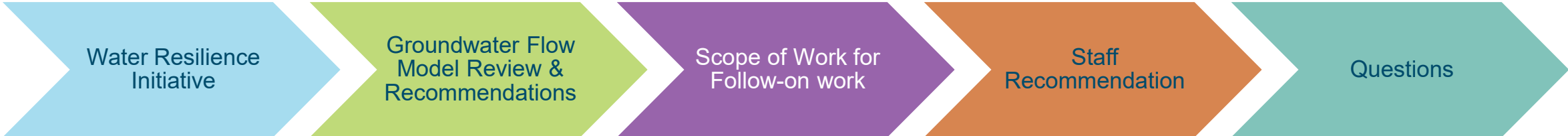
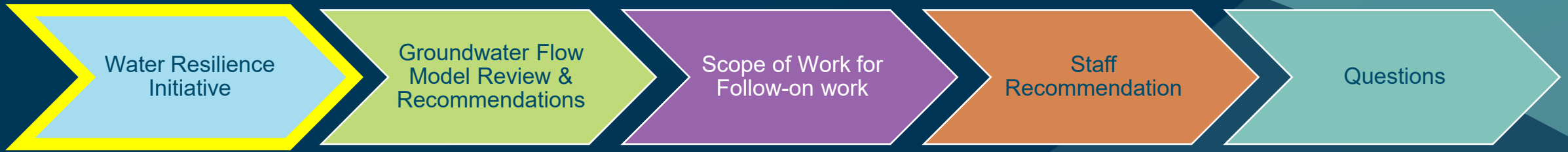
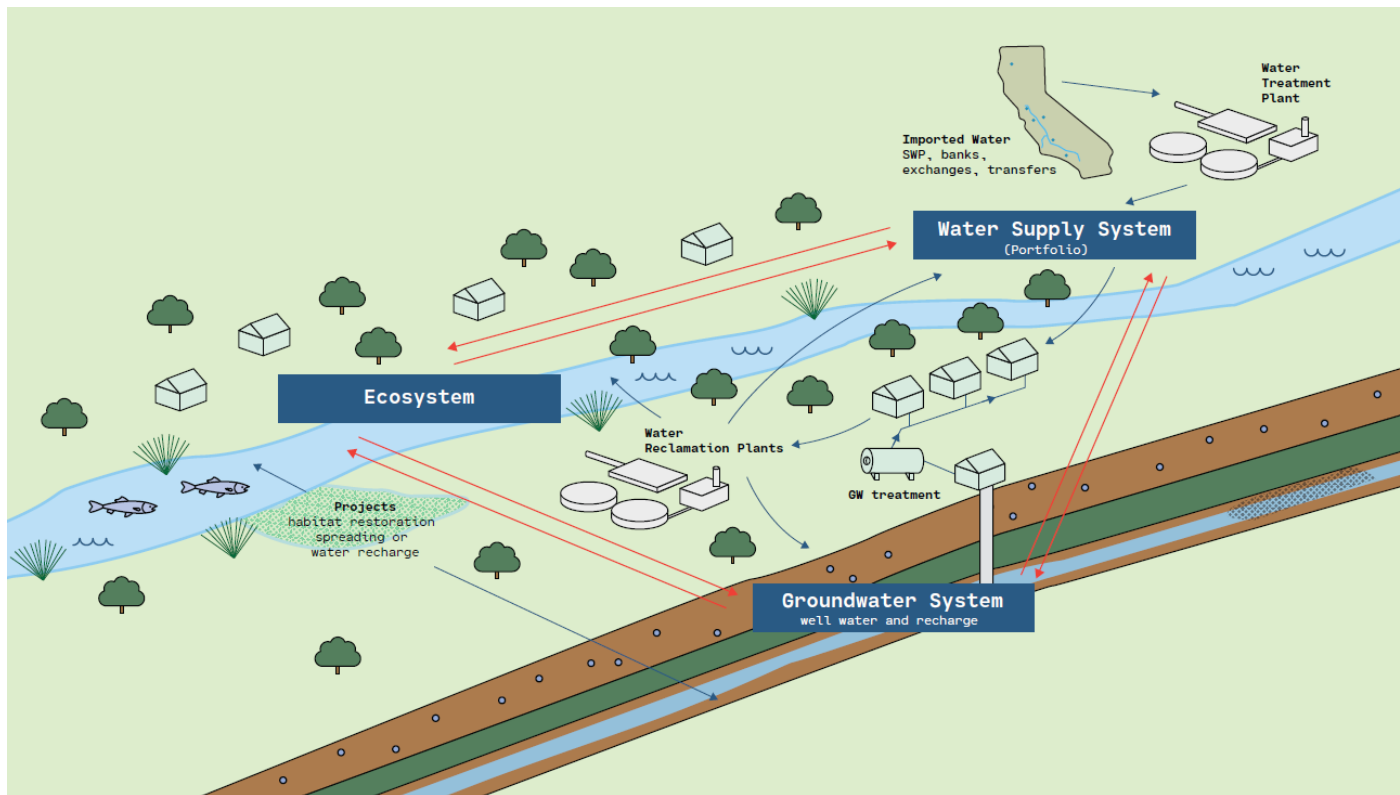


OUTLINE / OVERVIEW



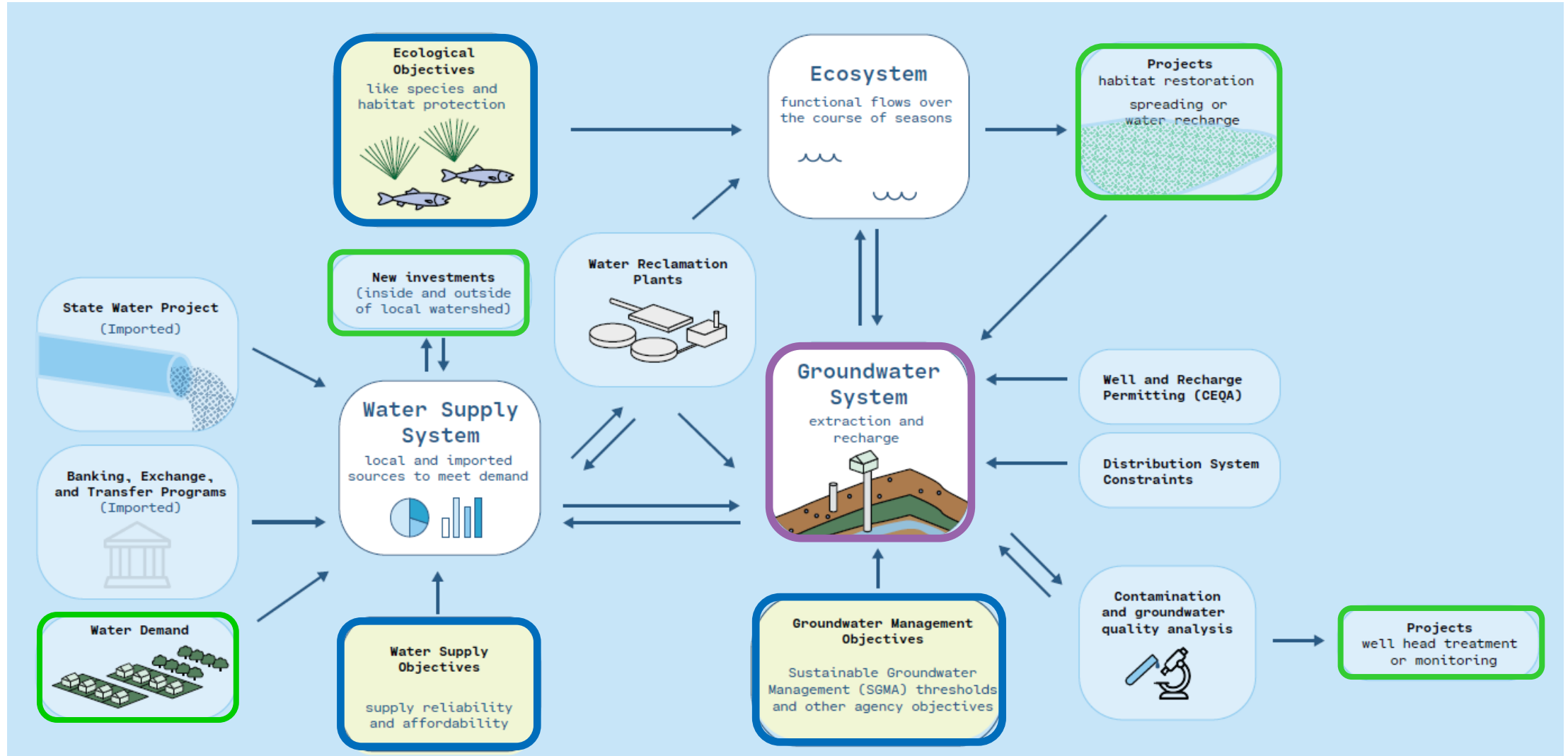


WATER RESILIENCE INITIATIVE (WRI) SCOPE



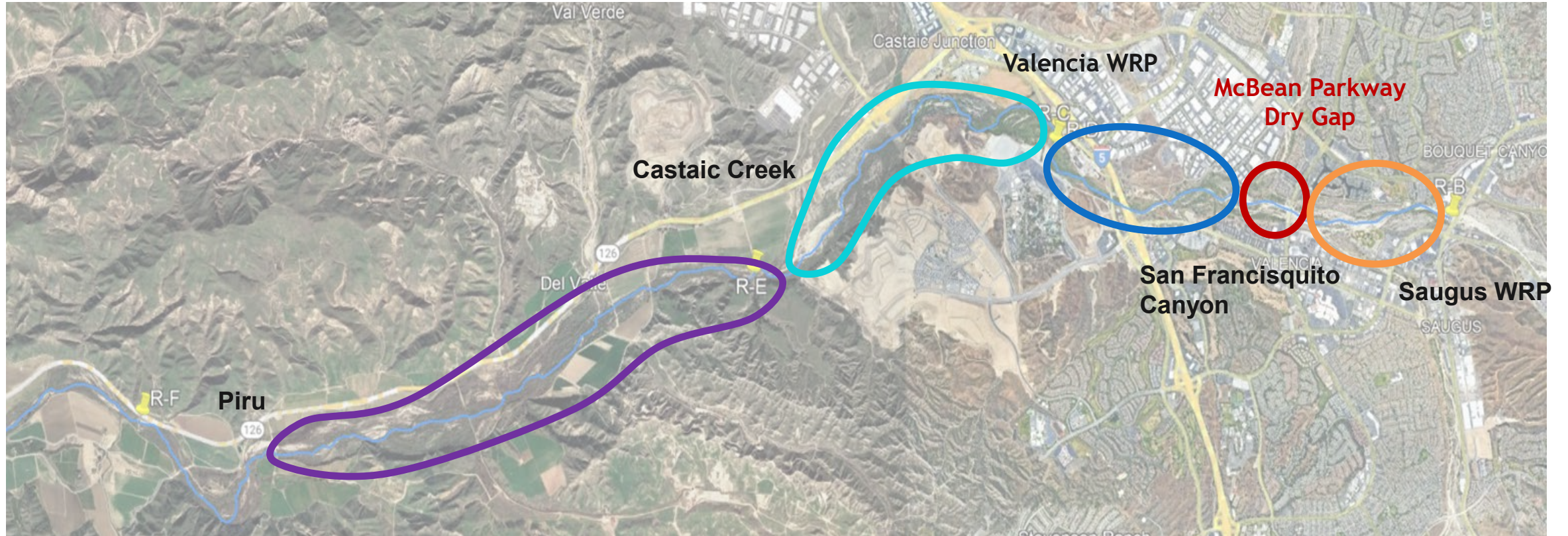
- **Integrates**
 - SCV Water’s mission and values
 - SCV Water’s Santa Clara River policies
- **Driven by**
 - Need for water supply reliability
 - Needs of the ecological systems and regulatory framework
- **Improved Planning Methodology**
 - Current and future climate and regulatory challenges
 - Relationships with other stakeholders

WRI - SCOPE



WRI - SURFACE WATER-GROUNDWATER INTERACTIONS

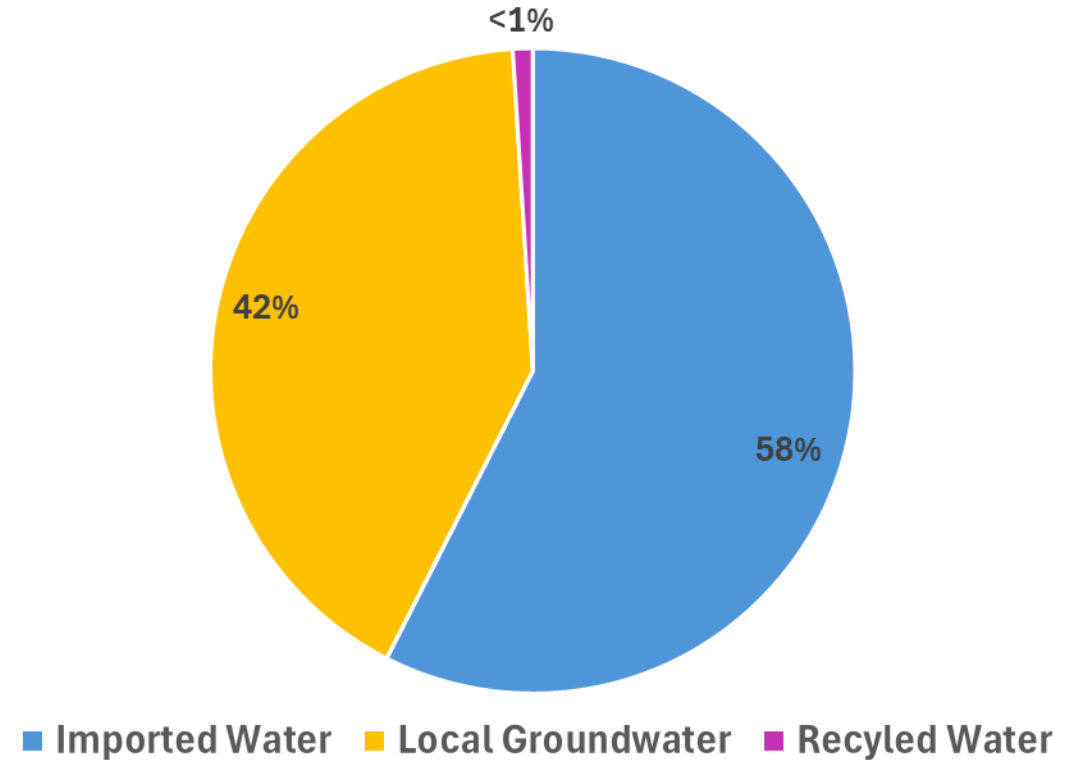
- Preliminary assessments of groundwater – habitat relationships

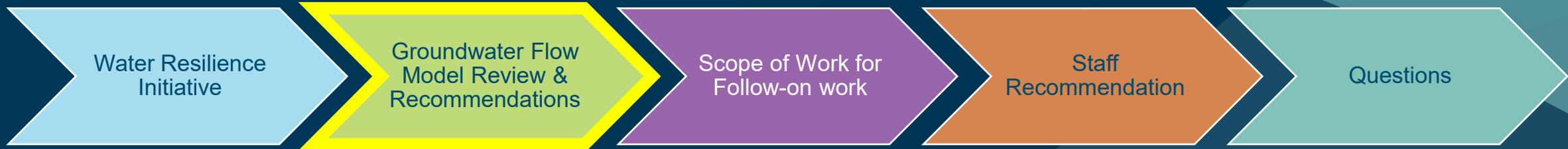


WRI - KEY DRIVERS

- **Groundwater**
 - Periodic use of the Saugus aquifer
- **Recycled water**
- **Interconnectedness to surface water**
- **Cost**
- **Climate Change**

SCV Water Average Year Supplies

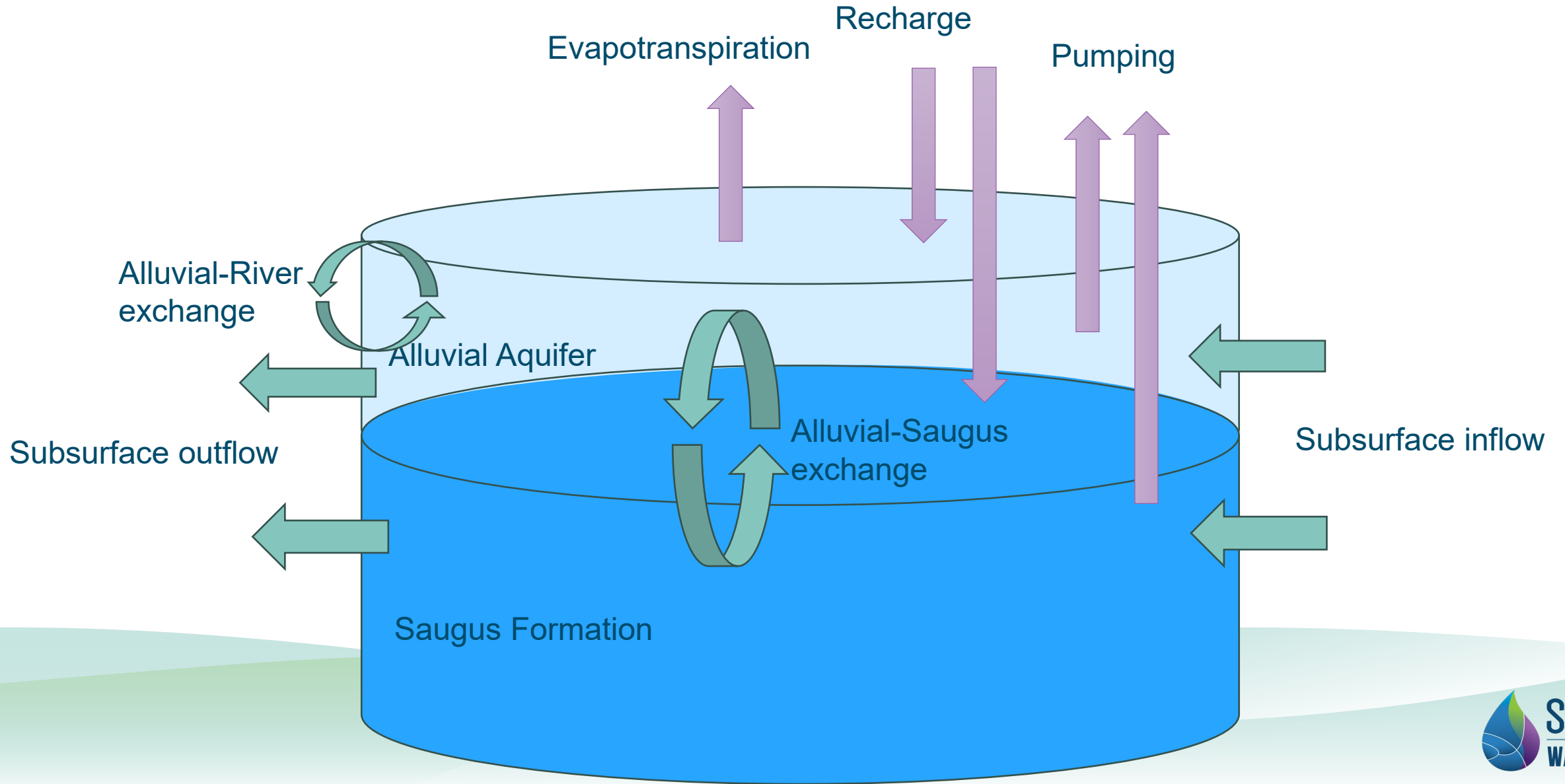




GROUNDWATER FLOW MODEL ENHANCEMENTS - SCOPE

- Key priorities under the WRI include:
 - Achieving greater efficiency in workflow.
 - Improving how the model represents the physical system to better evaluate key questions.
 - Improving visualization of model output.
- SCV Water was awarded a Bureau of Reclamation FY2023 WaterSMART Applied Science Grant.
 - Grant will help to enhance the groundwater model's conceptualization and calibration for:
 - Answering key questions.
 - Supporting robust decision-making.
 - Analyzing how storage can be used to improve water supply and ecosystem resilience.

GROUNDWATER FLOW MODEL ENHANCEMENTS - SCOPE



GROUNDWATER FLOW MODEL ENHANCEMENTS – OVERVIEW

- INTERA reviewed the construction of the current model, and the tools and workflow used to run the model and process output. Key recommendations from that review are:

Update & recalibrate the model.

- Reflect updates to the conceptual model currently being made.
- Incorporation of potentially new data and testing.

Transition to the most current USGS MODFLOW 6 platform.

Description of preferred construction for a new recharge compiler.

Develop automated workflows.

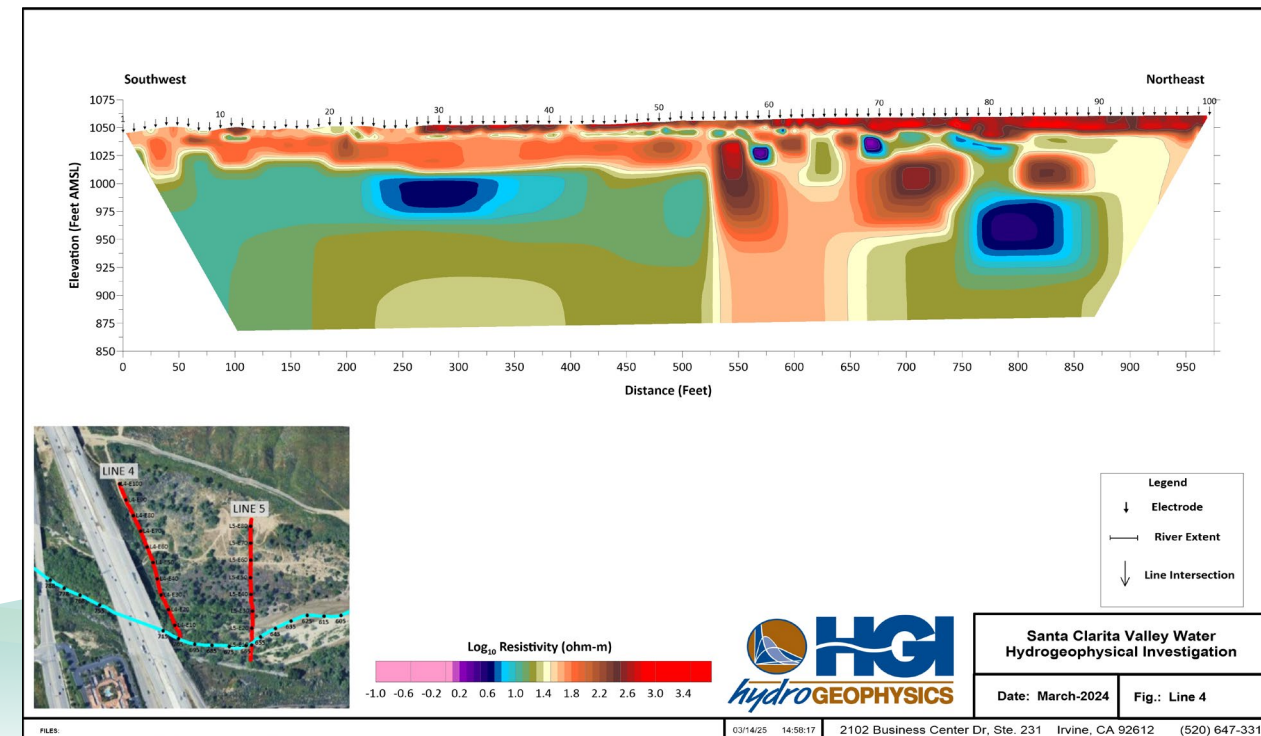
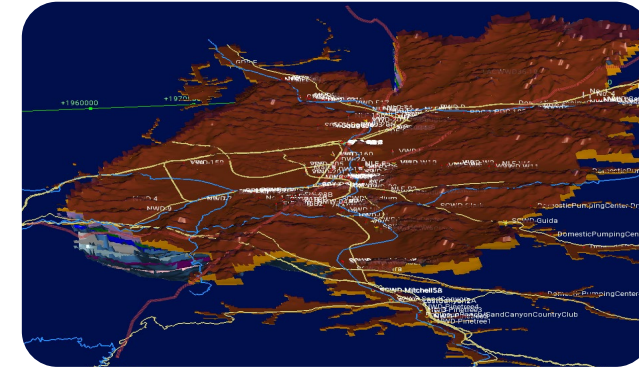
- Manage input and output files including visualizations.

Use of Parameter Estimation Software Tool (PEST) for calibration and other advanced analysis.

Development of a groundwater flow model emulator.

GROUNDWATER FLOW MODEL ENHANCEMENTS – COORDINATION OF PROPOSED & ONGOING WORK

- Consultant was advised of on-going efforts to update the conceptual model with additional data on basin geology.
 - The leapfrog model is being updated with data from RC Slade reports.
 - A geophysical survey has been completed in the river system between McBean Pkwy and the I-5 bridge.
- The updated conceptual model would be used to update the groundwater flow model

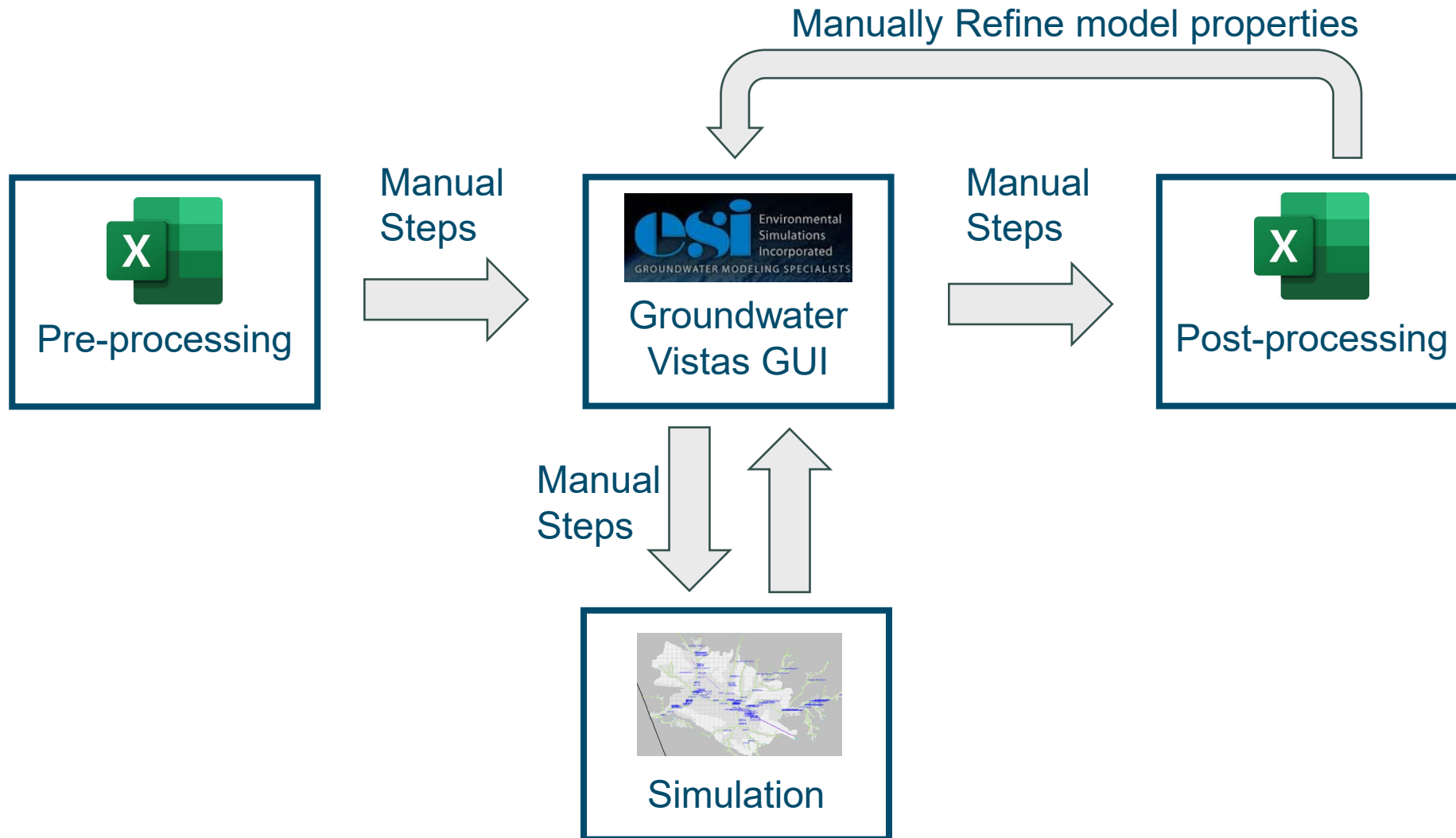


Santa Clarita Valley Water
Hydrogeophysical Investigation

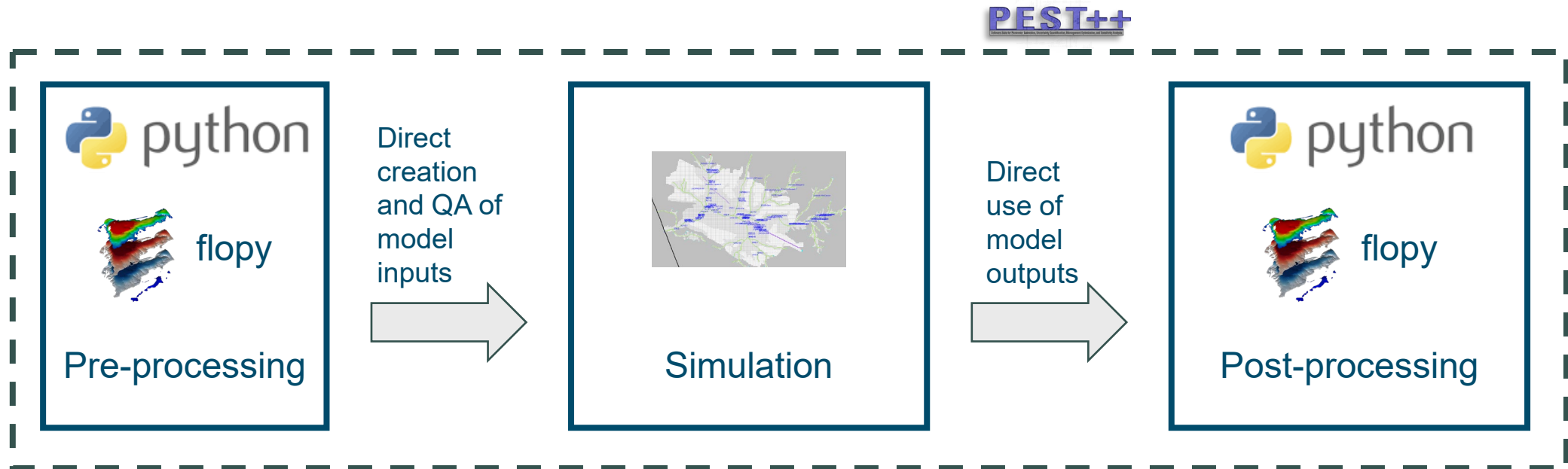
Date: March-2024

Fig.: Line 4

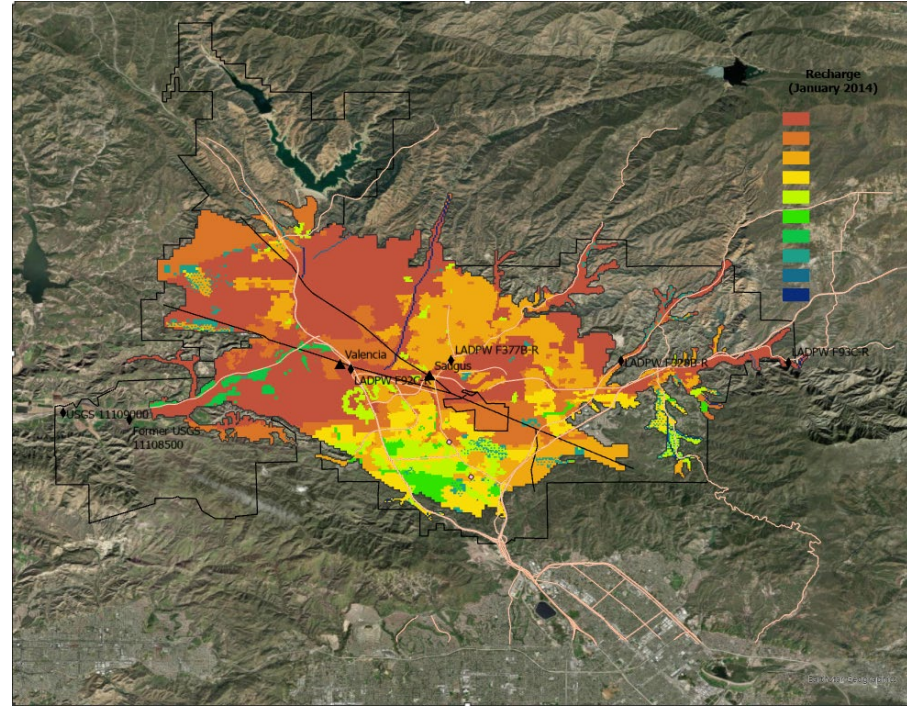
GROUNDWATER FLOW MODEL ENHANCEMENTS – CURRENT WORKFLOW



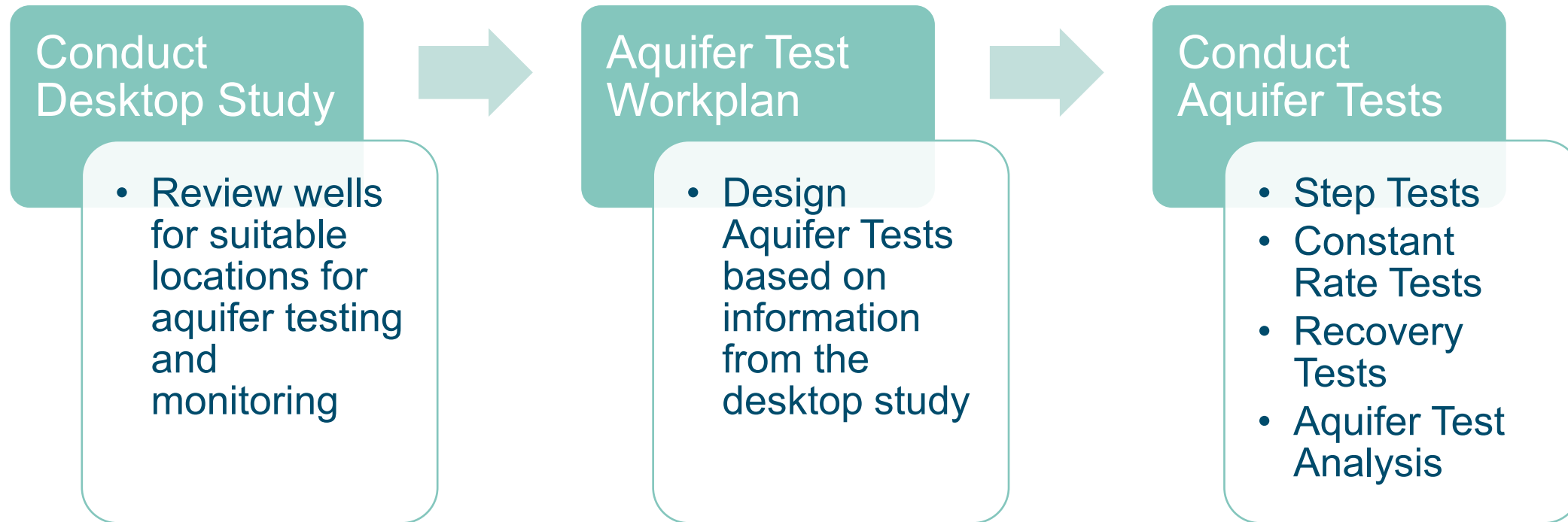
GROUNDWATER FLOW MODEL ENHANCEMENTS – PROPOSED WORKFLOW



GROUNDWATER FLOW MODEL ENHANCEMENTS - PROPOSED UPDATE OF RECHARGE TOOL



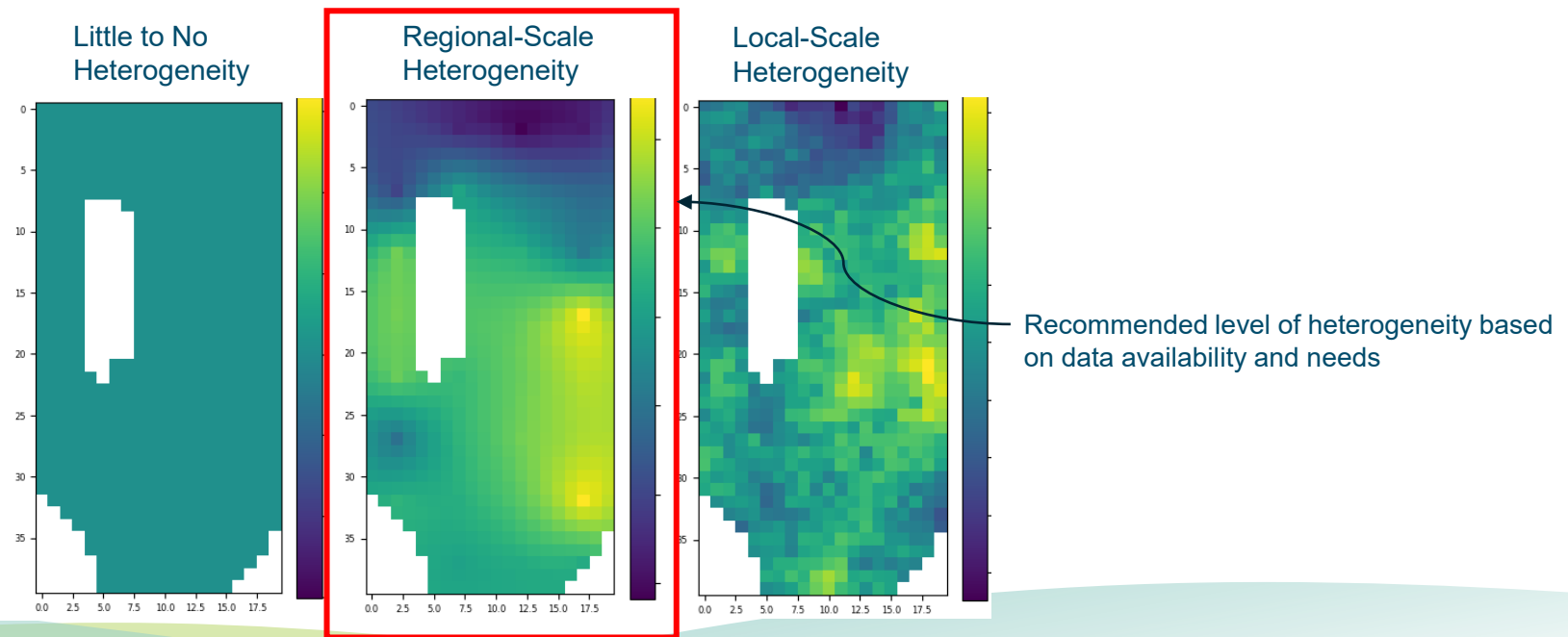
GROUNDWATER FLOW MODEL ENHANCEMENTS – AQUIFER TESTING TO MODEL CALIBRATION



GROUNDWATER FLOW MODEL ENHANCEMENTS – PROPOSED REFINEMENTS OF MODEL CALIBRATION

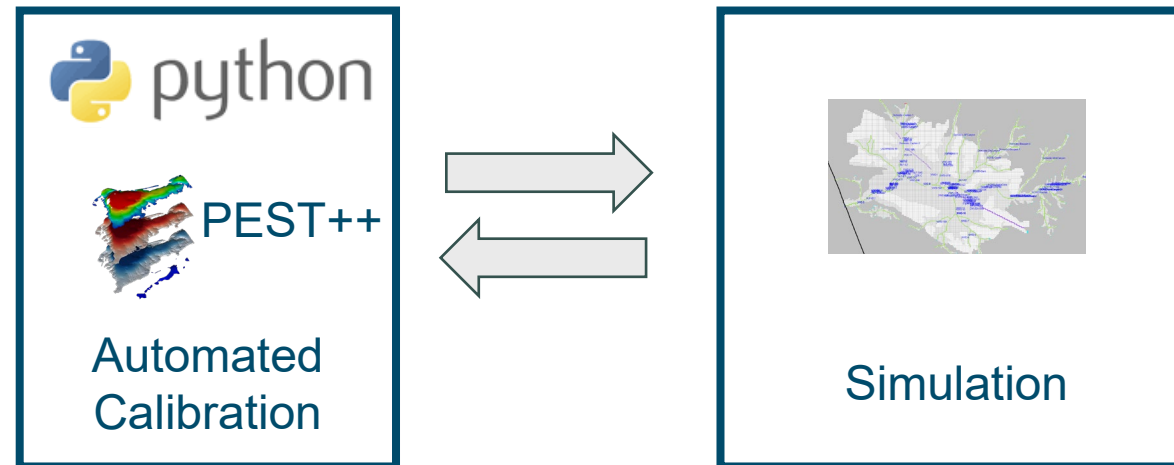
- More granular representation of the heterogeneity of the water bearing strata

Example of different scales of heterogeneity in the subsurface



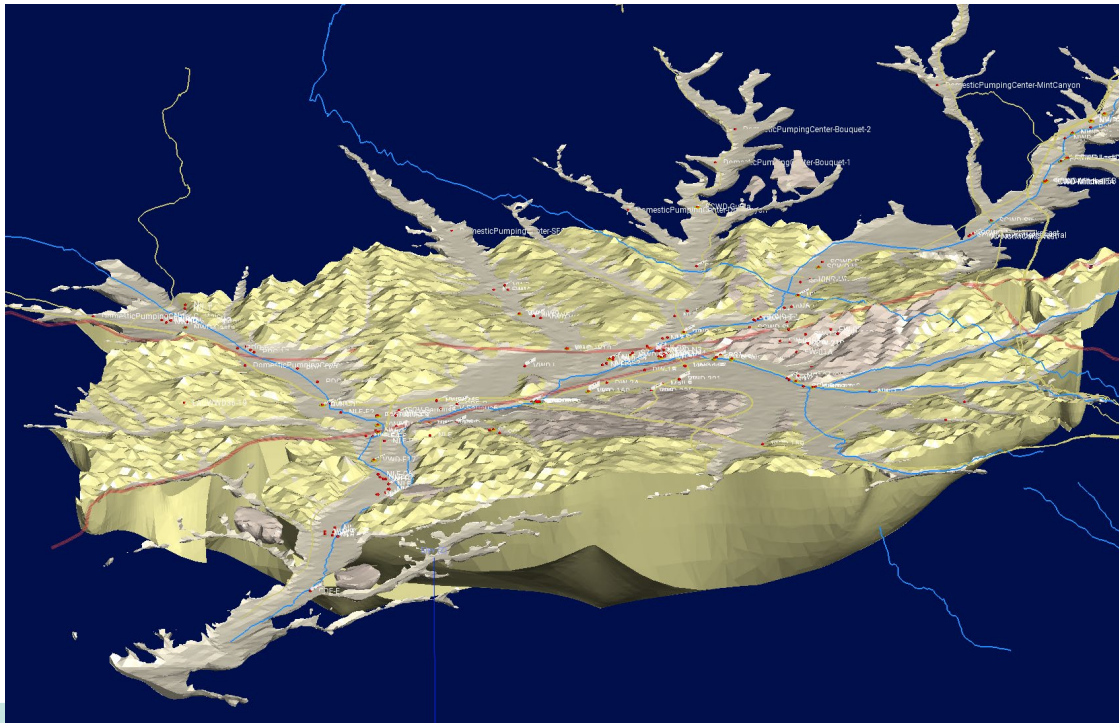
GROUNDWATER FLOW MODEL ENHANCEMENTS – AUTOMATED MODEL CALIBRATION

- A key tool for the calibration of the model is the USGS Parameter Estimation Software Tool (PEST).
 - Adds efficiency allowing advanced analysis to support decision making.
 - Enables data worth analysis to ensure cost efficiency in future data gathering efforts.
 - Allows us to understand uncertainty and evaluate risk.

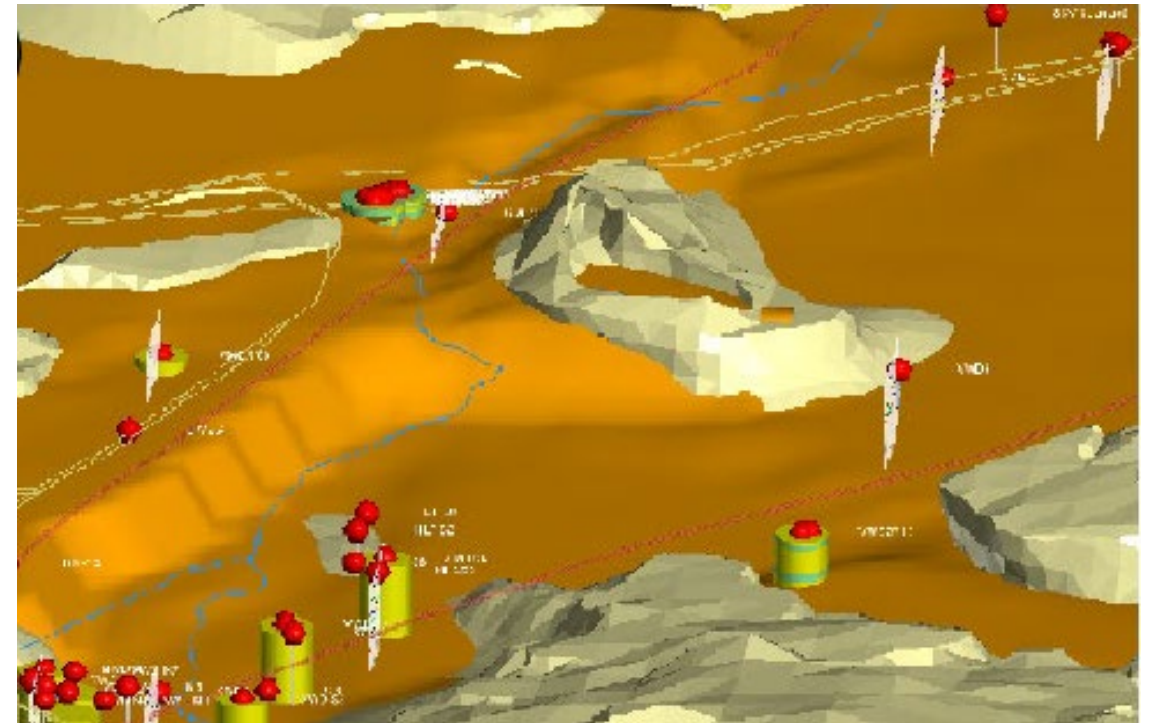


GROUNDWATER FLOW MODEL ENHANCEMENTS - IMPROVED VISUALIZATIONS

Utilize Leapfrog for Visualizations

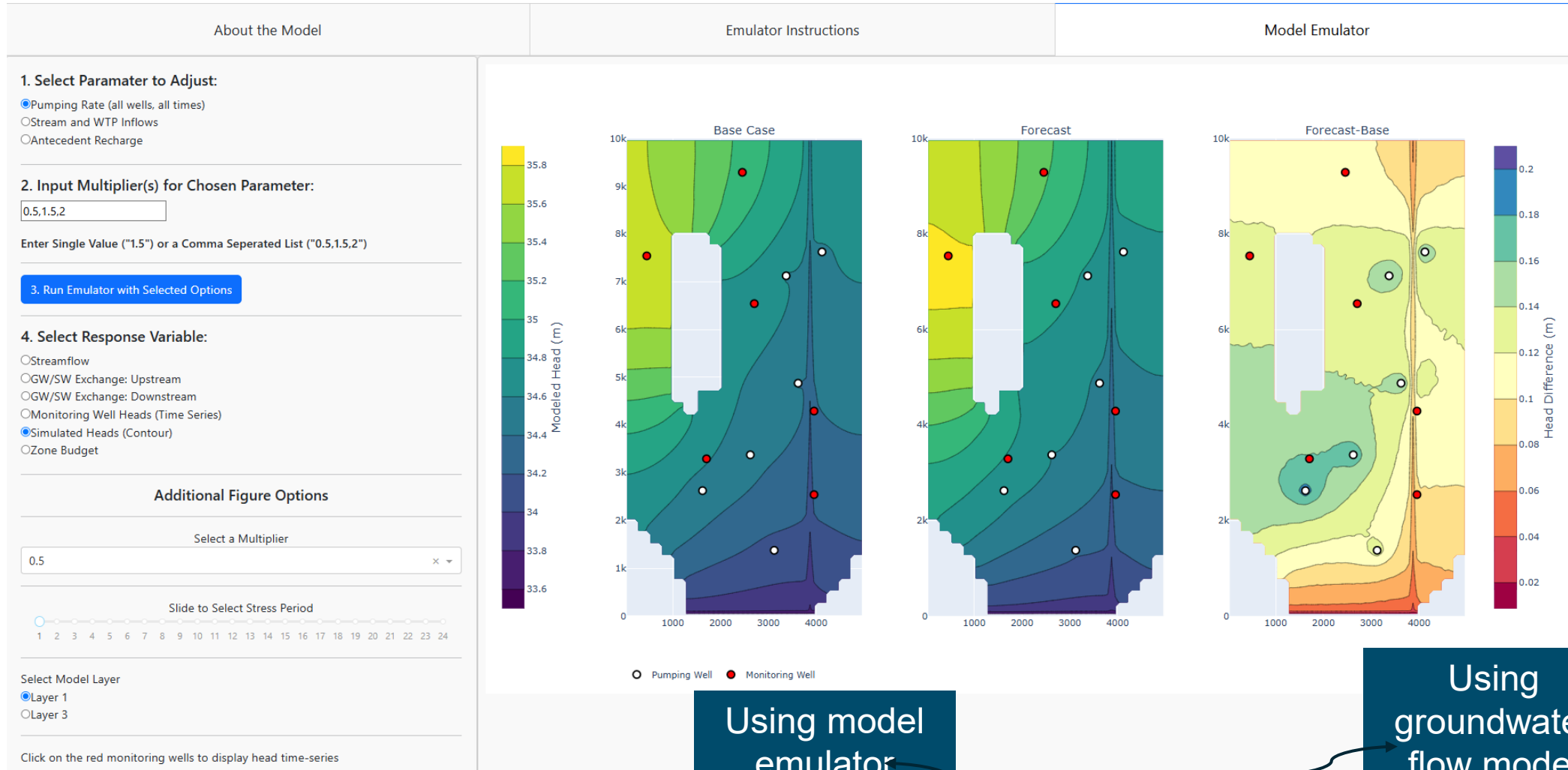


Create New 3-D Visualizations



GROUNDWATER FLOW MODEL ENHANCEMENTS – PROPOSED DECISION SUPPORT TOOL

Example of emulator dashboard (not representative of USCR Groundwater Basin)



Using model emulator < 5 min

Same analysis

Using groundwater flow model ~6-8 hours



RECOMMENDATIONS FOR FOLLOW-ON SCOPE OF WORK

- Task 1: Develop a data collection and testing plan
 - Review of the conceptual water balance and sources of pumping capture in the basin
 - (Optional) 4 additional aquifer tests
- Task 2: Convert Groundwater Flow Model to MODFLOW6
- Task 3: Update the Groundwater Flow Model Recharge Package to State-of-the-Practice
- Task 4: Update the Flow Model Hydrostratigraphy with data collected by other consultants
- Task 5: Set up PEST++ and model calibration workflow
- Task 6: Update Model Calibration
- Task 7: Develop enhanced 3-D visualizations of model output
- Task 8: Develop emulator and supplemental visualizations

RECOMMENDATIONS FOR FOLLOW-ON SCOPE OF WORK

- Task 9: Prepare detailed model documentation
- Tasks 10 & 11: Run model scenarios in support of WRI and GSP development
- Task 12: Conduct webinar for USBR as required under the Applied Sciences Grant
- Task 13: Training and Data Sharing
- Task 14: Model Coordination
- Task 15: Planning for future Structured Decision Making under the WRI
- Task 16: Project Management
- Task 17 (Optional): Monitoring Well Construction Support

RECOMMENDATIONS FOR FOLLOW-ON SCOPE OF WORK

- Schedule: 2 years from Notice to Proceed.
- Funding:
 - Included the FY2025/2026 and FY2026/2027 Capital Budget.
 - BOR FY2024 Applied Science Grant.
- Budget: \$1,083,498.
 - \$658,395 for modeling.
 - \$408,981 covered under the Applied Science Grant.
 - \$249,414 (capital budget).
 - \$408,981 for field data collection and aquifer testing task.

RECOMMENDATIONS FOR FOLLOW-ON SCOPE OF WORK – DRAFT SCHEDULE

2025												2026												2027					
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
SCV-GSA WY2024 Annual Report												SCV-GSA WY2025 Annual Report				GSP 5-year update report writing								BoD GSP adoption					
Updated HCM. New leapfrog model												Determine Undesirable results (UDs)				Run model to quantify pumping for UD's (Prior to workshop)				Model simulation for ISW, budget analysis, other scenarios									
SGM Alluvial & Saugus monitoring wells installation																													
Coordination and Training																													
Set up PEST and Model Calibration Workflow												Update Model Calibration																	
Develop Data Collection Plan				Data Collection (Aquifer Response)																									
Update to MF6		Update Recharge Package		Update hydrostratigraphy		Develop Model Emulator & Visuals																		Run pumping scenarios for WRI					



STAFF RECOMMENDATION

- That the Water Resources and Watershed Committee recommends that the Board of Directors authorize the General Manager to enter into a professional services agreement with INTERA for follow-on work to Improve Modeling of the Local Groundwater System.