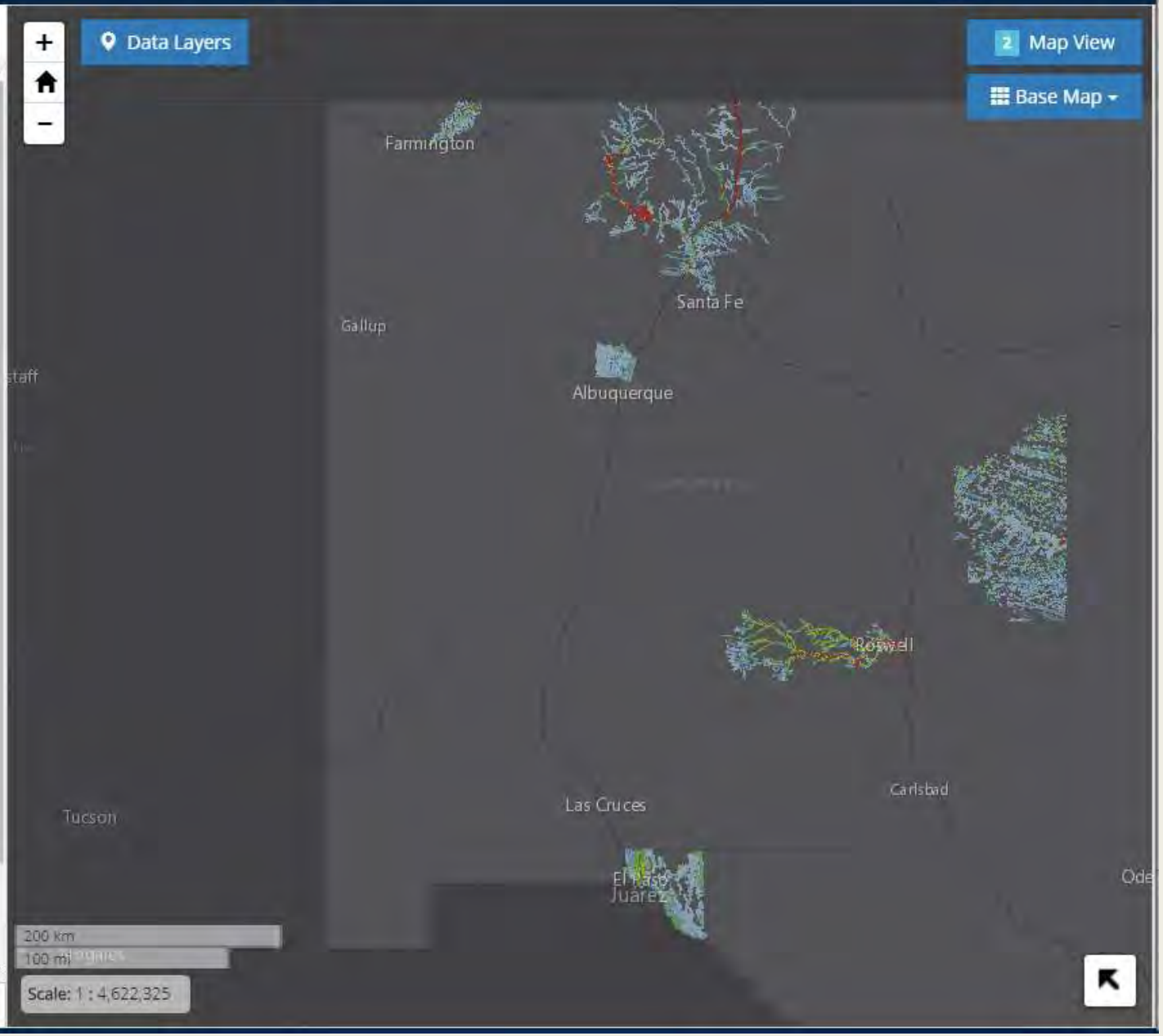
**Comments:** Depicts estimated water depths above land surface during a 1% annual chance storm event (a storm that has a 1/100 chance of occurring in any calendar year).

## Base Map: Dark




**Comments:** This base map provides a dark, neutral background with minimal colors, labels, and features to

Quick Start | Glossary | About



# Estimated Base Flood Elevation Viewer


1% and 0.2%
Estimated Flood Extent

1%
Estimated Flood Depth

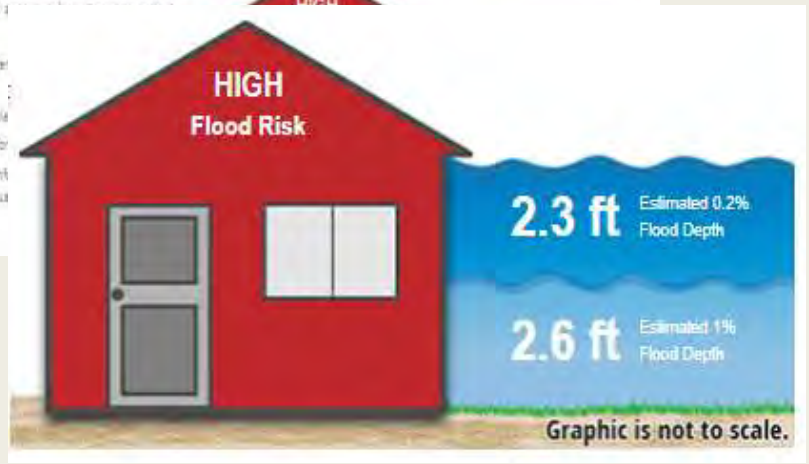
# Estimated Base Flood Elevation Viewer

- Floodplains on the Left
- Depth Grid on the Right


| Flood Event | Estimated Flood Depth* | Estimated Base Flood Elevation* |
|---|---|---|
| 1 Percent (100 Year) | 2.6 feet above land surface | 5320.8 feet NAVD 1988 |
| 0.2 Percent (500 Year) | 2.3 feet above land surface | 5320.8 feet NAVD 1988 |

* The information included in this report is based on the location marker shown in the map. Results are not considered an official determination.

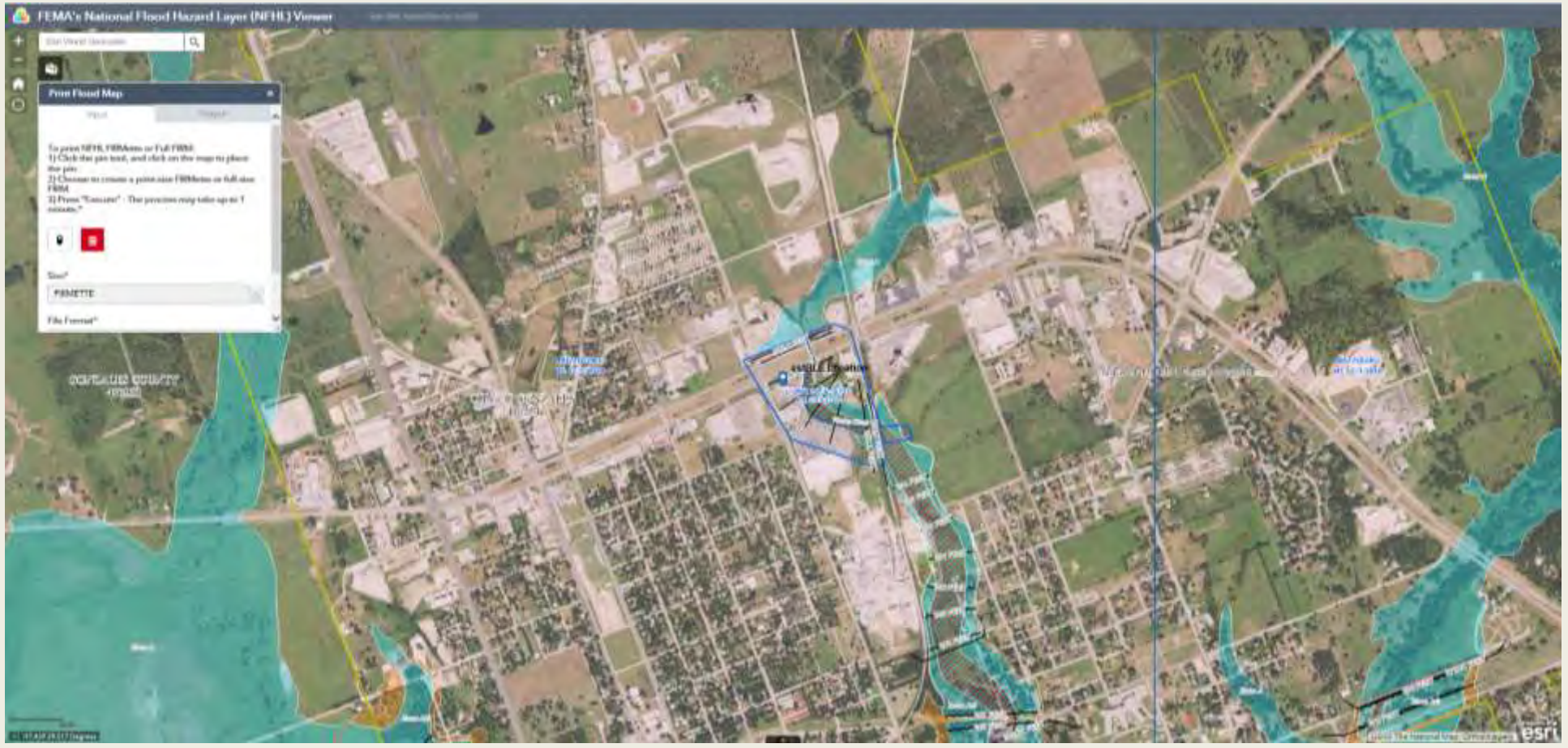
**Information made available from the Estimated BFE Viewer needs to be accepted by local community officials to be used for insurance rating purposes.**




The web address of the report can be used to share or bookmark a specific location.

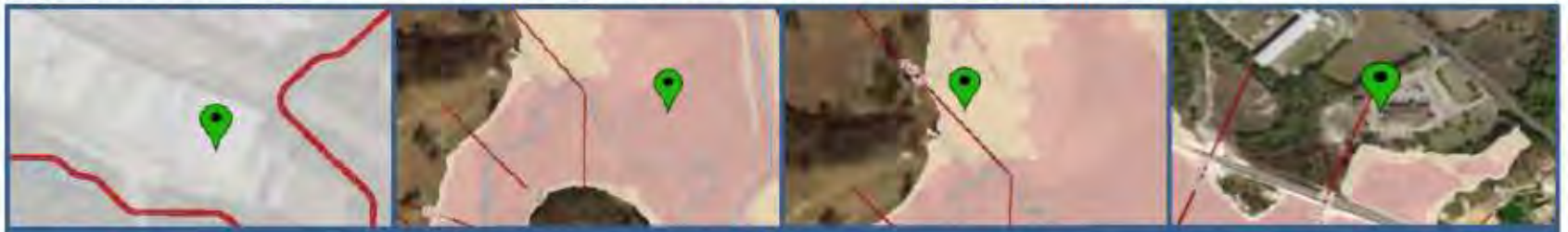
# Estimated Base Flood Elevation Viewer

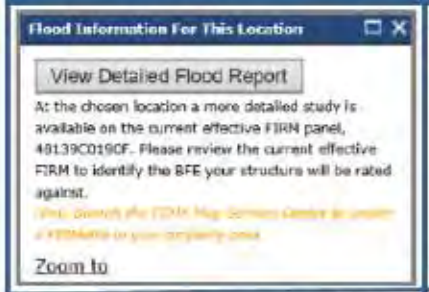
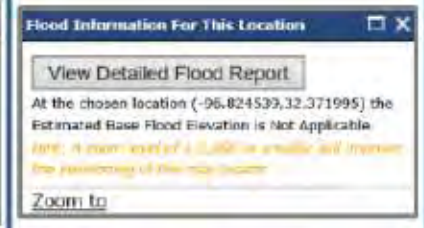
If detailed information is available on the current effective FIRM,
The viewer will alert you and offer you the option to open the National Flood Hazard Layer (NFHL)



# Region 6 eBFE Viewer

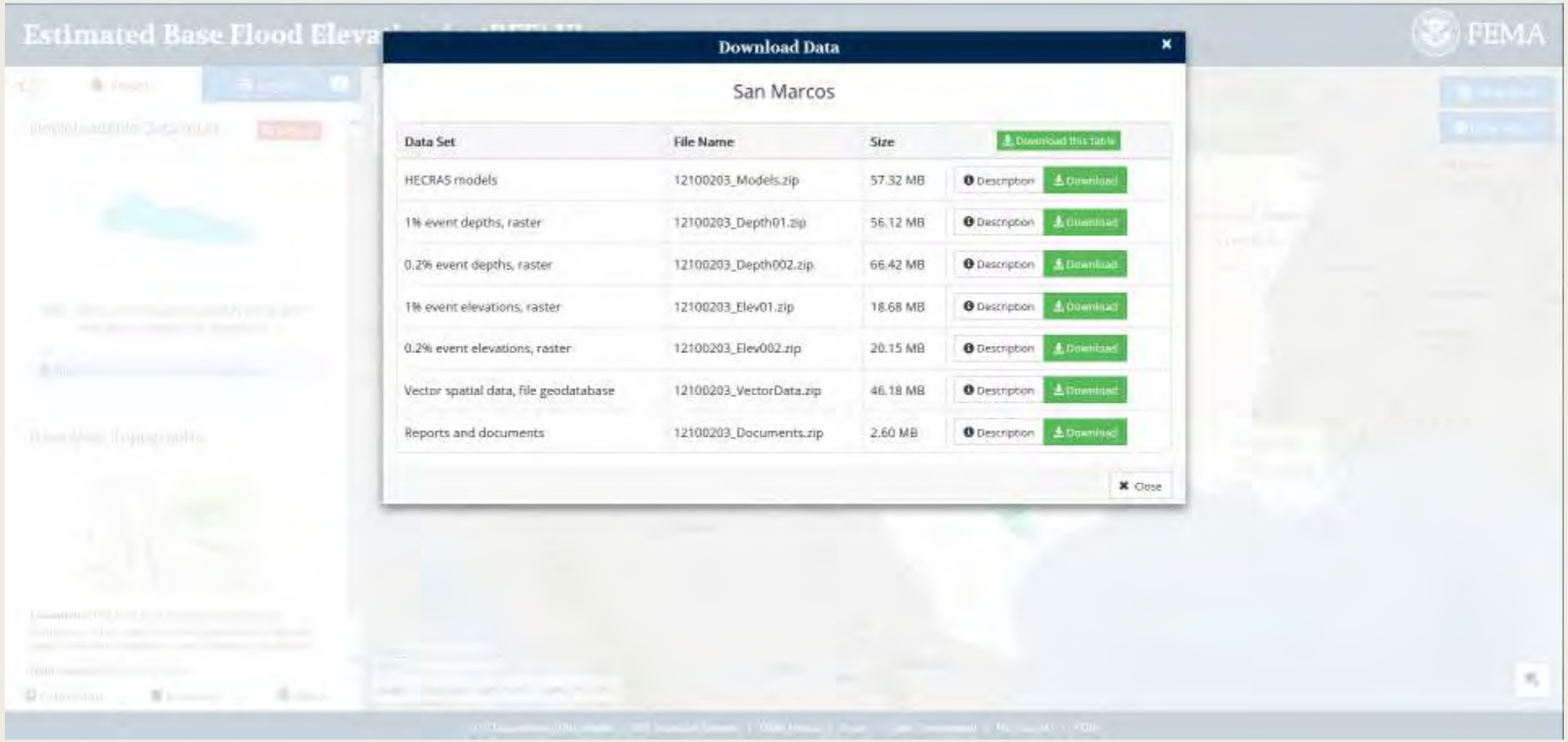
There are four possible outcomes dependent upon where the **Drop Pin** is placed: Detailed Study Available, High Risk, Low to Moderate Risk and Low Risk. More information is available in Table below.



| Detailed Study | High Flood Risk | Moderate Flood Risk | Low Flood Risk |
|---|---|---|---|
|  |  |  |  |
| **Flood Risk Report Details:**<br>- Effective FIRM panel that should be reviewed to determine current Base Flood Elevation<br>- Longitude/Latitude<br>- Model Location | **Flood Risk Report Details:**<br>- Estimated Flood Elevation<br>- Estimated Flood Depth<br>- Longitude/Latitude<br>- Model Location | **Flood Risk Report Details:** (**does not include info for 1%**):<br>-Estimated Flood Elevation<br>-Estimated Flood Depth<br>-Longitude/Latitude<br>-Model Location | **Flood Risk Report does not include Flood Elevations at this time.**<br>Land and structures outside of any indicated flood extent may experience flooding during an event that exceeds the 0.2% annual chance. |

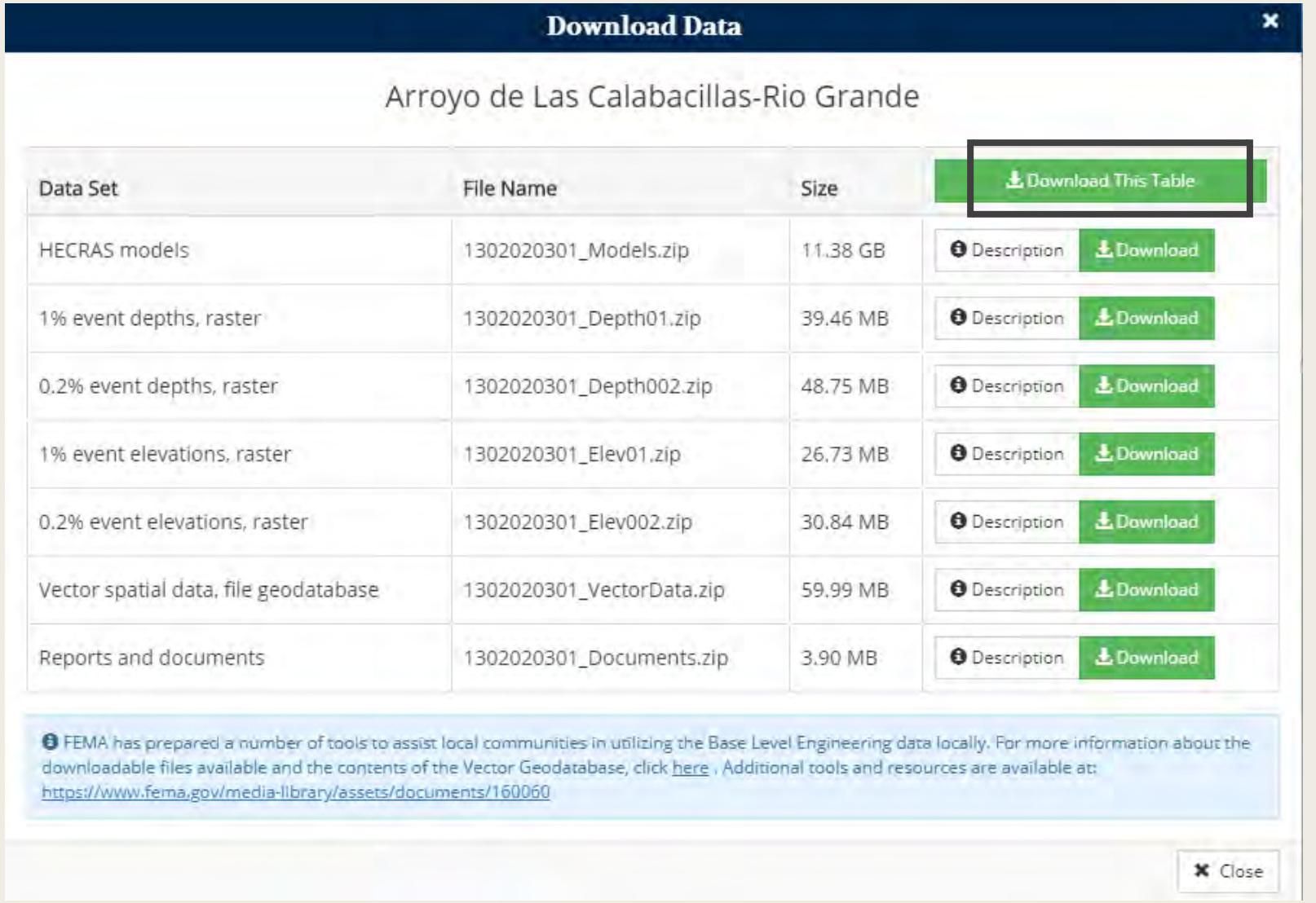
*Note: At this time, flood elevations are only available in the High Flood Risk flood extent area.*

# Download the Data




**www.InFRM.us/estBFE**

# Download the Data



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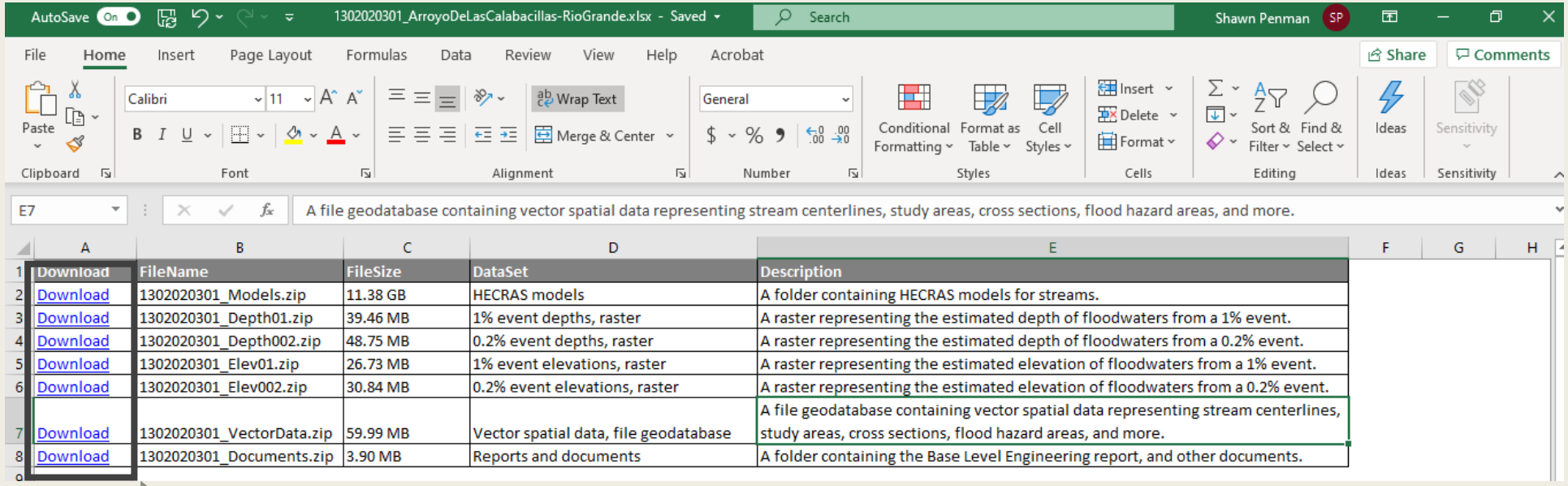



| Download | FileName | FileSize | DataSet | Description |
|---|---|---|---|---|
| Download | 1302020301_Models.zip | 11.38 GB | HECRAS models | A folder containing HECRAS models for streams. |
| Download | 1302020301_Depth01.zip | 39.46 MB | 1% event depths, raster | A raster representing the estimated depth of floodwaters from a 1% event. |
| Download | 1302020301_Depth002.zip | 48.75 MB | 0.2% event depths, raster | A raster representing the estimated depth of floodwaters from a 0.2% event. |
| Download | 1302020301_Elev01.zip | 26.73 MB | 1% event elevations, raster | A raster representing the estimated elevation of floodwaters from a 1% event. |
| Download | 1302020301_Elev002.zip | 30.84 MB | 0.2% event elevations, raster | A raster representing the estimated elevation of floodwaters from a 0.2% event. |
| Download | 1302020301_VectorData.zip | 59.99 MB | Vector spatial data, file geodatabase | A file geodatabase containing vector spatial data representing stream centerlines, study areas, cross sections, flood hazard areas, and more. |
| Download | 1302020301_Documents.zip | 3.90 MB | Reports and documents | A folder containing the Base Level Engineering report, and other documents. |

Hyperlinks for each of the dataset available are included in the excel file. Excel file can be sent ahead of any meeting you are going to have in the watershed areas.

# TSDN Report

Base Level Engineering Technical Support Data Notebook

Base Level Engineering for Southern Sandoval County Arroyo Flood Control Authority, New Mexico

*August 16, 2019*

FEMA

Federal Emergency Management Agency
Department of Homeland Security
800 N. Loop 288
Denton, TX 76209



**Table 1: HEC-HMS Watershed Modeling Summary**

| Watershed | Drainage Area (Sq. Miles) | HEC-HMS Version | Rout Meth | | |
|---|---|---|---|---|---|
| Black Arroyo | 11.5 | 3.5 | Musk Cung | | |
| Calabacillas Arroyo | 69.2 | 3.5 | Musk Cung | | |
| La Barranca Arroyo | 12.0 | 3.5 | Musk Cung | | |
| Montoyas Arroyo | 60.4 | 4.2.1 | Muskingum-Cunge | SCS CN | Clark UH |
| Unnamed Arroyo (aka Coronado Arroyo) | 0.4 | 3.5 | Muskingum-Cunge | Initial and Constant | Clark UH |
| Venada Arroyo | 16.4 | 3.5 | Muskingum-Cunge | Initial and Constant | Clark UH |
| Willow Creek | 2.0 | 3.5 | Muskingum-Cunge | Initial and Constant | Clark UH |
| Zia | 11.1 | 4.2.1 | Muskingum-Cunge | SCS CN | SCS UH |

## 2.2 HEC-HMS STUDY DATA DEVELOPMENT

### 2.2.1 Rainfall Determination

Each provided HEC-HMS rainfall-runoff model included the 1% annual chance rainfall event. Precipitation depth data for the 10%, 4%, 2%, and 0.2% annual chance events and partial duration based 24-hour point precipitation frequency was obtained from NOAA Atlas 14. 1% plus and minus precipitation depths were established as one standard deviation above and below the 1%, 24-hour rainfall, respectively.

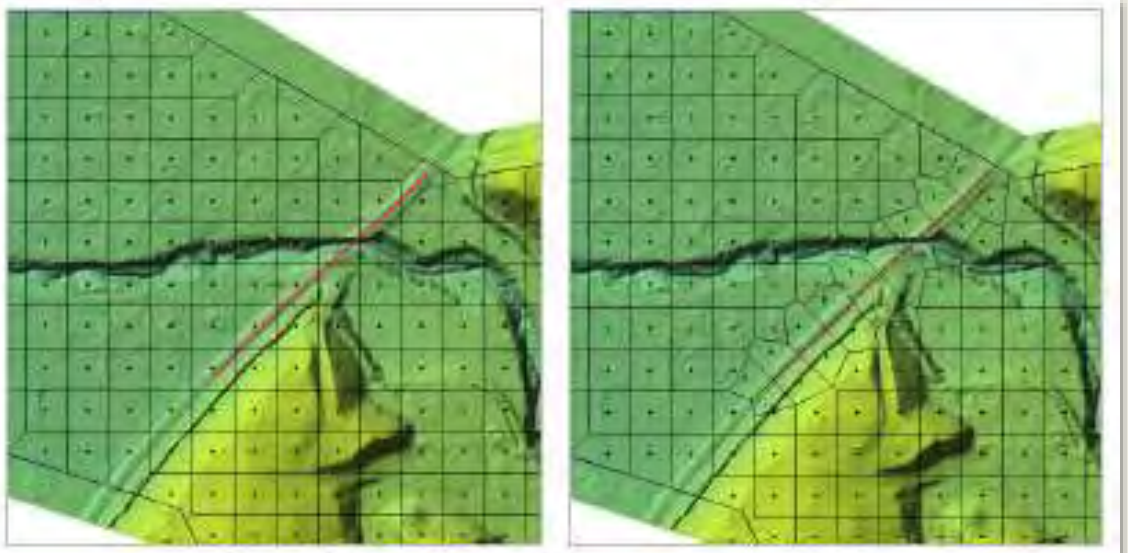


**Figure 3: Breakline Cell Adjustment in HEC-RAS**

# Products Support Local Decision Making

## Educate your Community and Make a Plan

- Public awareness campaigns
- Map and publicize potential inundation areas
- Training for local staff
- Community Emergency Response Teams
- Community preparedness exercises
- Evacuation signage

## Encourage Smart Land Use and Development Decisions

- Determine and enforce acceptable land uses in downstream areas
- Increase permeability and infiltration
- Maintain open space downstream
- Encourage stream and wetland restoration

## Enact Management Best Practices

- Develop a dam failure study and emergency action plan
- Manage stormwater regionally
- Implement an inspection, maintenance, and enforcement program to ensure structural integrity

## Conduct Mitigation Projects Downstream

- Acquisition
- Elevation
- Detention and/or drainage projects

## Strengthen Local Codes

- Local inspection and enforcement
- Enact higher floodplain management standards
- Require green infrastructure

# What can I do with BLE?

## BLE and Your Community Resolution Structure

**Your community is structured in a way that dictates HOW and WHEN you can use Base Level Engineering information**

- For Example:
  - *Storm County bylaws dictate that new flood hazard information can only be adopted when FEMA publishes it on a new FIRM.*
  - *The Town of Seiche has an ordinance that requires public presentation of new data at a Town Council meeting and a vote on it's official usage.*
  - *Hazard County requires an update to it's zoning overlay districts (which comes with it's own public review and community approval process) before any new flood hazard information can be used.*

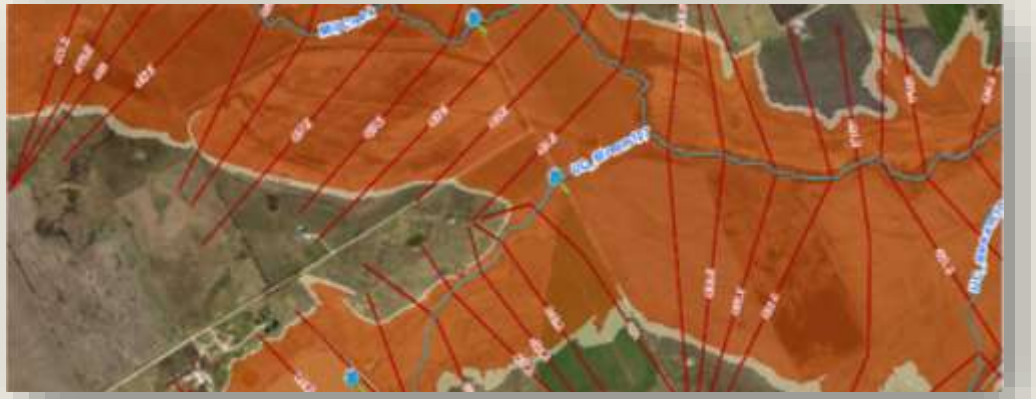
# Base Level Engineering as Best Available Information

- Communities are required to reasonably utilize BFE information when available
  - *60.3(b)*
- FEMA's Best Available Information Policy:
  - *FEMA Policy #104-008-02*
- BLE MAY be considered Best Available Information (BAI) and adopted by communities

***44 CFR 60.3(b)*** *When the Administrator has designated areas of special flood hazards (A zones) by the publication of a community's FHBM or FIRM, but has neither produced water surface elevation data nor identified a floodway or coastal high hazard area, the community shall:…*

***(3)*** *Require that all new subdivision proposals and other proposed developments (including proposals for manufactured home parks and subdivisions) greater than 50 lots or 5 acres, whichever is the lesser, include within such proposals base flood elevation data;*

***(4)*** *Obtain, review and reasonably utilize any base flood elevation and floodway data available from a Federal, State, or other source, including data developed pursuant to paragraph (b)(3) of this section, as criteria for requiring that new construction, substantial improvements, or other development in Zone A on the community's FHBM or FIRM meet the standards …*



# SSCAFCA

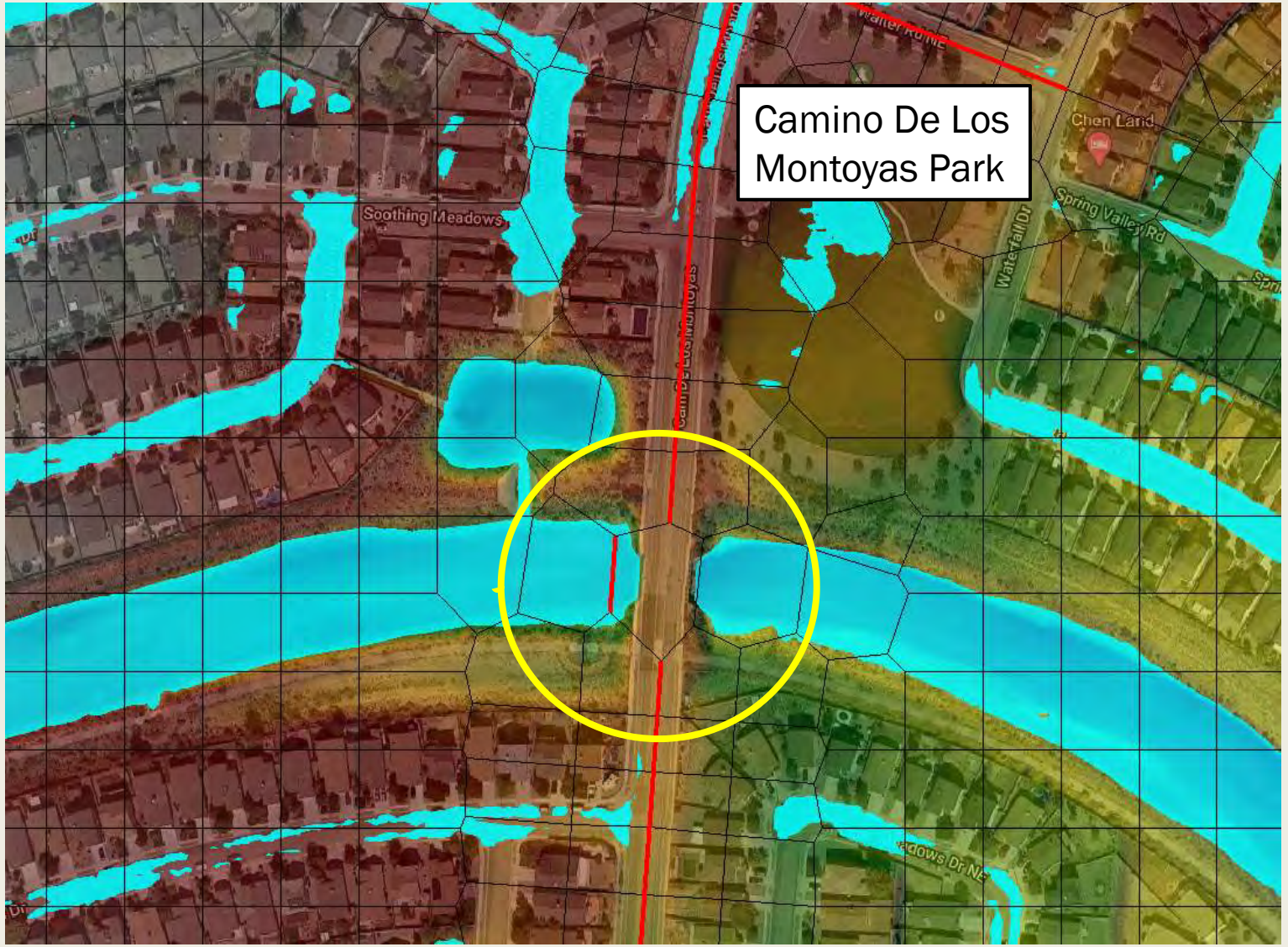
BLE Areas of Interest

Mat Hornack, ESP & Associates

# SSCAFCA 2D Modeling

- Used split breaklines to allow flow to pass through embankments

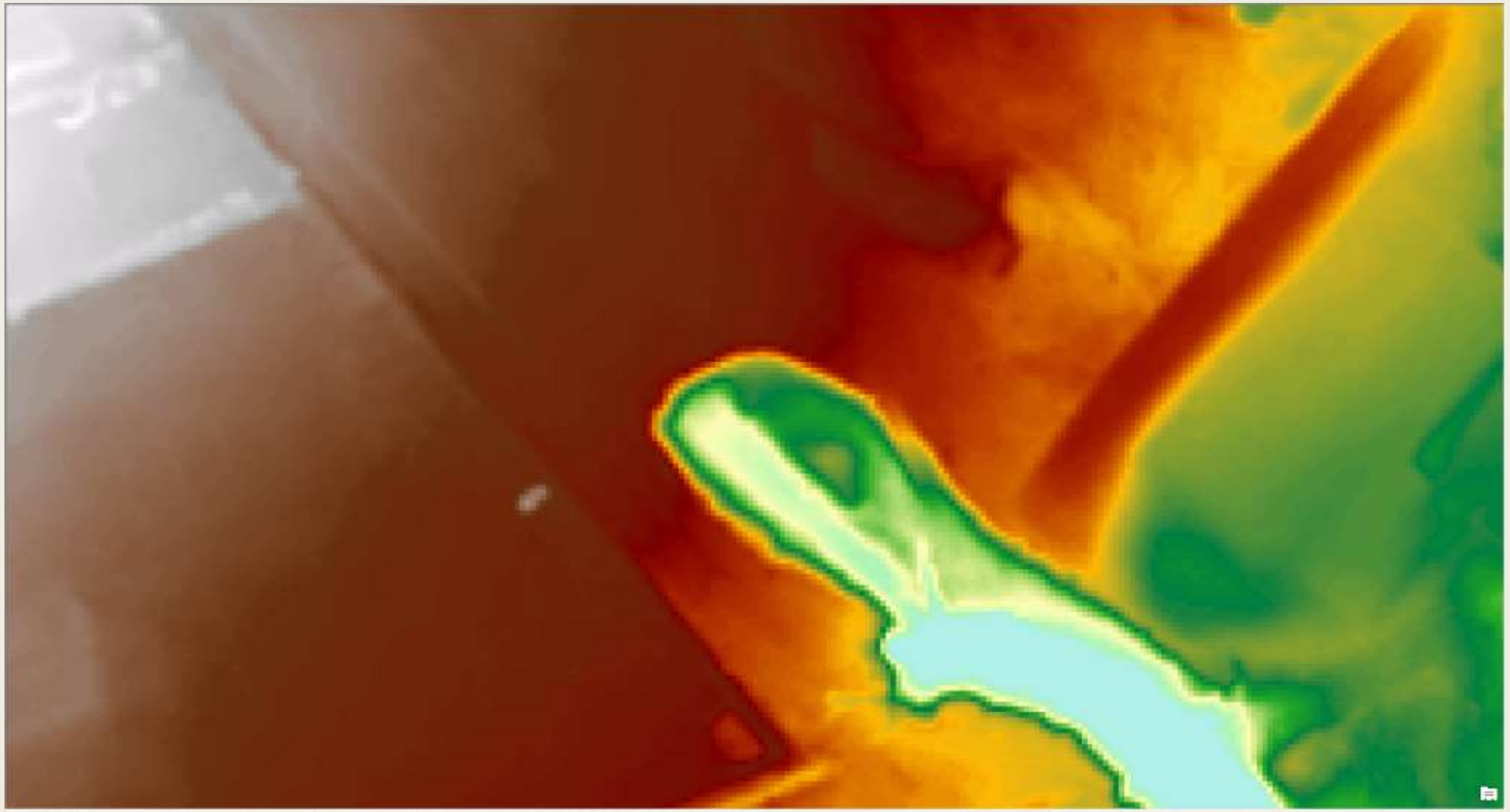
# SSCAFCA 2D Modeling



# SSCAFCA Area of Interest

- Terrain near Big R Stores – Santa Ana Pueblo
  - *Near the intersection of US HWY 550 and Pat D'Arco Hwy*
- Terrain shows discrepancy with imagery
- Outside of BLE scope to adjust this

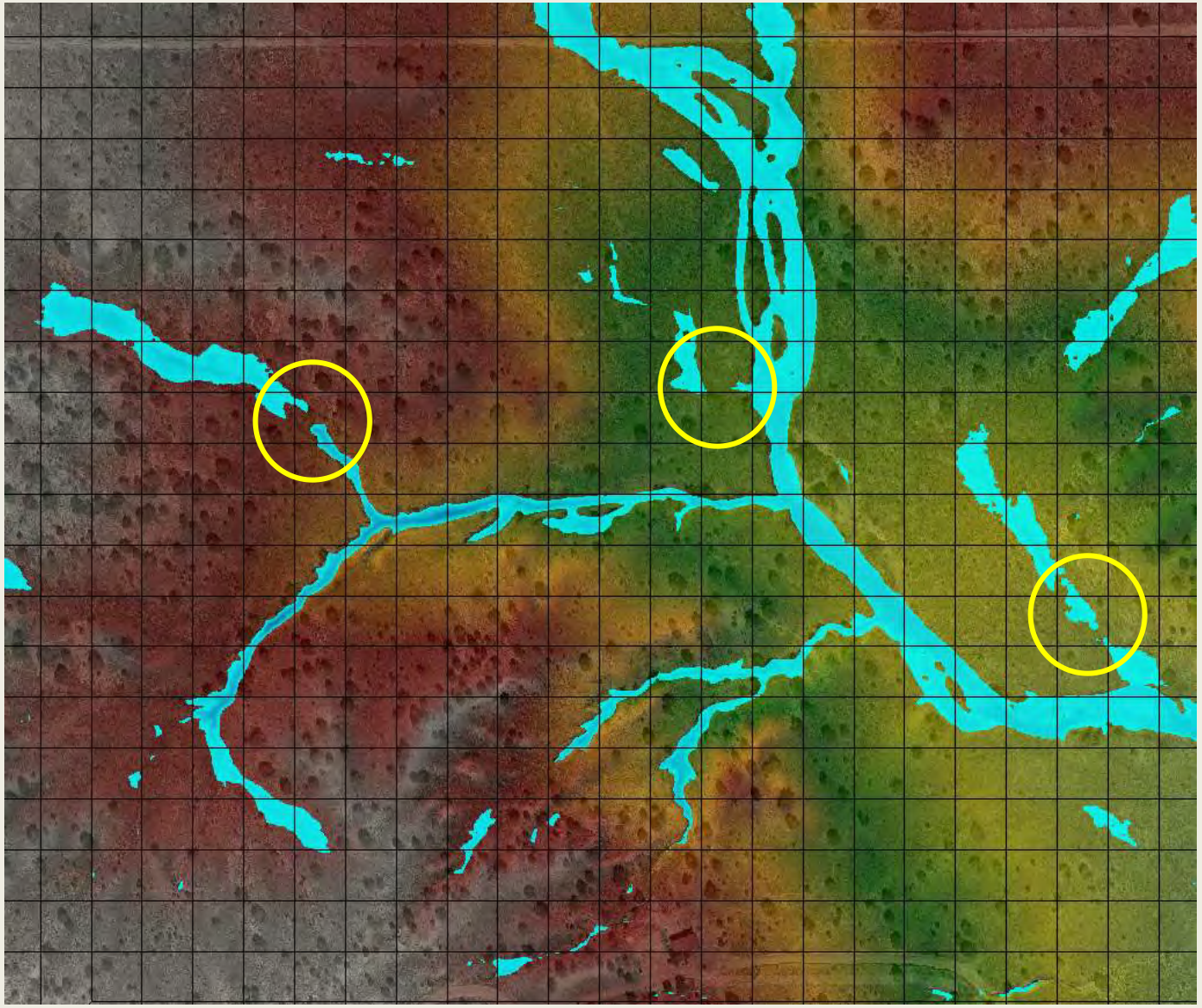
# SSCAFCA Areas of Interest



# SSCAFCA Areas of Interest

- If looking at RAS model:
  - *Gaps may or may not be real*
  - *There are differences in mapping using calculation points and mapping from RAS Mapper*
- Notice cell spacing and orientation could be adjusted for areas of interest to improve model results

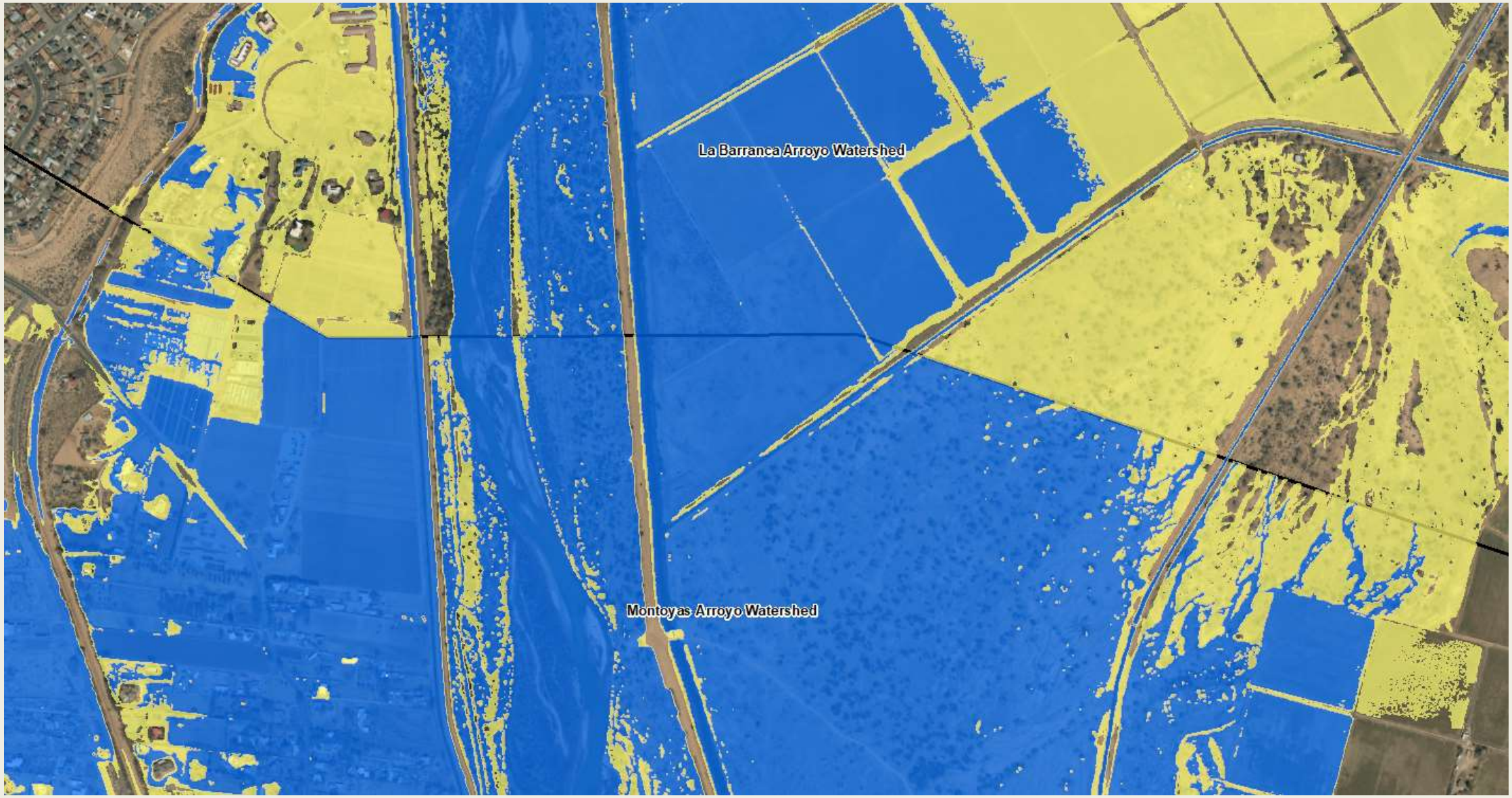
# SSCAFCA Areas of Interest



# SSCAFCA Areas of Interest

- Along the Rio Grande, some models tie-in at the 2D flow area boundaries and others do not
- Rio Grande was not a focus of the study (most of it has been previously studied)
  - *If Rio Grande is analyzed in future study, should add levees, structures, breaklines, and establish downstream WSELs*
- La Barranca and Montoyas boundary discrepancy shown on next slide
  - *This location is within a detailed study area*

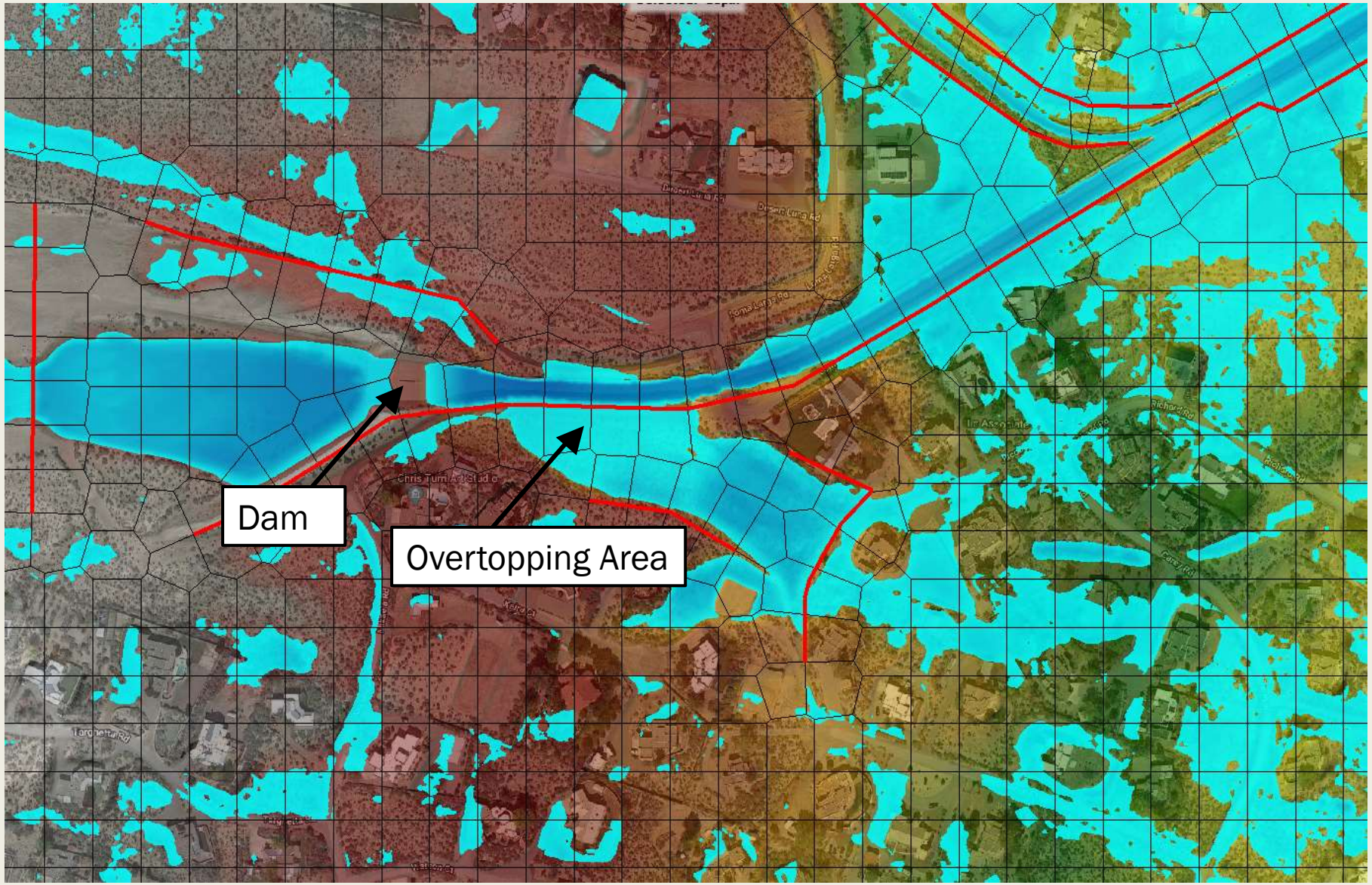
# SSCAFCA Areas of Interest



# SSCAFCA Areas of Interest

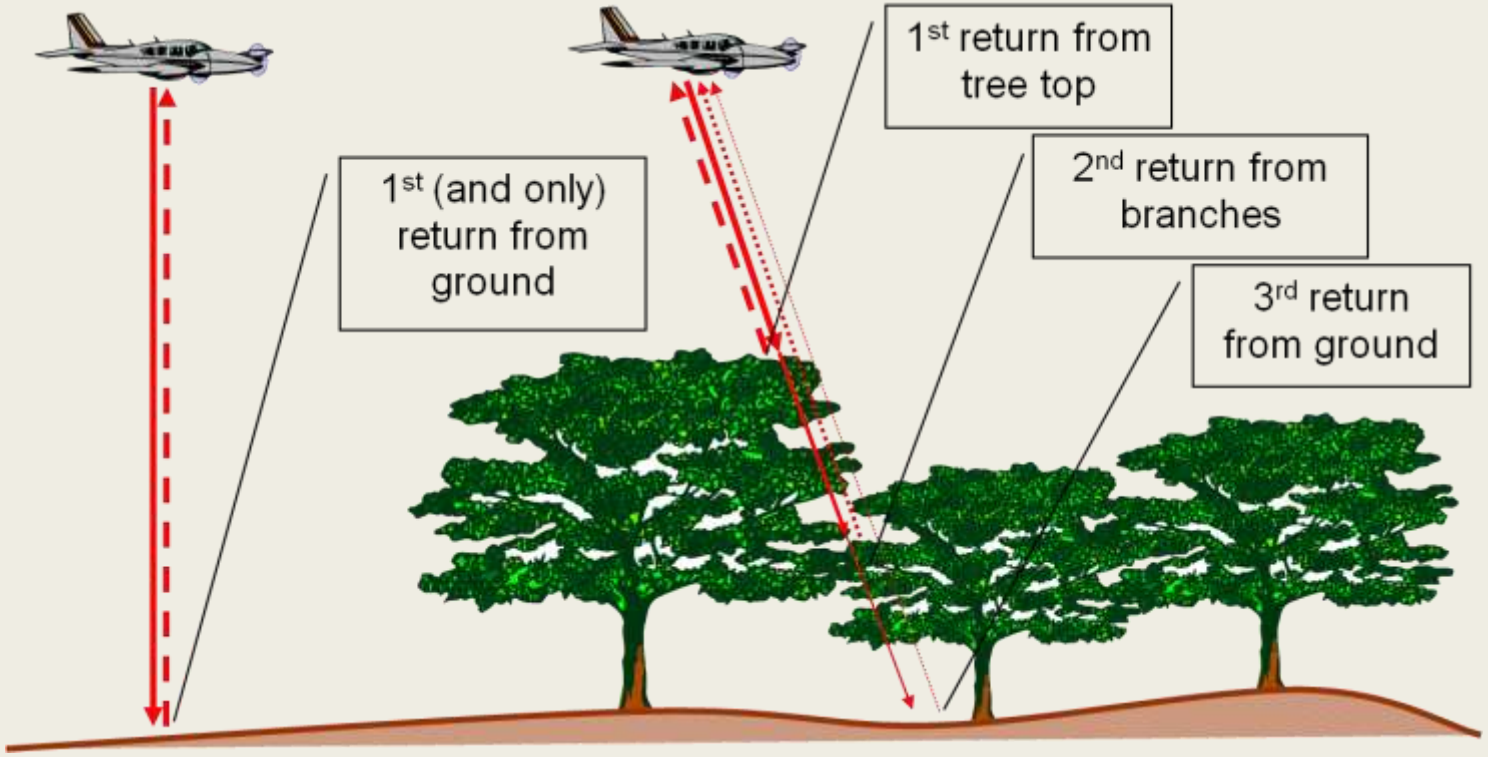
- Area near the north end of Loma Larga Rd in northern Corrales
- Example where an overtopping area was considered unrealistic
- Important to see some of the limitations of the BLE approach

# SSCAFCA Areas of Interest



# LIDAR

# Lidar Returns




Forest Resource Assessment Nepal

# Current 10 Meter DEM vs USGS QL2 Lidar

# NMFLOOD.org

## NMFLOOD.ORG

A collaborative resource to promote New Mexico flood risk awareness and resiliency

### Watershed Projects

Discovery Project Areas

- Valencia County
- Curry and Roosevelt Counties

Base Level Engineering Project Areas

- Animas Watershed
- Rio Hondo Watershed
- Upper Rio Grande Watershed
- Curry & Roosevelt Counties
- Rio Chama Watershed
- Southern Sandoval County Arroyo and Flood Control Authority (SSCAFCA)

### Special Projects

Lidar Building Footprint Toolbar

The LiDAR Building Extraction Toolbox for LiDAR LAS 1.4 files works with ESRI ArcGIS version 10.4, 10.5 and ArcGIS Pro.

- LiDAR Building Footprint Extraction Tool User Guide
- LiDAR Building Footprint Extraction Tool Video Playlist
- LiDAR Building Footprint Tool Download

### Statewide Projects

New Mexico Multi-Hazard Risk Portfolio

- Risk Portfolio Landslide Risk
- Risk Portfolio Wildfire Risk
- Risk Portfolio Flood Risk

Other Statewide Projects

- Stream Gage Analysis
- Alluvial Fan and Debris Flow Report
- Automated Landslide Hazard Detection
- New Mexico Zone D Report

### Interactive Maps

Statewide flood data

- FEMA's National Flood Hazard Layer (NFHL)

Region VI Viewers

- Estimated Base Flood Elevation (estBFE) Viewer

CTP Interactive Maps

- Lidar Status for New Mexico

### Story Maps

- Impacts of September 2013 Flooding in New Mexico
- Turn Around Don't

# EBFE VIEWER DEMO

www.InFRM.us/estBFE

# More BLE Information & Resources

## FEMA BLE Resources

https://www.fema.gov/media-collection/base-level-engineering-ble-tools-and-resources

- Estimated BFE Viewer
- Overview – What is Base Level Engineering?
- Using the Estimated BFE Viewer
- BLE as Best Available Information
- HOW2 – Find the Right HEC-RAS Model
- Fact Sheet – Flood Depth Grids
- BLE and Letters of Map Revision

Plus many more

# QUESTIONS

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