BUREAU OF RECLAMATION

CalSim 3: Tulare Development

CWEMF Annual Meeting , April 2023

Presenter: Lauren Thatch (USBR)

Modeling Division, Bay Delta Office

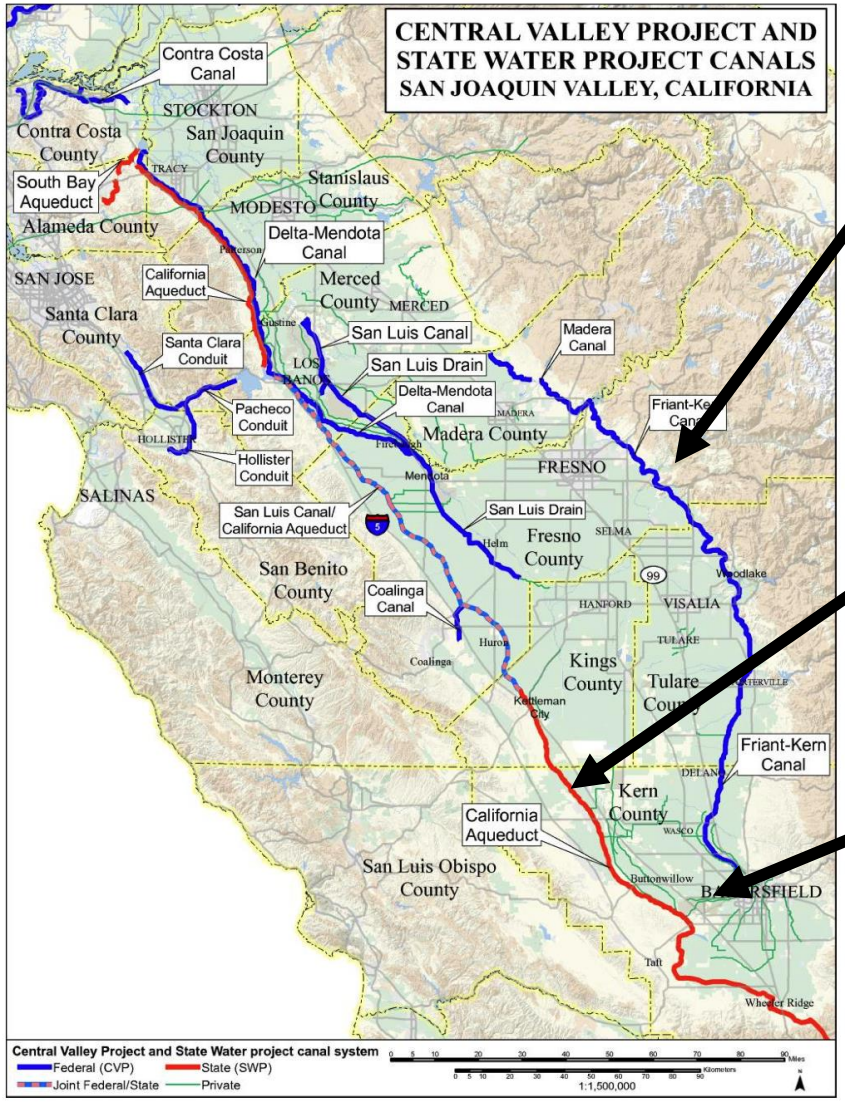
Presentation Overview

- Existing Model Representation
- Surface Hydrology Development
  - Precipitation
  - Reference Evaporation
  - Crop ETc
- Continued Development

Background – Tulare Lake Basin

- Historically more dependent on groundwater supplies
- Significant CVP/SWP contractors/users
- Looking towards the future: Large groundwater banking projects
  - Kern County Water Bank
  - Semitropic Water Bank

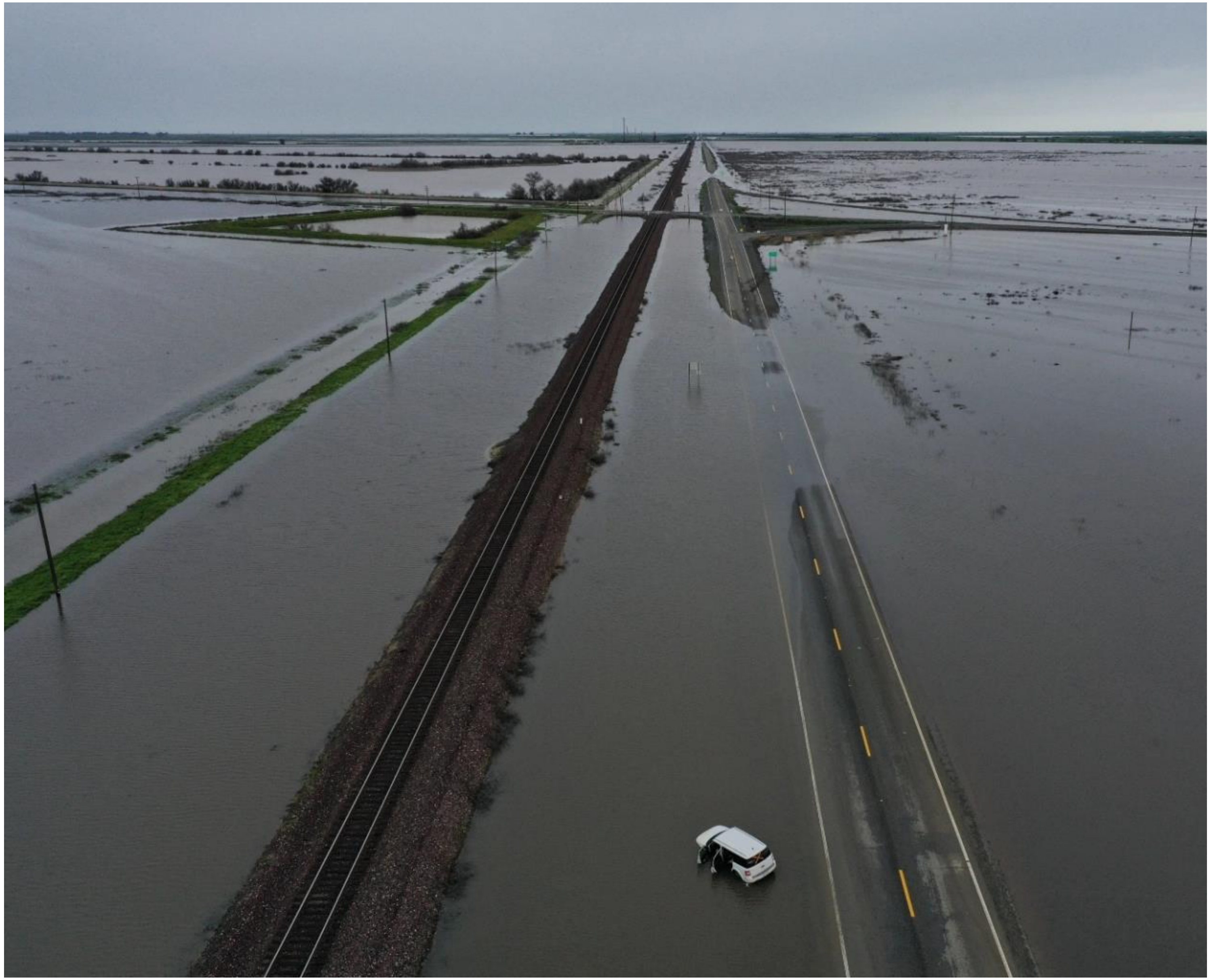
CVP/SWP infrastructure and deliveries



Friant-Kern Canal

California Aqueduct

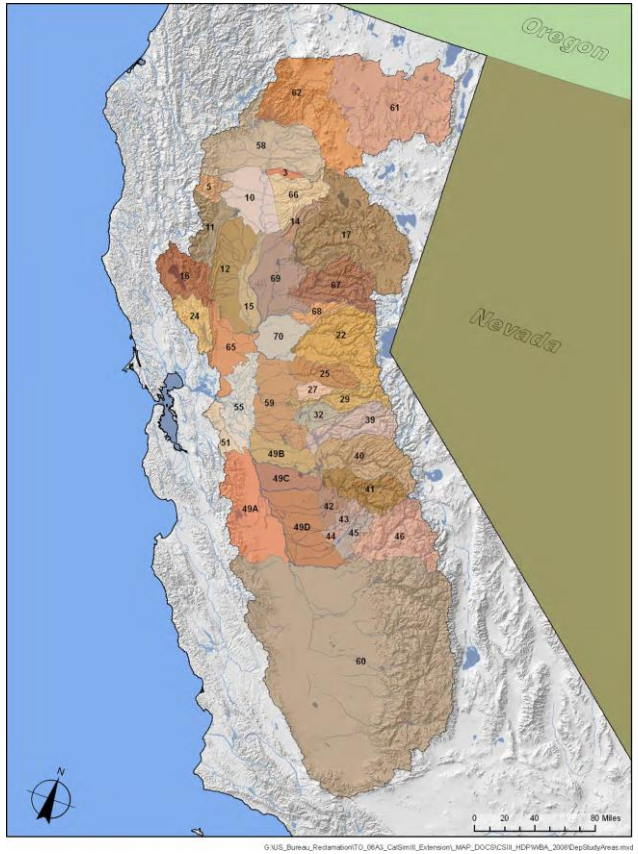
Cross Valley Canal



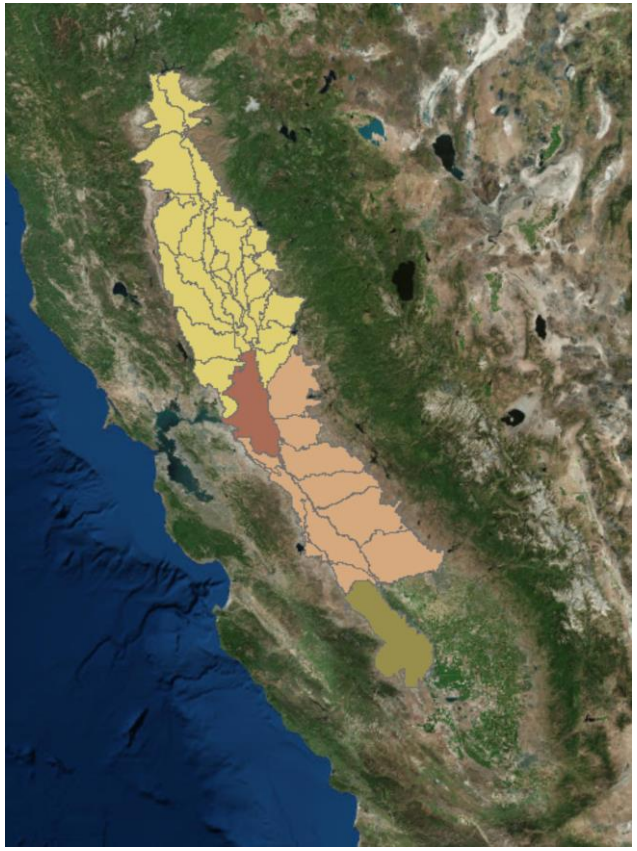

TULARE LAKE
VISALIA
BAKERSFIELD
Tulare
Tipton
Delano
Fresno
Kingston
Smiths Ferry
Goshen
Woodville
Centreville
Watsons Ferry
Fresno City
Porterville
K E R N
T U L A R E
Kern L.
White River

Background – Existing Representation

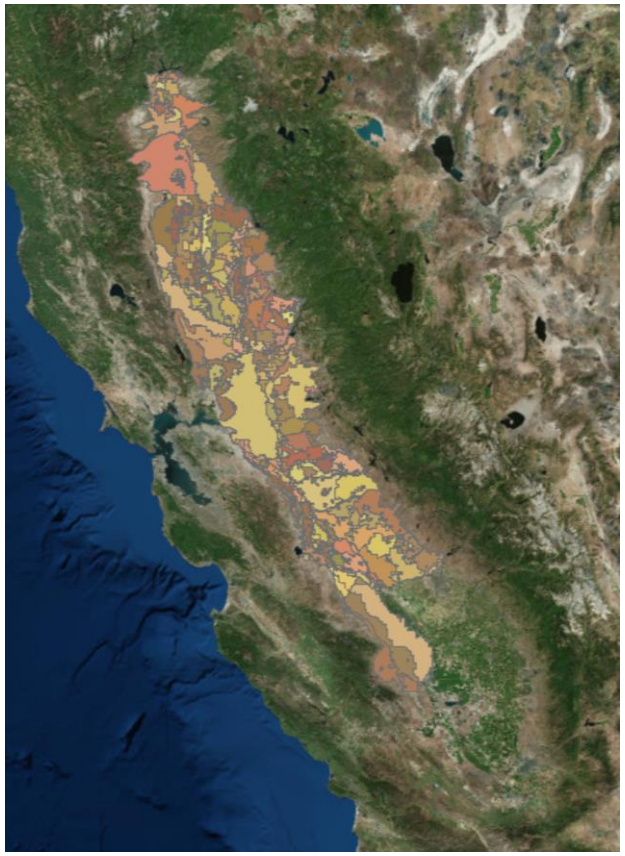
CalSim II DSAs



CalSim 3 WBAs



CalSim 3 DUs



Background – Existing Representation

Table 2-4. Water Budget Areas in Tulare Lake Hydrologic Region

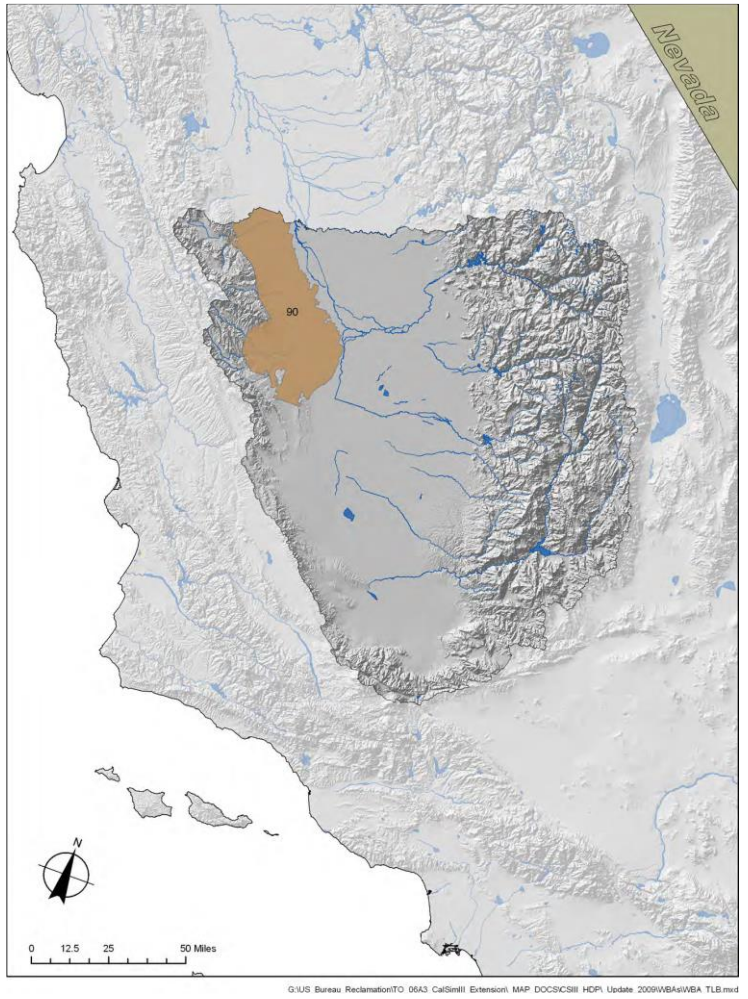
WBA	Description[1]	Area	
		(square miles)	(acres)
90	Westlands Water District	1,228	786,114
91	Mendota Pool diverters[2]	Undefined	

Notes:

[1] WBAs are named after cities, towns or other geographic features located within the WBA.

[2] WBA 91 is used to identify water diversions from the Mendota Pool for use within the Tulare Lake Hydrologic Region. A land-use-based hydrology was not developed for these diversions or their associated water users. Thus, WBA 91 refers to an undefined area, and is a placeholder for future CalSim 3.0 developments in the Tulare Lake Hydrologic Region.

Key:
WBA = Water Budget Area

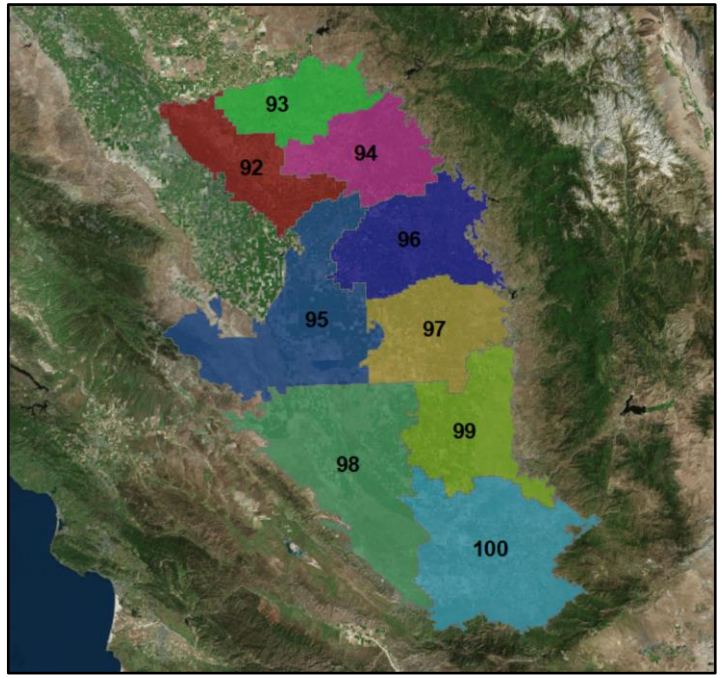


Background – Previous Tulare Development

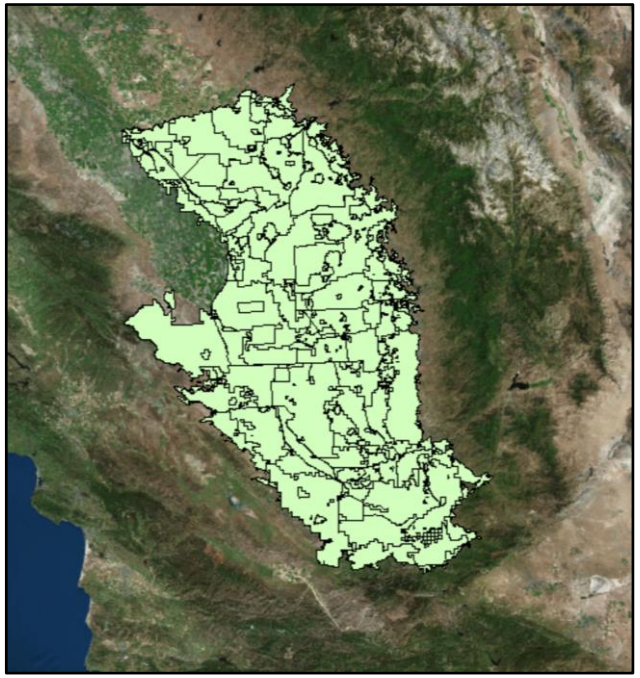
Source Information:

- C2VSIM GW Regions
- USGS B118 Basins
- Agricultural Water Management Plans
- County LAFCO Reports
- Groundwater Management Plans
- Urban Water Management Plans

Water Budget Areas

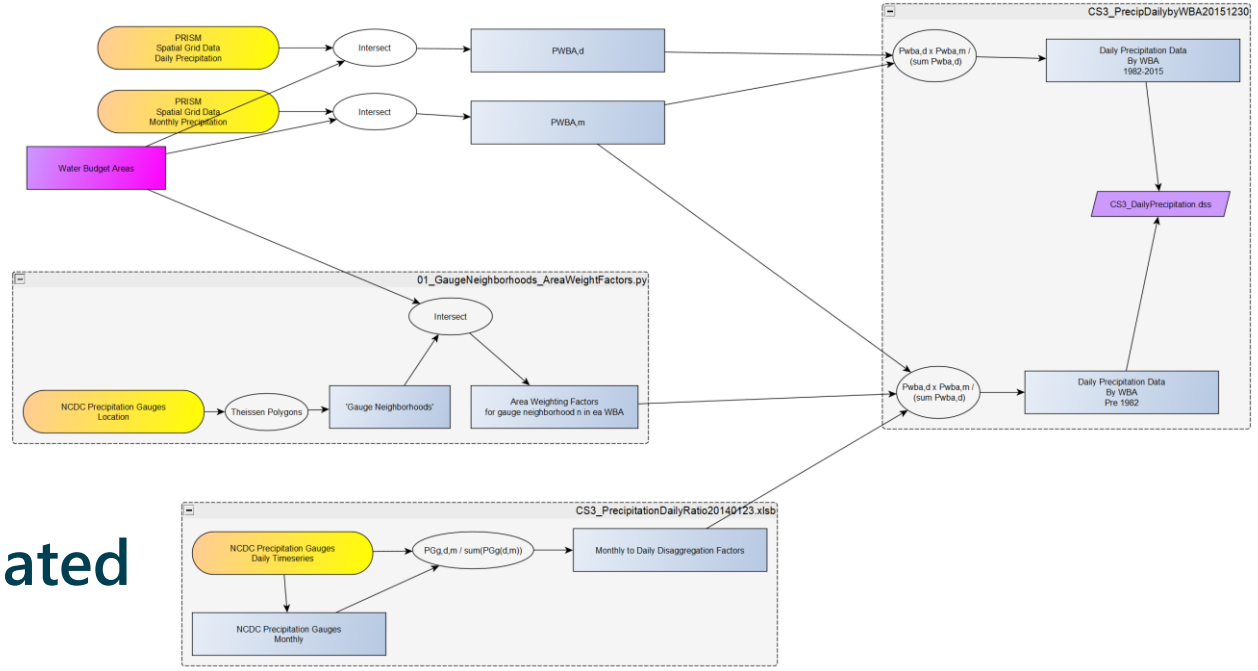


Agricultural, Urban, and Refuge Demand Units



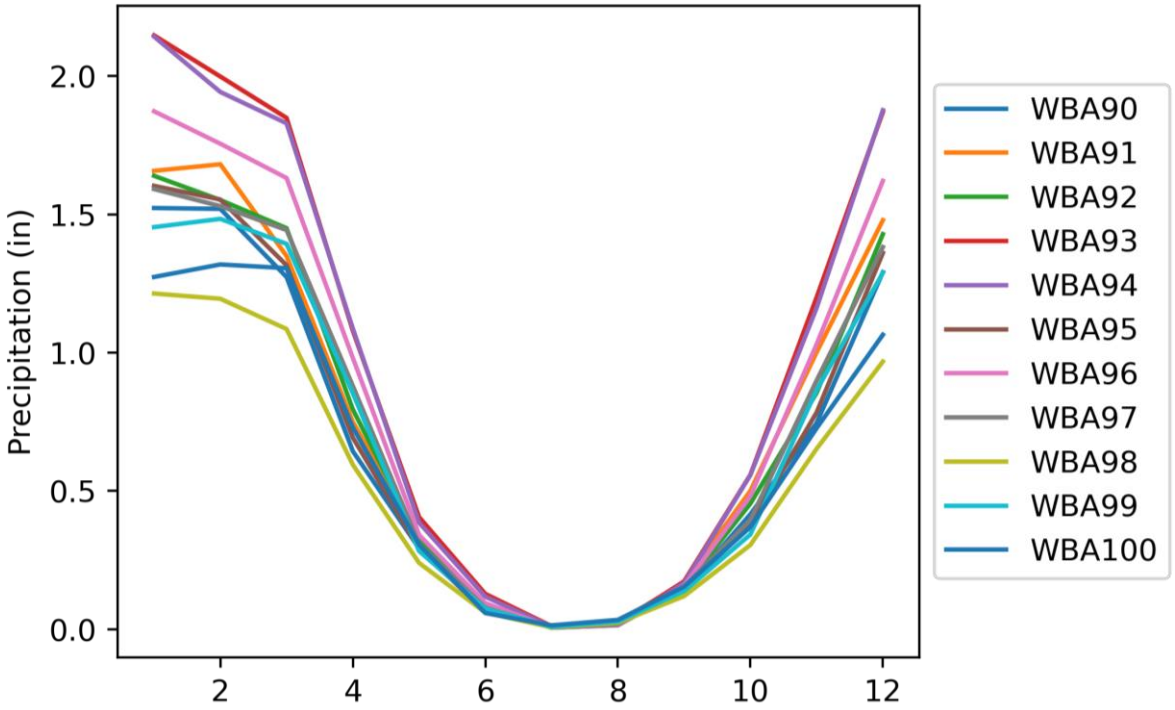
Precipitation Timeseries Development

- Data Sources
  - PRISM – Daily, Monthly Spatial Data
  - NCDC Precipitation Gages
- Methods
  - After 1982 - PRISM daily data aggregated over WBA
  - Prior to 1982 – PRISM monthly data disaggregated to daily using NCDC station Data
- Excel/Visual Basic → Python

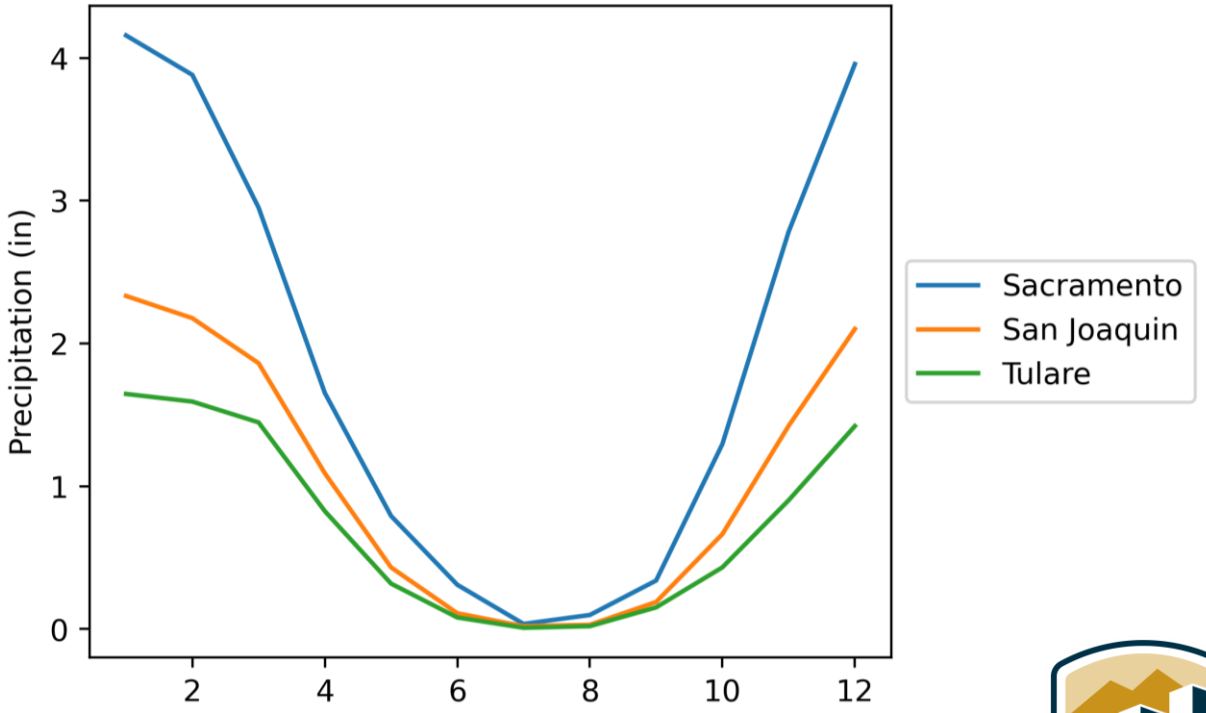


Precipitation Timeseries Development

Tulare WBAs

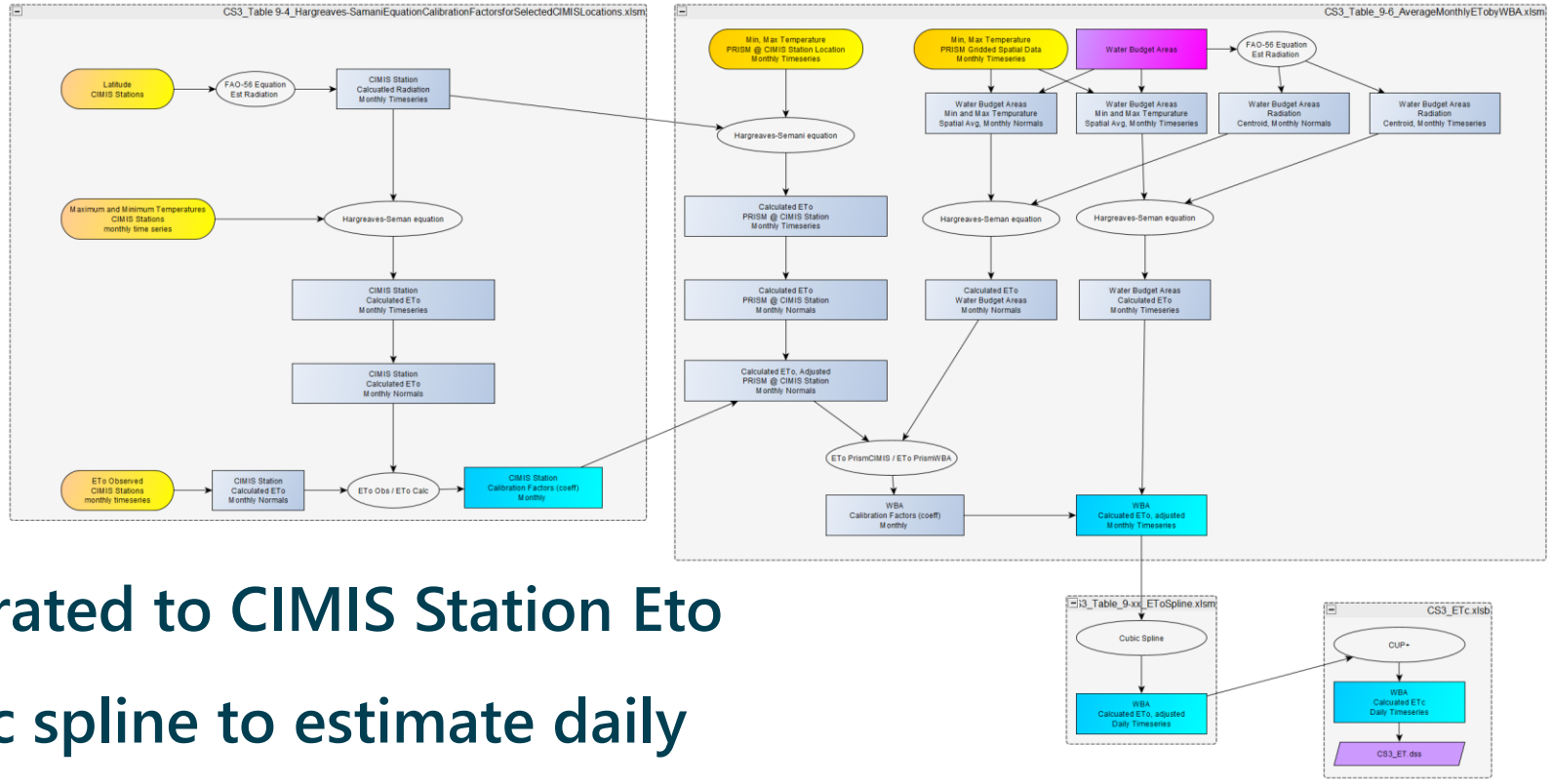


Basins



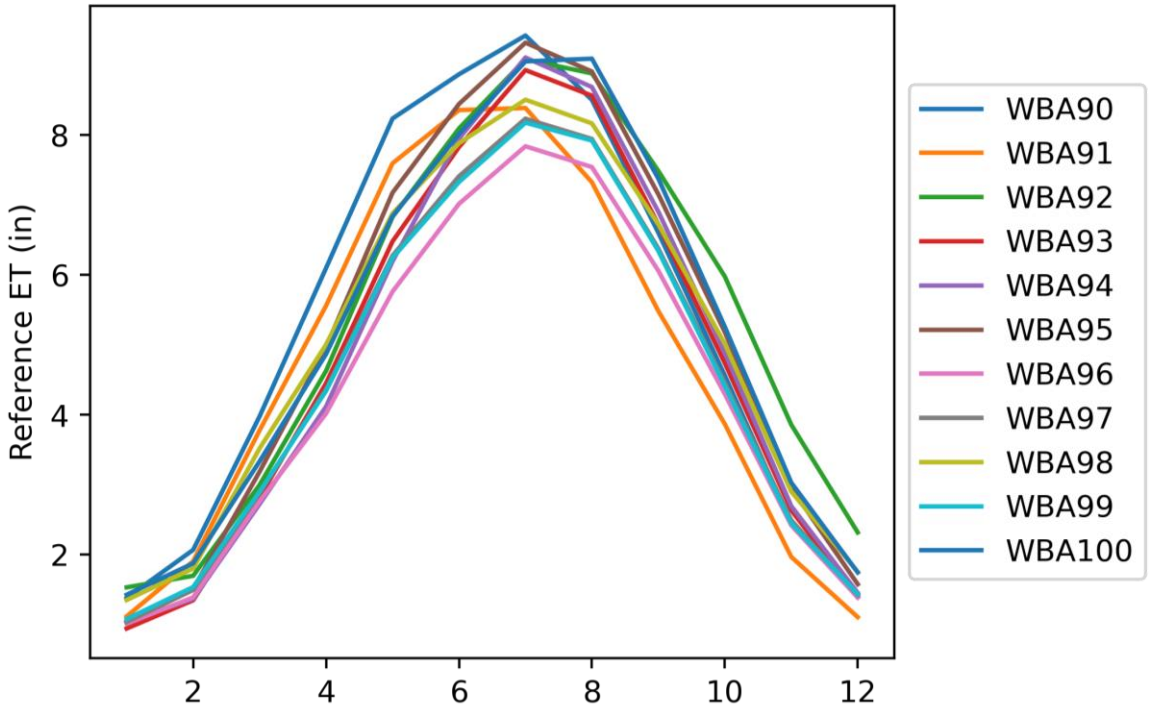
Reference ET Timeseries Development

- Data Sources
  - CIMIS Stations
  - PRISM, Monthly, Gridded
- Methods
  - Hargreaves-Semani calibrated to CIMIS Station Eto
  - Calculated Monthly, cubic spline to estimate daily
- Excel/Visual Basic → Python

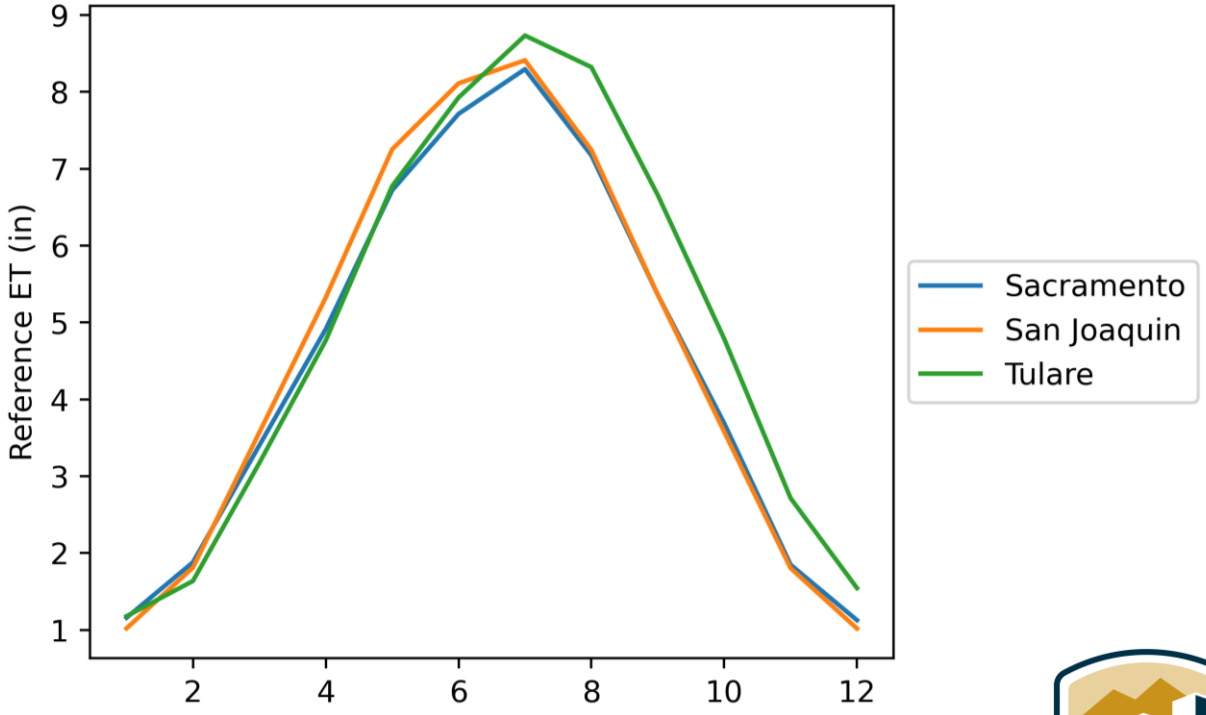


Monthly Average Reference ET

Tulare WBAs

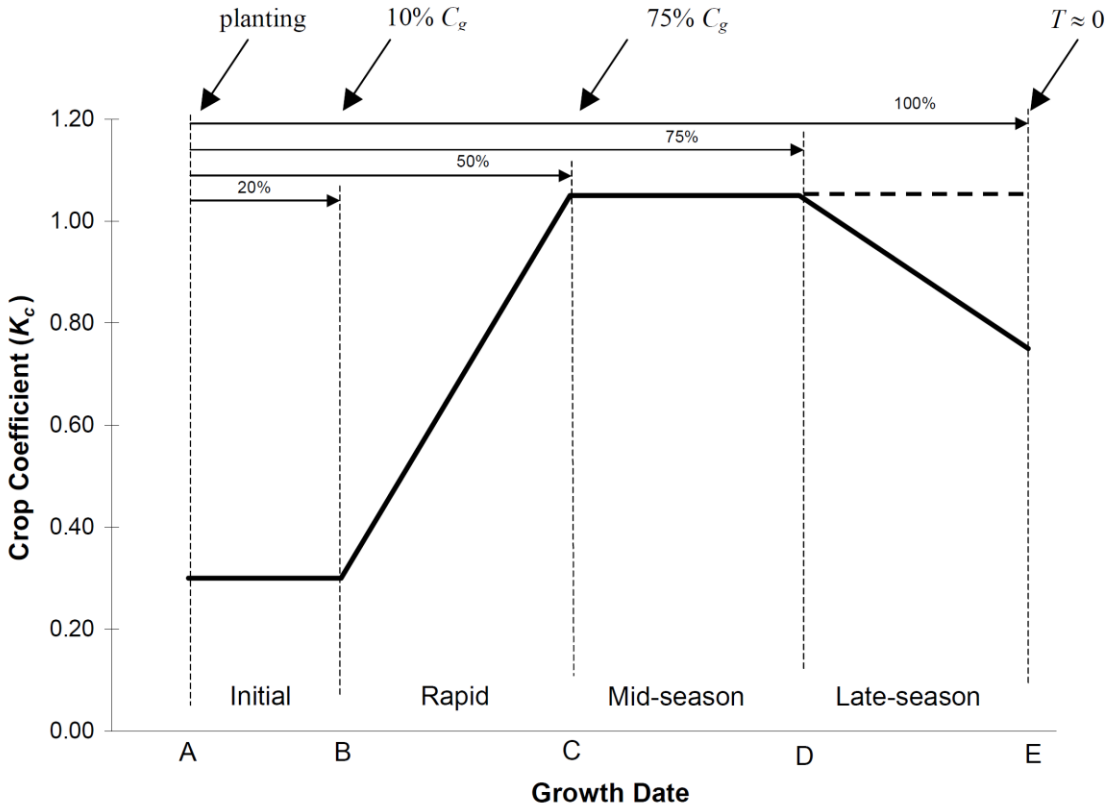


Basins



Crop ET Timeseries Development

- Consumptive Use Program (CUP+)
  - Season is separated into growth periods
  - Growing season is a fixed input
- Model inputs
  - Crop Coefficients
  - Reference ET
  - Precipitation
- Excel/Visual Basic → Python

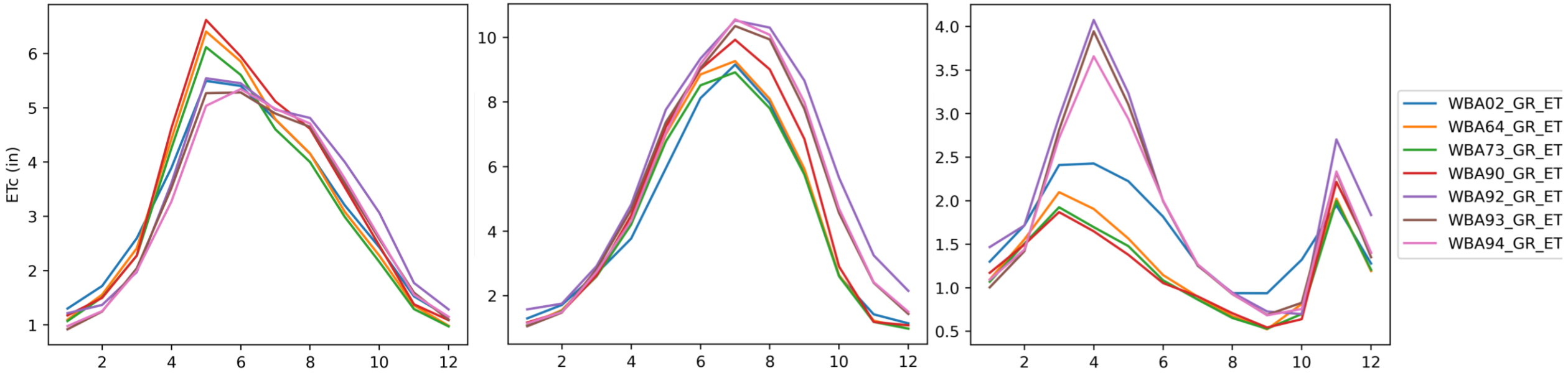


Monthly Average Crop ET

CU

AP

GR



Future Development

- Additional Preprocessed Inputs
  - Rims Watersheds
  - Reservoir Evaporation
  - To name a few…
- CalSim3 Model Updates
  - WRESL Code
  - Collection of historical datasets for evaluation – including natural flow and diversion/delivery datasets
  - Calibration

Questions?

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RECLAMATION