

Assessing Economic Benefits Associated with the Basin-Wide Feasibility Studies Multi-Objective Flood Planning

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2017 ROADMAP



Today's Discussion

- **Introduction and Background**

- What are the Central Valley Flood Protection Plan (CVFPP) and Basin-Wide Feasibility Studies (BWFS)?
- BWFS Multi-Objective Economic Benefits

- **Methodology**

- Ecosystem benefits
- Recreation & Open Space benefits
- Avoided Loss of Service benefits – Power, Water/Wastewater & Transportation

CVFPP Overview



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A Stressed System, the Need for Action

- Central Valley people, property and assets at risk
- Current flood risk management path unsustainable
- Lack of funding for capital works and for ongoing operations and maintenance of existing infrastructure
- In 2008, the Legislature enacted the Central Valley Flood Protection Act, which authorized and required development of the Central Valley Flood Protection Plan (CVFPP) to address these issues

2017 Update to the CVFPP

- CVFPP is a dynamic, programmatic plan, updated in five year cycles – CVFPP first adopted in 2012, first “Update” in 2017
- 2017 Update has same goals 2012 CVFPP
- The planning horizon is the 30 years
- Refines and updates the State Systemwide Investment Approach (SSIA)
- Adds specificity about recommended near and longer-term investment and financing approach
- Provides broad guidance about more resilient risk management
- Coordinated and aligned with other major flood management efforts



Technical Work to Support CVFPP Goals

- Technical analyses informing a reasonable, balanced and cost-effective approach
- Emphasis on sustainable, integrated flood management
- Diverse array of actions to improve flood protection
- CVFPP Public Draft December 2016

CVFPP GOALS

Primary Goal: Improve flood risk management

Reduce the chance of flooding

Reduce damages once flooding occurs

Improve public safety, preparedness, and emergency response

Supporting Goals

Improve Operations and Maintenance

Promote Ecosystem Functions

Promote Multi-benefit Projects

Improve Institutional Support

Introduction and Background

- BWFS Multi-Objective Economic Benefits

CVFPP Seeks to Provide a Range of Benefits



Flood risk management

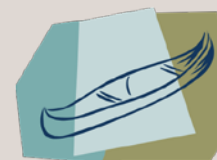


Ecosystem restoration

Water supply and water quality



Recreation and open space



Hydropower



Navigation

Commercial fisheries



Social and regional economic effects



BWFS Benefit Evaluation Methodology

BWFS Evaluation Methodology: Ecosystem

- **Benefits evaluated separately for**
 - Ecosystem
 - Target species
- **Ecosystem Benefits**
 - evaluated using the Habitat Equivalency Analysis (HEA).
- **Target Species Benefits**
 - Qualitatively assessed

BWFS Evaluation Methodology: Recreation

1. Screened concepts for recreation potential
2. Determined the appropriate Recreational Use Reference factor (Annual Visitor Days)
3. Determined the amount of new recreational acreage for each concept
4. Compared potential recreational benefits across BWFS configurations

BWFS Evaluation Methodology – Open Space

SACRAMENTO/SAN JOAQUIN BASIN:

1. Screened current local government data for those detached, single-family residential parcels:
 - Located within 8 mile buffer of geographic center of an Urbanized Area, as defined by the U.S. Census Bureau as consisting of densely developed territory that contains 50,000 or more people, and
 - Located within 0.5 mile of one of the Concepts

BWFS Evaluation Methodology – Open Space

SACRAMENTO/SAN JOAQUIN BASIN- Cont'd:

2. Applied the median sale price of single-family homes in the City of Woodland, the applicable Urbanized Area, from Zillow (\$309,000 as of June 2015)
3. Applied the resulting aesthetic premium of 4.5 percent (Taylor et al., 2012)

BWFS Evaluation Methodology: Avoided Loss of Service

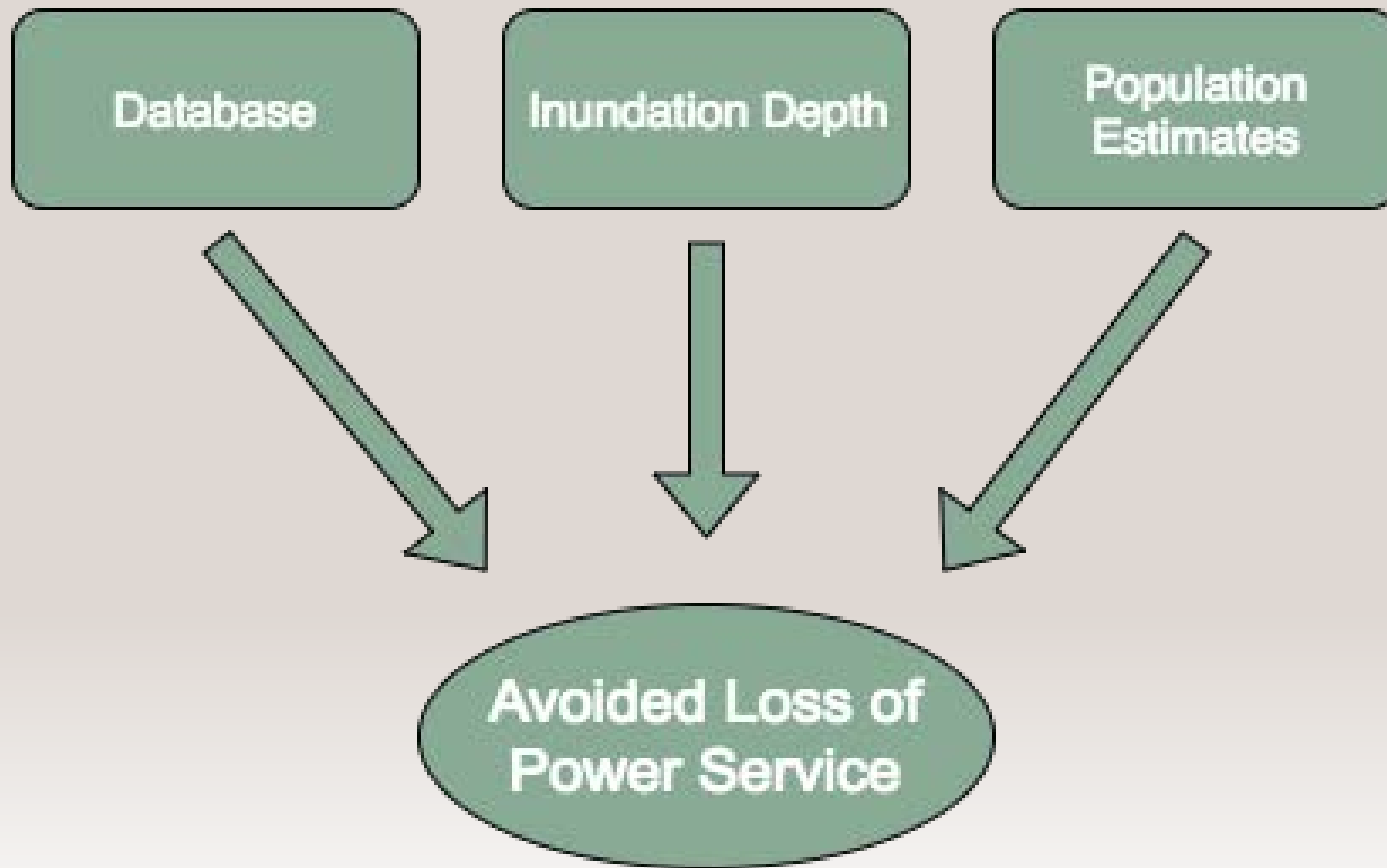
- Avoided Loss of Service analyses focus on effects of flooding outside the inundated area
- Services potentially affected outside the inundation area are:
 - Power
 - Water/Wastewater
 - Transportation

BWFS Evaluation Methodology: Avoided Loss of Power Service

Assumptions:

- Location of flood-induced outages.
- Population losing power for 1 day - 3%
- Population losing power for 5 days - 0.5%
- Value of loss of power/person day = \$135 (FEMA)

BWFS Evaluation Methodology: Avoided Loss of Power Service



BWFS Evaluation Methodology: Avoided Loss of Water/Wastewater Services

Assumptions:

- Uses representative samples of damage areas to estimate benefits of increased levels of protection
- Service loss based on flood depth
- WTP values from FEMA (2011) used:
 - Water services: \$93/person/day
 - Wastewater services: \$41/person/day

BWFS Evaluation Methodology: Avoided Loss of Water/Wastewater Service

Methods:

- Used existing asset data from the Hazards United States Multi-Hazard (HAZUS-MH) database
- Representative flood inundation scenarios were generated using existing information and flood models developed in line with HAV methodology to support the BWFS.

BWFS Evaluation Methodology: Avoided Loss of Water/Wastewater Service

Limitations:

- HAZUS and EPA databases – incomplete with respect to facility size and capacity and in some cases data is restricted due to security concerns
- Network reliability information not available
- Resilience of individual facilities – unknown, thus vulnerability and time needed to restore service also unknown.

The Path Forward

- Need to change how we think about flood risk management
- 2017 Update will refine the 2012 CVFPP and provides a holistic path forward to a different approach
- The refined SSIA enables the State to integrate and prioritize investments in multi-benefit flood risk reduction projects
- CVFPP will take 30 years to implement



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For More Information



Central Valley Flood Management
Planning (CVFMP) Program website

www.water.ca.gov/cvfpm



cvfmp@water.ca.gov

C V F P P

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BWFS Evaluation Methodology: Avoided Loss of Transportation Service

Assumptions:

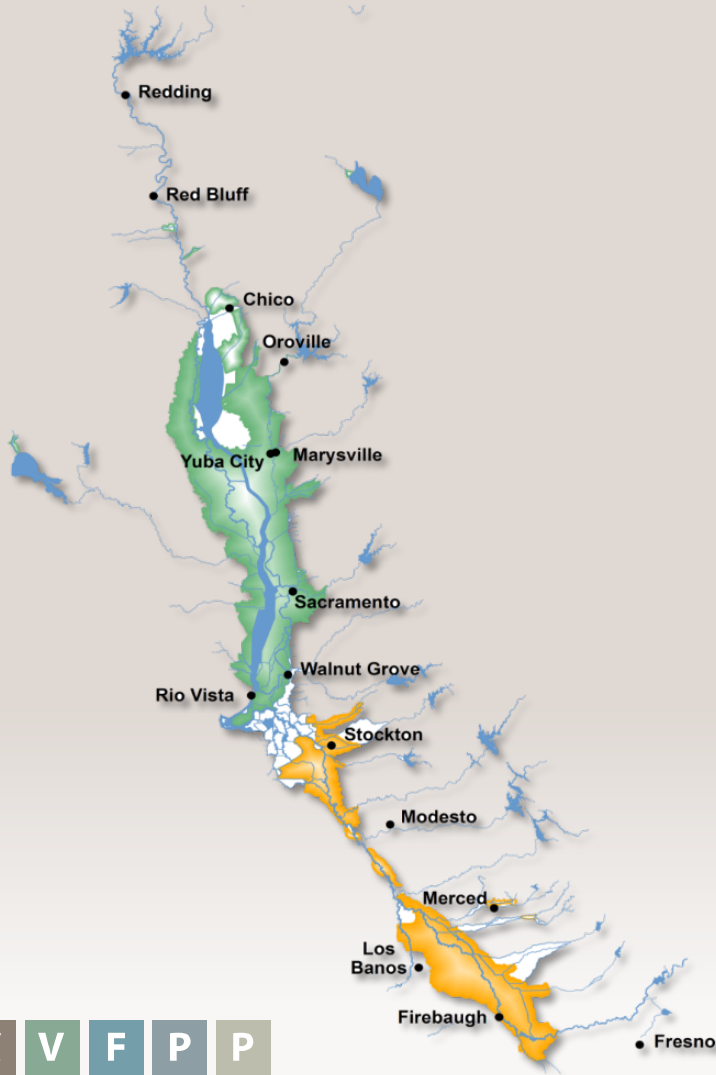
- Flood expected to change traveler behavior
- Both private and commercial traffic is expected to be affected – though to different degrees
- Rail travel not included at this time

BWFS Evaluation Methodology: Avoided Loss of Transportation Service

Methods:

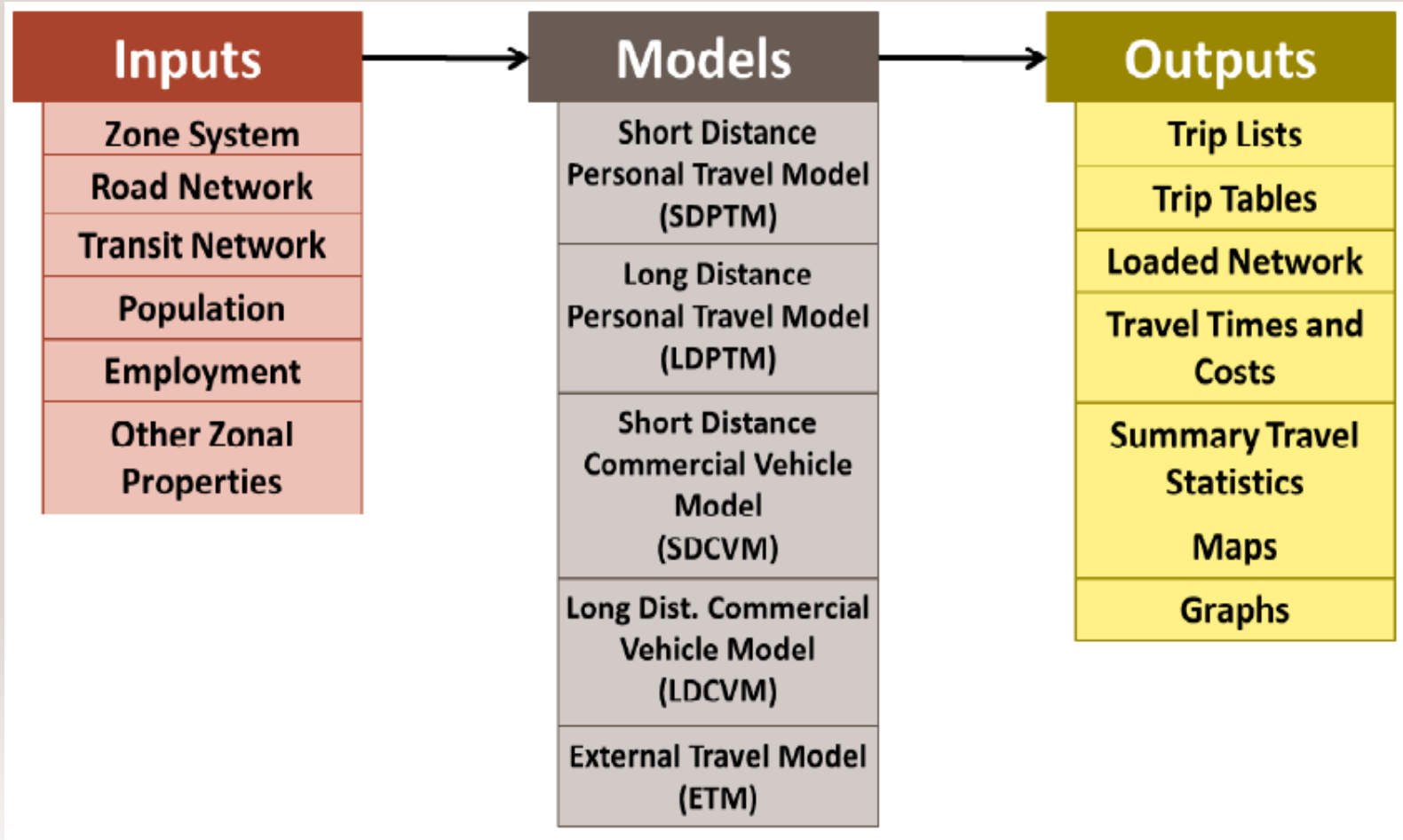
- Loss of trips due to inaccessibility of traveler destinations
- California Statewide Travel Demand Model (CSTDM)
- CSTDM Translates information regarding traveler delays, diversions and interruptions into expected economic impacts

BWFS Evaluation Methodology: Avoided Loss of Transportation Service



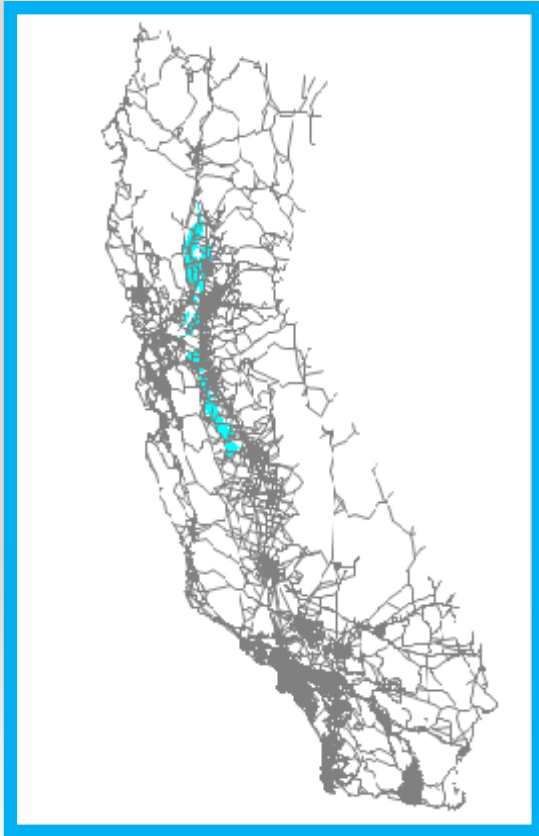
- Linked California Statewide Travel Demand Model (CSTDM) network to road centerline geolocations.
- Overlaid flood inundation areas and depths on road network
- Assessed road operations and closures
- Used CSTDM to estimate traffic volumes, routes, travel times
- Estimated costs of travel delays, re-routing

Linked Analysis Provides New Way of Assessing Transportation Service Benefits

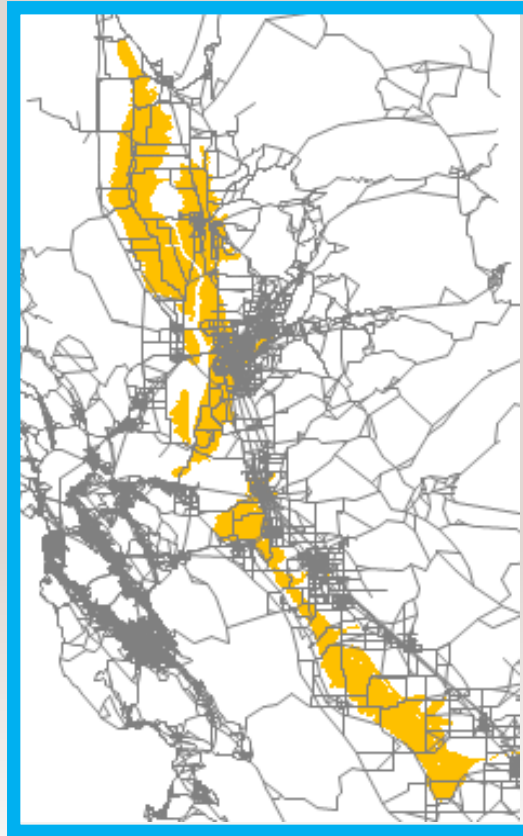


Model/Study/Basin Area

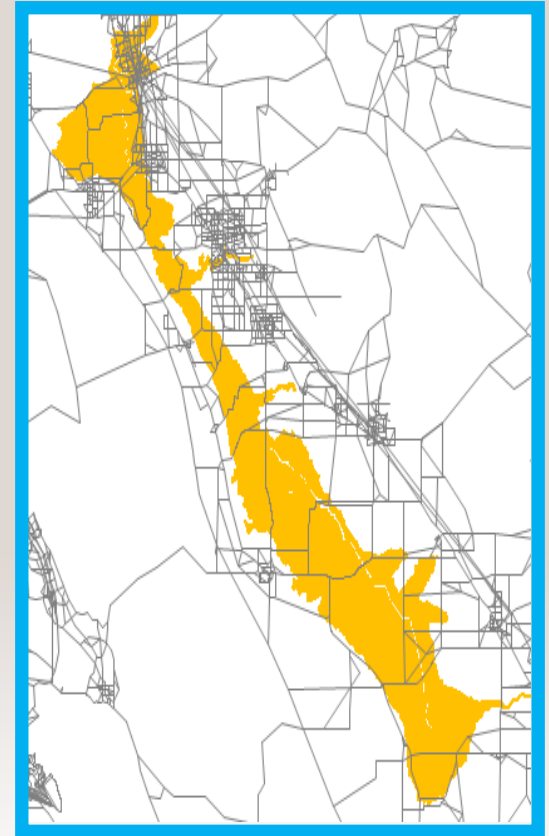
Travel Model



Basin Wide

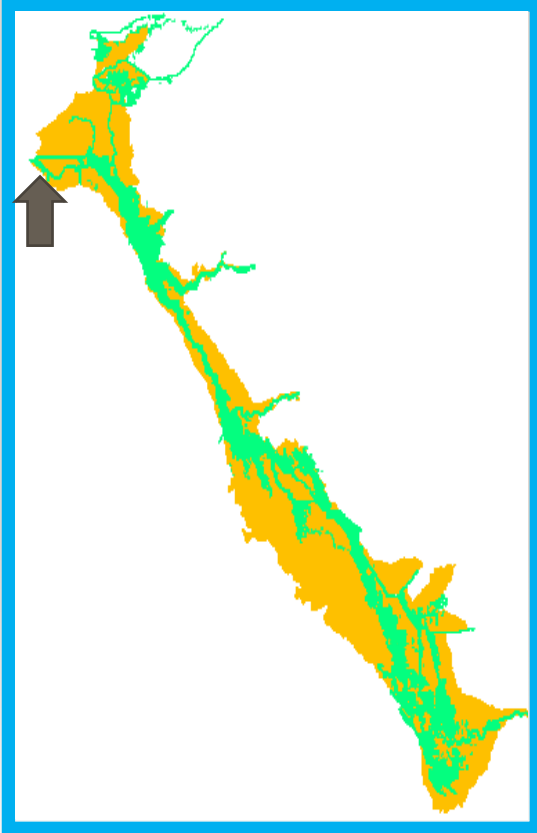


San Joaquin

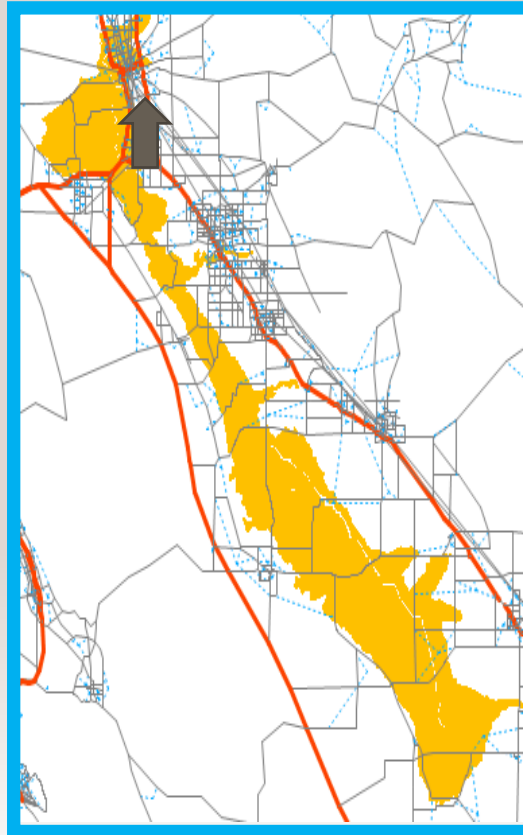


Data Sources Used

Inundation Grid



Road Network



CSTDM Network

