

# **Carson River, NV PMR Update**

## **7.20.2022**



# Outline

- Project History
  - Initial Study
  - Levee Analysis
  - Floodway Analysis
- Hydrology
- Hydraulic Modeling
- Mapping
- Project Status



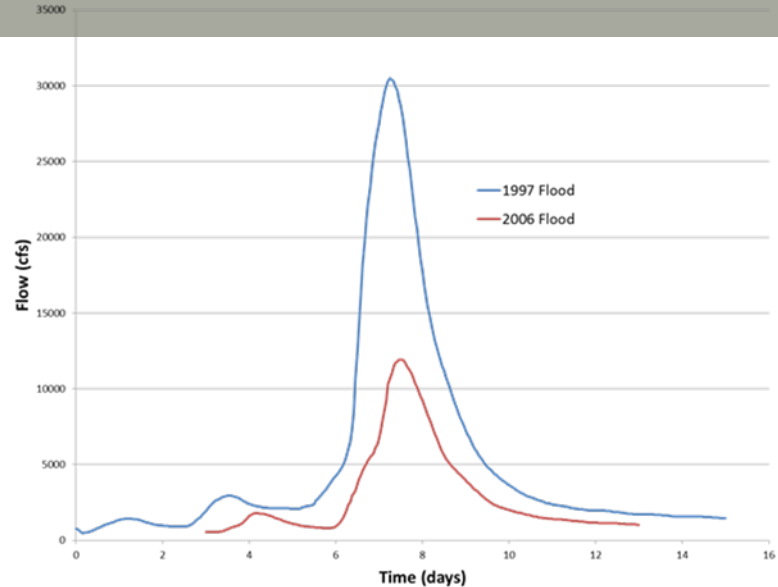
# Project History

- MAS 3 & 4
  - MAS 3 – Modeling 100yr floodplain
  - MAS 4 – Project Reporting and Mapping
  - FEMA Submittal February 2017
- FEMA Comments January 2019
- HDR Resubmittal September 2020
- FEMA Comments December 2020
  - Included Floodway Requirements
- Douglas County Petitioned for no Floodways 2021
  - FEMA Rejected 2021
- Revised Floodway Modeling and Mapping Late 2021

# Hydrology

- Effective FEMA Flood Insurance Study
  - Hydrology based on 1980's estimates
  - Revised peak flow estimates
  - Include 1997 and 2006 events
- Revised Hydrology
- Used “Balanced Hydrograph” approach
  - Peak and n-day statistics
  - 1-, 3-, 5-, 7-, 10-day
  - 1997 and 2006 flood events as “pattern” hydrographs
  - 1- and 0.2-Percent-annual-chance

| Streamgaging Station | Description       | Effective (cfs) | Proposed (cfs) |
|----------------------|-------------------|-----------------|----------------|
| 10308200             | EFCR Markleeville | 23,556          | 22,974         |
| 10309000             | EFCR Gardnerville | 21,694          | 21,305         |
| 10310000             | WFCR Woodfords    | 8,465           | 6,985          |
| 10311700             | Carson City       | 36,000          | 33,500         |
| 10311000             | Dayton            | 36,000          | 30,700         |

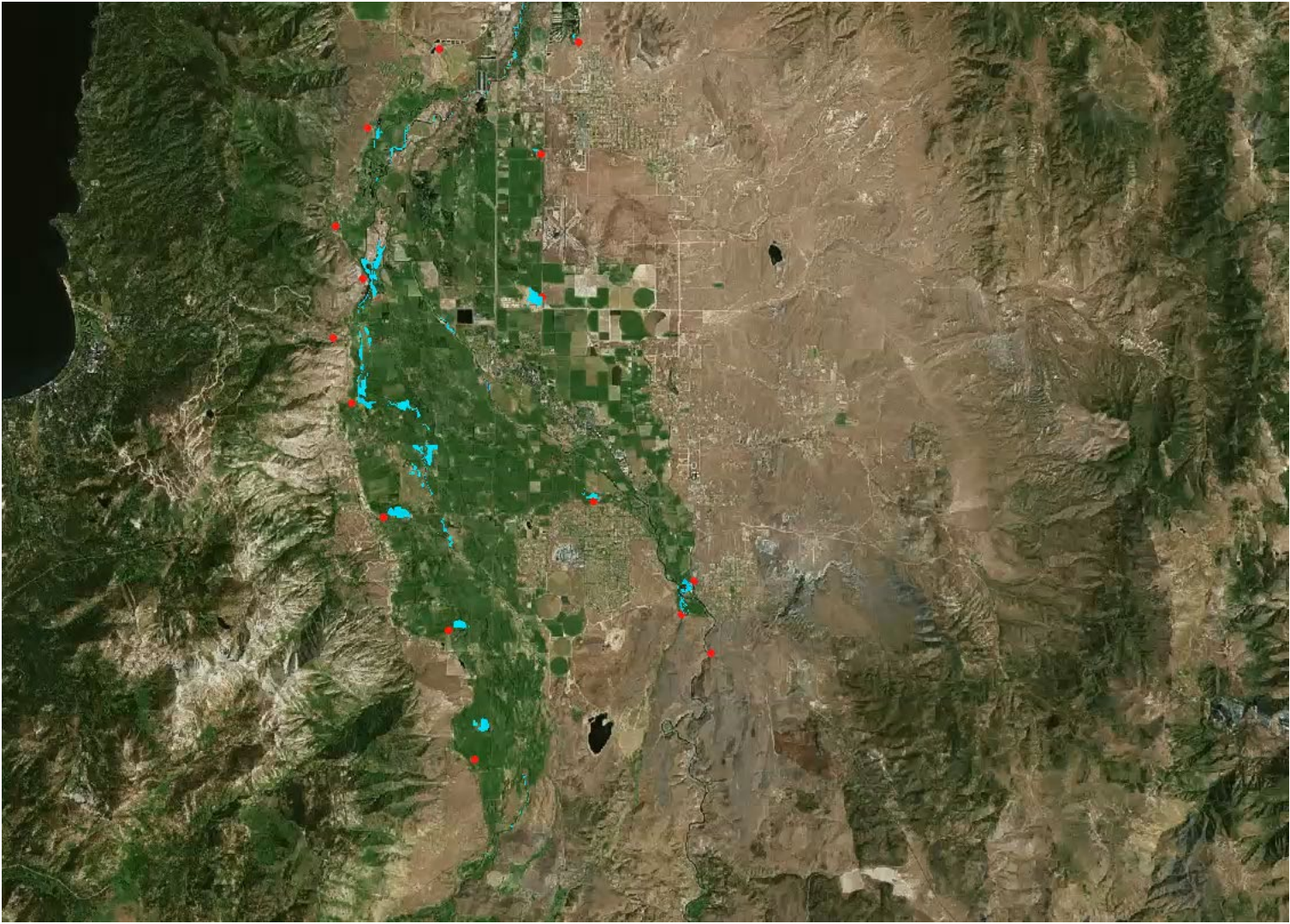


# Carson River Hydraulic Modeling

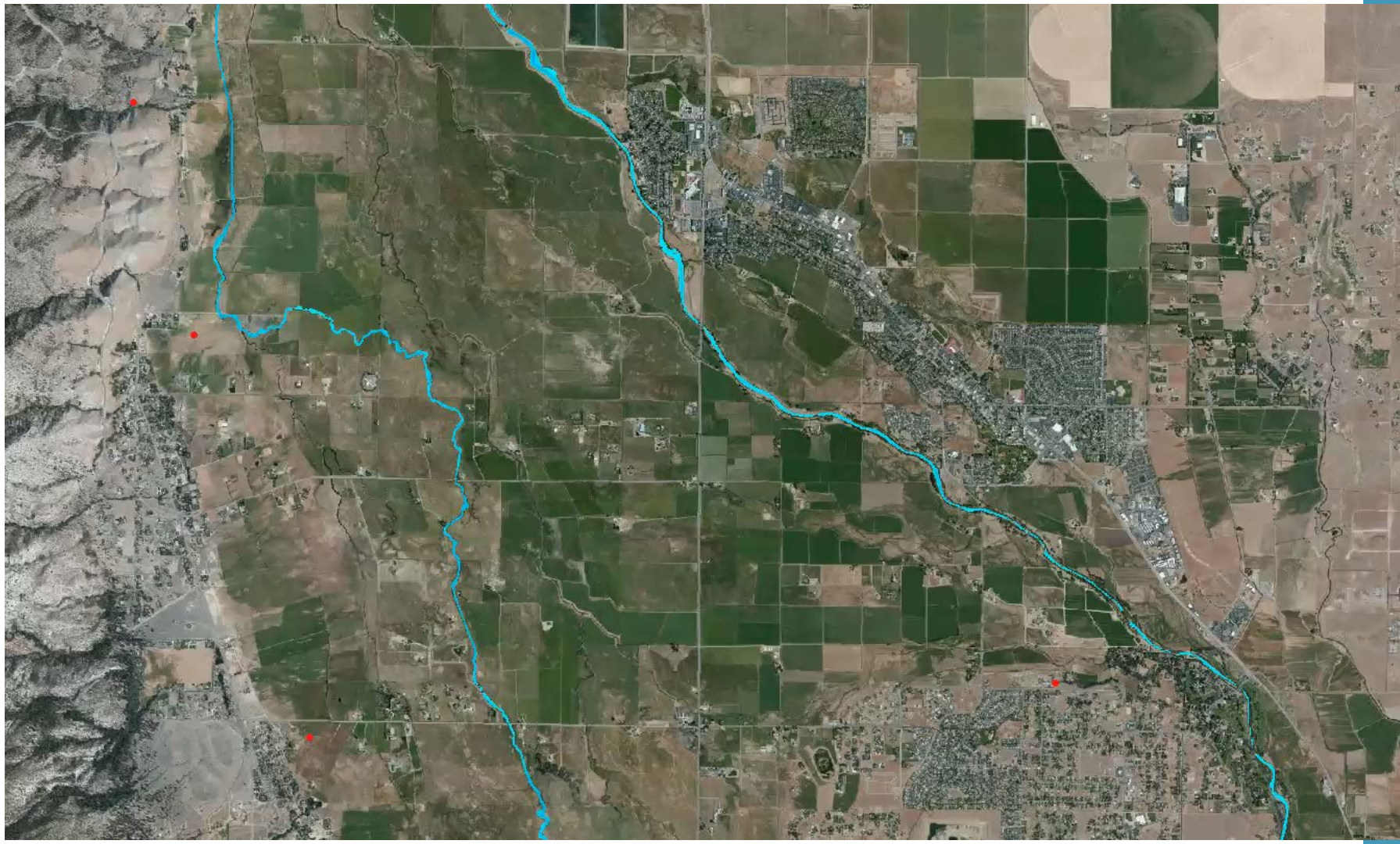
- US Army Corps of Engineers' HEC-RAS
  - Public Domain
- Integrated 1D/2D Modeling
  - Complex floodplain behavior
  - Flow in multiple directions
- Unsteady-state
  - Input hydrographs
  - Assess timing and volume
- One Model for Watershed
  - Consistency
  - Cost effective





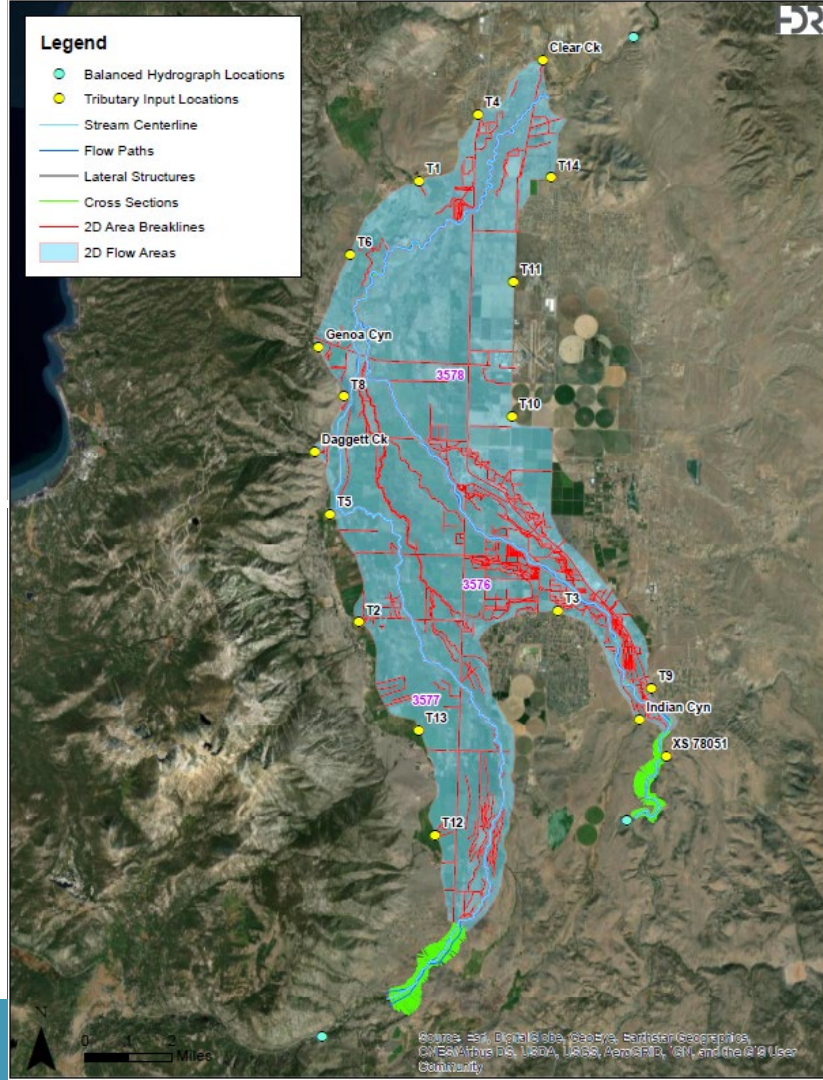






# HEC-RAS Model

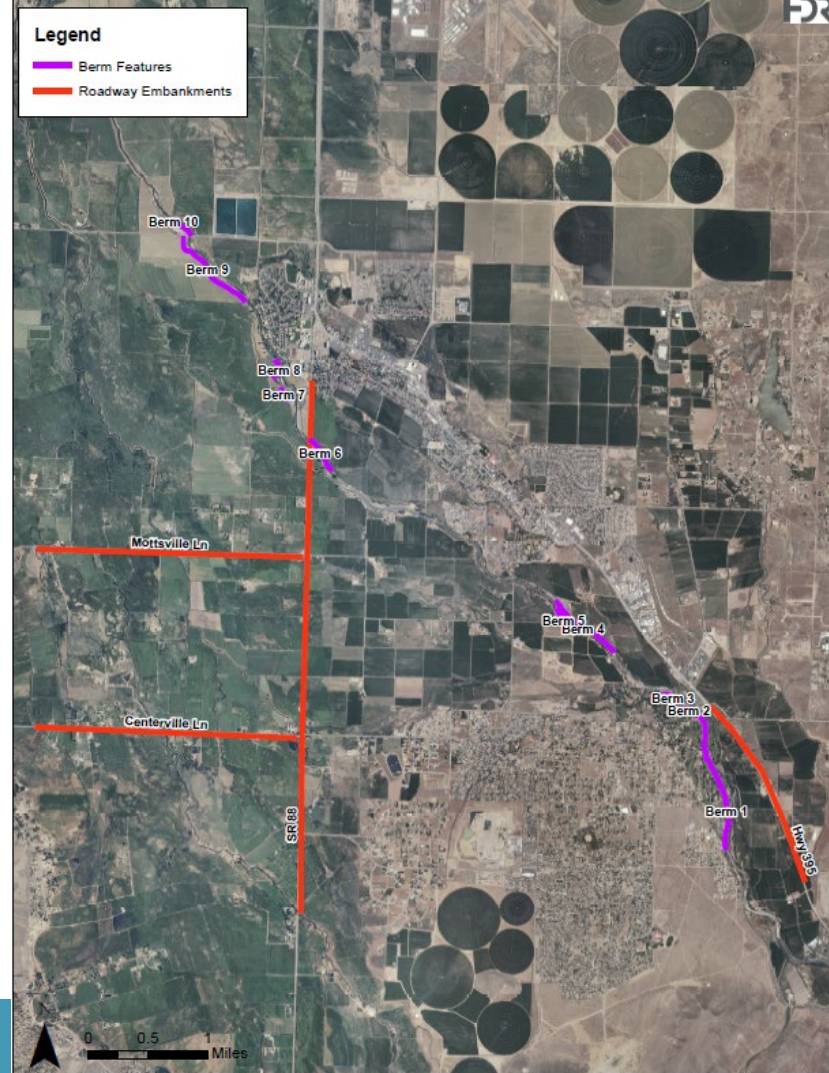
- East Fork - 1D
- West Fork - 1D
- Main Stem - 1D
- Overbanks - 2D
- 18 Tributary Flow Inputs
- 4-day Model Run
- 100-yr Zone AE
- 500-yr Zone X





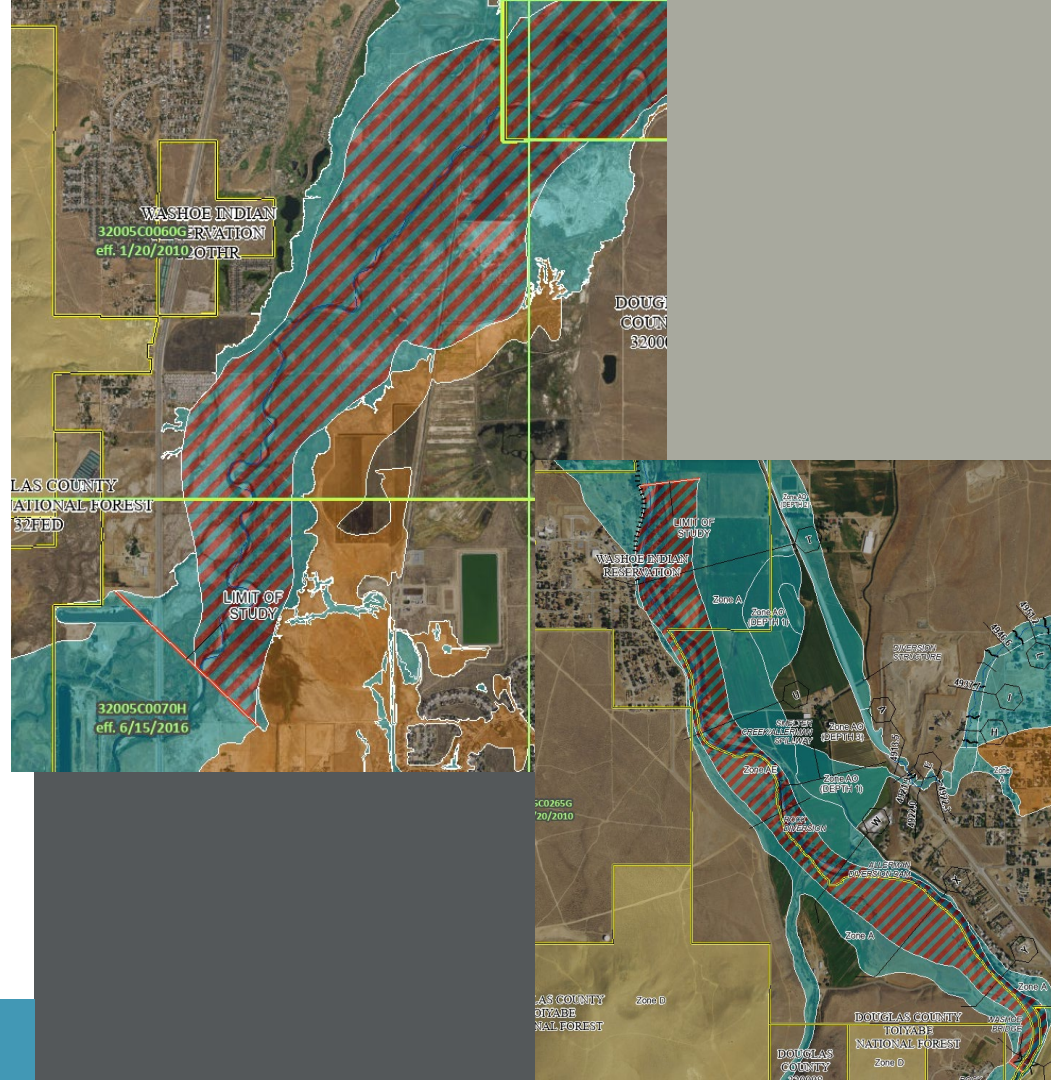
# Levee Analysis Model

- FEMA Levee Analysis Requirements
  - Non-certified berms, roadways, levees
  - Modeled as non-existent
- FEMA Identified 14 features
- 12 model runs eliminating features
- Combined worse cases for mapping



# Floodway Model

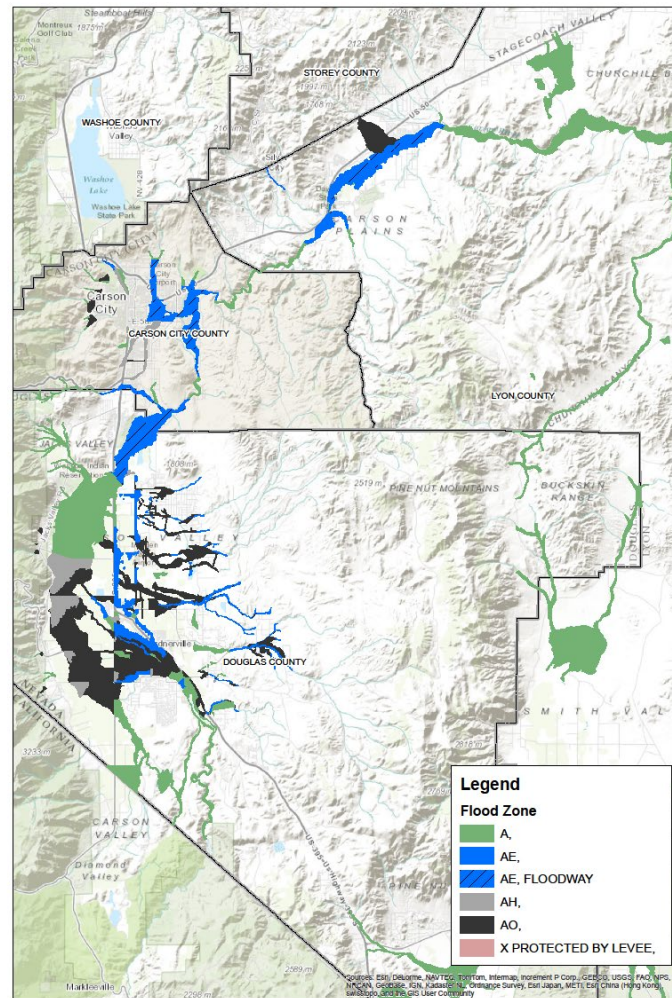
- Existing Main Stem Floodway
- Existing East Fork Floodway
- FEMA Requirement to Maintain Floodway
- No “Degradation” of Mapping
- “Model Backed Floodway”
- New 2D Procedures
- Floodplain Encroachments until 1 ft Surcharge





# Existing Mapping

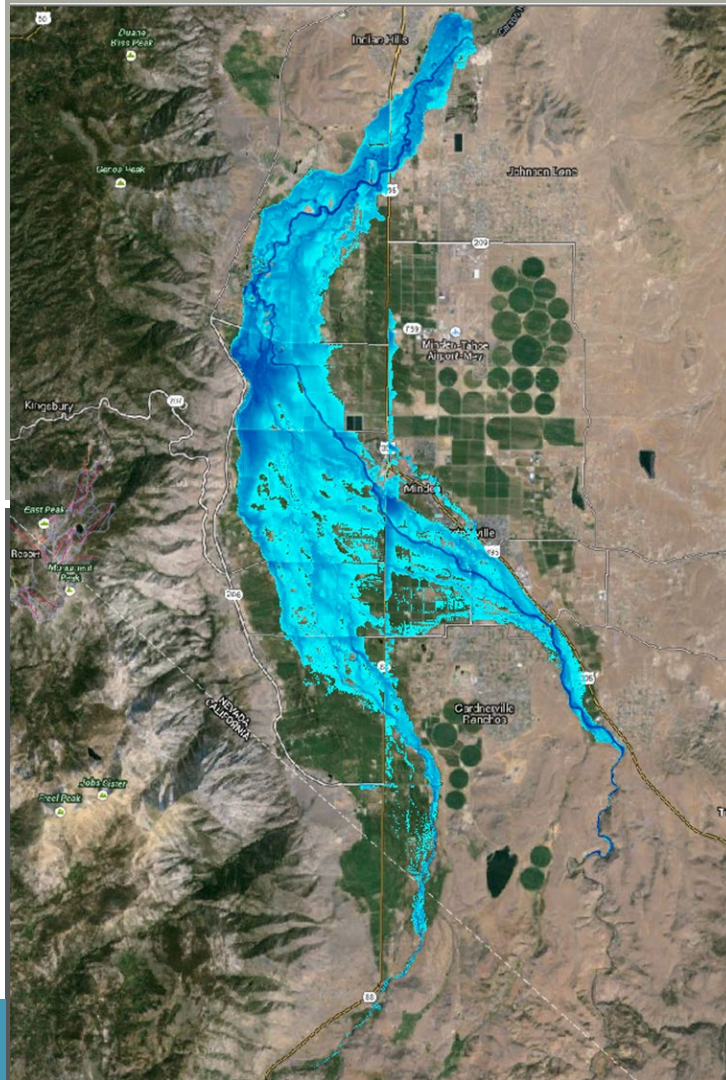
- Flood Hazard Areas
  - A
  - AE
  - AH
  - AO
  - Floodway



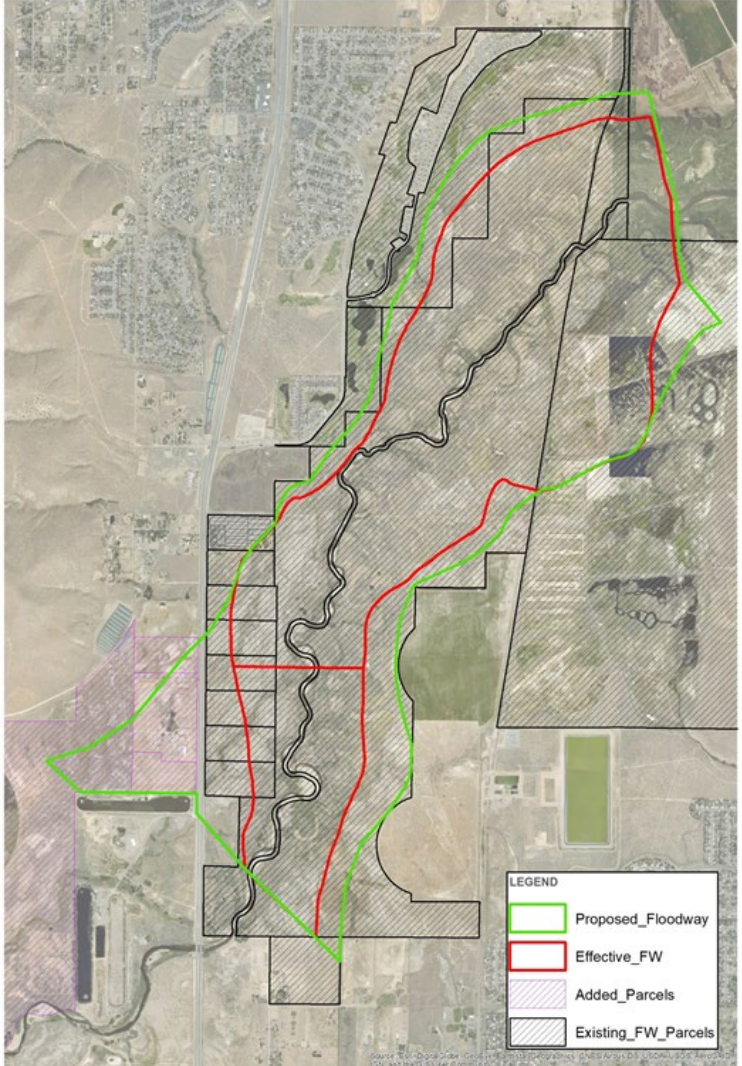
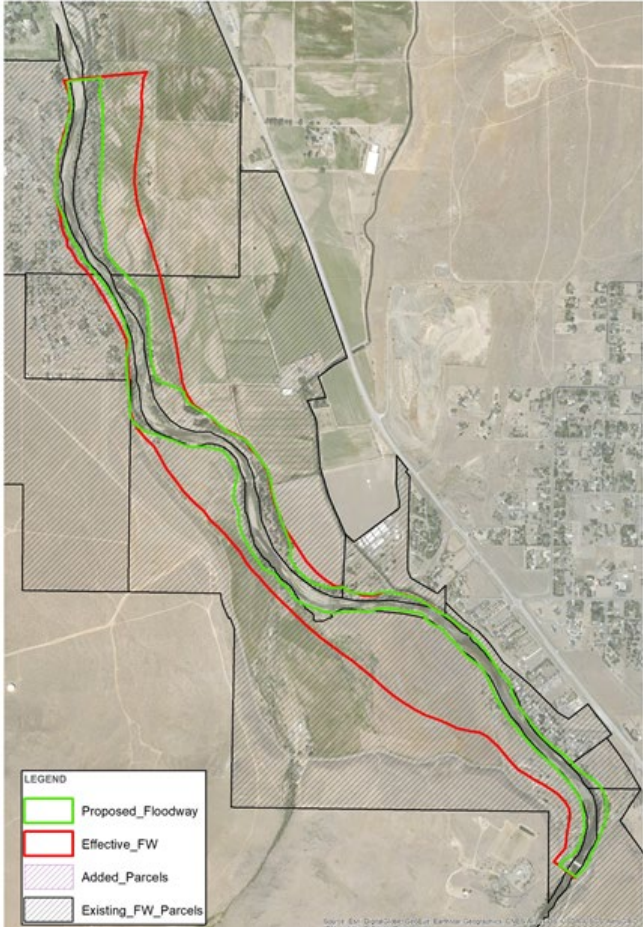


# New Mapping

- AE and AE Floodway
  - 90+ Miles
  - Consistency in Mapping
- Updated
  - Terrain
  - Methodology
  - Hydrology
  - Floodplain boundaries
- Watershed Scale
  - Pre-defined Regulatory Flood Hazard Zone
  - Cuts down costs and time for new projects



# New Floodway Mapping



# Project Status