San Mateo Plain Groundwater Basin Assessment

Stakeholder Workshop #6

17 AUGUST 2017

COUNTY OF SAN MATEO
HEALTH SYSTEM

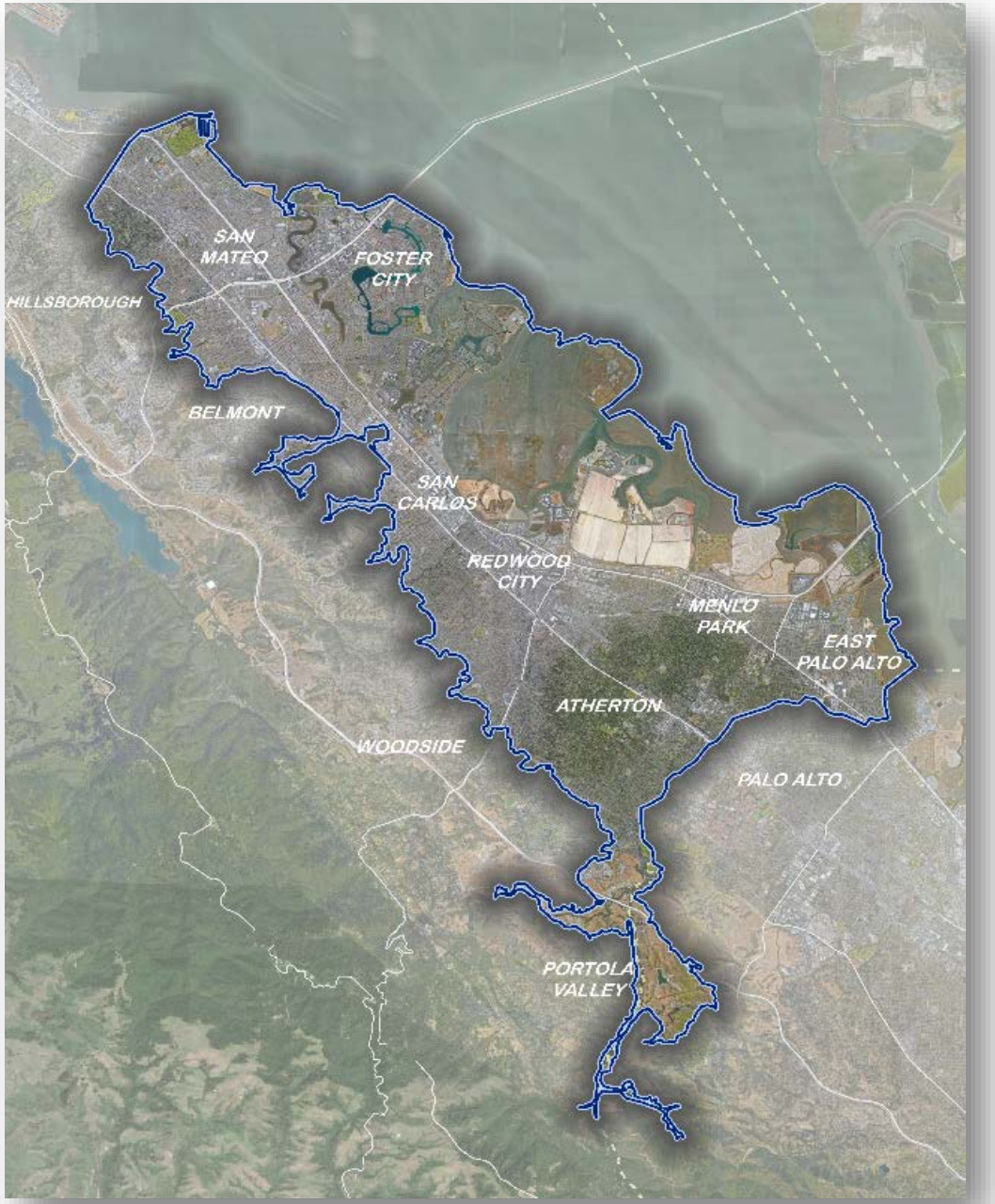
TODD GROUNDWATER

eki environment & water

HYDROFOCUS INC.
Solutions for Land and Water Resources

PRESENTATION OVERVIEW

- Introductions
- Project Overview
- Summary of Phase 2 Activities
- Upcoming Activities
- Breakout Session & Share Out



SAN MATEO PLAIN GROUNDWATER BASIN ASSESSMENT

- Funded through Measure K and Office of Sustainability
- Project Objectives:
  - Increase Public Knowledge
  - Evaluate Hydrogeologic and Groundwater Conditions
  - Evaluate Risk of Undesirable Results
  - Potential Groundwater Management Strategies

SUPPORTED BY MEASURE K
LOCALFUNDS LOCALNEEDS
WWW.SMCGOV.ORG

OFFICE OF SUSTAINABILITY
COUNTY OF SAN MATEO

http://smcsustainability.org/energy-water/groundwater

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THE PROJECT IS BEING EXECUTED IN THREE PHASES

Phase 1

- Stakeholder Coordination and Public Outreach
- Data Compilation, Unification, and Sharing
- Develop Initial Basin Conceptual Model
- Develop Basin Groundwater Numerical Model
- Evaluate Potential Basin Management Strategies
- Prepare Phase I Report

Apr 2016 – Jan 2017

Phase 2

- Public Outreach
- Fill Selected Data Gaps
- Update Database
- Update and Refine Conceptual and Numerical Models

Jul 2017– Dec 2017

Phase 3

- Public Outreach
- Conduct Scenario Evaluations
- Prepare Final Report

Aug 2017 – Jun 2018

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ON-GOING STAKEHOLDER OUTREACH

- Small group and one-on-one meetings
- Presentations to organizations and governing bodies
- Stakeholder workshops
- New website address: http://www.smcsustainability.org/energy-water/groundwater/
- Open Data Portal

Workshop #1
May 17, 2016
Project Introduction and Overview

Workshop #2
September 7, 2016
Basin Conceptual Model

Workshop #3
November 21, 2016
Groundwater Flow Model

Workshop #4
December 6, 2016
Basin Management Options

Workshop #5
January 31, 2017
Phase I Results and Report

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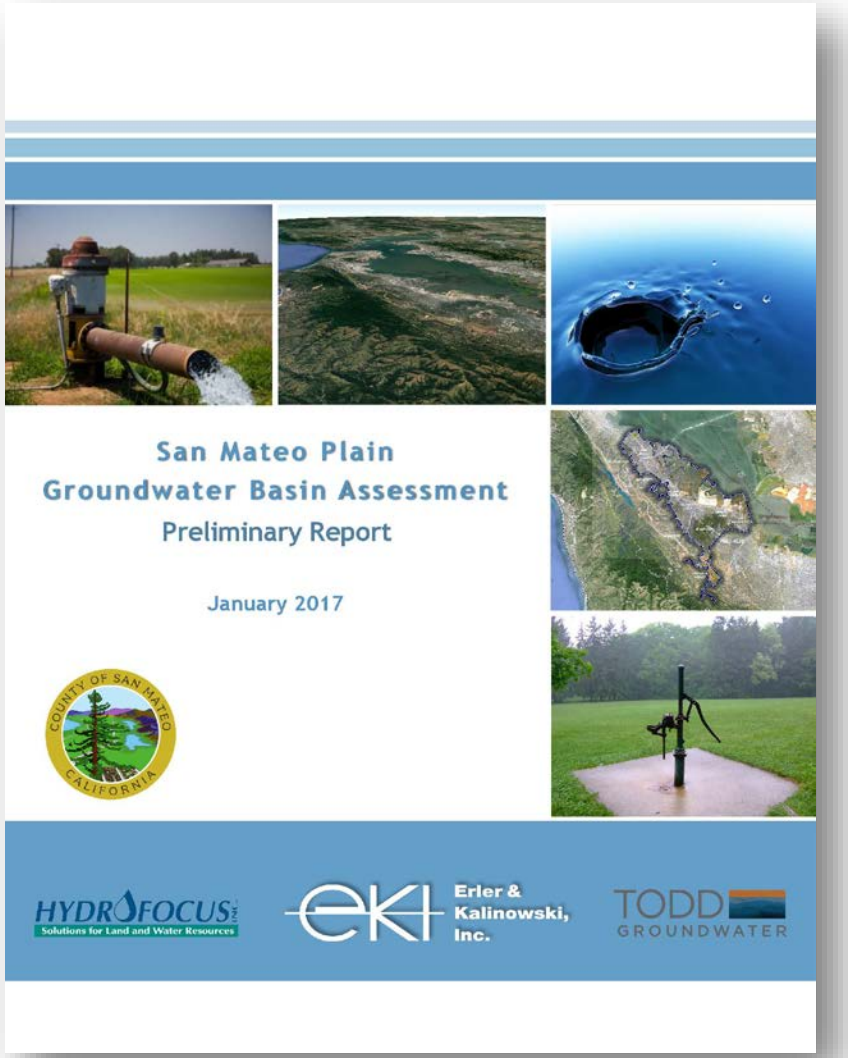
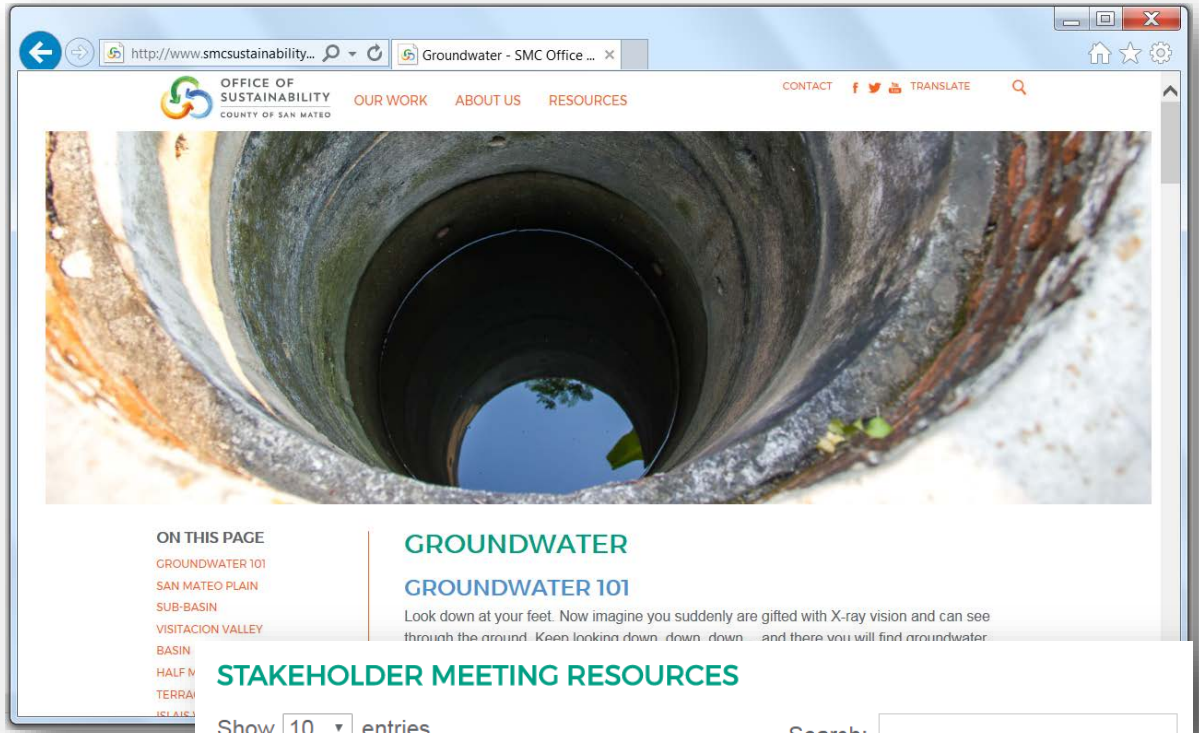
PRELIMINARY REPORT – JANUARY 2017

- Comprehensive technical assessment of the Basin
- Profiled by Stanford's Water in the West:
  http://waterinthewest.stanford.edu/news-events/news-insights/san-mateo-plain-groundwater-subbasin-local-case-study
- Available on Project website:
  http://www.smcsustainability.org/download/energy-water/groundwater/Final-Phase-1-Report.pdf



PUBLICLY ACCESSIBLE DATA

- Data for website and OpenData Portal, including:
  - List of web resources and links to electronic data repositories and reports used for the basin assessment
  - DWR well logs (soon to be provided)
  - http://www.smcsustainability.org/energy-water/groundwater/



STAKEHOLDER MEETING RESOURCES

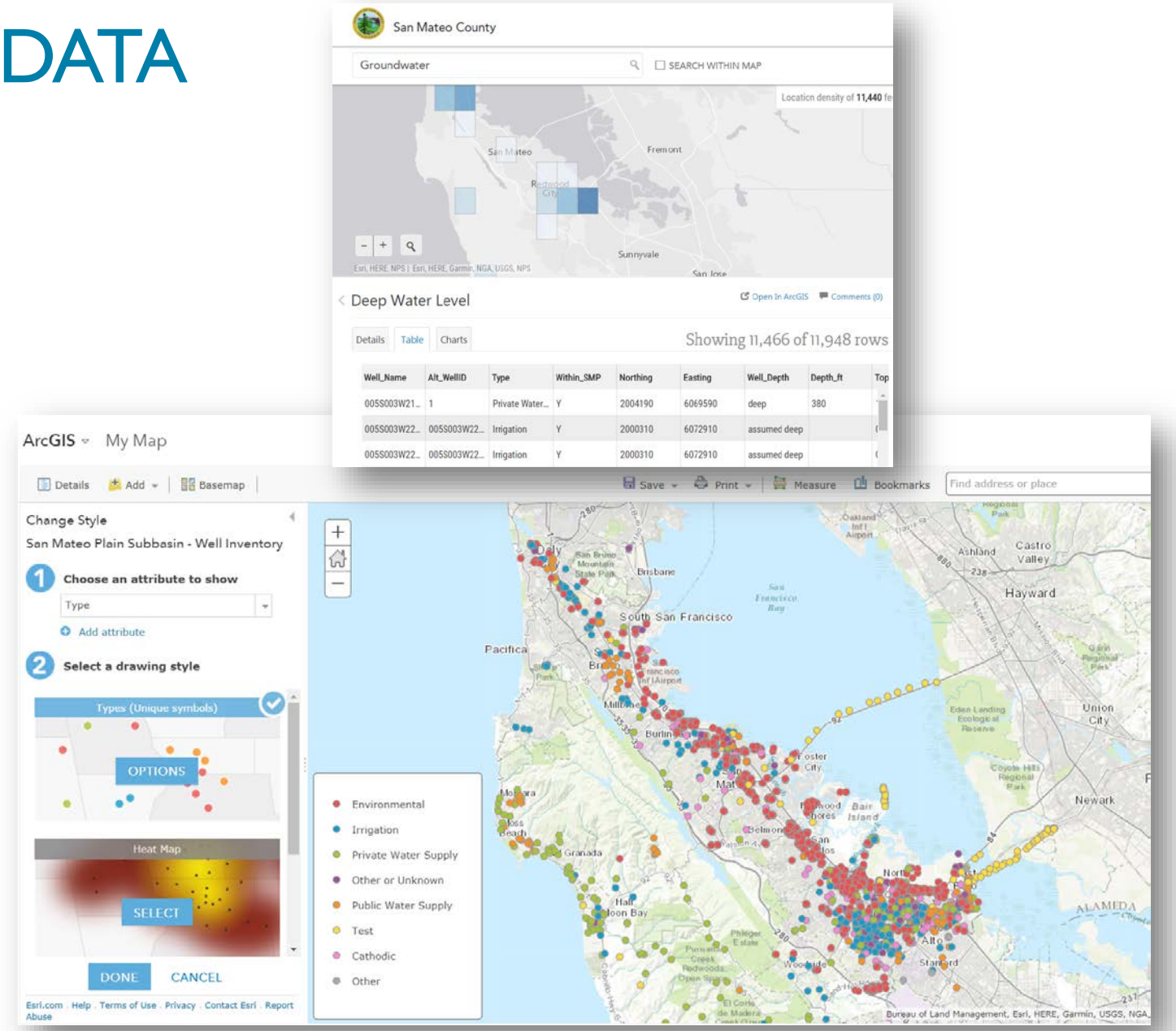
Show 10 entries Search:

WORKSHOP DATE	LOCATION	WORKSHOP MATERIALS
August 17, 2017	Sobrato Community Conference Center Redwood Shores Shoreway Conference Room 350 Twin Dolphin Drive, Redwood City	Agenda
January 31, 2017	Redwood Shore Public Library, Community Room 399 Marine Parkway, Redwood City	Agenda Presentation
December 6, 2016	Emergency Operations Center Belmont City Hall, 2nd Floor #1 Twin Pines Lane, Belmont	Agenda Presentation Discussion Feedback
November 21, 2016	Menlo Park's Arrillaga Family Recreation Center 700 Alma Street, Menlo Park	Agenda Presentation
September 7, 2016	Wind Room, Foster City Community Center 1000 E. Hillsdale Ave, Foster City	Agenda Presentation
May 17, 2016	Oak Room, San Mateo County Library 55 W. 3rd Ave, San Mateo	Agenda Presentation Discussion Feedback

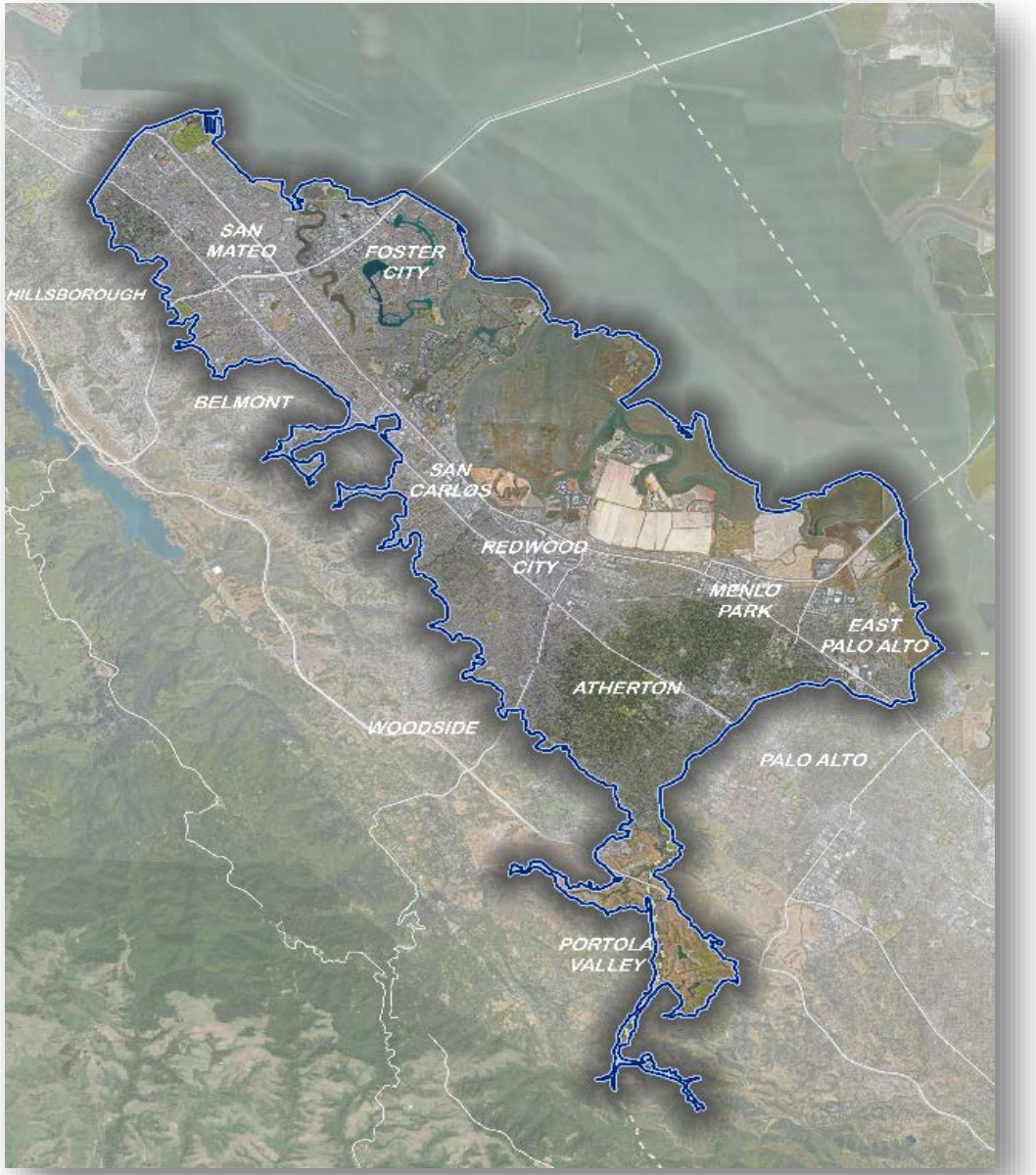
Showing 1 to 6 of 6 entries Previous Next

PUBLICLY ACCESSIBLE DATA

- 15 GIS shapefiles on the County Data Portal
- Data gathered and used for preliminary report for Phase 1:
  - Water levels
  - Water quality
  - Well construction info
  - Rough well locations
  - http://data-smcmaps.opendata.arcgis.com/datasets?q=Groundwater&sort_by=relevance

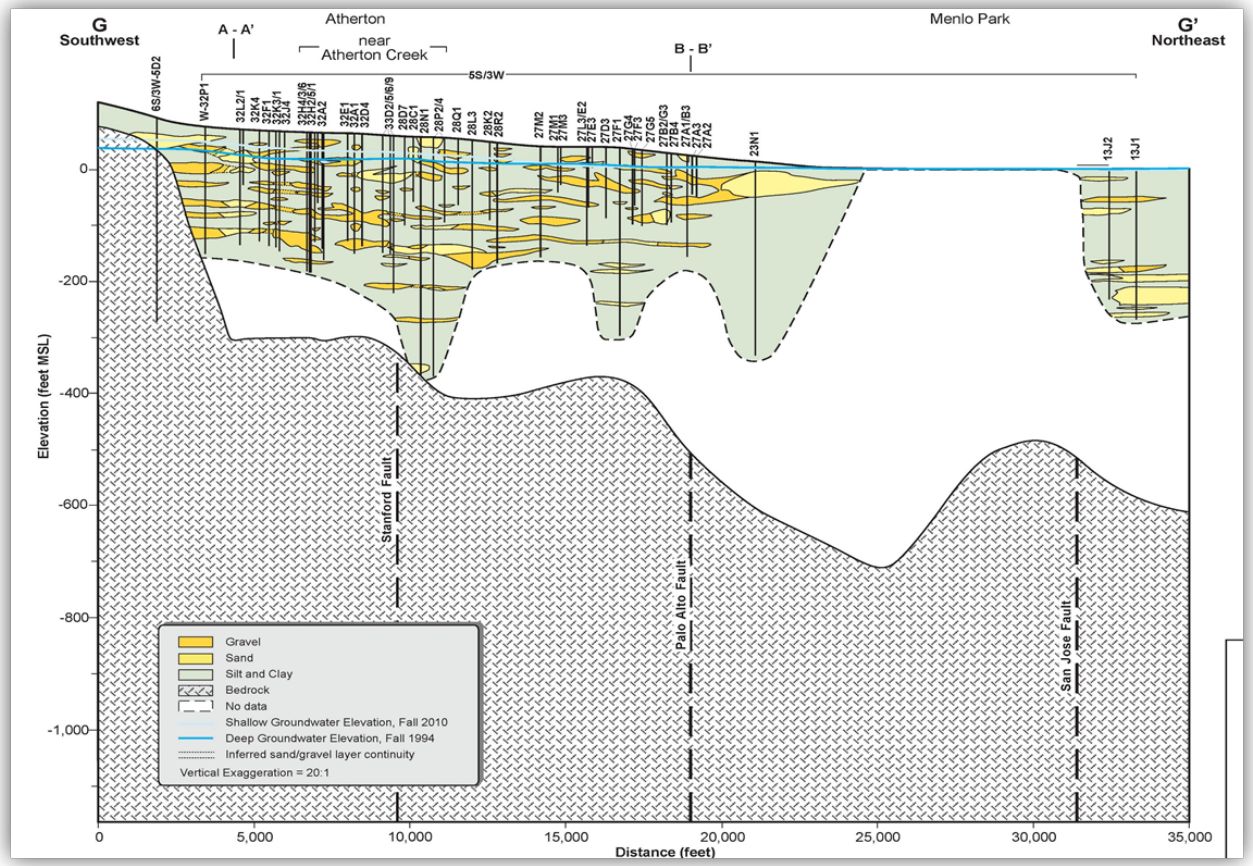


SUMMARY OF PHASE 2 ACTIVITIES



PHASE 1 EFFORT IDENTIFIED KEY DATA GAPS

- Temporal and spatial groundwater levels, quality, and production
- Aquifer pump test observation data
- Streamflow-groundwater interactions
- Sewer line-groundwater interactions
- Understanding of flow along basin boundaries
- Bay Mud effective conductivity



ADDITIONAL PARTNERSHIPS WERE FOSTERED

- SFPUC
  - Historical Geotracker data compilation
  - Additional streams and streamflow measurements
- Local Commercial, Municipal, and Residential entities/ public
  - Groundwater monitoring (74 potential deep wells identified)
- Stanford and San Francisquito Creek JPA
  - Additional streams and streamflow measurements
- Studies within and adjacent to Basin
  - SCVWD, CCAG, San Mateo, Palo Alto/SCVWD

Balance Hydrologics, 2017

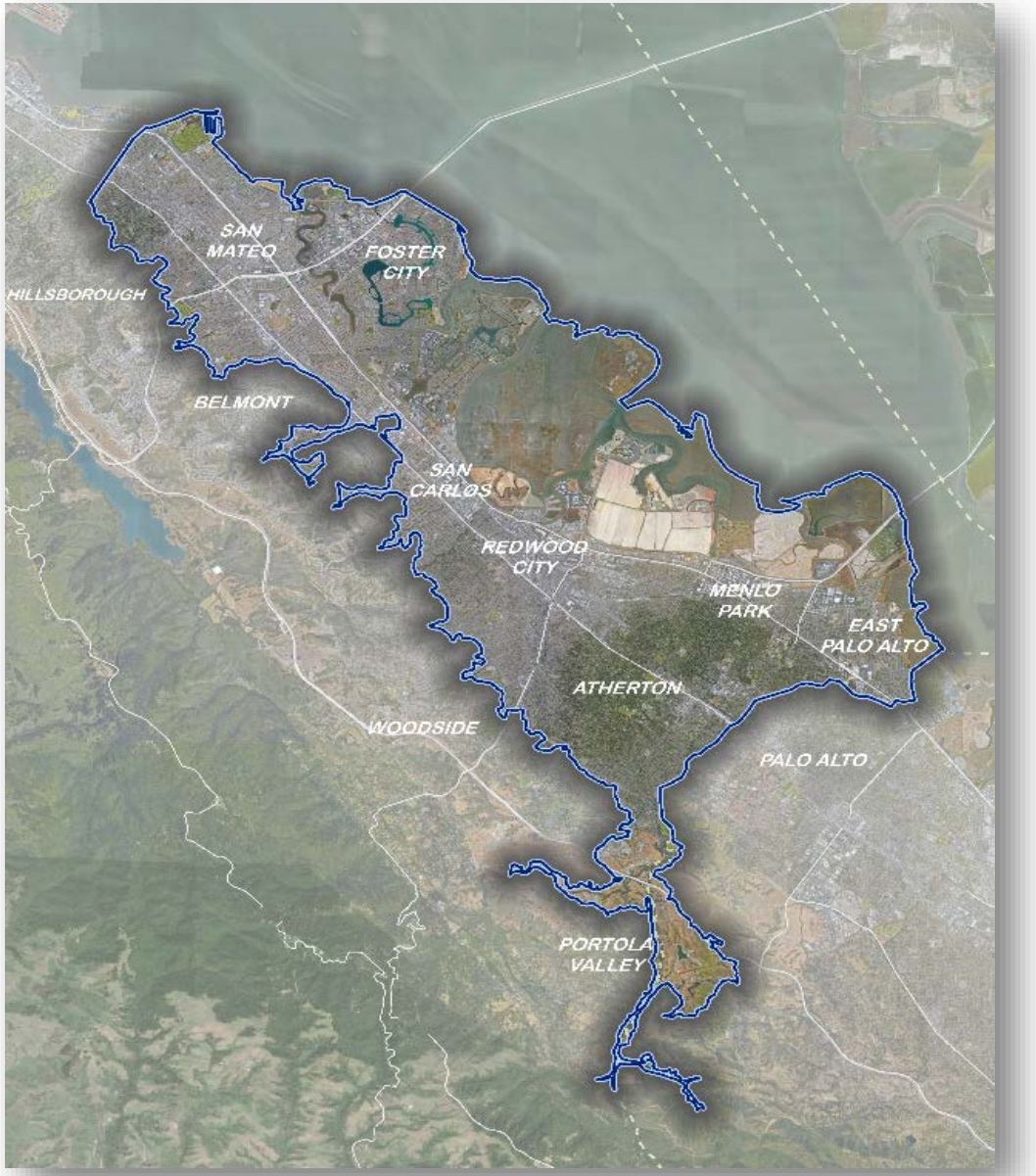
KEY PHASE 2 ACTIVITIES HAVE BEEN SCOPED / COMPLETED

- Reconciliation of boundary flow conditions (SCVWD)
- Remediation site reviews
  - Tidal studies
  - Pump tests
  - Groundwater extraction
- Bay Mud effective conductivity
  - Evaluating sites for study this Fall

DATABASE IMPROVEMENTS SINCE JULY 2016

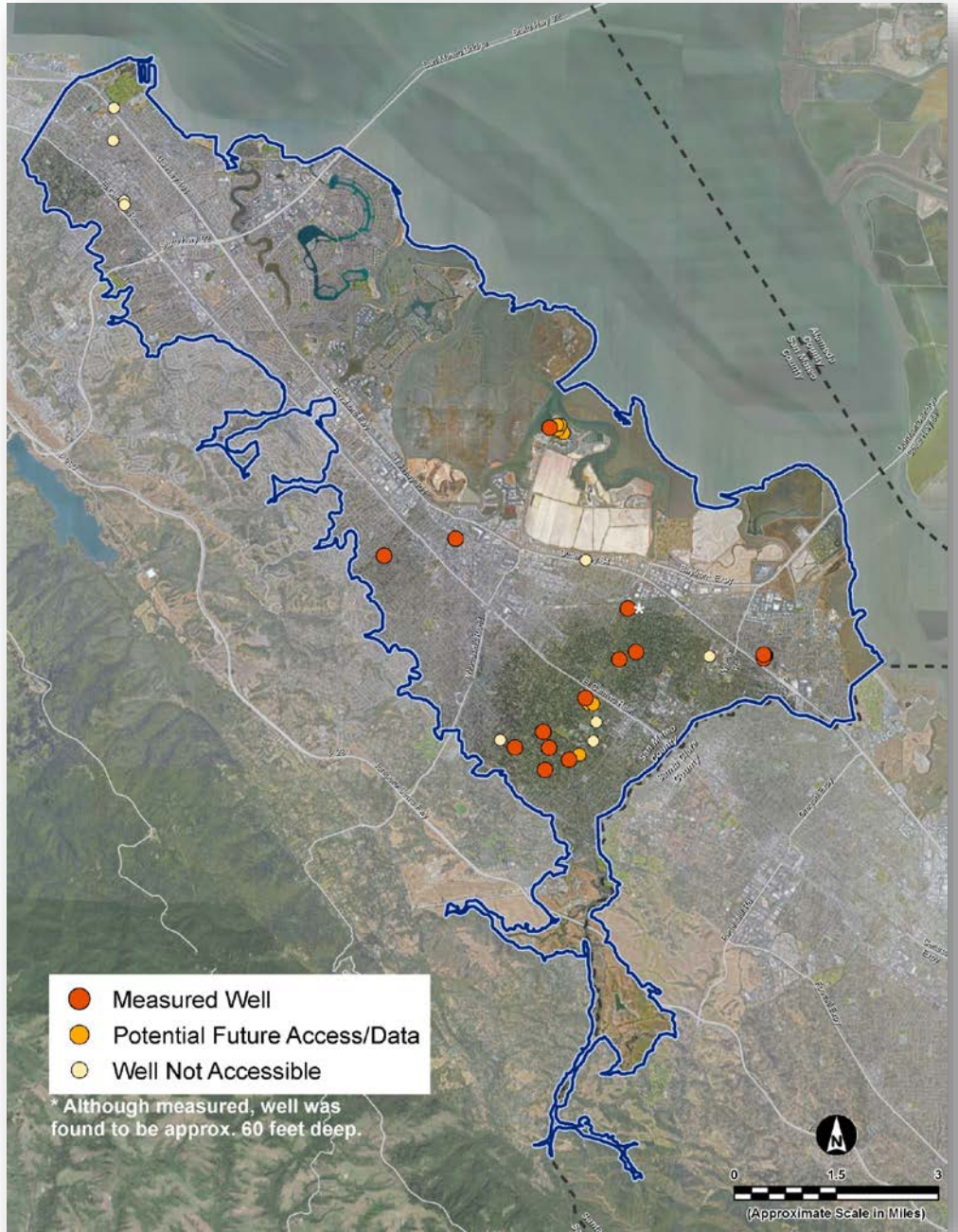
- Data received since July 2016
- Pre-Geotracker (<2002) groundwater data
  - 273 remediation sites
- Domestic well surveys
  - 117 wells and 57 sumps
- Well tests and information from new production well (Menlo Park)
- Results of sewer line-groundwater study
- Repeated and expanded streamflow measurements

COUNTY-LED DATA GATHERING EFFORTS



2017 DEEP WELL MEASUREMENTS

- County began with 74 potential deep wells identified
- Gained access to 35 wells on 27 sites
- Able to measure 16 wells (15 deep wells)
  - 8 residential
  - 5 municipal
  - 3 corporate-owned
- Access or data possible for 16 additional wells



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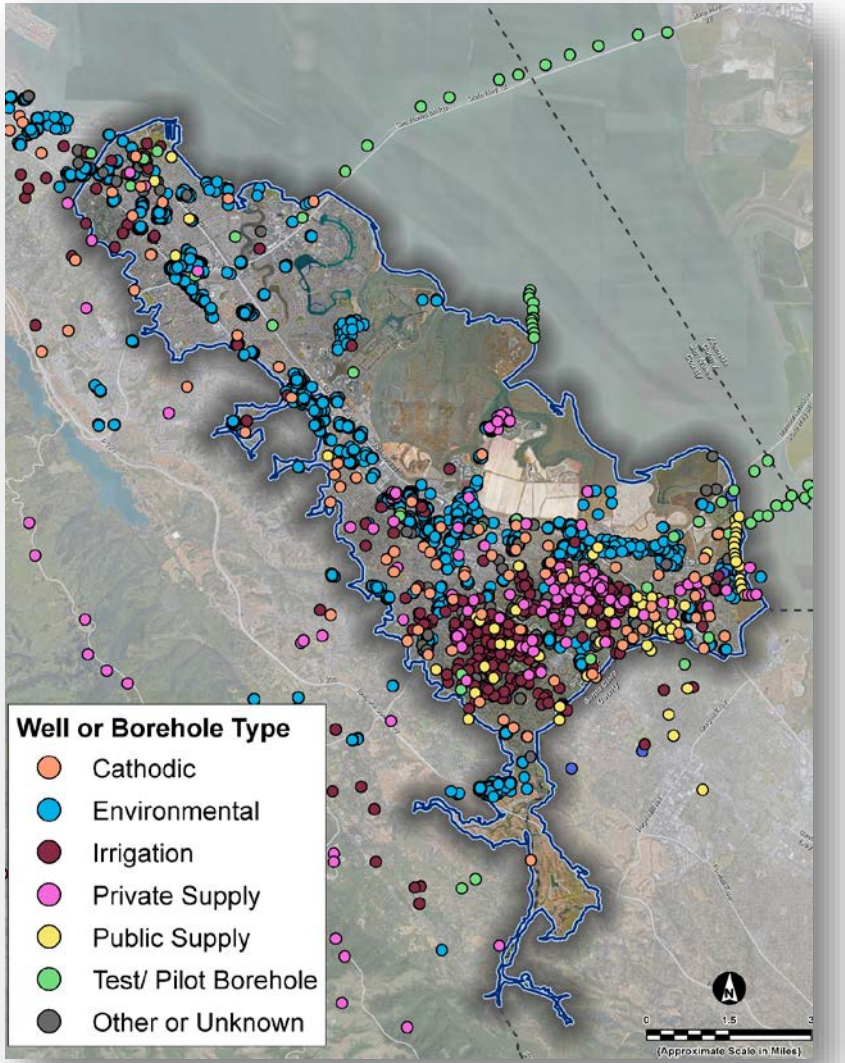
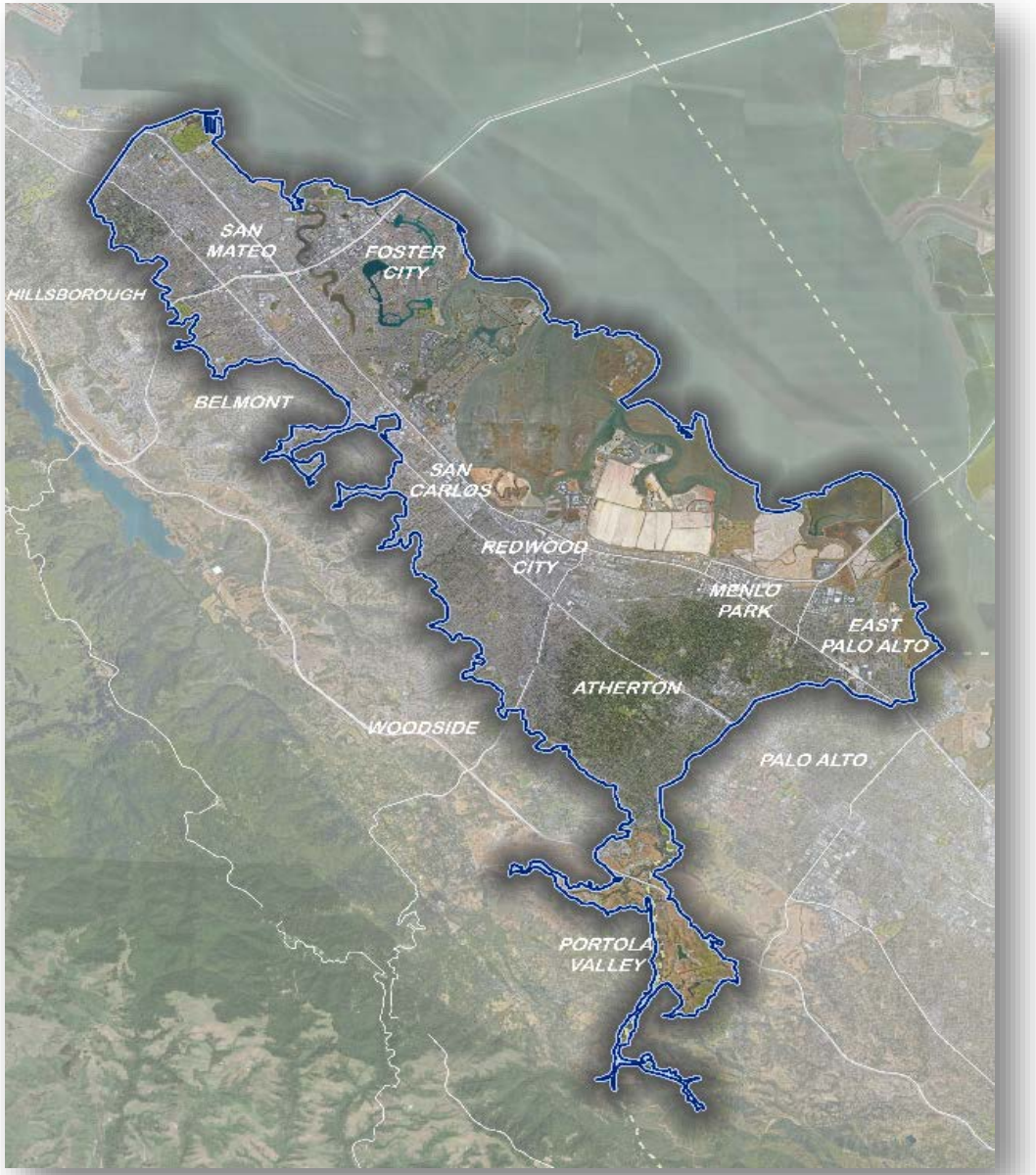
HISTORICAL WATER LEVEL MEASUREMENTS

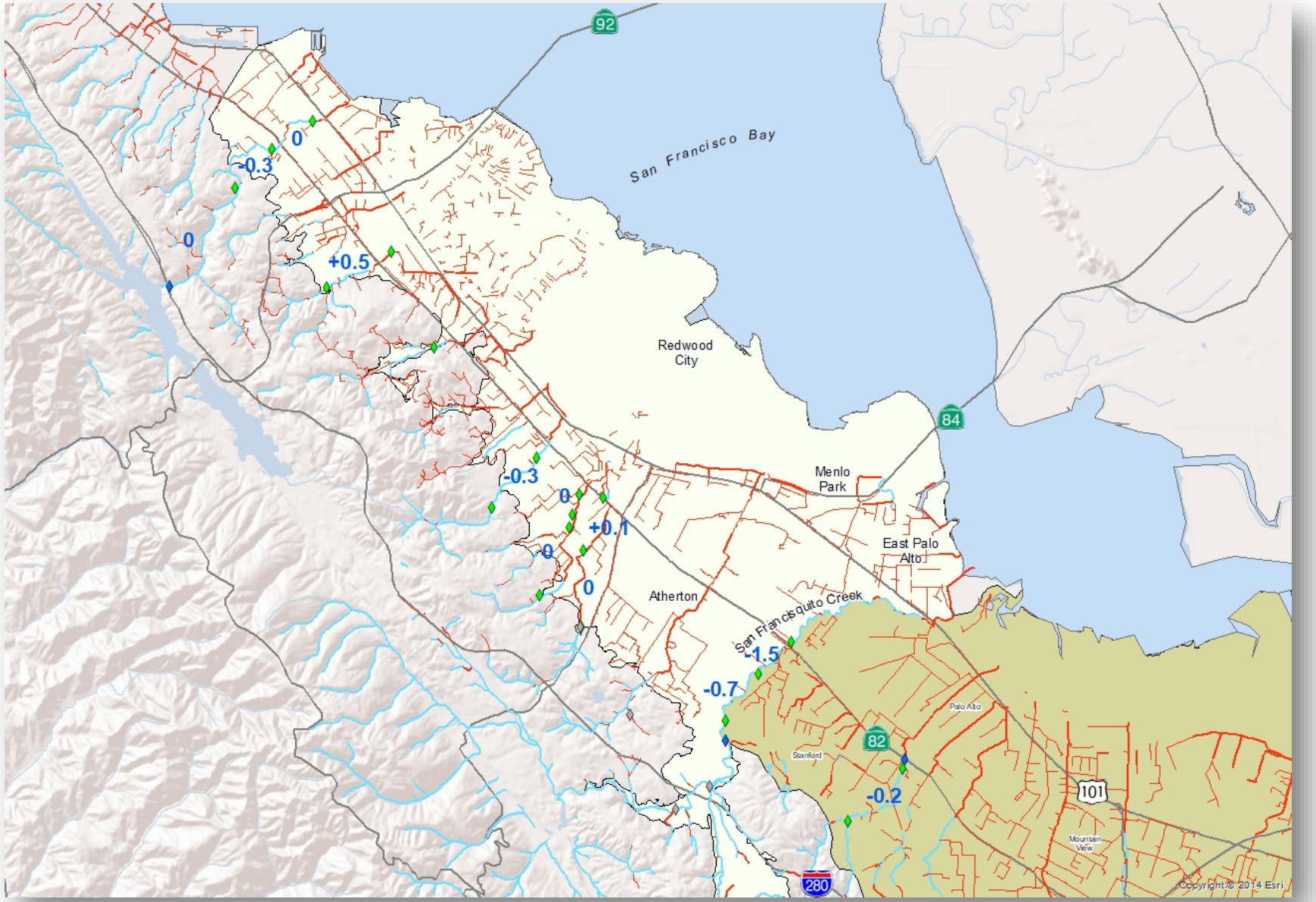
- County performed data entry of pre-Geotracker water level data for remediation site wells
- All shallow wells, dates ranging from 1986 to 2004
- Over 12,000 water level measurements from over 700 wells
- Expanded dataset from approx. 65,000 water level measurements to over 78,000 measurements
- Now have water level measurements from approx. 2,900 wells
- Added 300+ additional wells to database



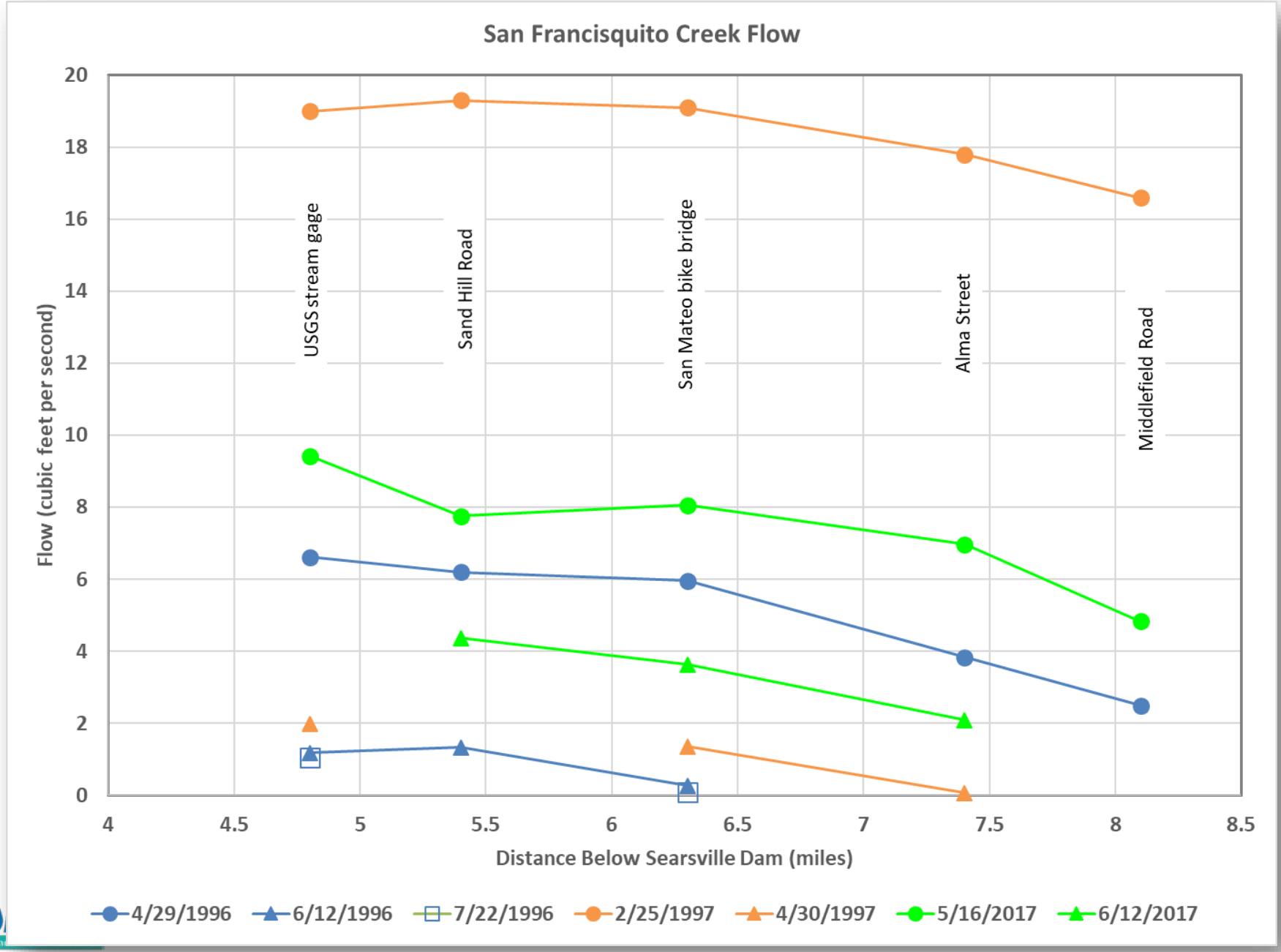
STREAM GAUGING, WATER BALANCE & HYDROLOGIC CONCEPTUAL MODEL UPDATES



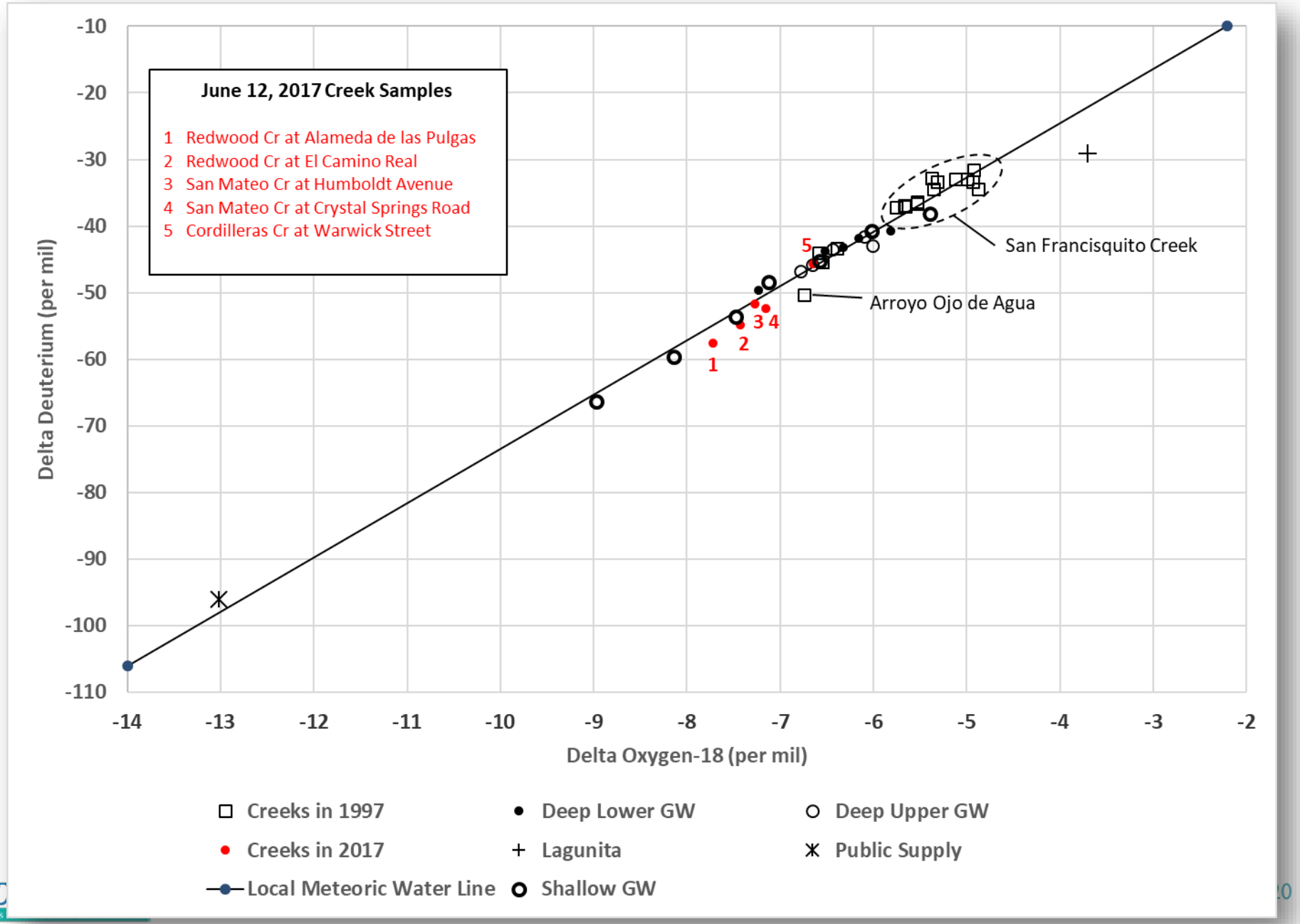
STREAM FLOW GAINS & LOSSES



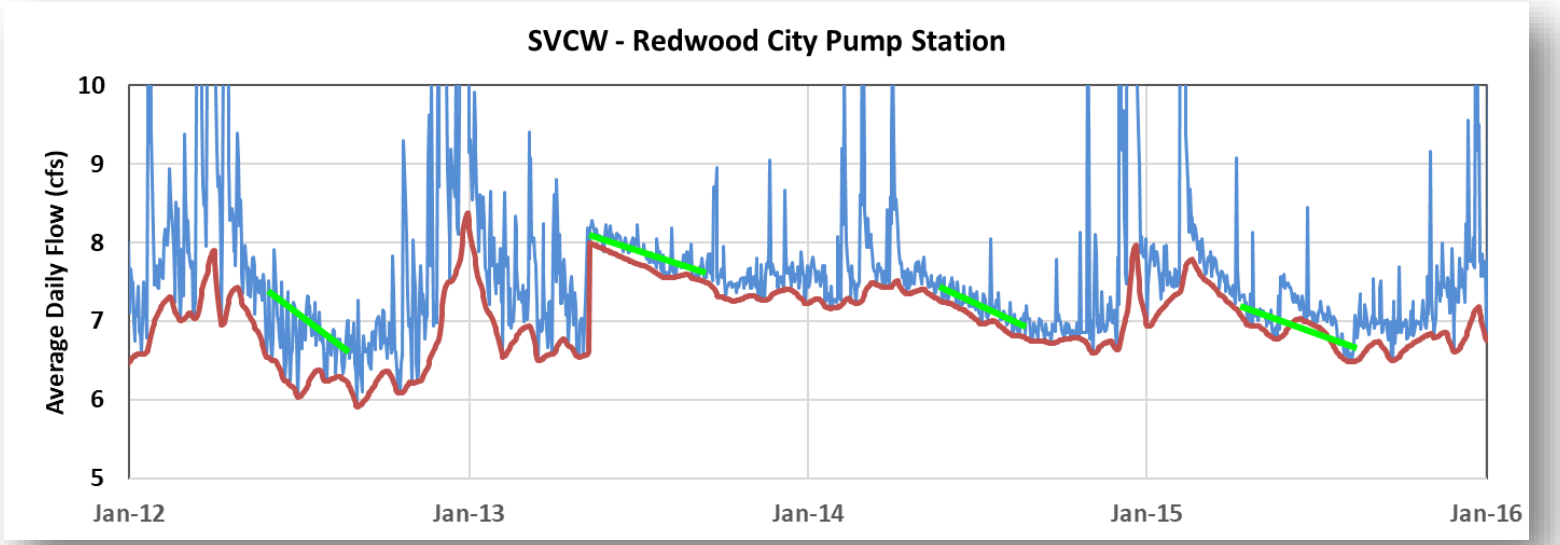
SAN FRANCISQUITO CREEK GAINS AND LOSSES

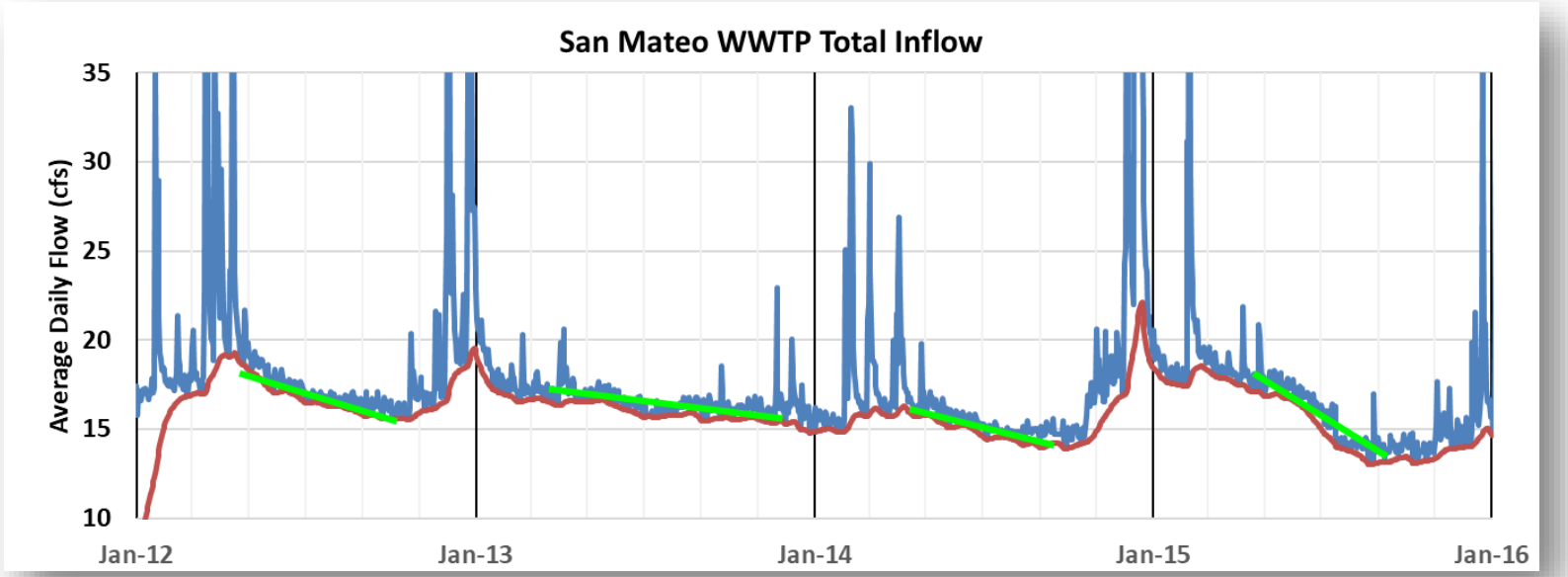


STABLE ISOTOPE RESULTS



GROUNDWATER INFILTRATION TO SEWERS





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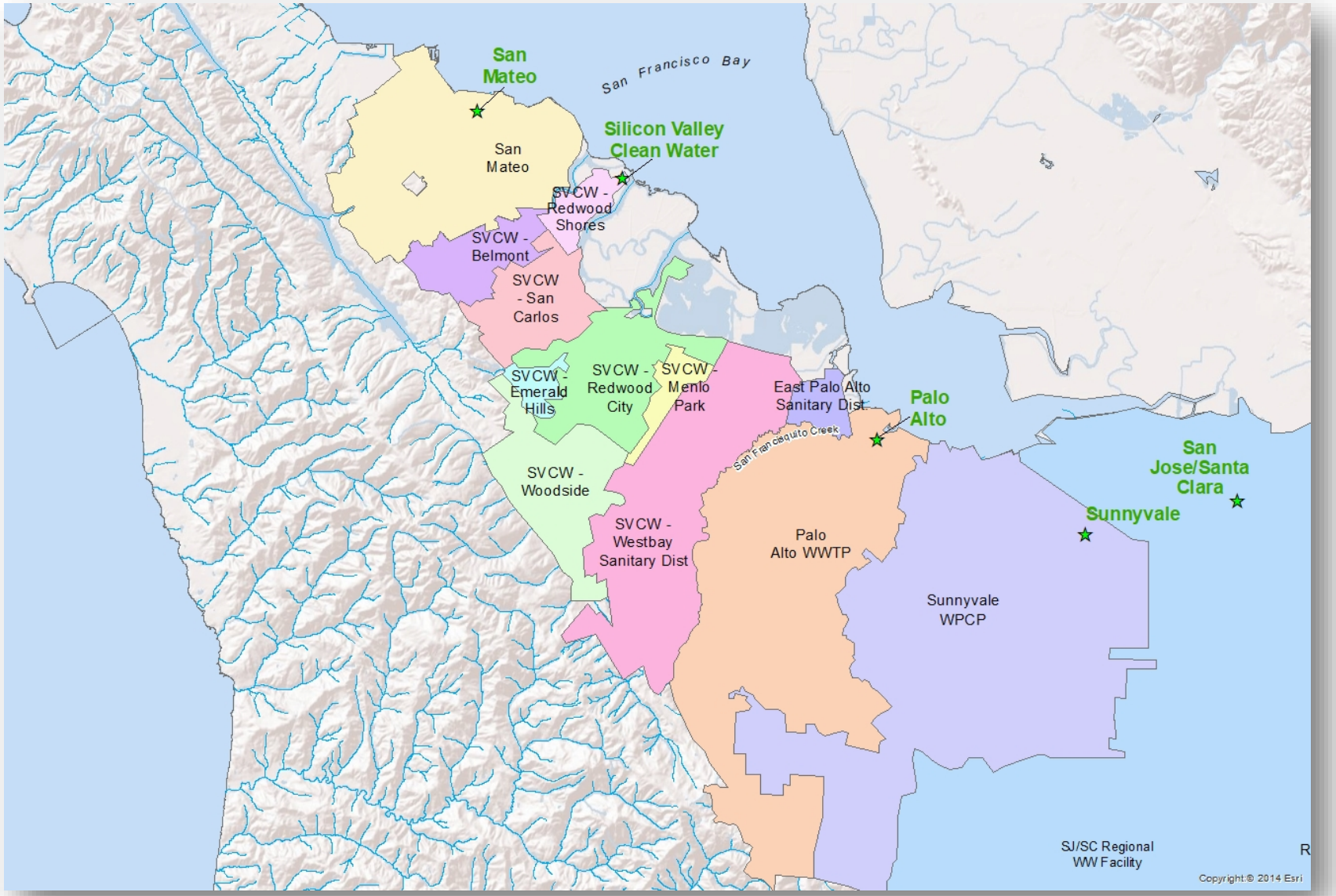

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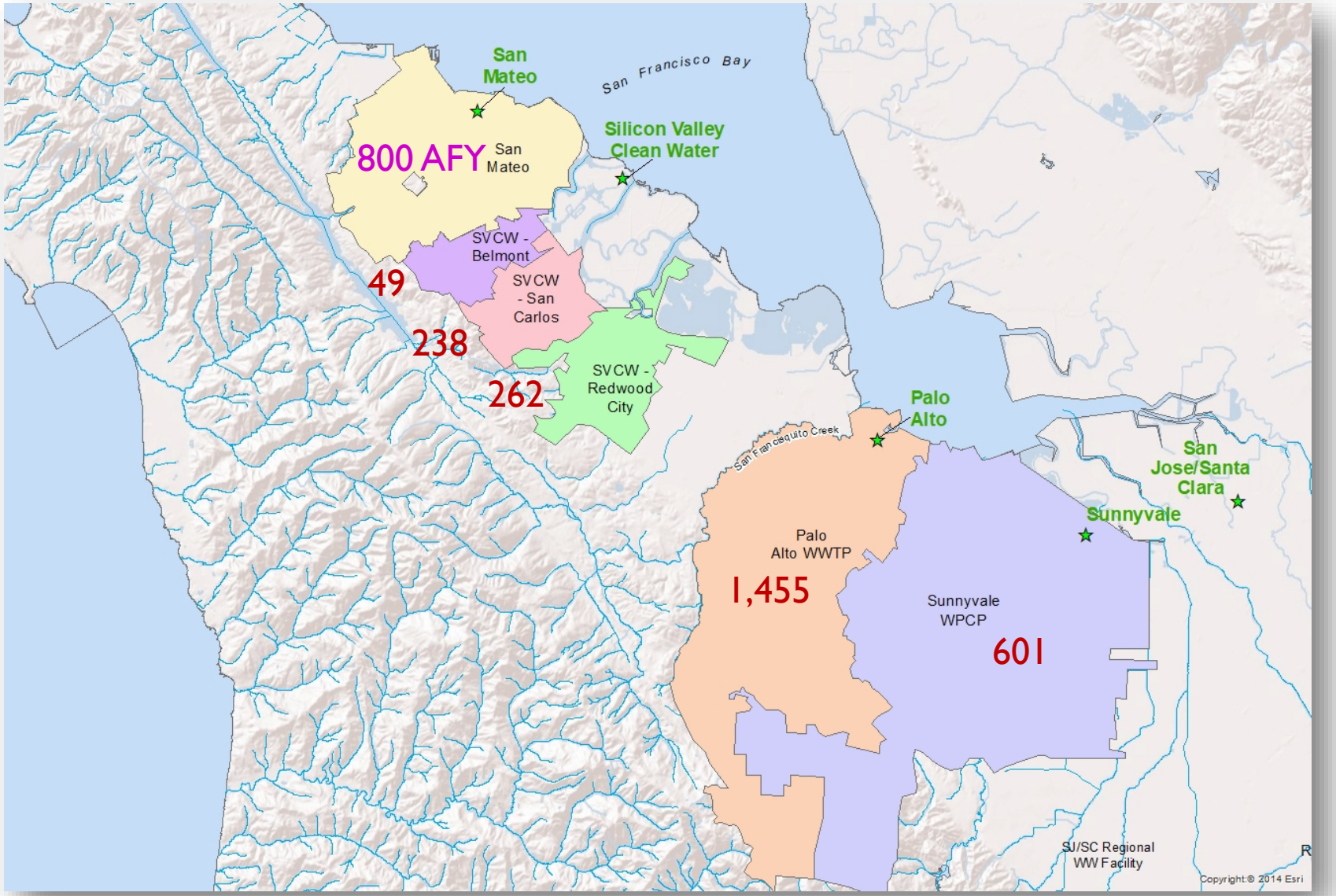
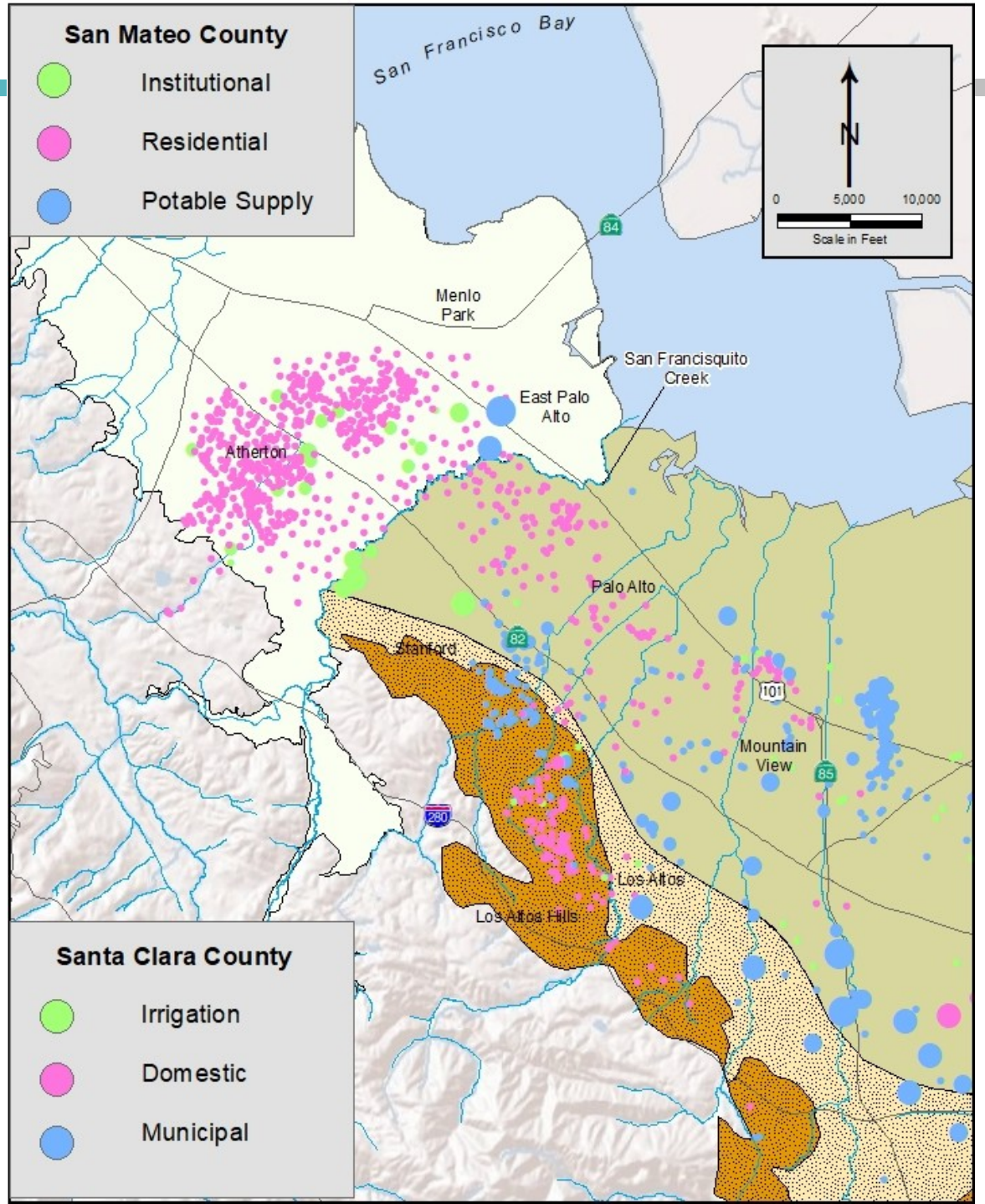
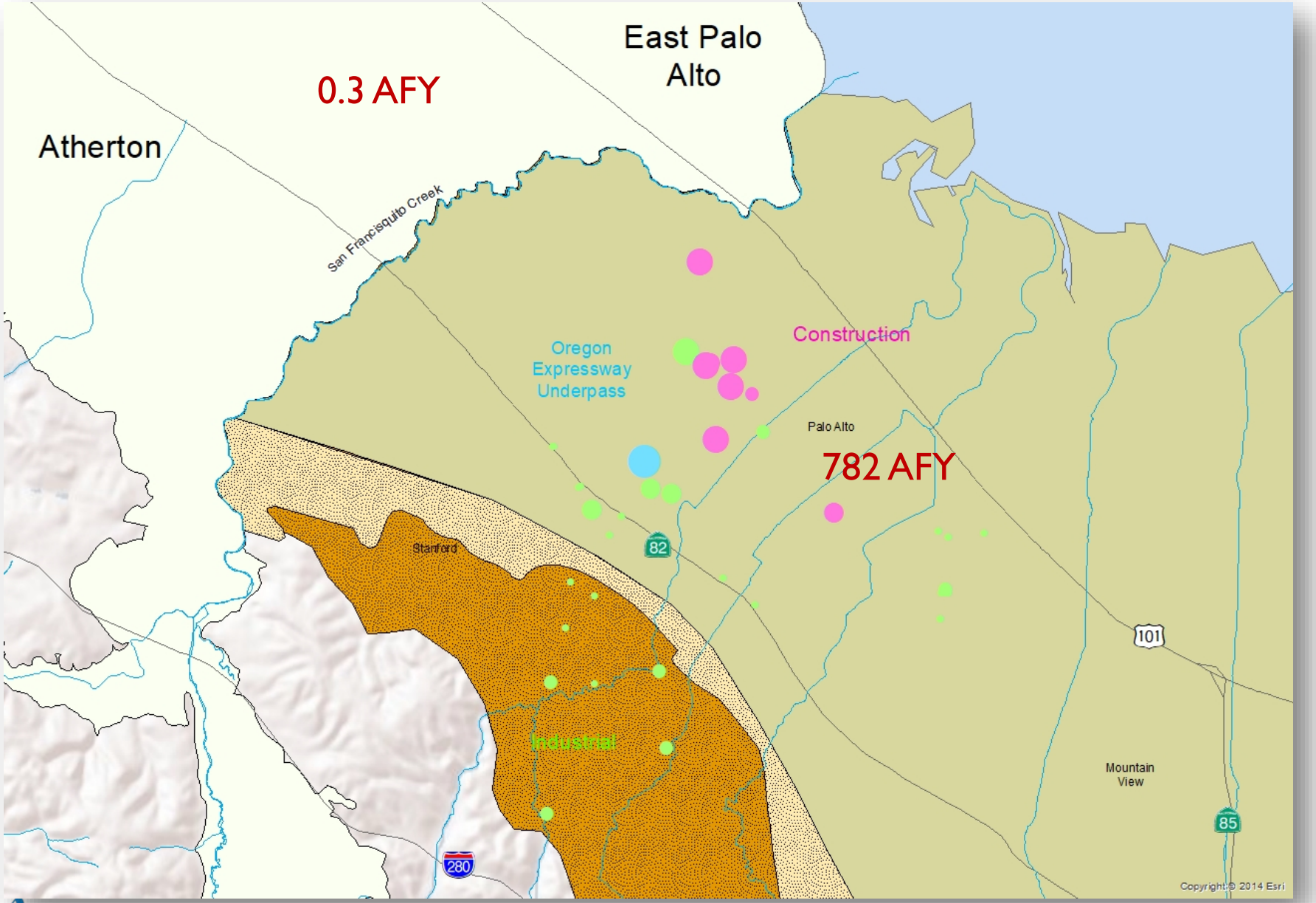


MUNICIPAL, IRRIGATION & DOMESTIC PUMPING

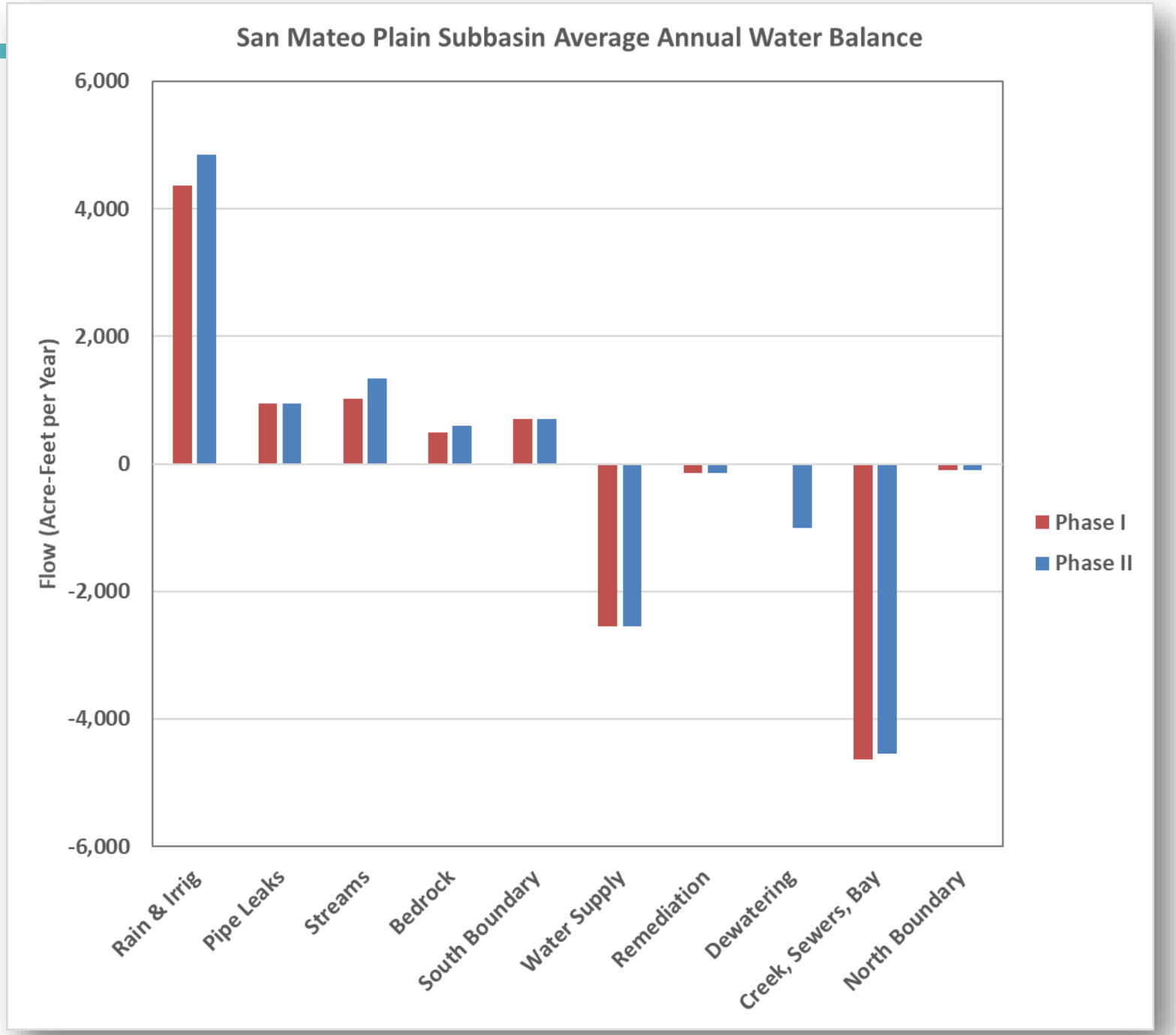


DEWATERING PUMPING

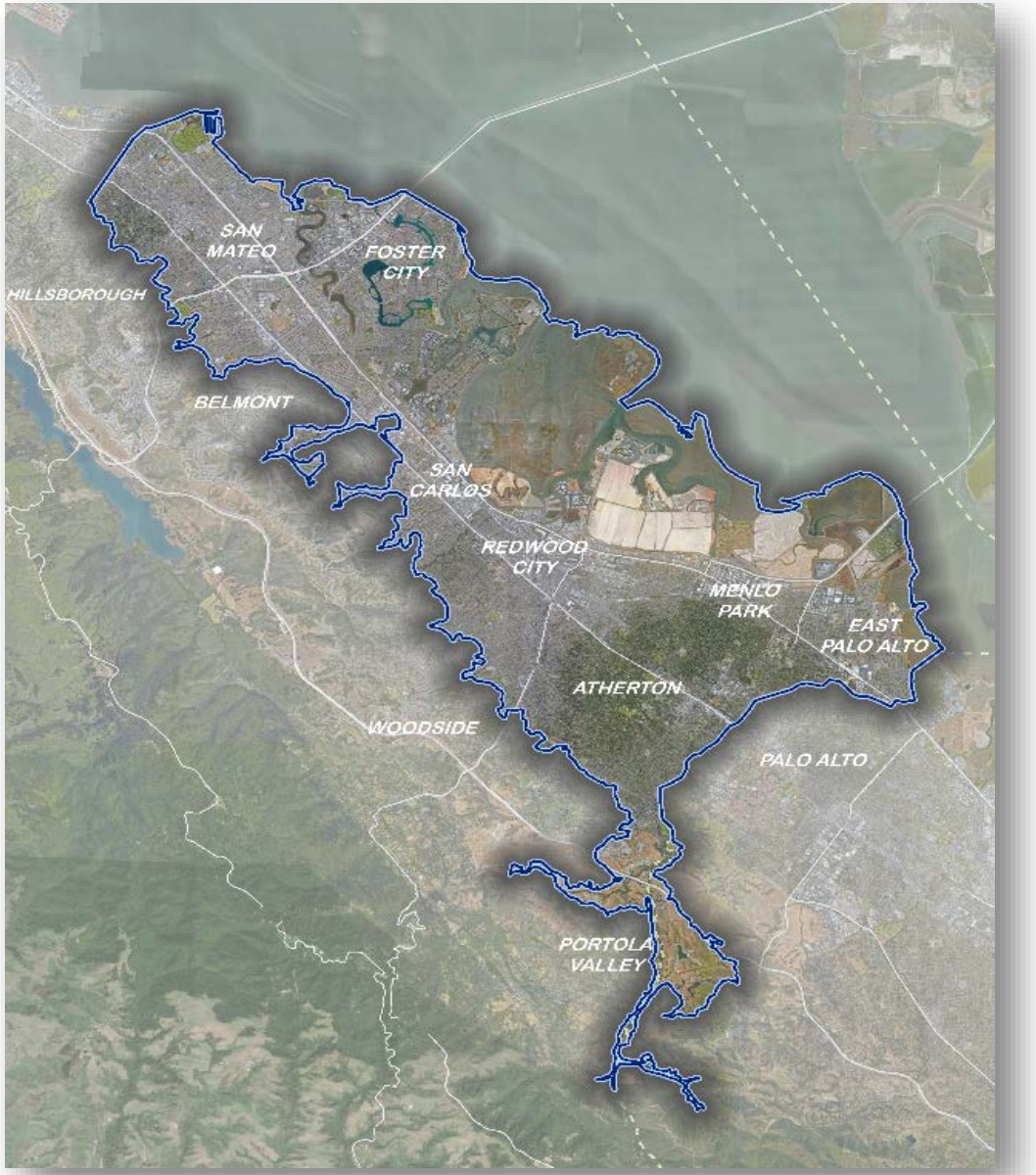


AVERAGE ANNUAL WATER BALANCE

In - Out = 8,400 AFY

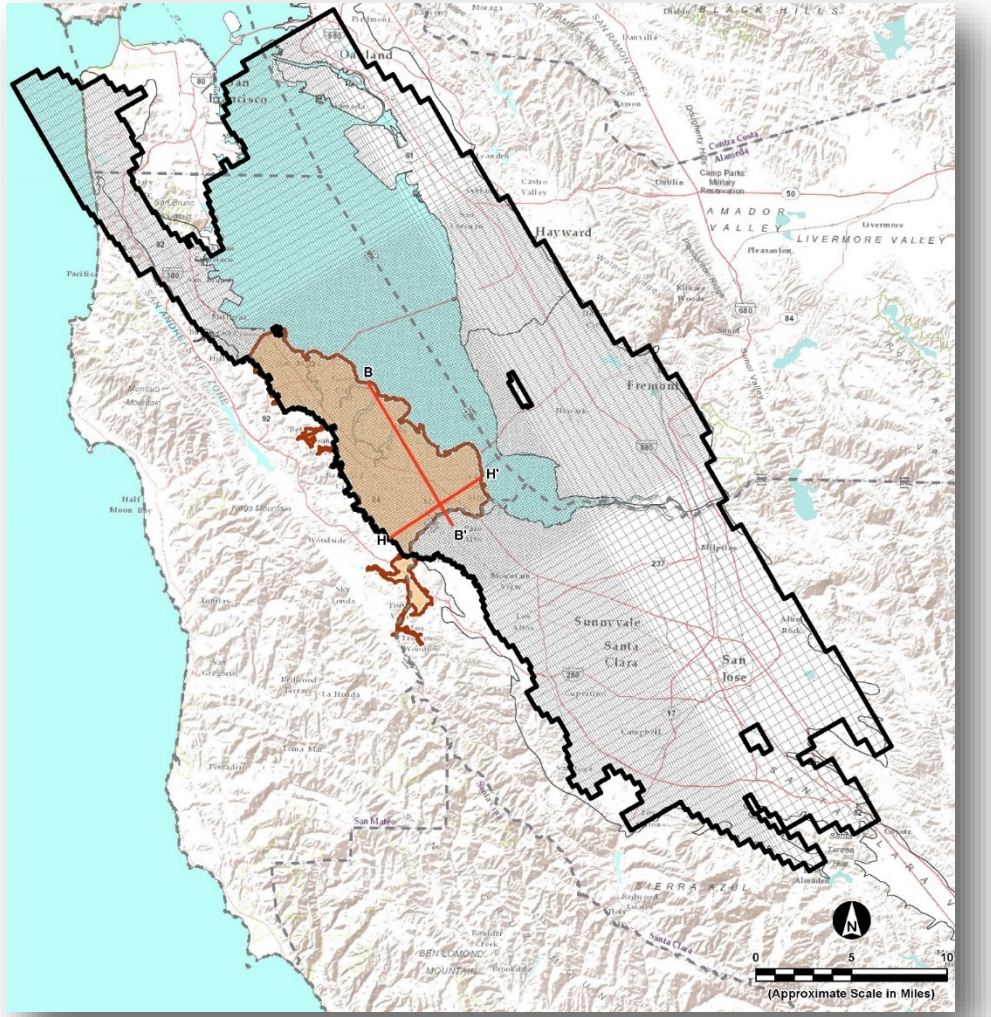


NUMERICAL MODEL UPDATES

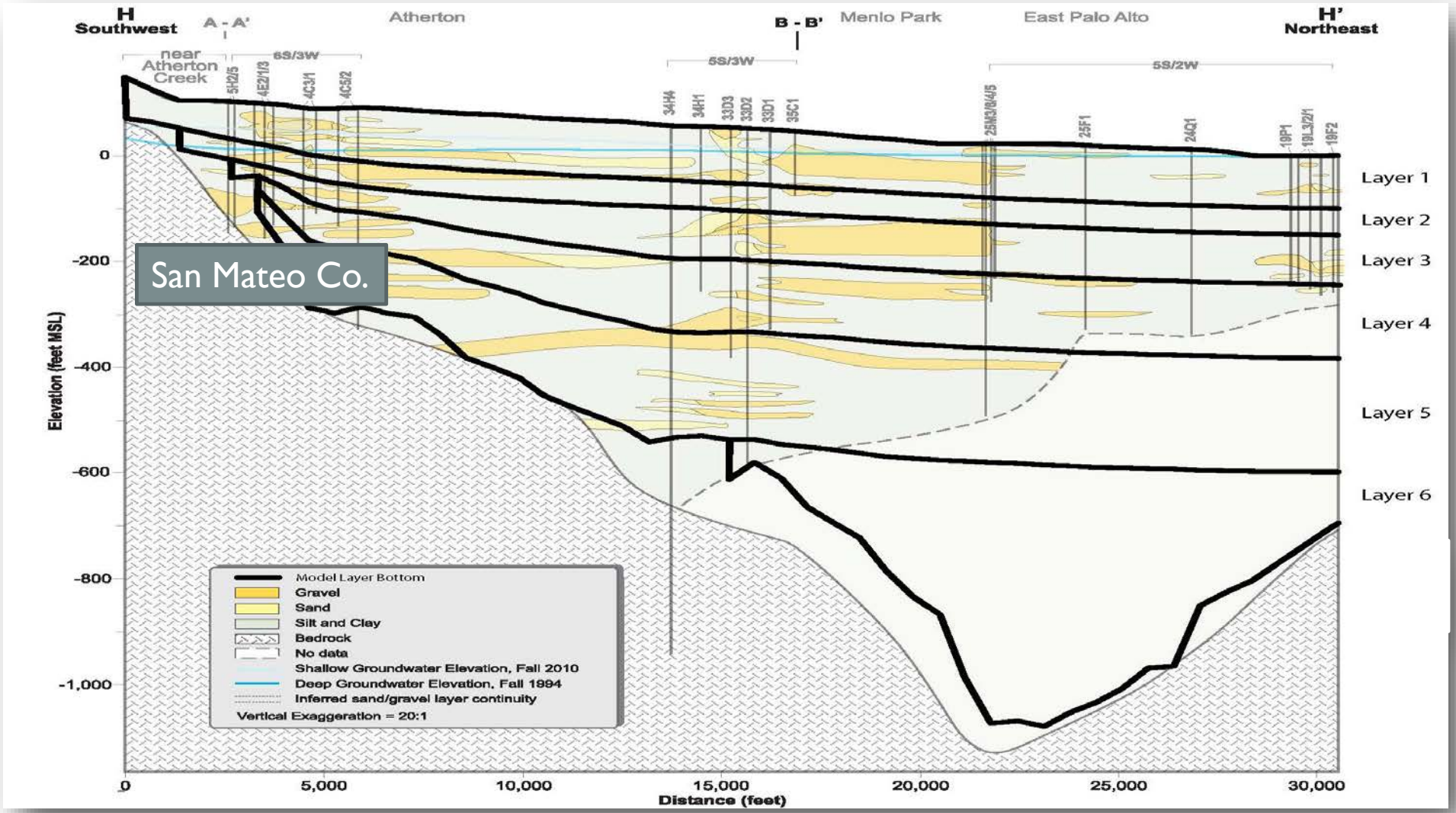


QUANTITATIVE ASSESSMENT OF BASIN CONCEPTUAL MODEL – ACTIVE MODEL GRID (LAYER 1)

- Physical Boundaries
- 10 – 160 Acre Cell Size
- Water-Levels (Bay/Ocean)
- Specified Inflow (Recharge)
- Specified Outflow (Pumping)

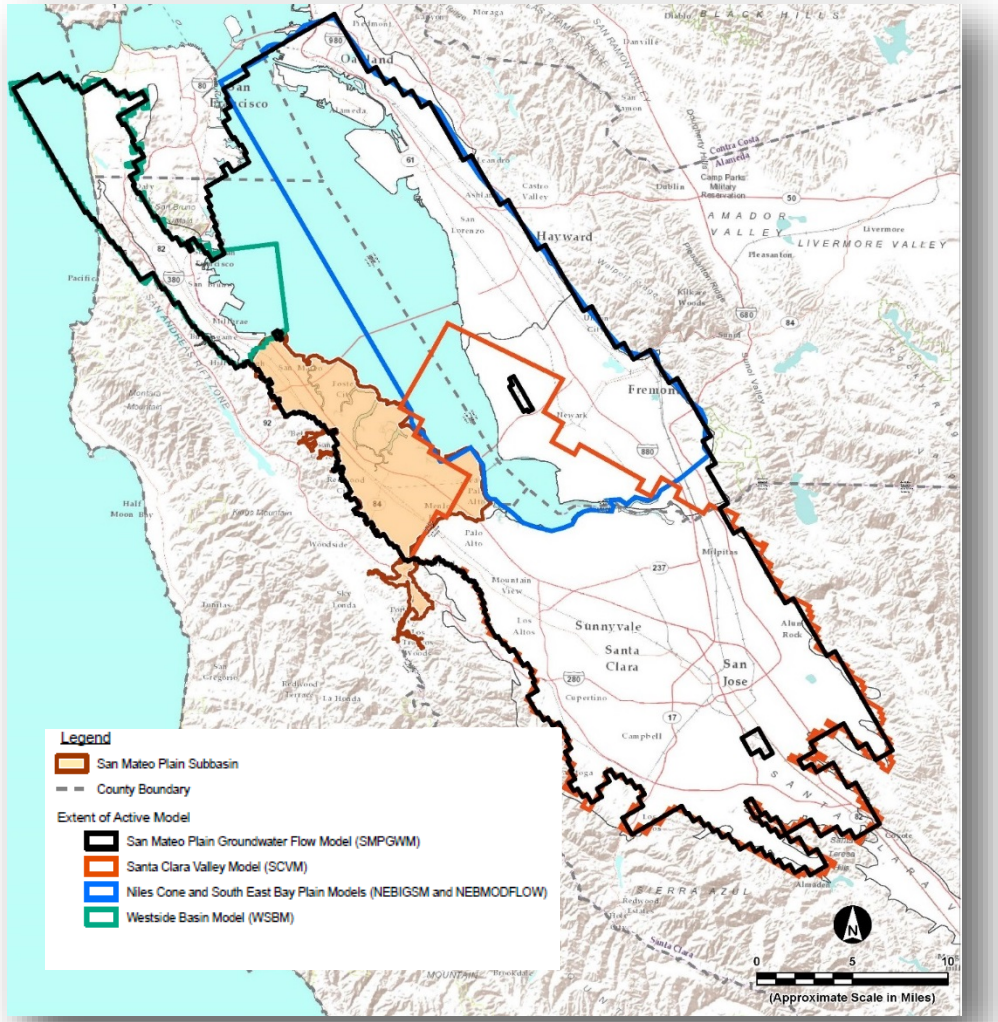


LAYERING (WEST – EAST)



UTILIZE EXISTING MODELS AND PROJECT DATABASE FOR SMPGWM INPUT DATA

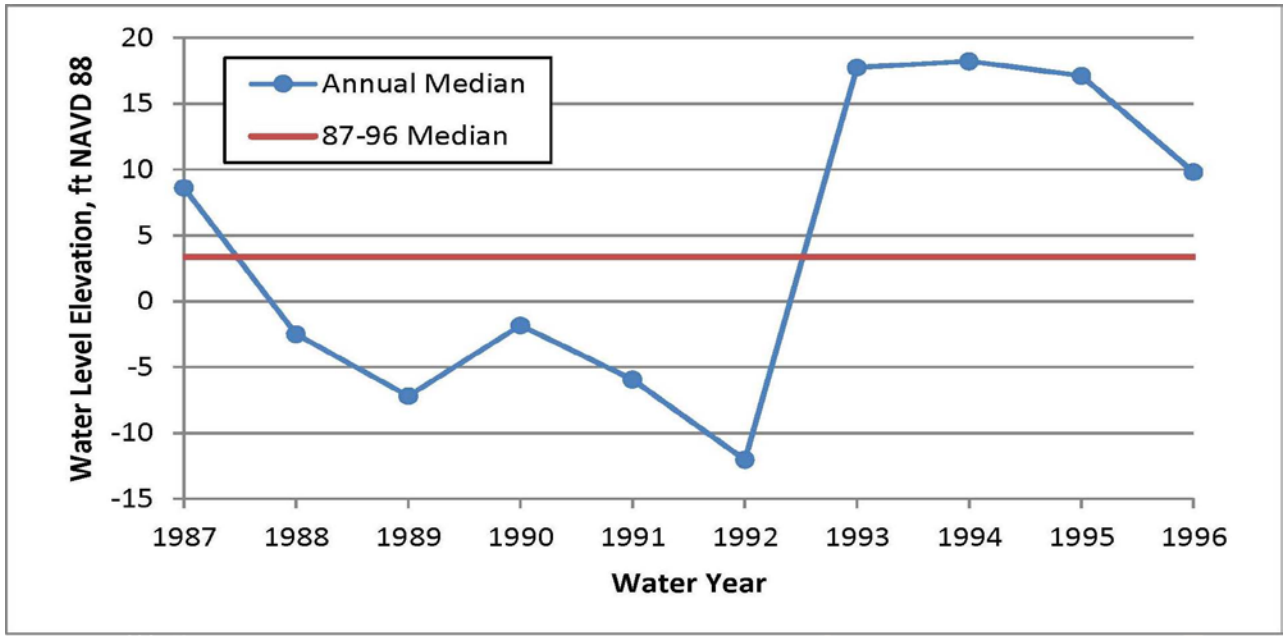
- Westside Basin Model (WBM)
- Niles Cone and South East Bay Plain Integrated Groundwater Surface Water Model (NEBIGSM)
- Santa Clara Valley Water District Model (USGS/IMOD)
- SMP Project Data Base and Conceptual Model



TEMPORAL MODELING APPROACH
(AVERAGE 1987-1996 CONDITIONS)

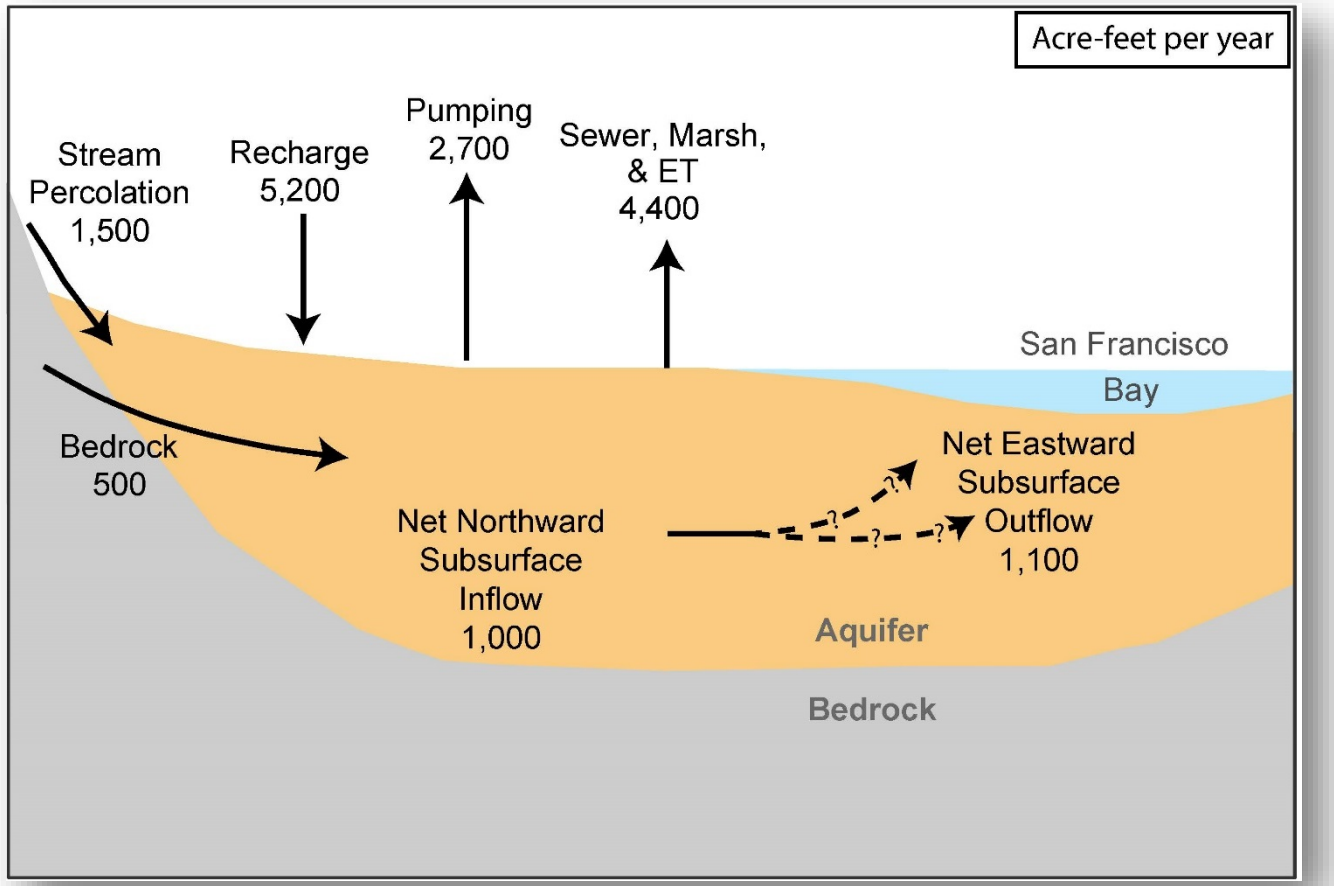
Employed Steady-State approximation:

- Average groundwater conditions represented by median measured water levels in wells.
- Calibrate hydraulic conductivity
- Assess hydraulic consistency of the Basin conceptual model
- Evaluate average annual water balance

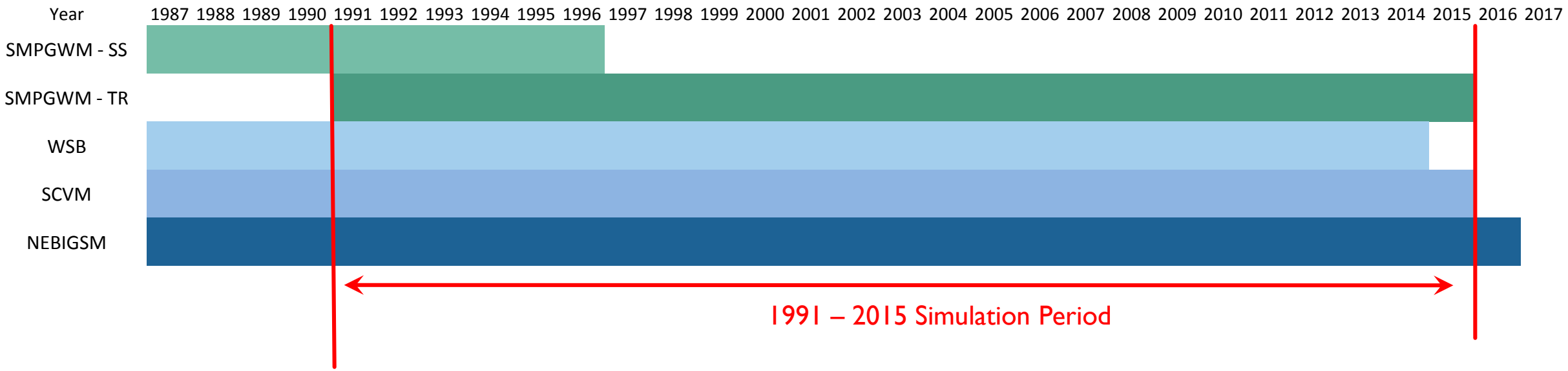


MODEL CALCULATED ANNUAL BASIN WATER BUDGET

(1987 – 1996)

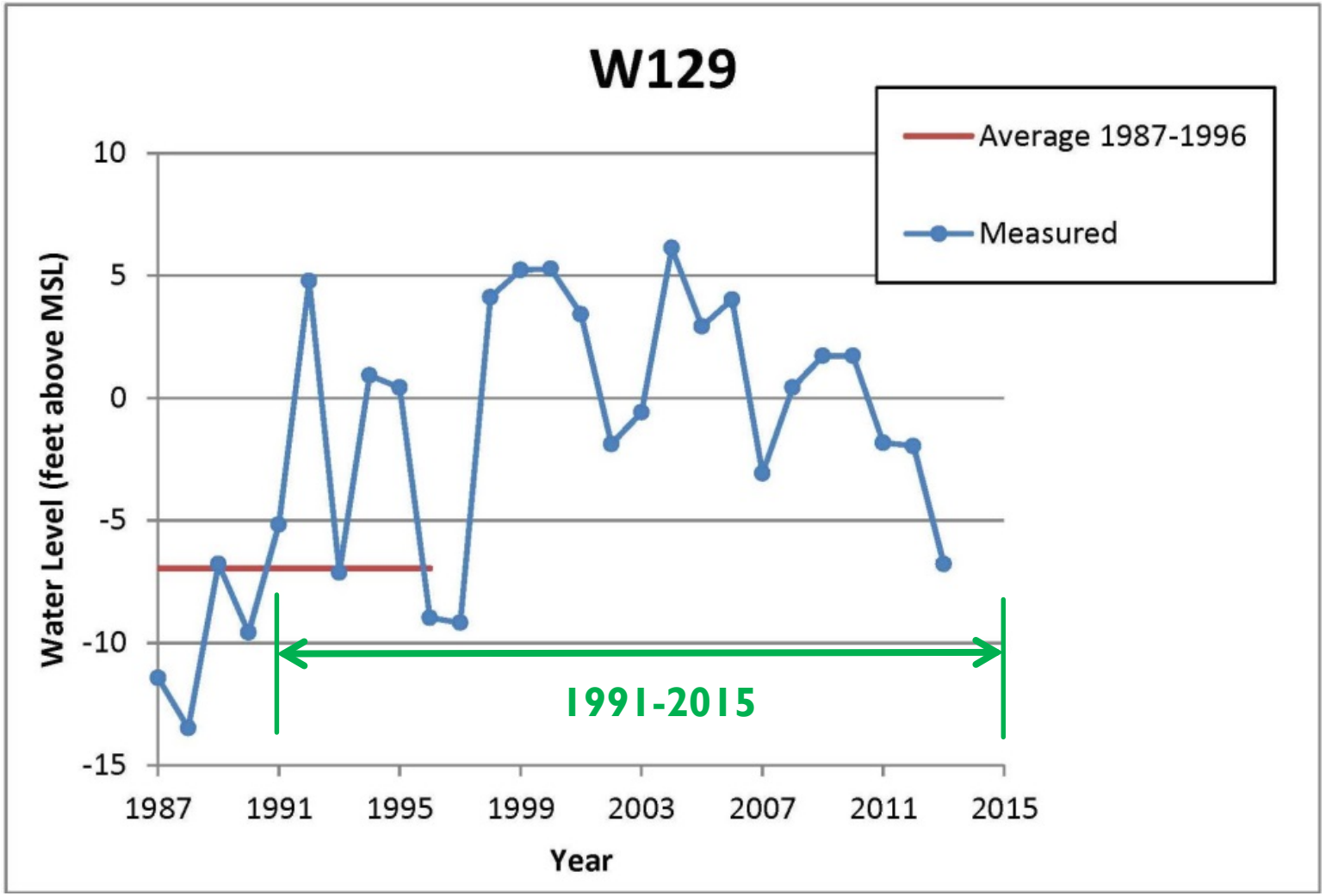


SIMULATION TIMELINE

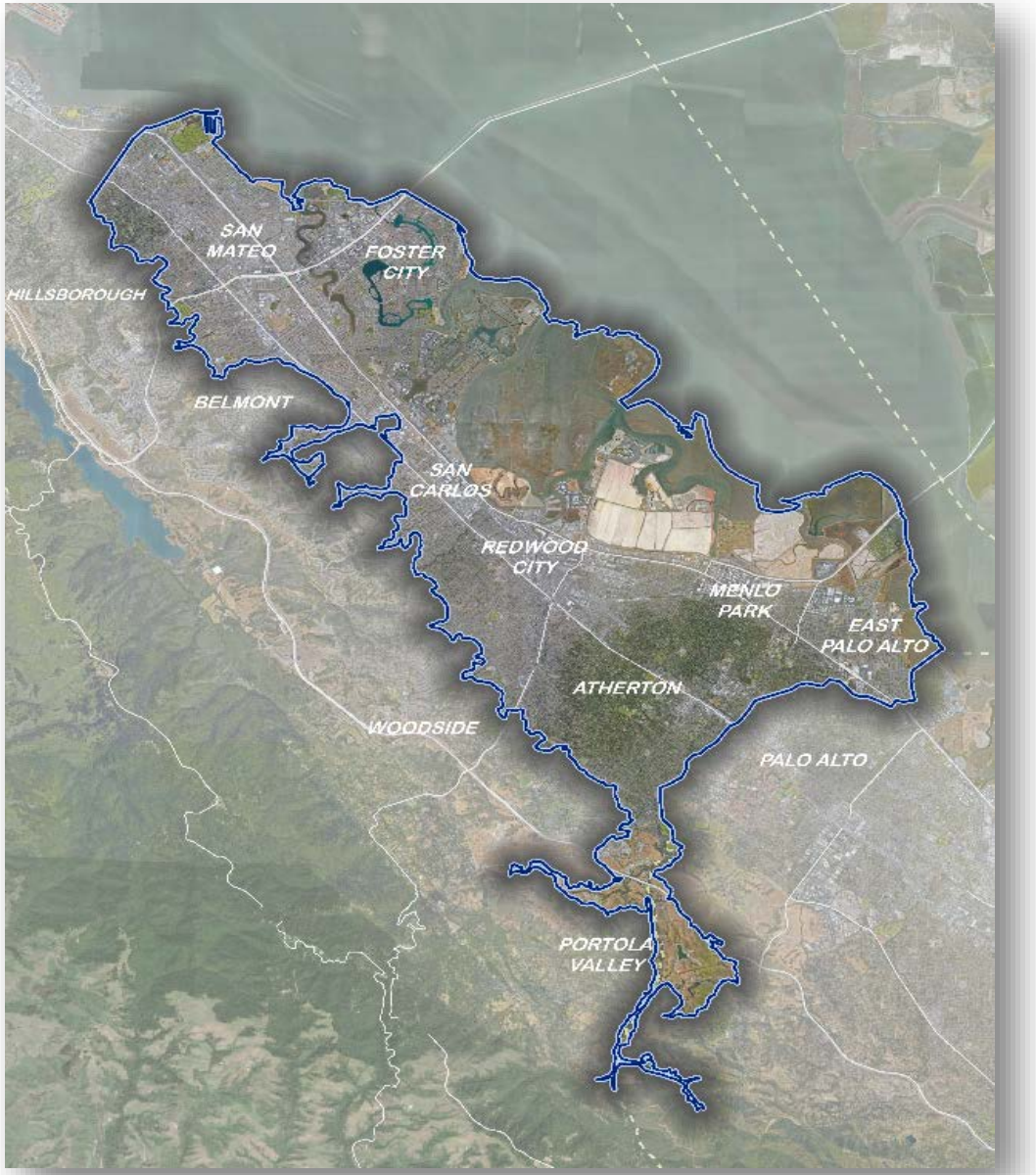


- SMPGWM – SS — San Mateo Plain Groundwater Model – Steady State
- SMPGWM – TR — San Mateo Plain Groundwater Model - Transient
- WSB — Westside Basin Model
- SCVM — Santa Clara Valley Water District Model
- NEBIGSM — Niles Cones and South East Bay Plain IGSM

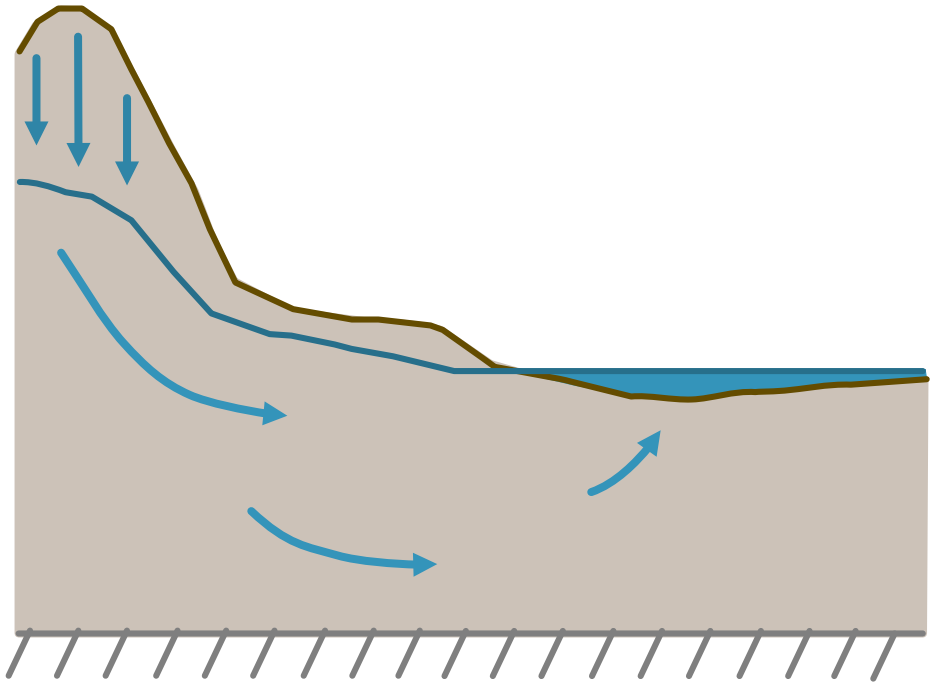
TRANSIENT SIMULATION

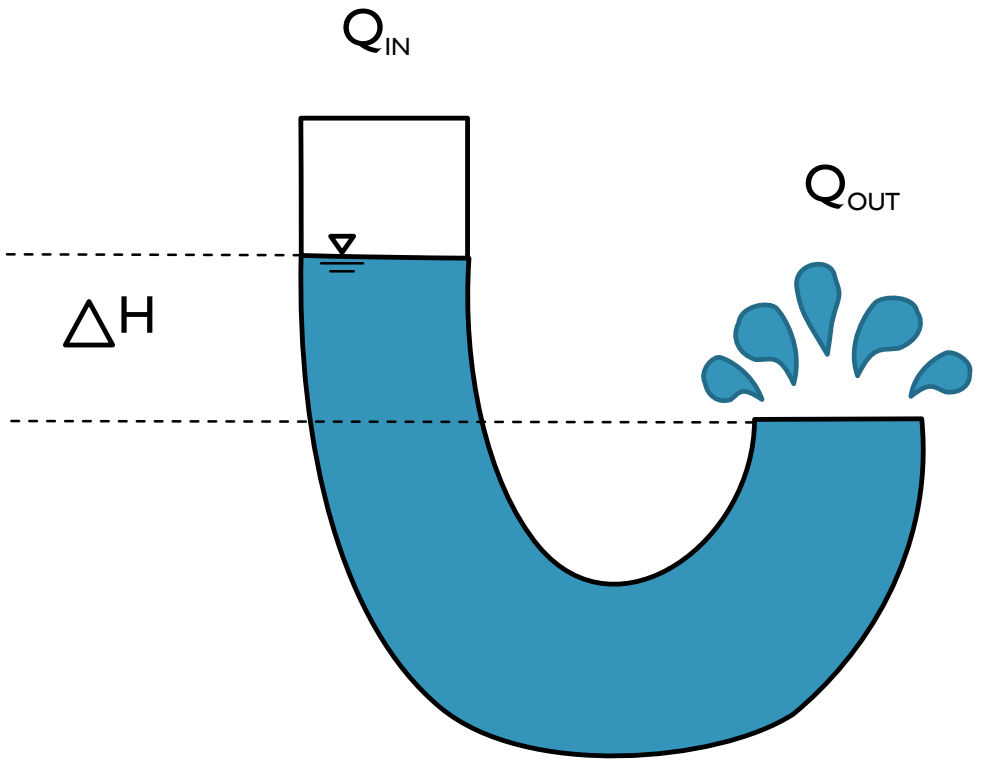


BAY MUD CONDUCTIVITY EVALUATION

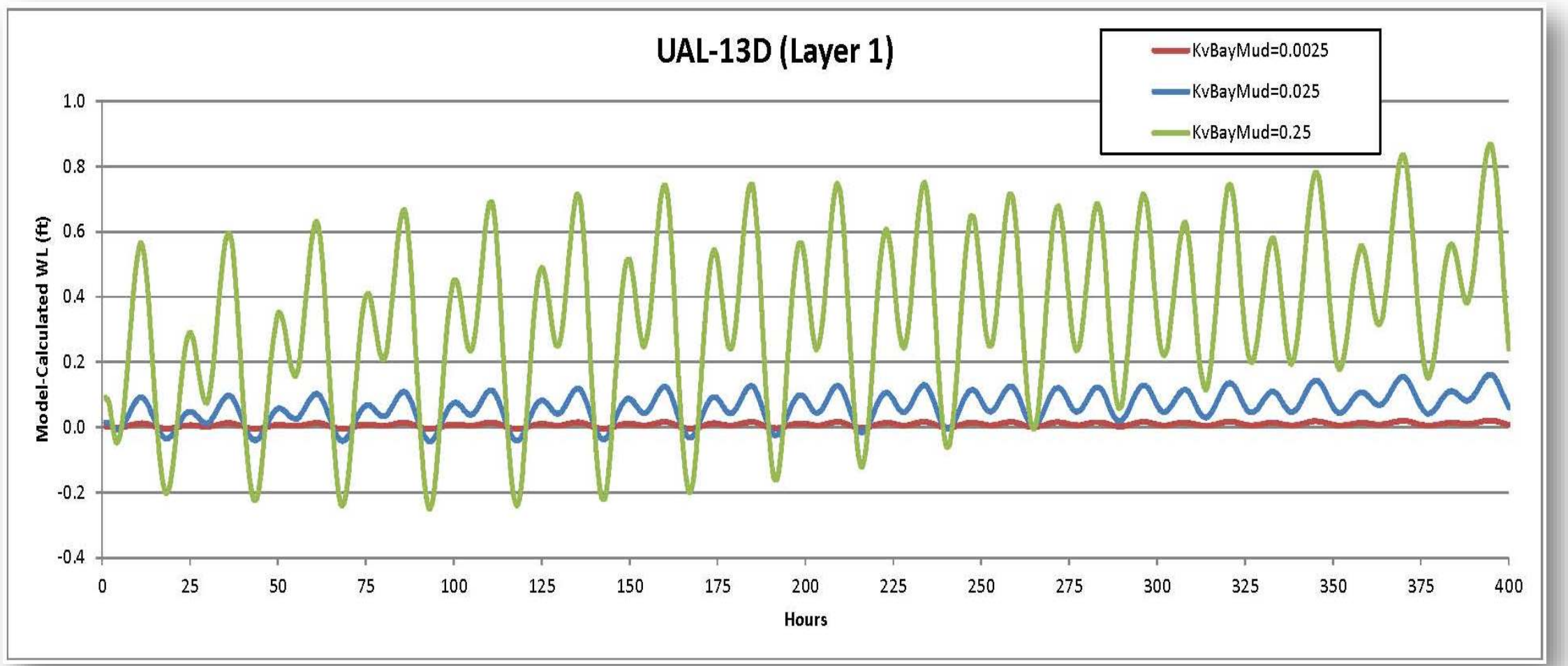


BAY MUD STUDY

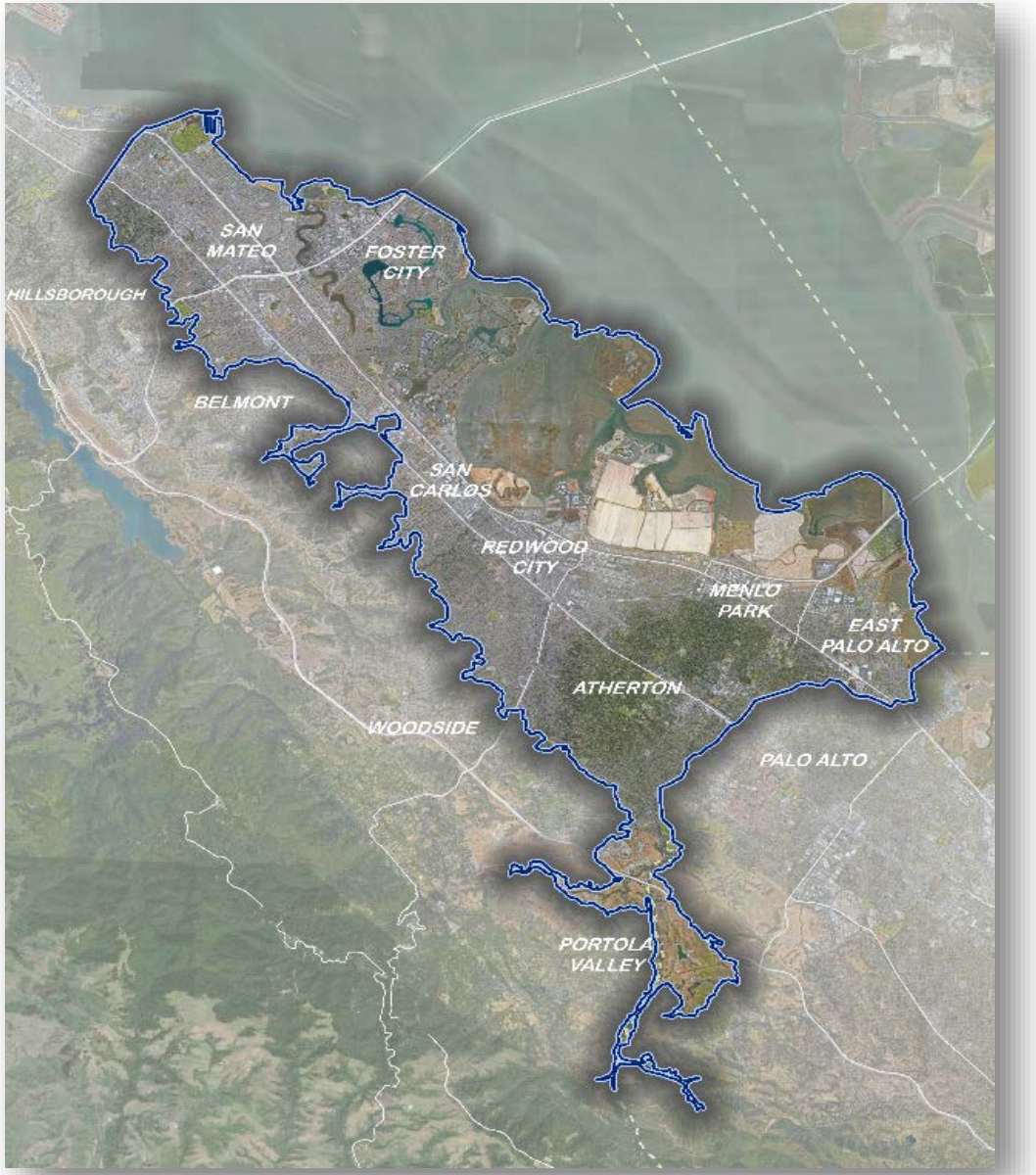




EXAMPLE TIDAL ANALYSIS

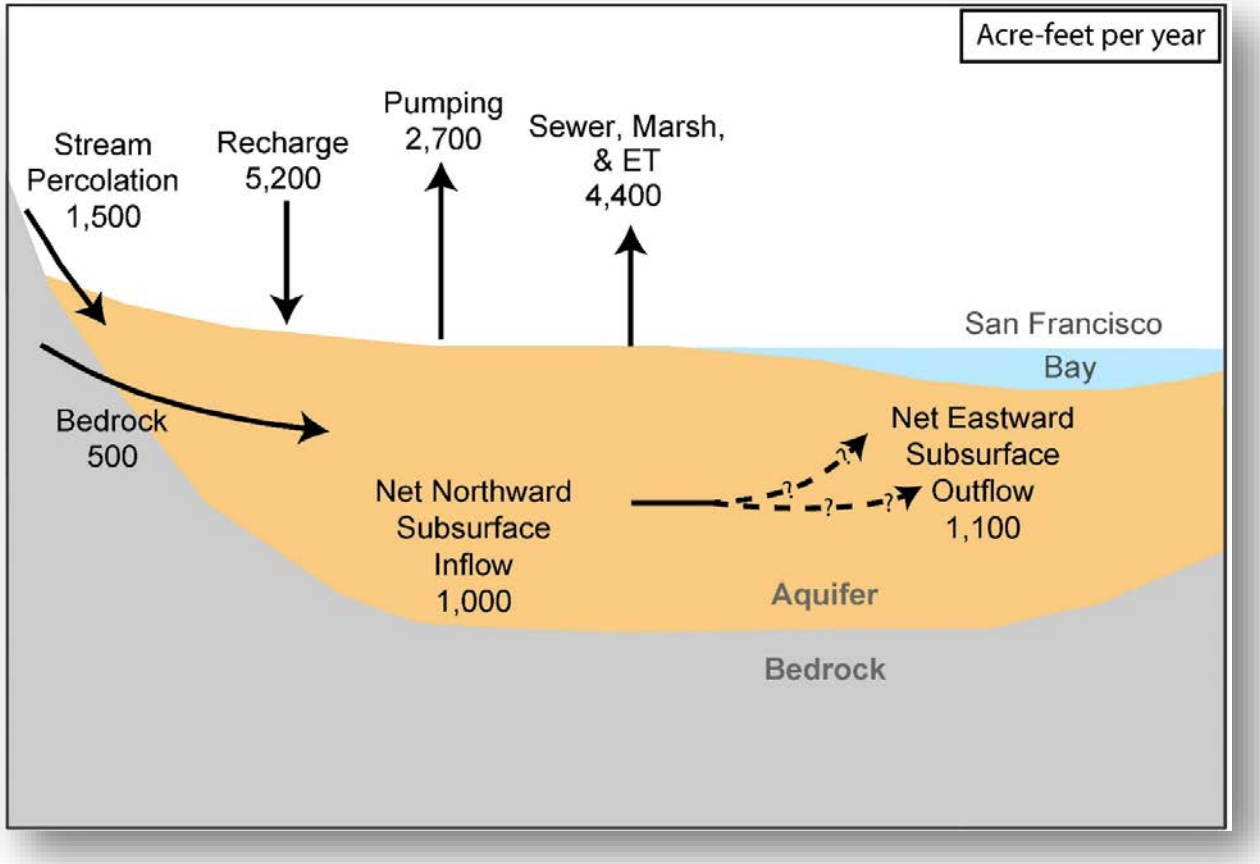


OBJECTIVES FOR PHASE 3



MODELING SCENARIO DEVELOPMENT

- Use Transient model to assess Basin sensitivity to changing hydrologic conditions & potential management decisions
- Quantify Basin changes in each scenario relative to the historical baseline
- Baseline
  - 24-year calibration period (1991-2015)
  - Represents current, 2015 conditions



POTENTIAL SCENARIOS TO MODEL

Projected Groundwater Development/ Increased Pumping

Increased Groundwater Recharge (Stormwater infiltration projects)

Climate Change: Sea Level Rise

Climate Change: Changes in Rainfall Intensity and Timing

Land Use Changes

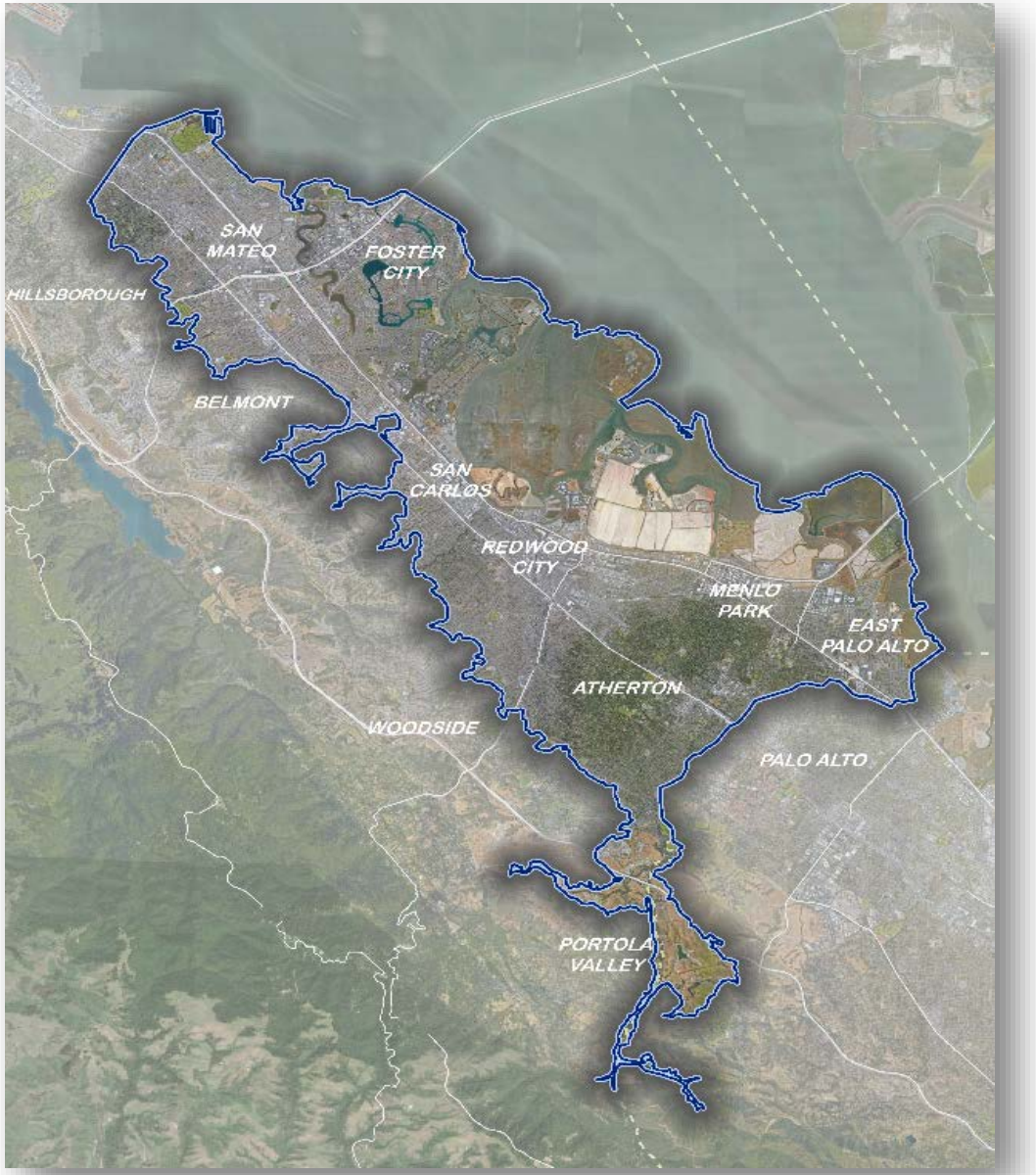
Other?

MODEL LIMITATIONS & CONSIDERATIONS FOR PHASE 3

- Goal is to understand the Basin's sensitivity to changed conditions or management
- The more complex the scenarios, the fewer that can be completed for Phase 3
- Focused on changes within the San Mateo Plain Basin only
- Not intended to analyze the impact of any single project or collection of projects (within or outside of Basin)*

*Model will be available to others to use for this purpose, as desired

BREAKOUT SESSION



SMALL GROUP BREAKOUT SESSION

Discussion Topic 1 – Scenario Priority

- Within your group, identify potential scenarios within the Basin to model.
- Discuss and rank which scenarios you think should be the highest priority for model development in Phase 3.
- Each group will discuss their top 2 highest priority scenarios with the group, and share why they feel these should be the highest priority to assess.

Projected Groundwater Development/ Increased Pumping

Increased Groundwater Recharge (Stormwater infiltration projects)

Sea Level Rise

Changes in Rainfall Intensity and Timing

Land Use Changes

Other?

SMALL GROUP BREAKOUT SESSION

Topic 2 – Model Scenario Assumptions

- Choose one of the your group's top 2 scenarios and discuss how you would model that scenario.
- What are the key factors that would change relative to current conditions (provide reference sources)?
- Where would these changes occur within the basin?
- How significantly would they change from current conditions?
- Over what time period would the changes happen?

Projected Groundwater Development/ Increased Pumping

Increased Groundwater Recharge (Stormwater infiltration projects)

Sea Level Rise

Changes in Rainfall Intensity and Timing

Land Use Changes

Other?

SHARE OUT

- Topic 1 – High Priority Scenarios to Model
- Topic 2 – Model Scenario Assumptions

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STAKEHOLDER DISCUSSION TOPIC 1: Model Scenarios & Priority

Identify model scenarios for the future that you would like to see be modeled as part of the Phase 3 work. Think about the specifics of the scenarios and then rank the these in order of importance, with 1 being of the highest importance. Note the basis for ranking values.

Priority	Potential Model Scenarios	Basis for Priority Ranking

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STAKEHOLDER DISCUSSION TOPIC 2: Defining Model Scenarios

For your group's highest ranked scenario, detail what factors you think should be assumed for purposes of modeling the future scenario. Please be specific as possible.

Scenario 1	

Key Factors that Would Deviate from Current Conditions & Basis for Selecting these Factors:

How significantly might these factors deviate from Current Conditions:

Time period the changes may occur:

Location of changes in Basin (use map at right):

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NEXT STEPS

- Complete Phase 2 activities
- Initiate Phase 3
- Next Stakeholder Workshop – Anticipated October/November 2017

QUESTIONS?

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