SAN MATEO PLAIN GROUNDWATER BASIN ASSESSMENT

STAKEHOLDER WORKSHOP#5

JANUARY 31, 2017

Erler & Kalinowski, Inc.

TODD GROUNDWATER

HYDROFOCUS INC.
Solutions for Land and Water Resources

PRESENTATION OVERVIEW

- Introductions
- Project Overview
- Take Aways from Workshop #4
- Summary of Phase 1 Results
- Phase 2 Discussion

SAN MATEO PLAIN GROUNDWATER BASIN ASSESSMENT

- Funded through Measure K
- 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

http://green.smcgov.org/san-mateo-plain

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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

Feb 2017– Dec 2017

Phase 3

- Public Outreach
- Conduct Scenario Evaluations
- Prepare Final Report

Sep 2017 – Apr 2018

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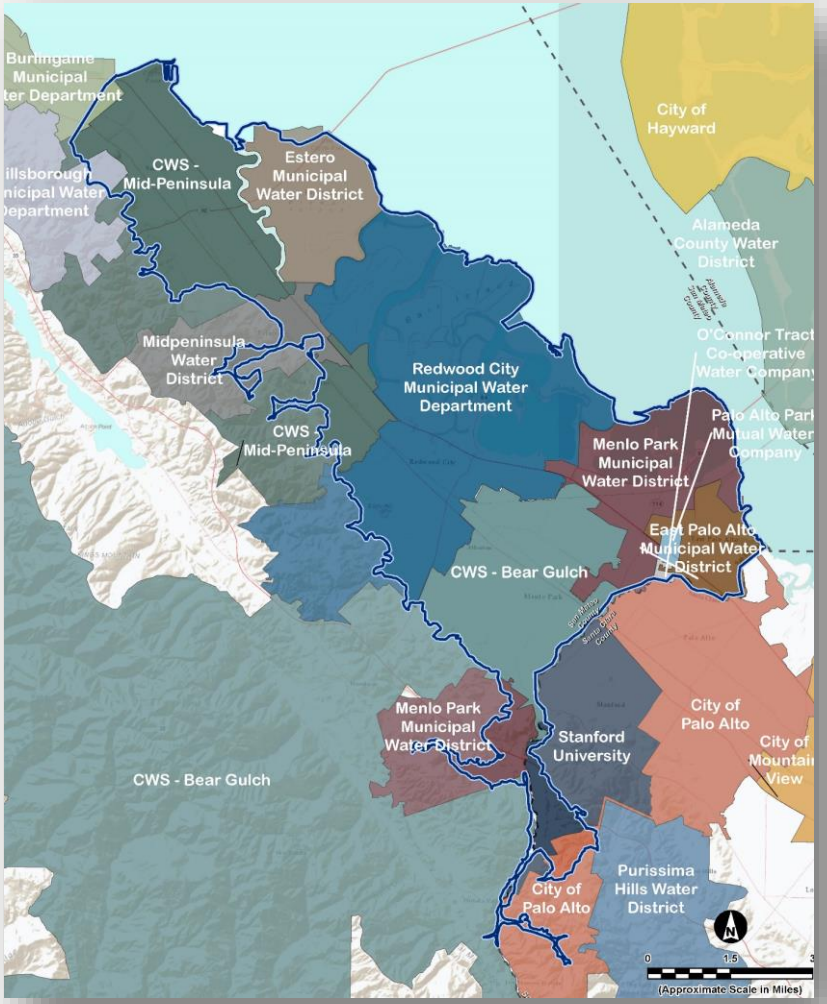
ON-GOING STAKEHOLDER OUTREACH

- Small group and one-on-one meetings
- Presentations to organizations and governing bodies
- Stakeholder workshops
- Website: http://green.smcgov.org/san-mateo-plain
- Open Data Portal



STAKEHOLDER WORKSHOPS IN PHASE 1

Workshop #1

May 17, 2016

Project Introduction and Overview

Workshop #2

September 7, 2016

Basin Conceptual Model

Workshop #3

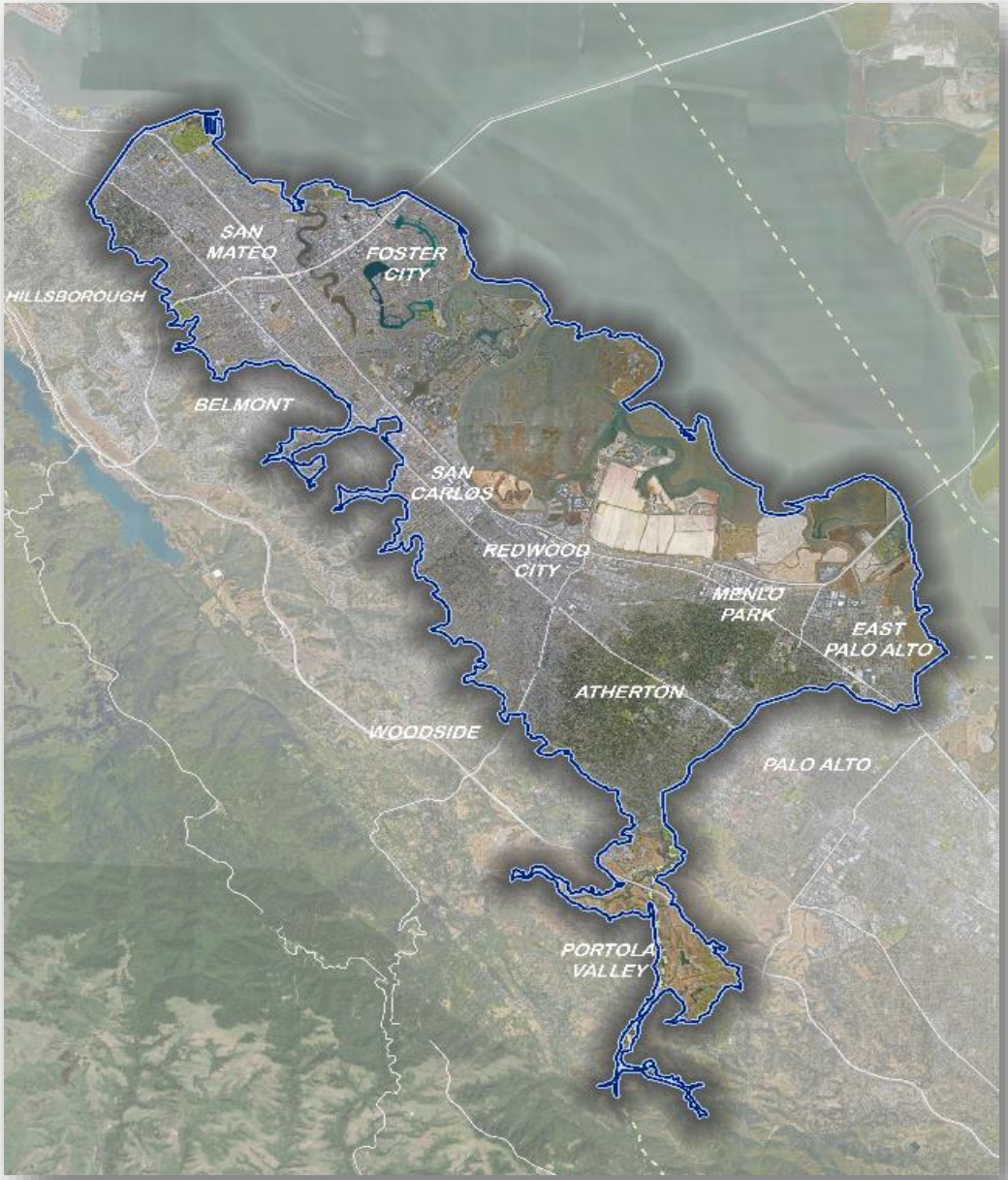
November 21, 2016

Groundwater Flow Model

Workshop #4

December 6, 2016

Basin Management Options



TAKEAWAYS FROM WORKSHOP #4

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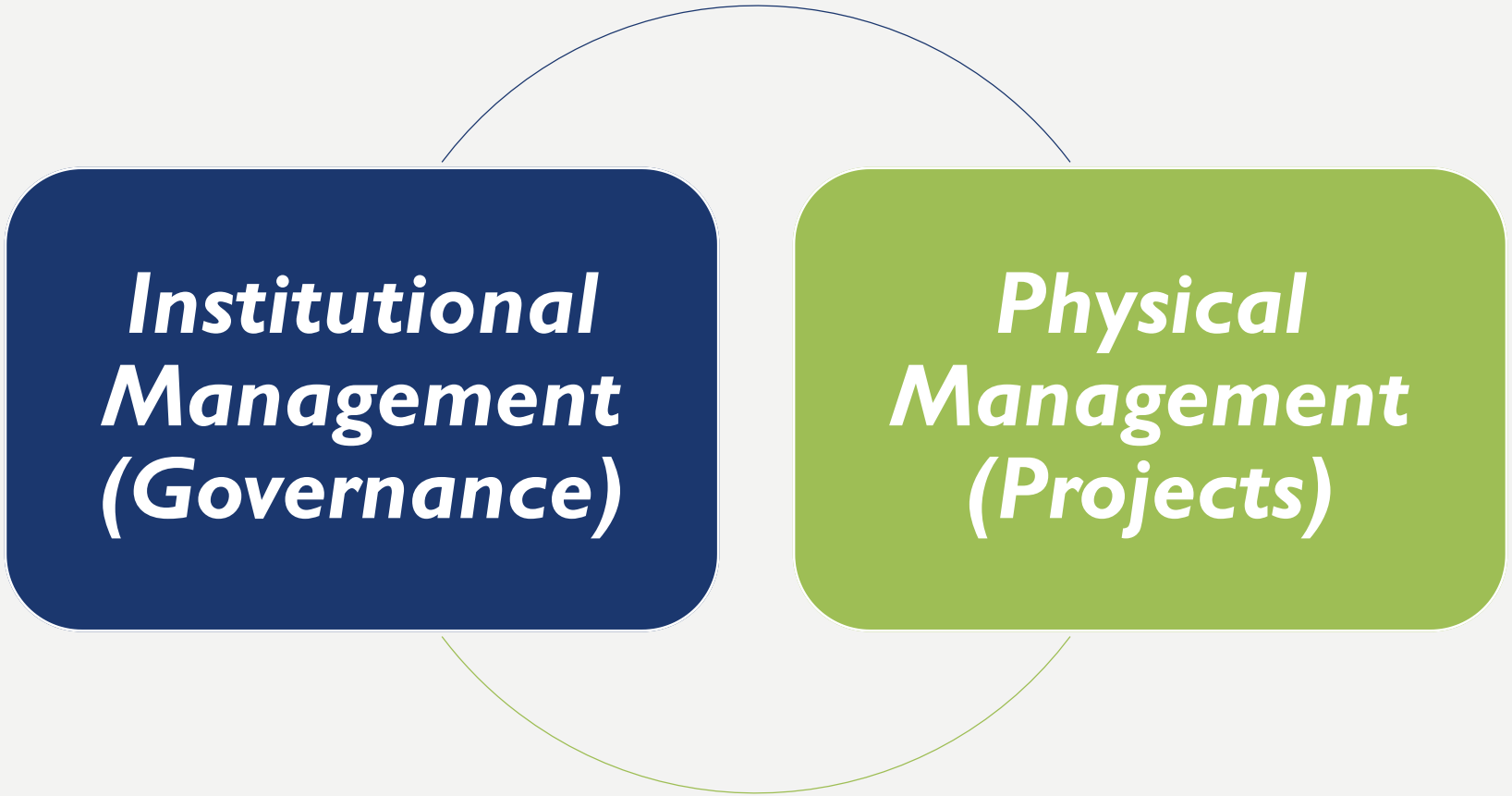
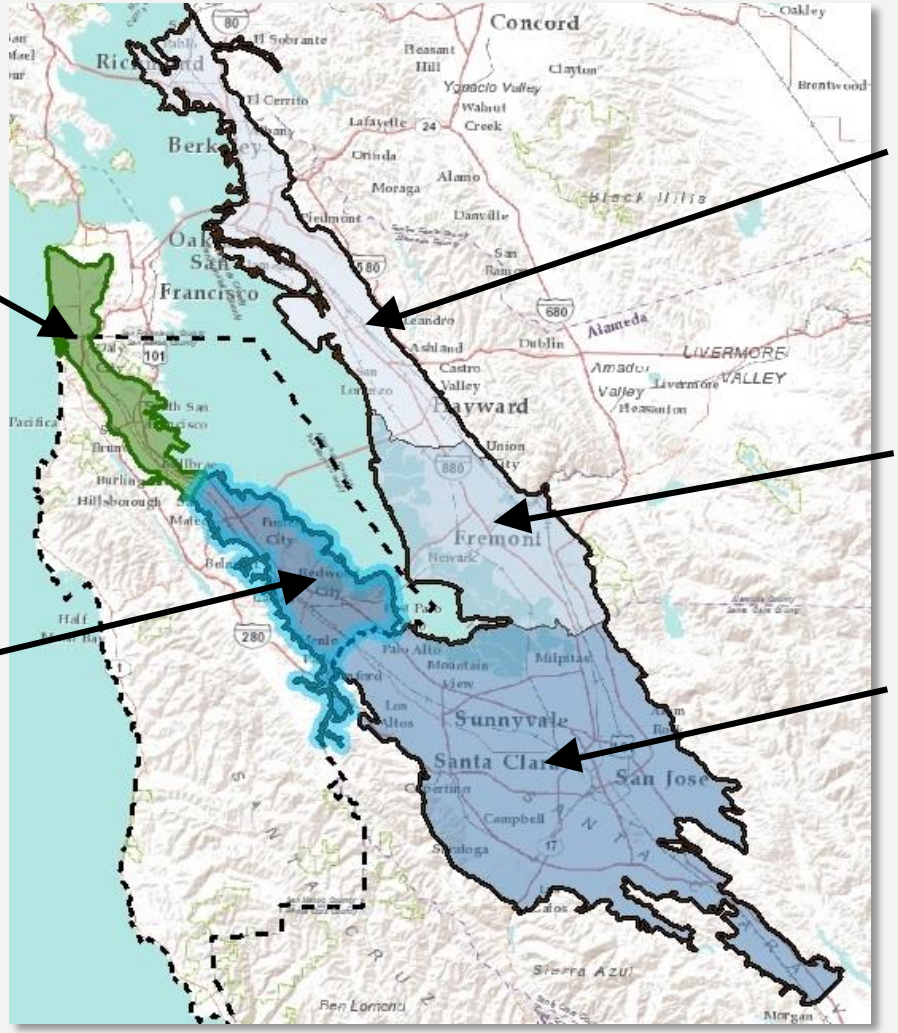
GROUNDWATER MANAGEMENT



GROUNDWATER MANAGEMENT COMPONENTS

Institutional Management (Governance)	*Physical Management (Projects)*
"Unmanaged"	*Water sources*
Voluntary Management	*Delivery methods*
SGMA	*Recharge projects*
Special Act District	*Pumping regulation*
Adjudication	*Groundwater quality projects*

GROUNDWATER IS ACTIVELY MANAGED IN ADJACENT BASINS



Westside Basin

East Bay Plain Subbasin

Niles Cone Subbasin

San Mateo Plain Subbasin

Santa Clara Subbasin

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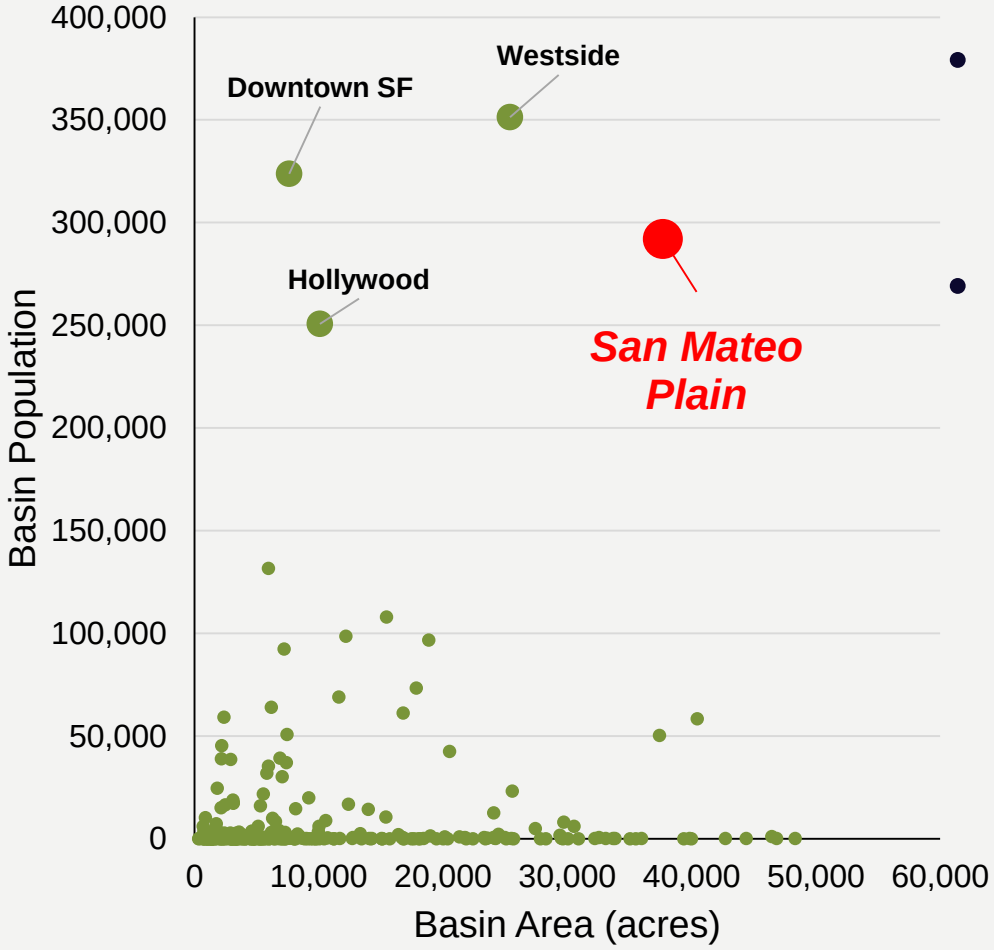
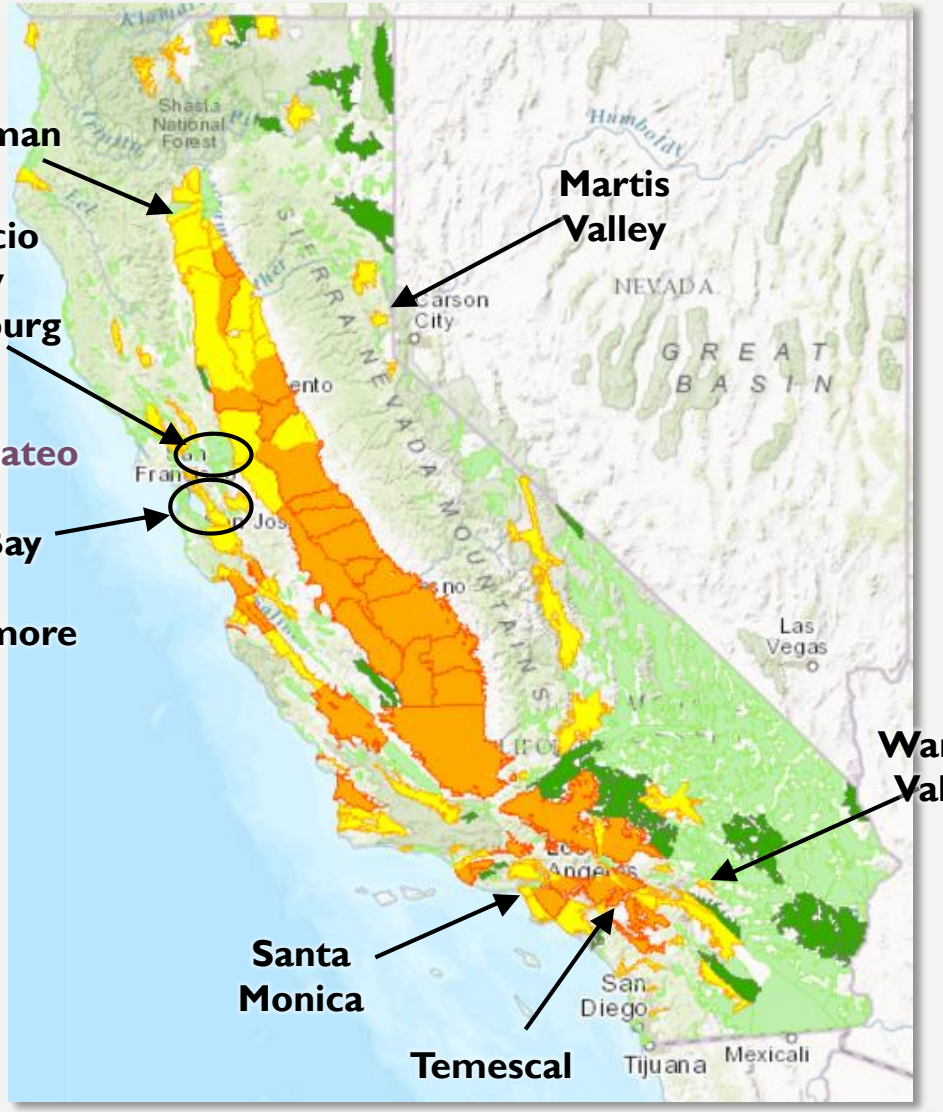
SAN MATEO PLAIN IS UNIQUE IN TERMS OF SIZE AND POPULATION



- Very Low priority basin with small acreage and large population
- Only three other CA basins fit these criteria:
  1. Downtown SF – Little to no groundwater use
  2. Hollywood – Inland basin
  3. Westside – Closest analog to the San Mateo Plain

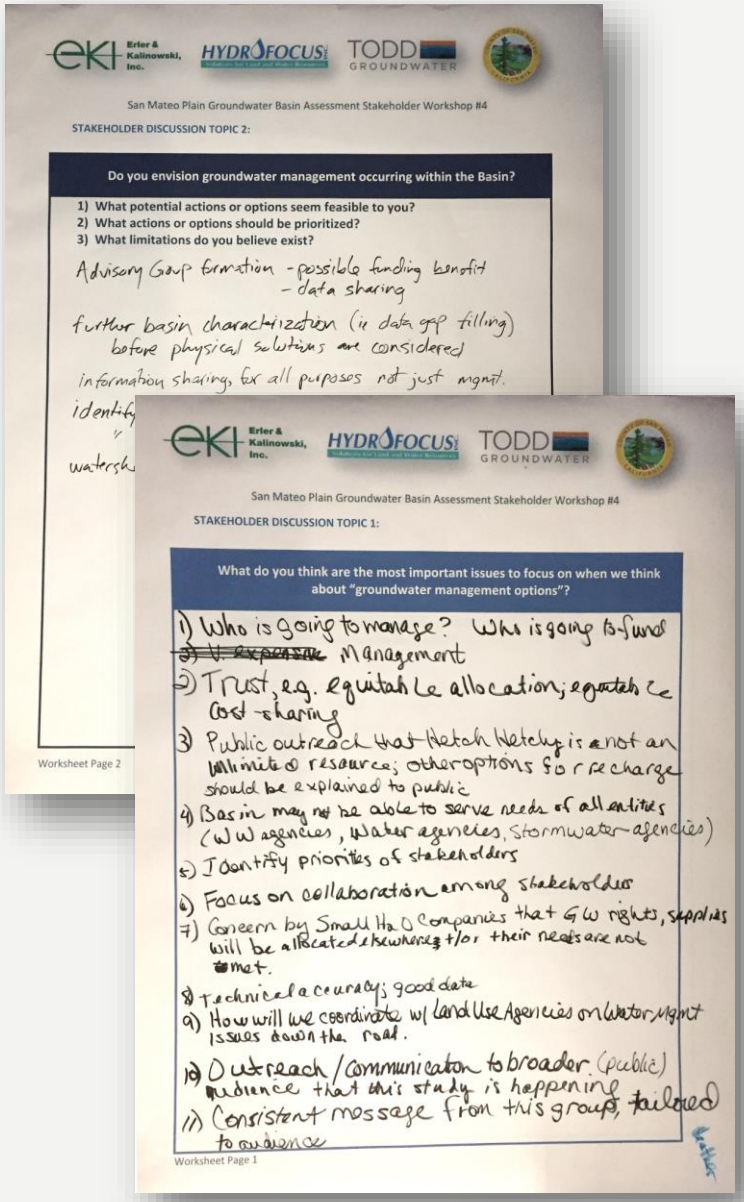
OTHER "SIMILARLY USED" BASINS ARE GEOGRAPHICALLY DISPERSED



WORKSHOP #4 BREAKOUT SESSION TOPICS

- What do you think are the most important issues to focus on when we think about "groundwater management options"?

- Do you envision groundwater management occurring within the Basin?
  - What potential actions or options seem feasible to you?
  - What actions or options should be prioritized?
  - What limitations do you believe exist?


San Mateo Plain Groundwater Basin Assessment Stakeholder Workshop #4

STAKEHOLDER DISCUSSION TOPIC 2:

Do you envision groundwater management occurring within the Basin?

1) What potential actions or options seem feasible to you?
2) What actions or options should be prioritized?
3) What limitations do you believe exist?

Advisory Group formation - possible funding benefit
- data sharing

further basin characterization (ie data gap filling) before physical solutions are considered

information sharing, for all purposes not just mgmt.

identify

watersh

Worksheet Page 2

San Mateo Plain Groundwater Basin Assessment Stakeholder Workshop #4

STAKEHOLDER DISCUSSION TOPIC 1:

What do you think are the most important issues to focus on when we think about "groundwater management options"?

1) Who is going to manage? Who is going to fund Management
2) Trust, eg. equitable allocation; equitable cost-sharing
3) Public outreach that Hetch Hetchy is not an unlimited resource; other options for recharge should be explained to public
4) Basin may not be able to serve needs of all entities (WW agencies, Water agencies, Stormwater agencies)
5) Identify priorities of stakeholders
6) Focus on collaboration among stakeholders
7) Concern by Small H2O companies that GW rights, supplies will be allocated elsewhere &/or their needs are not met.
8) Technical accuracy; good data
9) How will we coordinate w/ Land Use Agencies on Water/Mgmt issues down the road.
10) Outreach/communication to broader (public) audience that this study is happening
11) Consistent message from this group, tailored to audience

Worksheet Page 1

KEY TAKE-AWAYS FROM WORKSHOP #4

- High interest in the development of a better technical understanding of the Basin and the collection of more and higher quality data
- High interest in additional Basin-wide and regional coordination and collaboration
  - Formation of advisory committees (from voluntary to more formalized/proactive management)
  - Goal to enhance coordination, outreach and messaging
- Funding and cost-sharing came up repeatedly, including opportunities for coordinated project-based management and funding

REVIEW OF PRELIMINARY REPORT FINDINGS

REPORT STRUCTURE

Section 1	• Introduction
Section 2	• Basin Overview
Section 3	• Stakeholder Engagement
Section 4	• Review and Compilation of Available Data
Section 5	• Basin Water Quality Evaluation
Section 6	• Hydrogeologic Conceptual Model
Section 7	• Basin Water Balance
Section 8	• San Mateo Plain Groundwater Flow Model
Section 9	• Evaluation of Risk of Potential Undesirable Results
Section 10	• Initial Evaluation of Basin Management Options
Section 11	• Data Gaps and Potential Next Steps

Report available for download at http://green.smcgov.org/san-mateo-plain

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Section 2

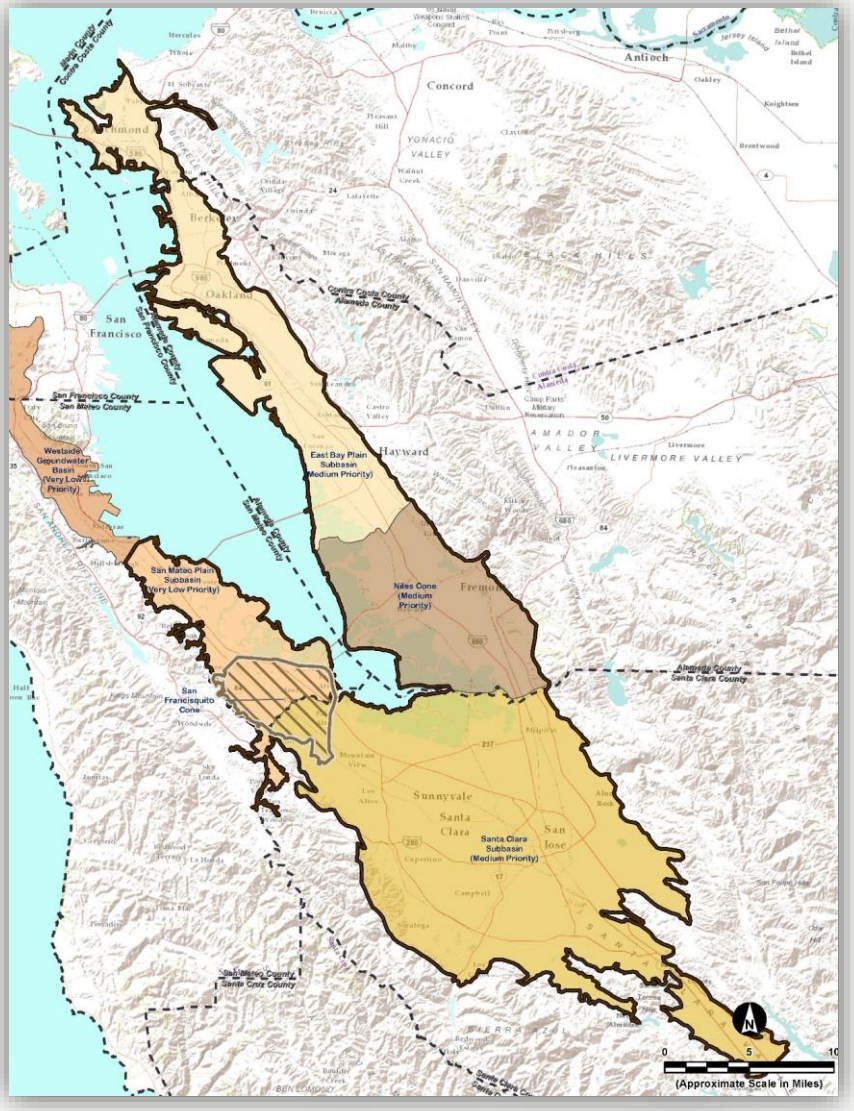
- Basin Overview

Section 3

- Stakeholder Engagement

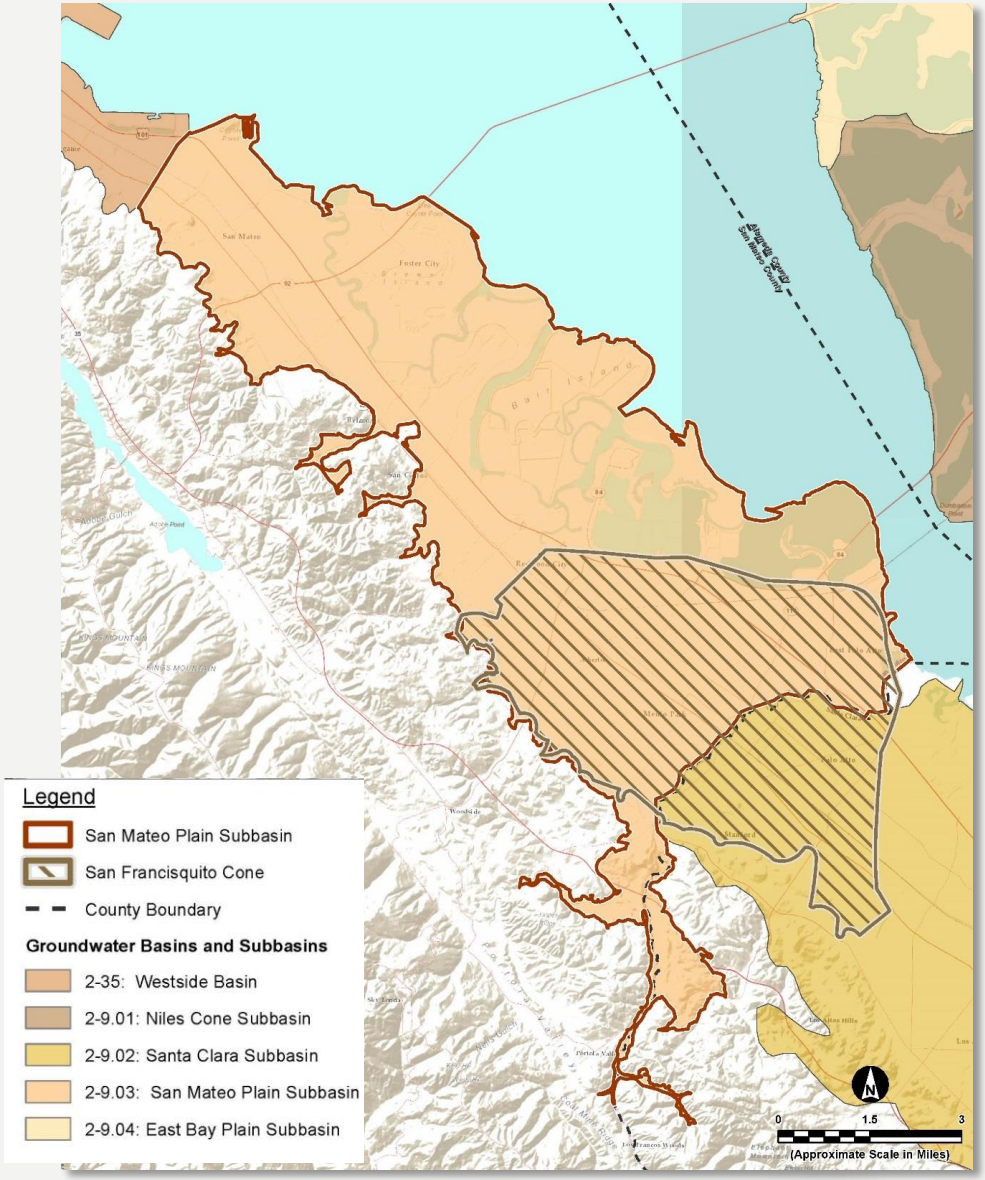
BASIN IS PART OF REGIONAL GROUNDWATER SYSTEM

- Part of the Santa Clara Valley Basin (DWR Basin 2-09)
- Hydraulically connected to Santa Clara, Niles Cones, and East Bay Plain Subbasins
- Overlain by northern portion of the San Francisquito Cone



SAN MATEO PLAIN SUBBASIN

- DWR Basin 2-9.03
- 37,708 acres
- Limited use of groundwater by municipal suppliers
- Limited technical analysis conducted to date



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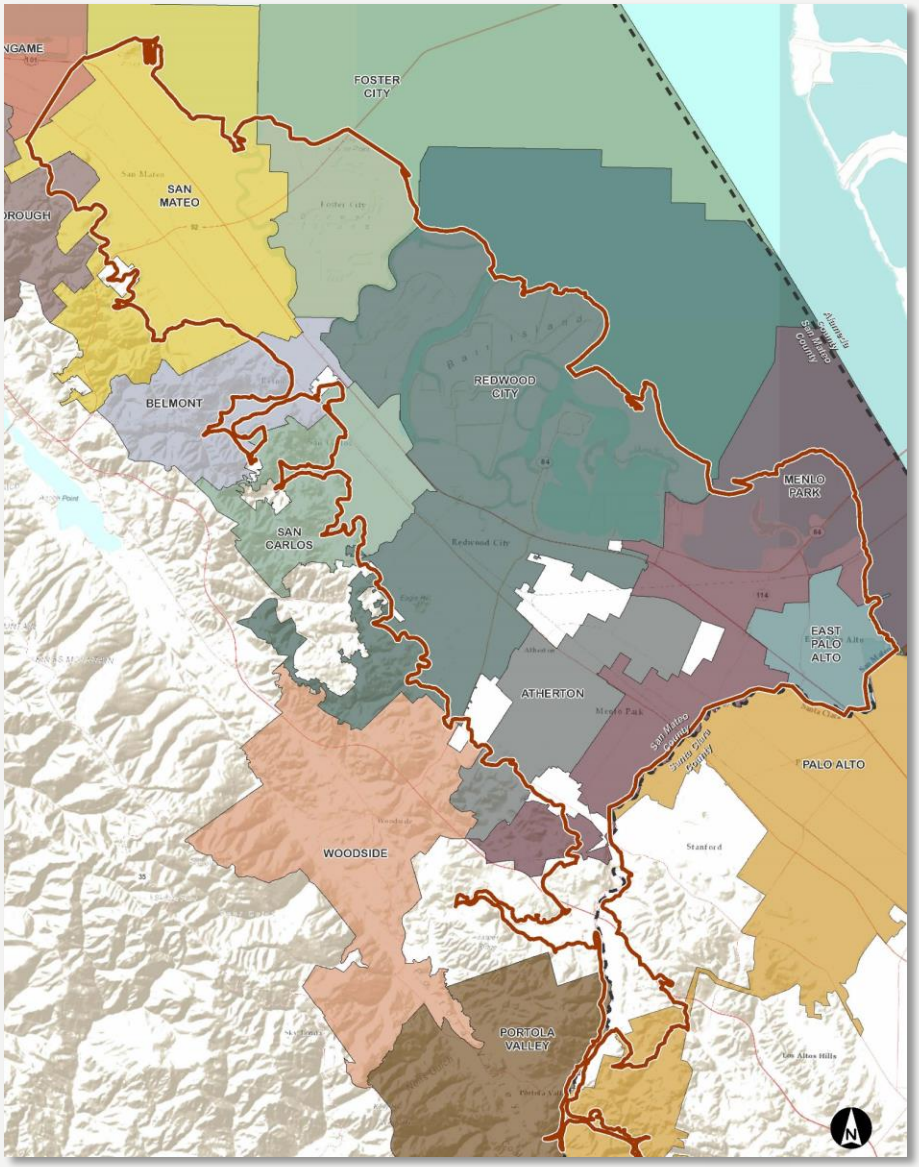
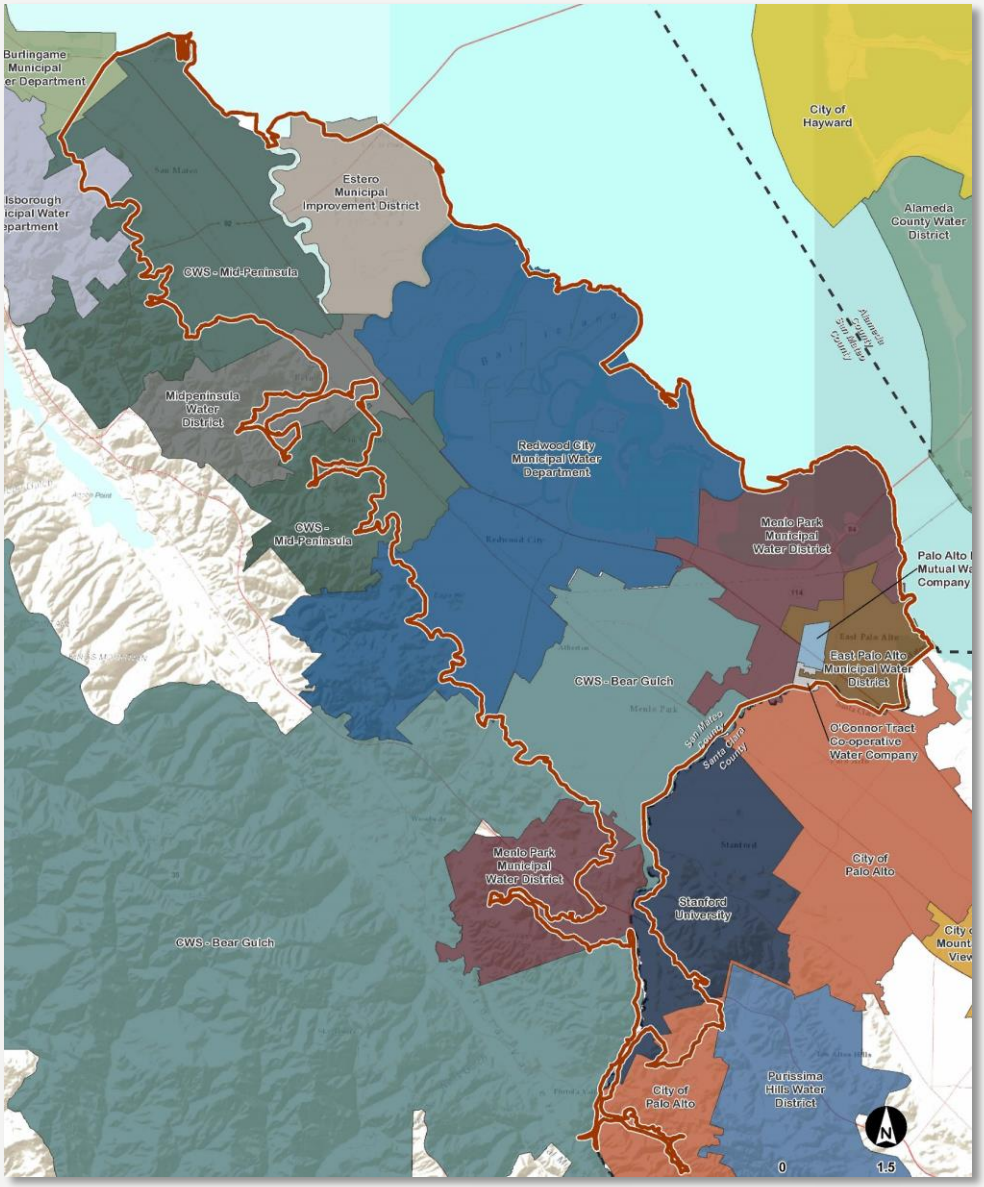
HIGHLY URBANIZED BASIN

- 13 cities
- Total population is approximately 292,000



MULTIPLE WATER SUPPLIERS

- 13 water suppliers
- Primarily supplied by Hetch Hetchy
- Approximately 2,700 AFY of total groundwater pumping (municipal and private wells)

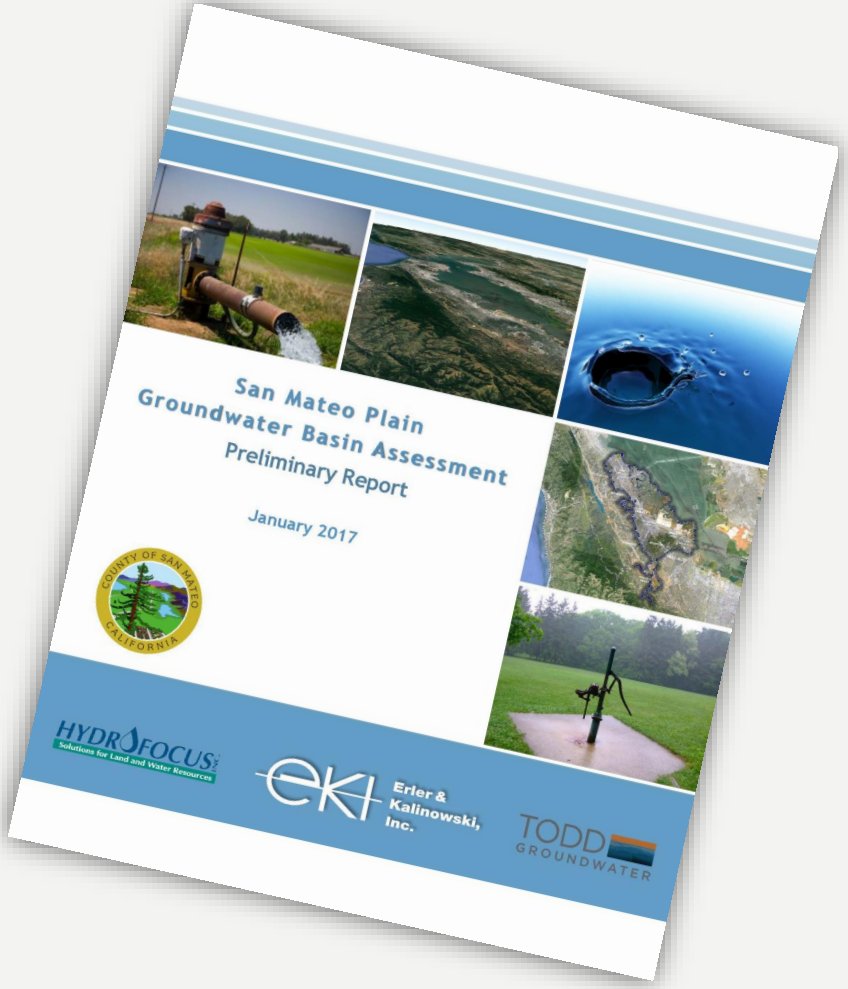


EXTENSIVE STAKEHOLDER OUTREACH

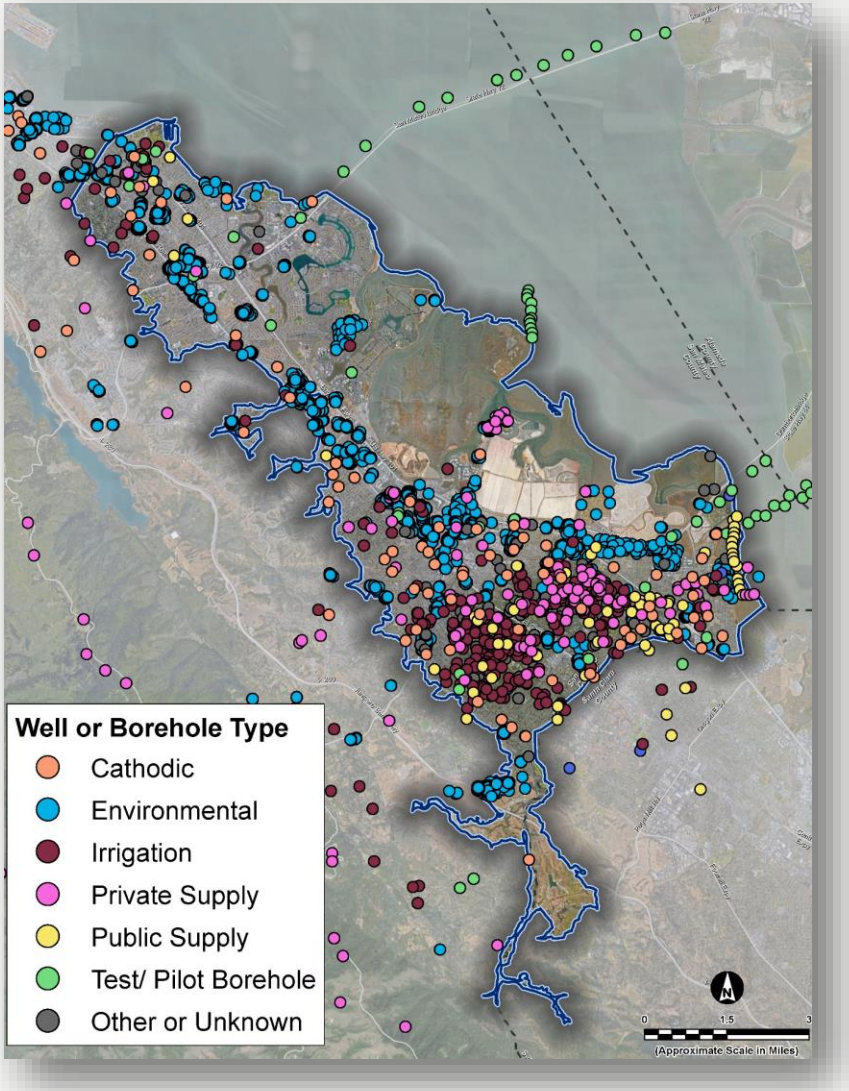
- 5 Stakeholder Workshops
- 26 meetings with agencies and other interested parties
- 6 presentations to governing bodies and regional organizations
- Outreach is ongoing…

Section 4

- Review and Compilation of Available Data



INITIATED BROAD DATA COLLECTION EFFORT



- Information from ~3,000 wells and boreholes
- Data collected through 15 July 2016
- Data and GIS files will be publicly available

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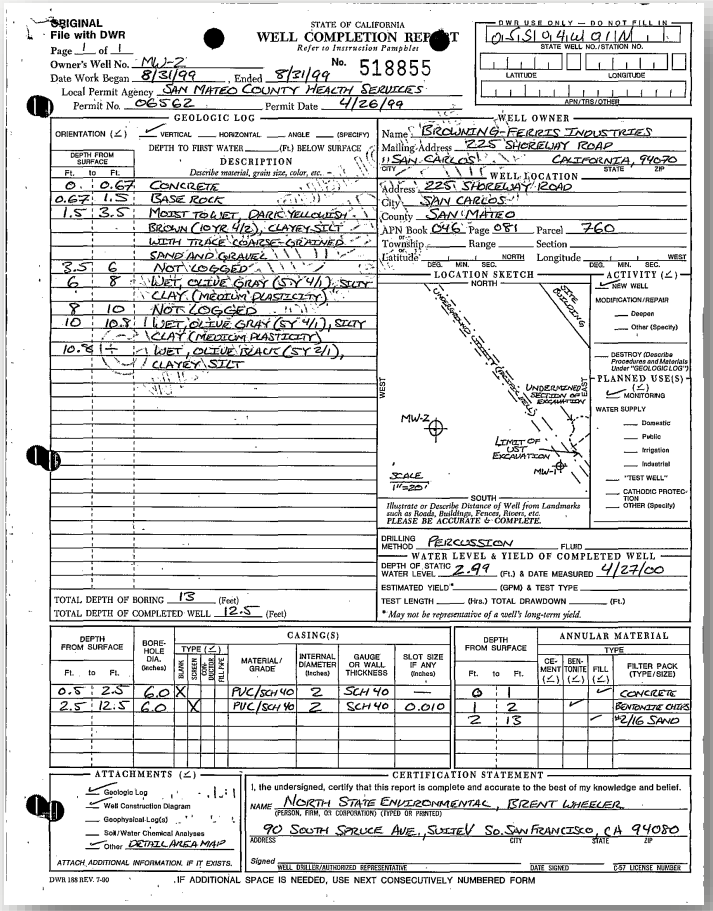
KEY DATA SOURCES

- Previously compiled data for the BAWSCA Strategy Groundwater Model (SGM)
- Geotracker and GAMA online databases
- County well permitting data
- DWR well driller's logs
- Previous groundwater reports and studies (USGS, Redwood City, DWR, East Palo Alto, etc.)



ORIGINAL
File with DWR

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. 518855

Page 1 of 1
Owner's Well No. MW-2
Date Work Began 8/31/99 Ended 8/31/99
Local Permit Agency SAN MATEO COUNTY HEALTH SERVICES
Permit No. 96562 Permit Date 4/26/99

DWR USE ONLY — DO NOT FILL IN
01S/04W01N
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE APN/TRS/OTHER

GEOLOGIC LOG
ORIENTATION (✓) ✓ VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DEPTH TO FIRST WATER ___ (Ft.) BELOW SURFACE

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION Describe material, grain size, color, etc.
0	0.67	CONCRETE
0.67	1.5	BASE ROCK
1.5	3.5	MOIST TO WET, DARK YELLOWISH BROWN (10YR 4/2), CLAYEY SILT WITH TRACE COARSE-GRAINED SAND AND GRAVEL
3.5	6	NOT LOGGED
6	8	WET, OLIVE GRAY (5Y 4/1), SILTY CLAY (MEDIUM PLASTICITY)
8	10	NOT LOGGED
10	10.5	WET, OLIVE GRAY (5Y 4/1), SILTY CLAY (MEDIUM PLASTICITY)
10.5	+	WET, OLIVE GRAY (5Y 3/1), CLAYEY SILT

TOTAL DEPTH OF BORING 13 (Feet)
TOTAL DEPTH OF COMPLETED WELL 12.5 (Feet)

WELL OWNER
Name BROWNING-FERRIS INDUSTRIES
Mailing Address 225 SHORELWAY ROAD
City SAN CARLOS CALIFORNIA, 94070
CITY STATE ZIP

WELL LOCATION
Address 225 SHORELWAY ROAD
City SAN CARLOS
County SAN MATEO
APN Book 046 Page 081 Parcel 760
Township ___ Range ___ Section ___
Latitude ___ DEG. MIN. SEC. NORTH Longitude ___ DEG. MIN. SEC. WEST

LOCATION SKETCH
NORTH
Underground Storage Tank Excavation
MW-2
Limit of UST Excavation
MW-1
SCALE 1"=20'
WEST
SOUTH
Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc.
PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)
✓ New Well
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")
PLANNED USE(S) (✓)
✓ MONITORING
WATER SUPPLY
___ Domestic
___ Public
___ Irrigation
___ Industrial
___ "TEST WELL"
___ CATHODIC PROTECTION
___ OTHER (Specify)

DRILLING METHOD PERCUSSION FLUID
WATER LEVEL & YIELD OF COMPLETED WELL
DEPTH OF STATIC WATER LEVEL 2.99 (Ft.) & DATE MEASURED 4/27/00
ESTIMATED YIELD* ___ (GPM) & TEST TYPE ___
TEST LENGTH ___ (Hrs.) TOTAL DRAWDOWN ___ (Ft.)
* May not be representative of a well's long-term yield.

CASING(S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	TYPE (✓) SCREEN	MATERIAL/GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0.5	2.5	6.0	X		PVC/SCH 40	2	SCH 40	—
2.5	12.5	6.0		X	PVC/SCH 40	2	SCH 40	0.010

ANNULAR MATERIAL

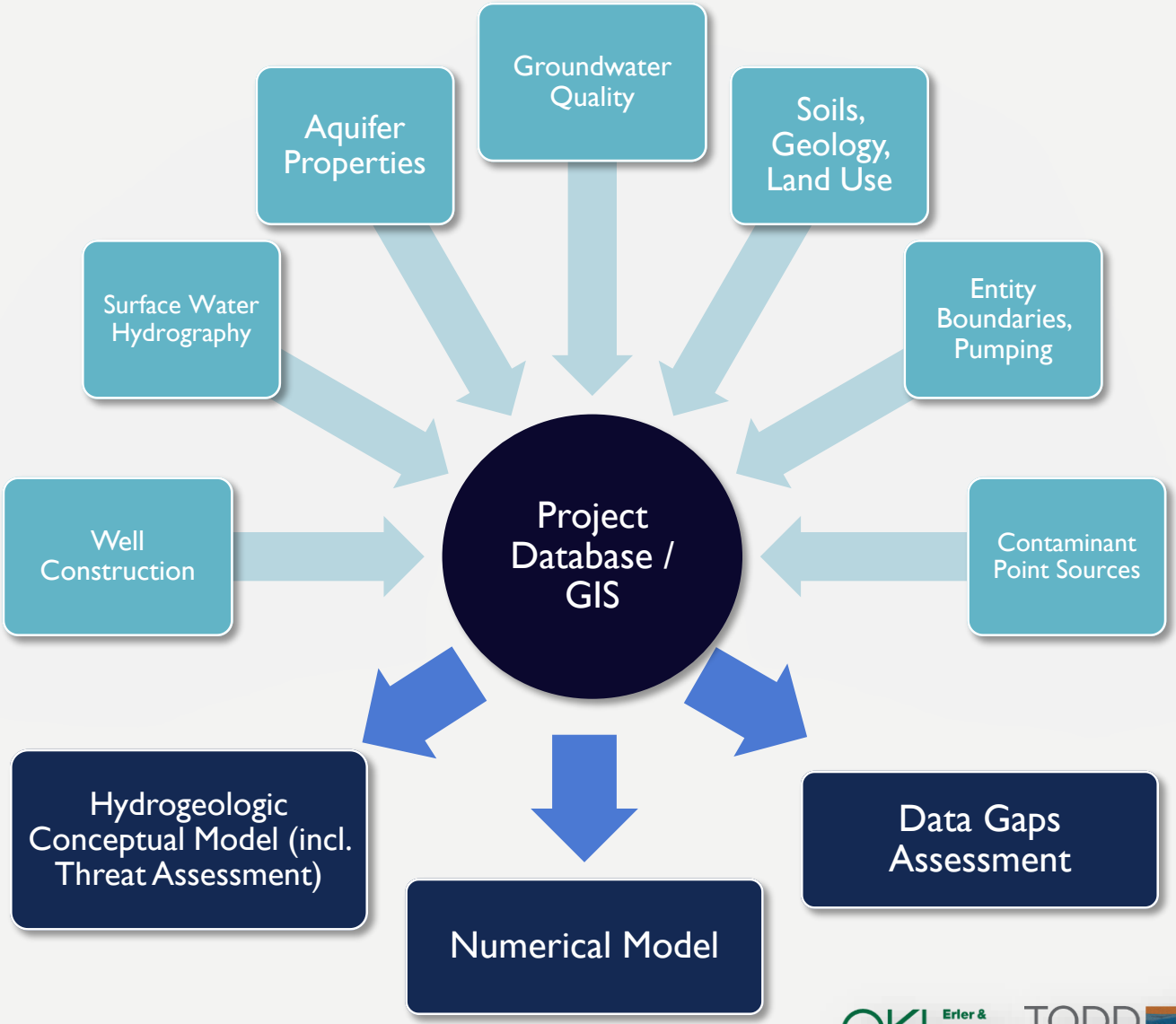
DEPTH FROM SURFACE Ft.	to Ft.	TYPE: CEMENT (✓)	TYPE: BENTONITE (✓)	TYPE: FILL (✓)	FILTER PACK (TYPE/SIZE)
0	1			✓	CONCRETE
1	2		✓		BENTONITE CHIPS
2	13			✓	#2/16 SAND

ATTACHMENTS (✓)
___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
✓ Other DETAIL AREA MAP
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.
NAME NORTH STATE ENVIRONMENTAL, BRENT WHEELER
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS 90 SOUTH SPRUCE AVE., SUITE V SO. SAN FRANCISCO, CA 94080
ADDRESS CITY STATE ZIP
Signed ___ DATE SIGNED ___
WELL DRILLER/AUTHORIZED REPRESENTATIVE
C-57 LICENSE NUMBER

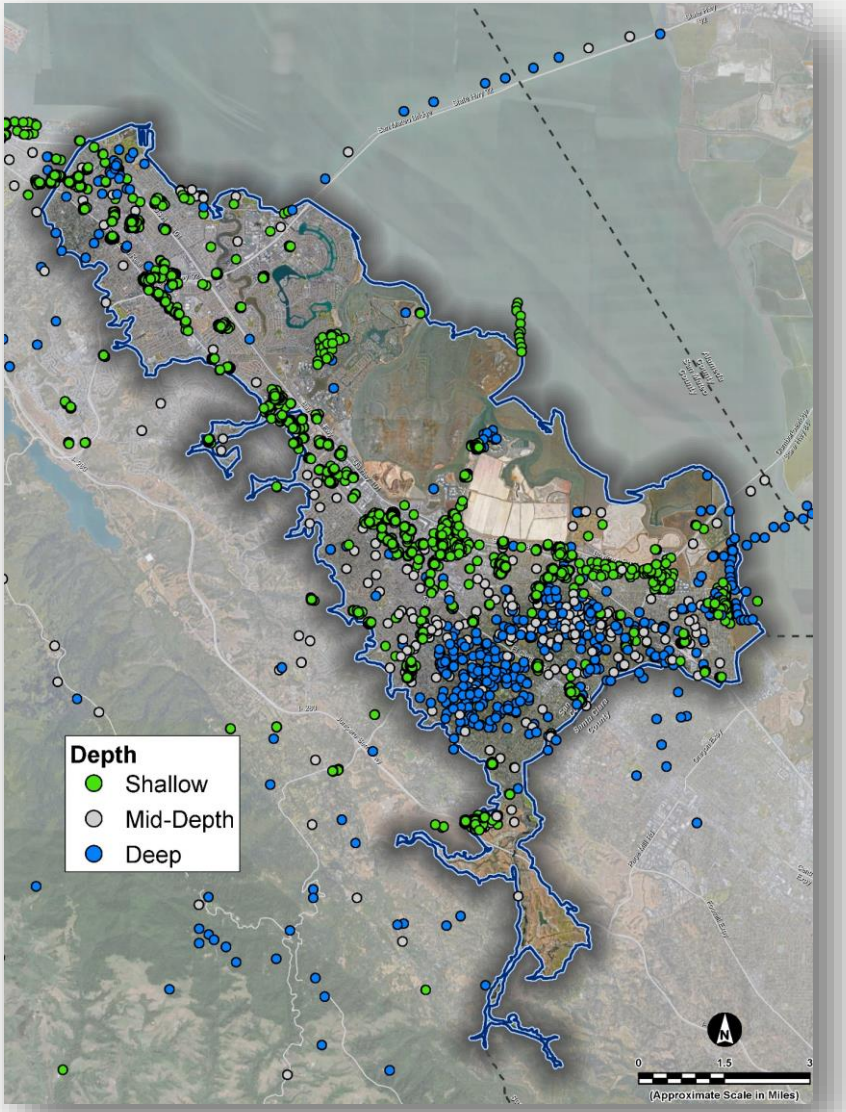
DWR 188 REV. 7-90 IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

COMPREHENSIVE PROJECT DATABASE



DATA WERE STRATIFIED BASED ON DEPTH

- Shallow wells (≤ 50 ft bgs) typically associated with remediation sites
- Deep wells (≥150 ft bgs) typically investigation or production wells



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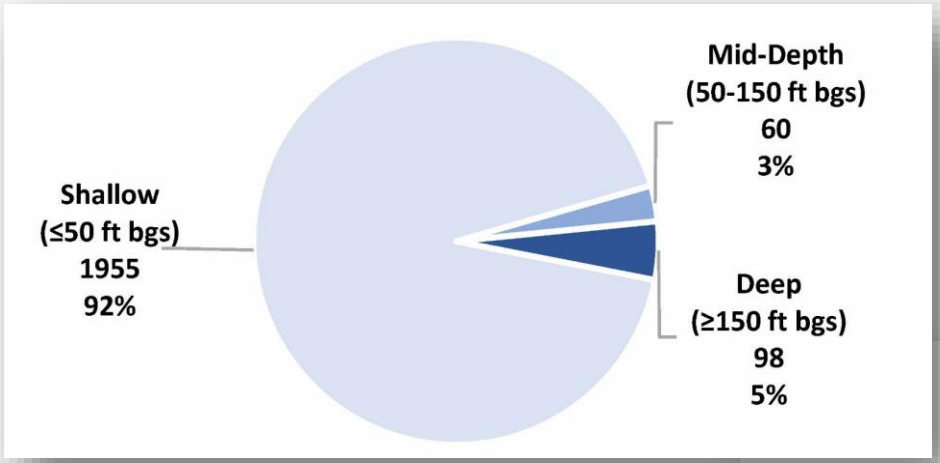
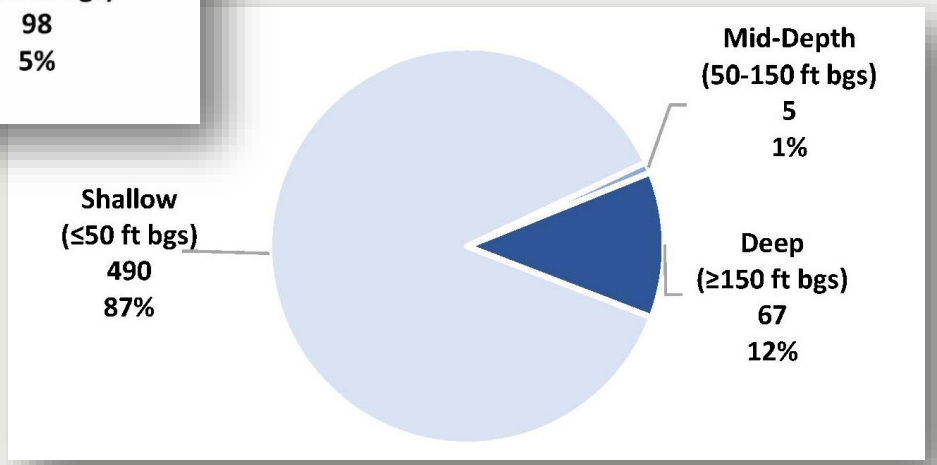
MOST WELLS IN THE BASIN ARE "SHALLOW"

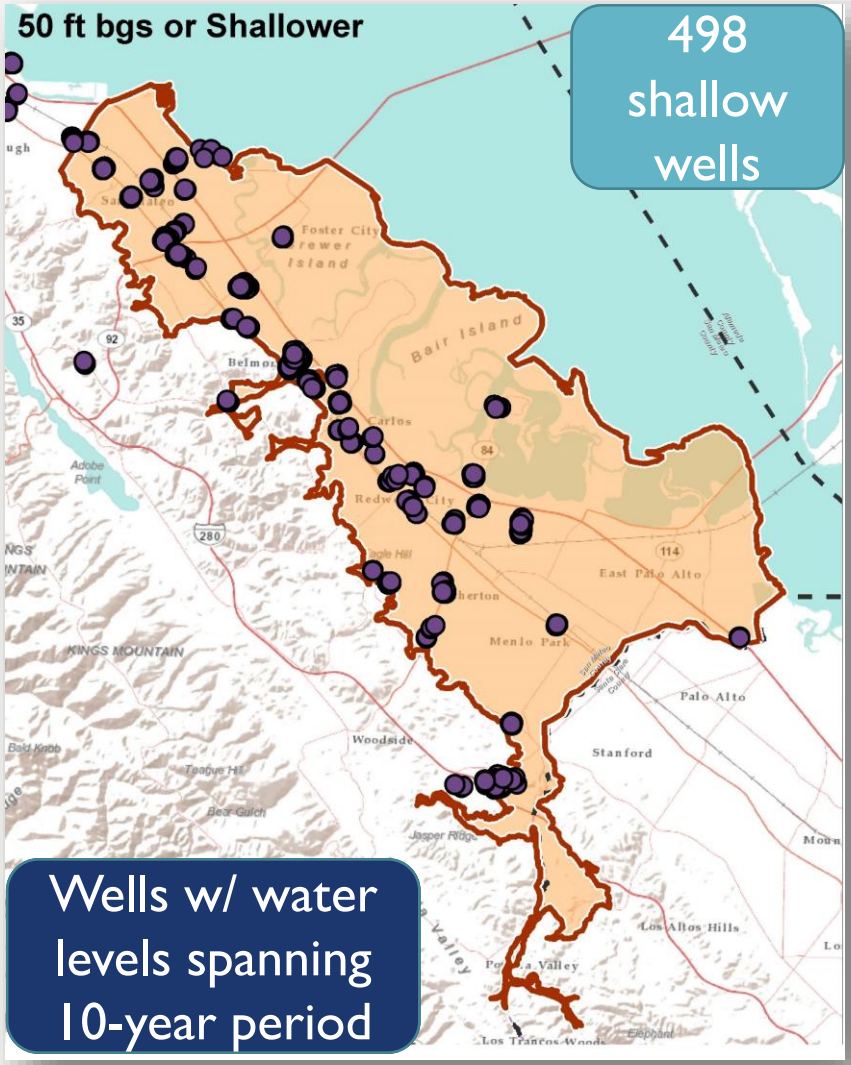
Wells with Water Level Data

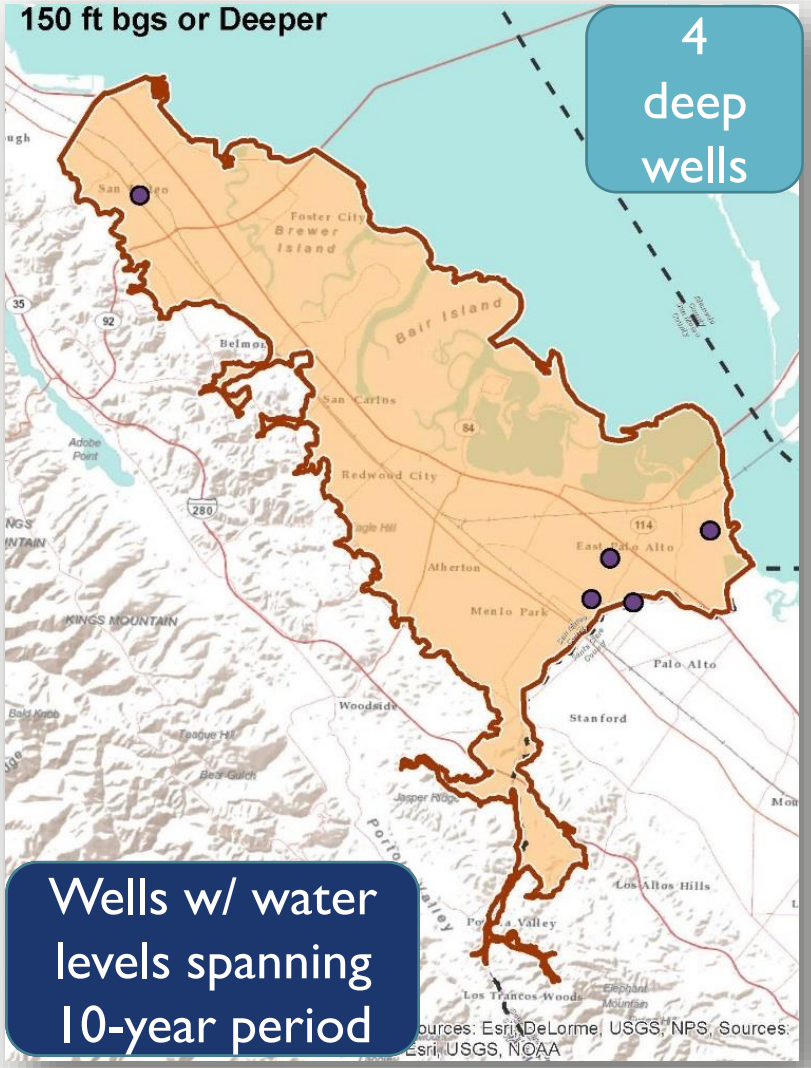


Wells with Water Quality Data



WELLS WITH >10 YEARS OF WATER LEVEL MEASUREMENTS





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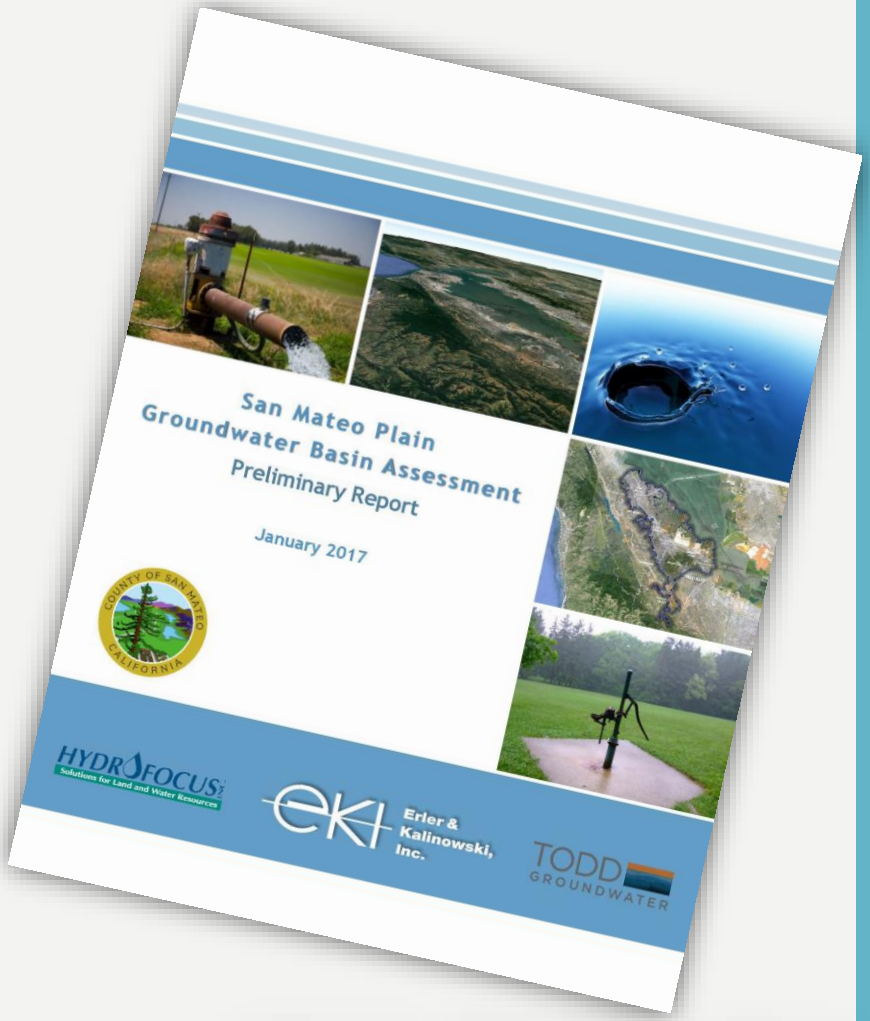
Section 5

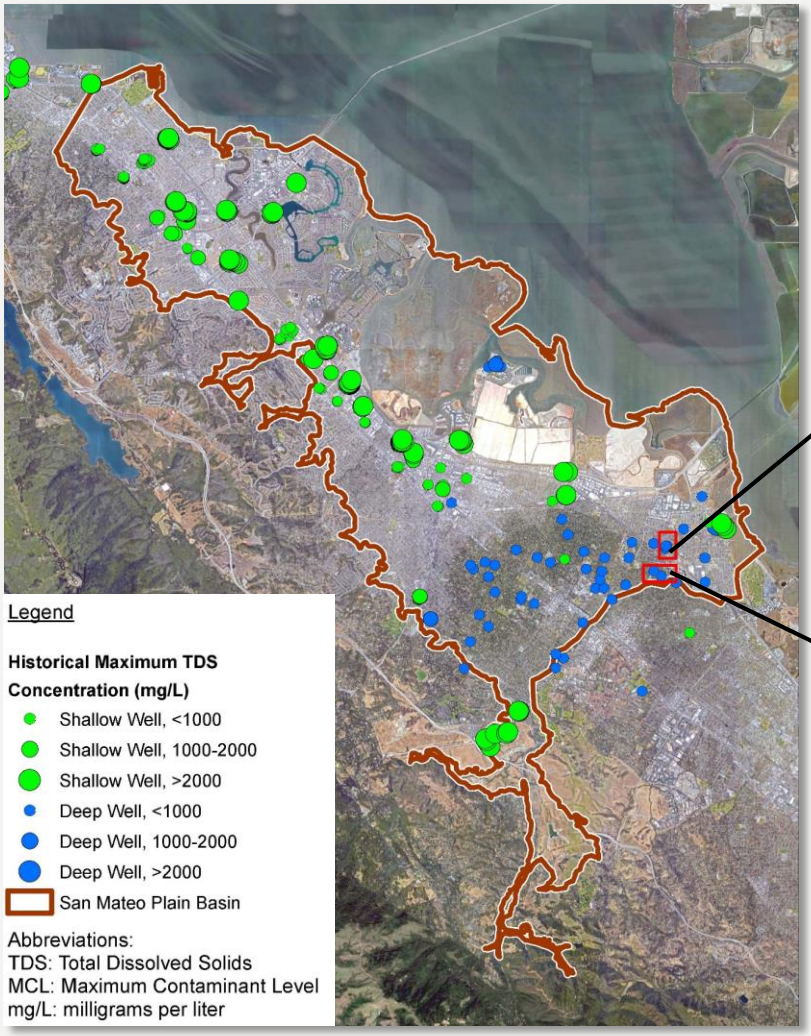
- Basin Water Quality Evaluation

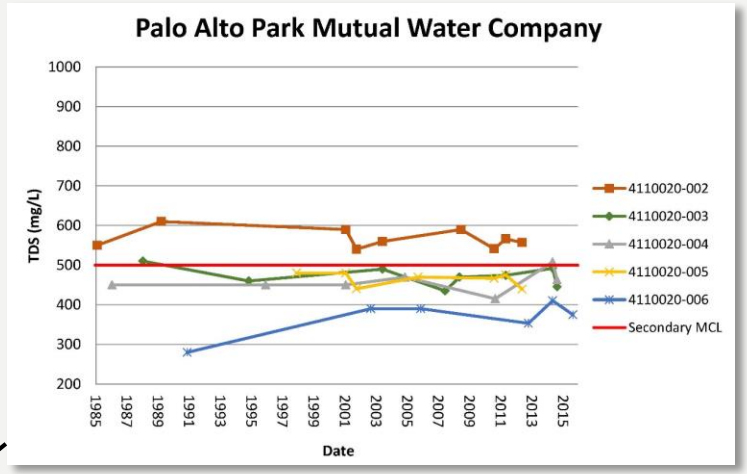


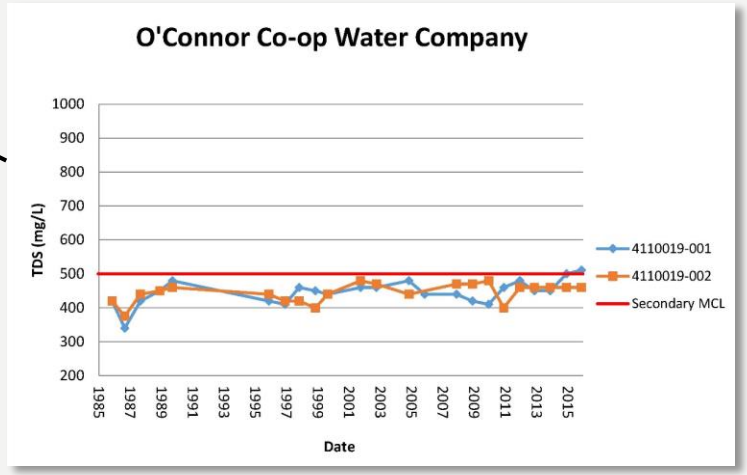
WATER QUALITY EVALUATION TO UNDERSTAND SUITABILITY OF RESOURCE

- Data show that water quality varies with depth, but appears to be stable over time
- Some minerals naturally present at concentrations above drinking water standards (secondary MCLs)
- Known contamination from remediation sites is being addressed through regulatory oversight

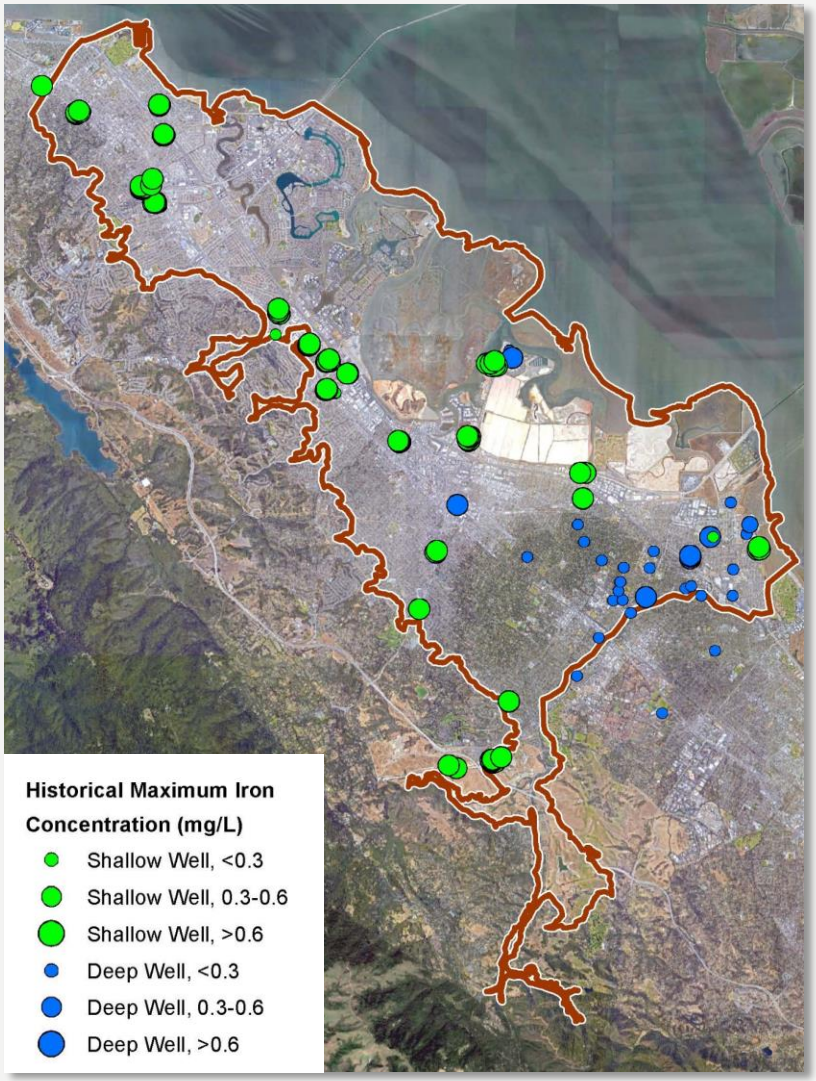
TOTAL DISSOLVED SOLIDS (TDS)

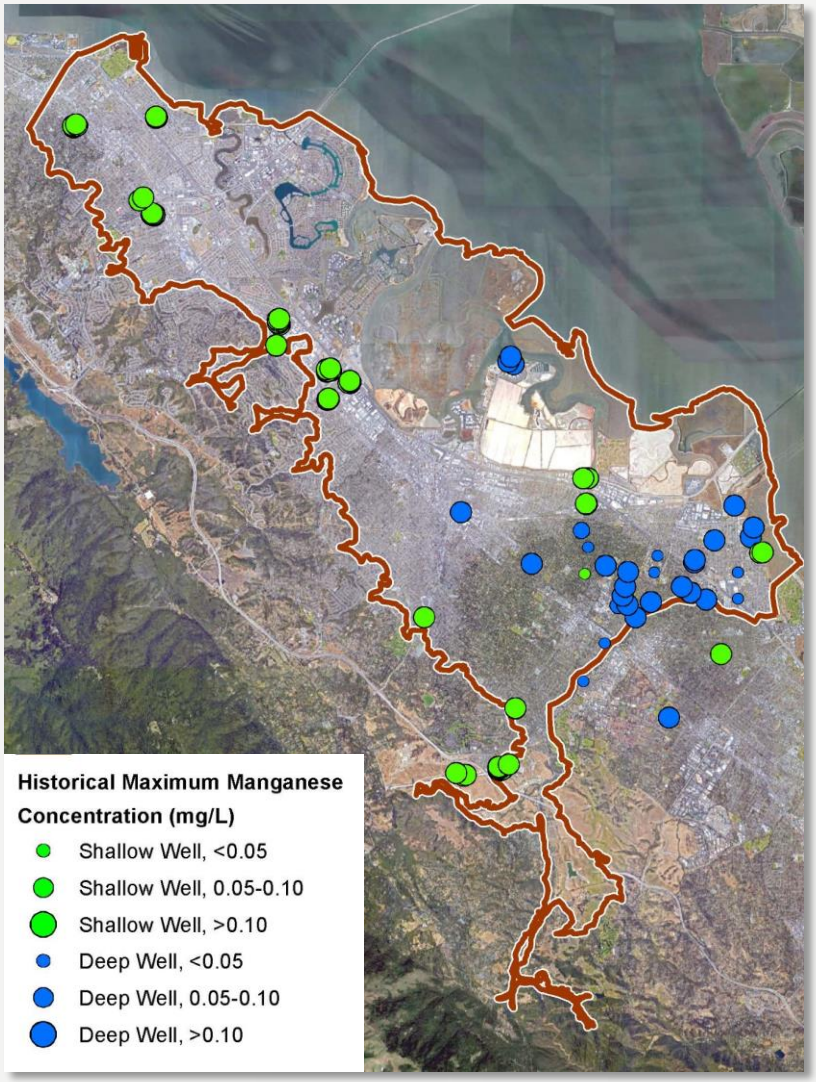






IRON AND MANGANESE ARE UBIQUITOUS





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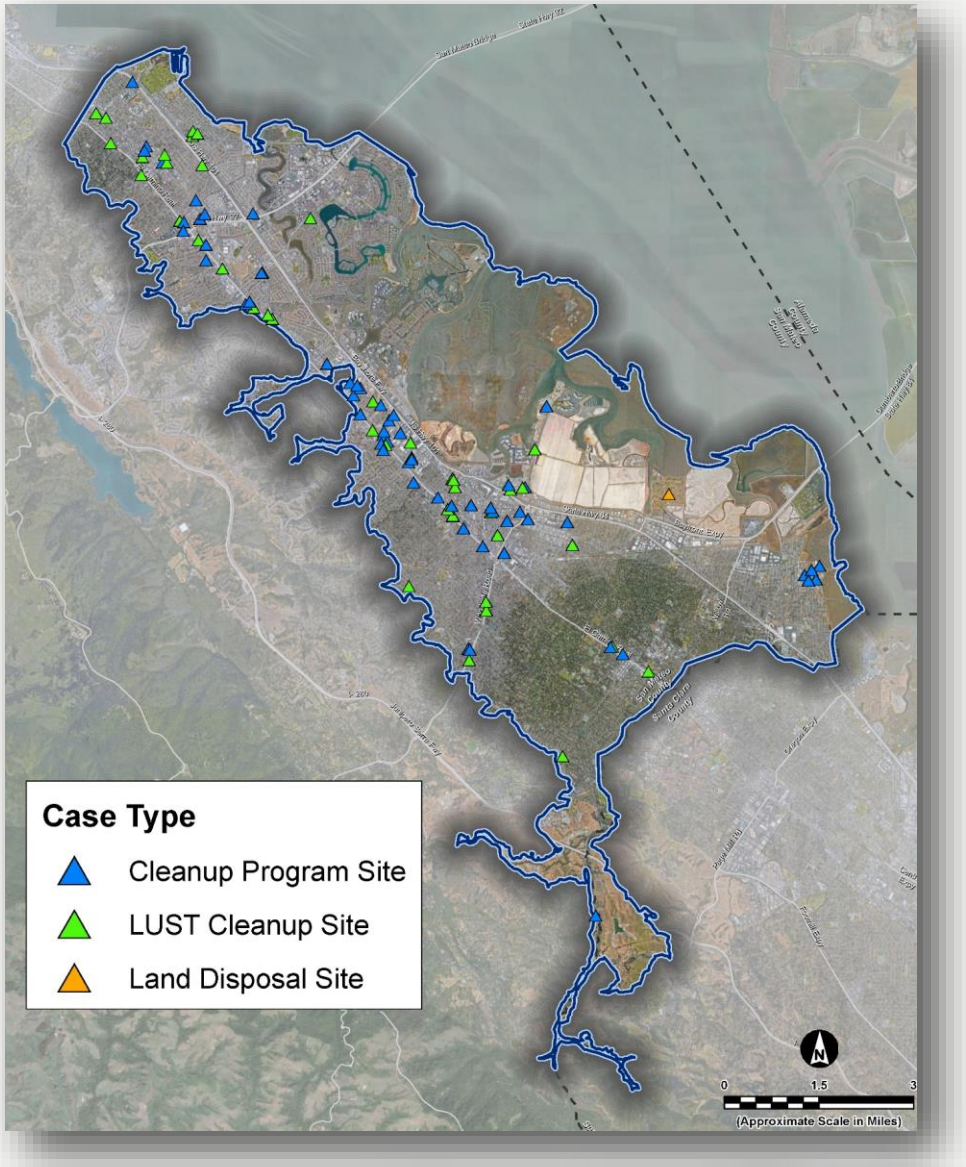
POINT SOURCE CONTAMINATION SITES

- 751 regulated sites were identified in the Geotracker system
- 141 active sites
- Mostly isolated in shallow zone
- Some potential risk of vertical cross-contamination

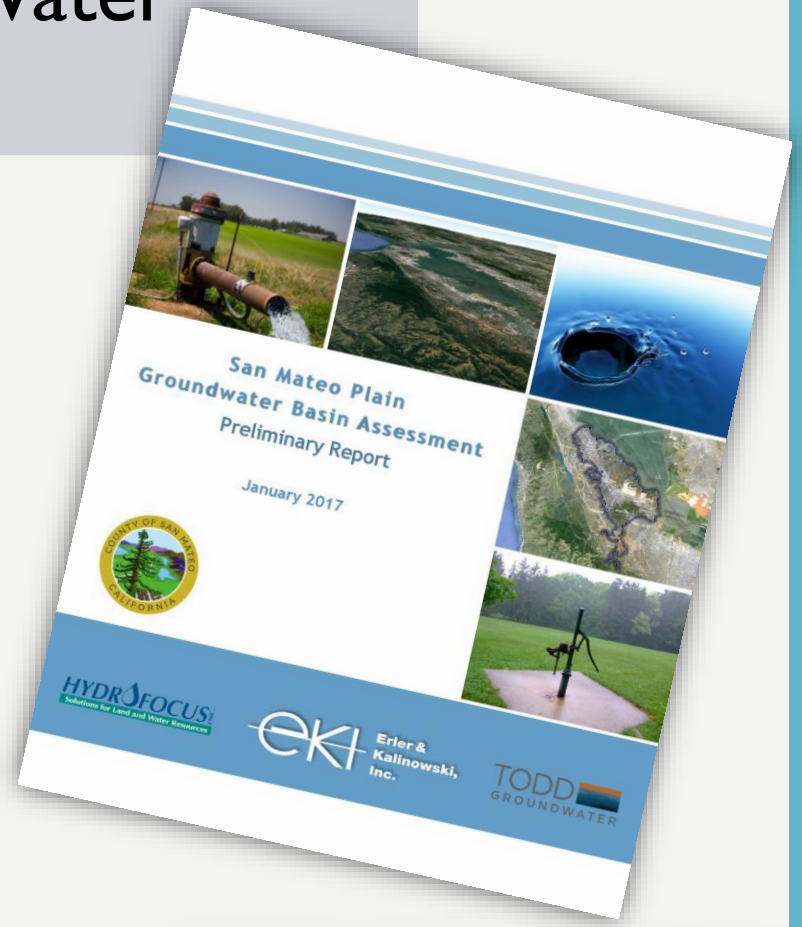


Section 6

- Hydrogeologic Conceptual Model

Section 7

- Basin Water Balance

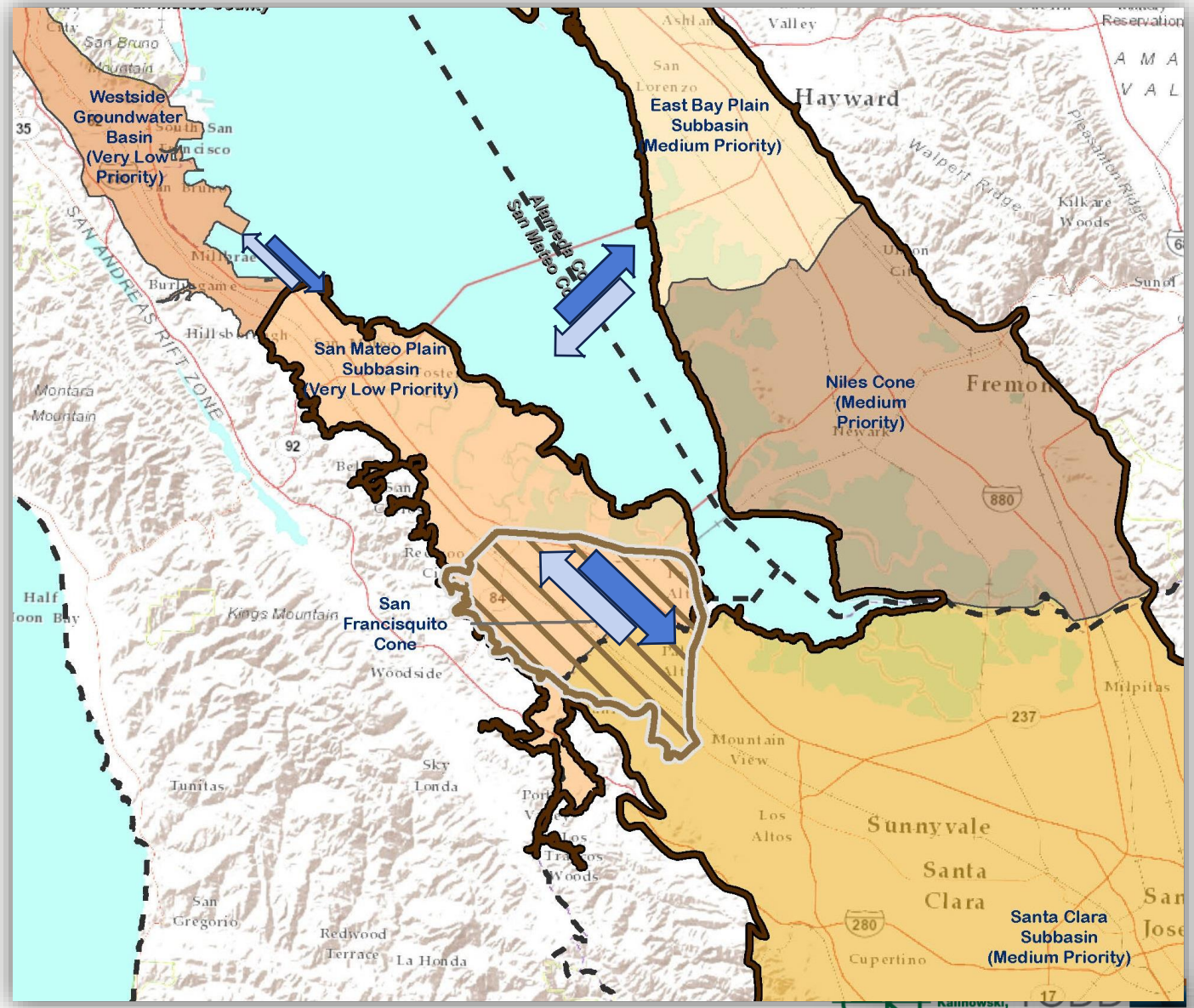


HYDROGEOLOGIC CONCEPTUAL MODEL

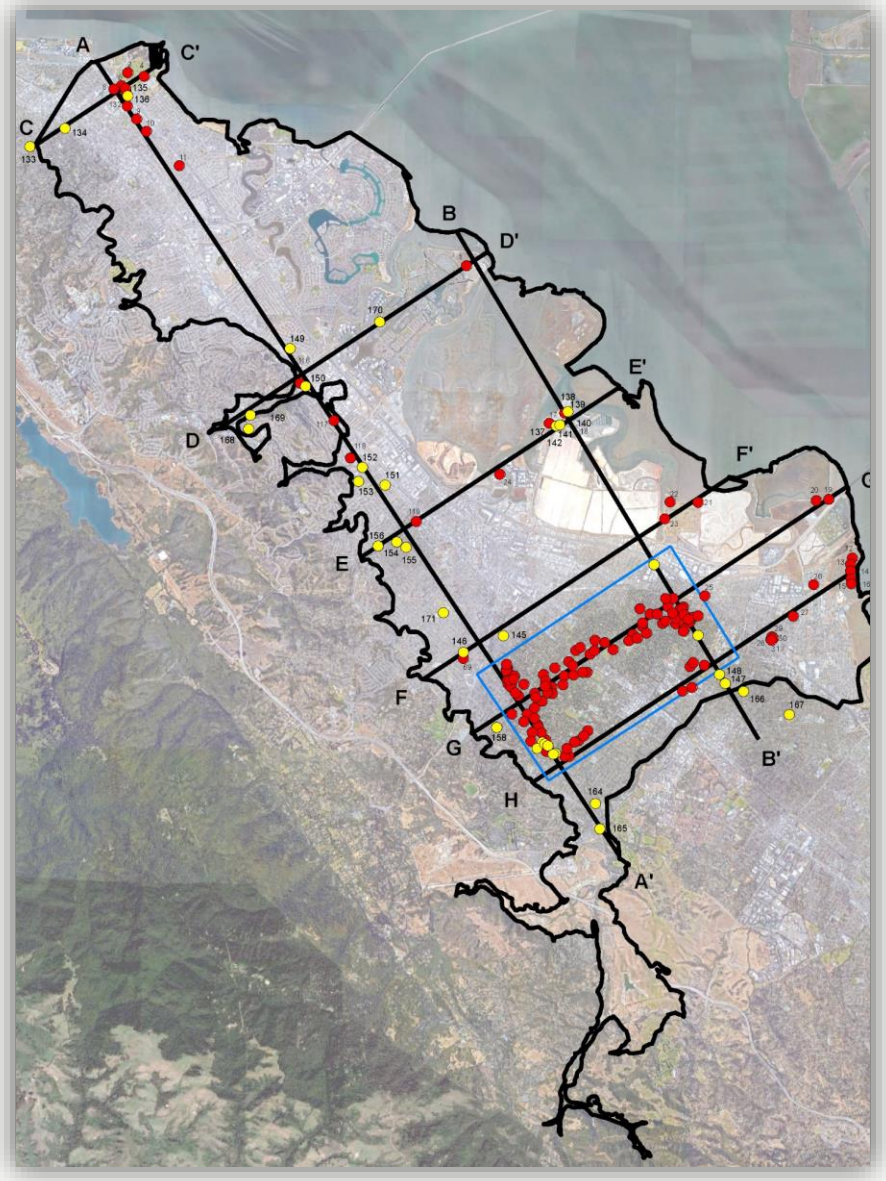
- Description of the physical setting and characteristics of a basin that influence the groundwater system
  - Geology, aquifers, boundaries
  - Hydrology, climate, land use

- Foundation for further hydrogeologic analysis
  - Development of water budgets and numerical groundwater flow models
  - Provides the physical context for planning and management efforts

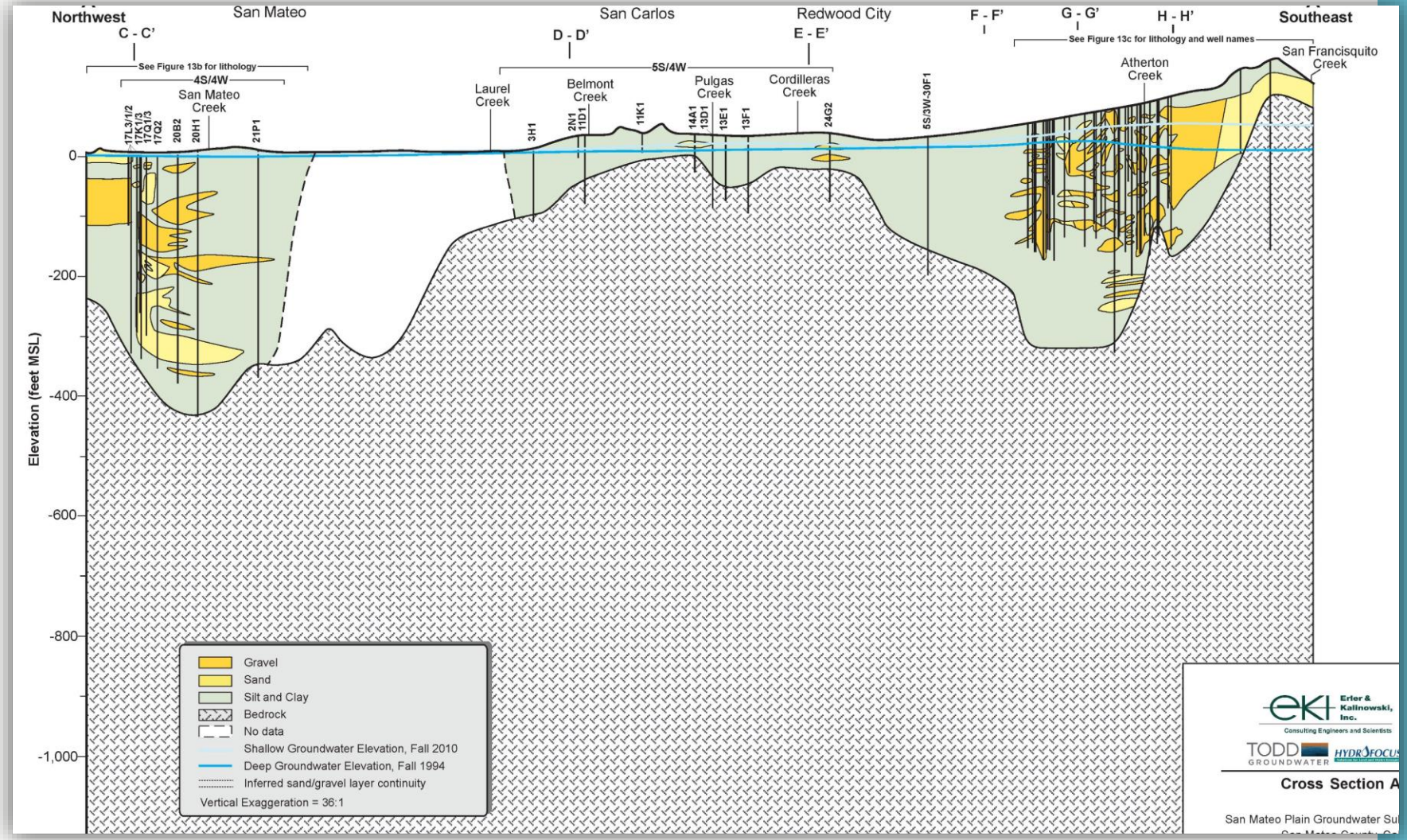
REGIONAL GROUNDWATER SYSTEM



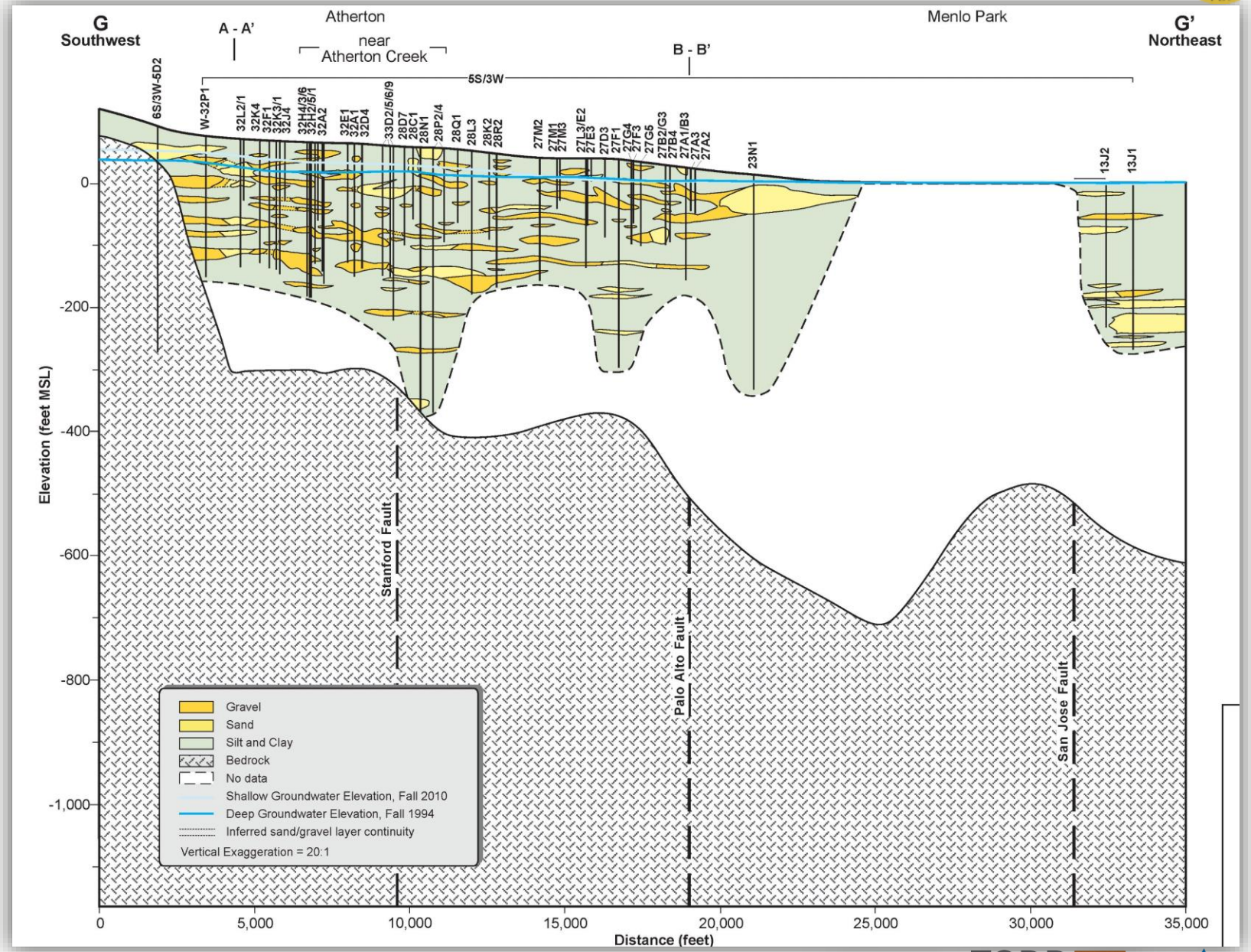
CROSS-SECTION TRANSECTS



NORTH-SOUTH CROSS-SECTION



EAST-WEST CROSS-SECTION



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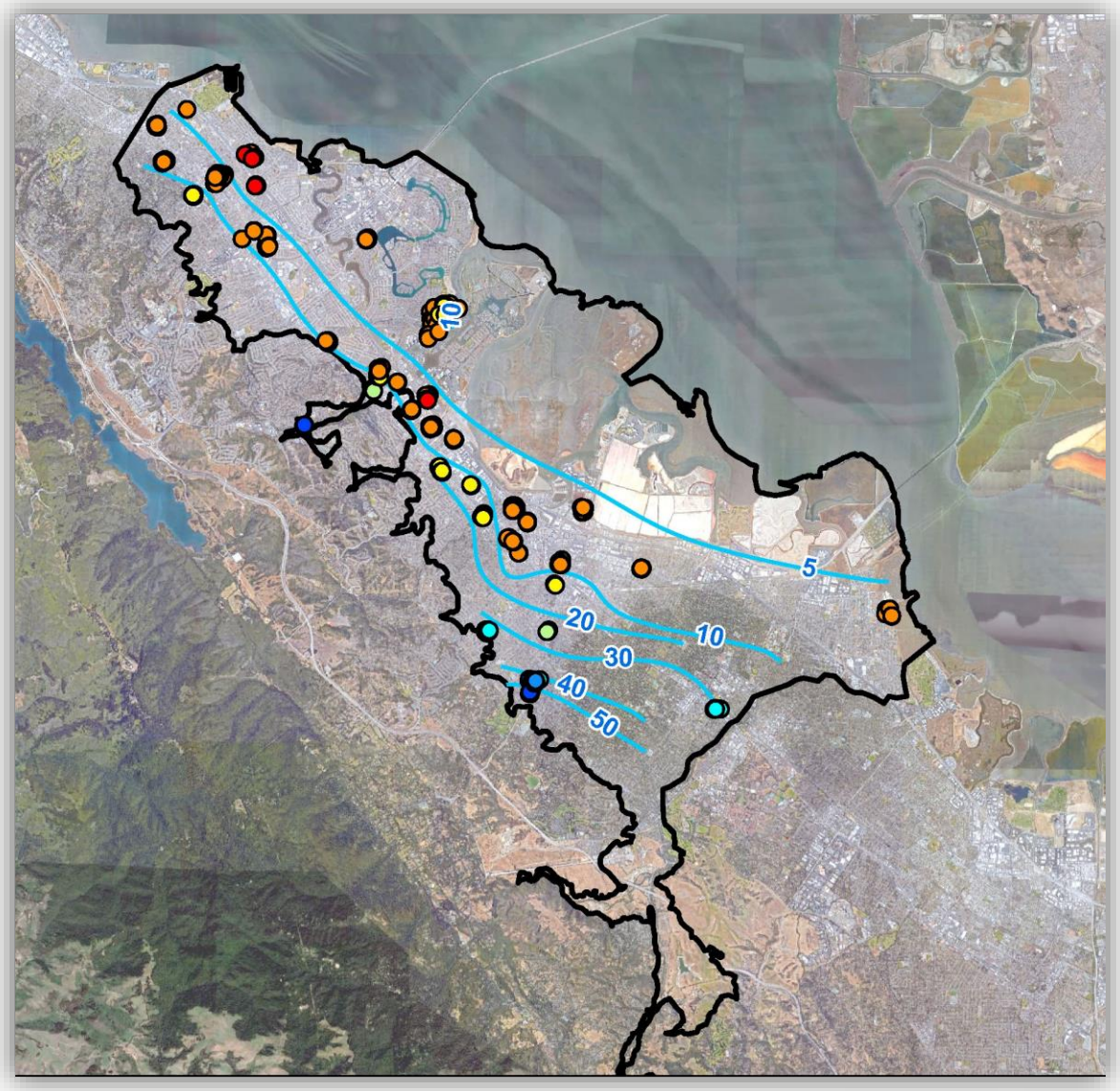
SHALLOW GROUNDWATER ELEVATIONS – FALL 2010



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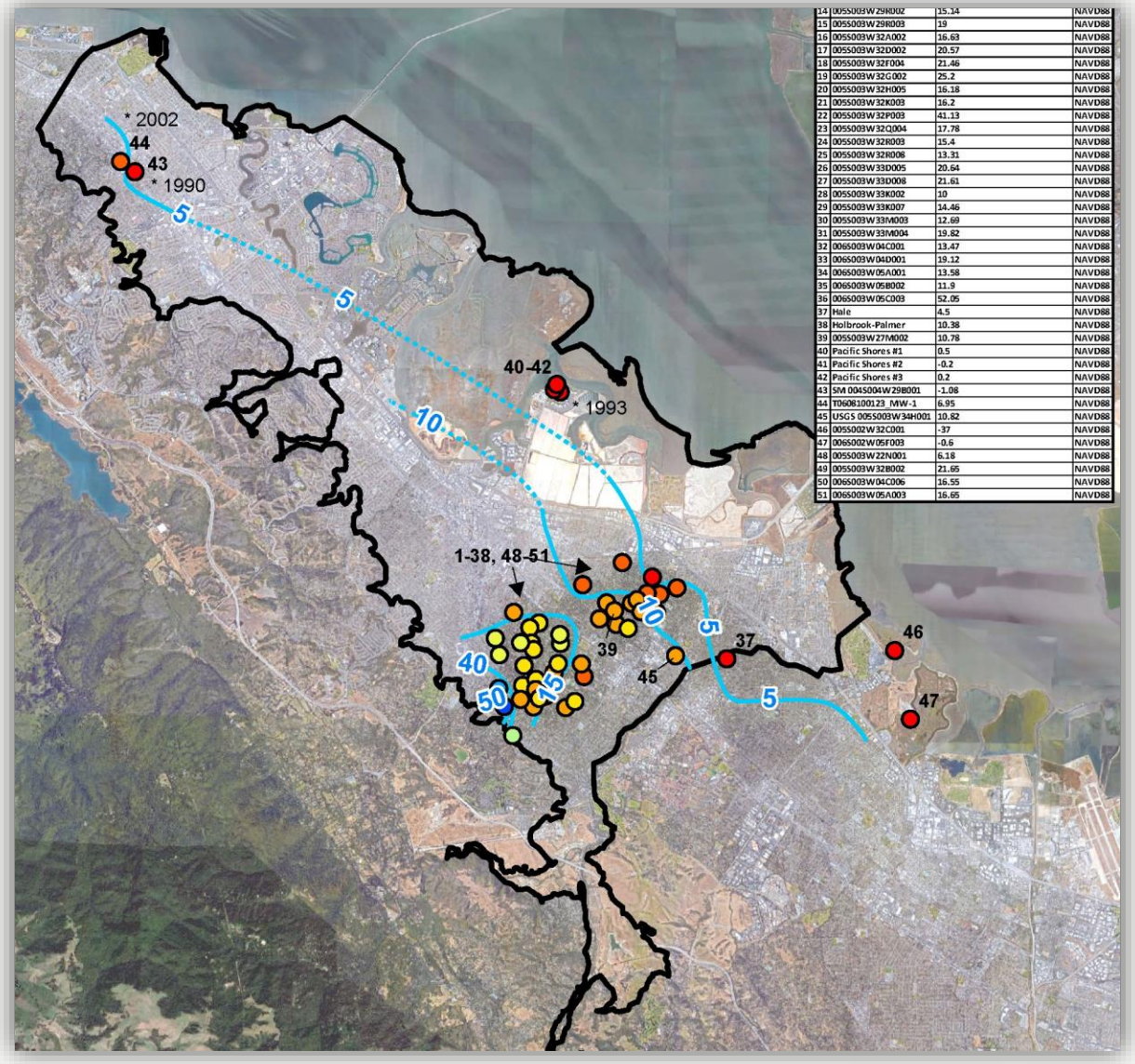
DEEP GROUNDWATER ELEVATIONS – FALL 1994



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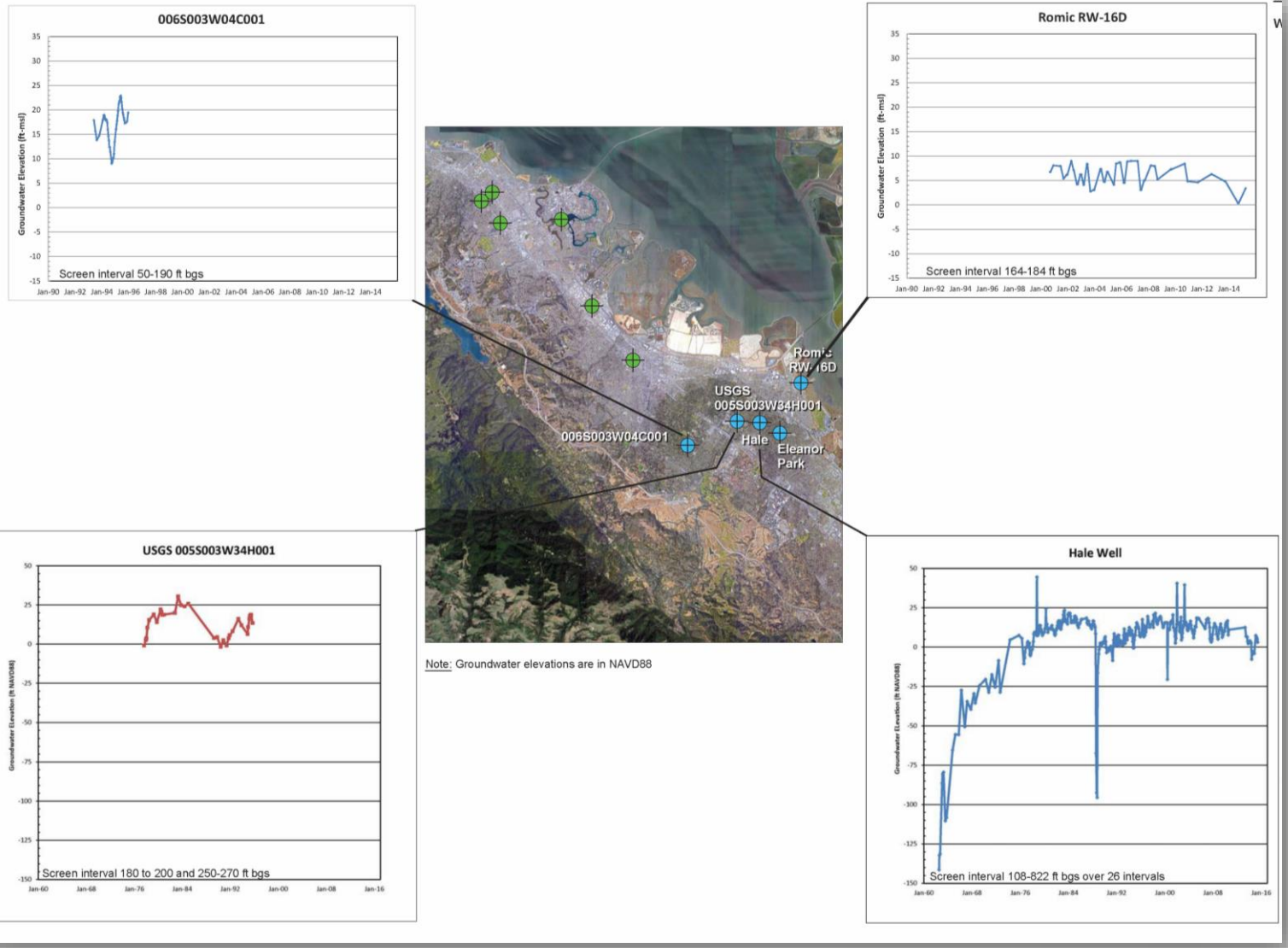
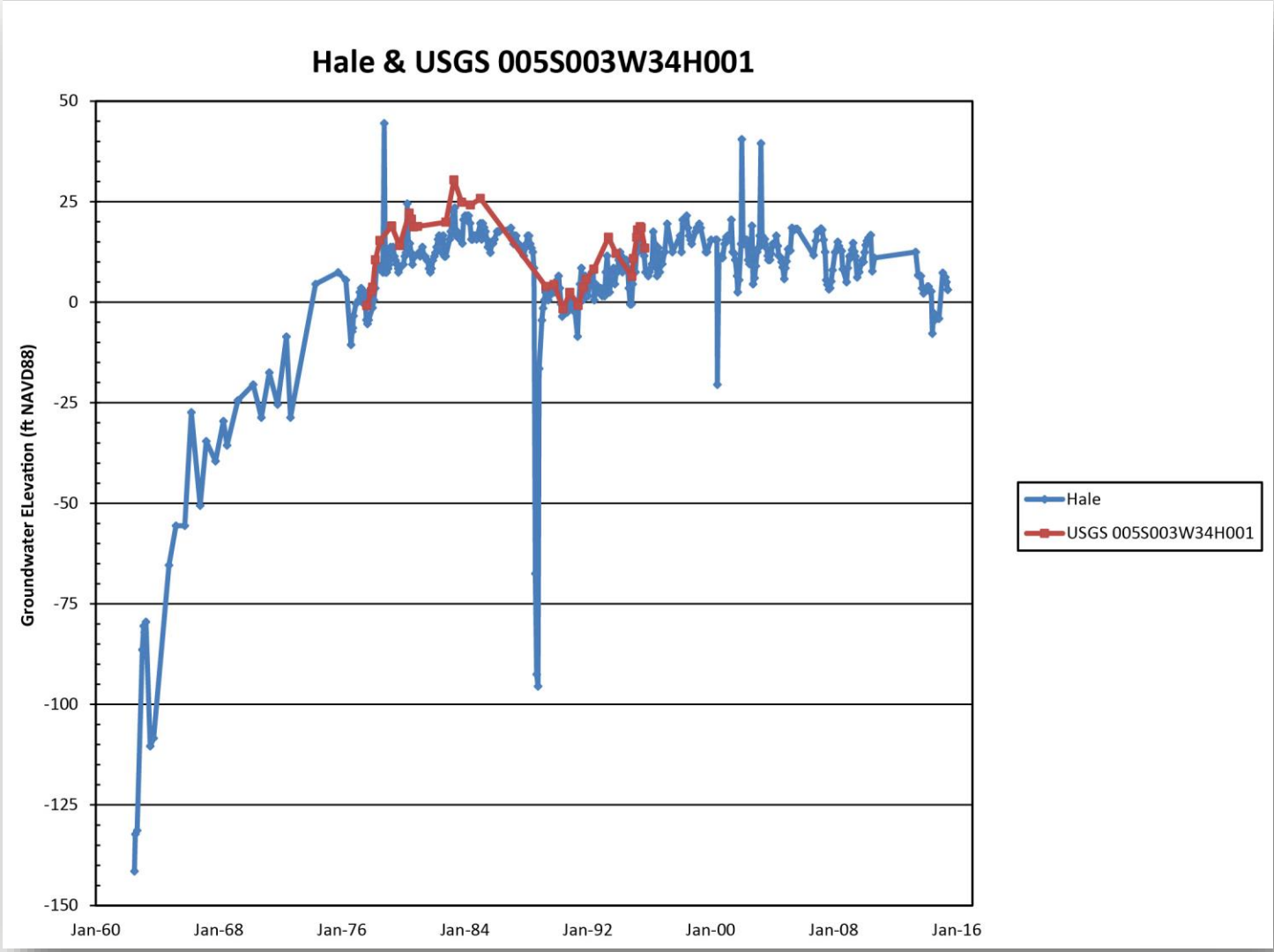
15	0055003W29R003	19	NAVD88
16	0055003W32A002	16.63	NAVD88
17	0055003W32D002	20.57	NAVD88
18	0055003W32F004	21.46	NAVD88
19	0055003W32G002	25.2	NAVD88
20	0055003W32H005	16.18	NAVD88
21	0055003W32K003	16.2	NAVD88
22	0055003W32P003	41.13	NAVD88
23	0055003W32Q004	17.78	NAVD88
24	0055003W32R003	15.4	NAVD88
25	0055003W32R006	13.31	NAVD88
26	0055003W33D005	20.64	NAVD88
27	0055003W33D008	21.61	NAVD88
28	0055003W33K002	10	NAVD88
29	0055003W33K007	14.46	NAVD88
30	0055003W33M003	12.69	NAVD88
31	0055003W33M004	19.82	NAVD88
32	0065003W04C001	13.47	NAVD88
33	0065003W04D001	19.12	NAVD88
34	0065003W05A001	13.58	NAVD88
35	0065003W05B002	11.9	NAVD88
36	0065003W05C003	52.05	NAVD88
37	Hale	4.5	NAVD88
38	Holbrook-Palmer	10.38	NAVD88
39	0055003W27M002	10.78	NAVD88
40	Pacific Shores #1	0.5	NAVD88
41	Pacific Shores #2	-0.2	NAVD88
42	Pacific Shores #3	0.2	NAVD88
43	SM 0045004W29B001	-1.08	NAVD88
44	T0608100123_MW-1	6.95	NAVD88
45	USGS 0055003W34H001	10.82	NAVD88
46	0055002W32C001	-37	NAVD88
47	0065002W05F003	-0.6	NAVD88
48	0055003W22N001	6.18	NAVD88
49	0055003W32B002	21.65	NAVD88
50	0065003W04C006	16.55	NAVD88
51	0065003W05A003	16.65	NAVD88

BASIN GROUNDWATER HYDROGRAPHS (DEEP)

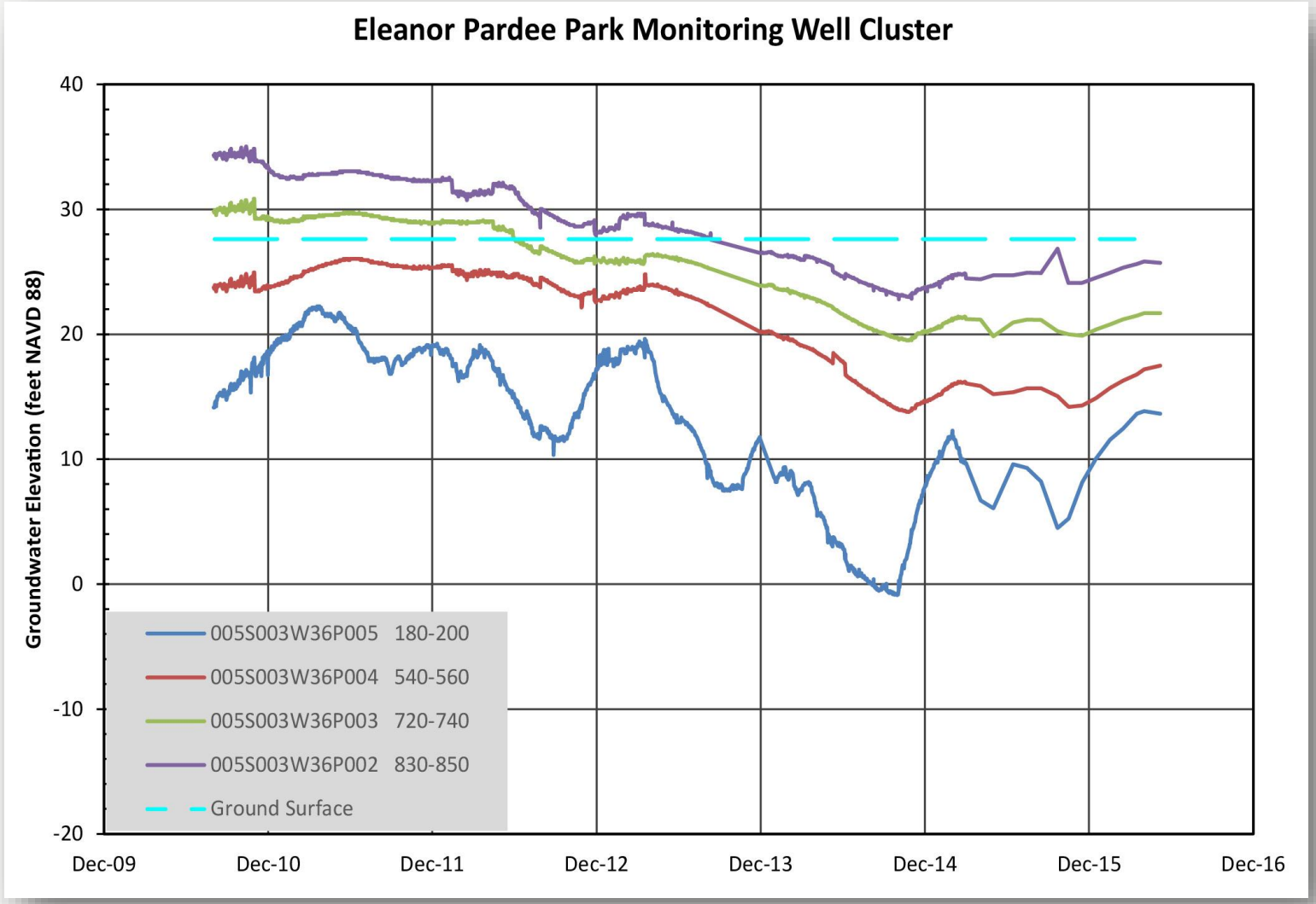


Note: Groundwater elevations are in NAVD88

GROUNDWATER HYDROGRAPHS, HALE AND 34H1



GROUNDWATER HYDROGRAPHS, ELEANOR PARK



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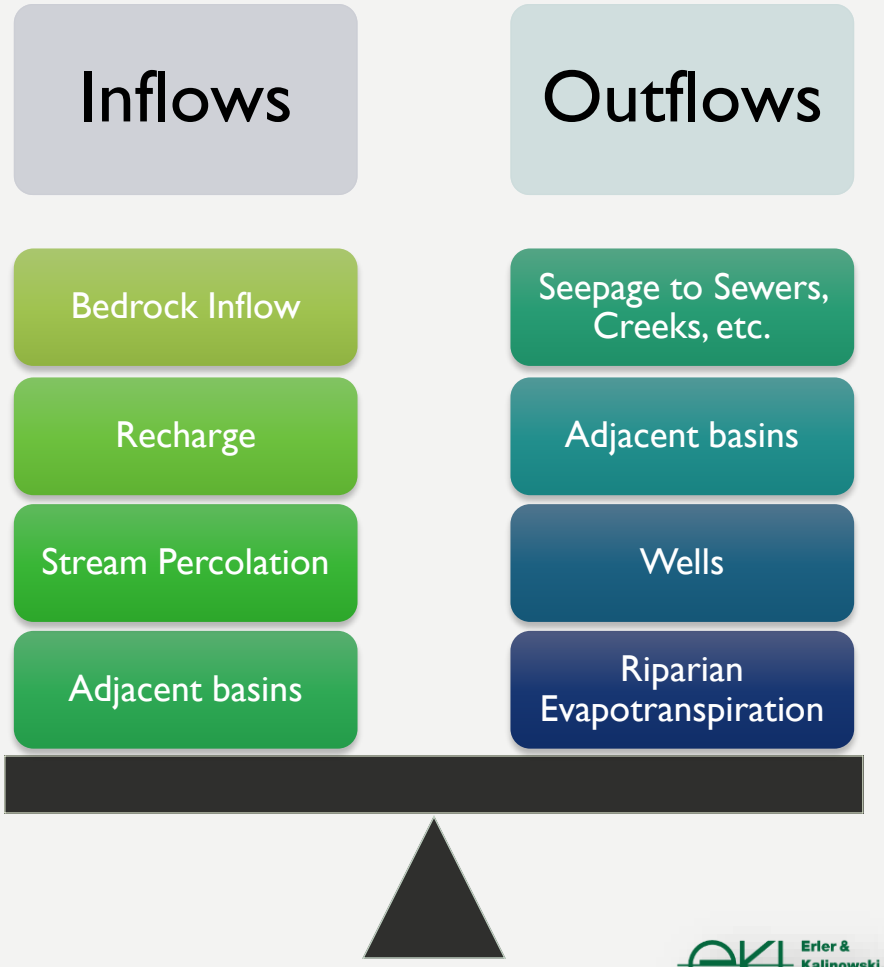
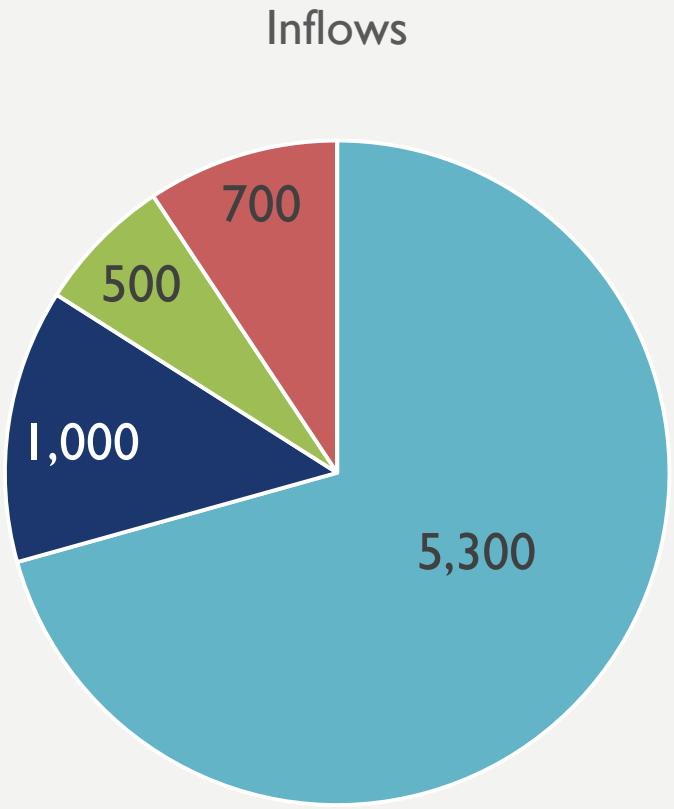
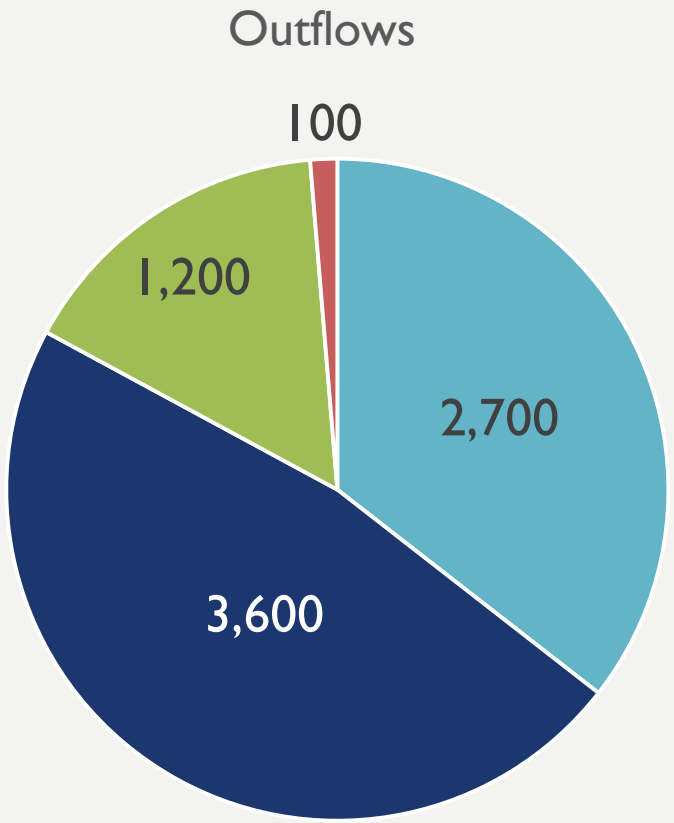
BASIN WATER BALANCE

- Accounting of all inflows and outflows to a groundwater basin



INFLOWS AND OUTFLOWS (AFY)





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WATER BALANCE COMPARISON

	Estimated Basin Water Balance			Model-Calculated Water Budget
	Average	Plausible Range		
Inflows (AFY)				
Dispersed Recharge	5,300	3,800	10,000	5,200[a]
Stream Percolation	500	500	1400	1,500
Bedrock Inflow	500	100	1000	500
Santa Clara Plain	700	100	1,100	1,100
Saltwater Intrusion	0	0	0	0
Total Inflow	**7,500**			**8,300**
Outflows (AFY)				
Wells	2,700	2,100	4,200	2,700
Groundwater Seepage	3600	2100	5300	4400
San Francisco Bay	1,200	700	2,100	1,200
Westside Basin	100	-100	100	
Total Outflows	**7,500**			**8,300**

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Section 8

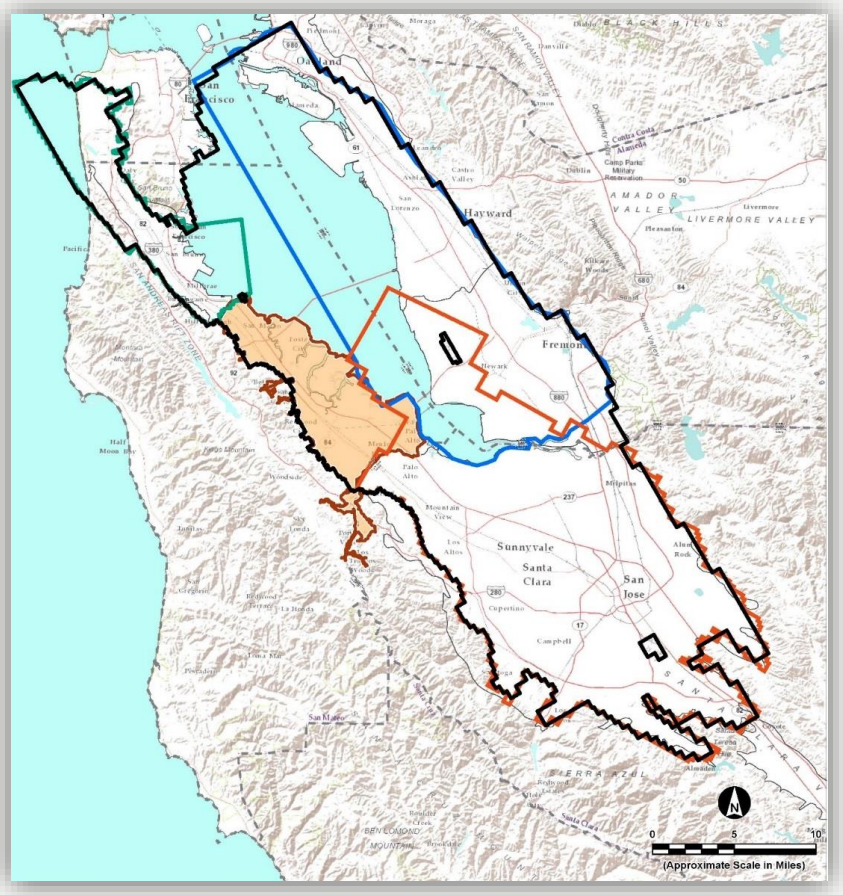
- San Mateo Plain Groundwater Flow Model

Section 9

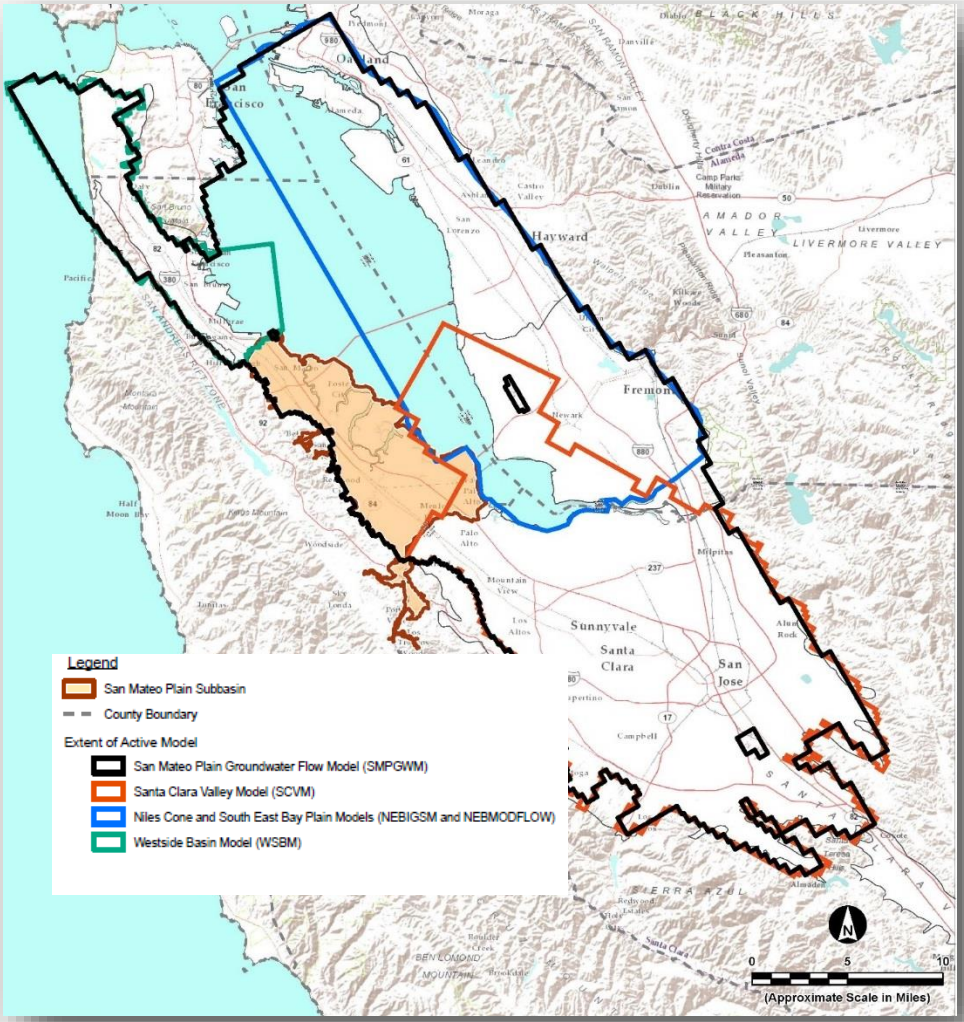
- Evaluation of Risk of Potentially Undesirable Results

NUMERICAL MODEL DEVELOPED FOR BASIN

- Model represents a significant contribution
- Quantitatively understand how the Basin functions as part of regional system
- Future evaluation of implications of management (e.g., groundwater recharge) and hydrologic scenarios (e.g., climate change)



UTILIZED EXISTING MODELS AND PROJECT DATABASE



- BAWSCA "SGM" (1987-1996)
- Westside Basin Model (1959-2009)
- Niles Cone and South East Bay Plain Integrated Groundwater Surface Water Model (1965-2000)
  - MODFLOW (EBMUD)
  - IGSM (ACWD)
- USGS Santa Clara Valley Model (1970-1999)
- Project Database and Conceptual Model

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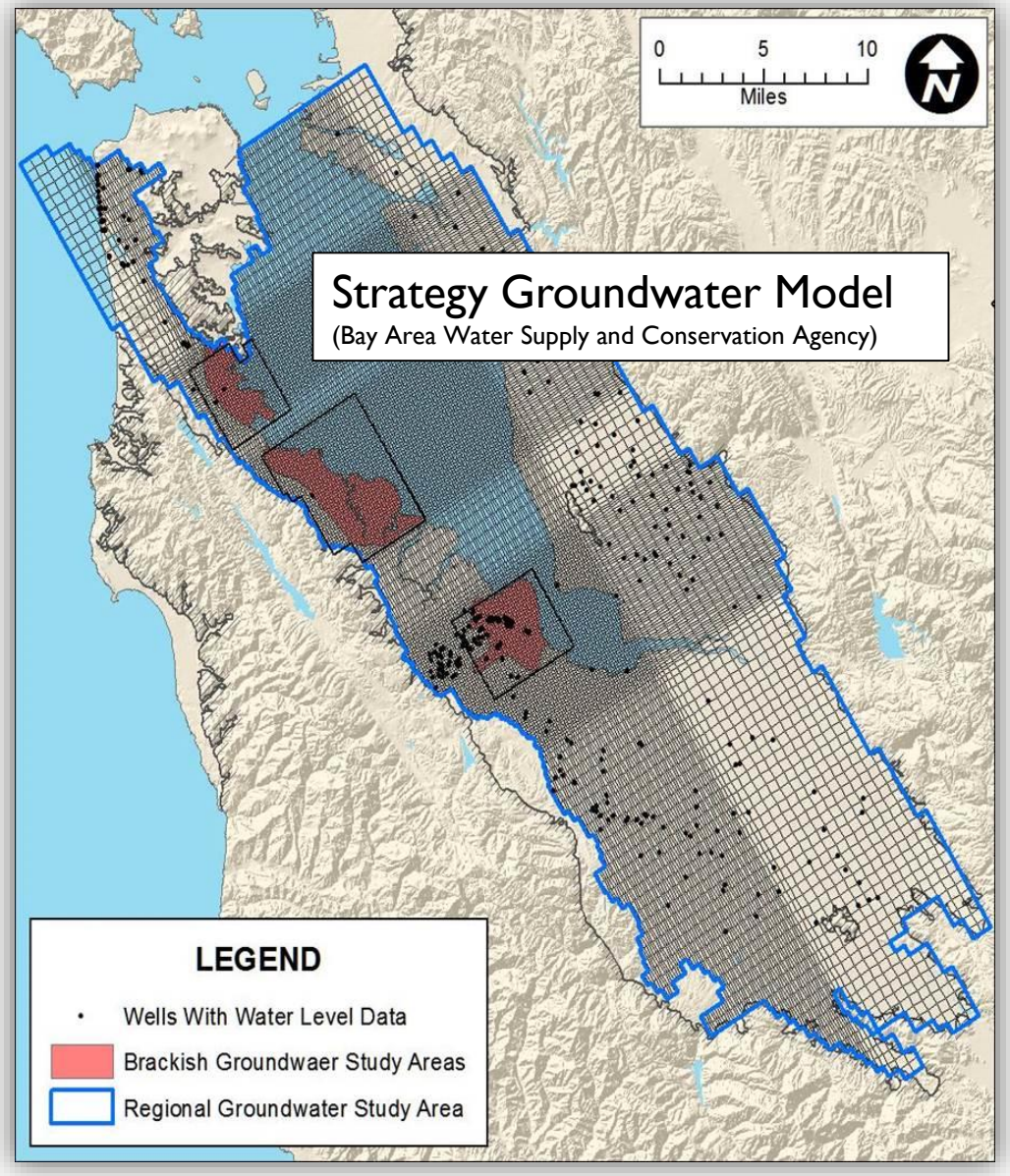
MODEL EXTENT AND GRID



- Started with existing "SGM"
- Refined Model Grid
  - Area (cell dimensions)
  - Depth intervals (layers)
- Updated recharge and pumping
- Calibrated using measured water levels
- Assessed Basin Water Budget
- Timeframe: 1987-1996

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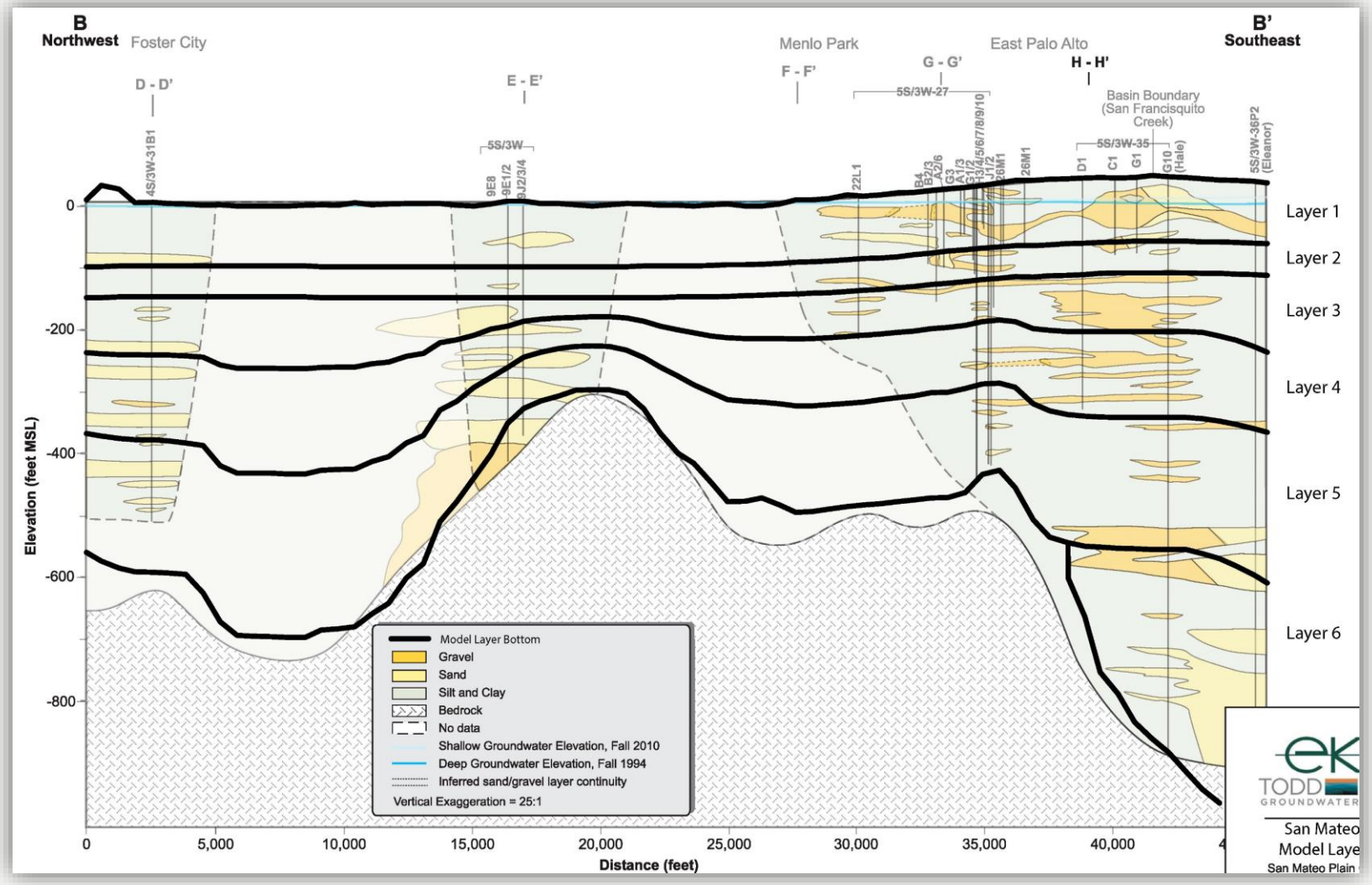
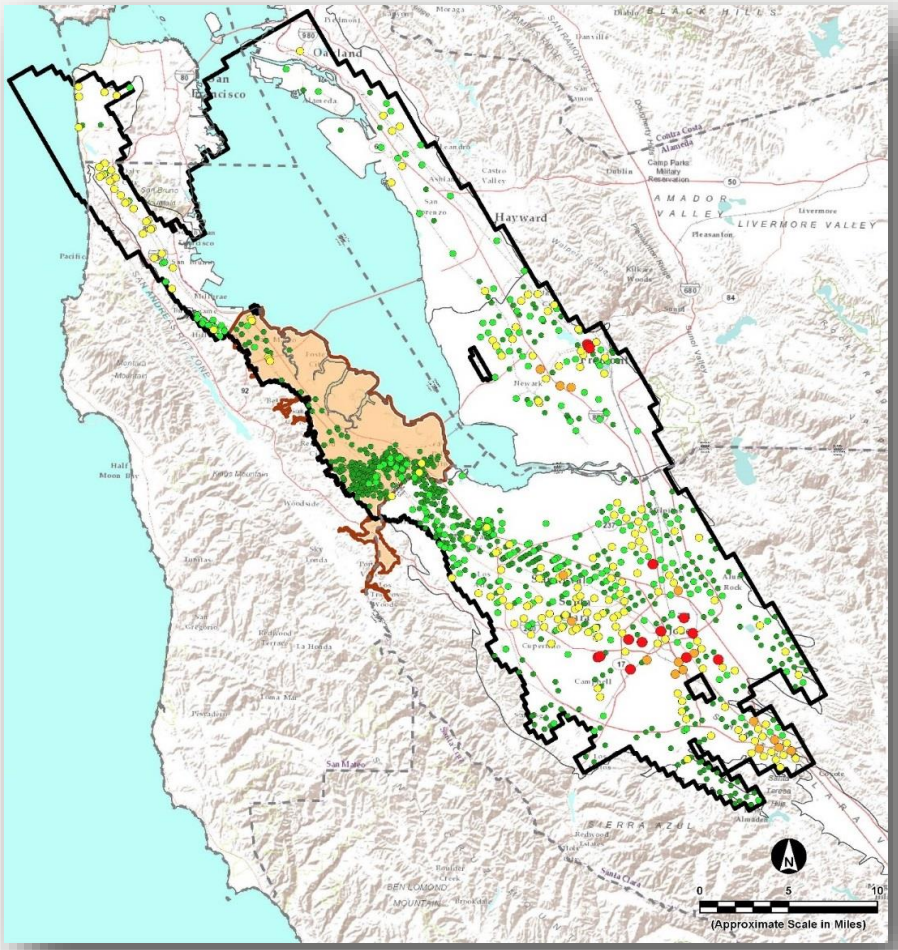
DEPTH DISTRIBUTION OF ACTIVE MODEL GRID – 6 LAYERS

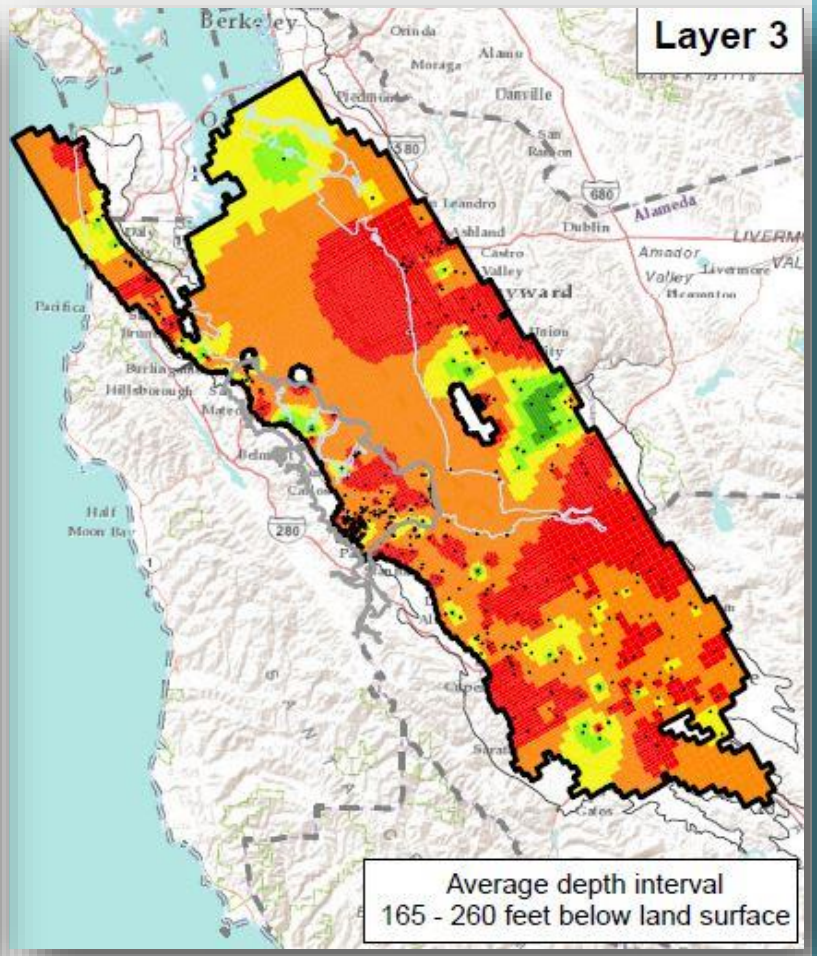


SPATIAL DISTRIBUTION OF KEY PARAMETERS

Well locations and pumping rates



Coarse-Grained Sediment Fraction



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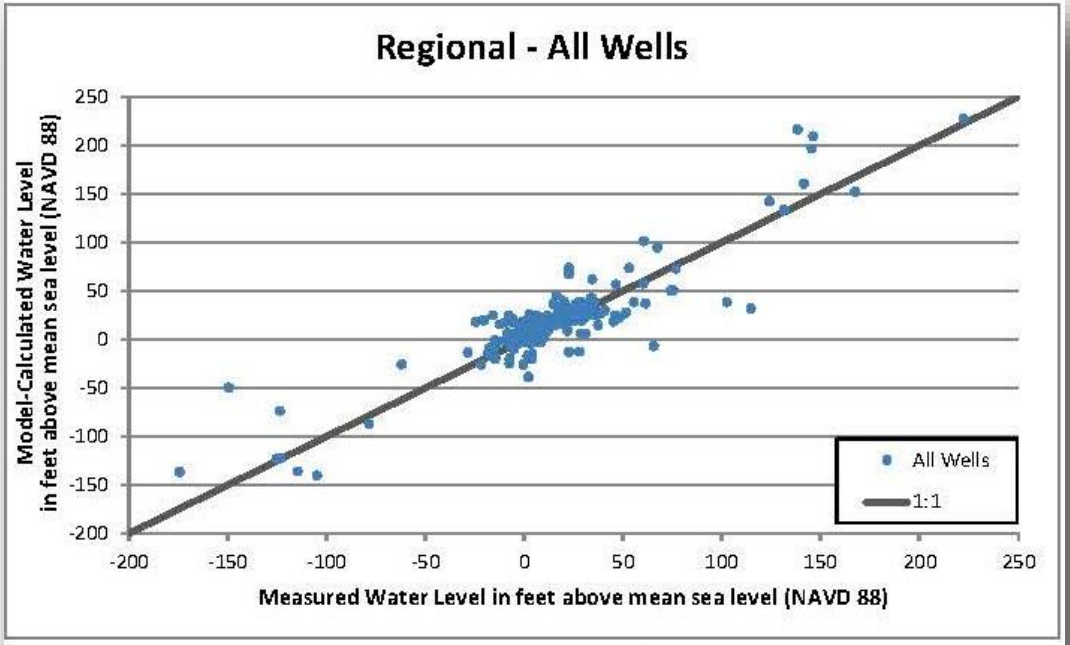
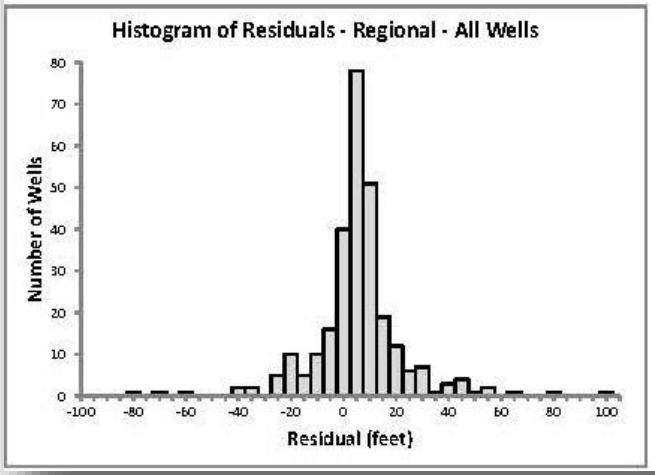
MODELED VS. MEASURED WATER LEVELS (ALL WELLS)

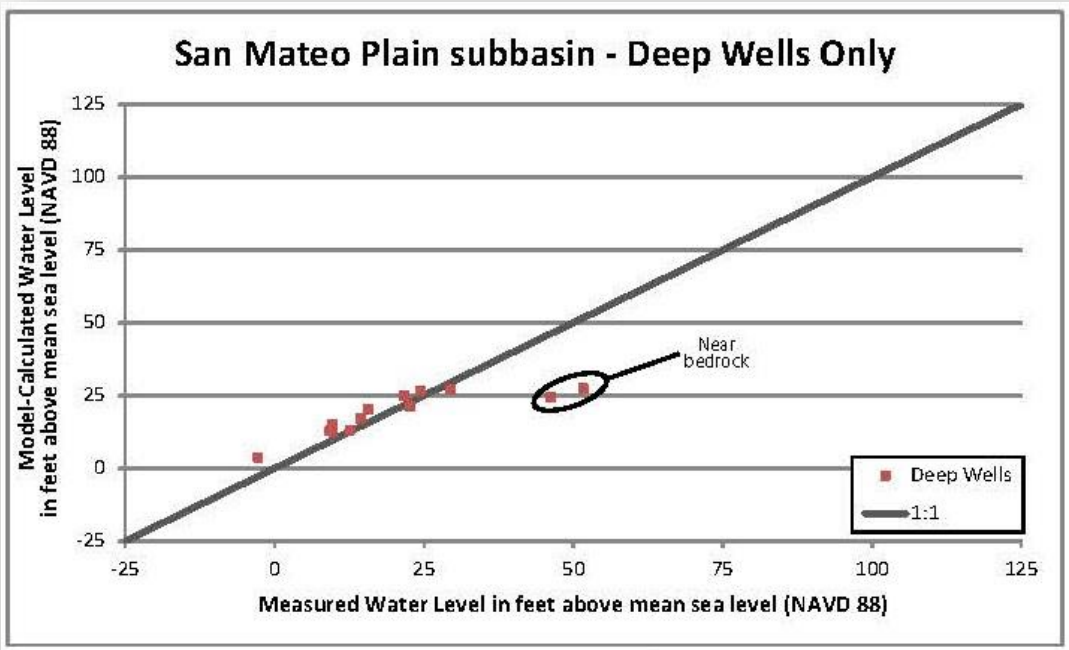


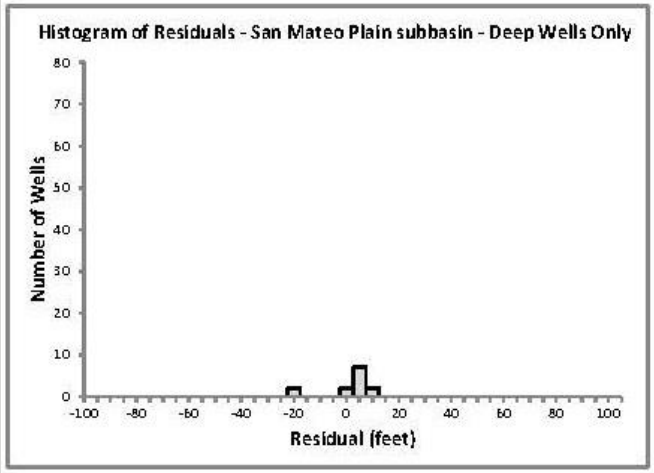


Error Statistics (in feet)

RMSE:	18.2
Min error:	-83.1
Max error:	99.4
Mean error:	3.3
Median error:	3.0

MODELED VS. MEASURED WATER LEVELS (SMP - DEEP)





Error Statistics (in feet)

RMSE:	3.6
Min error:	-2.4
Max error:	6.5
Mean error:	2.5
Median error:	2.9

Statistics exclude outliers near bedrock

NUMERICAL MODEL DEVELOPMENT

Phase 1

- Steady-state model

Phase 2

- Convert to transient model

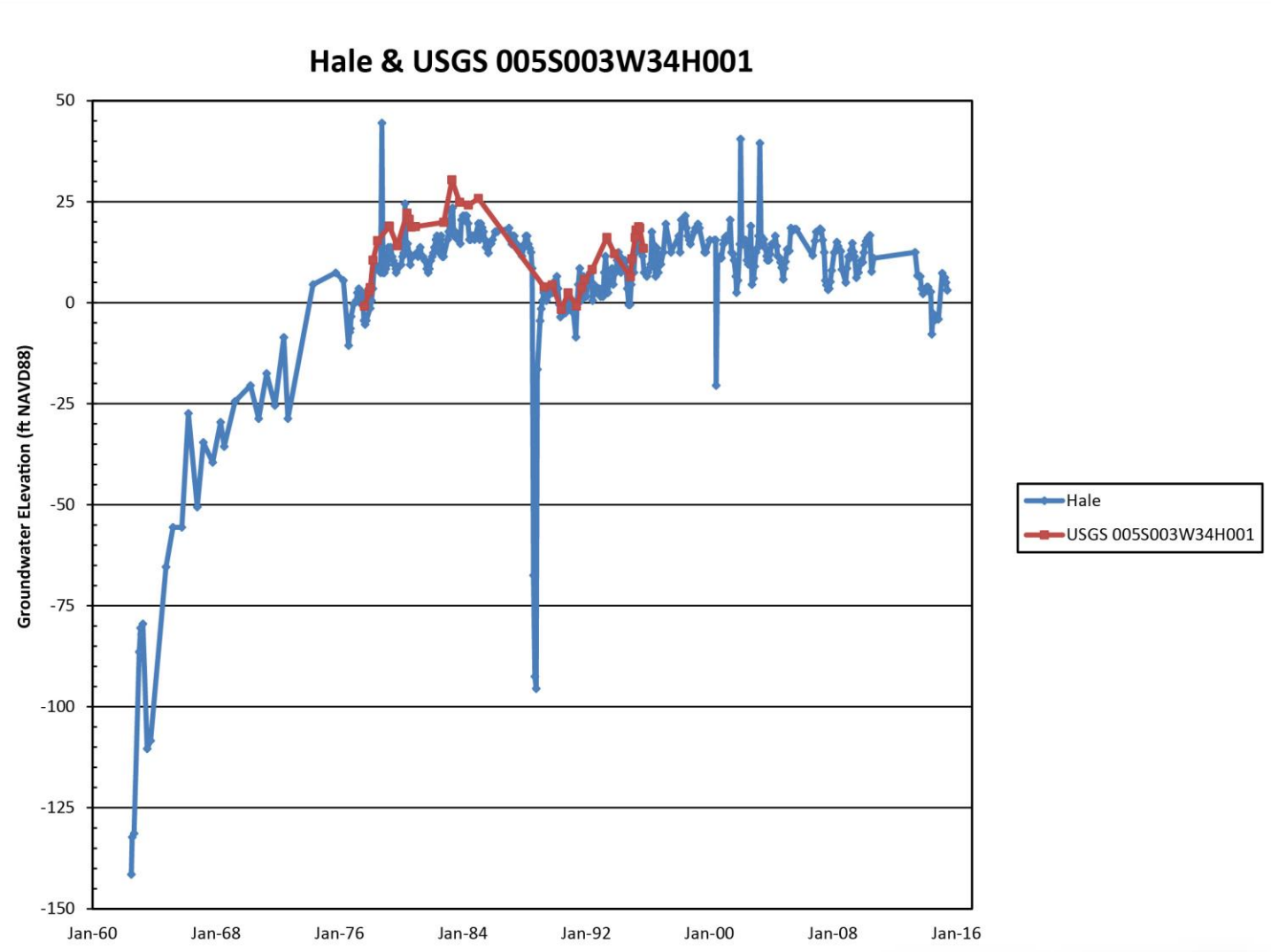
Phase 3

- Run scenarios to evaluate potential future basin conditions (e.g., climate change)

EVIDENCE OF HISTORICAL UNDESIRABLE RESULTS

- Groundwater pumping from San Francisquito Cone & adjacent basins in first half of 20th century caused:
  - Lowering of water table
    - Average decline of 10 ft/yr between 1923 and 1926
    - Water level in the Hale Well in Palo Alto was about 150 ft lower in 1960s than in recent years
  - Up to 2 feet of subsidence measured in East Palo Alto (Poland and Ireland, 1988)
  - Saltwater intrusion
    - Chloride concentrations peaked in two Palo Alto wells in 1962 (Hale well) and 1972 (Rinconada well)
    - “Ravenswood Wells” in East Palo Alto

BASIN CONDITIONS HAVE IMPROVED AND STABILIZED

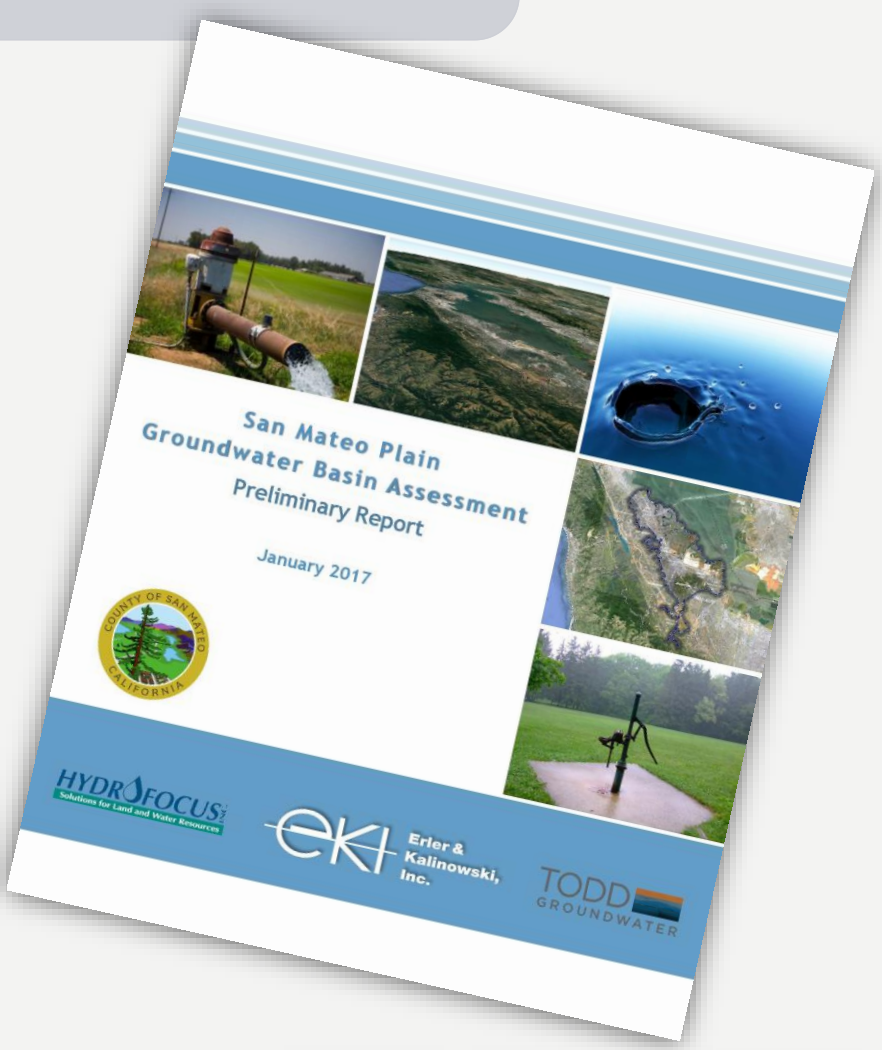


EVALUATION OF POTENTIAL "UNDESIRABLE RESULTS"

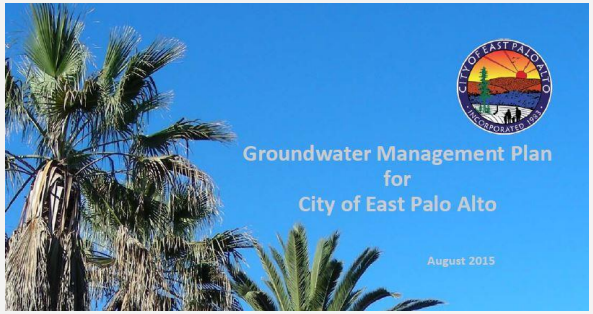
- Changes to the Basin Water Balance from Increased Pumping and/or Decreased Recharge
  - Declining groundwater levels
  - Decreased water in storage in basin
  - Land subsidence
  - Salt water intrusion
  - Impacts to interconnected surface water
- Other potential "Undesirable Results/Effects" to Basin Water Quality
  - Salt and nutrient loading
  - Point-source contamination sites
  - Cross-contamination between Shallow and Deep Aquifers
  - Sea level rise

Section 10

- Initial Evaluation of Basin Management Options

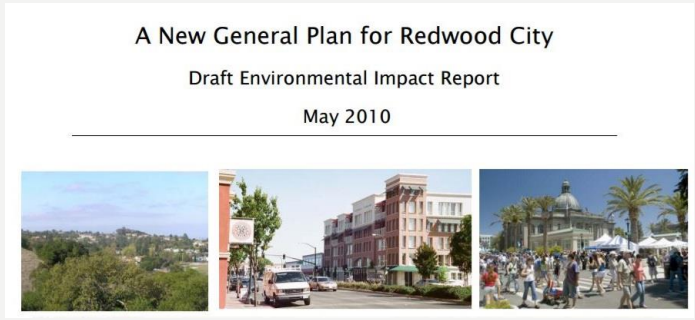


CURRENT BASIN "MANAGEMENT"



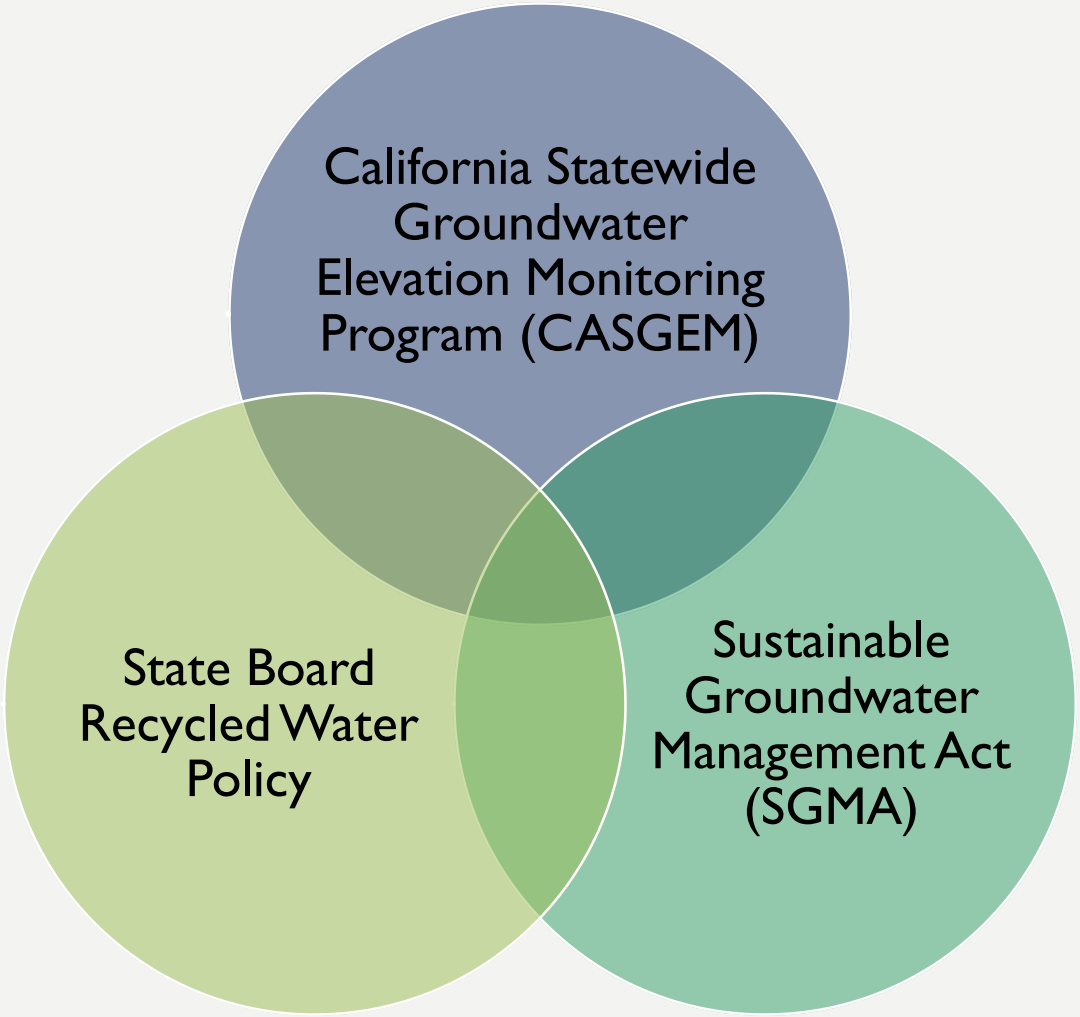
- Local GWMPs

- County oversight of well permitting and groundwater remediation



- "As-needed" environmental review

EXISTING STATEWIDE FRAMEWORKS



SGMA – KEY REQUIREMENTS

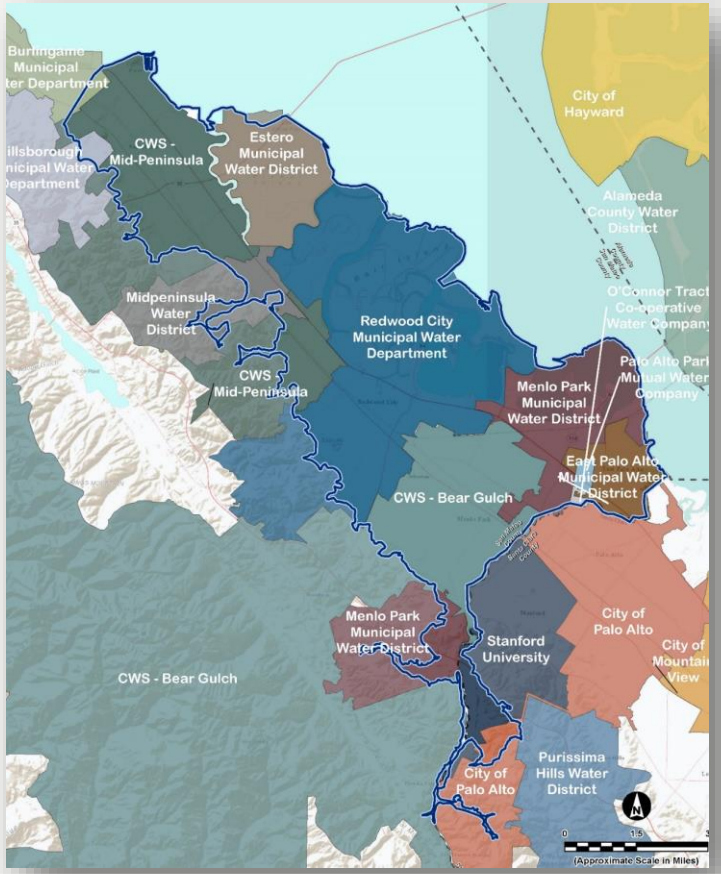
- Requires Formation of Groundwater Sustainability Agencies (GSAs);
- Development of Groundwater Sustainability Plans (GSPs)
- Sustainable management of entire basins and avoidance of “Undesirable Results”

RELEVANCE OF SGMA TO BASIN

- Basin is not currently required to comply with SGMA
  - Designated as ‘Very Low’ priority by DWR in 2014
  - Based upon groundwater usage that was less than DWR’s 2,000 AFY threshold
  - If Basin had exceeded threshold, it would have been a ‘Medium’ priority basin
- Basin may have to comply with SGMA in the future
  - Basin could be re-prioritized in 2017/2018* or in the future
  - Analysis will include updated groundwater use data

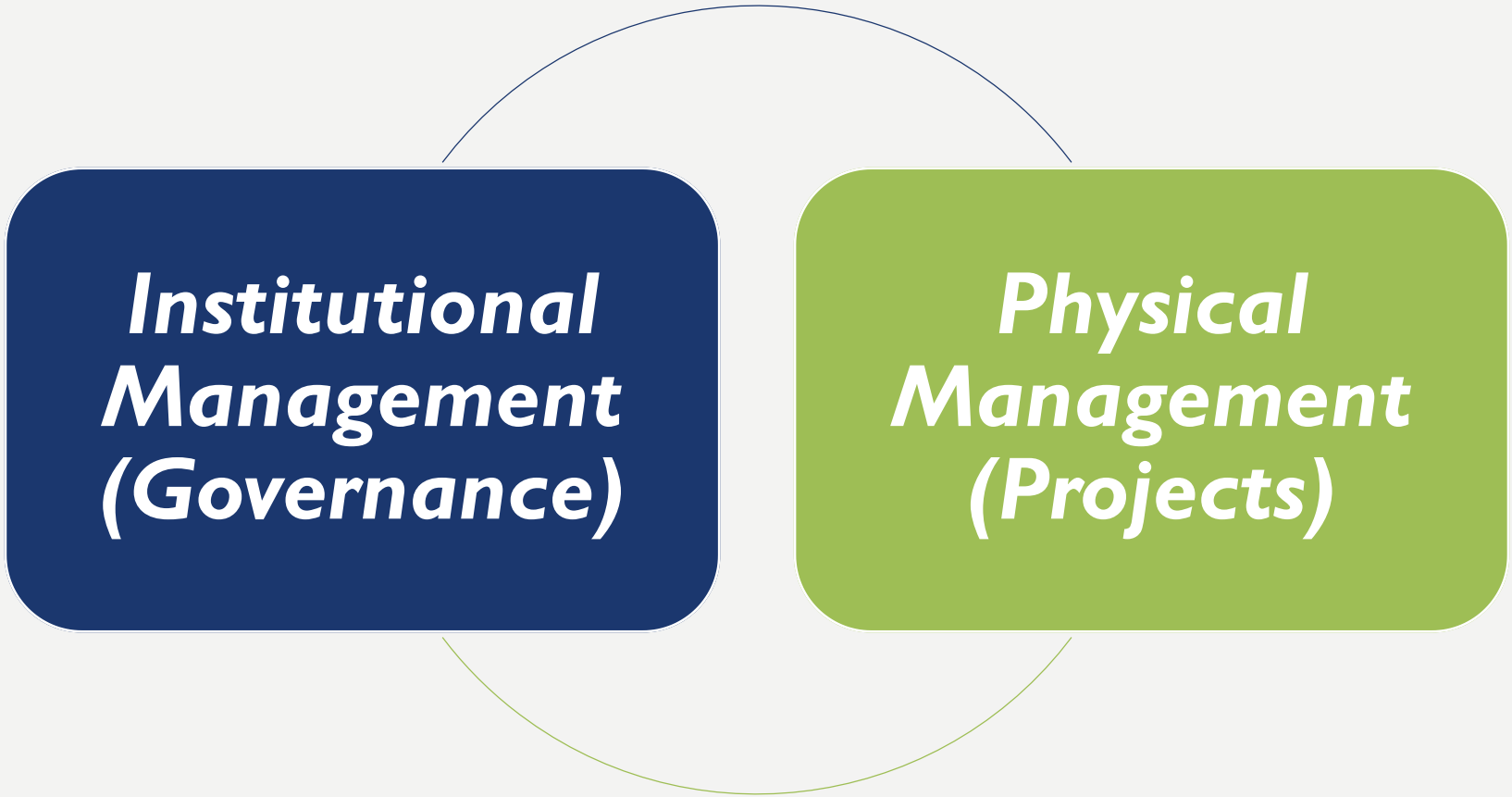
THERE ARE 43 GSA-ELIGIBLE ENTITIES IN THE BASIN

- Cities and towns (13)
- Water districts, agencies, and suppliers (9)
- Mutual water companies and utilities regulated by CPUC (4)
- Counties (2)
- Wastewater agencies (12)
- Other entities (3)



**** Some entities overlie only a small portion of the Basin***

COMPONENTS OF GROUNDWATER MANAGEMENT



GROUNDWATER MANAGEMENT

Institutional Management (Governance)	*Physical Management (Projects)*
"Unmanaged"	*Water sources*
Voluntary Management	*Delivery methods*
SGMA	*Recharge projects*
Special Act District	*Pumping regulation*
Adjudication	*Groundwater quality projects*

SEVERAL WATER "SOURCES" CAN BE USED TO AUGMENT RECHARGE

Hetch-Hetchy Water

- SFPUC is sole wholesale supplier in Basin
- High quality source
- Limited by cost and availability

Recycled Water

- Anticipated supply from three WWTPs
- Limited by demands, infrastructure costs, regulatory constraints

Stormwater

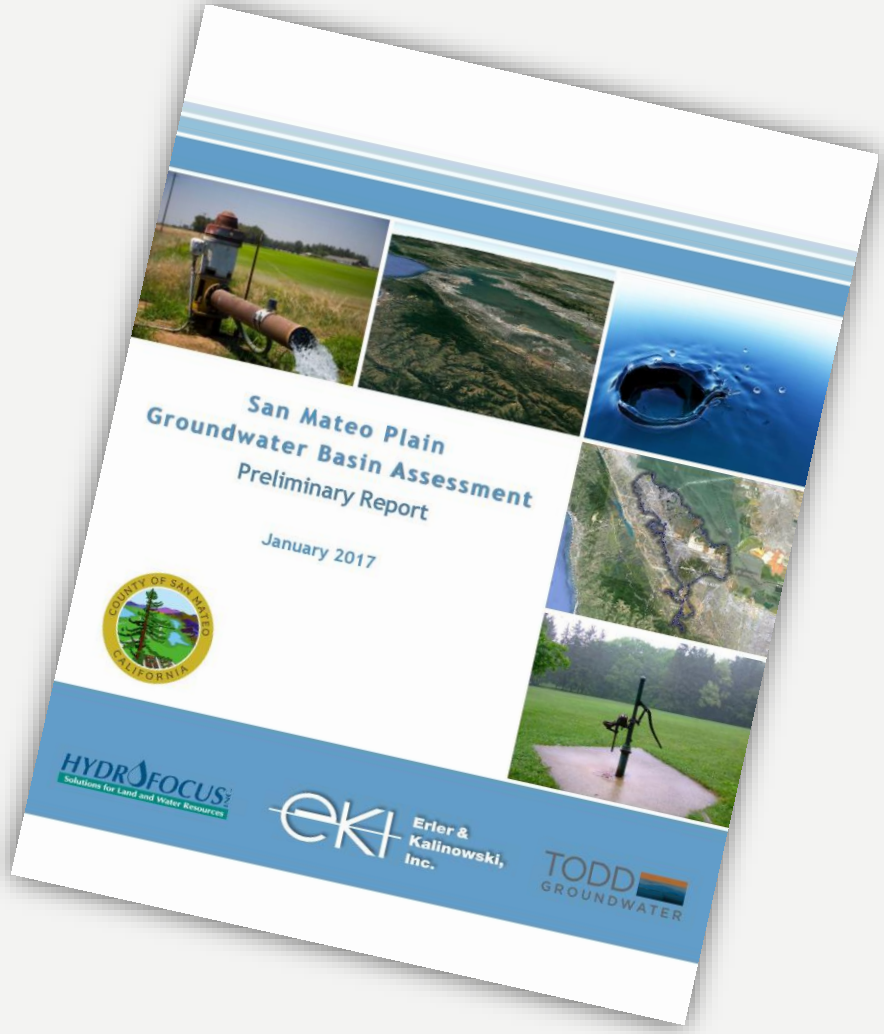
- Large portion of stormwater is conveyed directly to Bay
- C/CAG SMCWPPP

Water Conservation

- Reducing potable water demands decreases groundwater demand

Section 11

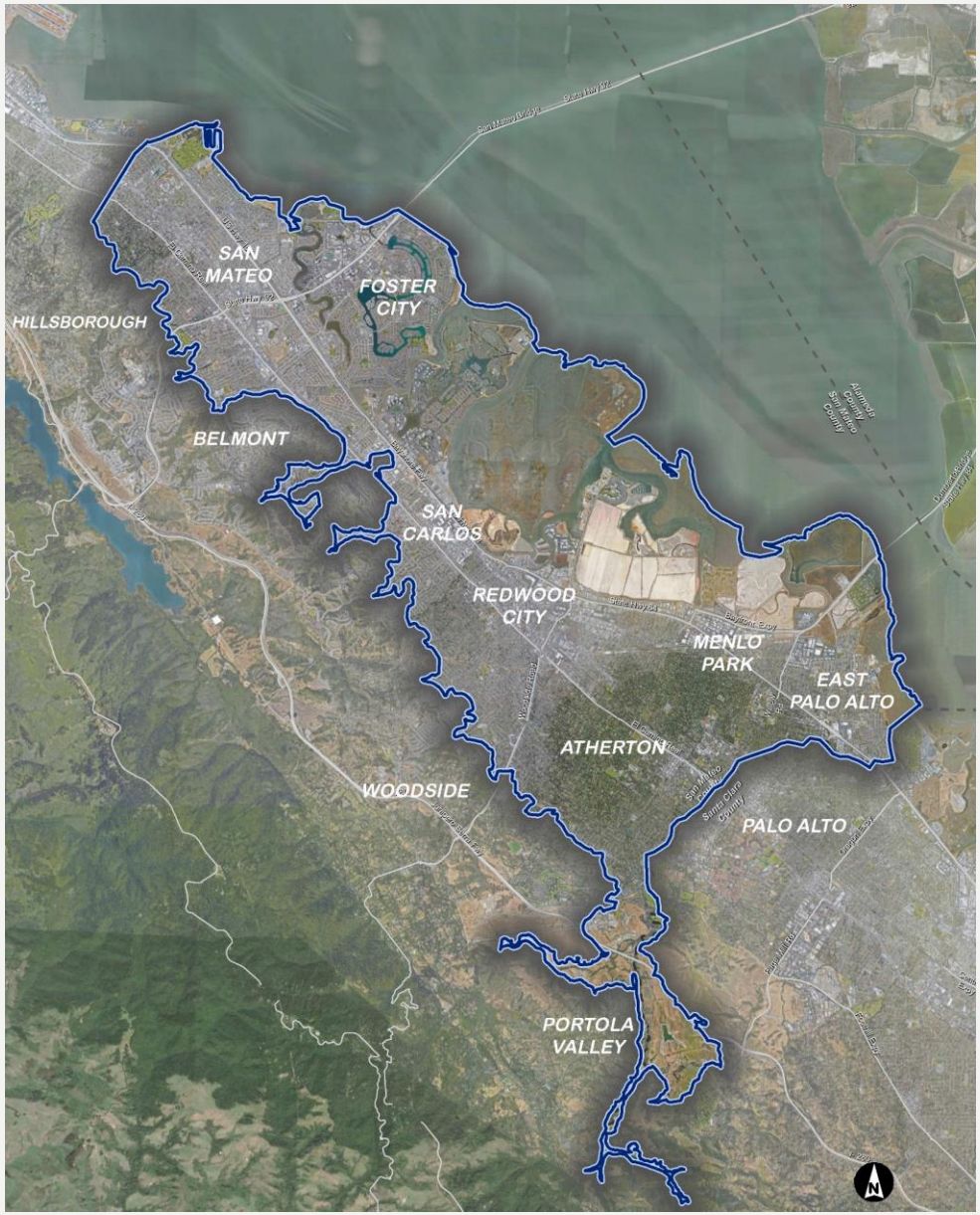
- Data Gaps and Potential Next Steps



DATA GAPS AND NEXT STEPS

- Overall scarcity of long-term groundwater level, quality, and pumping information

- Project Phase 2



PHASE 2 DISCUSSION

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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

Feb 2017– Dec 2017

Phase 3

- Public Outreach
- Conduct Scenario Evaluations
- Prepare Final Report

Sep 2017 – Apr 2018

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

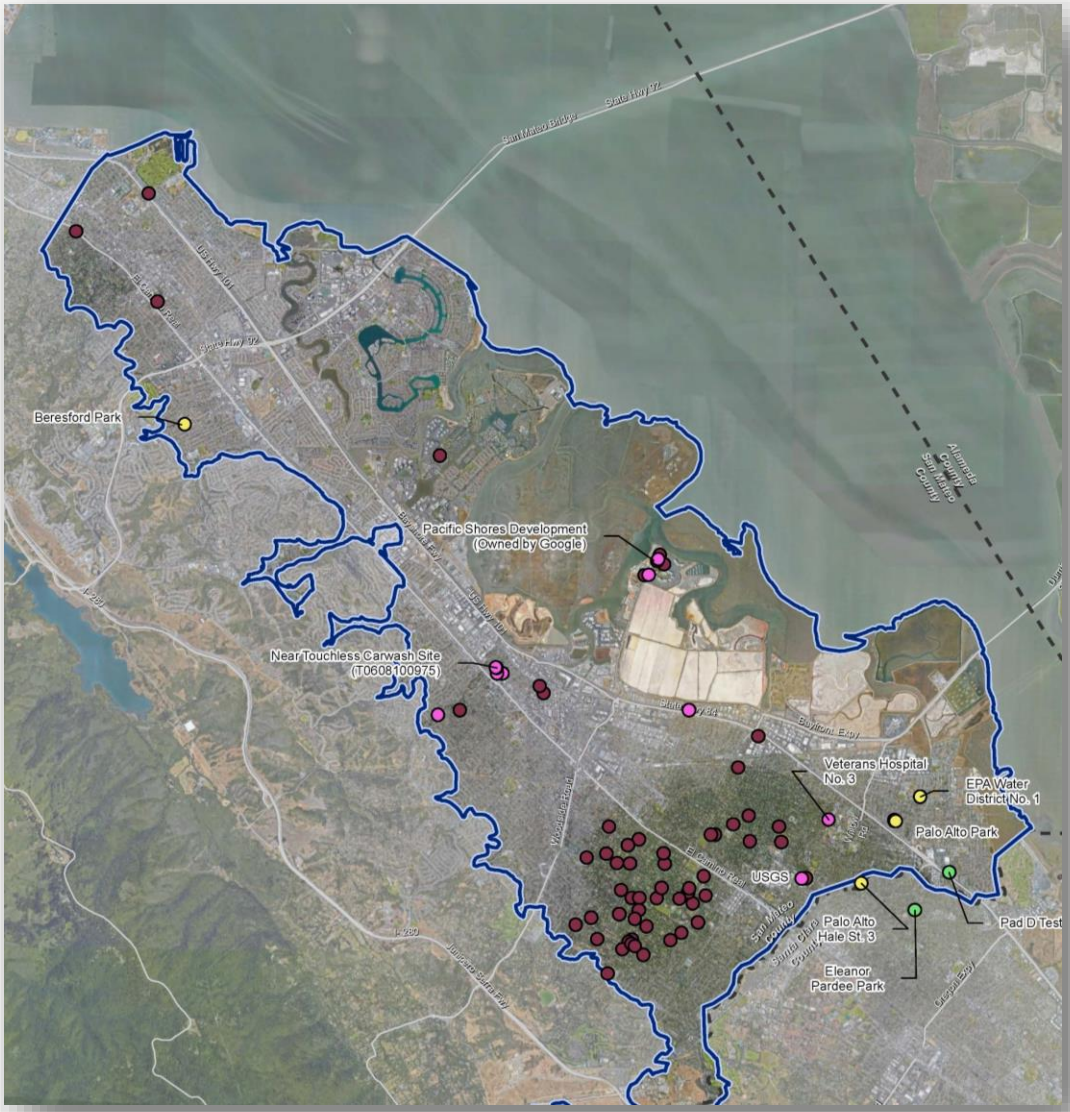
PHASE 2 – PART A: KNOWN DATA

- Data received since July 2016
- Pre-Geotracker (<2002) data
- Domestic well surveys, tidal studies, pump tests, and groundwater extraction from remediation sites
- East Palo Alto and Menlo Park well tests
- City of San Mateo sewer line-groundwater study
- Repeat and possibly expand streamflow measurements

PHASE 2 – PART B: PARTNERSHIPS NEEDED

- Current groundwater monitoring
- Additional aquifer pump tests
- Information on location and volume of discharges to sewer and storm water lines
- Additional streams and streamflow measurements
- Potential studies within and adjacent to basin

POTENTIAL CANDIDATE WELLS



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DATABASE AND MODEL UPDATES

- Open San Mateo County Portal
- Protocols and procedures for database update and maintenance
- New data validated and incorporated into various assessments and models
- Convert numeric steady state model to a transient model

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Sep 2017 – Apr 2018

QUESTIONS?

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