East Contra Costa Subbasin Groundwater Sustainability Plan Process for Adopting

Public Meeting

Ryan Hernandez

Contra Costa County Water Agency

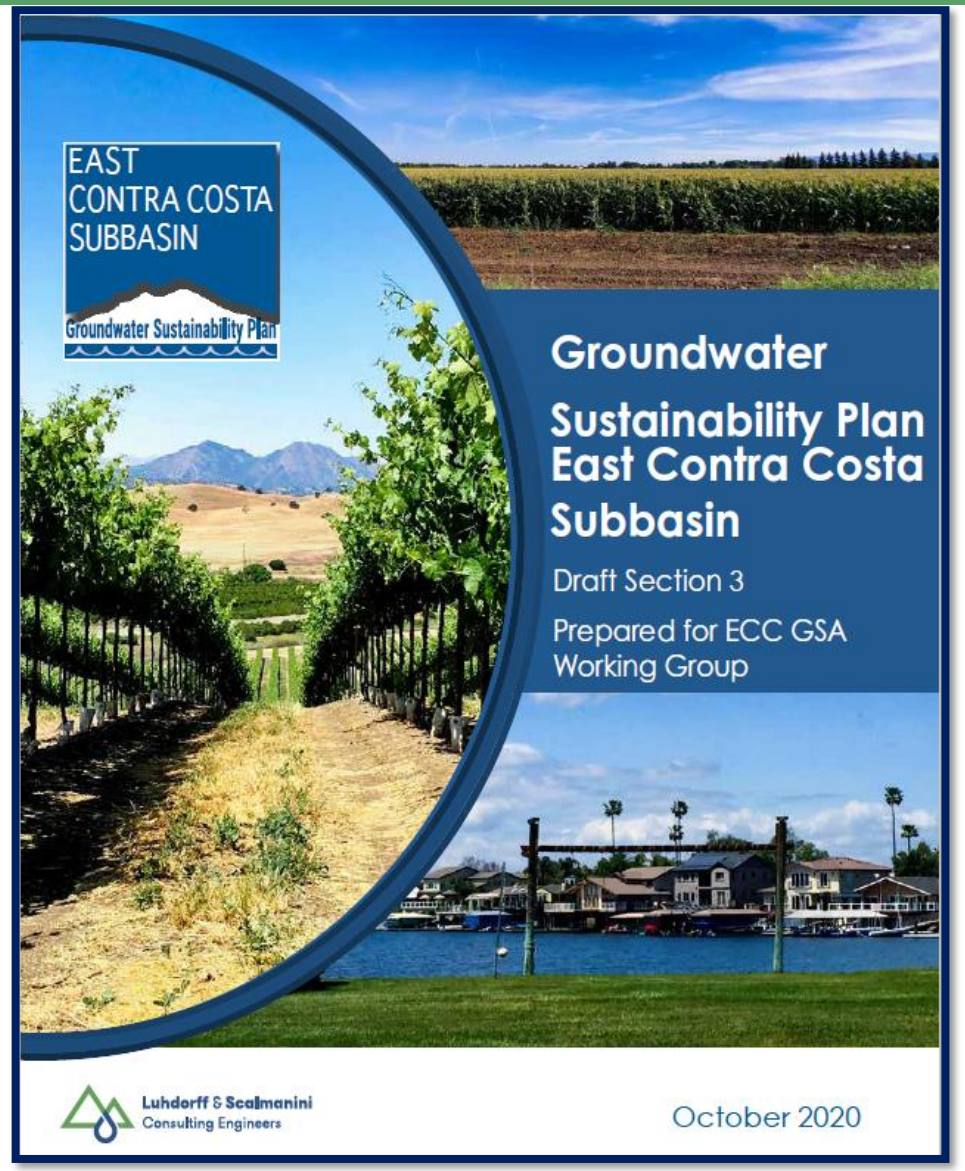
June 23, 2021

Opening Remarks

Diane Burgis
Supervisor, District 3
Contra Costa County

Introduction to East Contra Costa Subbasin GSP

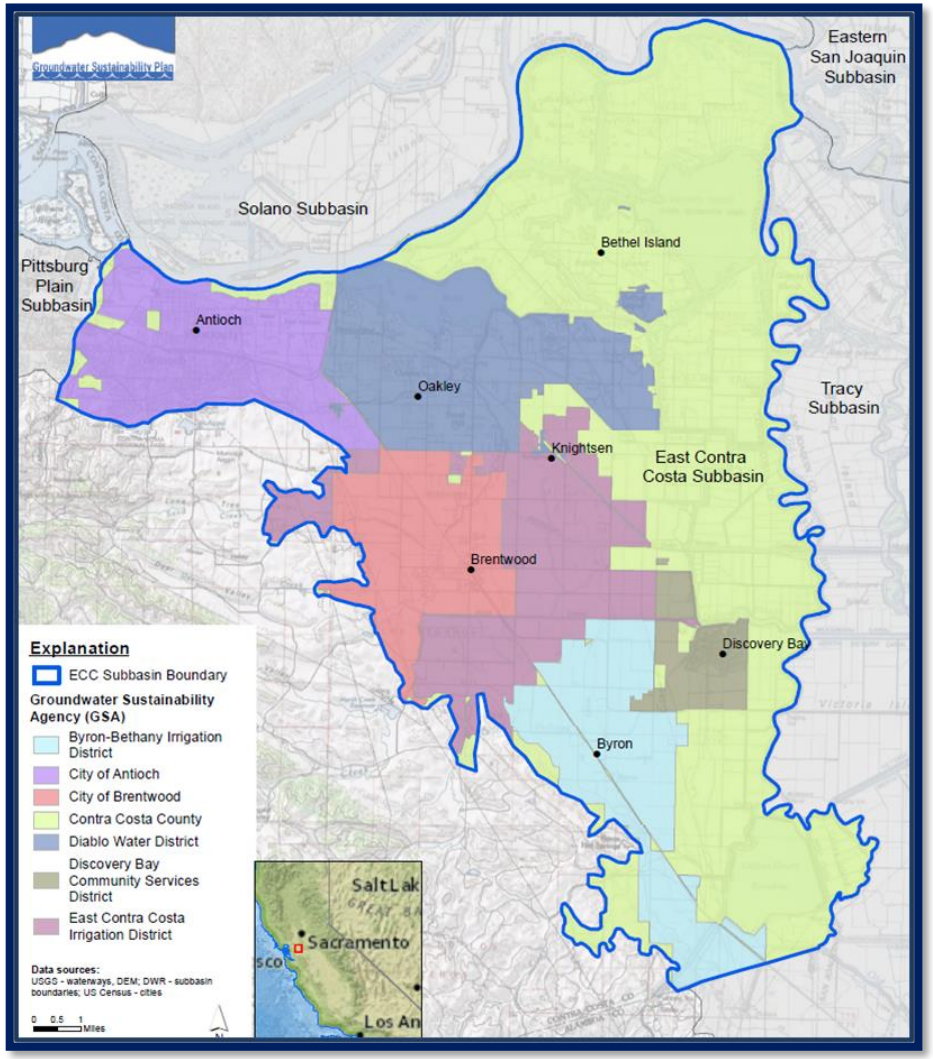
- Section 1: Purpose, Subbasin Description, and Agency Information
- Section 2: Plan Area
- Section 3 Basin Conditions
- Schedule-Process for Adopting
- Questions



Section 1 Purpose of the Groundwater Sustainability Plan

The Sustainable Groundwater Management Act requires groundwater to be managed by Groundwater Sustainability Agencies (local public agencies) to ensure a groundwater basin is operated within its sustainable yield.

This is done through a Groundwater Sustainability Plan, or GSP.



Section 1 East Contra Costa Subbasin

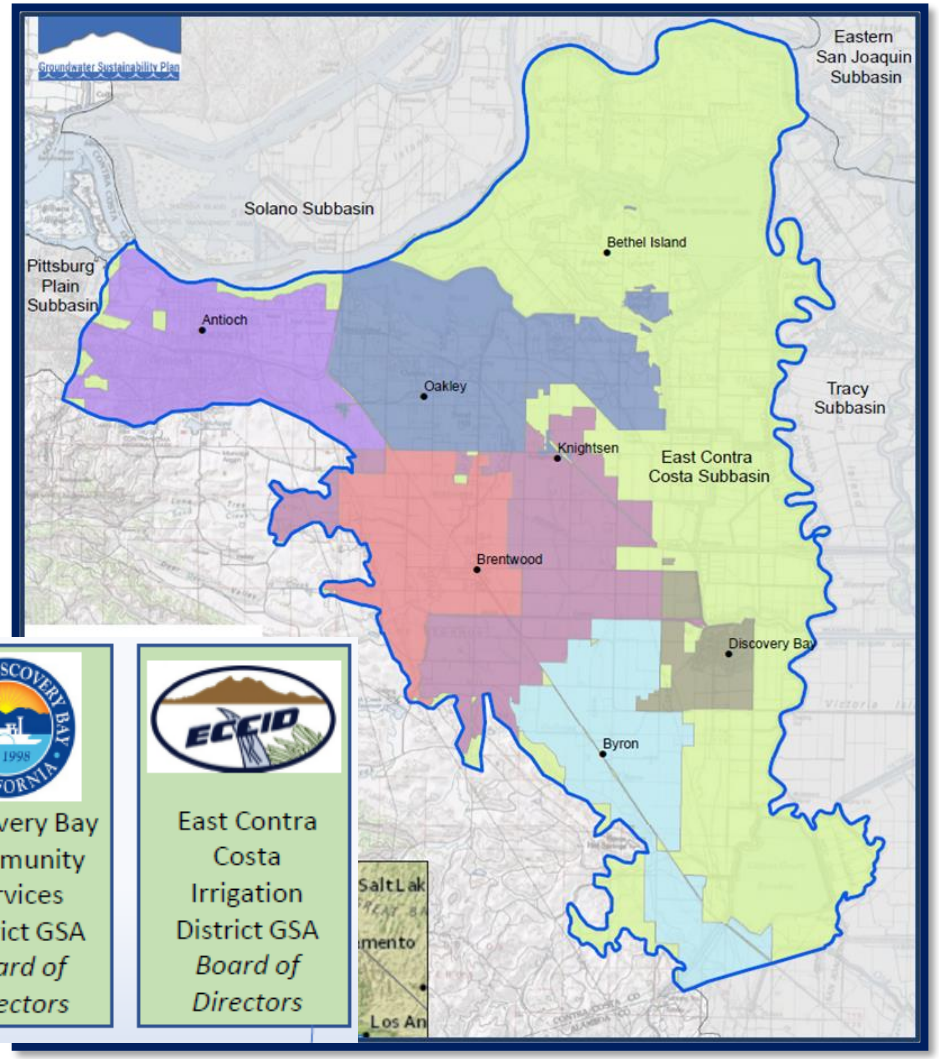
- In East Contra Costa, groundwater is pumped from aquifers that form a groundwater subbasin.
- A groundwater basin or subbasin is:

  "…an alluvial aquifer or a stacked series of alluvial aquifers with reasonably well-defined boundaries in a lateral direction and a definable bottom." DWR Bulletin 118, 2003
- The ECC Subbasin was ranked as a Medium Priority groundwater basin by the state requiring local agencies to prepare a GSP

Section 1 Agency Information

- What is a GSA
- ECC GSA Information: 7 GSAs and CCWD

  Long history of working together and stewardship of East Contra Costa County resources.

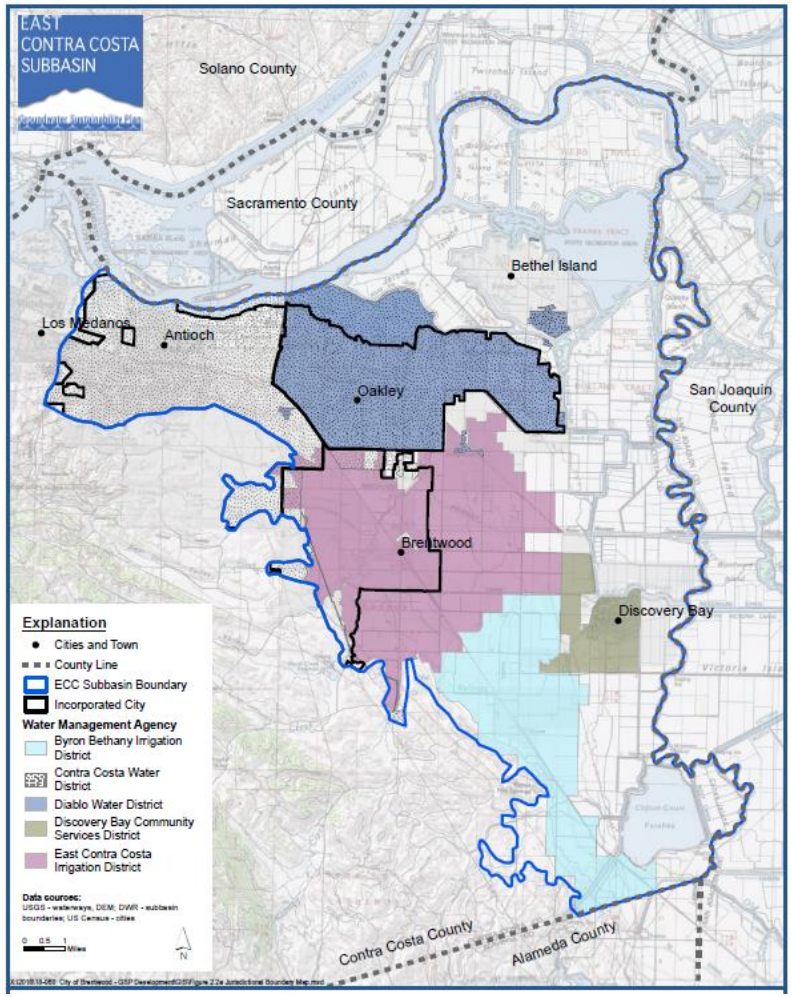


Byron –Bethany Irrigation District GSA *Board of Directors*	City of Antioch GSA *City Council*	City of Brentwood GSA *City Council*	Contra Costa County GSA *Board of Supervisors*	Contra Costa Water District *Board of Directors*	Diablo Water District GSA *Board of Directors*	Discovery Bay Community Services District GSA *Board of Directors*	East Contra Costa Irrigation District GSA *Board of Directors*

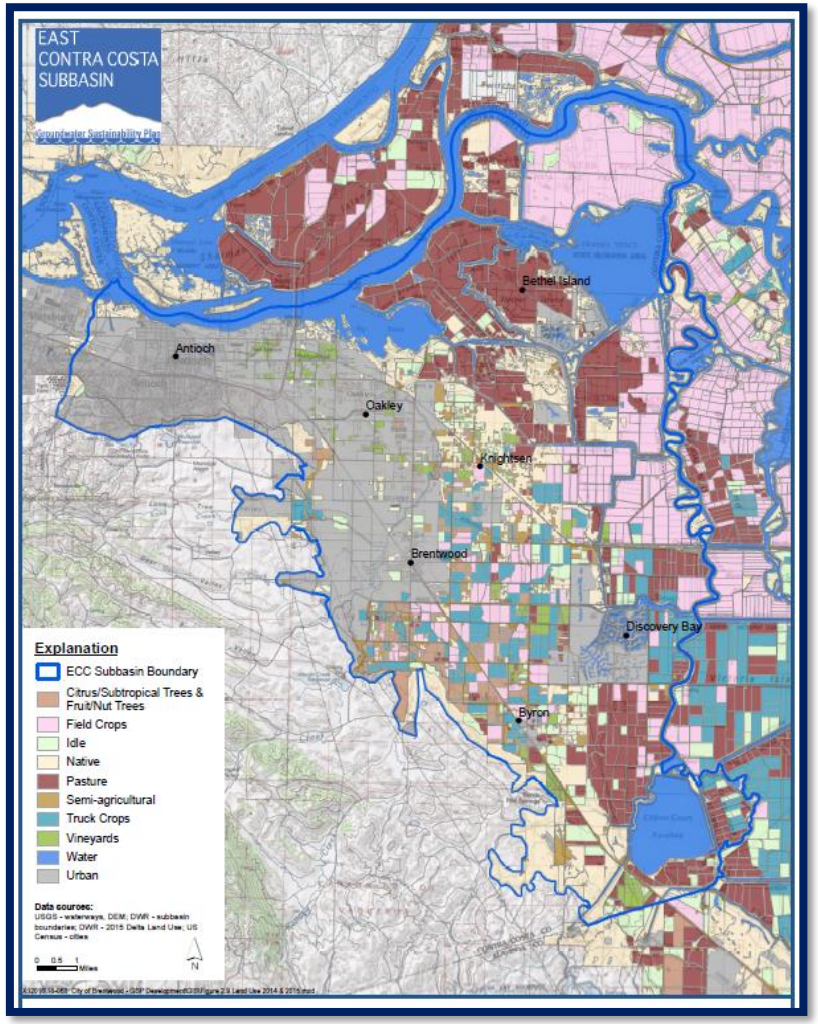
Section 2 Plan Area

EAST CONTRA COSTA SUBBASIN
Groundwater Sustainability Plan

Water Management Responsibilities



Land Uses Elements



Section 3 Stable Basin Conditions

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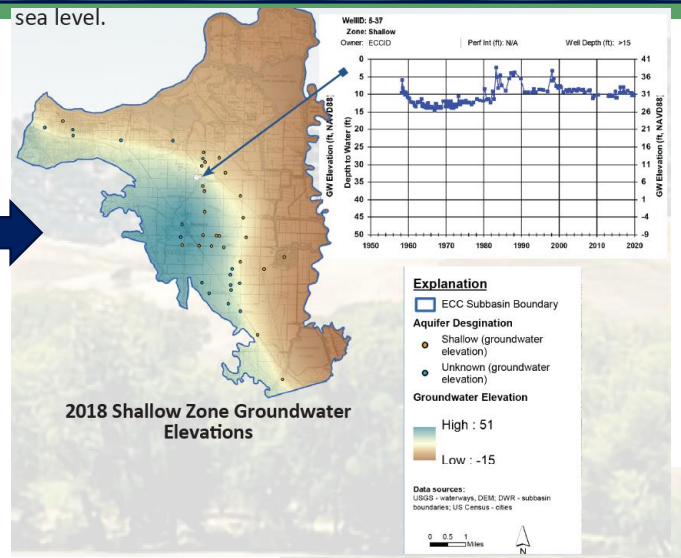
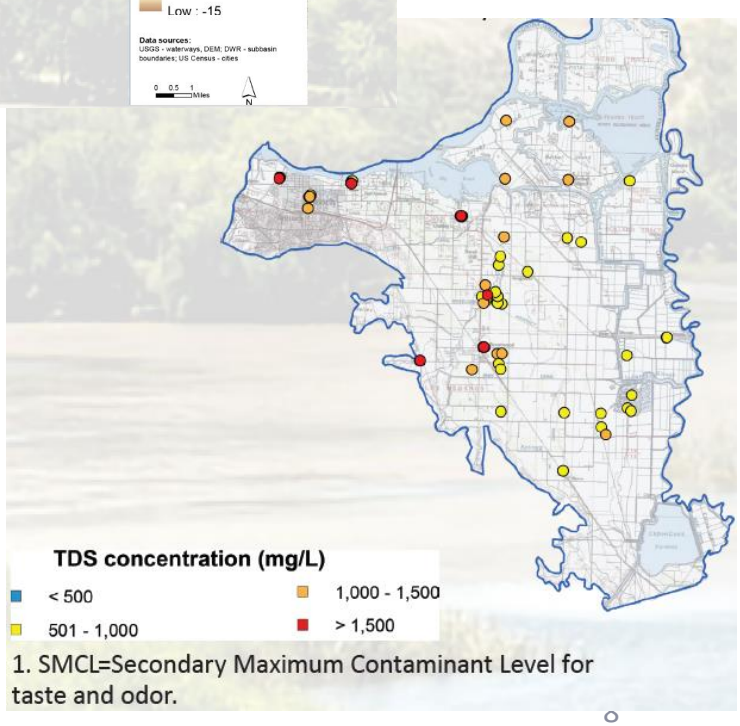
Groundwater Sustainability Plan

Six Sustainability Indicators: No Concerns

1. **Chronic Groundwater Level Lowering**: Not present
2. **Groundwater Storage**: No reduction
3. **Seawater Intrusion**: Not present
4. **Groundwater Quality**: No degradation due to pumping
5. **Land Subsidence** due to groundwater pumping: Not Present
6. **Surface Water Depletion** due to groundwater pumping: Not Present





Process for Adopting a GSP

Groundwater Sustainability Plan Sections

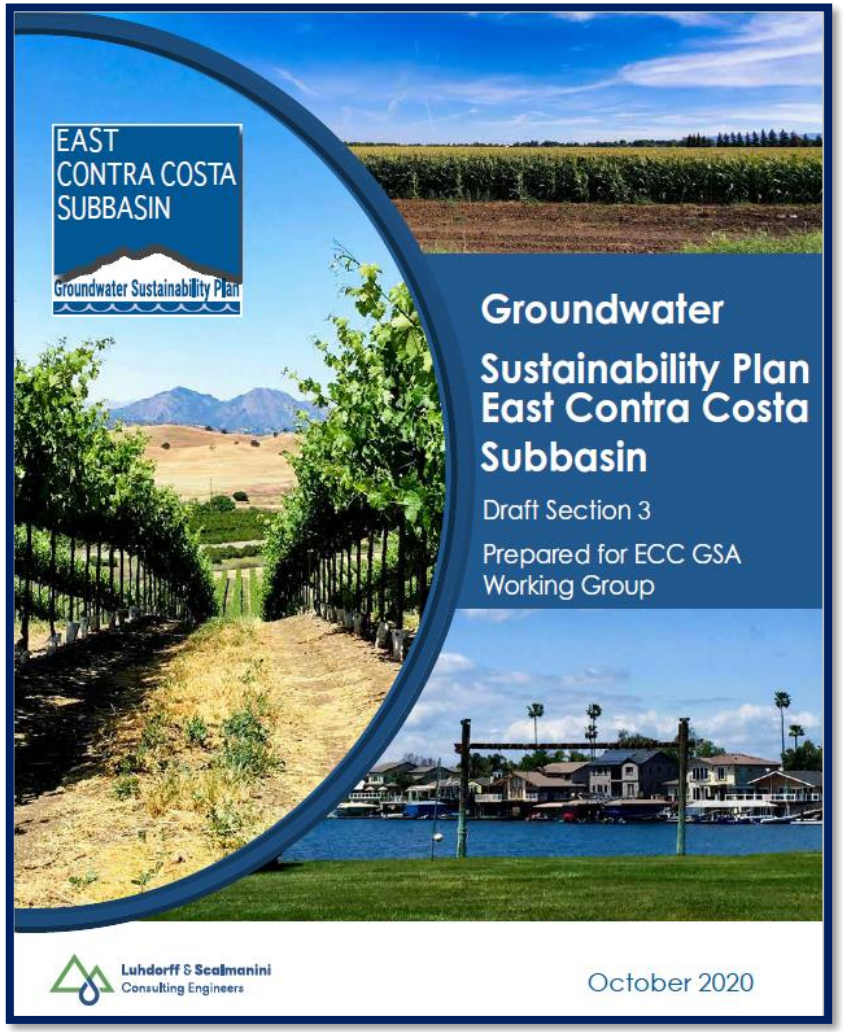
✓ 1. Notice of Intent to Adopt (NOI) – Required 90 days prior to adoptions (to be sent July 1, 2021)

2. Final Public Comment Period on Public Draft of entire GSP – September 1 to 30, 2021

3. Publish Final GSP – October 15, 2021

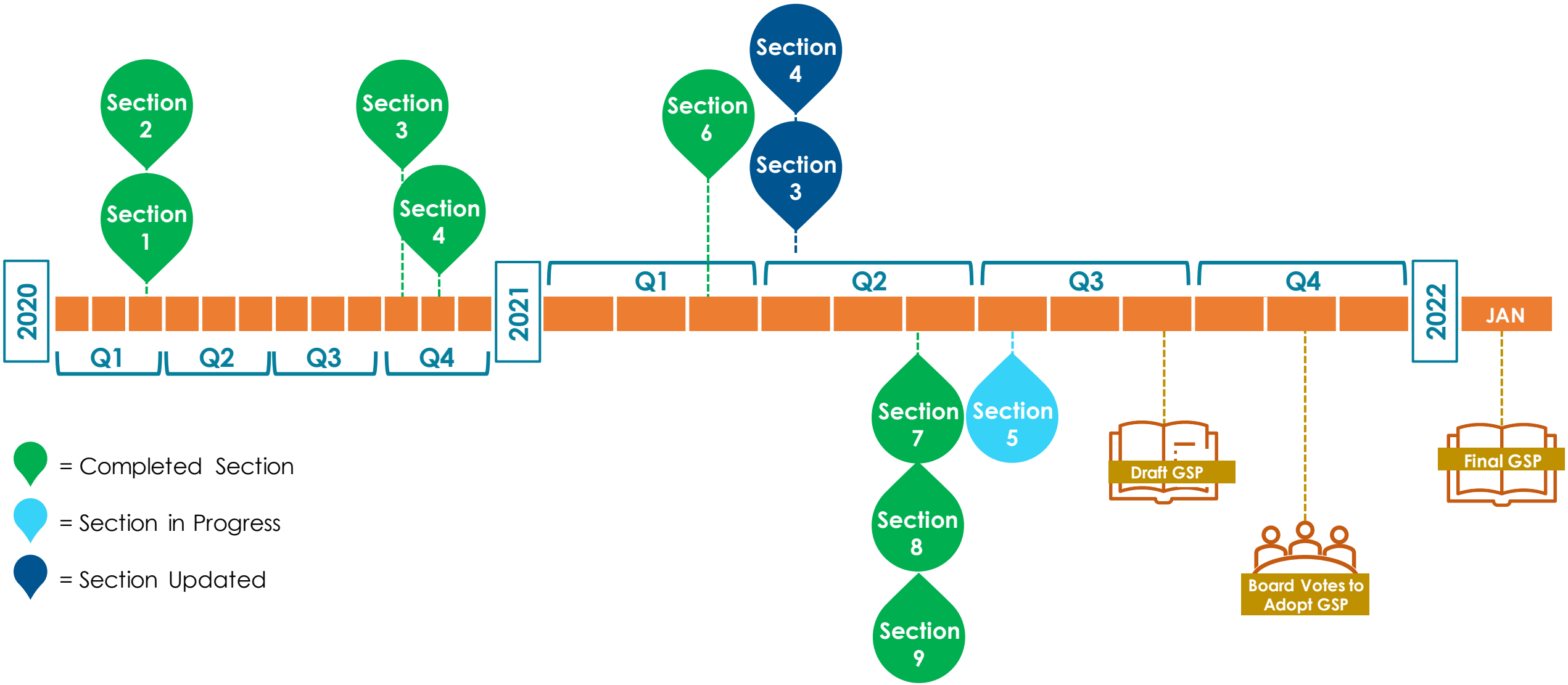
4. GSAs adopt– Each GSAs shall adopt the Final GSP (October 15-Dec. 15)

5. Deadline to submit GSP to DWR– January 31, 2022



Project Status: GSP Schedule

EAST CONTRA COSTA SUBBASIN
Groundwater Sustainability Plan



Questions?

Contact:
Ryan Hernandez
925-655-2919

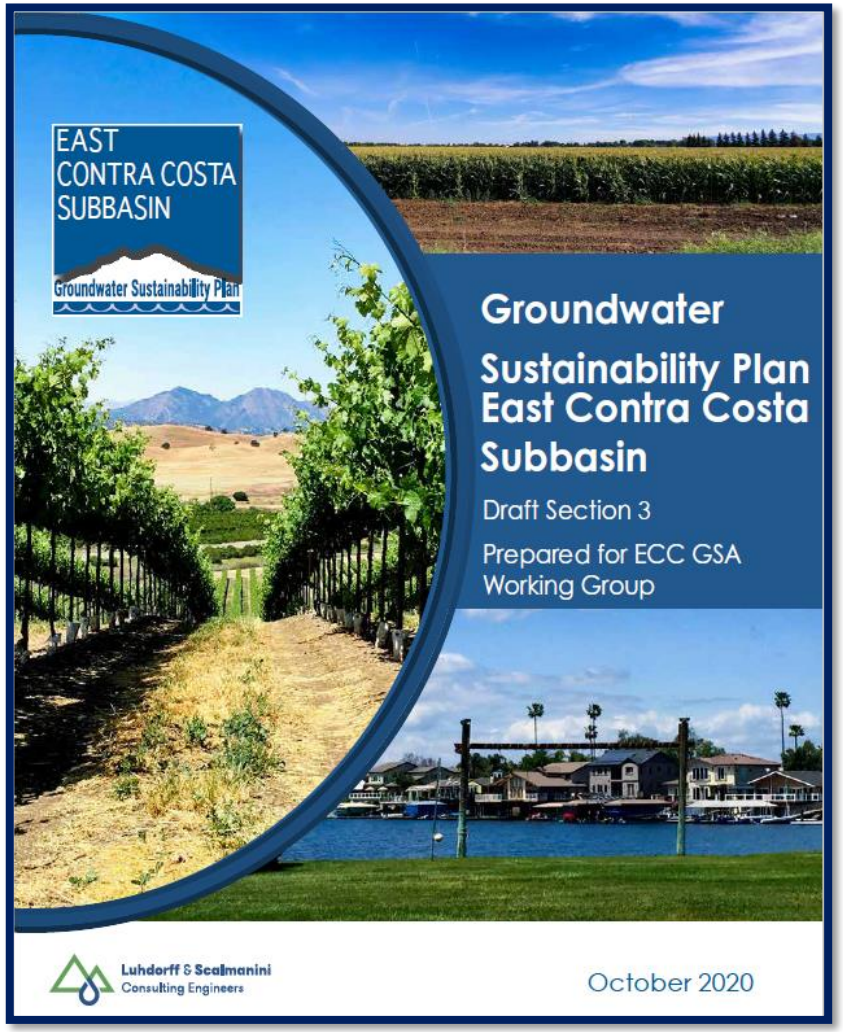
East Contra Costa Subbasin Groundwater Sustainability Plan

Tom Elson
Luhdorff & Scalmanini
Consulting Engineers

ECC Groundwater Sustainability Plan

Groundwater Sustainability Plan Sections

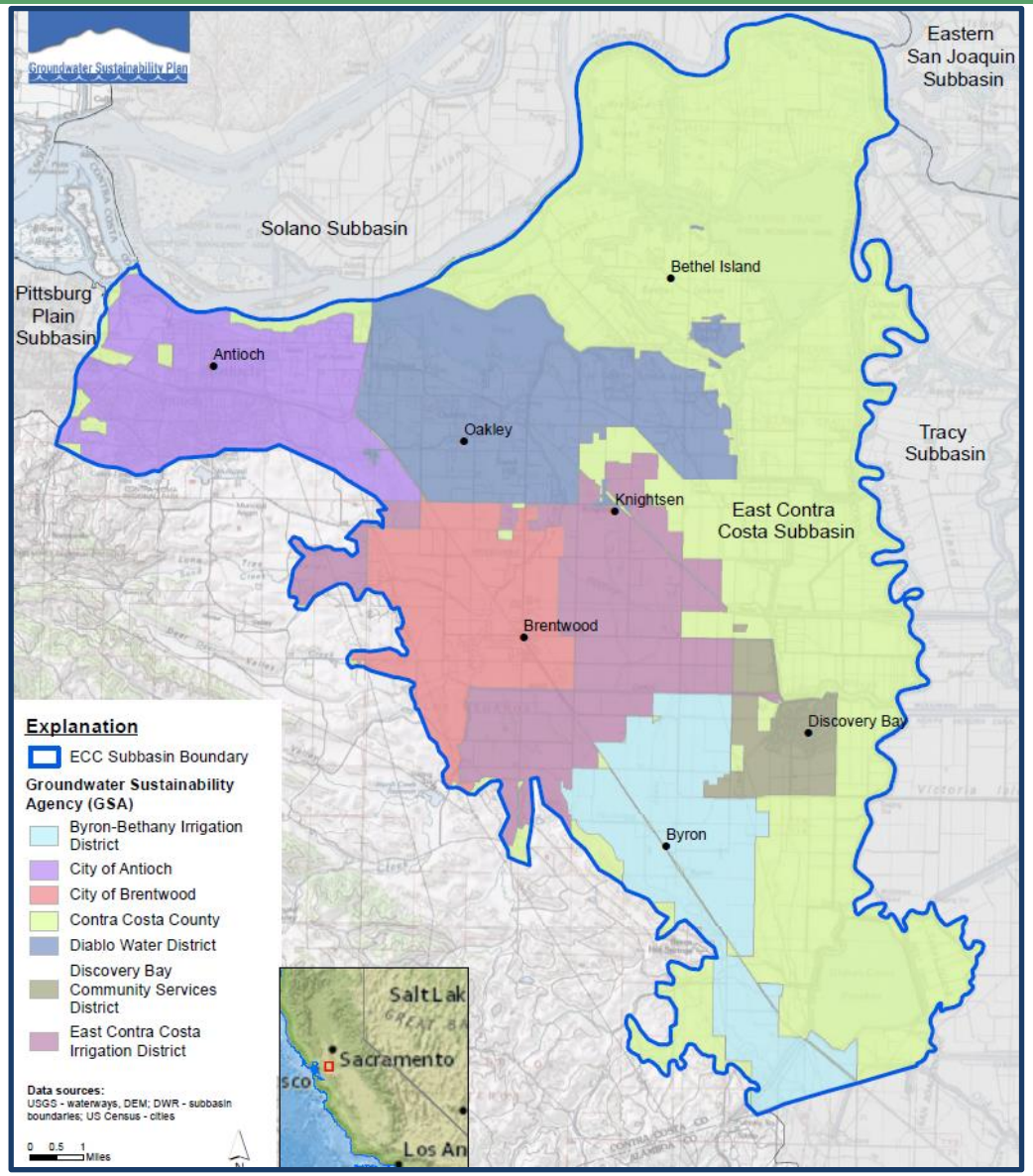
- ✓ 1. Introduction – Agency Information
- ✓ 2. Plan Area – Water Resources Programs, Land Uses Elements
- ✓ 3. Basin Setting – Hydrogeologic Conceptual Model, Groundwater and Surface Water Conditions
- ✓ 4. Water Supply – Historical, Current and Projected
- 5. Water Budget – Historical, Current and Projected (Model Results)
- ✓ 6. Monitoring Network
- ✓ 7. Sustainable Management Criteria
- ✓ 8. Projects and Management Actions
- 9. Plan Implementation



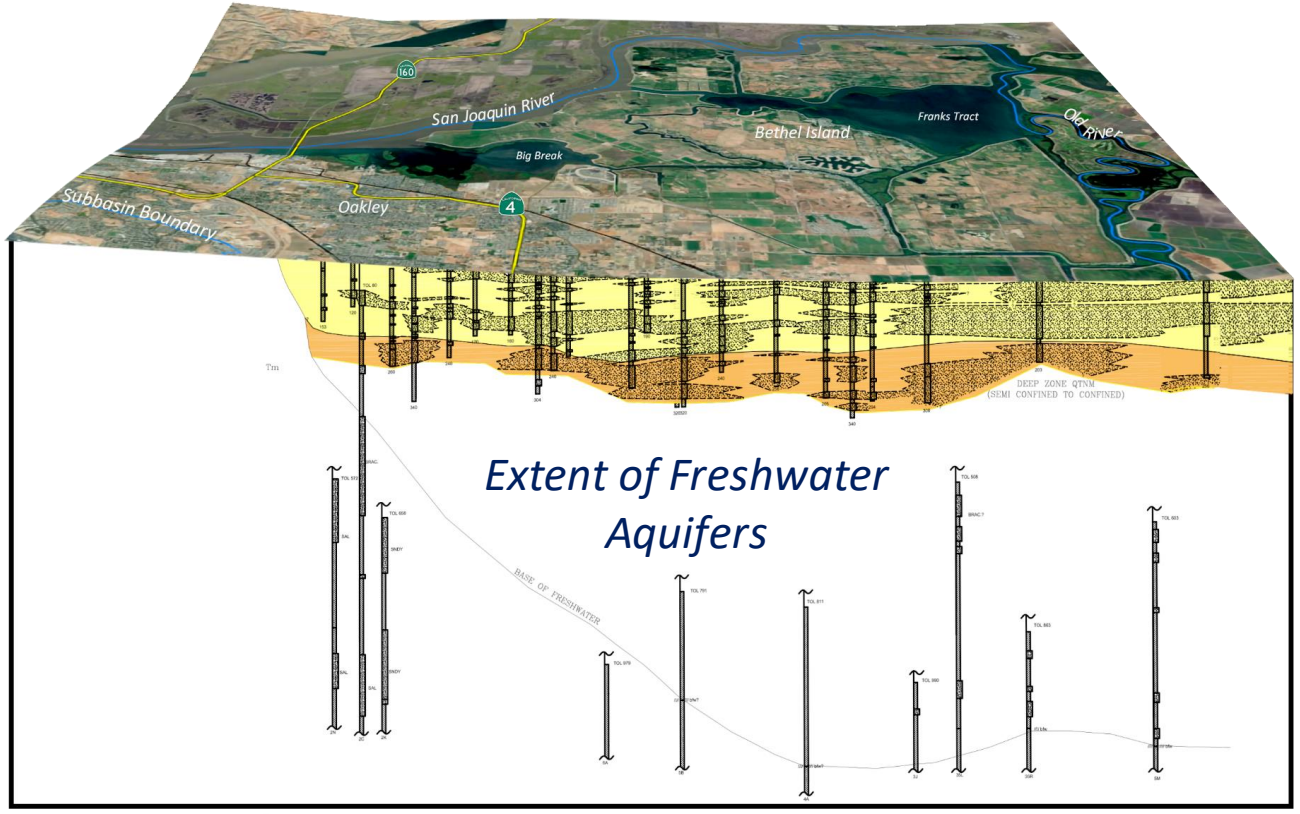
Introduction

The GSP *set forth a program to achieve and maintain a sustainable resource.*

Under SGMA *and new regulations, sustainable groundwater management is defined as the management and use of groundwater in a manner that can be maintained for the next 50 years without causing undesirable results.*



Key findings: geology and hydrogeology



Shallow Zone <150'deep

Deep Zone >150'

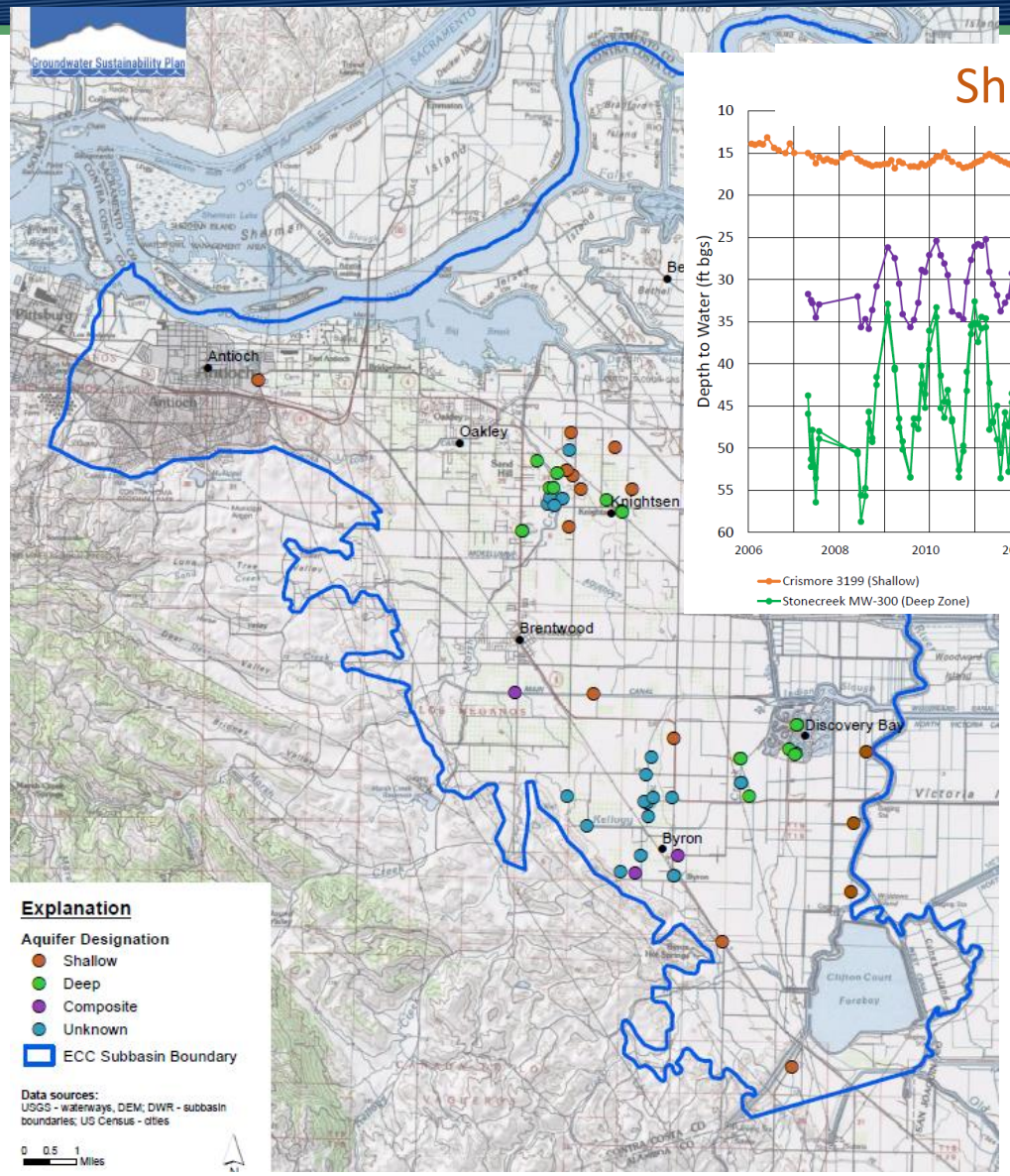
Public Supply Wells 200-400'

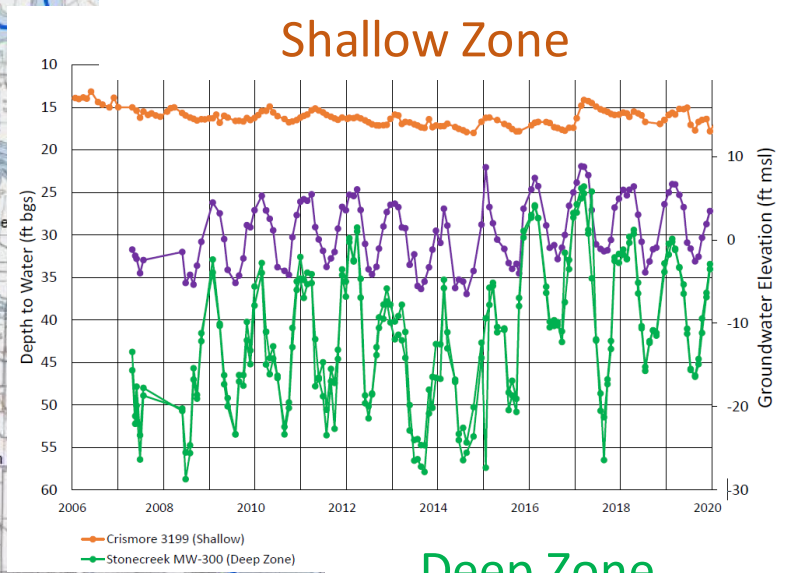
The hydrogeologic conceptual model includes understanding of water budget components (e.g., recharge sources, outflow, pumping)

Key findings: stable groundwater levels

Local agencies monitor water levels to understand groundwater conditions in the subbasin

- Have observed regionally stable groundwater conditions

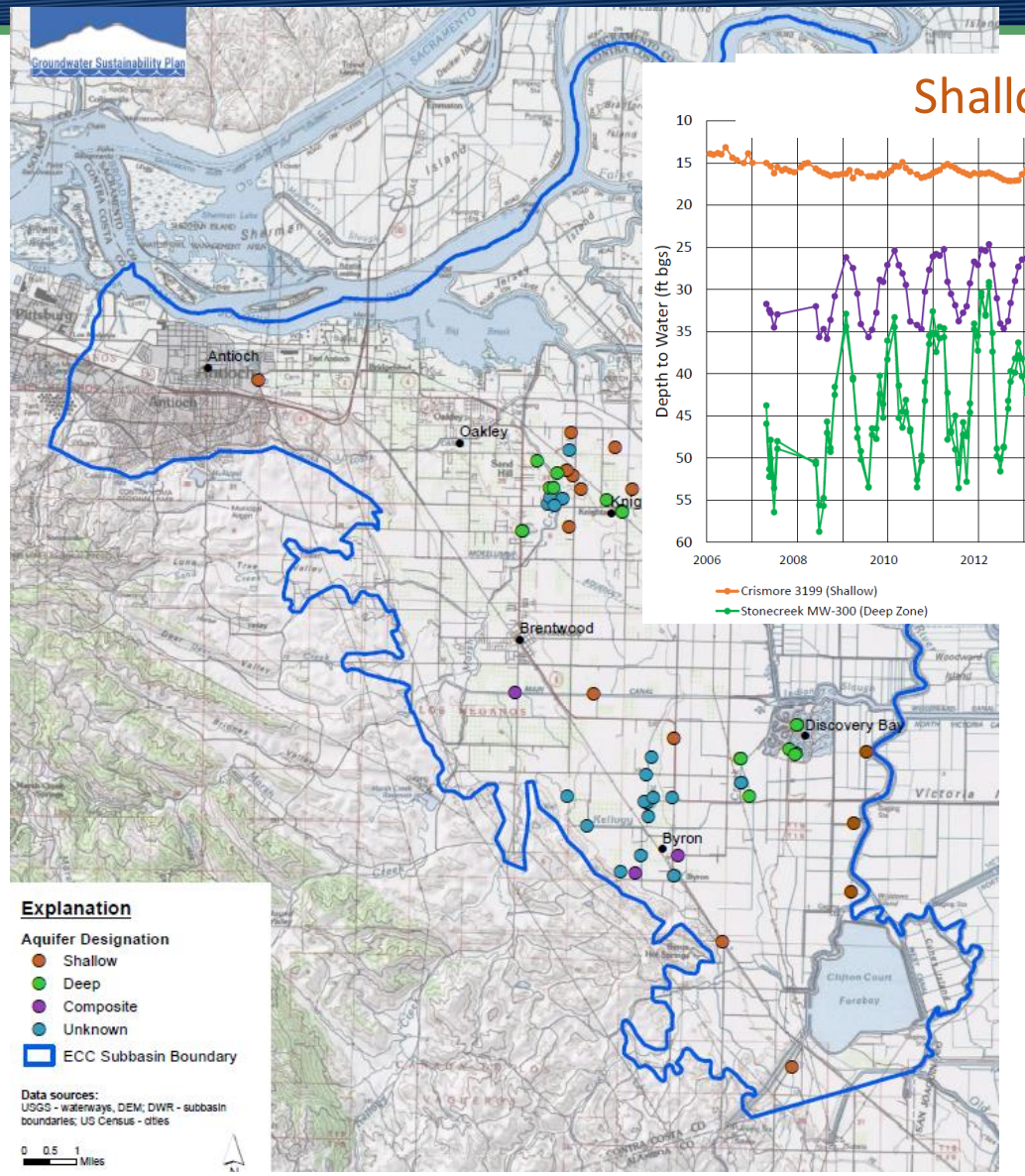


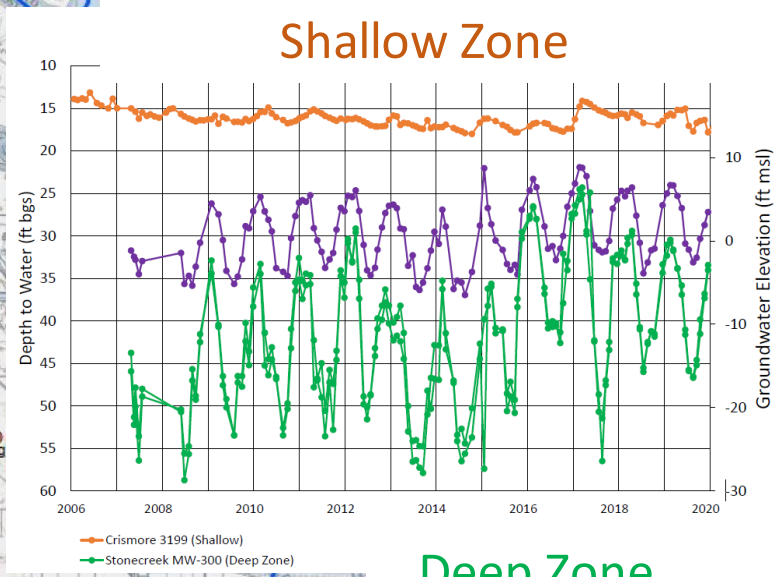


Deep Zone

Key findings: stable groundwater levels

- Groundwater demand is 15 % of total, rest is surface water
- Projected sustainability estimates indicate that even under much higher pumping, nearly 50%, groundwater storage and levels are sustainable
- Monitoring networks intended to ensure that localized problems don't arise as a result of assumptions and management actions





Deep Zone

Key finding: no historical impacts to well capacities

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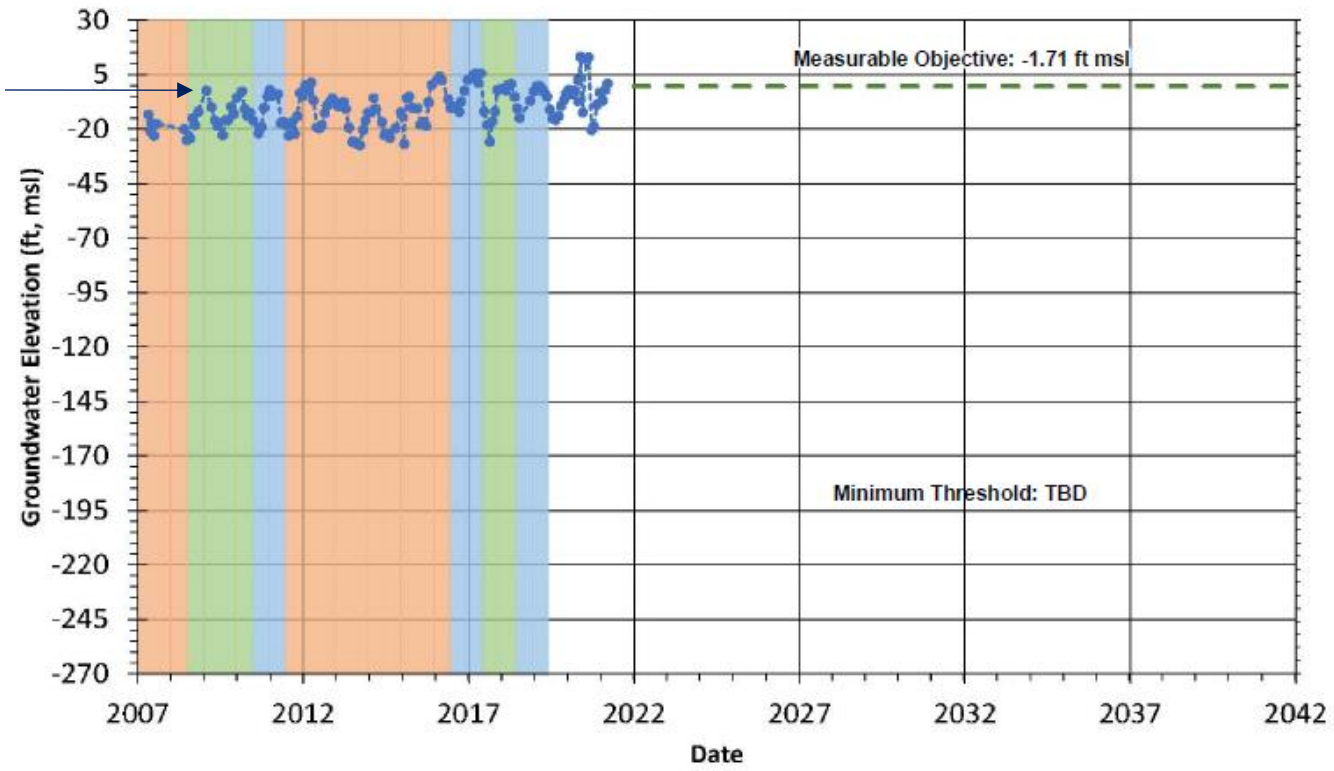
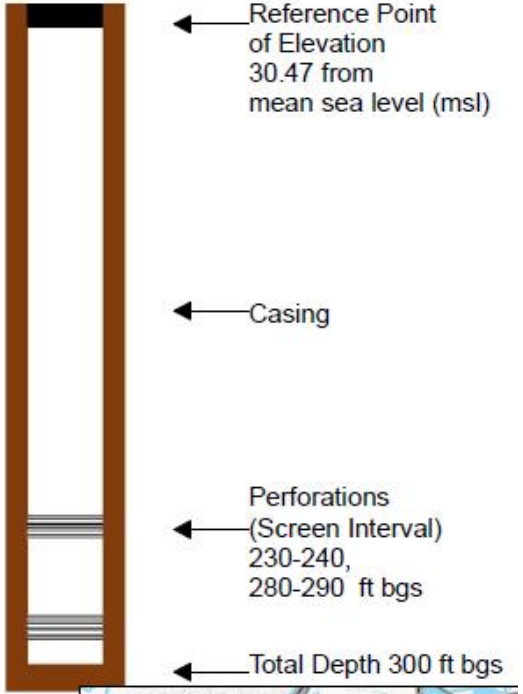
Groundwater Sustainability Plan

Stonecreek MW-300





Explanation

- Groundwater Elevation
- Measurable Objective
- Minimum Threshold

TBD=to be determined

Water Year Hydrologic Classification[1]

- Wet Water Year
- Normal Water Year
- Dry Water Year

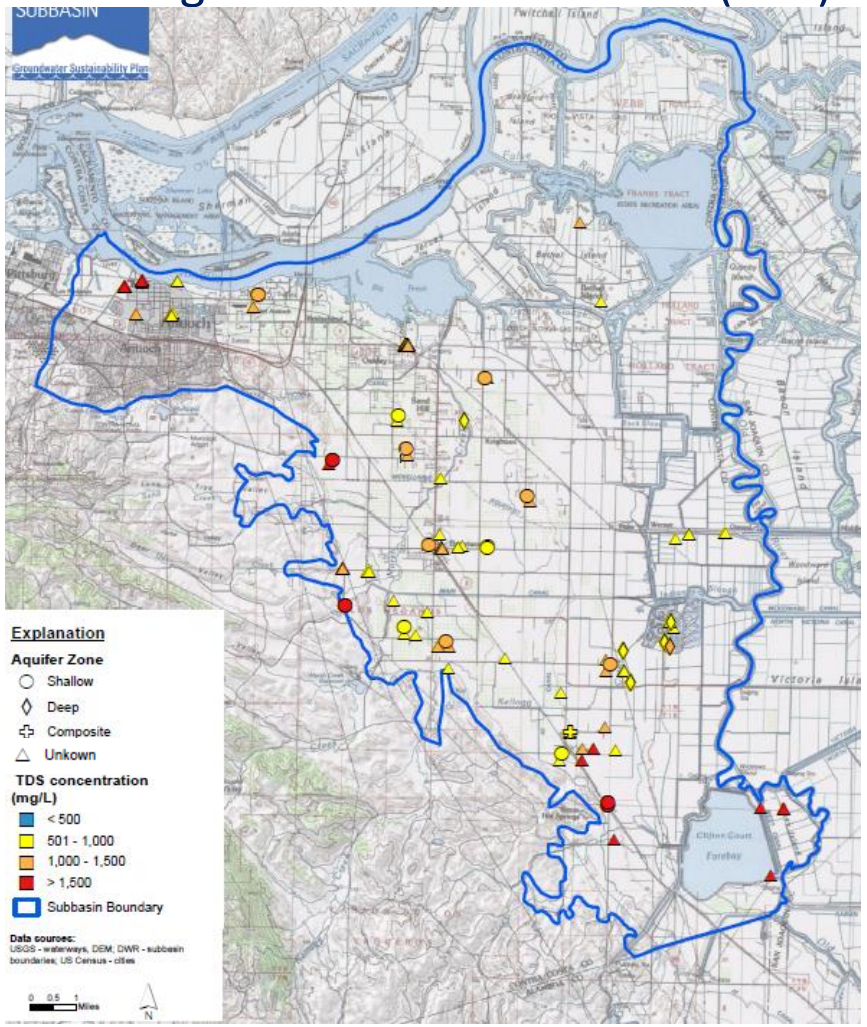
1. Source of Water Year Type: https://cdec.water.ca.gov/reportapp/javareports?name=WSIHIST

Data sources:
USGS - waterways, DEM;
DWR - subbasin boundaries;
US Census - cities

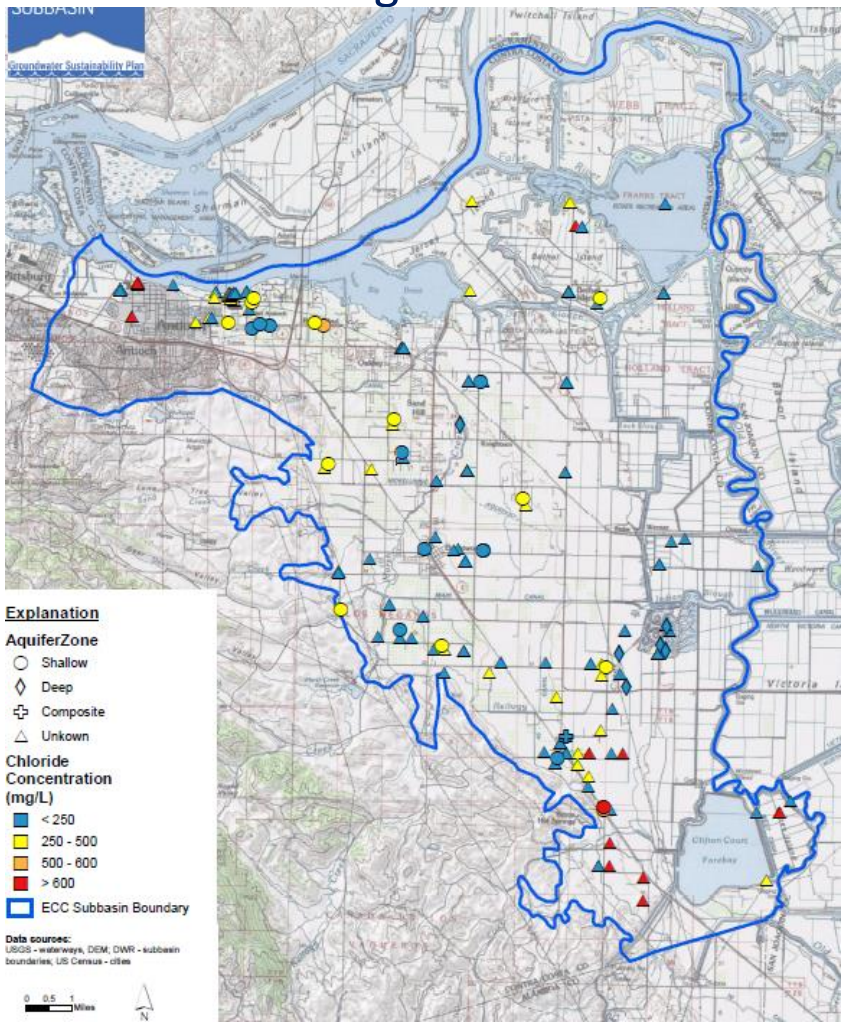
Key findings: groundwater quality

- Subbasin has relatively high native dissolved minerals
  - TDS generally greater than 500 mg/L
  - Chloride often greater than 250 mg/L

Average Total Dissolved Solids (TDS)

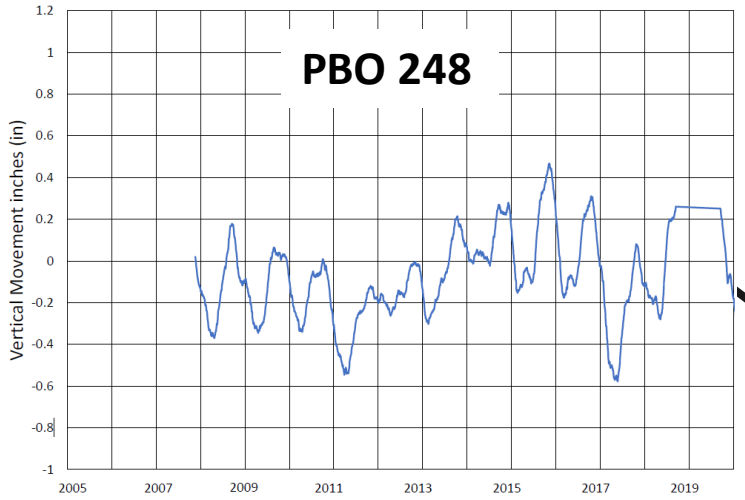


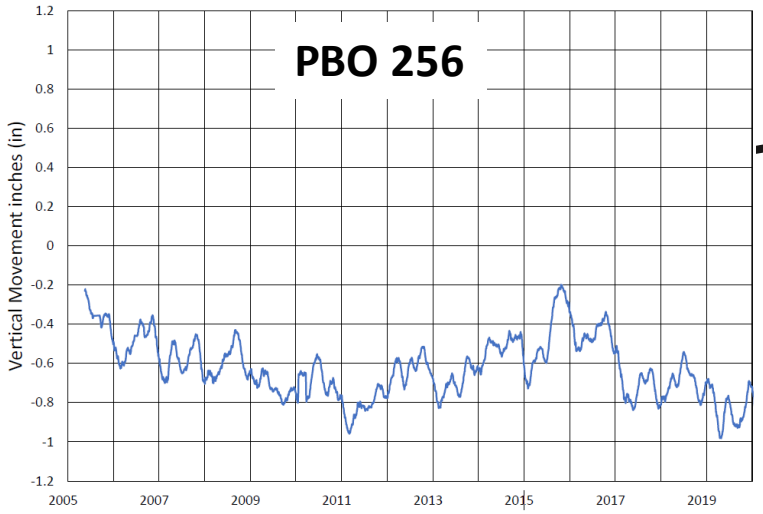
Average Chloride

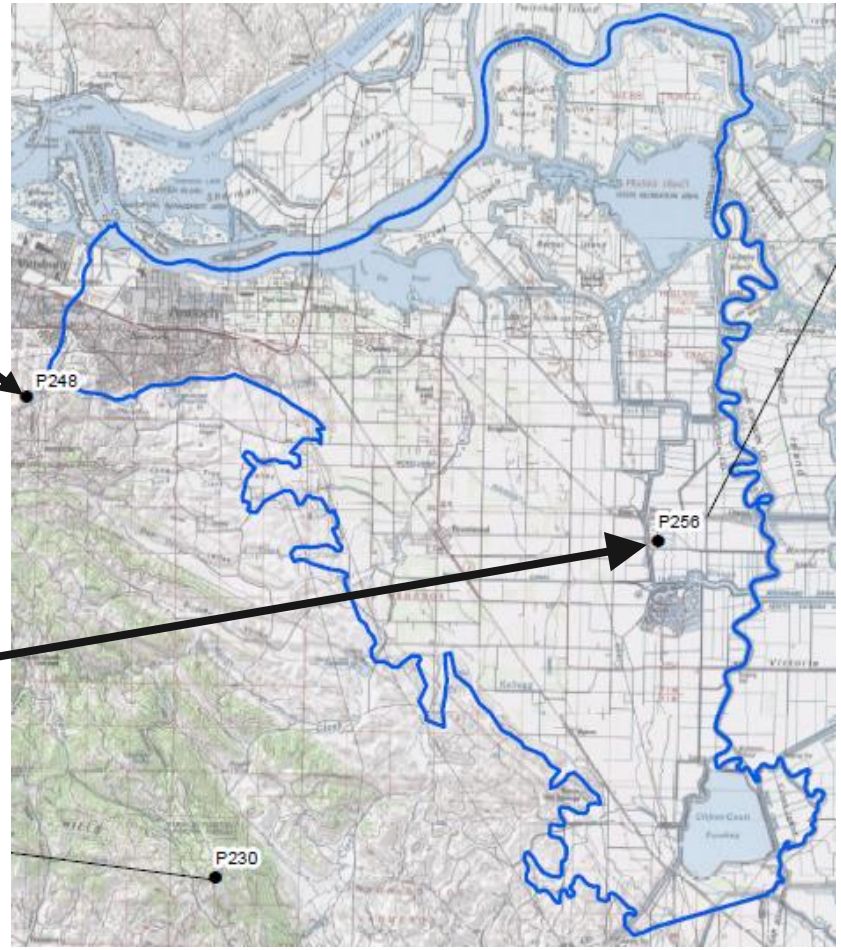


Key findings: no subsidence

Plate Boundary Observation (PBO) Stations







PBO stations:

- Can be used to monitor for land subsidence using vertical land surface measurements
- Two stations in and near the ECC Subbasin show minor elastic (recoverable) displacement and **no inelastic (permanent) displacement of the land surface**

Key findings: saline water intrusion

1. In the ECC Subbasin, there is no saltwater interface.
2. Potential source of saline water intrusion is migration of baywater into the Shallow Zone aquifers.
3. Although outflow through the Delta is managed to protect water quality,
    - increases in baywater salinity could potentially occur such as due to sea-level rise and, in turn,
    - saline baywater may impact sustainability if intrusion into shallow groundwater migrates vertically into Deep Zone.

Hydrogeologic setting and seawater intrusion

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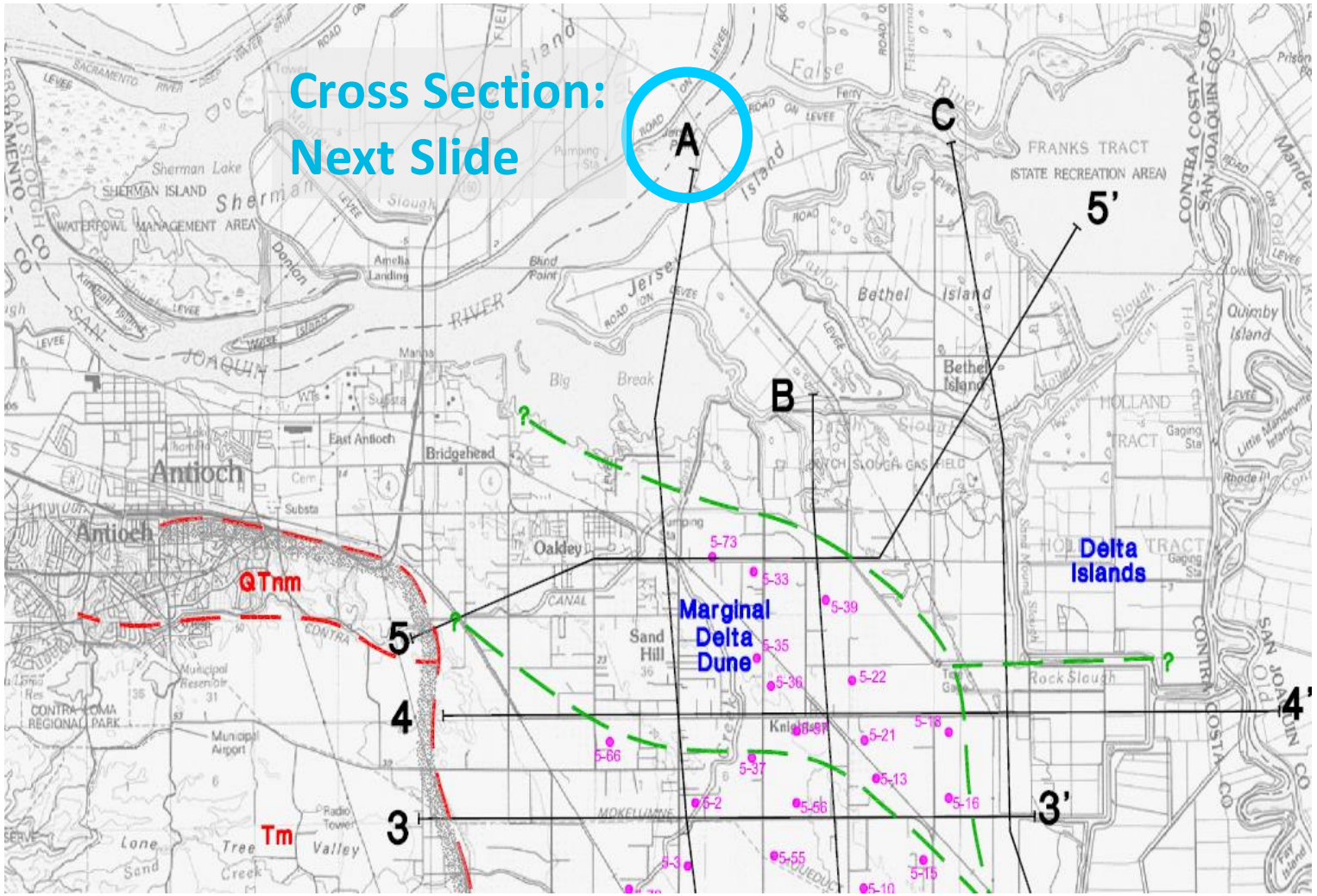
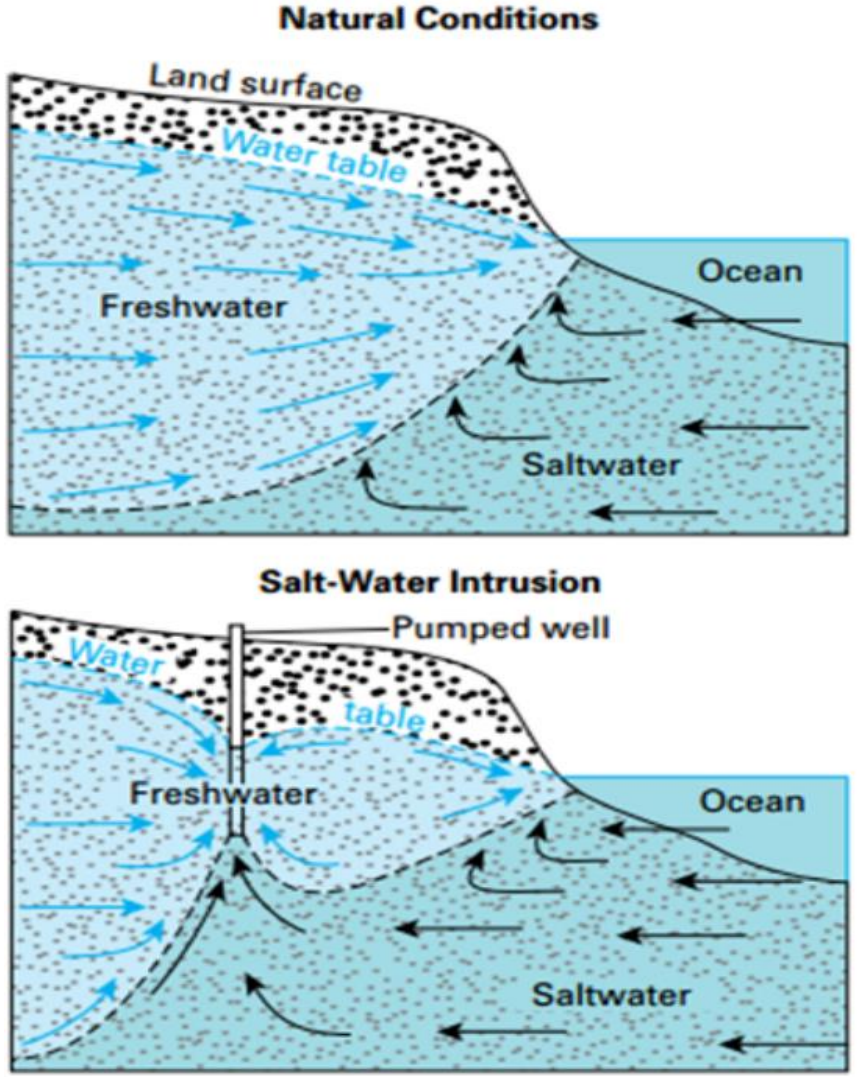
Groundwater Sustainability Plan





Sustainability indicators: seawater intrusion

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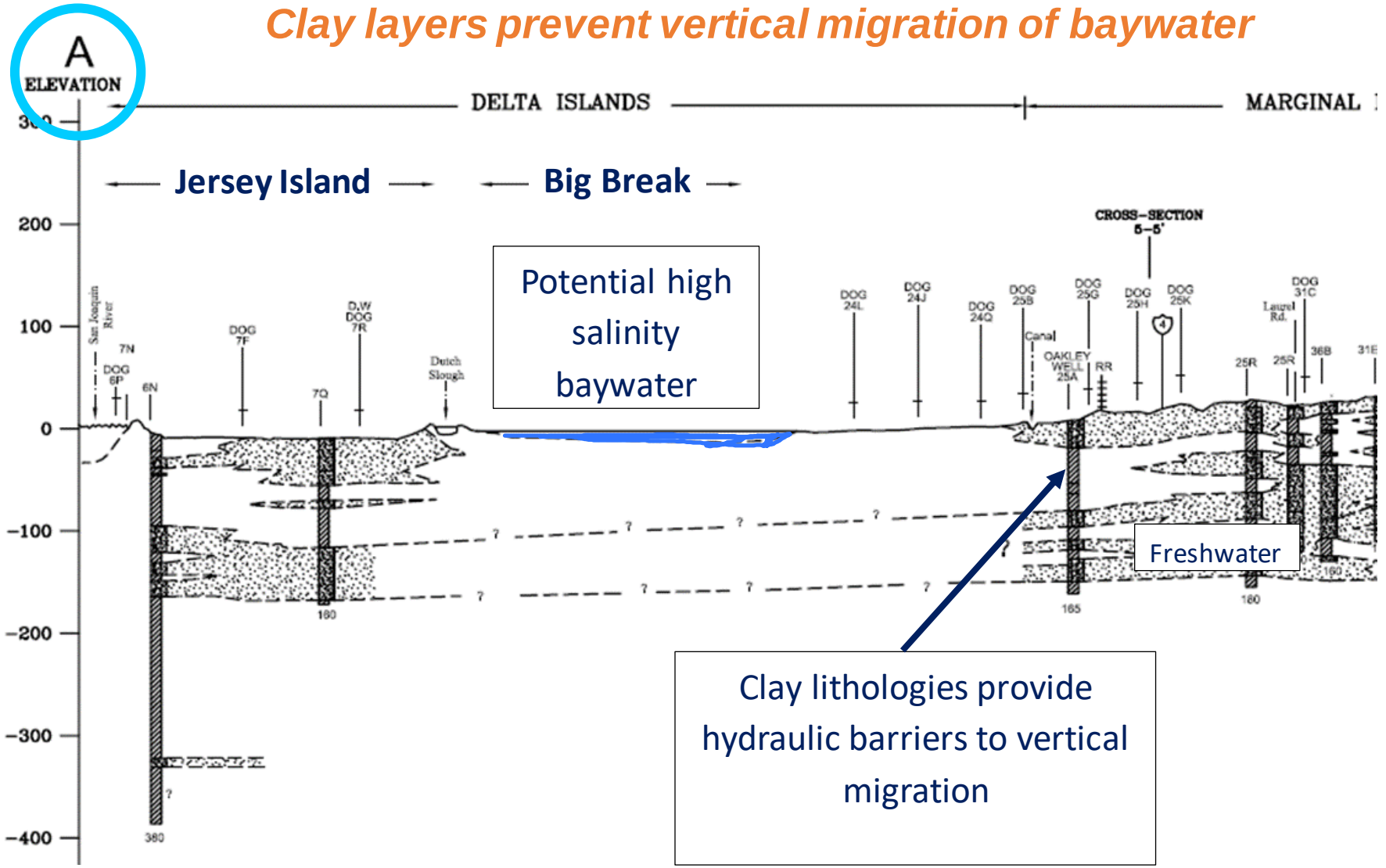
Groundwater Sustainability Plan

Clay layers prevent vertical migration of baywater



Questions?

Sustainable Management Criteria

Dan Muelrath
General Manager
Diablo Water District

Sustainable Management Criteria

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Groundwater Sustainability Plan

Sustainable management criteria consist of four requirements:

1. Establishing a Sustainability Goal
2. Identification of Undesirable Results
3. Determination of Minimum Thresholds (MT)
4. Targeting Measurable Objectives (MO)

Process

Sustainable management criteria were developed by ECC Working Group[1] with public input:

Each GSA identified uses and users within each area of responsibility.

Determined what constitutes undesirable results that have the potential to harm users and beneficial uses.

Developed technical basis for setting Measurable Thresholds and Measurable Objectives recognizing the past, current, and projected conditions in the ECC Subbasin.

1. Seven GSAs and Contra Costa Water District

Sustainability Goal

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Groundwater Sustainability Plan

The sustainability goal for the ECC Subbasin GSP is to manage the groundwater subbasin to:

- Protect and maintain safe and reliable sources of groundwater for all beneficial uses and users.
- Ensure current and future groundwater demands accounting for changing groundwater conditions due to climate change.
- Establish and protect sustainable yield for the Subbasin by achieving measurable objectives set forth in this GSP in accordance with implementation and planning periods .
- Avoid undesirable results defined under SGMA.

Six Undesirable results

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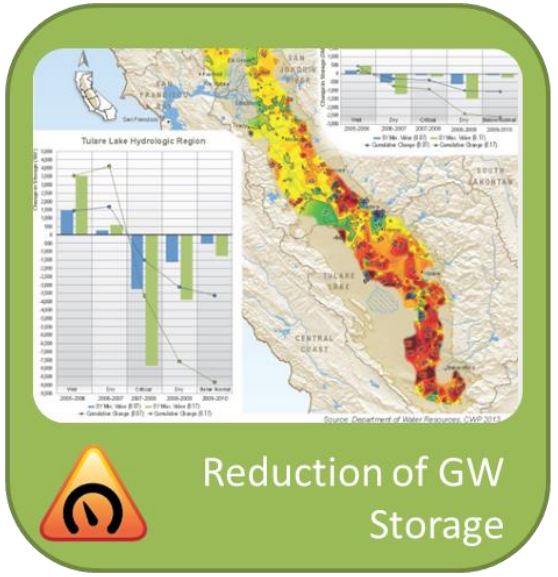
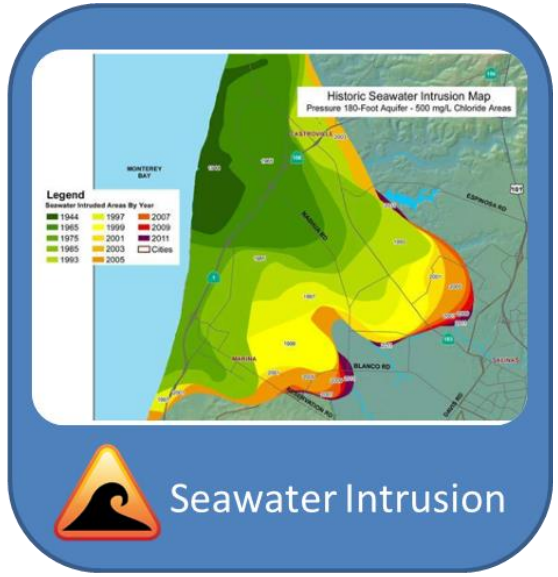
Groundwater Sustainability Plan

Avoiding Groundwater Conditions that Cause Significant and Unreasonable…..

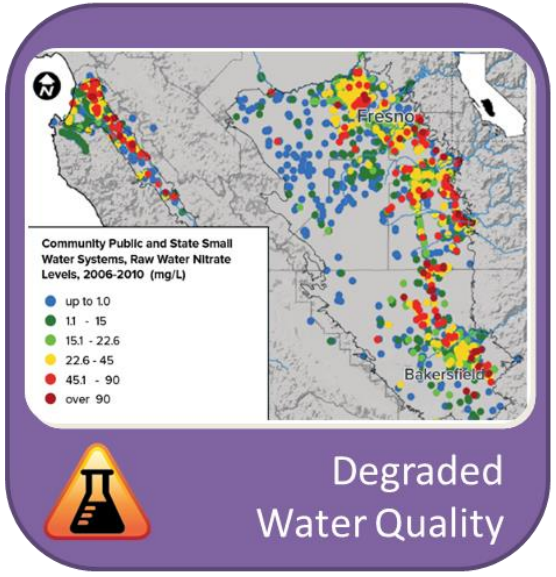

Lowering of GW Levels



Reduction of GW Storage



Seawater Intrusion



Degraded Water Quality


Land Subsidence


Depletion of Inter-connected Streams

Principles embodied in the GSP

- Continued public outreach to all interested parties and stakeholders...
- Adaptively manage the ECC monitoring networks….
- Prioritize environmental justice and groundwater dependent ecosystems….
- Protect the groundwater supply of potentially underrepresented communities.
- View the use and protection of groundwater as an integral part of long-term water management strategies...
- Protect and maintain sufficient groundwater storage to provide operational flexibility…
- Acknowledge that within the ECC Subbasin there are criteria and solutions that are regionally appropriate ...
- Continued cooperative water resources management by GSAs and other water agencies...

Undesirable results: chronic lowering of water levels

The ECC GSP defines significant and unreasonable chronic lowering of water levels as:

- *Unreasonable reduction or loss of water well capacity that cannot be mitigated.*

Applies to:

Agricultural wells

Commercial wells

Domestic supply wells

- Municipal wells
- Small water system wells
- Private domestic wells

Industrial wells

Undesirable results: chronic lowering of water levels

EAST CONTRA COSTA SUBBASIN
Groundwater Sustainability Plan

Also:

- Adverse economic impacts and burdens on local agricultural and commercial enterprises.
- Adverse economic impacts to existing well owners resulting in the need to: lower a well pump ("chasing the water"), to replace a pump, and/or to deepen or replace a well.
- Loss of water source due to drop in water levels (wells going "dry").
- Cause sustained water level declines to neighboring wells (well pumping interference).
- Lack of prioritization of health and human safety over uses such as landscape irrigation.
- Interference with other sustainability indicators.

Undesirable results: water quality

The ECC GSP defines significant and unreasonable changes in groundwater quality due to projects or actions as:

- Increases in concentrations of key groundwater quality constituents exceed drinking water maximum contaminant limits (MCLs) reducing groundwater for domestic, agricultural, municipal, or environmental beneficial uses.
- Changes in water quality that cause economic burdens placed on users to treat or replace sources of groundwater supply.
- Impacts to agricultural crop production and/or quality.
- Migration of contaminants to domestic or agricultural sources of supply.
- Movement or increases in currently unregulated chemical constituents that adversely impact beneficial uses and users of groundwater.

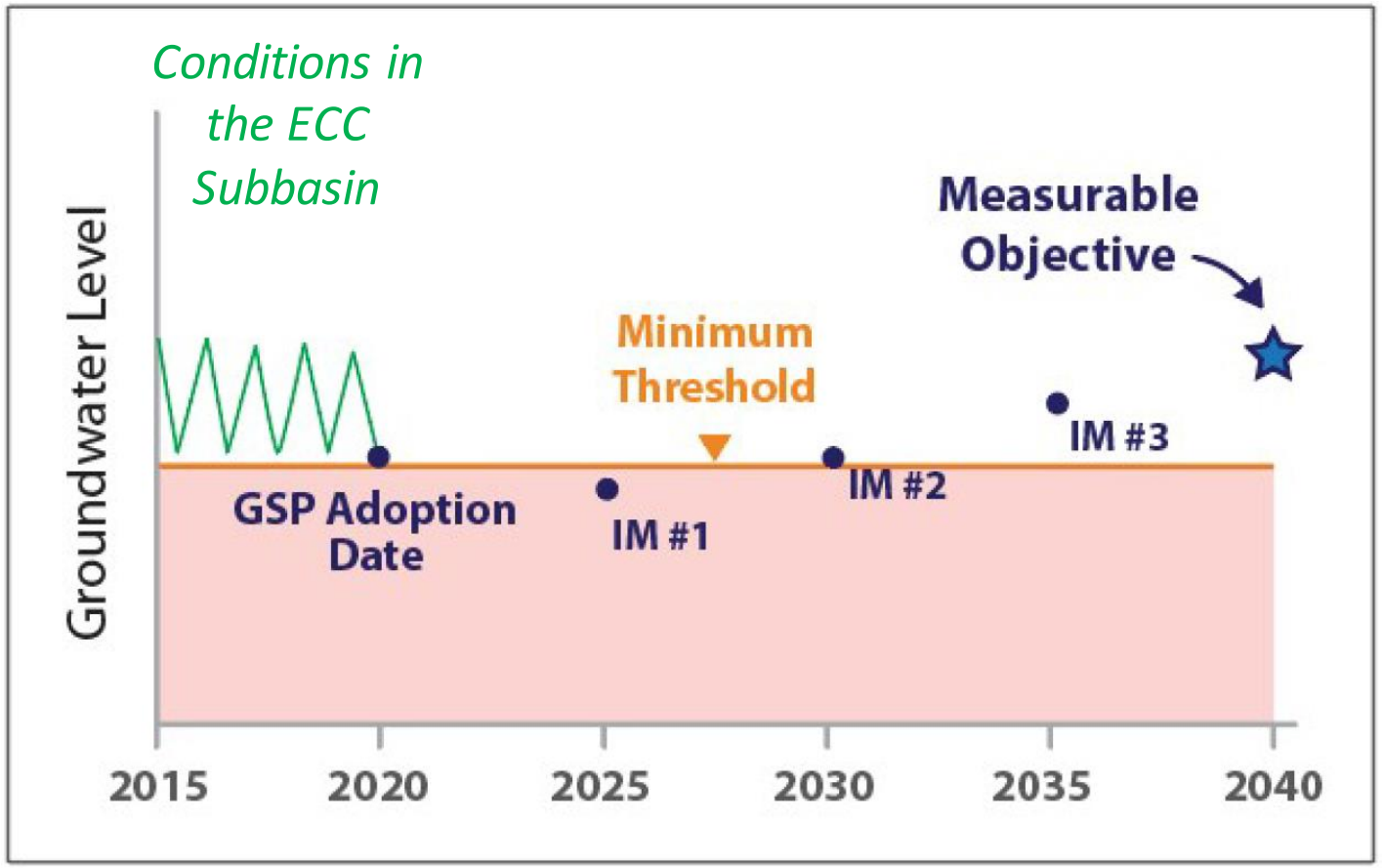
Minimum thresholds and measurable objectives
Chronic lowering of water levels

Minimum Thresholds

- Set at each Representative Monitoring Point
- Set for each sustainability indicator
- Quantitative value used to reflect undesirable result

Measurable Objectives

- Quantitative goal that allows operation flexibility above the MT



Note: this graph is for demonstration purposes only.

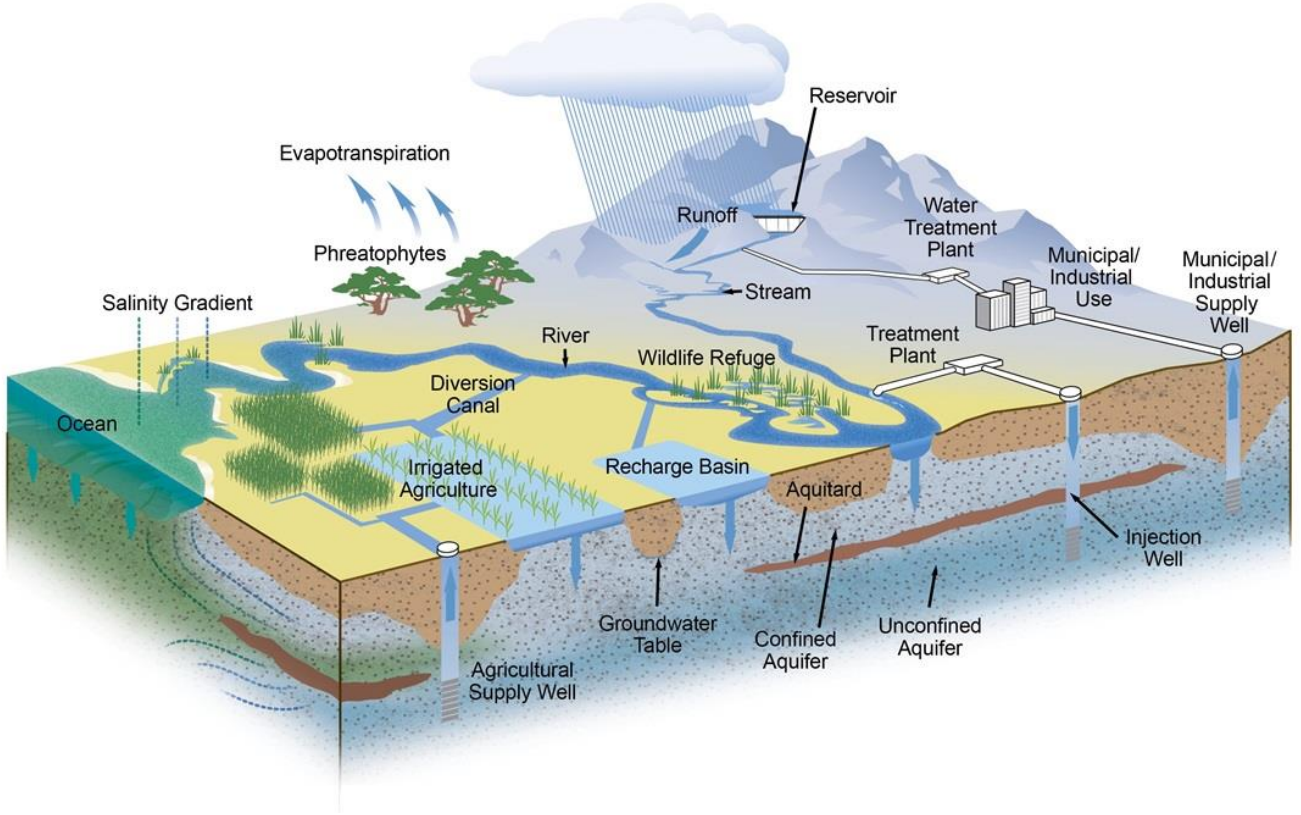
East Contra Costa Subbasin Groundwater Sustainability Plan

Tom Elson
Luhdorff & Scalmanini
Consulting Engineers

Section 5 water budget and groundwater flow model

A groundwater flow model was developed to evaluate:

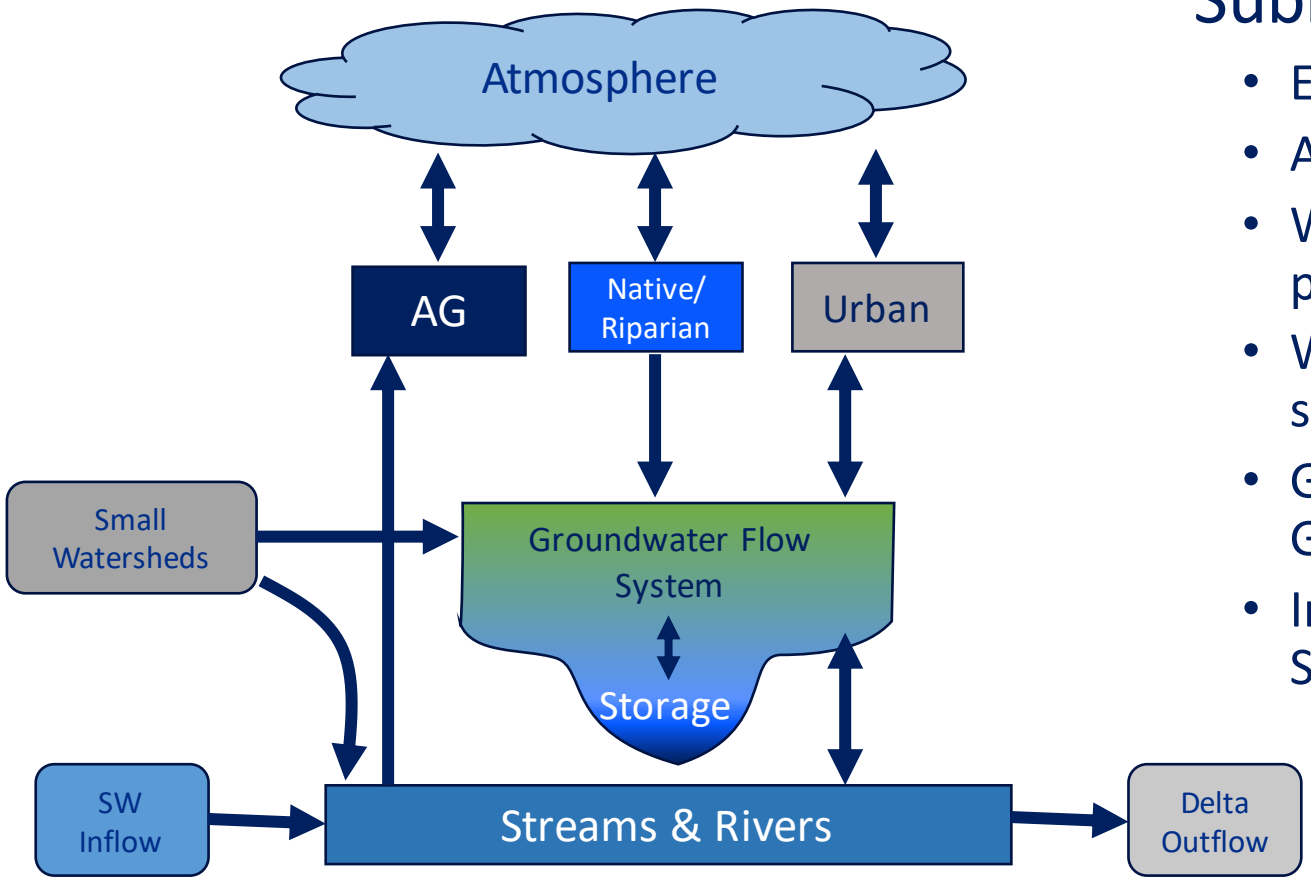
- Water Budget Components
- Future Scenarios
- Sustainable Yield



Section 5 water budget and groundwater flow model

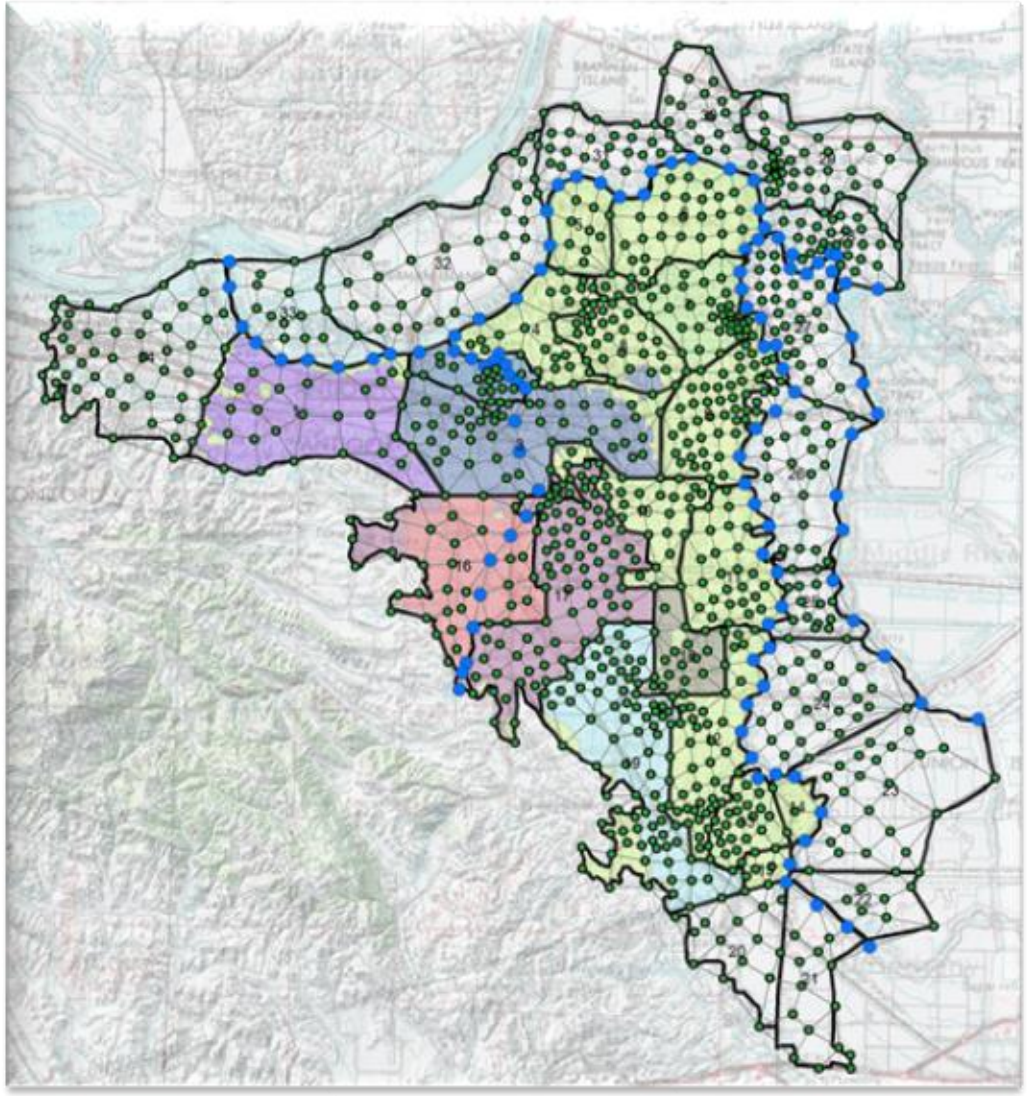
- Models improve understanding of processes that influence sustainability in the basin.
- Models can forecast the influence of projects and management actions on basin conditions.
- Models can simulate changing climate conditions that may occur during the 50-year planning and implementation horizon.

Water Budget Components



- Model Output for each Water Balance Subregion and for ECC Subbasin
  - Evapotranspiration
  - Agricultural and Urban Water Use
  - Water Supply (precip, diversions, groundwater pumping, storage)
  - Water Use (recharge, runoff, evapotranspiration, storage)
  - Groundwater Storage & Cumulative Change in Groundwater Storage
  - Inflows & Outflows (Recharge, Boundary Flows, Streams, Storage, Pumping)

Refining Existing DWR Model: Development of Local ECC Subbasin Model



Model Features

- Local pumping amounts
- Local surface water delivery amounts
- Water Balance Subregions within the basin
- Improvements to vertical model layering to match Hydrogeologic Conceptual Model (HCM)
- Improved calibration well network and surface water gages
- Calibration – groundwater level agreement

Water Budget Components Entire Subbasin

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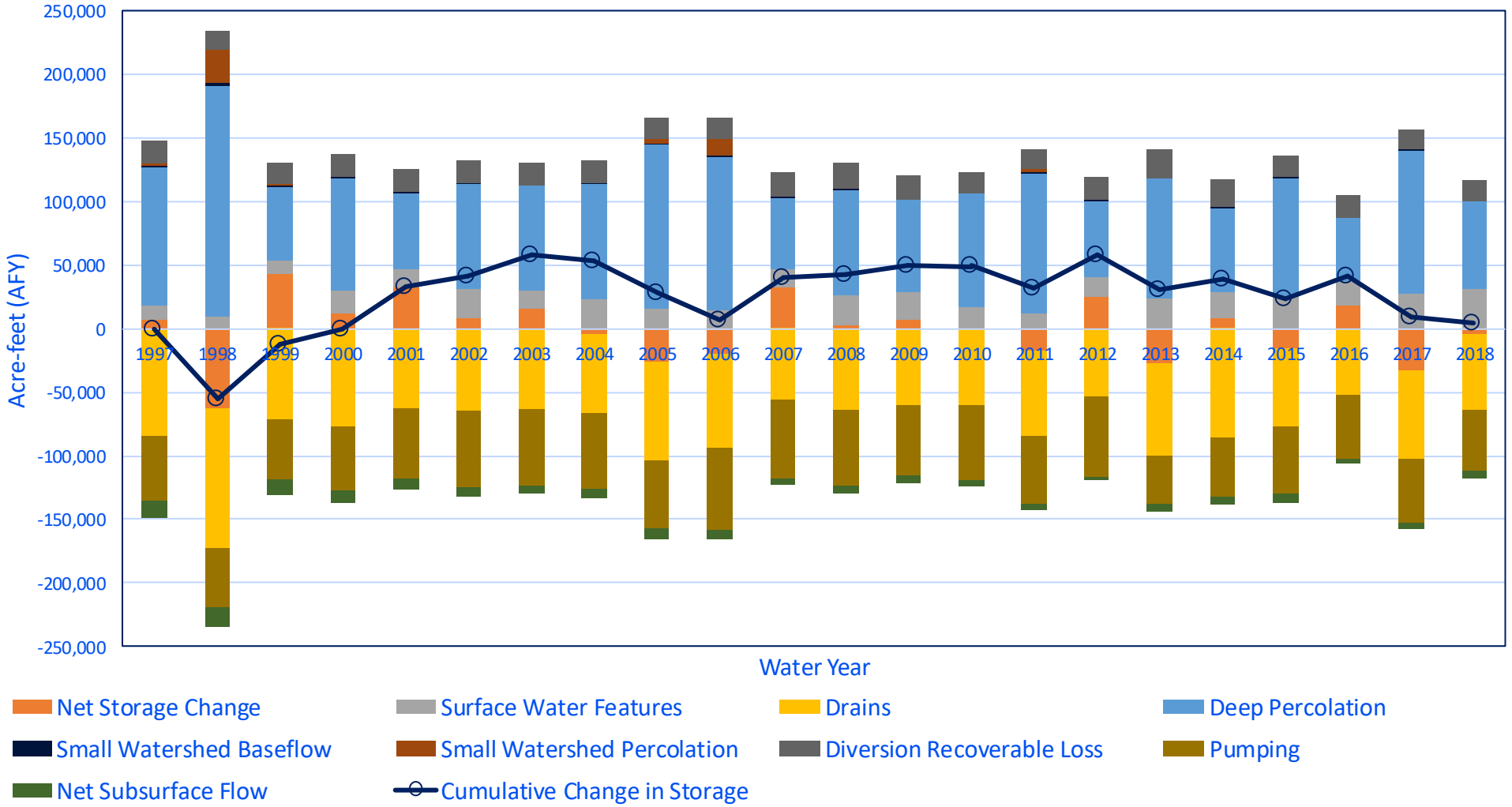
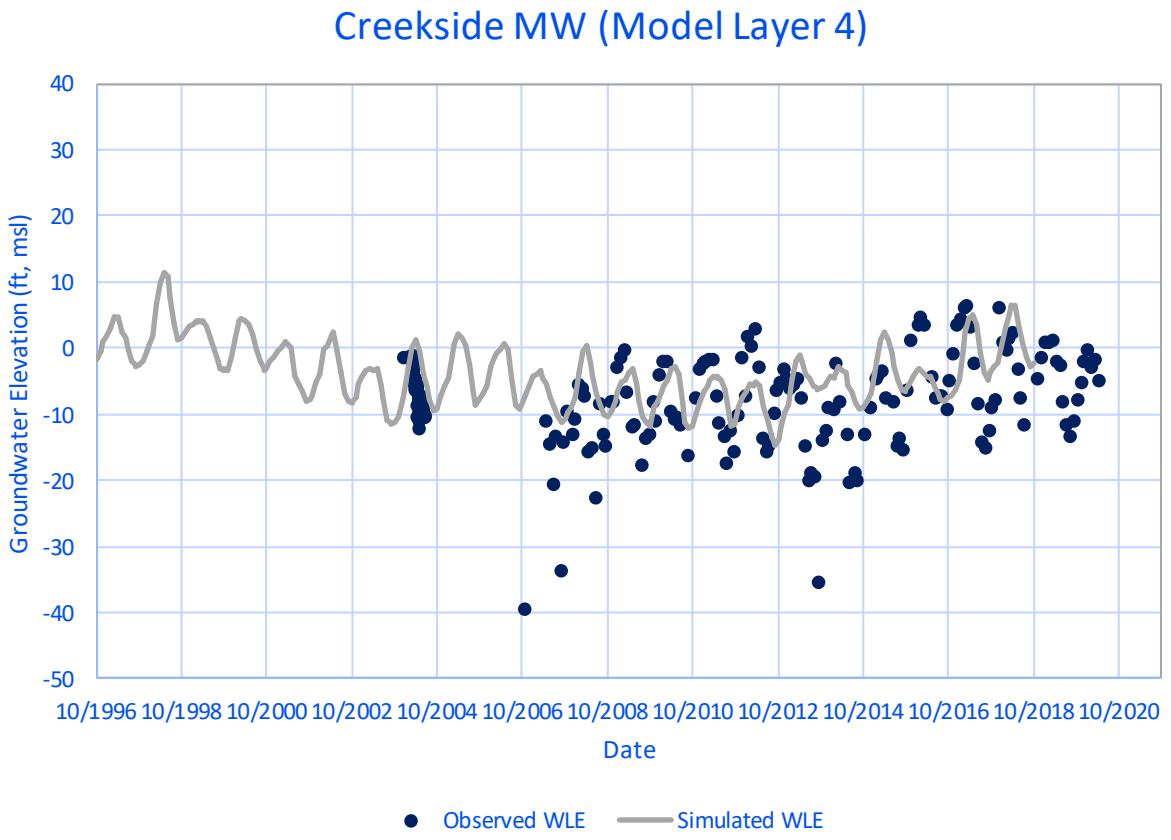
Groundwater Sustainability Plan

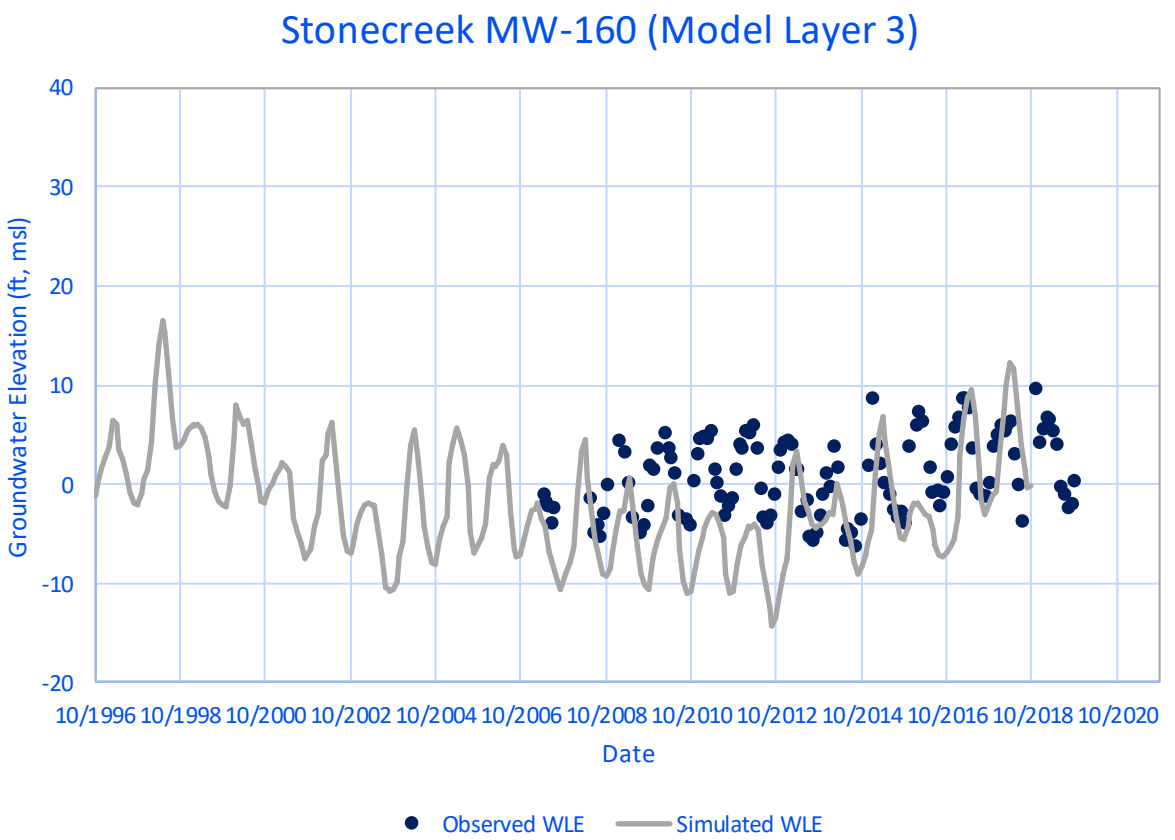
ECC Subbasin Water Budget (Water Years 1997-2018)



ECC SUBBASIN IN BALANCE

Selected Calibration Wells Within DWD





The model is well-calibrated in the DWD area, as seen by the closely matching simulated and observed groundwater levels.

Future Scenarios

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50-year Future

Climate Change

Management Actions/Projects

Predictive Future Model Scenarios

- DWR Produced SGMA Guidance Document
  - Provides adjustment data for different climate change scenarios
  - Pick a historic simulation period and apply the adjustments over a 50-year period
  - Scenarios for far-future 2070 central tendency
- Sea Level
- Local Management Actions/Projects Expected to Occur

Modeling Status, cont.

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Groundwater Sustainability Plan

Sea Level Rise Scenario

NRC's predicted rise (0.5 feet in 2030 and 1.5 feet in 2070)

- Values for each intervening year linearly interpolated using these predictions
- Raises the model head boundary condition in the Delta

Modeling, cont.

EAST CONTRA COSTA SUBBASIN
Groundwater Sustainability Plan

Sustainable Yield Scenario

- Reduced surface water deliveries and increased groundwater pumping until undesirable results arise for sustainability indicator(s)
- Scenarios indicate that basin outflow and stream depletion occur before storage and water level declines

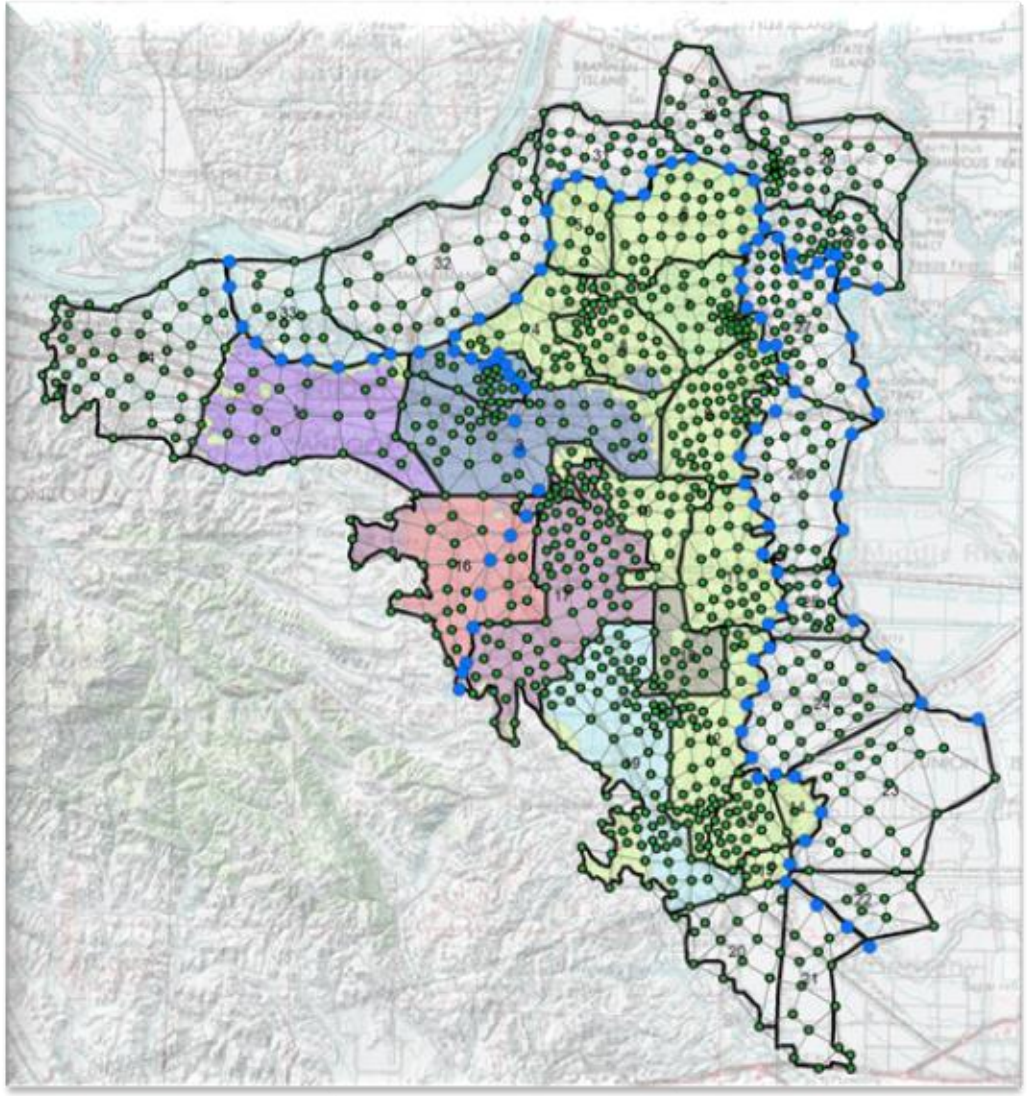
Water Budget Section 5: sustainable yield scenario(s)

EAST CONTRA COSTA SUBBASIN
Groundwater Sustainability Plan

Groundwater Budget Flow Component	Base Period (WY 1997-2018)	Water Year 2015	*Minimum Annual Base Period Value*	*Maximum Base Period Value*	Future Land Use Scenario (WY 2019-2068)	Sustainable Yield Run: Reduce SW Deliveries by 75%	Sustainable Yield Run: Reduce SW Deliveries by 50%	Sustainable Yield Run: Reduce SW Deliveries by 48%	Sustainable Yield Run: Reduce SW Deliveries by 45%	Sustainable Yield Run: Reduce SW Deliveries by 40%
Drains	-68,460	-62,757	*-108,993*	*-51,735*	-83,060	-33,823	-56,134	-54,585	-54,355	-56,523
Surface Water Features	18,560	25,480	*10,135*	*31,887*	12,591	28,728	20,075	19,509	18,818	17,644
Deep Percolation	88,720	93,545	*49,915*	*180,801*	94,414	94,152	94,637	94,660	94,691	94,736
Small Watershed Baseflow	976	572	*498*	*2,320*	880	880	880	880	880	880
Small Watershed Percolation	2,260	0	*0*	*26,702*	2,051	2,051	2,051	2,051	2,051	2,051
Diversion Recoverable Loss	17,779	17,081	*14,568*	*22,330*	16,969	6,965	11,514	11,866	12,319	13,096
Pumping	-53,961	-51,691	*-64,017*	*-38,557*	-29,095	-117,559	-77,601	-74,504	-70,526	-63,694
Net Subsurface Flow	-7,197	-7,362	*-14,840*	*-2,972*	-12,895	11,656	-2,208	-3,057	-4,077	-5,767
Net Storage Change	-199	14,869	*-43,310*	*63,407*	3,119	-241	1,979	2,091	2,234	2,464

Sustainable Yield Estimate = 74, 500 AFY
(with urban land use growth and a reduction of SW deliveries by 48%)

Modeling in perspective



- Modeling is best suited at this stage as a comparative tool. Uncertainty is part of predictions.
- Precision will be developed over time through expansion of monitoring networks and database.
- Therefore, adaptive management is a key principle of sustainable management.

Questions?

Section 6- Monitoring Network

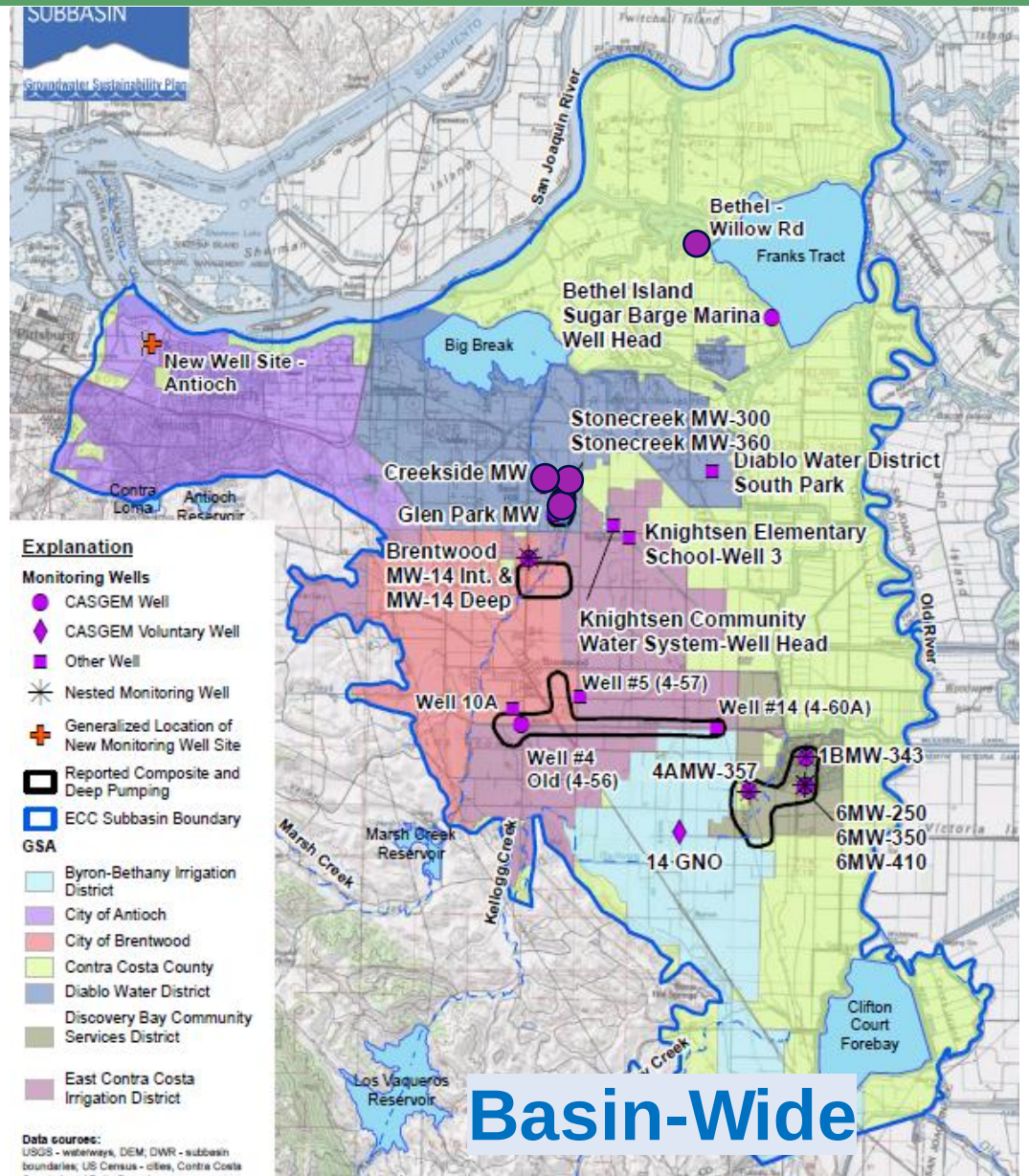
Basin-wide Monitoring Networks

- Groundwater Levels
- Groundwater Quality

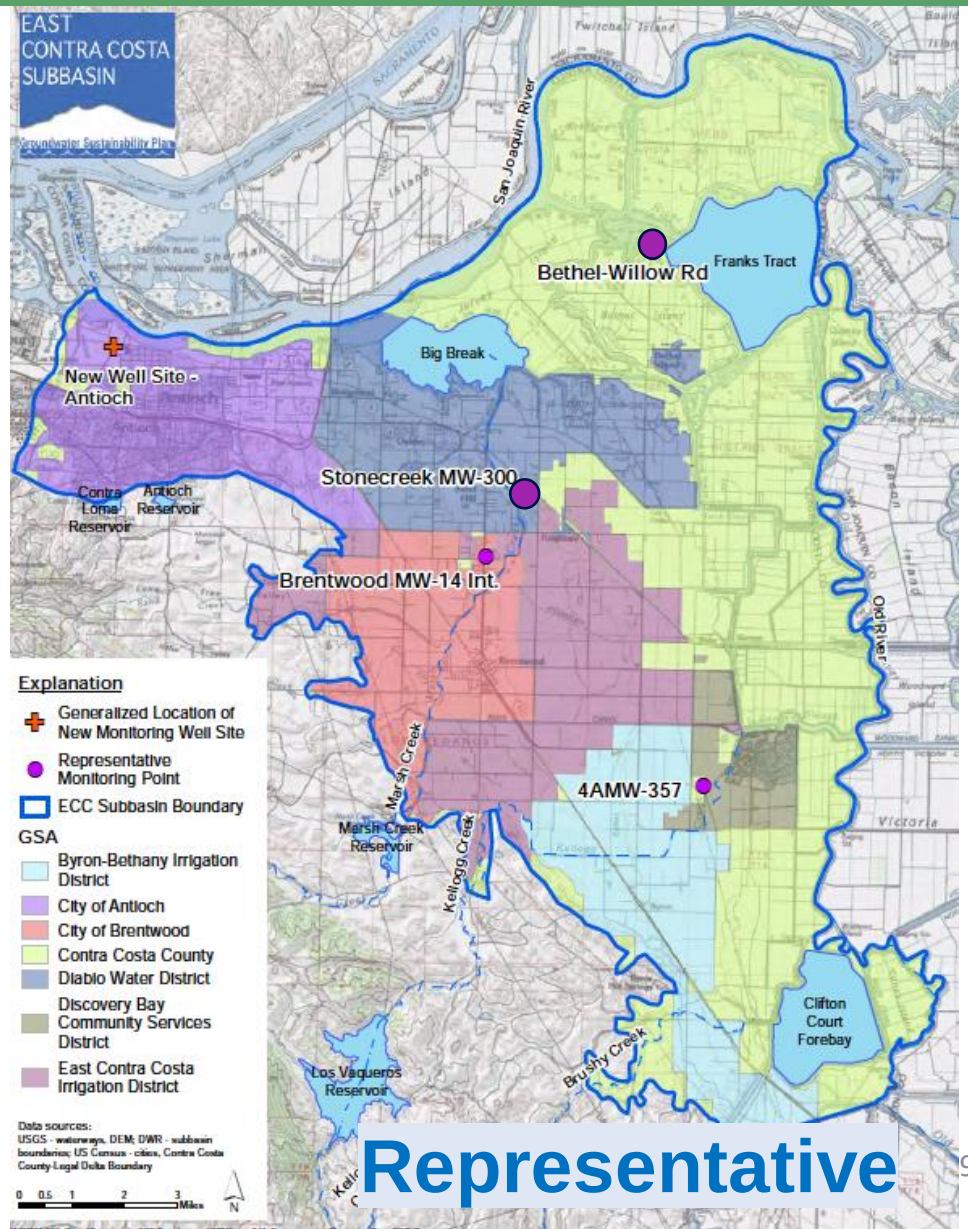
Representative Monitoring Networks

- Subset of Basin-wide Monitoring Network
- Used to Monitor Sustainability and Apply Minimum Thresholds (MT) and Measurable Objectives (MO)

Deep Zone Monitoring Network - GWL

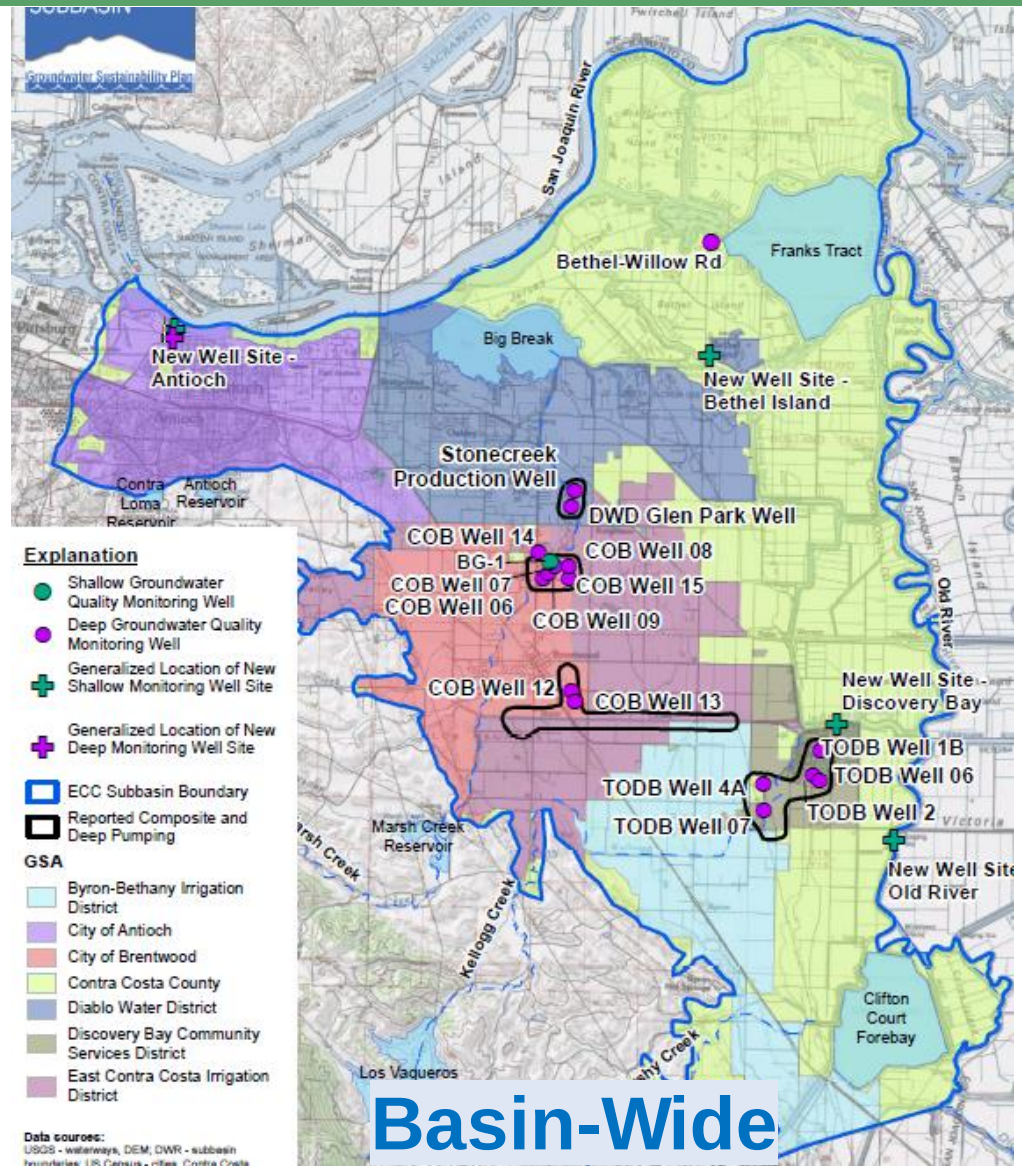


Basin-Wide

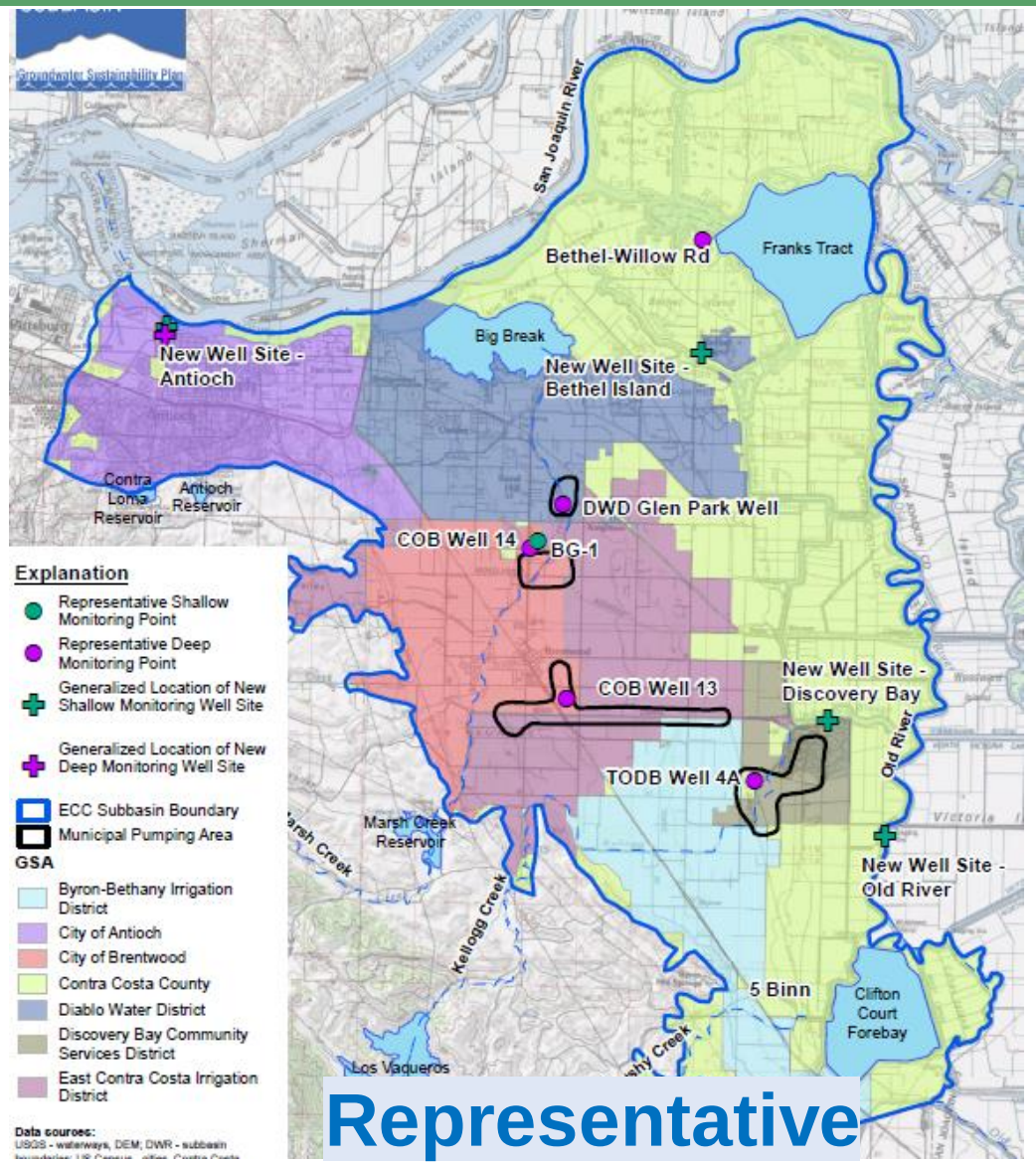


Representative

Monitoring Network - WQ



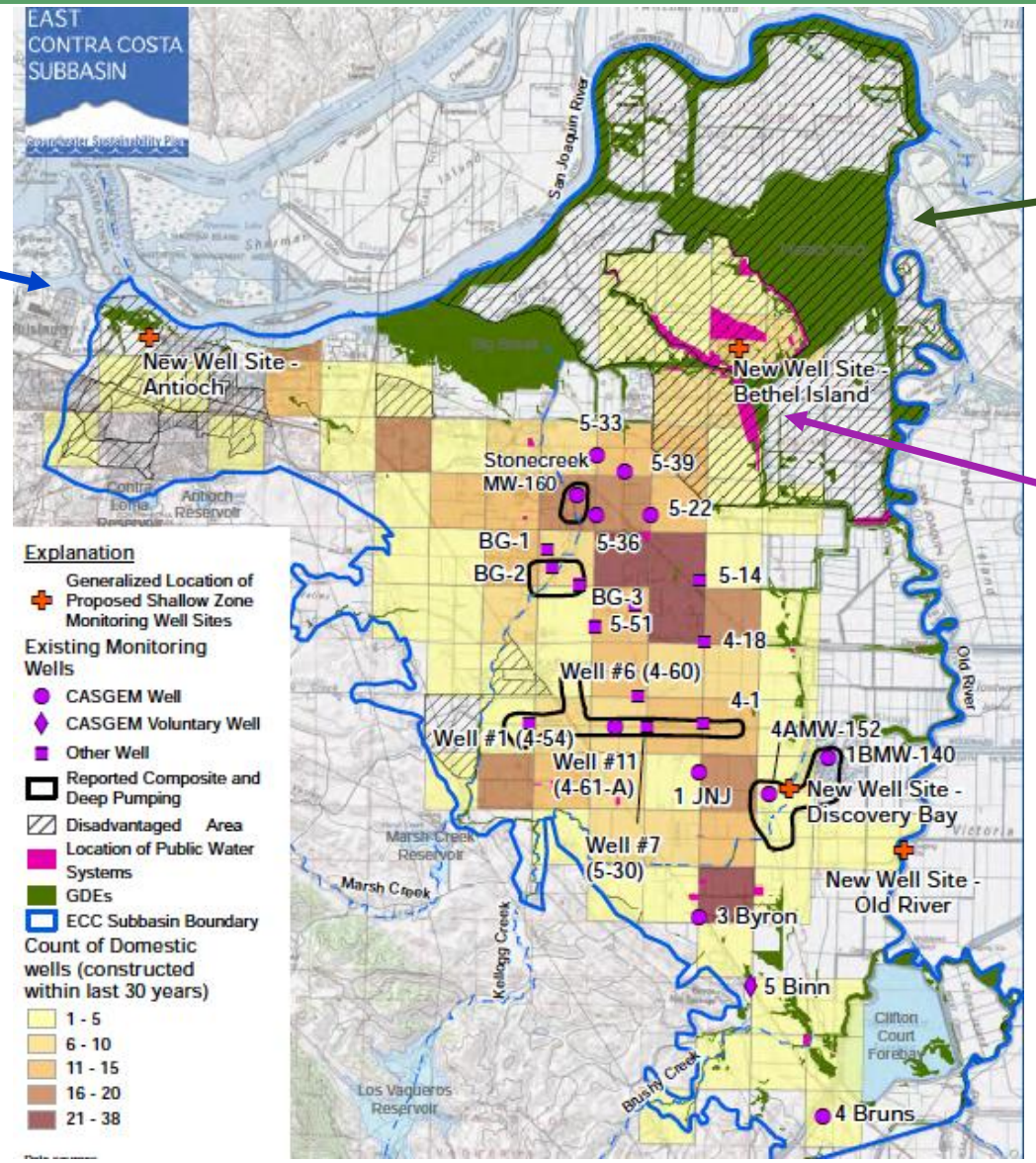
Basin-Wide



Representative

Monitoring Network – other basin concerns

Delta connections



Groundwater dependent ecosystems

Public water systems

Questions?

Section 8- Projects and Management Actions

- Developed by GSAs on local or basin-wide scales
- Principle of adaptive management: implemented if needed in response to potential causes of undesirable results
  - Projects might include:
    - Direct recharge
    - Aquifer Storage and Recovery (ASR)
    - In-lieu recharge
  - Management Actions might include:
    - Conservation
    - Pumping restrictions
    - Well location limitations

Management Actions

Regulation of new wells under GSA authorities granted through SGMA

Type	No.	Management Action
Wells	1	Restrict well spacing
	2	Require meter/ Withdrawal Fees/Tiered Pricing:
	3a	New Well Permitting Requirements: specific conditions that may include monitoring, usage reporting, and usage limits.
	3b	New Well Permitting Requirement: GSAs by their own discretions limit well completion zones

Section 8, cont.

EAST CONTRA COSTA SUBBASIN
Groundwater Sustainability Plan

Management Actions

Does not apply to de minimis users extracting

< 2 acre-feet per year

Section 8, cont.

EAST CONTRA COSTA SUBBASIN
Groundwater Sustainability Plan

Management Actions

Regulation of new wells with consideration of sustainability issues in each GSA will require coordination with permit agency – Contra Costa County

Questions?

Plan Implementation

Aaron Trott
General Manager
East Contra Costa Irrigation District

Section 9 Plan Implementation

1. Governance
   - new MOU? GSAs are exploring options
2. Budget
   - Funding needed for ongoing work to satisfy regulations
   - GSAs reviewing projected costs and means to pay for costs
3. What needs to cover (e.g., monitoring, reporting, outreach and communication)
4. Schedule

5 year Implementation Budget[1]

- Estimated ECC GSP annual cost range: $140,000 to $245,000/year
- Tasks covered by the 5-year budget:
  - Community Outreach and Education
  - GSP Monitoring and Data Management
  - GSP Reporting
    - Annual Reports
    - 5-year Update of GSP
  - Grant Writing
  - Response to comments from DWR on GSP
- Funding:
  - Cost sharing options being evaluated
  - Grants

1. Does not include projects and management actions).

5-Year Implementation Schedule

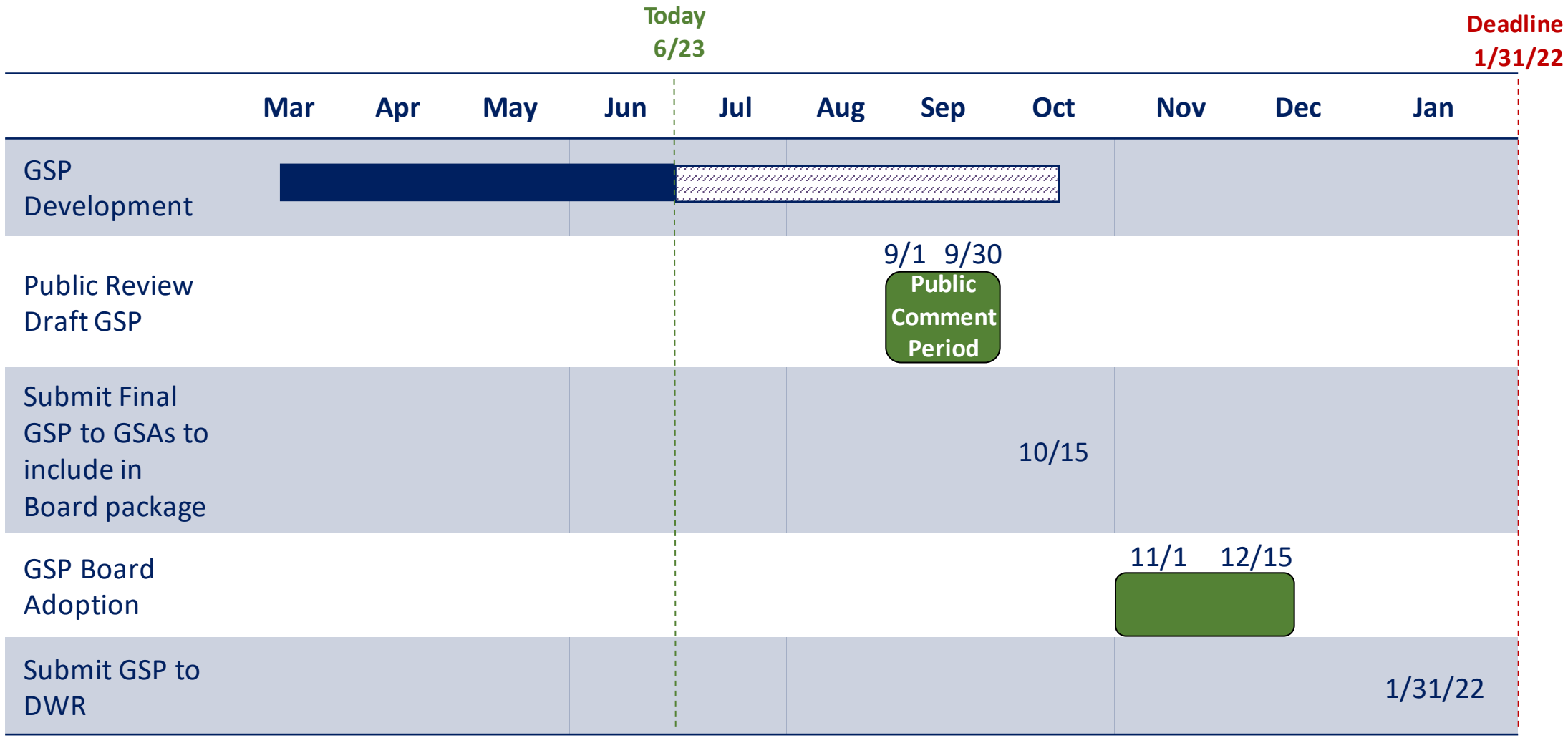
EAST CONTRA COSTA SUBBASIN
Groundwater Sustainability Plan

Task	2022	2023	2024	2025	2026	2027
Plan Implementation						
GSP Submittal to DWR	X					
Outreach and Communication						
Monitoring and DMS						
GSP Reporting						
Annual Reports	X	X	X	X	X	X
5-year GSP Evaluation Reports						X
DWR Review	DWR Review		Address DWR Comments	DWR Approval		
GSA operating agreement	Operate under new MOU					

Closing Remarks

Paul Seger
Board President
Diablo Water District

Schedule for GSP Adoption



Questions??

Thank you!