

Groundwater Reliability Partnership for the San Mateo Plain Sub-basin



March 22, 2017

BAWSCA

“A multicounty agency authorized to plan for and acquire supplemental water supplies, encourage water conservation and use of recycled water on a regional basis.”

[Bay Area Water Supply and Conservation Agency Act, AB2058(Papan-2002)]

Welcome!

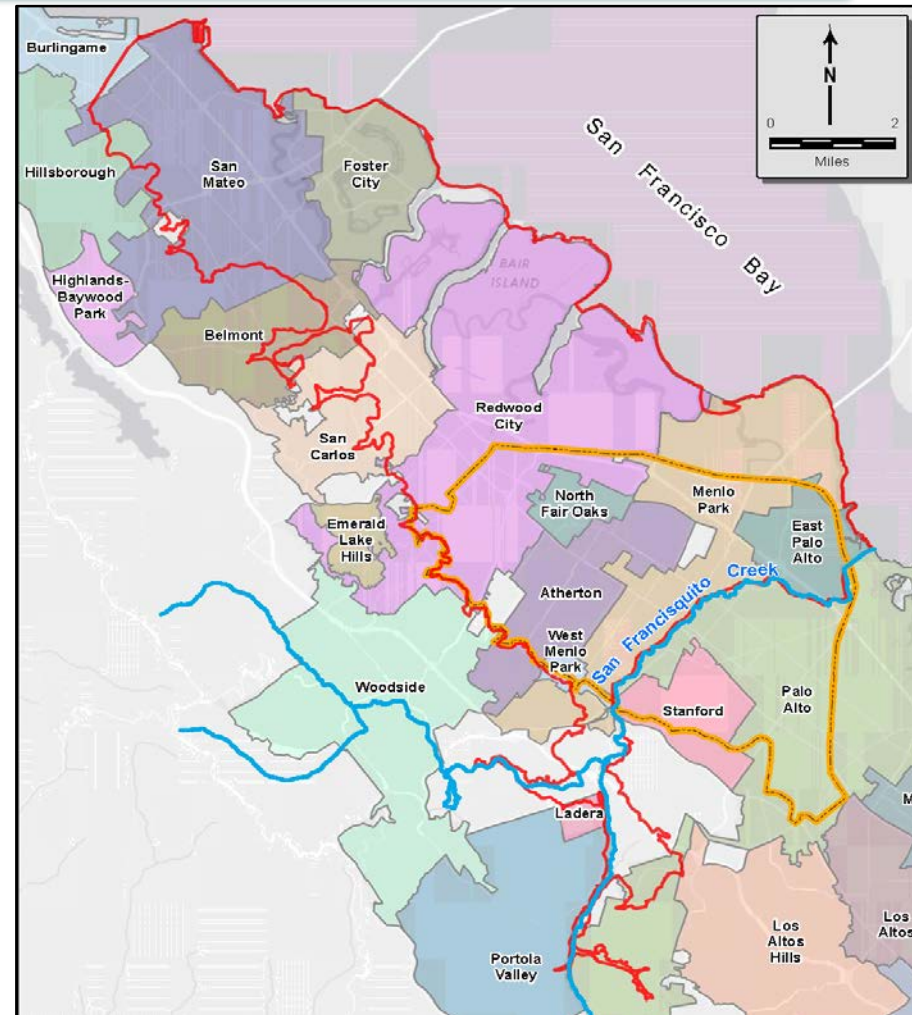
- This is a meeting of the Groundwater Reliability Partnership for the San Mateo Plain Sub-basin
- Agenda for today's meeting:
 - Welcome and introductions
 - Summary of previous meetings
 - Use and management of basins adjacent to the San Mateo Plain Sub-basin
 - The East Bay Plain Sub-basin
 - San Mateo County's Stormwater Resource Plan
 - Activities in the San Mateo Plain Sub-basin
 - Next Steps

Agenda

- **Welcome and introductions – Tom Francis, Water Resources Manager, BAWSCA**
- **Summary of previous meetings – Adrienne Carr, Senior Water Resources Specialist, BAWSCA**
 - **October 19, 2015**
 - **January 11, 2016**
 - **April 19, 2016**
- **Use and management of basins adjacent to the San Mateo Plain Sub-basin**
 - **The East Bay Plain Sub-basin**
- **San Mateo County's Stormwater Resource Plan**
- **Activities in the San Mateo Plain Sub-basin**
- **Next Steps**

What are the Goals of the Groundwater Reliability Partnership?

- Increased understanding of the hydrology and geology of the Basin
- Serving as a forum for sharing information among all stakeholders
- Continued sustainable use of the Basin to maintain groundwater quality and quantity and protect beneficial uses



Where is the San Mateo Plain Sub-basin?

- Many cities and communities overlie the basin
- Many water agencies overlie the basin
- The USGS defines a different basin: the San Francisquito Cone



What Basins are Adjacent to the San Mateo Plain Sub-basin?

- San Mateo Plain Sub-basin is a part of the Santa Clara Valley Basin
 - Santa Clara
 - Niles Cone
 - East Bay Plain
- Degree of connectivity between all sub-basins not well understood
- Westside basin to north, connectivity not known



Meetings Have Provided a Forum for Information Sharing and Learning

- October 19th, 2015 meeting
 - Presentations included BAWSCA, San Mateo County, City of East Palo Alto, update on Sustainable Groundwater Management Act
 - Good discussion on potential goals:
 - Increased understanding of the hydrology and geology of the Basin
 - Serving as a forum for sharing information among all stakeholders
 - Continued sustainable use of the Basin to maintain groundwater quality and quantity and protect beneficial uses

Meetings Have Provided a Forum for Information Sharing and Learning

January 11th, 2016 meeting

- Presentations included:
Westside Basin, Santa Clara Valley Water District – Santa Clara Sub-Basin, San Mateo County, Sustainable Groundwater Management Act updates
- Good discussion on lessons learned from adjacent basins
- Good discussion with group and San Mateo County staff about their upcoming Assessment



Meetings Have Provided a Forum for Information Sharing and Learning

April 19th, 2016 meeting

- Presentations included:
Alameda County Water District – Niles Cone Subbasin, West Bay Sanitary District Recycled Water Project - Sharon Heights Golf Course
- Good discussion on lessons learned from adjacent basins
- Good discussion on the interplay between stormwater and groundwater



Agenda

- Welcome and introductions
- Summary of previous meetings
- **Use and management of basins adjacent to the San Mateo Plain Sub-basin: The East Bay Plain Sub-basin**
 - **Alice Towey, Senior Civil Engineer, East Bay Municipal Utilities District**
 - **Jan Lee, Water Resources Manager, City of Hayward**
- San Mateo County's Stormwater Resource Plan
- Activities in the San Mateo Plain Sub-basin
- Next Steps

East Bay Plain Basin

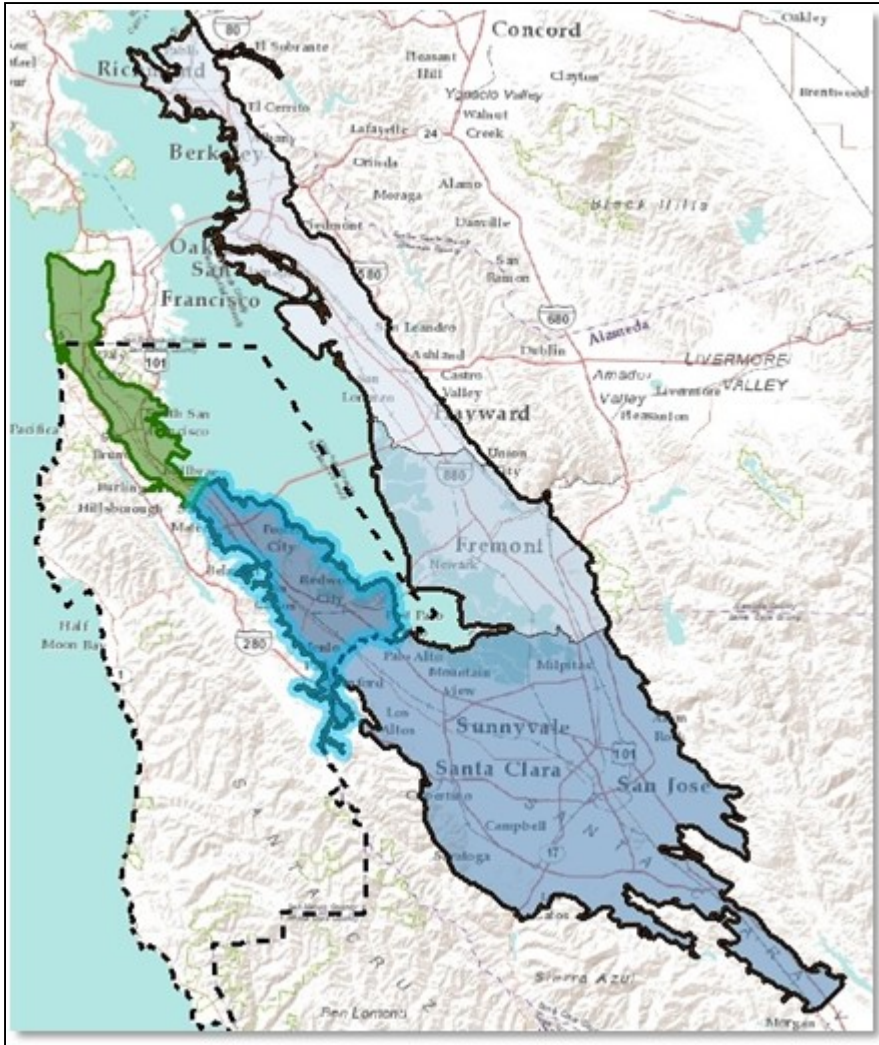
EBMUD & City of Hayward

Groundwater Reliability Partnership Meeting
March 22, 2017



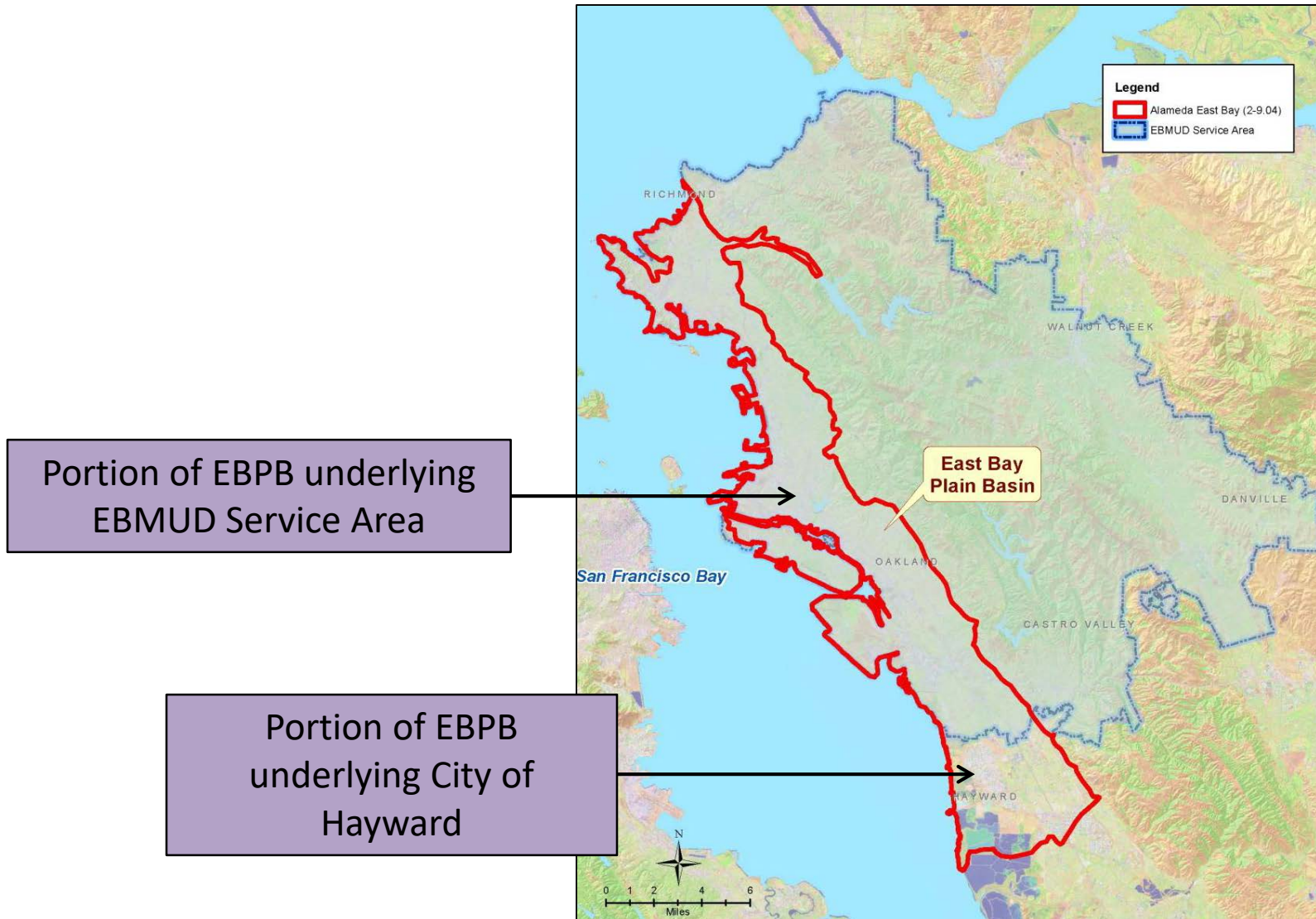
- Overview of the East Bay Plain Basin
- EBMUD's Bayside Groundwater Project
- EBMUD's Activities Relative to the Sustainable Groundwater Management Act (SGMA)
- City of Hayward Groundwater Efforts and SGMA-related Activities
- Working Together for Sustainable Groundwater Management

Regional Groundwater System



- Santa Clara Basin (DWR Basin 2-9)
 - San Mateo Subbasin
 - Santa Clara Subbasin
 - Niles Cone Subbasin
 - East Bay Plain Subbasin

East Bay Plain Basin



EBMUD and Local Groundwater: A Brief History



- East Bay Plain Basin (EBPB) - Historical source of supply for the East Bay, along with local creeks
- EBMUD prepared a Groundwater Management Plan for the South portion of the EBPB in 2013
- EBMUD became the California Statewide Groundwater Elevation Monitoring (CASGEM) reporting entity for Southern portion of EBPB in 2014
- EBMUD became the CASGEM reporting entity for Northern portion of EBPB in 2015

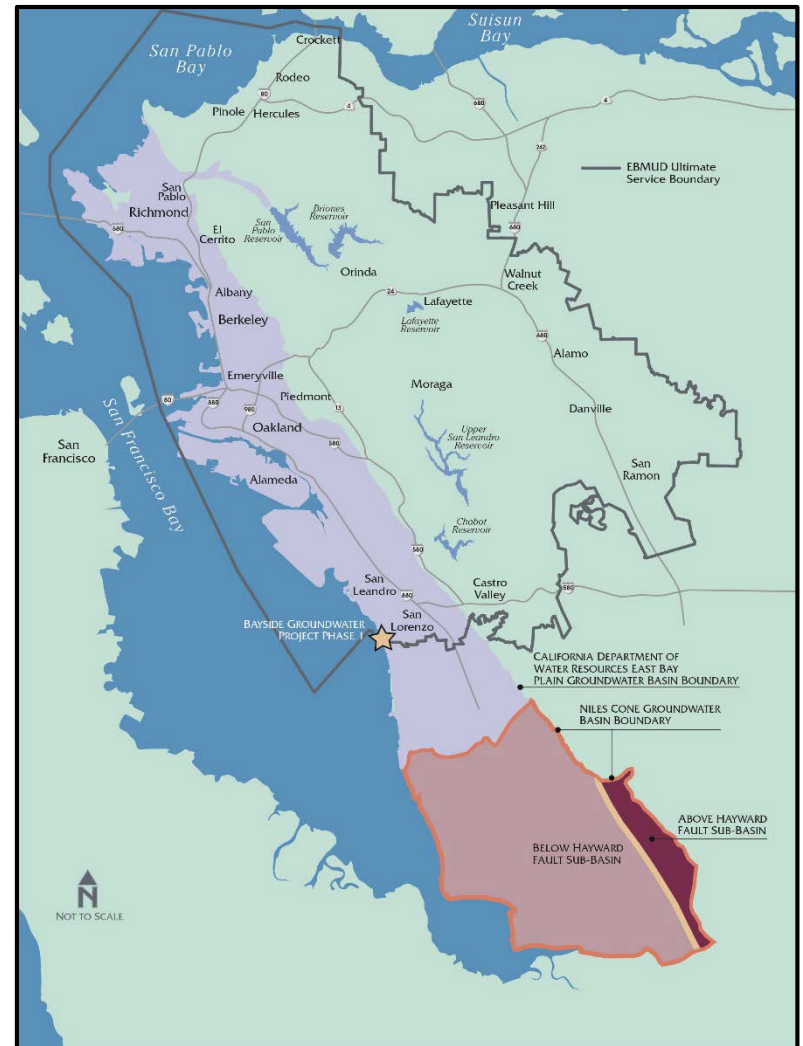
Artesian Wells; High Street, Oakland CA (1876); Thompson Water Works (predecessor to Contra Costa Water Works)



The Bayside Groundwater Project



- EBMUD's Water Supply Management Program 2040 identified a portfolio of projects to improve long term water supply reliability, including groundwater banking
- EBMUD completed construction of Bayside Phase 1 Facility in 2010
- Allows for injection of treated drinking in wet years for later extraction during dry years
- Bayside Phase 1 could provide up to 1 MGD of supplemental supply during a drought
- Potential for future expansion..?



The Bayside Groundwater Project



- Phase 1 facility includes:
 - 600 foot deep injection/extraction well
 - Water treatment plant
 - Distribution pipelines
 - Subsidence monitoring system
 - Network of monitoring wells
- In 2017, following many years of drought, EBMUD was able to make test injections



- SGMA directs local agencies to actively manage groundwater and develop Groundwater Sustainability Agencies (GSAs) for high and medium priority basins
 - The East Bay Plain Basin is designated a medium priority basin
 - Therefore, Groundwater Sustainability Plan (GSP) due in 2022
- Counties and cities within the EBMUD service area preferred that EBMUD serve as the GSA for the East Bay Plain
- If no GSA stepped forward, the State would intervene
 - State costs would be passed on to EBMUD
 - Loss of local control of the basin
 - Punitive measures could also be enacted (loss of grant/loan eligibility)

- In August 2016, EBMUD's Board of Directors held a public hearing and adopted a resolution declaring EBMUD's intent to become the Groundwater Sustainability Agency (GSA) for the entire portion of the basin underlying EBMUD's service area
- After filing a notice with DWR and completing the 90-day comment period, EBMUD became the exclusive GSA on November 28, 2016

History of Groundwater in Hayward



Hayward Emergency Wells



- ▶ 5 wells
- ▶ Constructed in 1990s
- ▶ Currently permitted for emergency use
- ▶ Total maximum capacity = 13.6 MGD



Well	Capacity (gpm)	Depth (feet)
A	1000	560
B	2000	534
C	2000	466
D	1300	600
E	3000	535

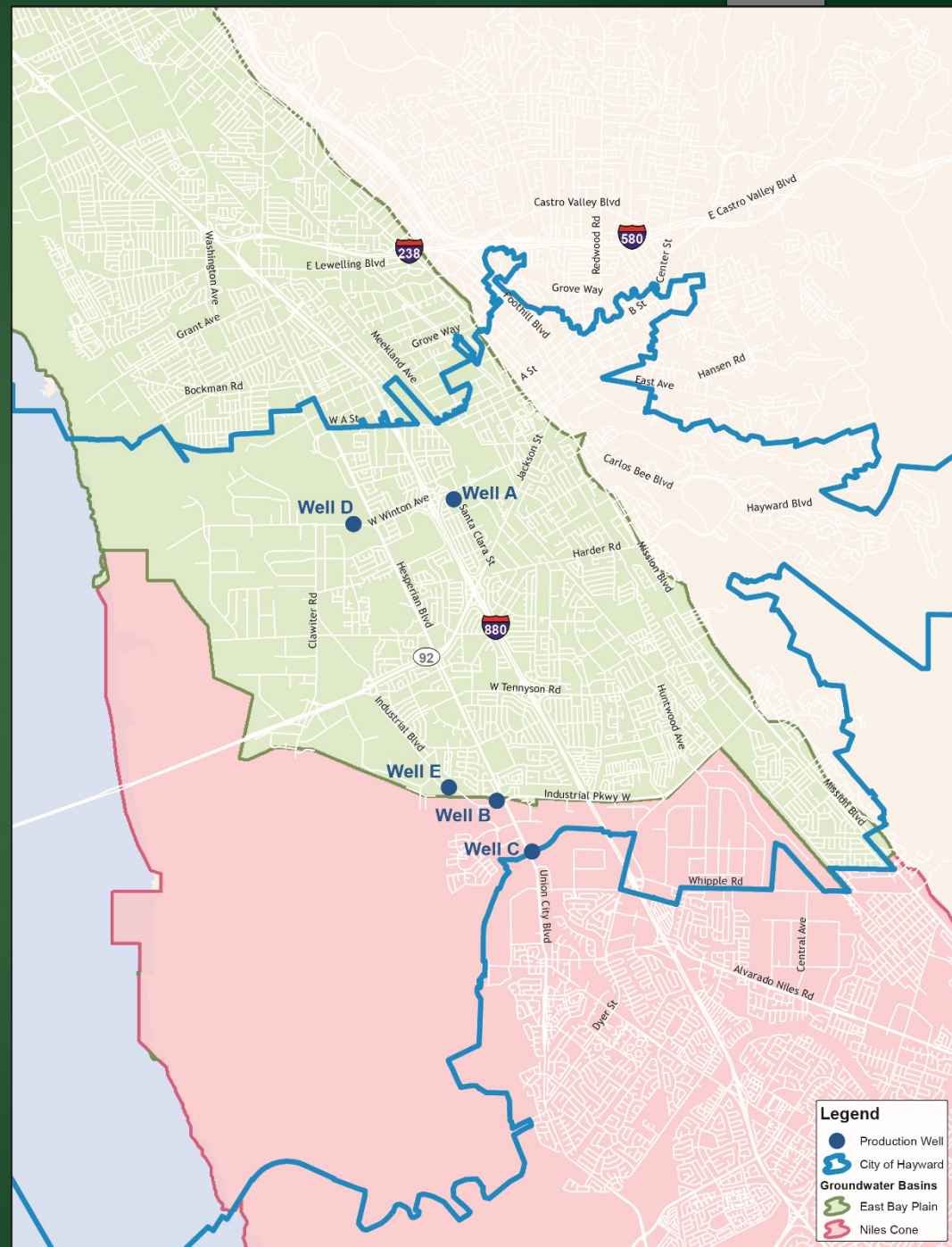
Relevance of SGMA to Hayward



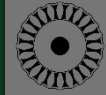
- ▶ Protection of groundwater resources
- ▶ Groundwater management and authority
- ▶ Medium-priority groundwater basins
 - Niles Cone Basin
 - East Bay Plain Basin (EBPB)

Hayward Considerations

- ▶ GSA responsibilities and authorities
- ▶ Resources
- ▶ Costs
- ▶ Local control



GSA Formation for East Bay Plain



- ▶ Deadline: June 30, 2017
- ▶ EBMUD GSA formed in November 2016
- ▶ Hayward filed GSA notice for remaining portion of East Bay Plain on March 6, 2017



GSP Options for East Bay Plain



- ▶ Submit to DWR by January 31, 2022
- ▶ Options
 1. Multiple GSPs
 2. Joint Hayward-EBMUD GSP
- ▶ Hayward and EBMUD preference to develop joint GSP



Next Steps



- ▶ Hayward would become exclusive GSA for City limits following 90-day notice period
- ▶ Continue outreach and coordination with basin stakeholders and neighboring agencies
- ▶ Develop agreements and scope of work to prepare joint GSP
- ▶ Apply for grant funding

Questions & Discussion



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East Bay Municipal Utility District
Alice.Towey@ebmud.com

Jan Lee
Water Resources Manager
City of Hayward
Jan.Lee@hayward-ca.gov

Agenda

- Welcome and introductions
- Summary of previous meetings
- Groundwater 101 – Shallow groundwater
- Use and management of basins adjacent to the San Mateo Plain Sub-basin:
 - The Niles Cone Sub-Basin
- **San Mateo County's Stormwater Resource Plan**
 - **Matt Fabry, Manager - San Mateo Countywide Water Pollution Prevention Program**
- Activities in the San Mateo Plain Sub-basin
- Next Steps



San Mateo Countywide Stormwater Resource Plan

Matthew Fabry, P.E.
Program Manager, C/CAG



SAN MATEO COUNTYWIDE
**Water Pollution
Prevention Program**

Clean Water. Healthy Community.
www.flowstobay.org

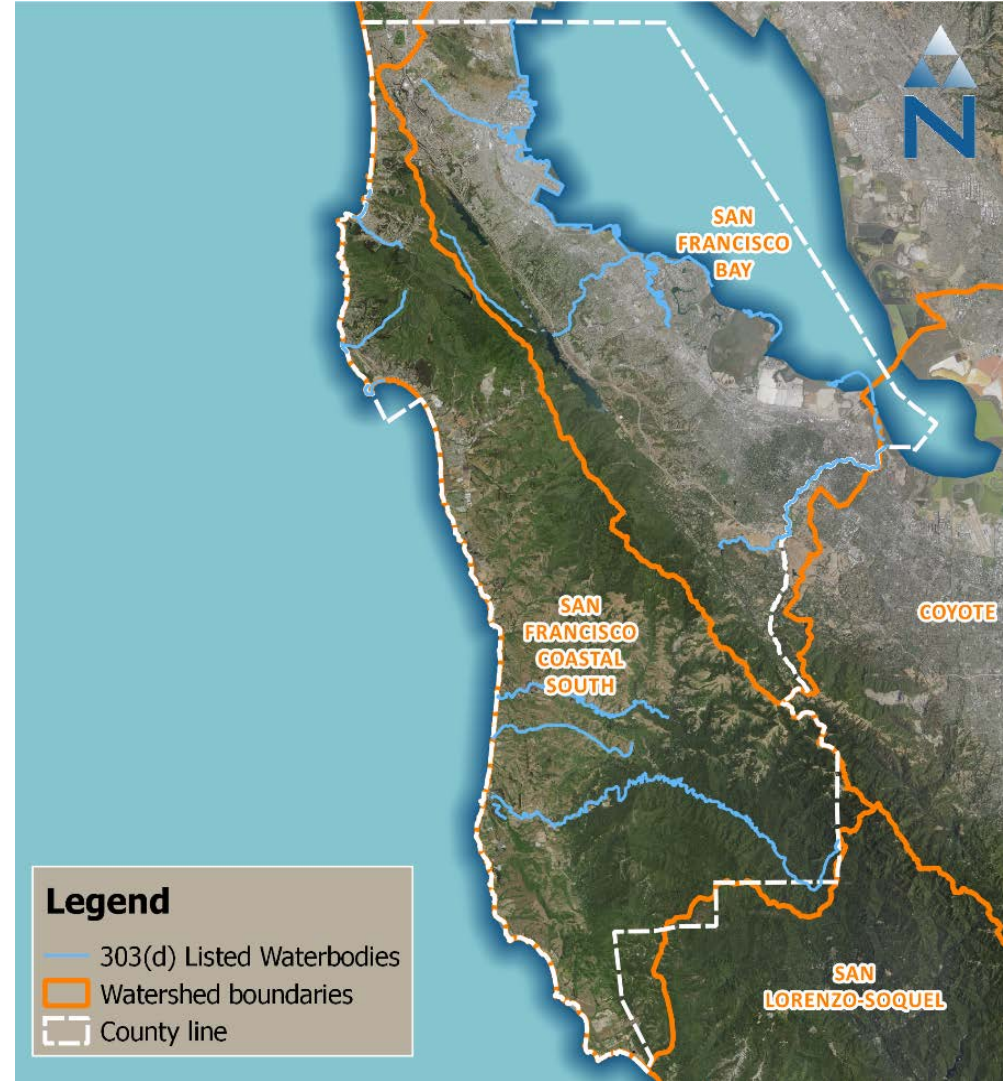
**BAWSCA Groundwater Meeting
March 22, 2017**

Stormwater Resource Plan (SRP)

- Senate Bill 985 (2014, Pavley) requires Stormwater Resource Plans in order to receive grants for stormwater capture projects
- Separate from Municipal Regional Permit, but related
- Goal is to better utilize rainfall as a resource to address water supply, flood, and quality concerns
- State Water Board issued SRP guidelines in late 2015
- C/CAG initiated countywide SRP in March 2016

Watershed-Based Approach

- San Francisco Bay & San Francisco Coastal South Watersheds
 - Watershed processes
 - Surface and groundwater quality
 - Water usage
 - Land use characteristics
 - Natural habitats
- Built on previous planning efforts



Project Types

Regional Projects



Green Streets

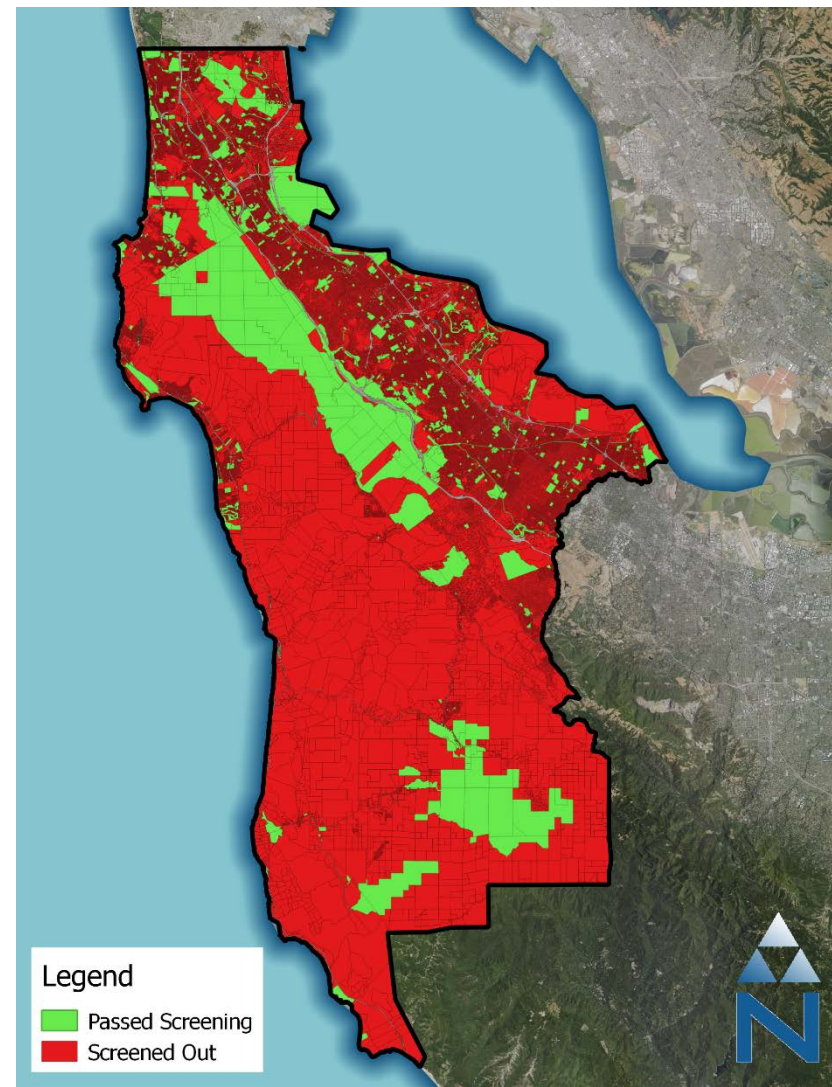


Low Impact Development



Screening of Sites for Onsite LID/Regional Projects

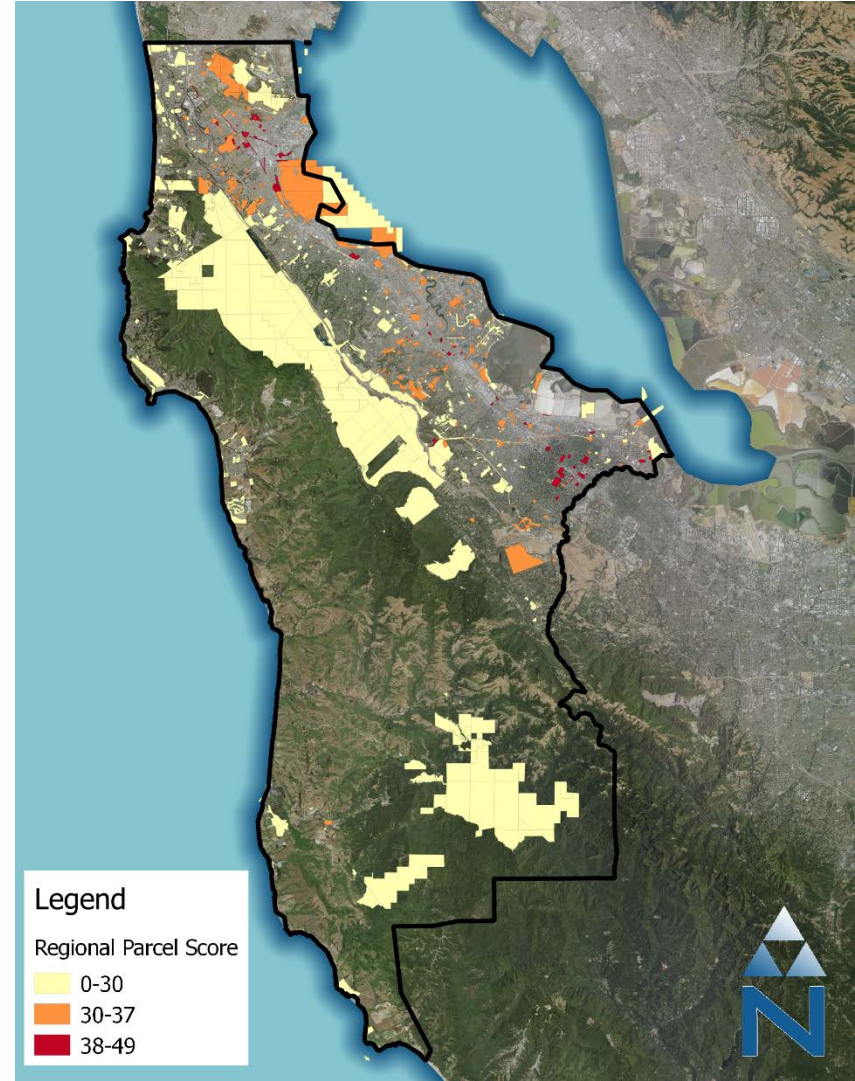
Screening Factor	Parcel Characteristic	Criteria	Reason
Public Parcels	Ownership	City, County or Town	Identify all public parcels for regional storm and dry weather runoff capture projects or onsite LID retrofits
	Land Use	Park, School, Other (e.g., Golf Course)	
Suitability	Parcel Size	>0.25 acres	Adequate space for regional stormwater and dry weather runoff capture project
		All	Opportunity for onsite green infrastructure retrofit
	Site Slope	< 10 %	Steeper grades present additional design challenges



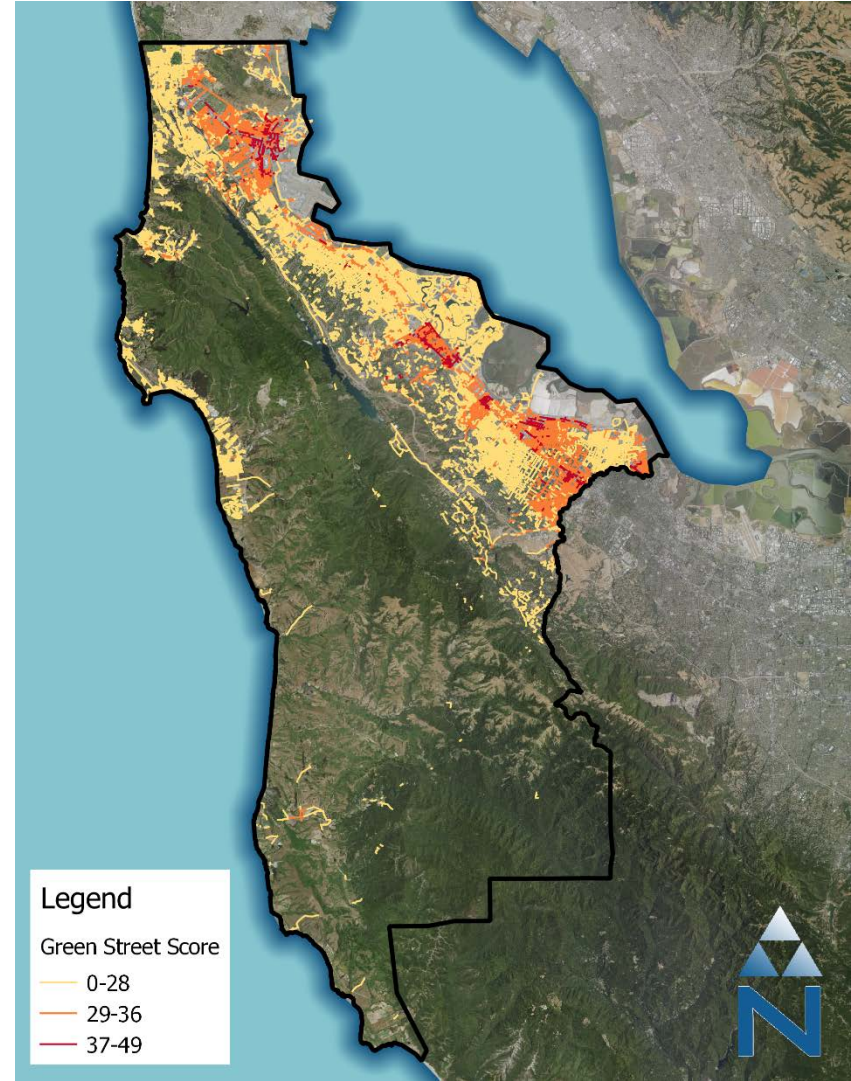
Regional Projects Prioritization Matrix

	Points						Weight Factor				
	0	1	2	3	4	5					
Parcel Land Use	--	--	Schools/Golf Courses	Public Buildings	Parking Lot	Park / Open Space	--				
Impervious Area	X < 40	40 ≤ X < 50	50 ≤ X < 60	60 ≤ X < 70	60 ≤ X < 80	80 ≤ X < 100	--				
Parcel Size (acres)	0.25 ≤ X < 0.5	0.5 ≤ X < 1	1 ≤ X < 2	2 ≤ X < 3	3 ≤ X < 4	4 ≤ X	--				
Hydrologic Soil Group	--	D	Unknown	C	B	A	--				
Slope (%)	5 < X ≤ 10	4 < X ≤ 5	3 < X ≤ 4	2 < X ≤ 3	1 < X ≤ 2	0 < X ≤ 1	--				
Proximity to Flood-prone Channels (miles)	Not in sub-basin	3 < X	--	1 < X ≤ 3	--	X ≤ 1	2				
Contains PCB Risk Areas	None	Potential High Interest	--	High Interest	--	--	--				
Currently planned by City or co-located with other City project	No					Yes	2				
Drains to TMDL waters	No									Yes	--
Above groundwater aquifer	No										--
Augments water supply	No					Yes					--
Water quality source control	No					Yes					--
Reestablishes natural hydrology	No					Yes					--
Creates or enhances habitat	No					Yes					--
Community enhancement	No	Yes	--								

Regional Projects



Green Streets





San Mateo County Project Prioritization

English

Info and Tools

Map

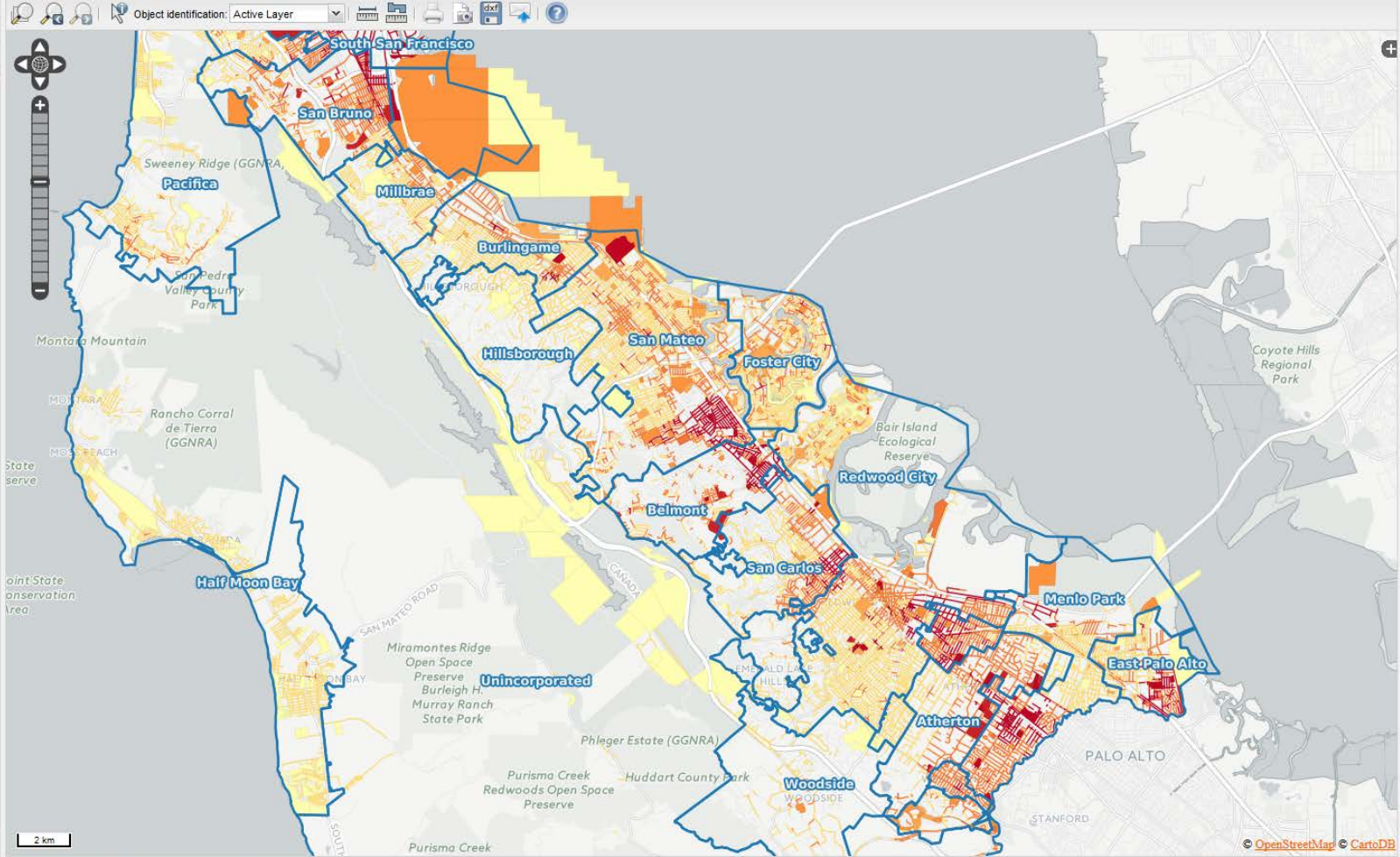
Map Layers

☒ San Mateo County Project Prioritization

- ☒ Jurisdiction
- ☒ Regional Projects prioritized
- ☒ LID Projects prioritized
- ☒ Green Streets prioritized

☐ Background Layers

- ☒ Light Theme (CartoDB)
- ☐ Dark Theme (CartoDB)
- ☐ Open Street Map
- ☐ Google Satellite
- ☐ Google Map



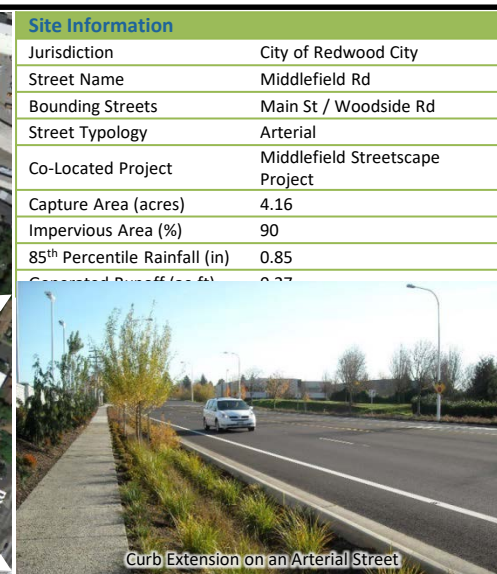
Layer order

Mode: navigation. Shift/rectangle or mouse wheel for zooming.

Coordinate: -13605540,4527935 1: 144448

Project Concepts

- C/CAG developed 22 project concepts for its member agencies
- Combination of regional, green street, and onsite projects
- Intent is to support future grant proposals



imperviousness is based on best professional judgement. All design assumptions/parameters and cost estimates must be re-evaluated during the detailed design process.

Green Infrastructure Type	Design Width (ft)	Design Length (ft)	Capture Volume (ac-ft)	
Bioretention (Curb Extension)	8	780	0.270	
Cost Estimate				
DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Excavation/Hauling	1,160	CY	\$50.00	\$58,000
Bioretention	6,240	SF	\$25.00	\$156,000
Curbs and Gutters	780	LF	\$17.25	\$14,000
CONSTRUCTION SUBTOTAL				\$228,000
Planning (20%), Mobilization (10%), Design (30%), Contingency (25%)				\$194,000
TOTAL COST				\$422,000

Concept for a Green Street Retrofit for Stormwater Capture

Site: Middlefield Road (City of Redwood City)

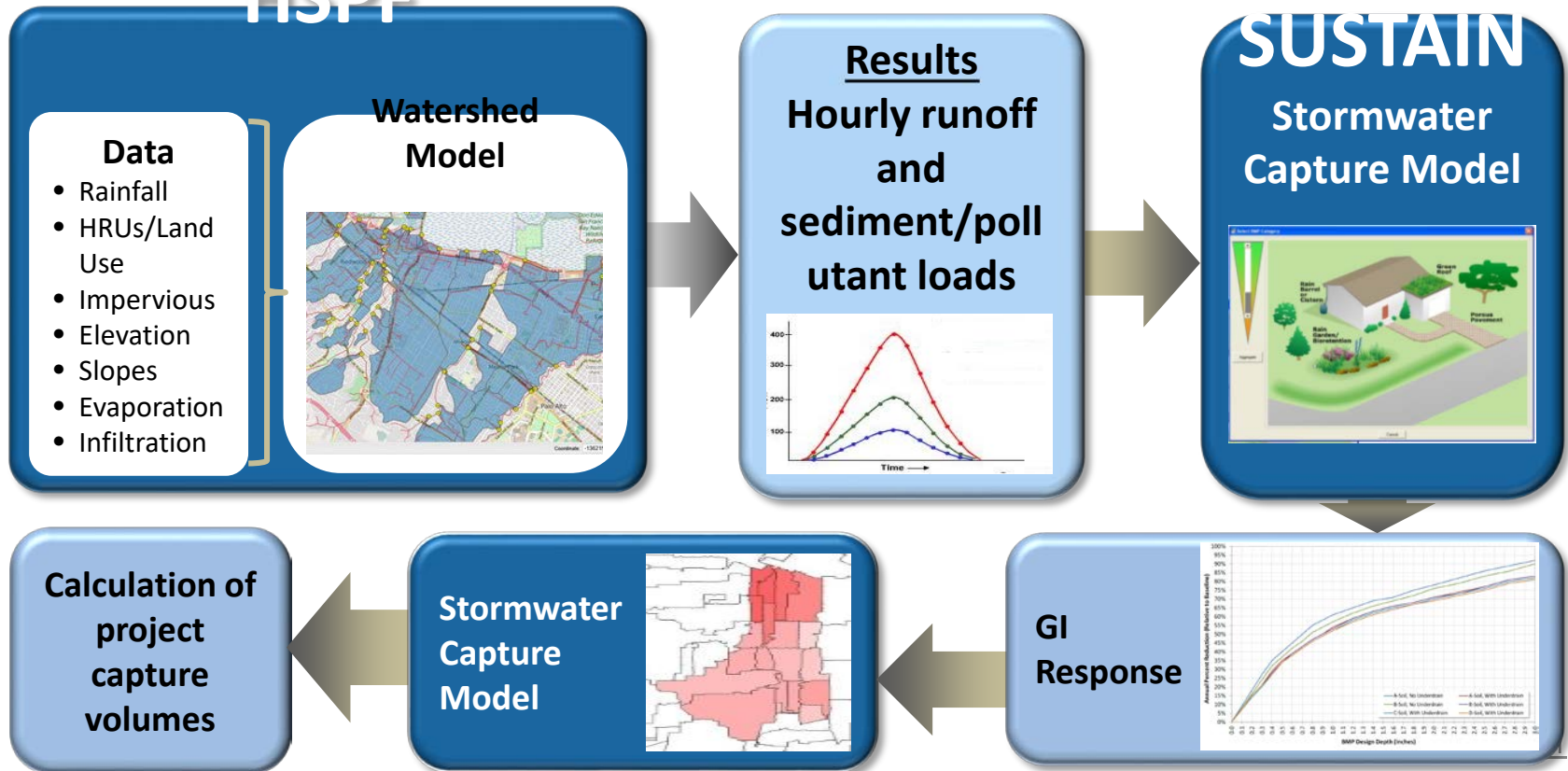


Stormwater Grants

- State Water Board stormwater grant program (Prop 1)
- C/CAG supported Redwood City and San Mateo proposals
- Five projects total: four green street, one parking lot
- State Board recommended funding for both proposals (~\$1.2 million total)
- Daly City also recommended to receive \$10 million
- Award announcement started 90-day clock to finalize and submit SRP to the State

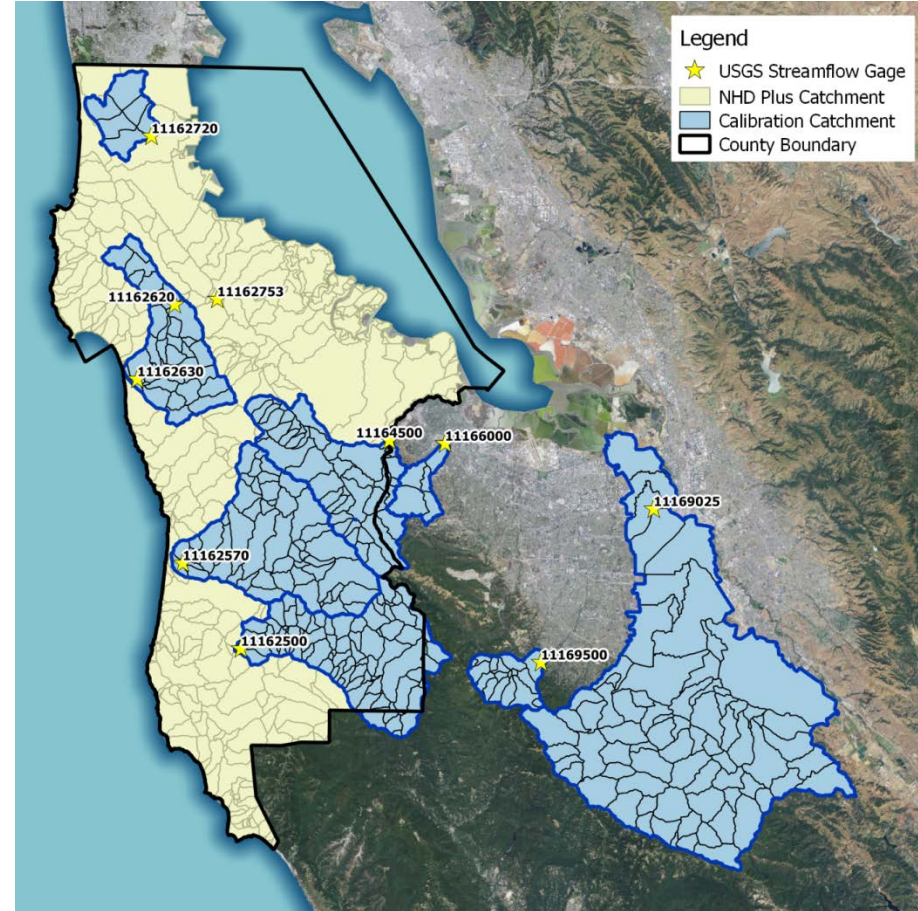
Reasonable Assurance Analysis

HSPF



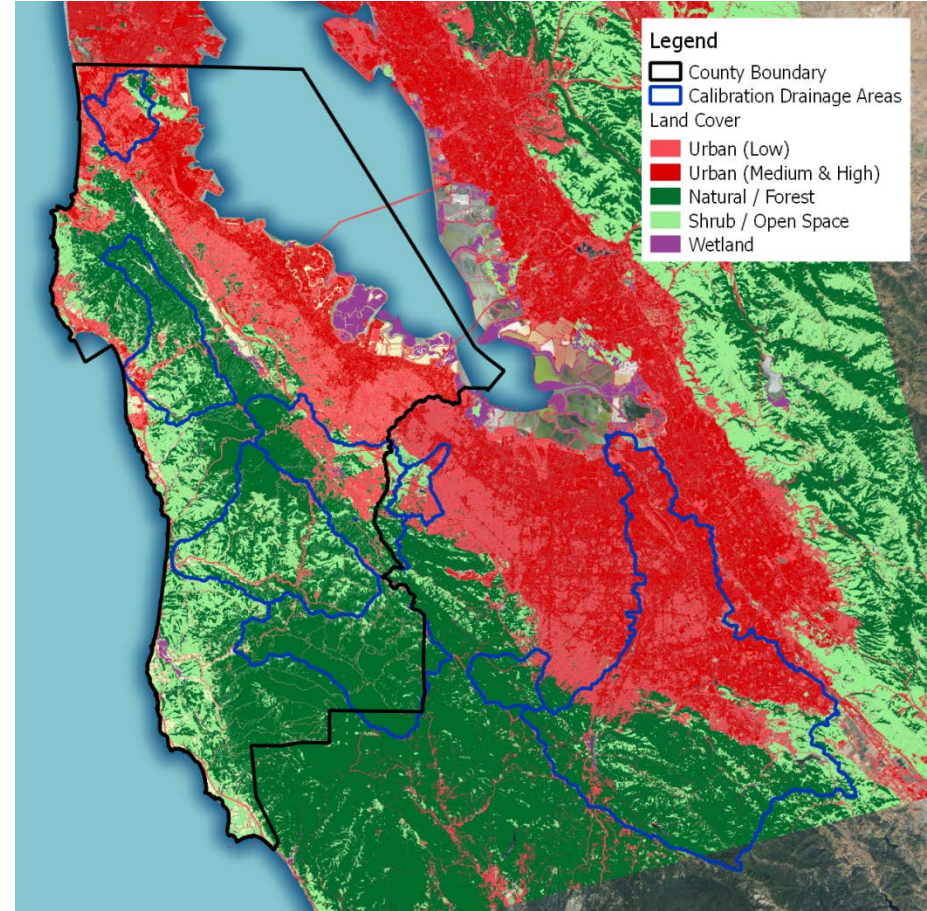
Model Calibration

- Selection of calibration watersheds based on:
 - Available flow and water quality data
 - Representation of land characteristics
 - Spatial and rainfall distribution
- Calibrated set of model parameters were then applied to all County watersheds



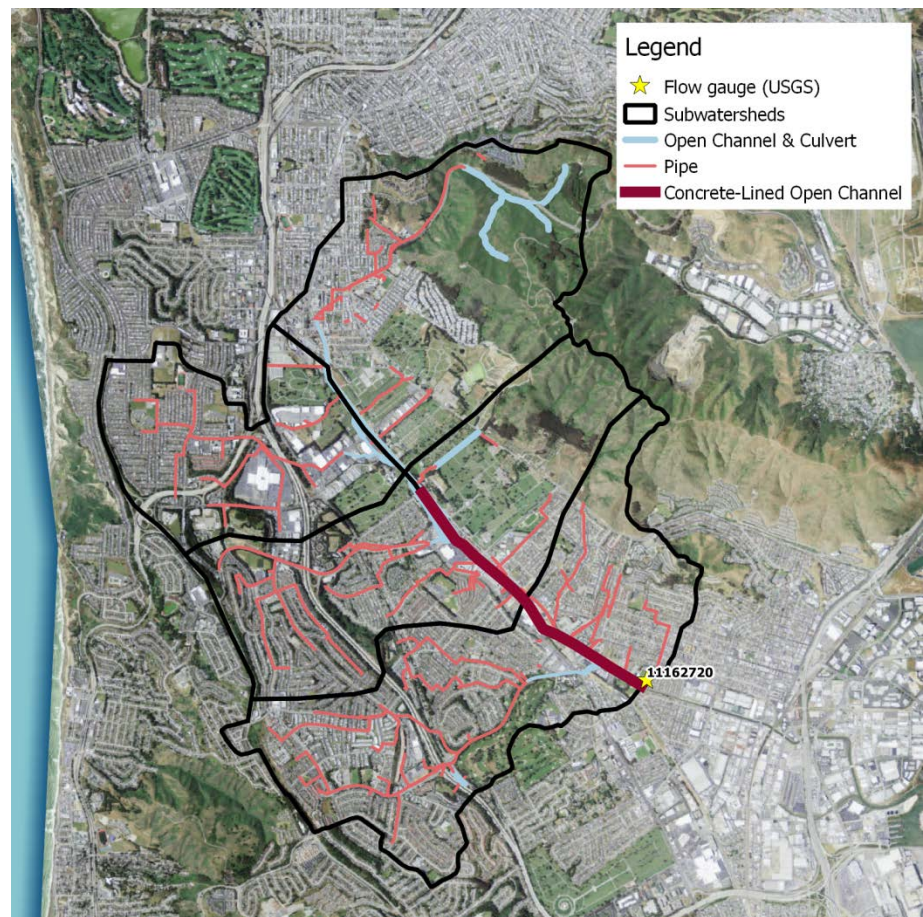
Hydrologic Response Units

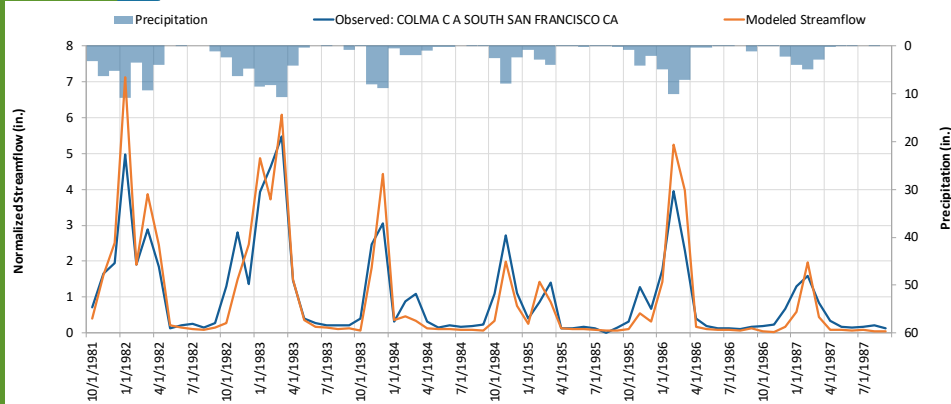
- Runoff & Pollutant load:
 - Slope
 - Hydrologic Soil Group (HSG)
 - Land use/cover
 - Impervious cover (DCIA)
- Urban HRU categories:
 - Rooftop, Sidewalk, Driveway, Roads based on analysis of typical parcels



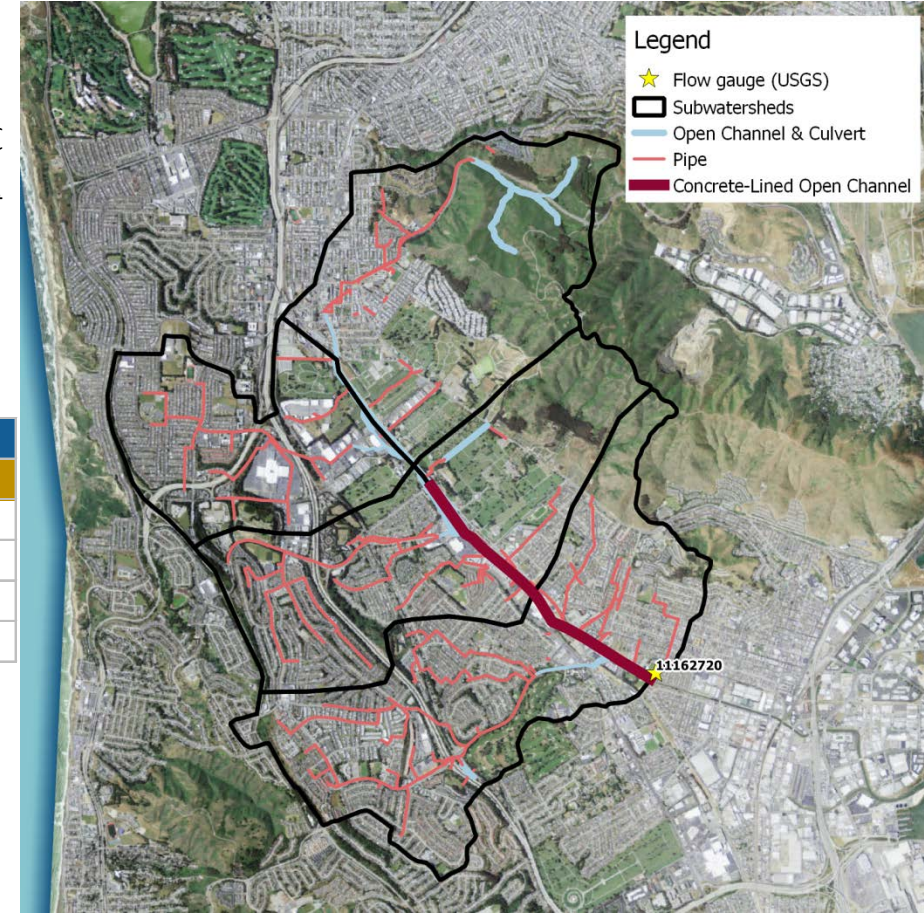
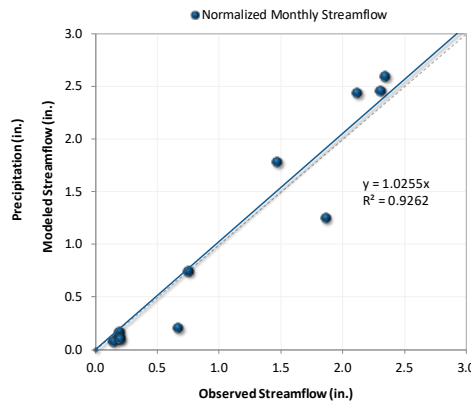
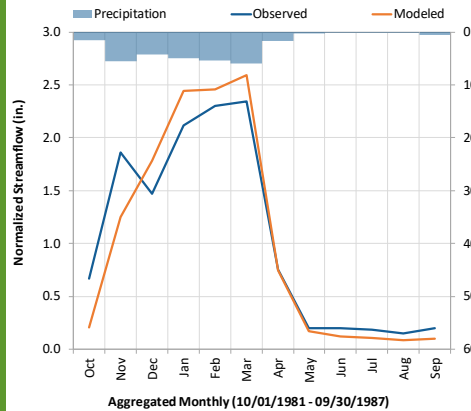
Example Hydrology Calibration Site

- Urban Watershed: Colma Creek
- Used Default BAHM (SMC)
- Added Irrigation
 - Estimated percent irrigated area from aerial photography
 - Cypress Lawn Cemetery
 - Other properties
- Concrete Lined Channel
 - Restricts groundwater flow from adjacent watersheds from entering the reach segment



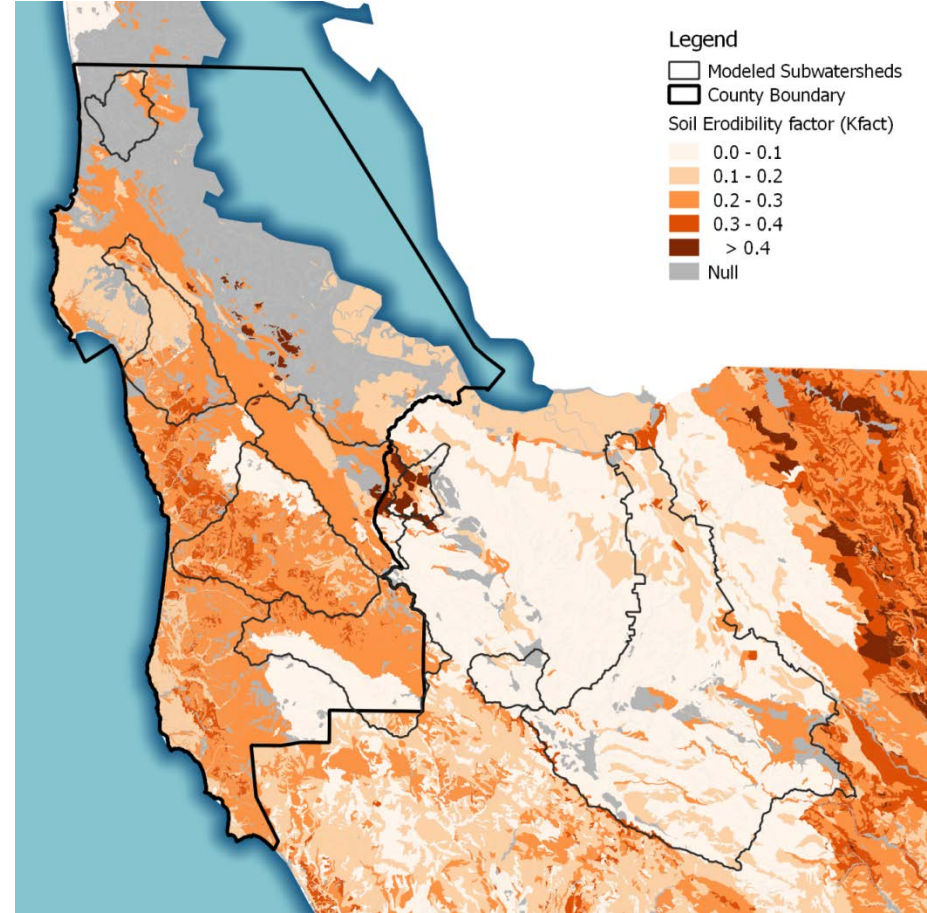


Calibration Metrics (10/01/1981 - 09/30/1987)	Relative Mean Error	Recommended Error Criteria			
		Very Good	Good	Fair	Poor
Total Annual Volume	-3.1%	≤ 5%	5 - 10%	10 - 15%	>15%
Highest 10% of Flows	-0.7%	≤ 10%	10 - 15%	15 - 25%	>25%
Lowest 50% of Flows	6.0%	≤ 10%	10 - 15%	15 - 25%	>25%
Annual Storm Volume	0.6%	≤ 10%	10 - 15%	15 - 25%	>25%



Calibration of Sediment Transport

- Hydrologic Soil Group: infiltration potential
- Erodibility: sediment mobilization potential
- Used as basis to stratify model parameters for erosion and sediment transport processes



Data Source: USDA SSURGO
(Soil Survey Geographic Database)

Green Infrastructure Planning

- Each agency must adopt workplan by July 1, adopt GI Plan by 2019
- Describe gradual shift from gray to green
- Achieve specific PCBs load reduction by 2040
- Prioritize/map areas for potential projects on drainage-area basis within specific time frames
- Design guidelines, details, & standard specs

Green Infrastructure Planning

- Amend other relevant plans
- Evaluate funding options
- Adopt relevant policies & ordinances
- Public outreach, staff training, educate electeds
- Early implementation (no missed opportunities)
- Participate in processes to promote GI

Next Steps

- C/CAG continue updating countywide models
 - will make available to public when complete
- Start modeling GI scenarios to achieve pollutant load reductions
- June 30, 2017: Local agencies adopt workplans for developing GI Plans
- Sept 2019: GI Plans must be completed



QUESTIONS?

Matthew Fabry, Manager

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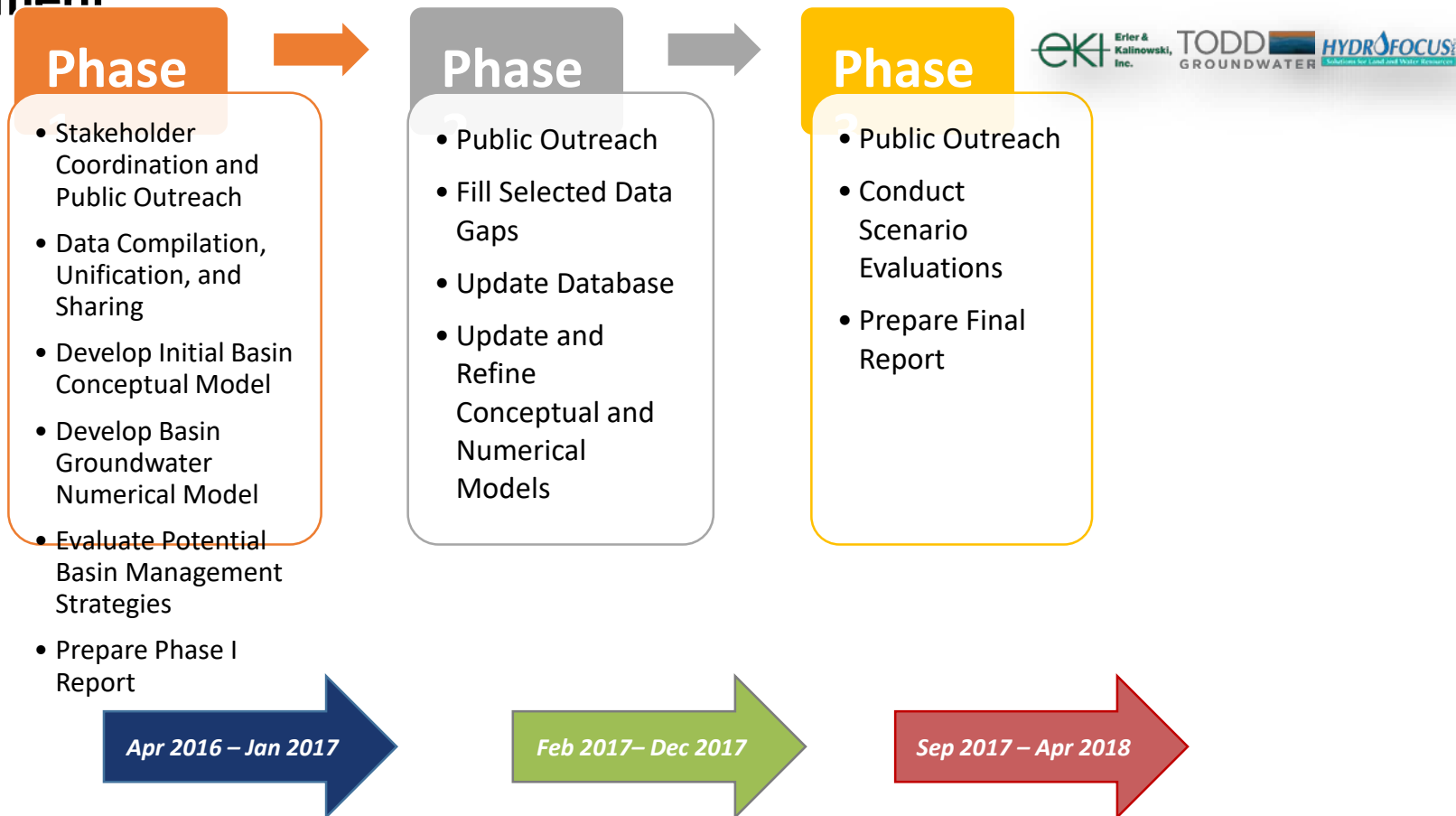
*Link to more information on the Stormwater
Resource Plan including the link to the web viewer*

www.ccag.ca.gov/srp

Agenda

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- Summary of previous meetings
- Use and management of basins adjacent to the San Mateo Plain Sub-basin: The East Bay Plain Sub-basin
- San Mateo County's Stormwater Resource Plan
- **Activities in the San Mateo Plain Sub-basin**
 - **San Mateo County's Assessment of the San Mateo Plain Sub-basin, Update on Phase 2 activities: Charles Ice, San Mateo County Department of Environmental Health**
 - **Update on Santa Clara Sub-basin, Bassam Kassab, Santa Clara Valley Water District**
 - **Update on West Bay Sanitary District's Recycled Project – Sharon Heights Golf Course, Phil Scott, District Manager, West Bay Sanitary District**
 - **City of Palo Alto's North County Groundwater Assessment, Karla Dailey, City of Palo Alto**
 - **Update on Westside Basin activities, Patrick Sweetland, City of Daly City**
- Next Steps

San Mateo County's San Mateo Plain Groundwater Assessment



Environmental Health Services
Charles Ice
Groundwater Protection Program Lead



COUNTY OF SAN MATEO
HEALTH SYSTEM

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 particularly regarding Bay Mud effective conductivity



More Information

San Mateo Plain Subbasin Groundwater Assessment

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

Open San Mateo County Portal

<https://data.smcgov.org/>

Charles Ice, cice@smcgov.org
650-399-6911



Environmental Health Services
Charles Ice
Groundwater Protection Program Lead



COUNTY OF SAN MATEO
HEALTH SYSTEM

Update on Sustainable Groundwater Management in Santa Clara and Llagas Subbasins

March 15, 2017



Agenda

- ▶ Alternative Submittal to DWR
- ▶ Next Steps: Evaluation of SGMA Authorities
- ▶ Current basin Conditions

SGMA Compliance – An Update

- ▶ On November 22, 2016, the Board of Directors of the Santa Clara Valley Water District adopted the **2016 Groundwater Management Plan** (GWMP) for Santa Clara and Llagas subbasins
- ▶ On December 21, 2016, staff **submitted the 2016 GWMP to DWR as an Alternative** to a Groundwater Sustainability Plan (GSP)



2016 Groundwater Management Plan

- ▶ Goals, strategies, outcome measures prompt effective action
- ▶ Updated technical information
 - ▶ Basin setting and conditions
 - ▶ Groundwater/surface water interaction
- ▶ Information on future groundwater demands
- ▶ New SGMA authorities acknowledged

Authorities available after GWMP adoption

- ▶ Regulation of pumping
 - ▶ Well spacing/operational requirements, pumping limitations or allocations
 - ▶ Existing water rights and potential liability must be carefully considered
- ▶ Collection of various fees
 - ▶ Fixed or tiered volumetric
 - ▶ Must comply with applicable Prop 218 provisions

Evaluation of SGMA authorities

- Board directed staff to engage stakeholder through the Water Conservation and Demand Management Committee
- The committee meets monthly
- Purpose: Make policy recommendations to the Board related to demand management in support of its policy to provide a reliable water supply to meet current and future water usage

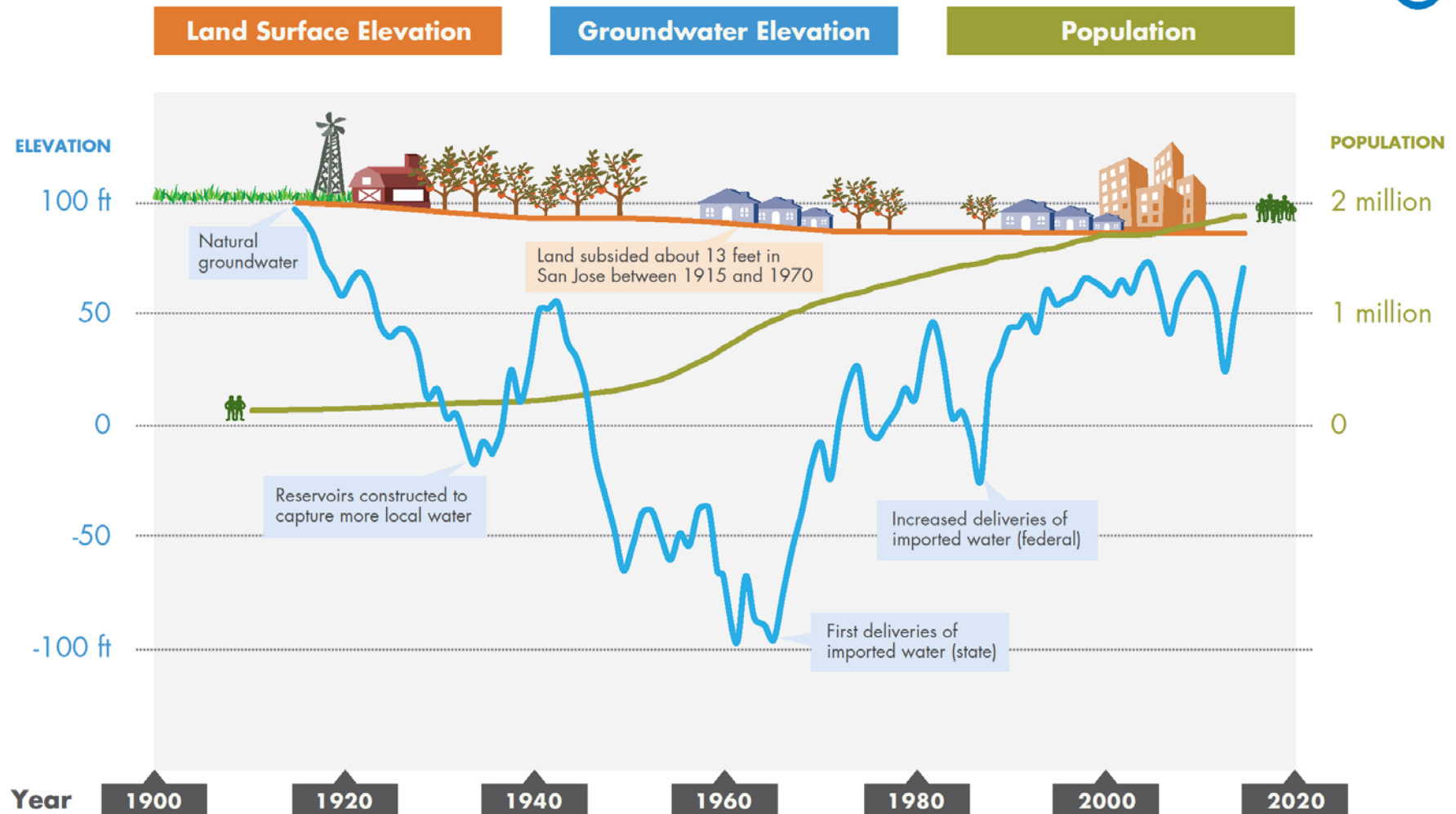
Current Basin Conditions

End of calendar year	Total GW storage (acre-feet)	Water Shortage Contingency Plan stage
2014	255,000	Stage 2 or Alert
2015	233,000	Stage 3 or Severe
2016	305,000	Stage 1 or Normal
2017 (50% exceedance probability)	336,000	Stage 1 or Normal

Rebounding GW Levels

SANTA CLARA COUNTY GROUNDWATER AT-A-GLANCE

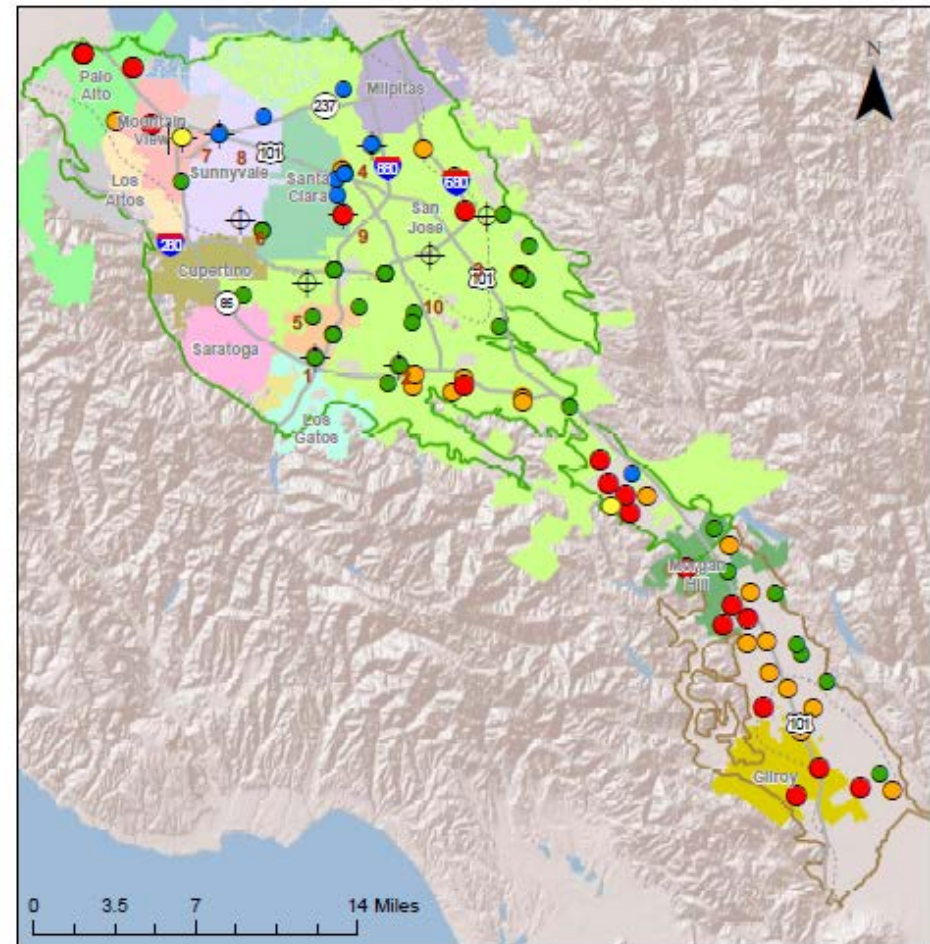
a graphic representation not intended as a technical exhibit



Shallow Conditions

The groundwater levels have rebounded in 2016 such that, in some areas of the unconfined aquifer, we are seeing water close to the ground surface (within 10 feet), which could be problematic for septic tanks

Depth To Water February 2017



Depth To Water (feet)

- < -10
- -10 – 0
- 0 - 10
- 10 - 20
- > 20

⊕ Subsidence Index Wells

DWR Groundwater Subbasins

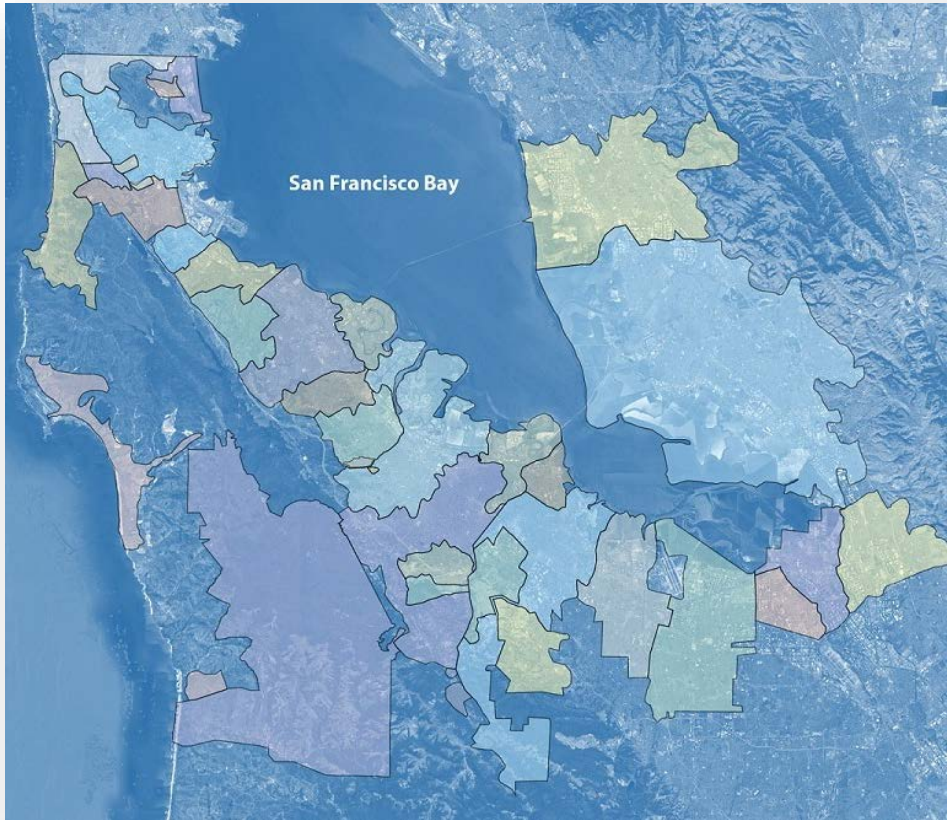
□ Llagas (3-3.01)

□ Santa Clara (2-9.02)

----- Approximate Extent of Confined Area

Next Steps

- BAWSCA to continue to host meetings to further goals:
 - Increased understanding of the hydrology and geology of the Basin
 - Serving as a forum for sharing information among all stakeholders
 - Continued sustainable use of the Basin to maintain groundwater quality and quantity and protect beneficial uses
- BAWSCA board to continue to fund ongoing efforts of the Groundwater Reliability Partnership
- Future meeting topics of interest to stakeholders?



Thank You!

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650-349-3000

<http://bawsca.org/water/reliability/groundwater>