


The Best Science Available:

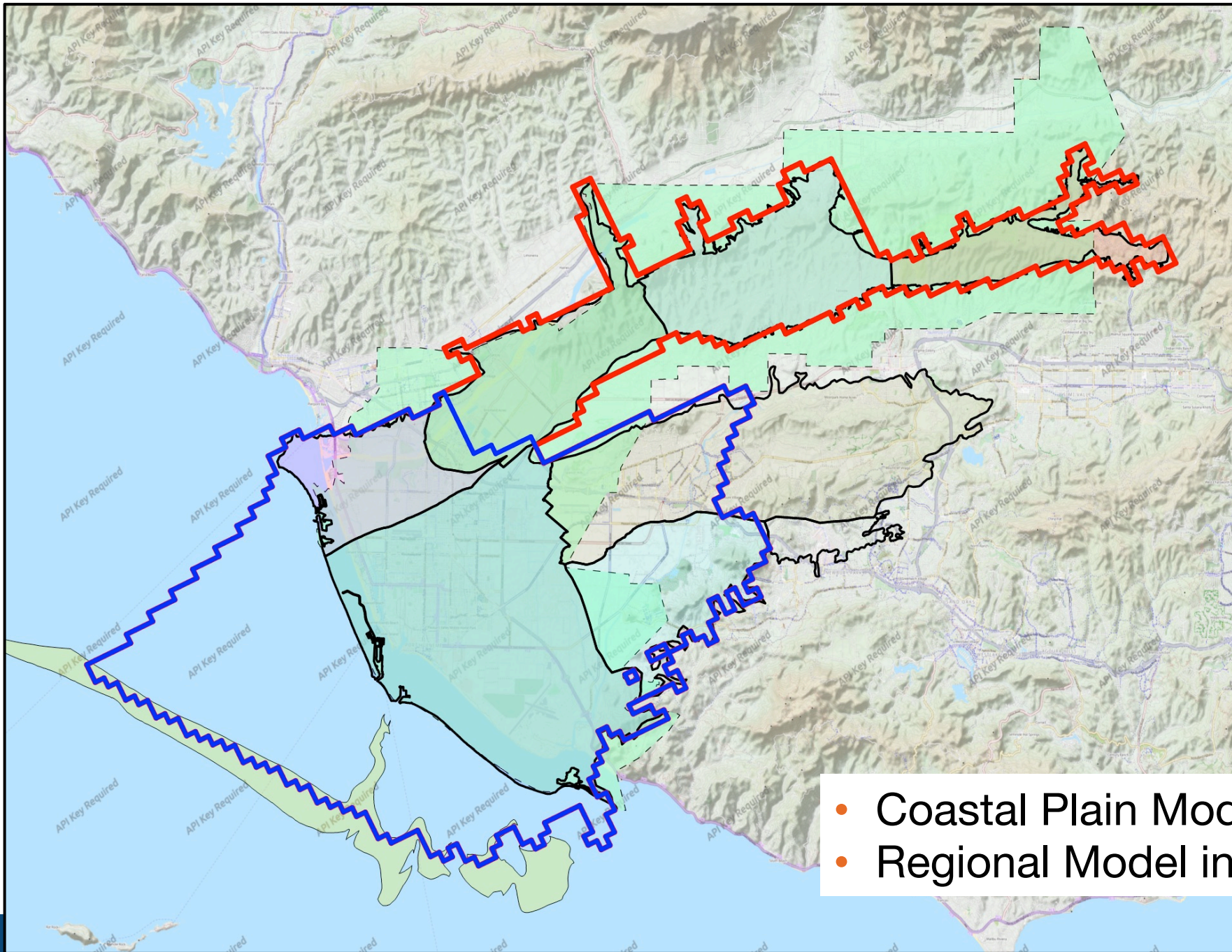
Updates, Improvements, and Increased Flexibility of
United's Groundwater Flow Models

October 26, 2023

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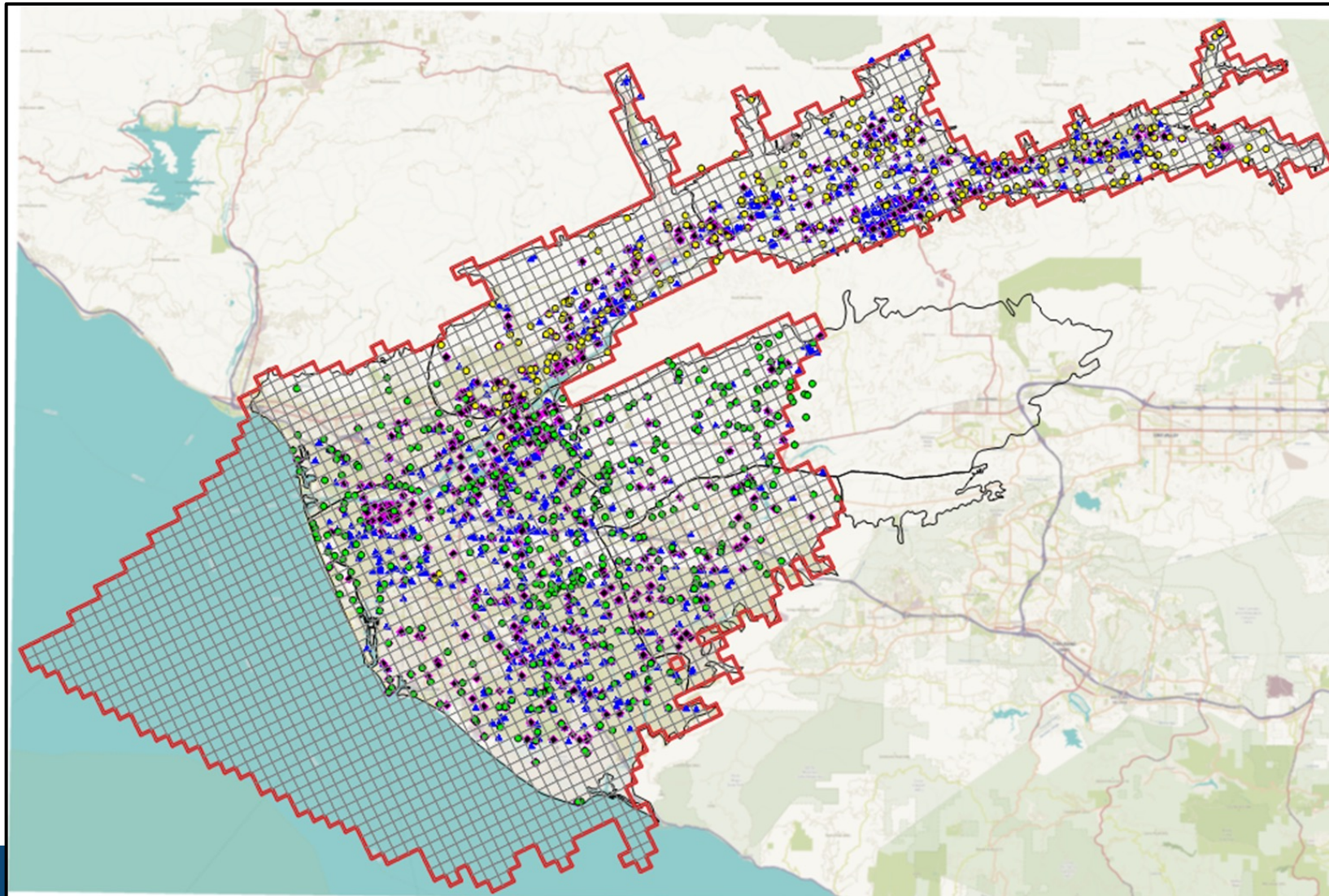
Numerical Groundwater Model

- Many local and public agencies often use groundwater models developed by U.S. Geological Survey (U.S.G.S.) or consultants. UWCD initiated its own model development in November 2013.
 - Since 2018, UWCD has been employing groundwater models for studies on groundwater sustainability, groundwater management, and project evaluation.
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- Coastal Plain Model in **blue line**
- Regional Model in **red line + blue line**

UWCD Groundwater Model is Built Upon Comprehensive Hydrogeological Data



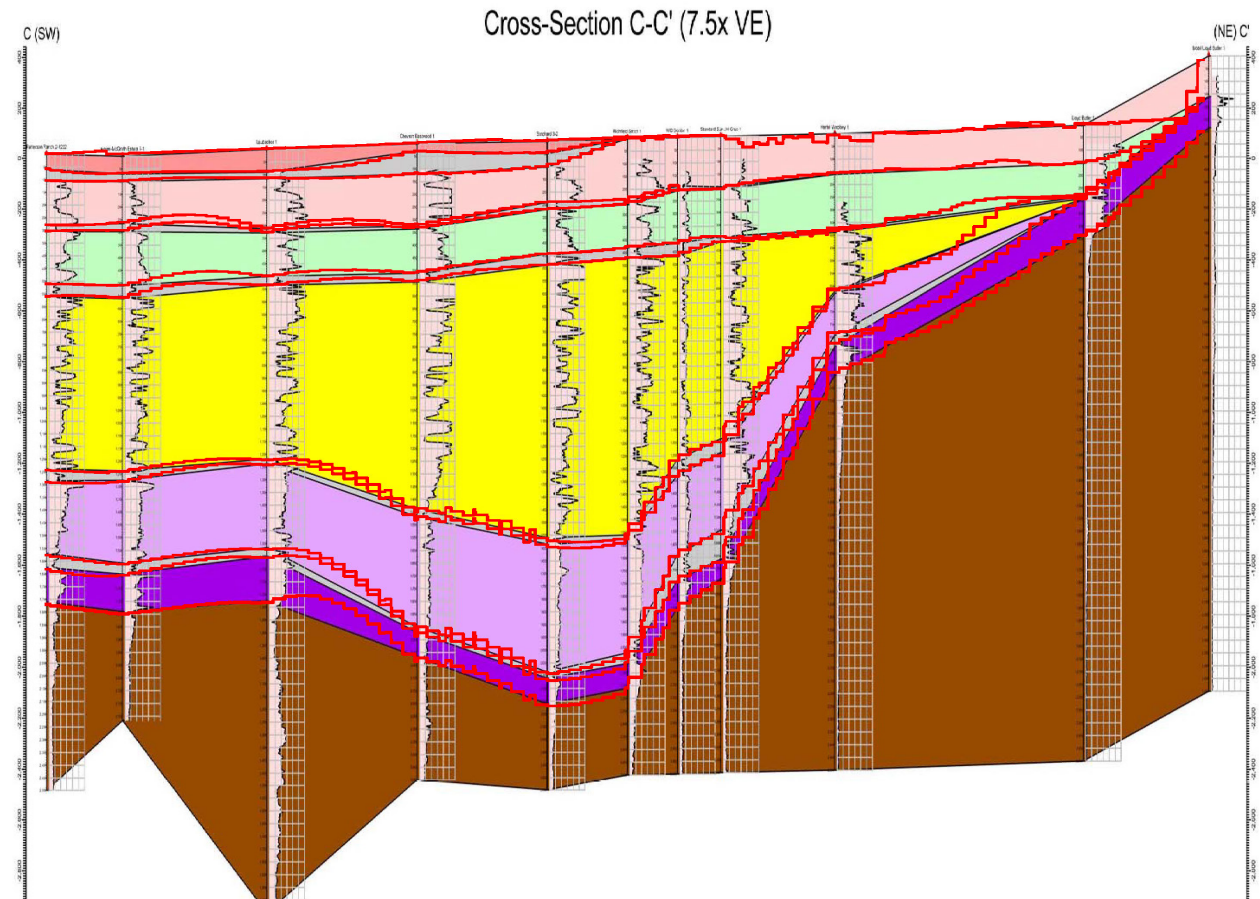
Based on 600+ **well e-logs**

Basin	Water Level Wells	Pumping Wells
All Basins	888	1610
Oxnard Plain	325	502
Oxnard Forebay	117	140
Pleasant Valley	80	132
West Las Posas	48	82
Mound	35	40
Santa Paula	118	180
Fillmore	104	363
Piru	51	125
Others	10	46

- Grid size: 2000 ft
- 26505 active cells
- 384.7 mile²

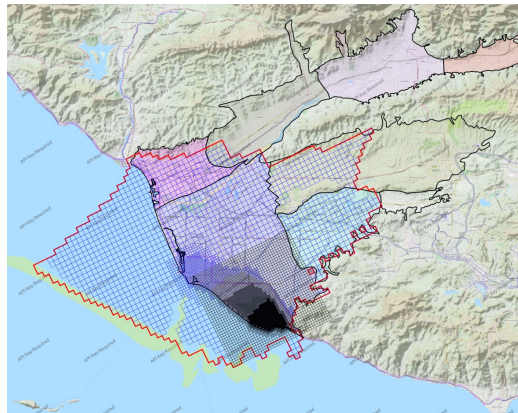
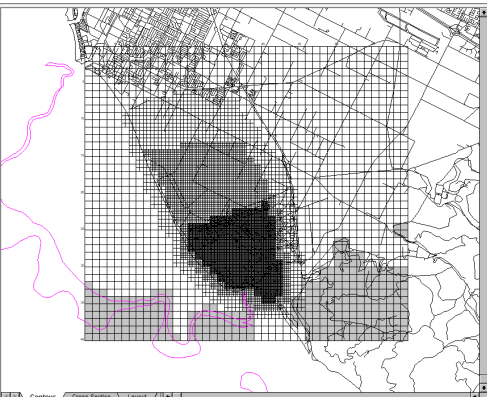
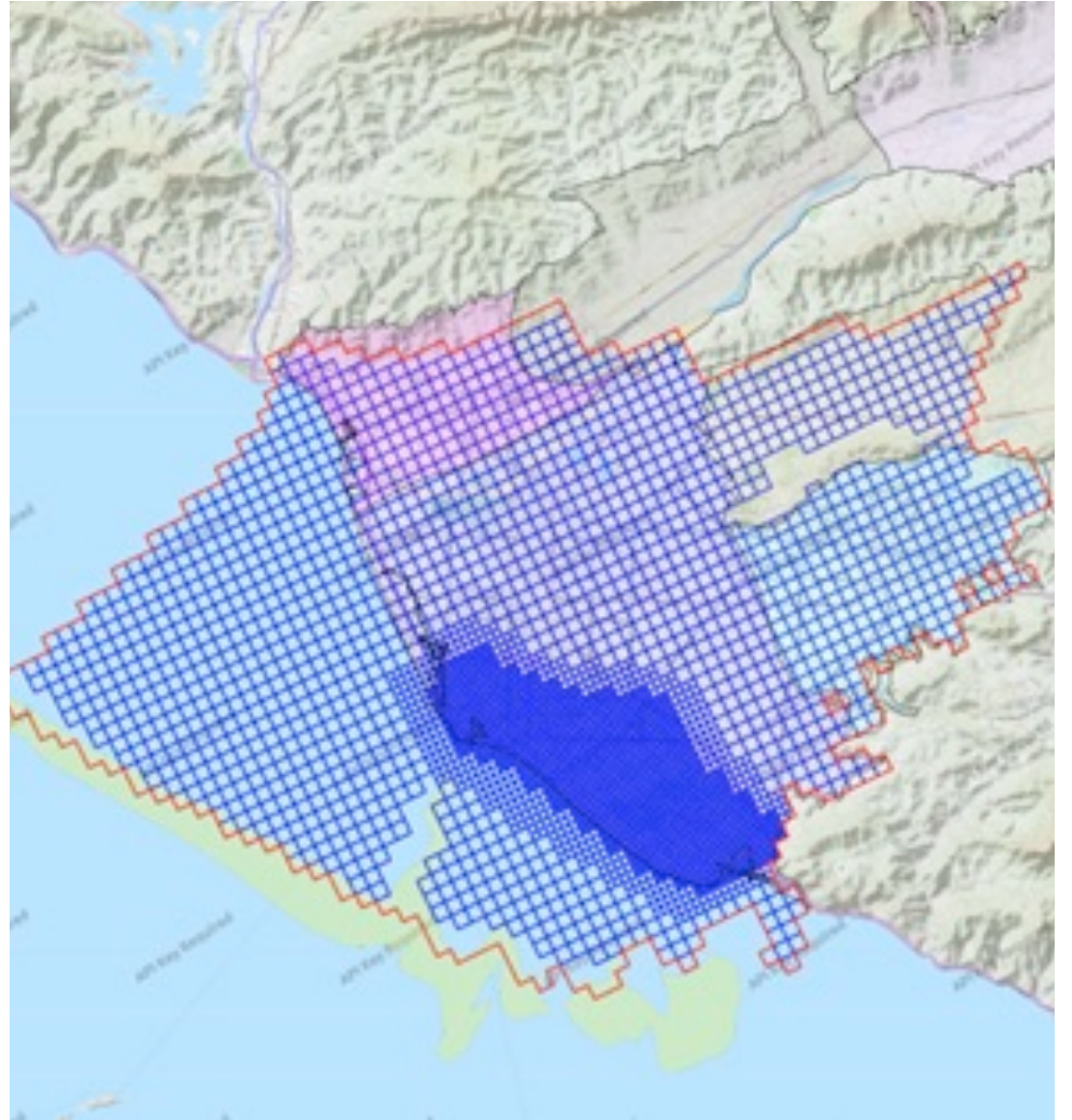
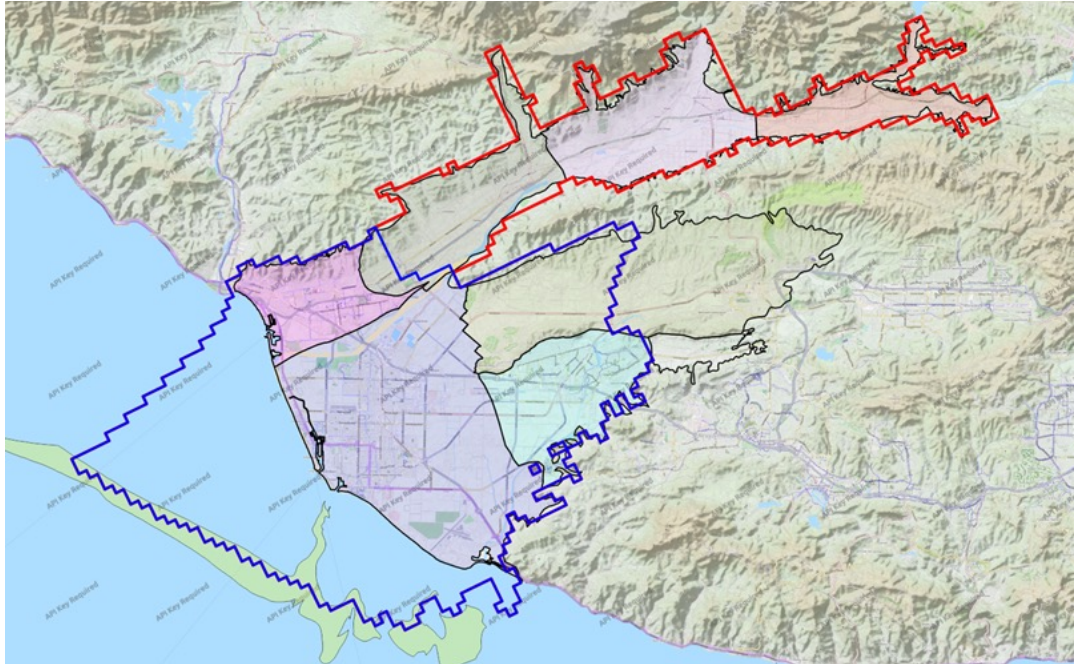
Coastal Basins (Oxnard Basin, PV, Mound, and West LP)

Aquifer System	Hydrostratigraphic Unit	Model Layer
Shallow	Ground Surface to the bottom of Semi-Perched Aquifer	1
UAS	Semi Perched-Oxnard Aquitard	2
	Oxnard Aquifer	3
	Oxnard-Mugu Aquitard	4
	Mugu Aquifer	5
LAS	Mugu-Hueneme Aquitard	6
	Hueneme Aquifer	7
	Hueneme-Fox Canyon Aquitard	8
	Fox Canyon Aquifer - upper	9
	Fox Canyon upper - basal Aquitard	10
	Fox Canyon Aquifer - basal	11
	Santa Barbara and/or other Formation - upper	12
	Grimes Canyon Aquifer	13
Deep	Older sedimentary rocks and Conejo Volcanics	Boundary

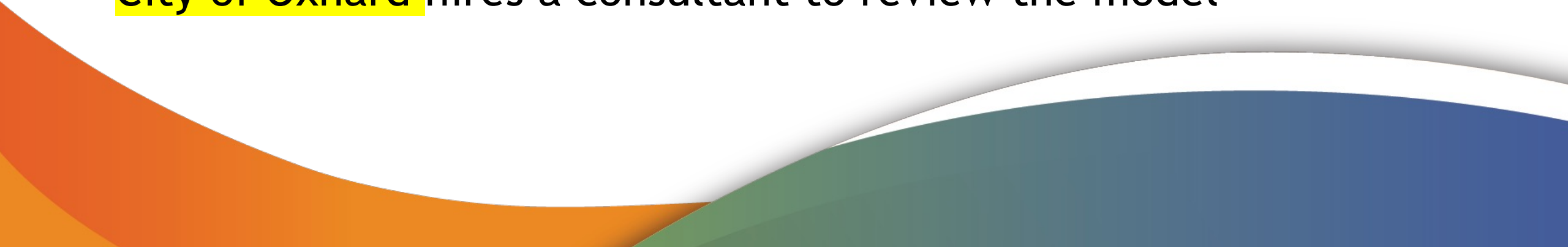


UWCD Groundwater Models

Coastal Plain Model	Regional Model	Coastal Plain Model Upgrade	Unstructured Grid Model	Perched Aquifer Model
Flow (MODFLOW-NWT)	Flow (MODFLOW-NWT)	Flow (MODFLOW-NWT)	Flow + Transport + Density (MODFLOW-USG-Transport)	Flow + Transport + Density (MODFLOW-USG-Transport)
GSPs for FCGMA	GSPs for Fillmore, Piru and Mound		Brackish water	Brackish water
Monthly	Daily	Monthly	Monthly	Monthly
1985-2015	1985-2019	1985-2019	1985-2019	1985-2019
Jun-2018	Aug-2020	Mar-2022	Completed/Ongoing	In the Works



Battle-Tested Model

- The model has been reviewed internally by UWCD surface water hydrologists and hydrogeologists
 - The model has been reviewed externally by an expert panel composed of nationally recognized modelers (Dr. Sorab Panday, Mr. John Porcello, and Mr. Jim Rumbaugh).
 - The model has been reviewed by Stanford professor, Dr. Daniel Tartakovsky
 - City of Oxnard hires a consultant to review the model
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Oxnard Aquifer

