
GWA
EASTERN SAN JOAQUIN
GROUNDWATER AUTHORITY
GWA Advisory Committee
June 13, 2018

Agenda

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

- Minimum Thresholds and Undesirable Results for Sustainability Indicators
- Model Recap (Historical Water Budget)
- Baseline Water Budget
- Future Water Budget
  - Projected Water Supplies and Demand
- July Agenda Items

Minimum Thresholds and Undesirable Results

Minimum Thresholds are Set for Each Sustainability Indicator

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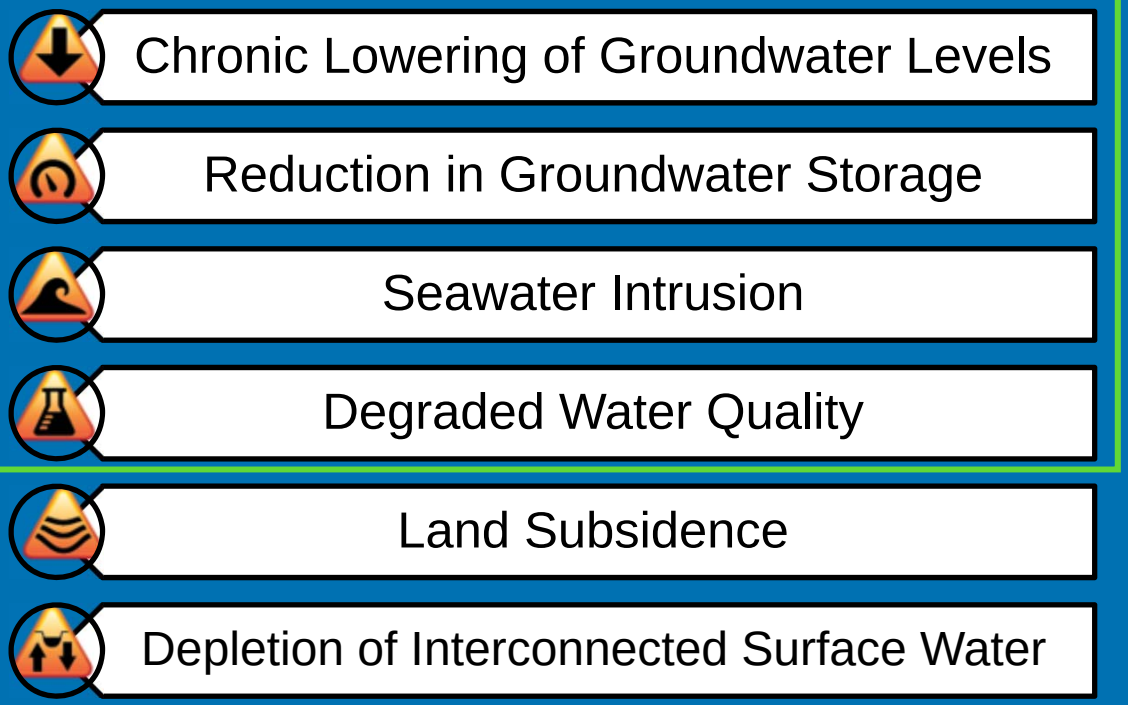

We will be discussing these four today

Minimum Thresholds: Building on Prior Work

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- Integrated Regional Water Management Plans
- 2004 Groundwater Management Plan
- Anecdotal data from GSAs
- Agricultural Water Management Plans
- MokeWISE Water Program
- Model Development Data Collection

Setting Minimum Thresholds: What do we want to strive for as a basin?

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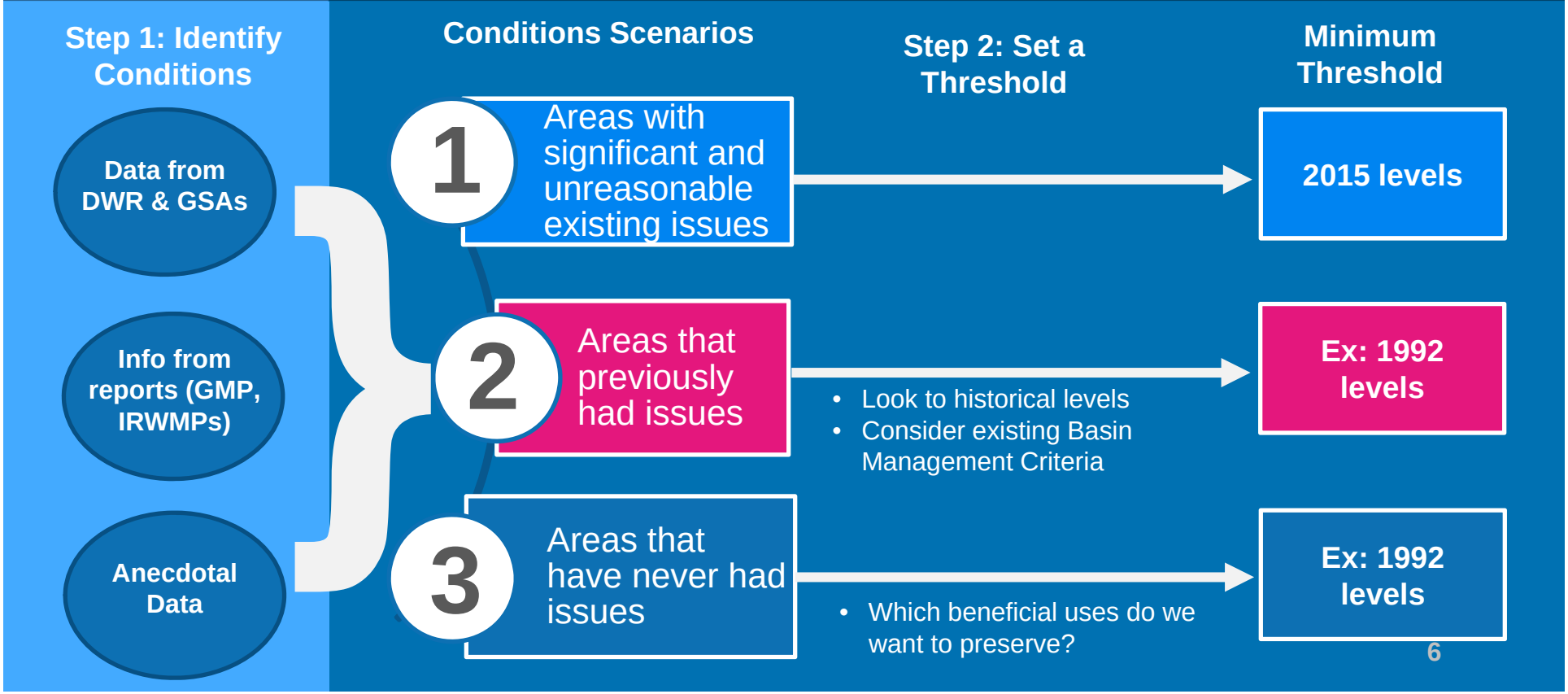

Minimum Thresholds for Sustainability Indicators

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- Chronic Lowering of Groundwater Levels
- Reduction in Groundwater Storage
- Seawater Intrusion
- Degraded Water Quality
- Land Subsidence
- Depletion of Interconnected Surface Water

Prior Work Establishes Minimum Threshold at Fall 1992 Levels

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A threshold has been established at 1992 levels:

"The Eastern San Joaquin Groundwater Basin contour measured in 1992 is proposed as the basin management framework baseline. Groundwater fell to its lowest recorded elevation in 1992 following a significant drought period and it is considered undesirable to drop below this level." *(2014 ESJ IRWMP)*

Undesirable Results were experienced in 1992:

"The fall 1992 contour is representative of extreme drought conditions where water levels fell to unprecedented levels. Many private groundwater users were forced to modify or deepen wells during the prolonged 1986-1992 drought period." *(2014 ESJ IRWMP)*

1992 Hydrographs

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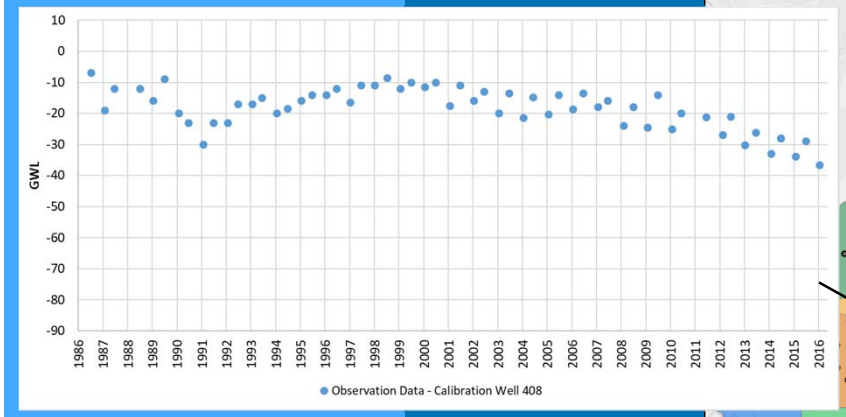

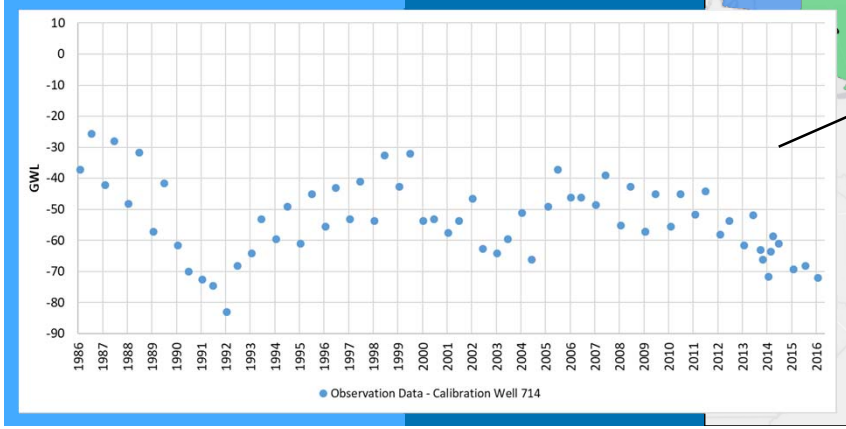

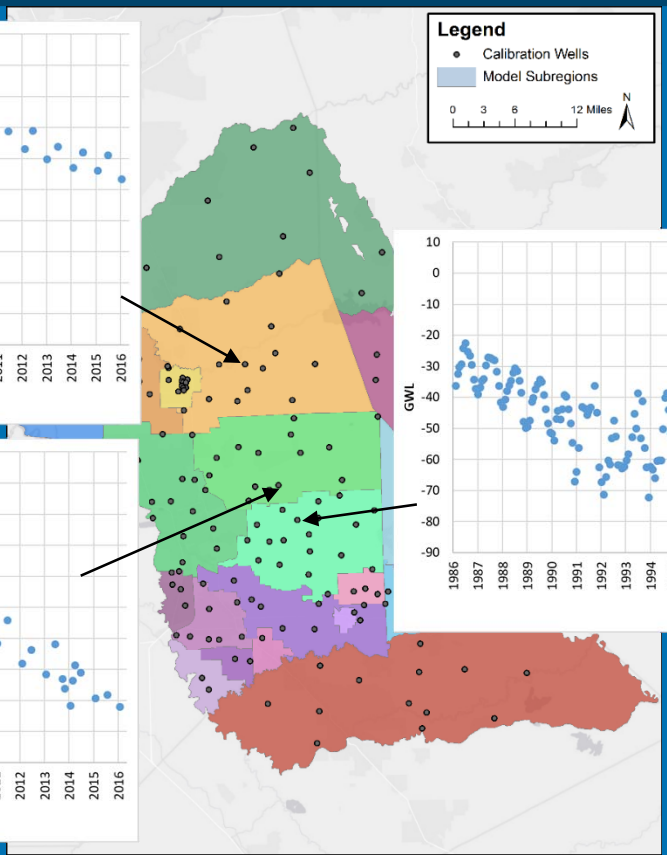

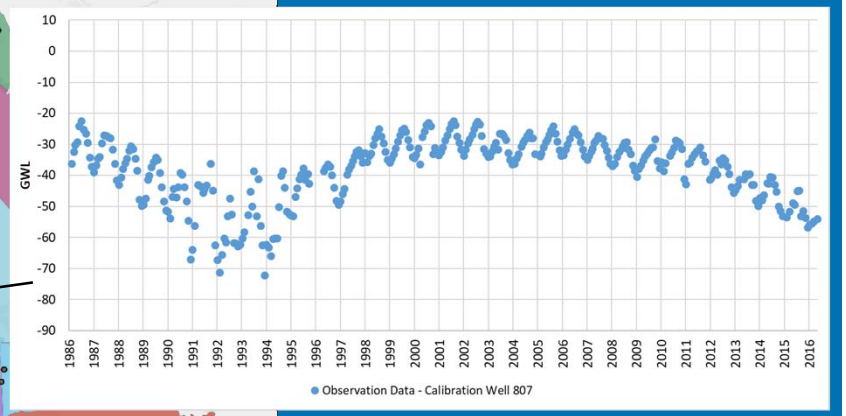

Wells Used in Analysis

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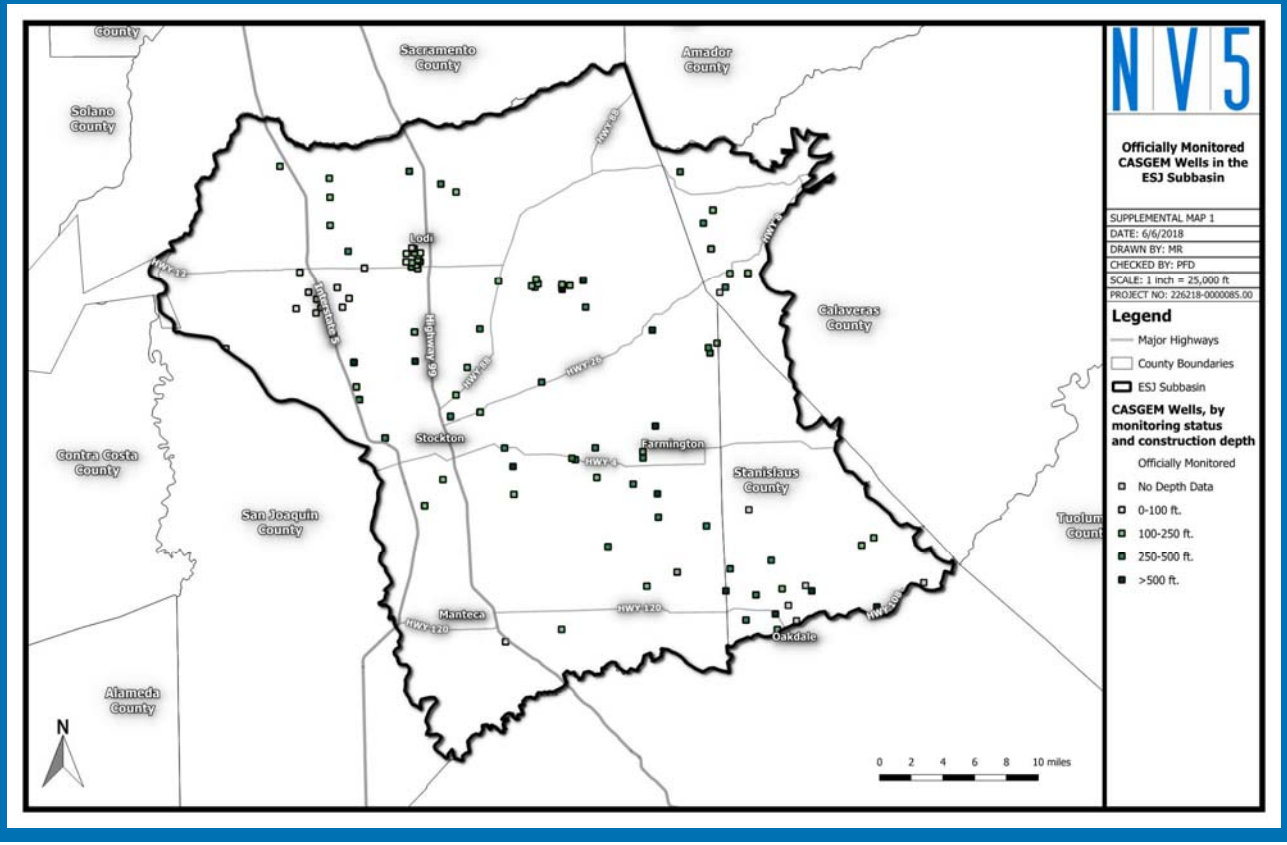
Officially Monitored CASGEM Wells



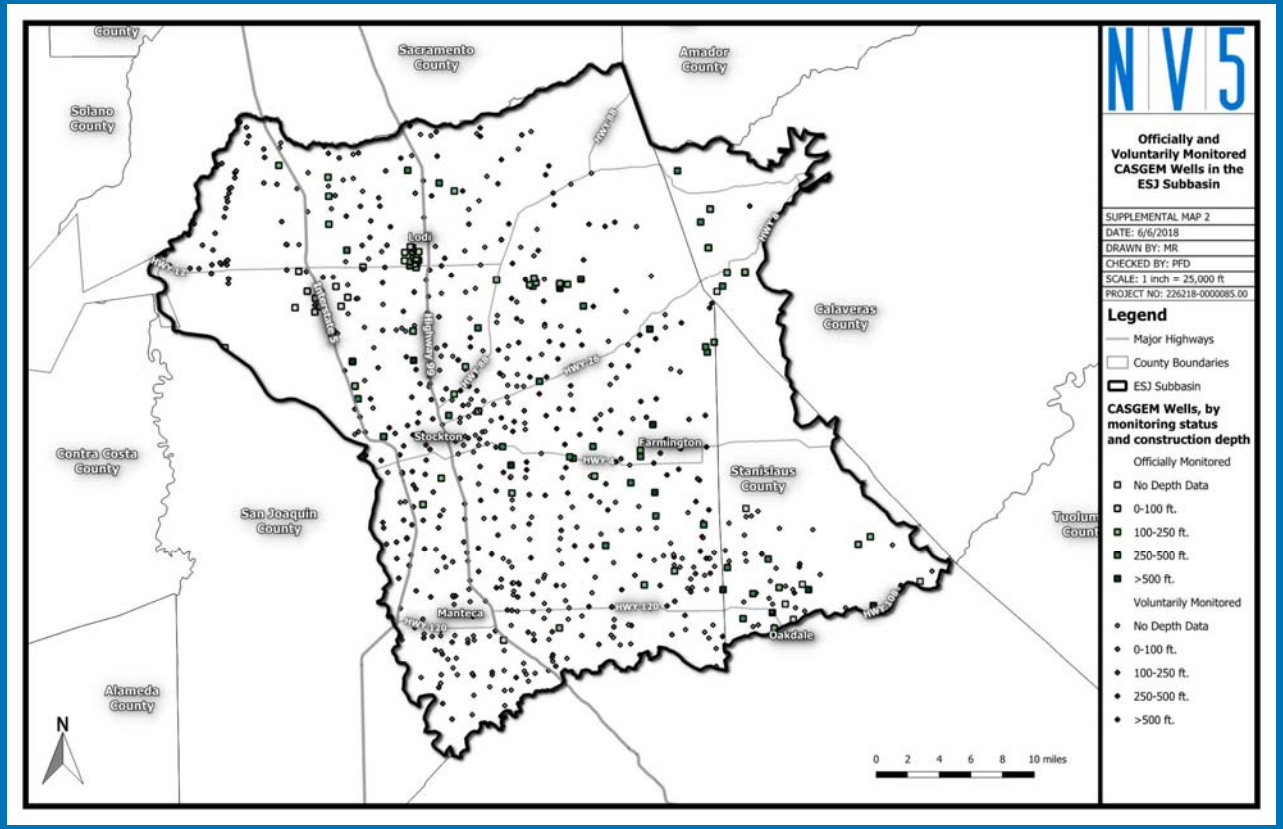
Wells Used in Analysis

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Officially Monitored CASGEM Wells

+

Voluntarily Monitored CASGEM Wells



Wells Used in Analysis

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Officially Monitored CASGEM Wells

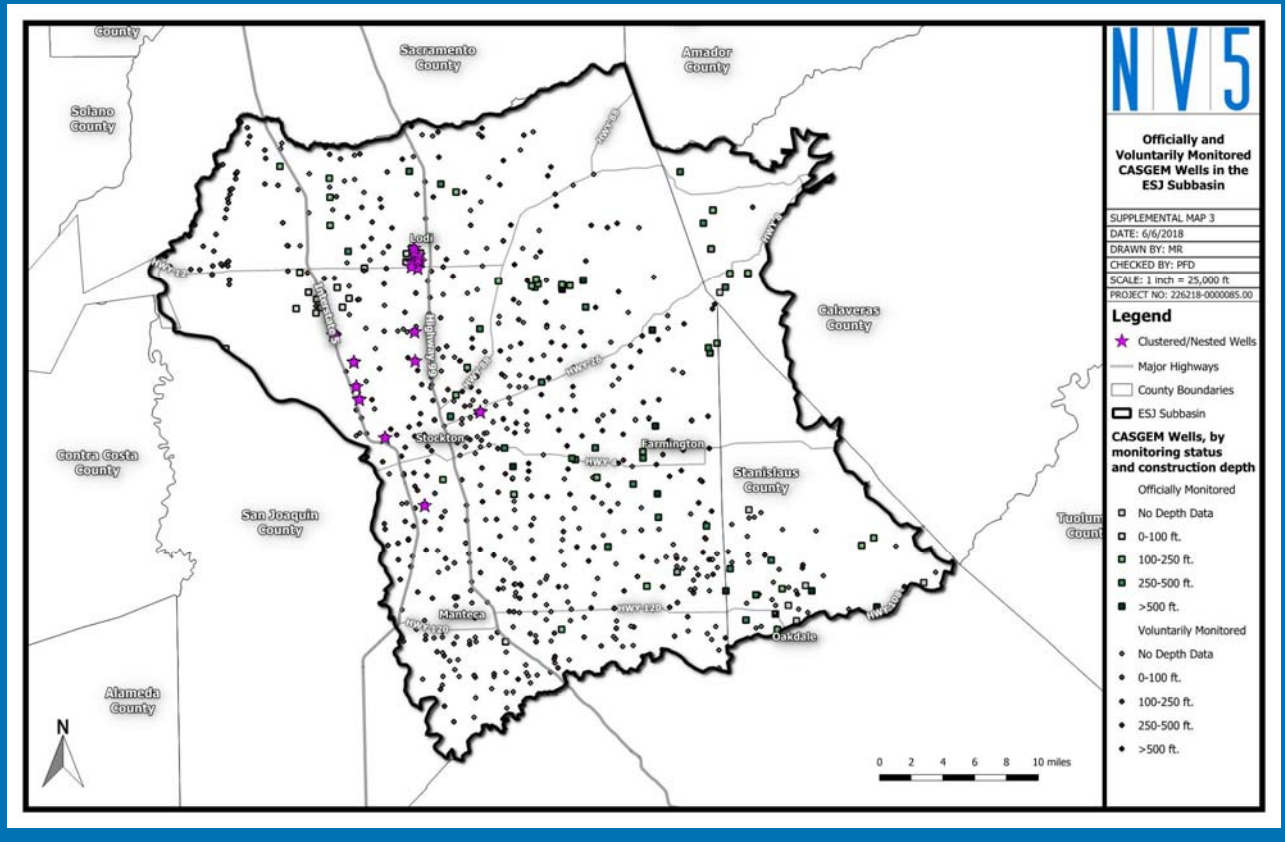
+

Voluntarily Monitored CASGEM Wells

+

Clustered and Nested Wells (CASGEM)

And more San Joaquin County wells not pictured!



Some Areas Have Already Declined Below 1992 Levels

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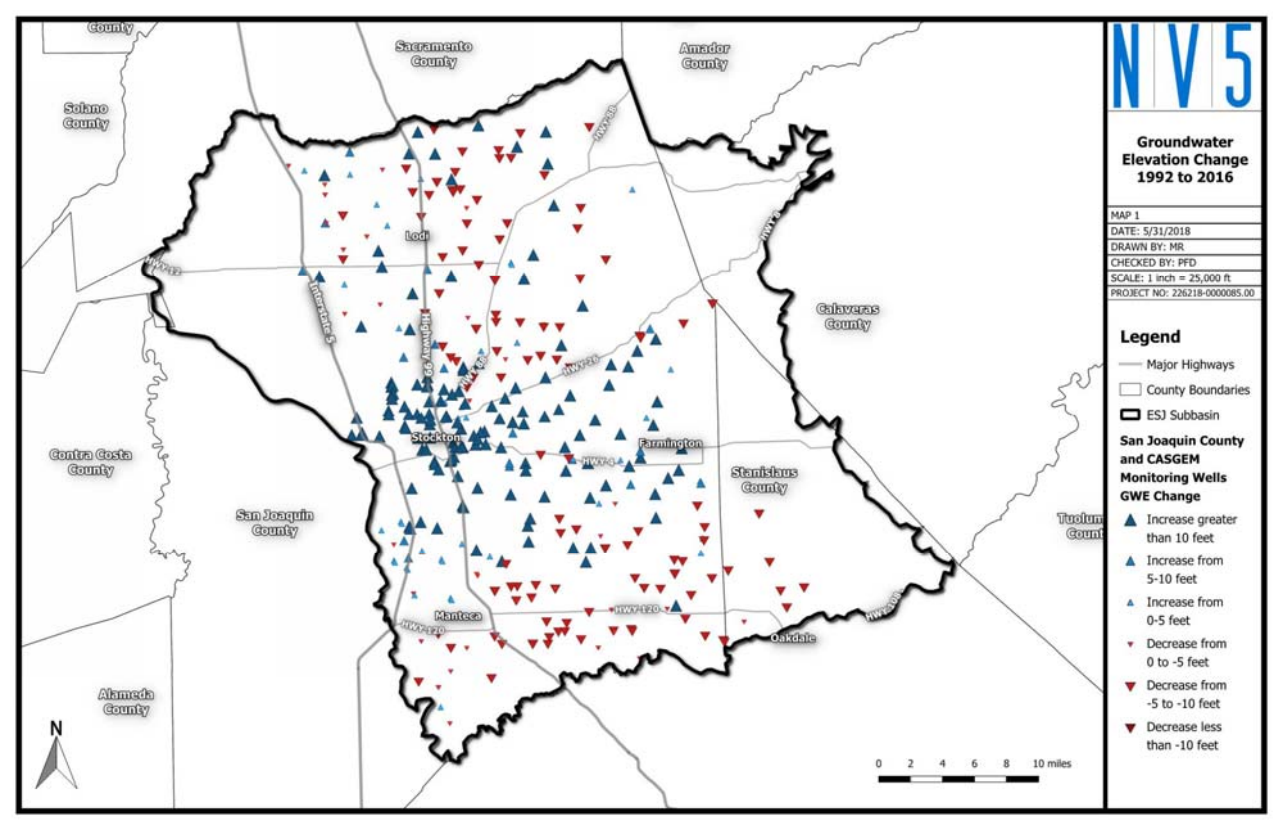
(red) – Areas that have declined since 1992

(blue) – Areas that have recovered since 1992



We Can Set a Threshold at the Lower of the Two

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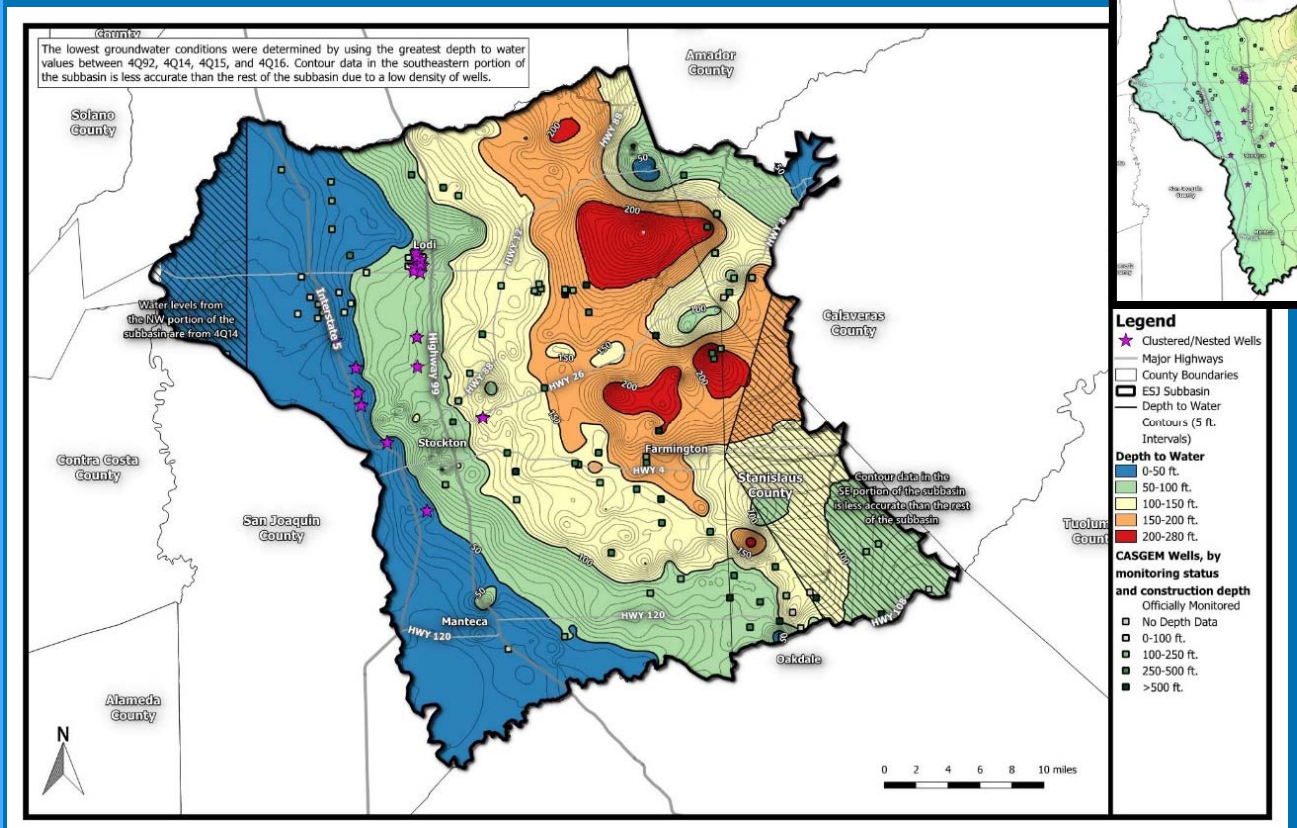
Lowest Lows between 1992 and 2015-16

Shown as Depth to Water



Putting this Threshold into Context

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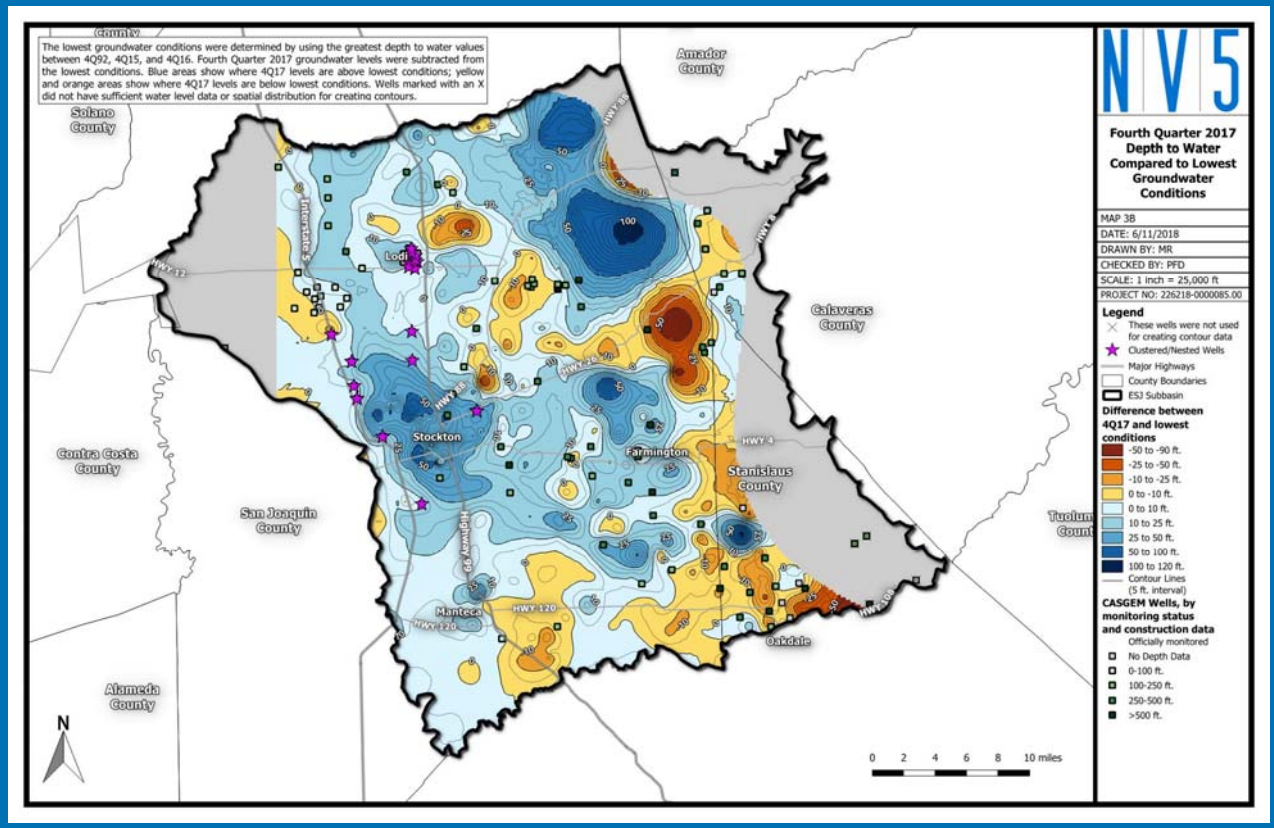
Difference between current levels and the proposed threshold

Shown as Depth to Water



Discussion: Do the proposed thresholds reflect the needs of the basin?

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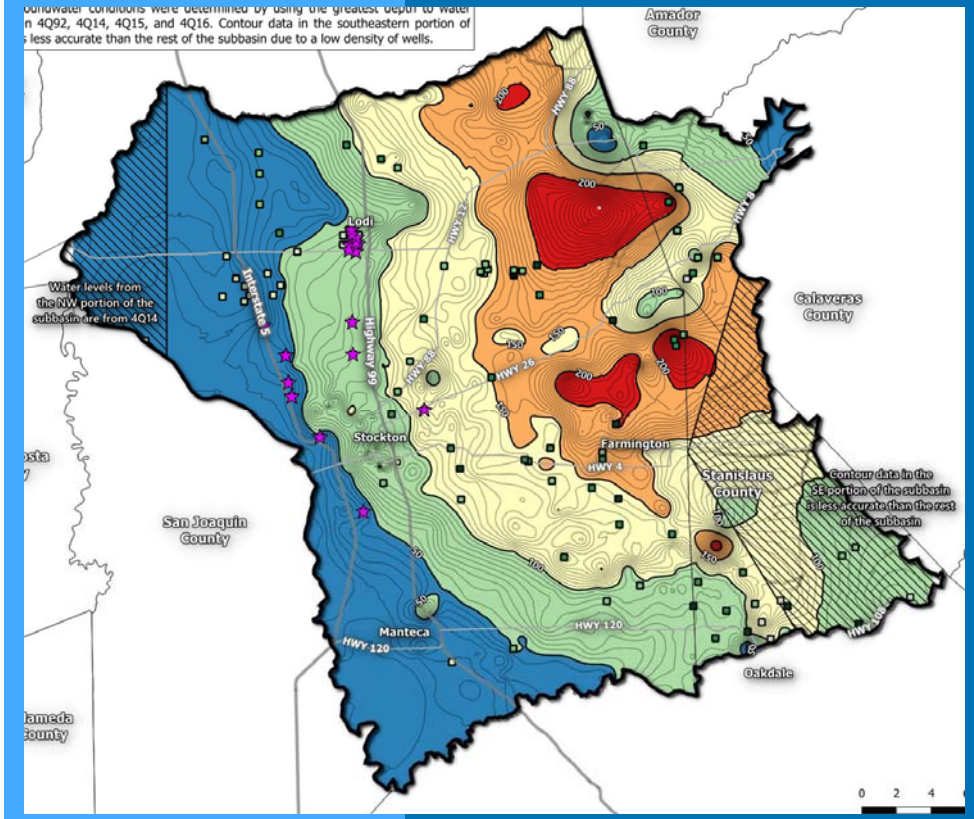

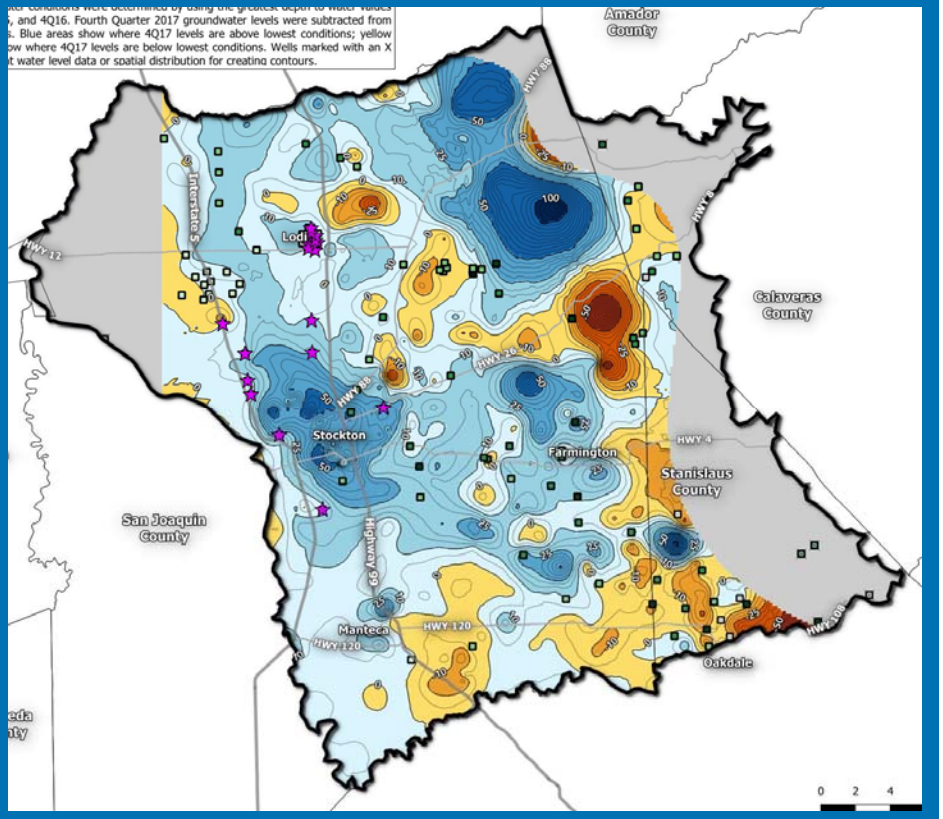

Minimum Thresholds for Sustainability Indicators

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- Chronic Lowering of Groundwater Levels
- Reduction in Groundwater Storage
- Seawater Intrusion
- Degraded Water Quality
- Land Subsidence
- Depletion of Interconnected Surface Water

Reduction in Groundwater Storage

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This Sustainability Indicator is not a concern for the Subbasin

****This does not mean we do not need to bring the basin into balance, it only means that groundwater-related impacts will be more sensitive to other indicators, such as groundwater elevations.*

Reduction in Groundwater Storage

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- SGMA BMPs provide guidance on this:

"If a GSA believes a sustainability indicator is not applicable for their basin, they must provide evidence that the indicator does not exist and could not occur." (*SGMA BMP 6, Sustainable Management Criteria*)

Reduction in Groundwater Storage

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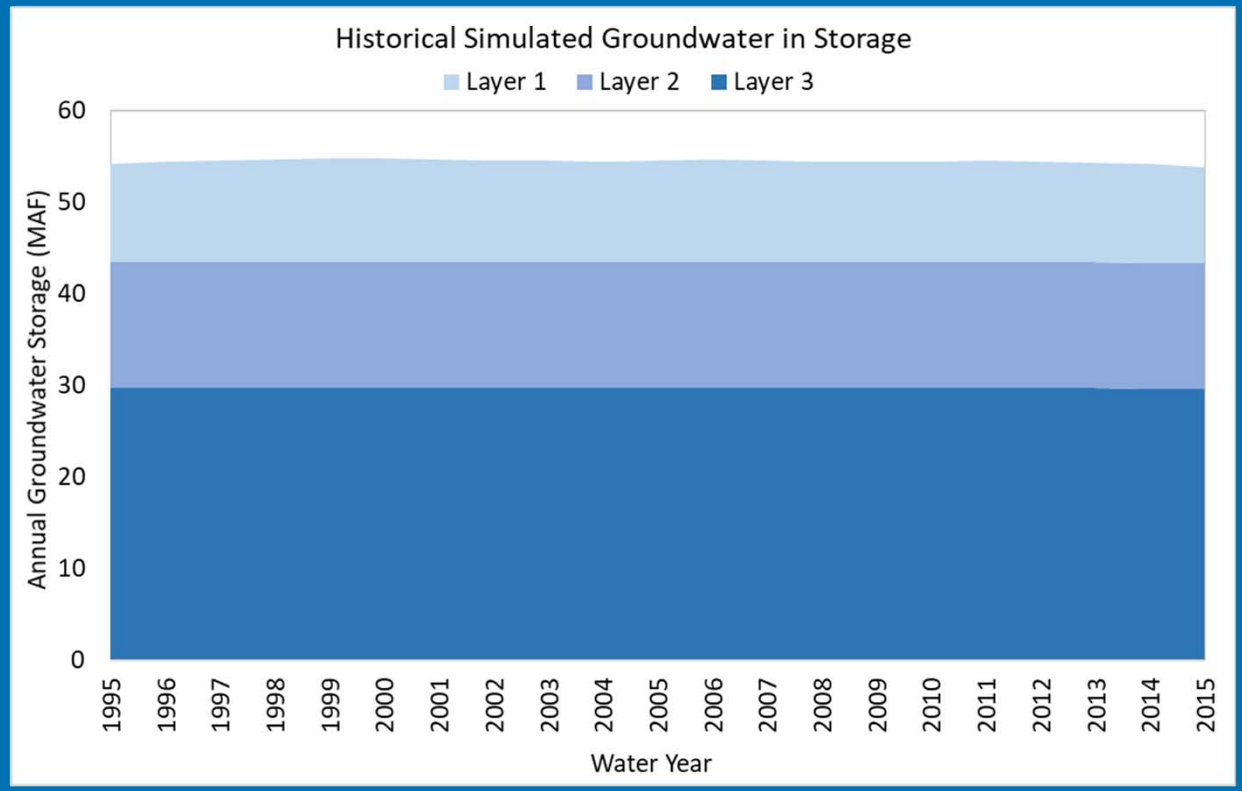
This graph shows freshwater only (model layers 1 through 3)



Minimum Thresholds for Sustainability Indicators

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- Chronic Lowering of Groundwater Levels
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- Depletion of Interconnected Surface Water

Seawater Intrusion

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This Sustainability Indicator is not a concern for the Subbasin

- Direct seawater intrusion does not occur in the Subbasin and thresholds do not need to be addressed; salinity will be addressed via the Water Quality Sustainability Indicator

Minimum Thresholds for Sustainability Indicators

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- Chronic Lowering of Groundwater Levels
- Reduction in Groundwater Storage
- Seawater Intrusion
- Degraded Water Quality
- Land Subsidence
- Depletion of Interconnected Surface Water

Prior Work Establishes Threshold as Halting Saline Intrusion Front

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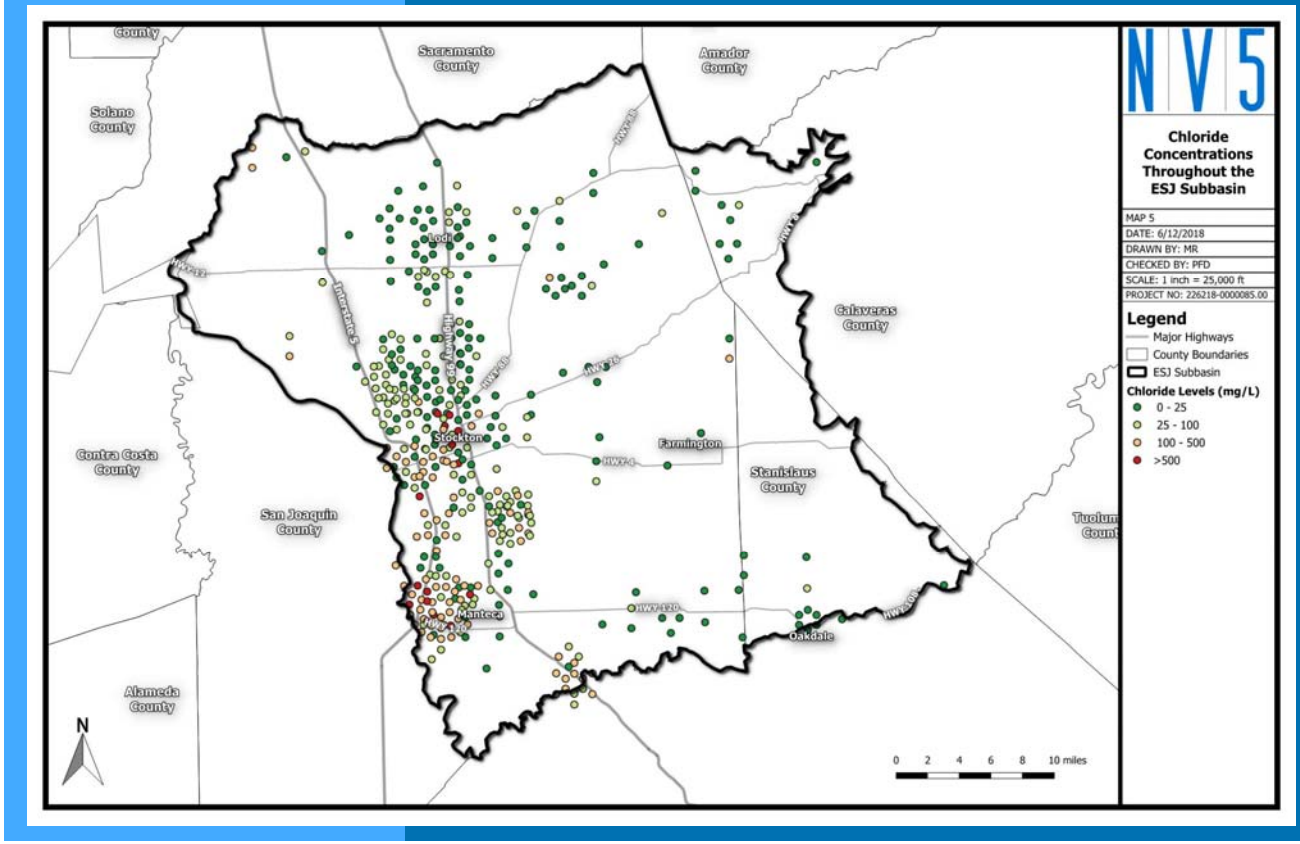

Identified Goal: Prevent further saline intrusion and degradation of groundwater quality throughout the Basin. *(2004 ESJ Groundwater Management Plan)*

Identified Undesirable Results for Water Quality

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What we've heard back from you:

- Salinity
- Arsenic (naturally occurring)
- Plumes
  - 1,2,3 TCP
- Others?

Discussion: Do the proposed thresholds reflect the needs of the basin?

Model Recap:
Historical Water Budget

Historical Model Recap

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- Since last meeting (May 9, 2018), outreach to CSJWCD, Lathrop, Lodi, SEWD, Stockton, and SSJID
- Based on outreach, refinements to surface water diversions and aquifer parameters
- The model is near final calibration

Baseline Water Budget

Water Budget: Defining Time Frames

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Historical

Uses historical information for hydrology, precipitation, water year type, water supply and demand, and land use going back a minimum of 10 years.

Covered Last Month

Current Conditions

Holds constant the most recent or "current" data on population, land use, year type, water supply and demand, and hydrologic conditions.

Covered This Month

Future Conditions

Uses the future planning horizon to estimate population growth, land use changes, climate change, etc.

Covered Next Month

Current Conditions
Baseline Assumptions

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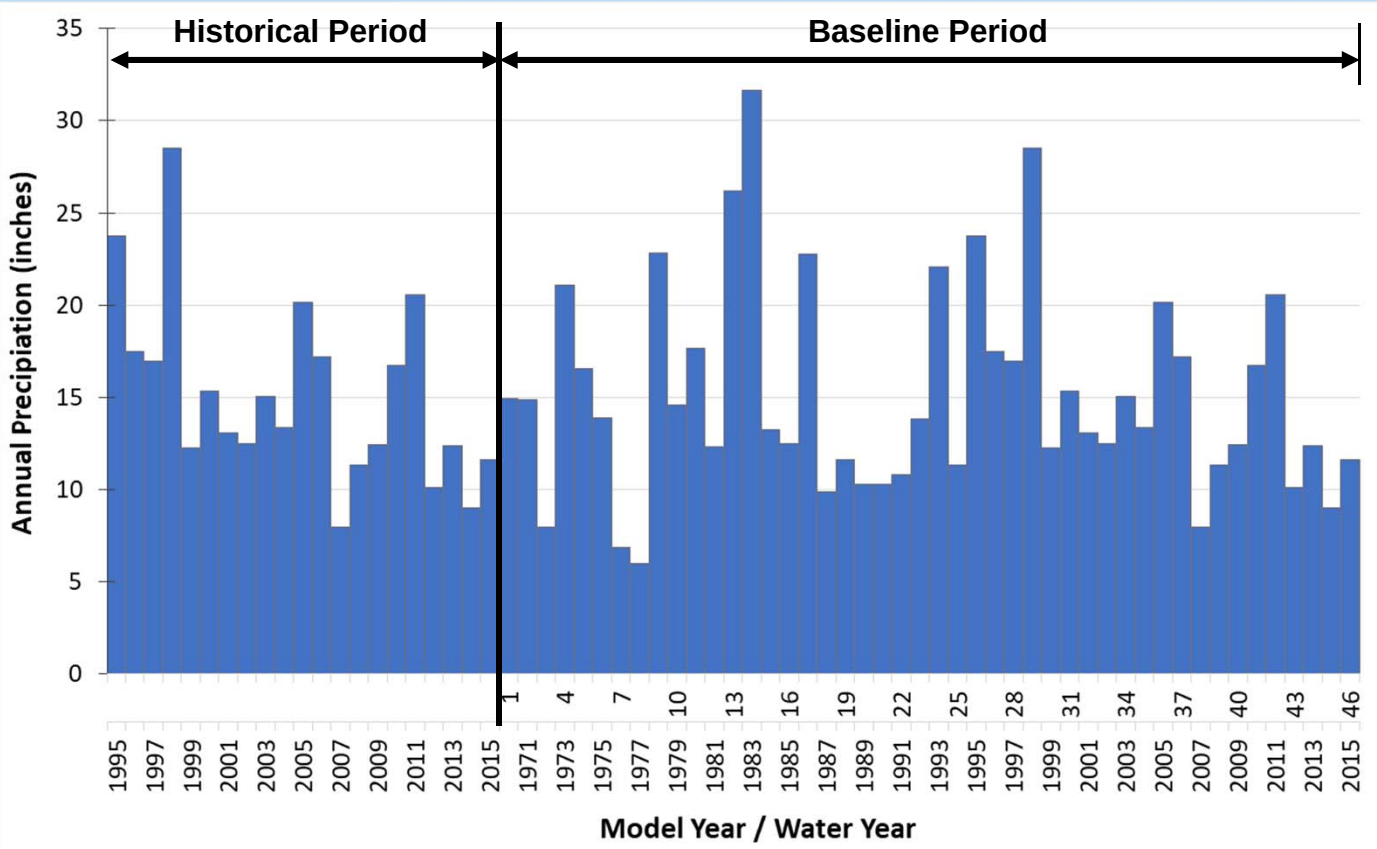

- Hydrology (precipitation and stream inflow): WY 1970-2015

Current Conditions
Baseline Assumptions

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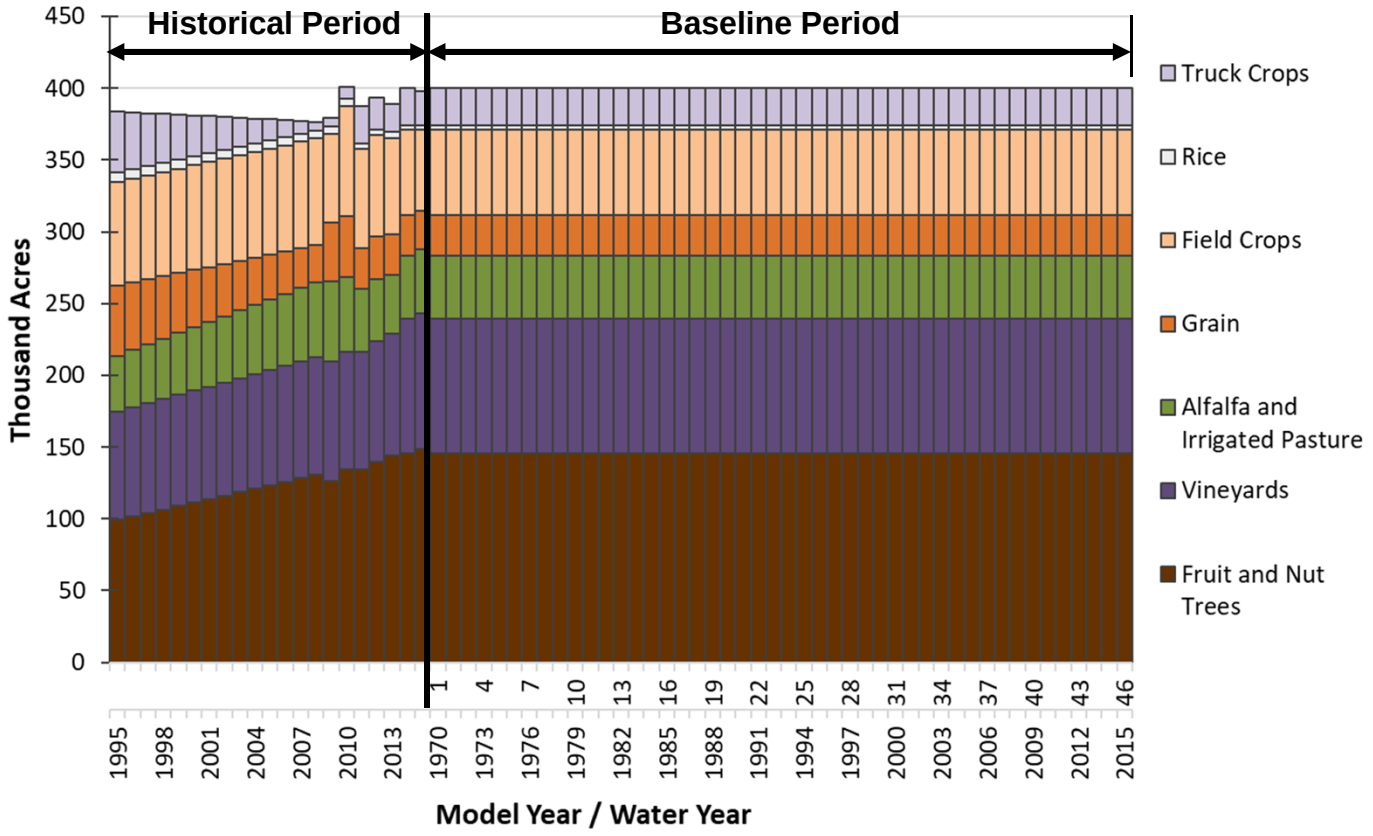

- Land Use and Cropping Pattern: 2014 DWR (LandIQ)

Current Conditions Baseline Assumptions

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- Surface Water Deliveries and Well Pumping:
  - Monthly deliveries estimated based on similar year concept, based on the San Joaquin Valley Water Year Index
  - Assume same delivery areas, diversion points or well locations, and estimated diversion losses
  - Assume continuation of only active diversions or wells

- Initial GW Conditions and Boundary Conditions: Based on ending GWL from historical ESJWRM

Current Conditions
Baseline Assumptions

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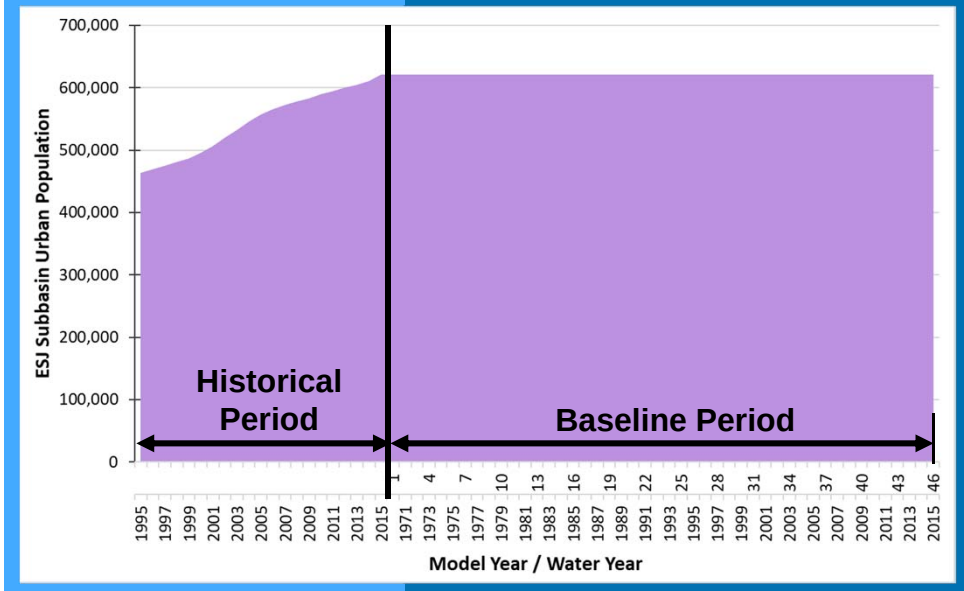
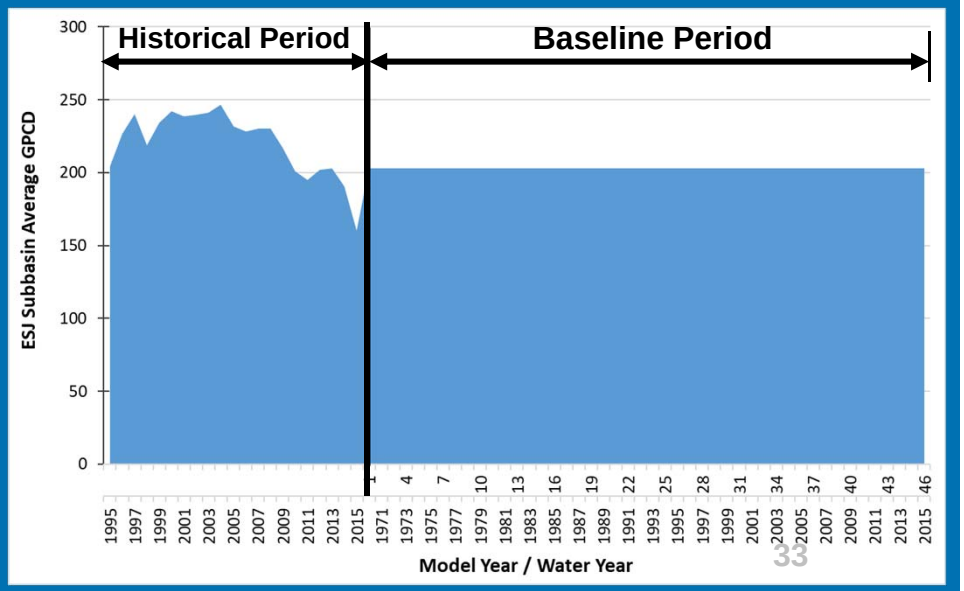
- Urban Demand:
  - No growth (2015 population level)
  - Pre-drought duty factors (2013 level GPCD)





Current Conditions Baseline
L&WU: Urban Water Use

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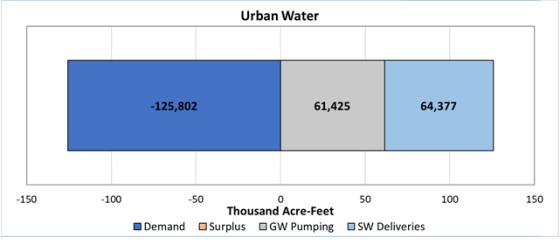

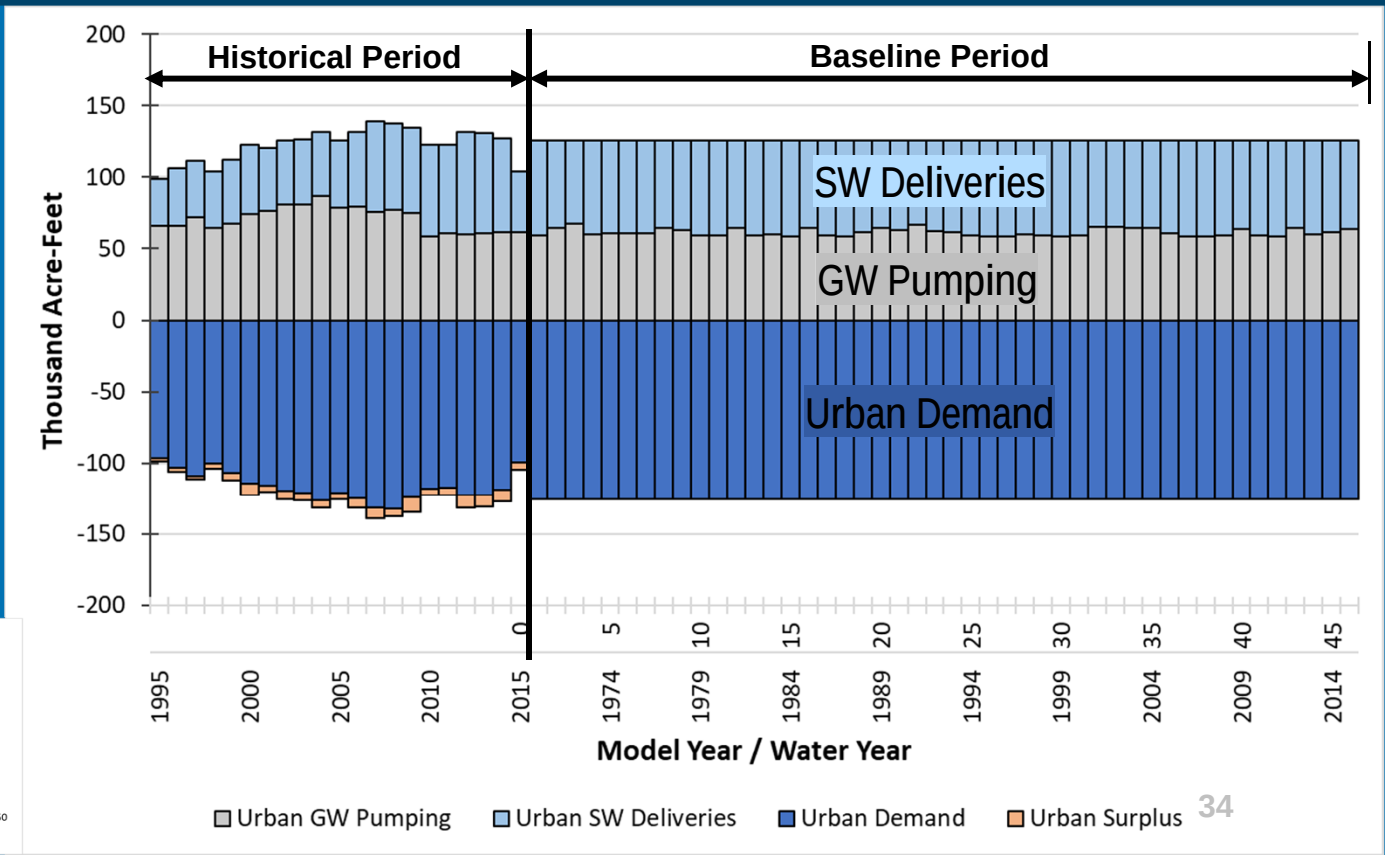

Current Conditions Baseline
L&WU: Agricultural Water Use

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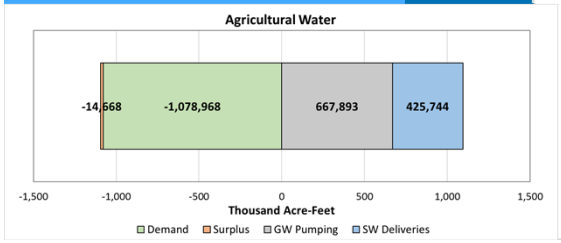

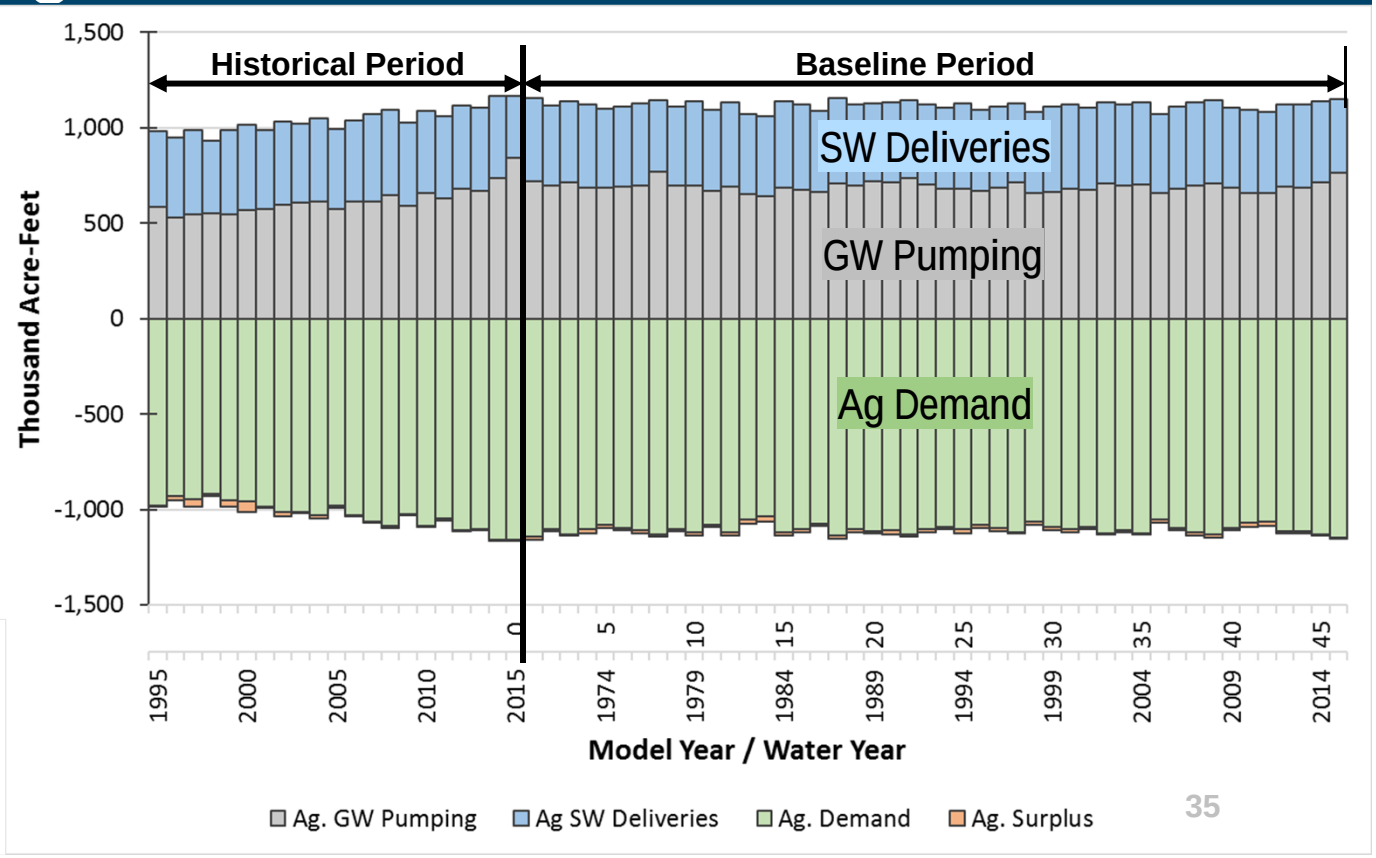

Current Conditions
Baseline Groundwater

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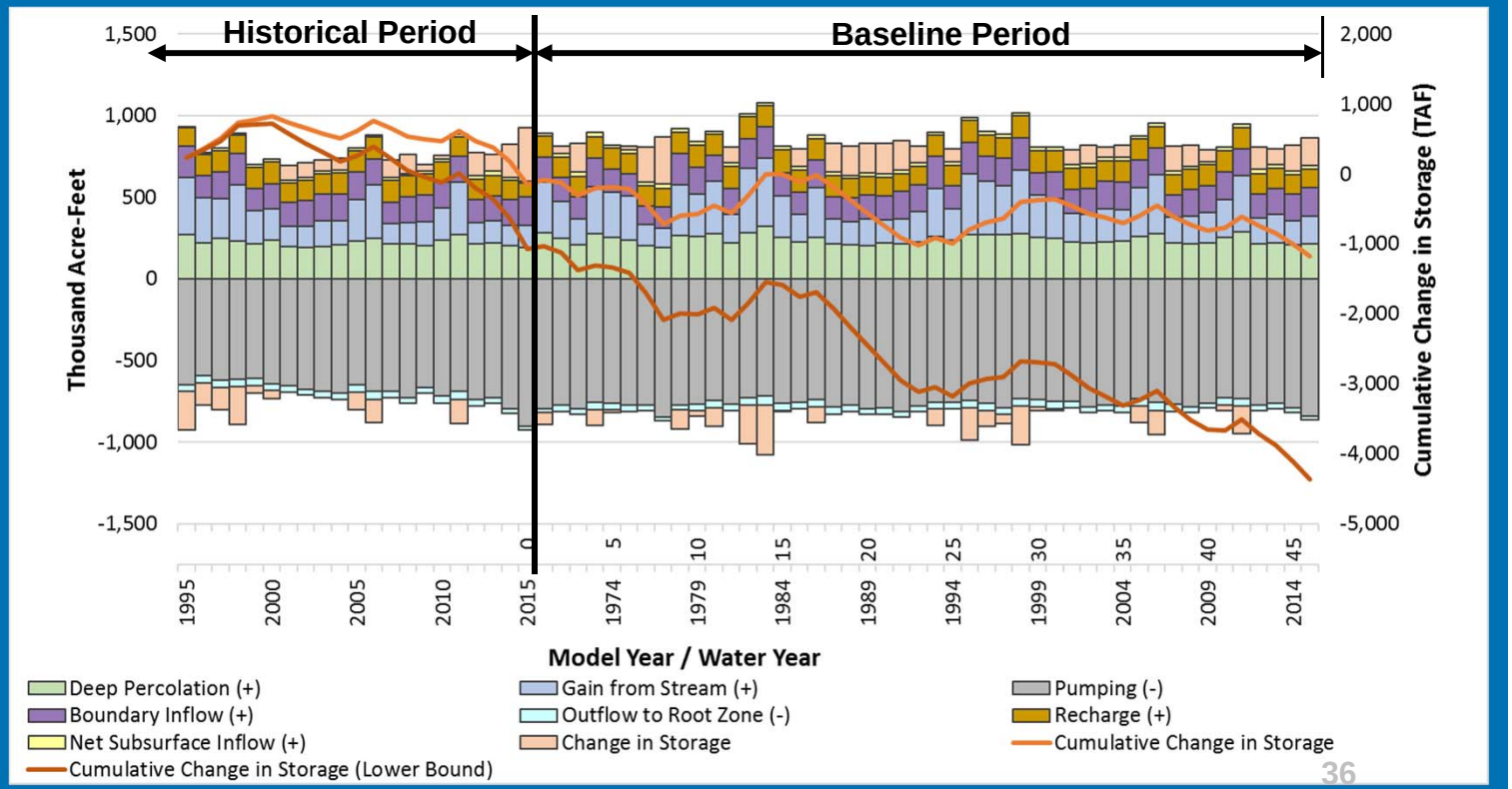
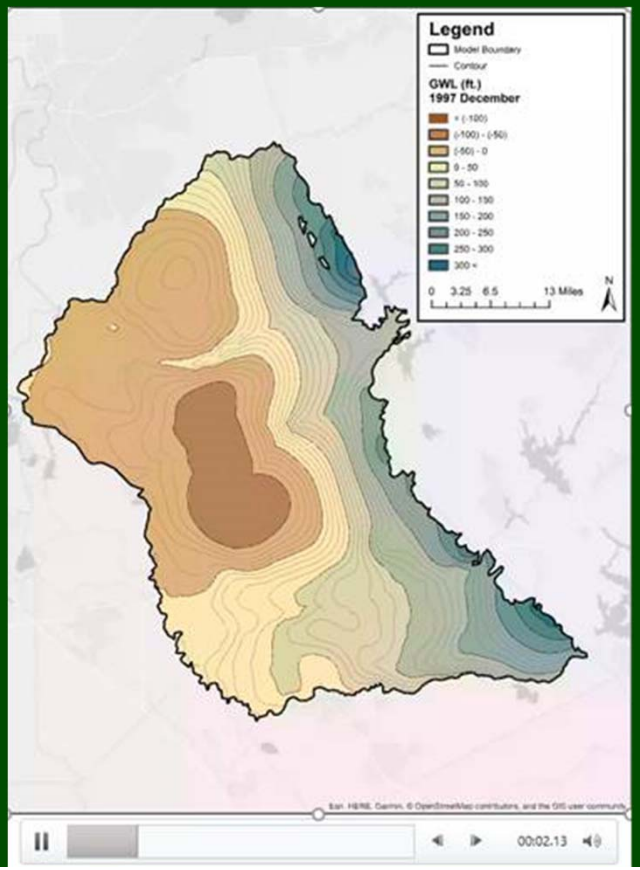
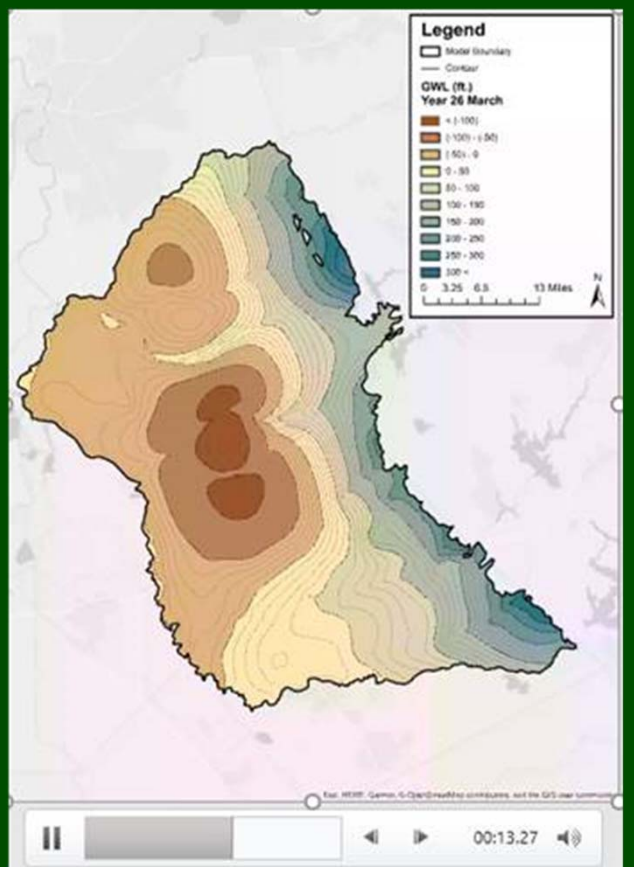


Historical Conditions GW Levels



Current Conditions Baseline GW Levels



Future Water Budget: Projected Supplies and Demand

Future Conditions Baseline

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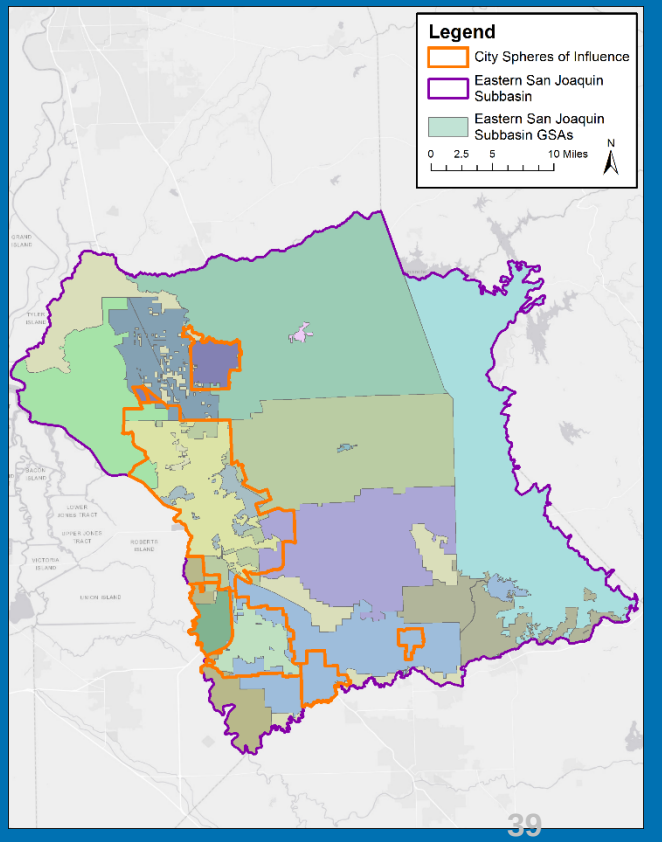
- Basin conditions under planned/projected water supply and demand
- Considerations:
  - GSA boundaries
  - Planning boundaries (i.e., spheres of influence)



Future Conditions Baseline Assumptions

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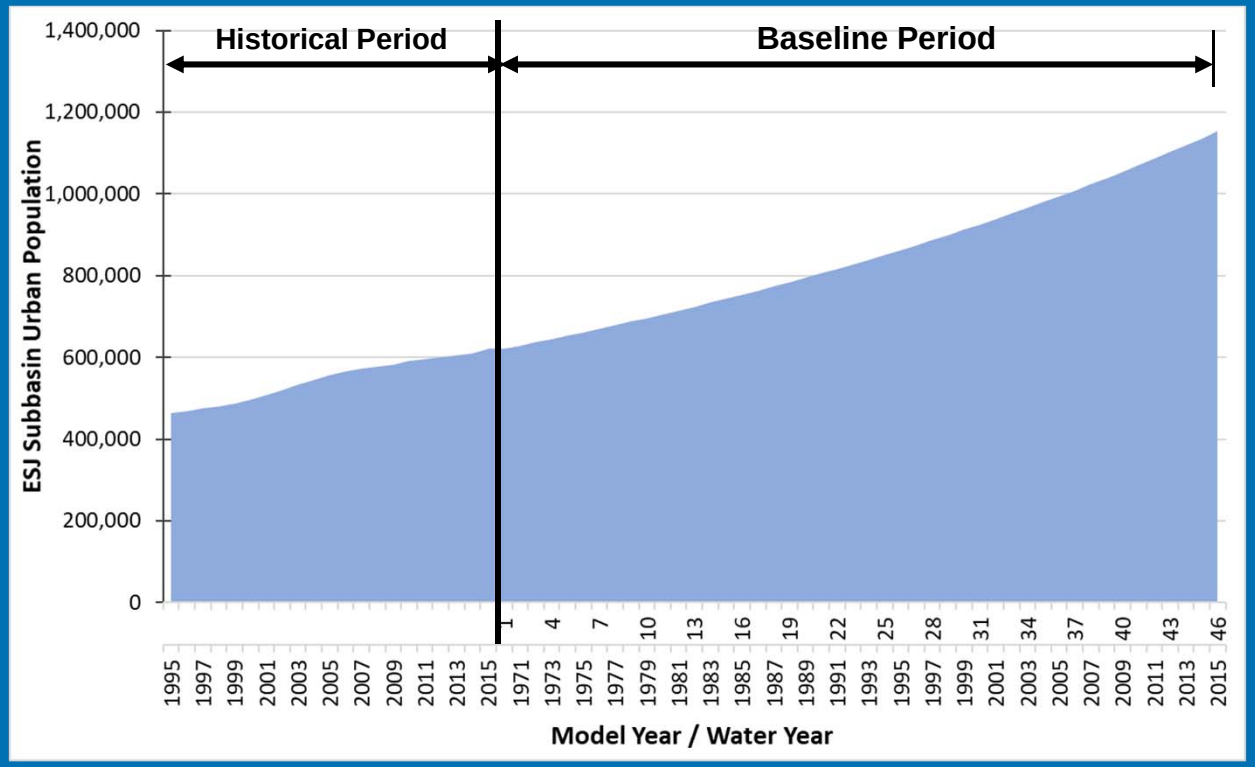
- Hydrology (precipitation and stream inflow): WY 1970-2015 (46 years)
- Initial Conditions and Boundary Conditions: Based on ending GWL from historical ESJWRM
- Urban Demand:
  - Assume no conservation or 2013 GPCD (i.e., pre-drought)
    - Consider new statewide water efficiency goals (50 GPCD by 2030 per SB 606/AB1668)
  - Project population based on published planning documents

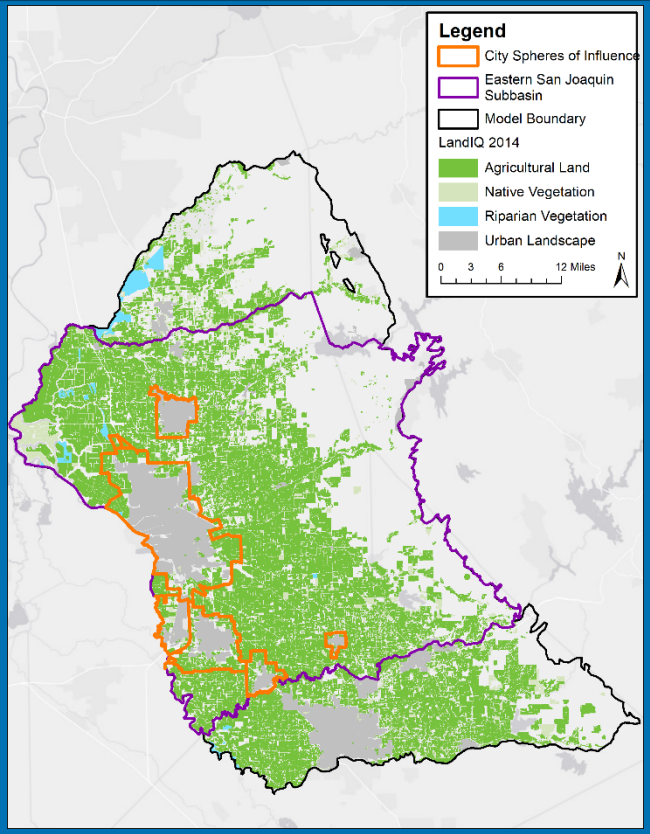
Future Conditions
Baseline Assumptions

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY



Future Conditions Baseline Assumptions

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY



- Land Use and Cropping Pattern: Assume full urban conversion

Discussion of Assumptions

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- Next month we will continue and finalize the discussion on assumptions going in the future water budget calculations

Approach to Projecting Supply and Demand

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Step 1	Identify future demands through 2040
Step 2	Identify supply projects with yield and timing
Step 3	Develop supplies and demand from “current” (2015) to 2040

References Used to Develop Supply/Demand Projections

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- Agricultural Water Management Plans
- Urban Water Management Plans
- Groundwater Management Plans
- Integrated Regional Water Management Plans
- Data directly from GSAs
- MokeWISE Water Availability Analysis
- Capital Improvement Programs
- General Plans

Exercise – Projected Future Supply and Demand (example)

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DEMAND (AFY)								
Use Type	**Description**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**Notes**
Agriculture (Total)		120,752	120,752	120,752	120,752	120,752	120,752	IRWMP Table 6-5 (Other Agriculture)

SUPPLY (AFY)								
Source	**Description**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**Notes**
Groundwater		120,752	120,752	120,752	120,752	120,752	120,752	No information on other sources, so assumed that groundwater is used to meet demand.

EXPECTED SUPPLY/DEMAND CHANGES FROM PROJECTS (RELATIVE TO 2015, AFY)								
Supply/Demand	**Project Name**	**2015**	**2020**	**2025**	**2020**	**2035**	**2040**	**Source/Description**

QUESTIONS:

Are there any future water supply projects we should be aware of?

July Advisory Committee Topics

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

- Minimum Thresholds
- Projected Water Budget
- Hydrogeologic Conceptual Model
- Water Accounting Framework Approach

Appendix Slides

Historical Water Budget

Historical Model L&WU

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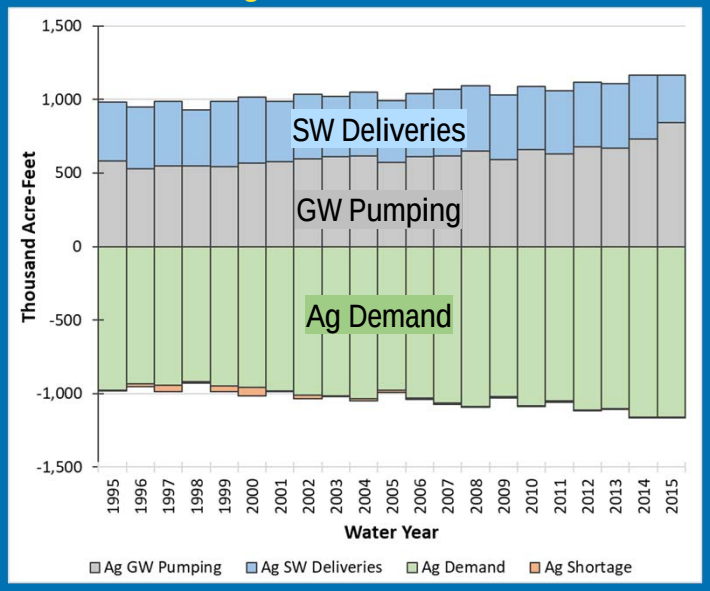
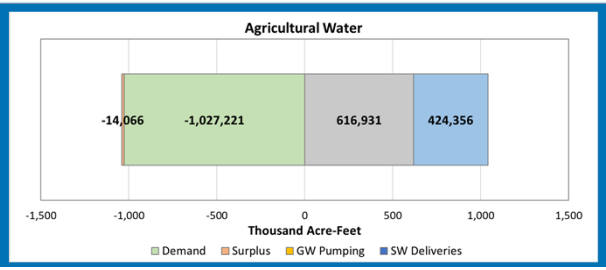
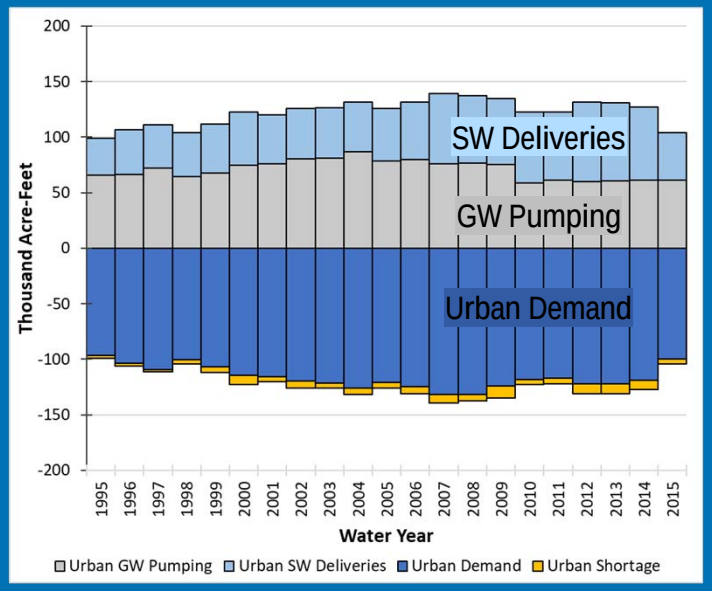
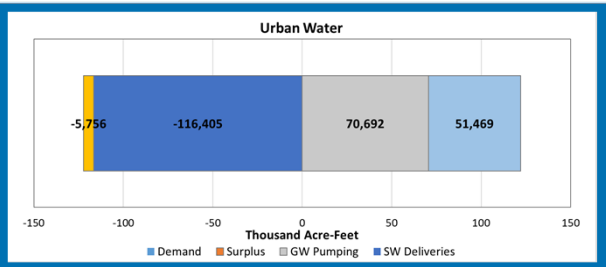
Agricultural Water Use





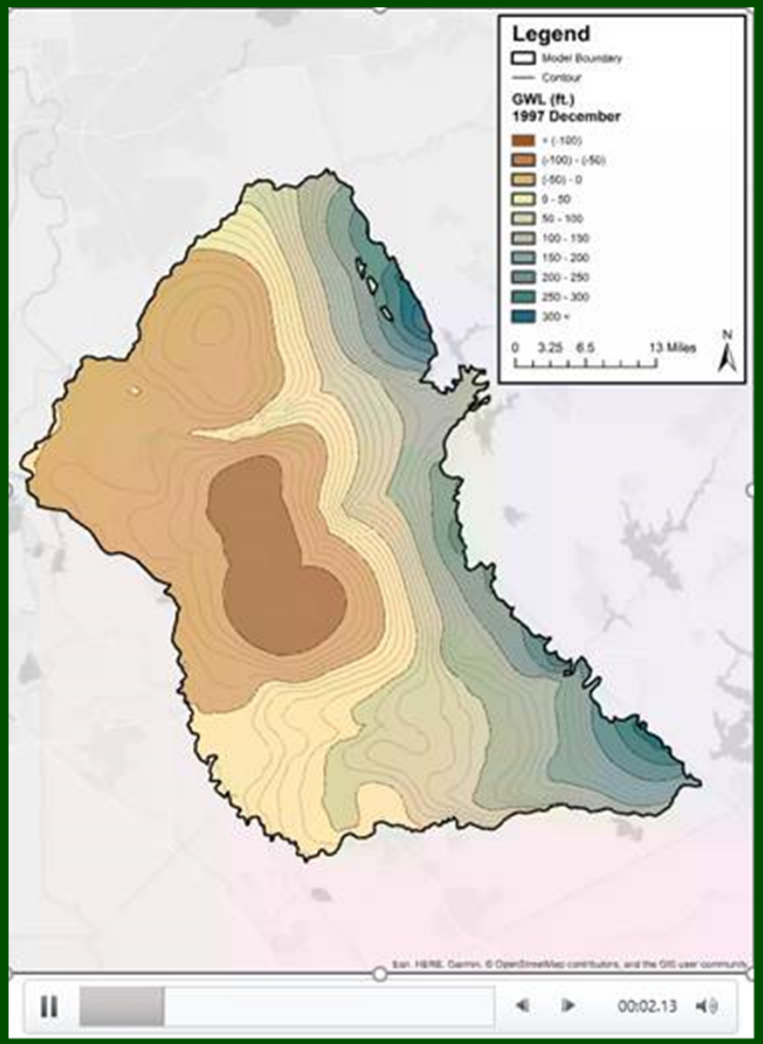
Urban Water Use





Historical Groundwater Levels

GW level changes over time for period: WY 1995 to 2015



Historical Model Groundwater Budget

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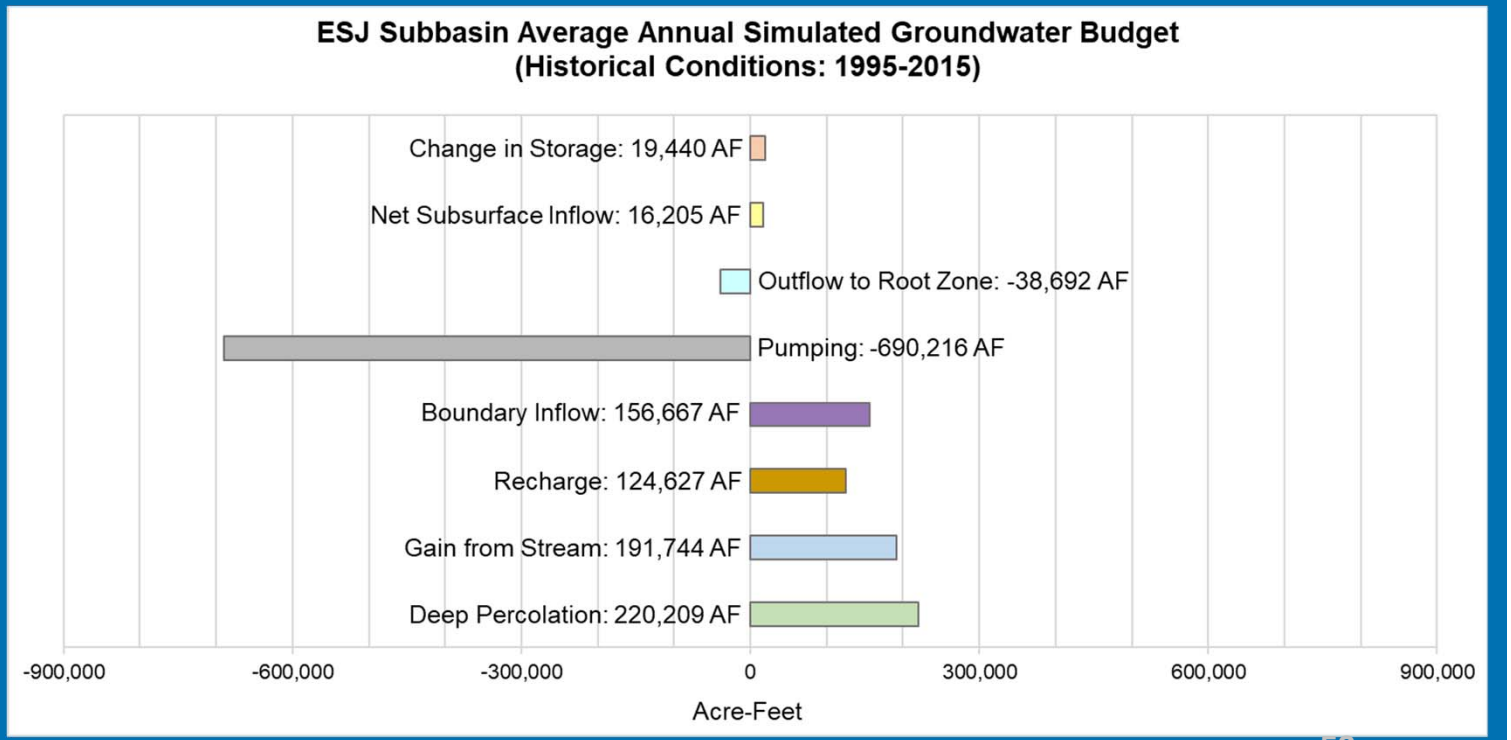
Average Annual GW Budget for period: WY 1995 to 2015



Historical Model Groundwater Budget

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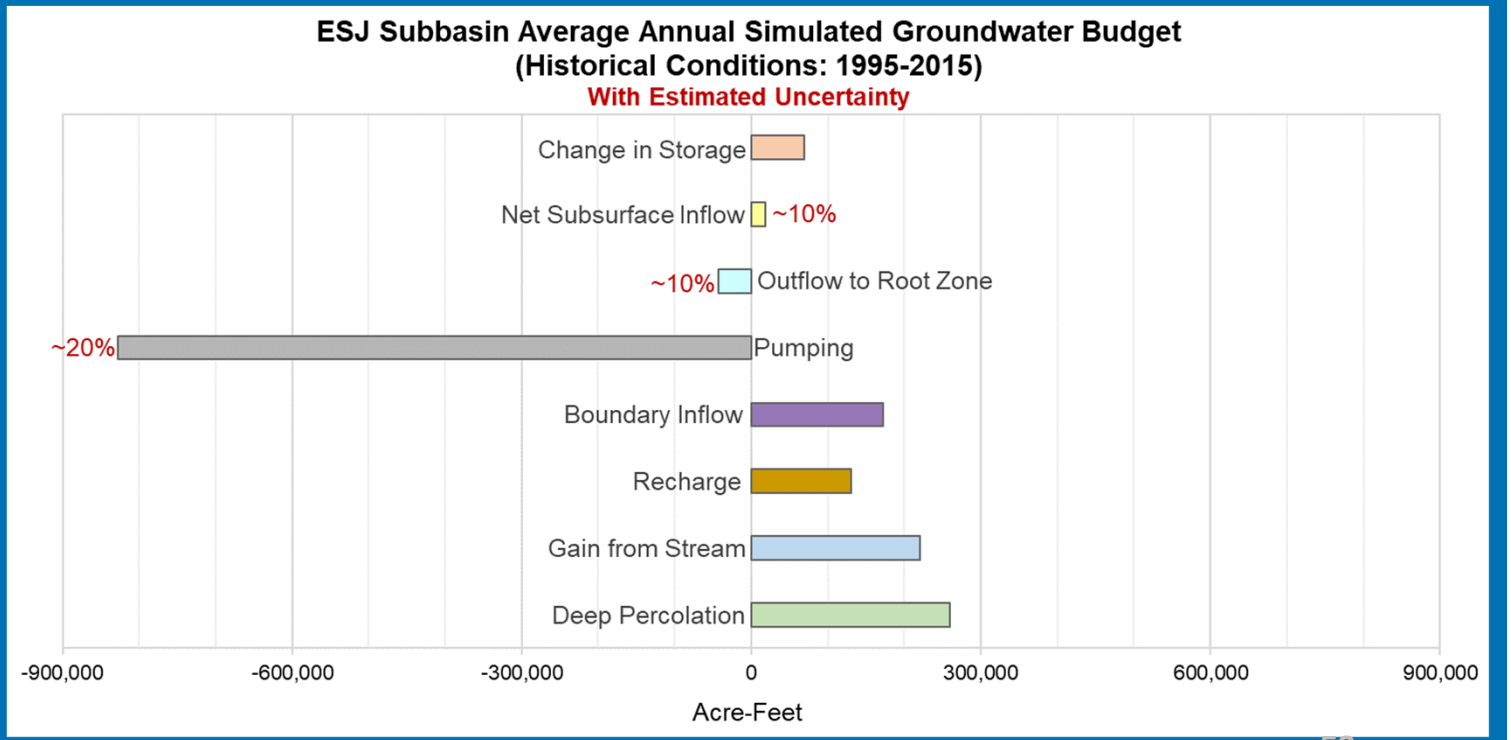

Historical Model Groundwater

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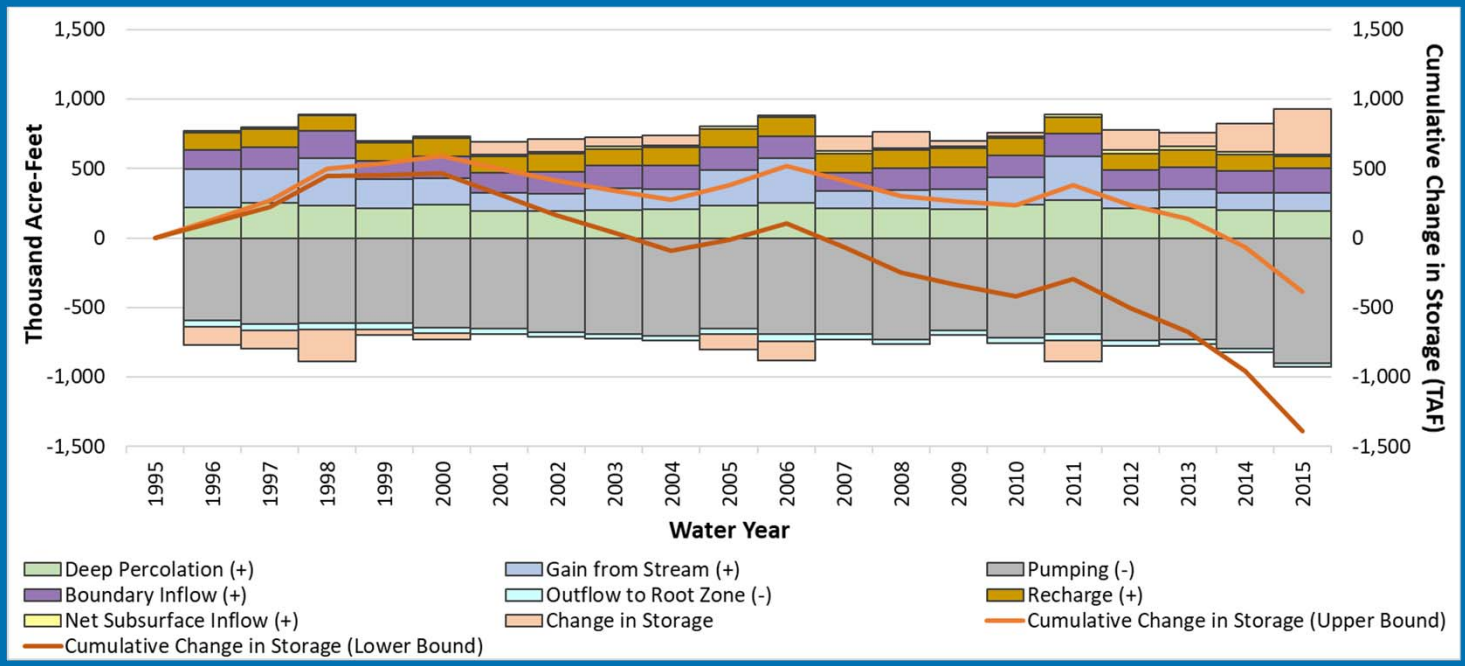
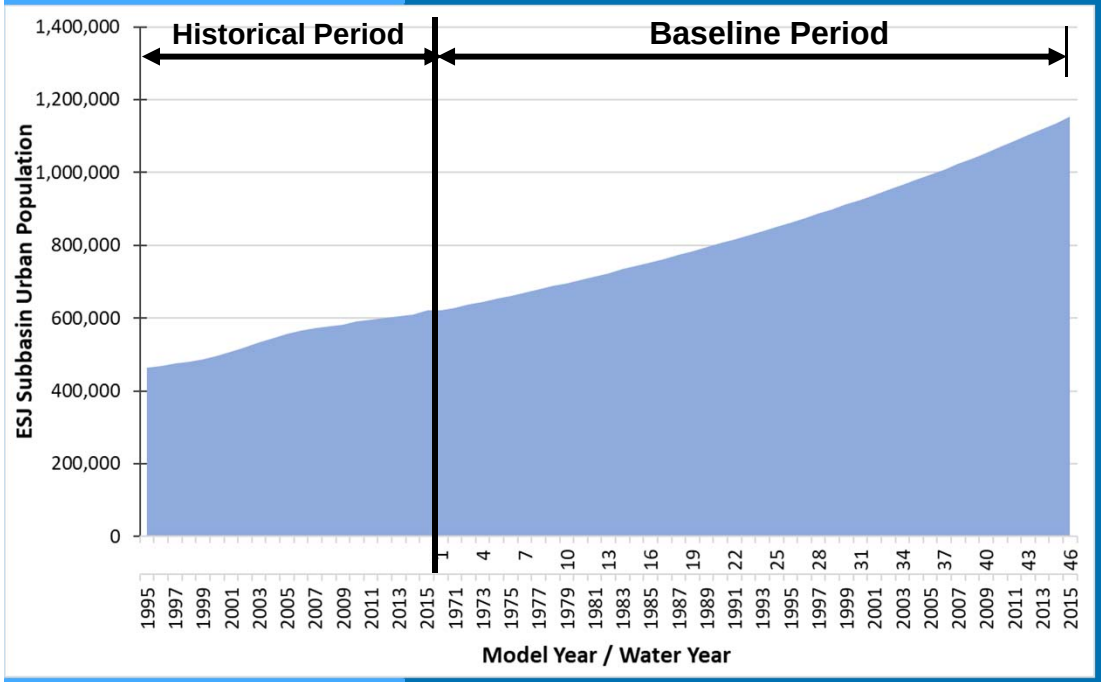
Average Annual GW Budget trends for period: WY 1995 to 2015

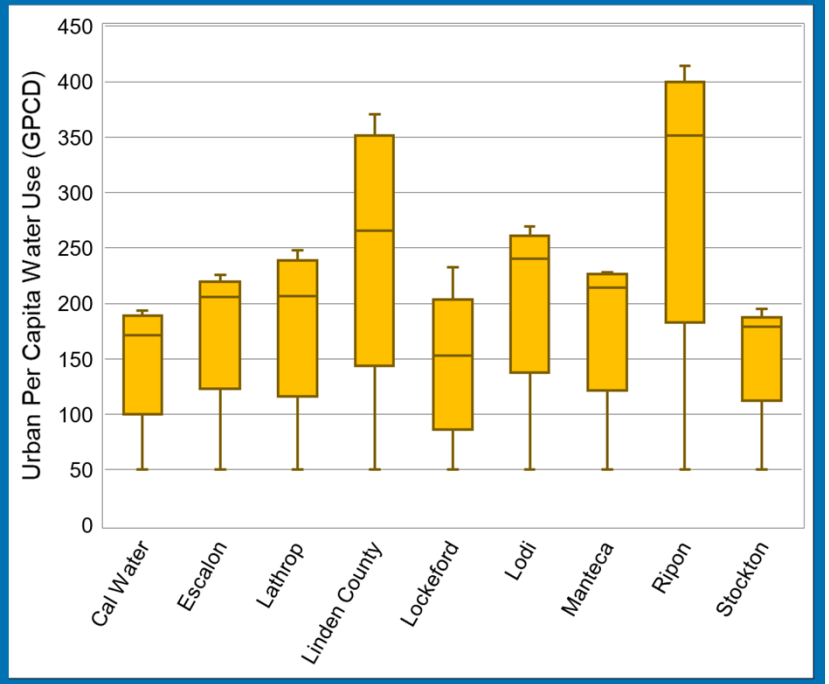


Projected Water Budget

Future Conditions
Baseline Assumptions

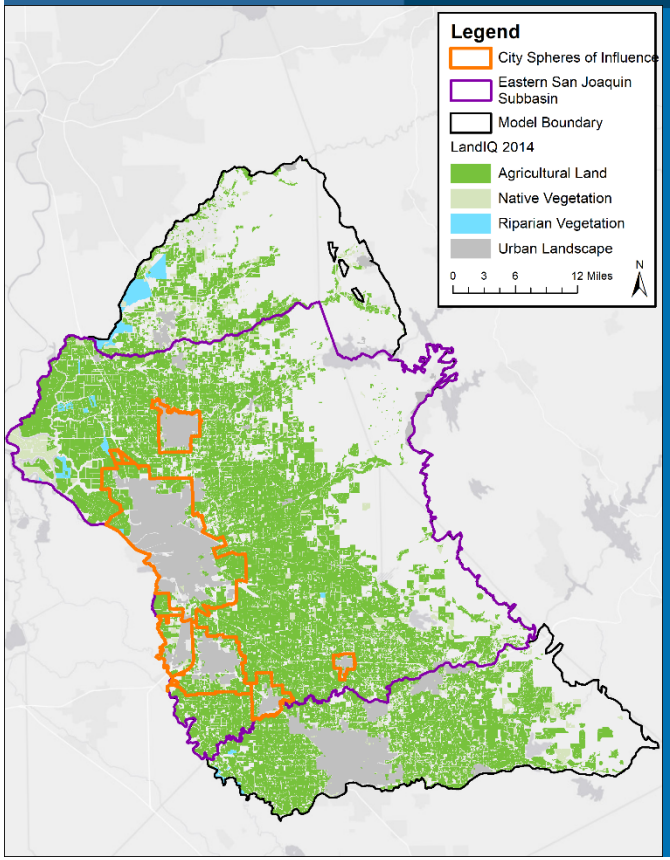
EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY



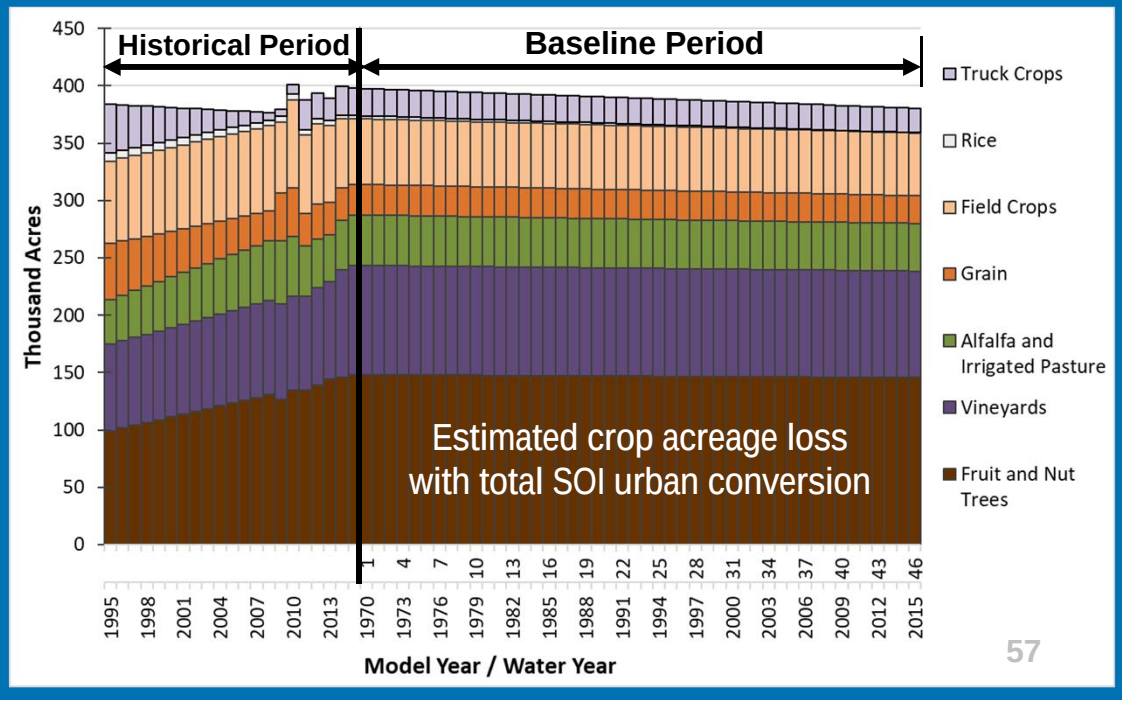


Future Conditions
Baseline Assumptions

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

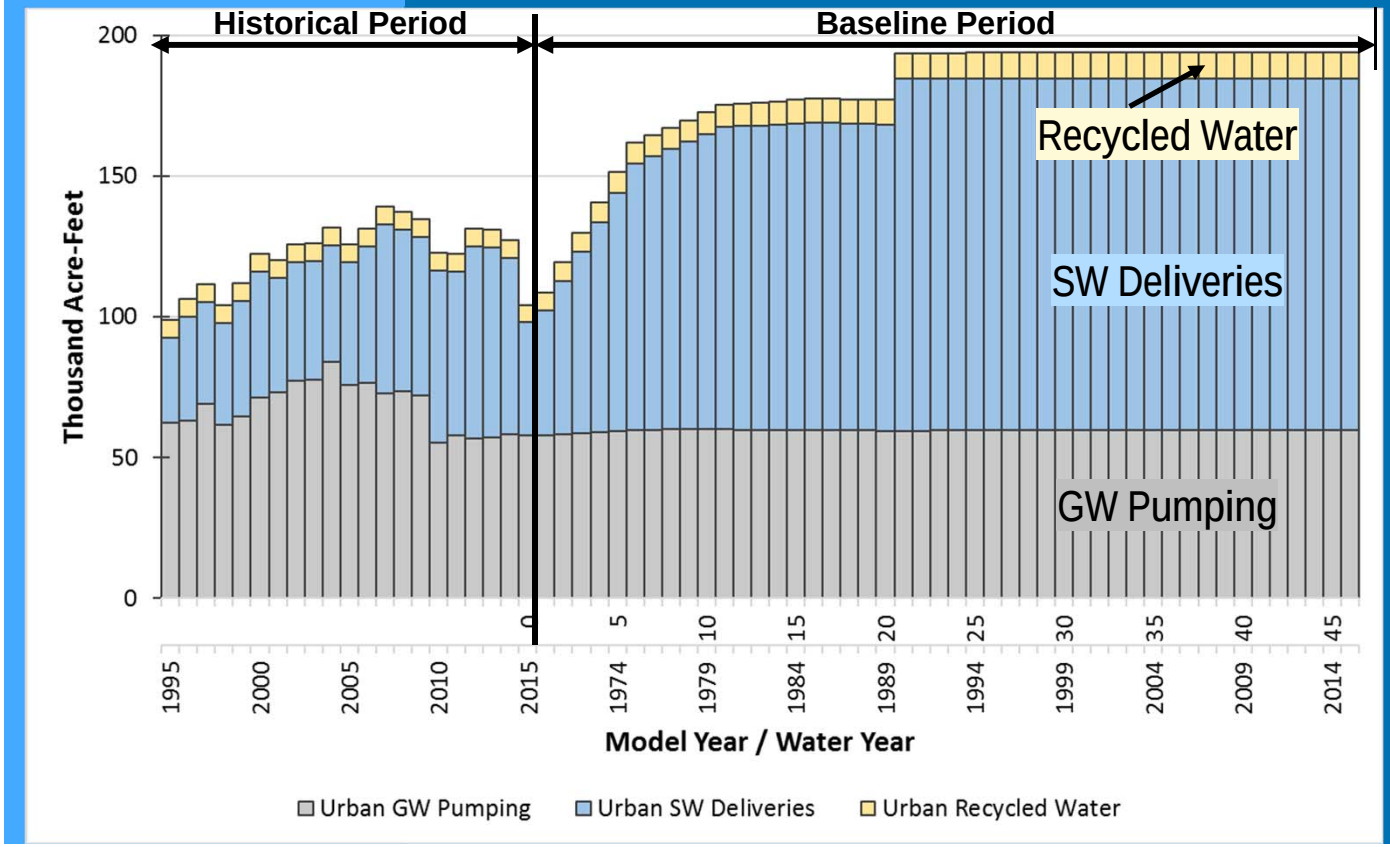


- Land Use and Cropping Pattern: Assume full urban conversion



Future Conditions Baseline Assumptions

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY



- Surface Water Diversions and Well Pumping: Estimate based on published planning documents
  - Add new planned diversions and wells

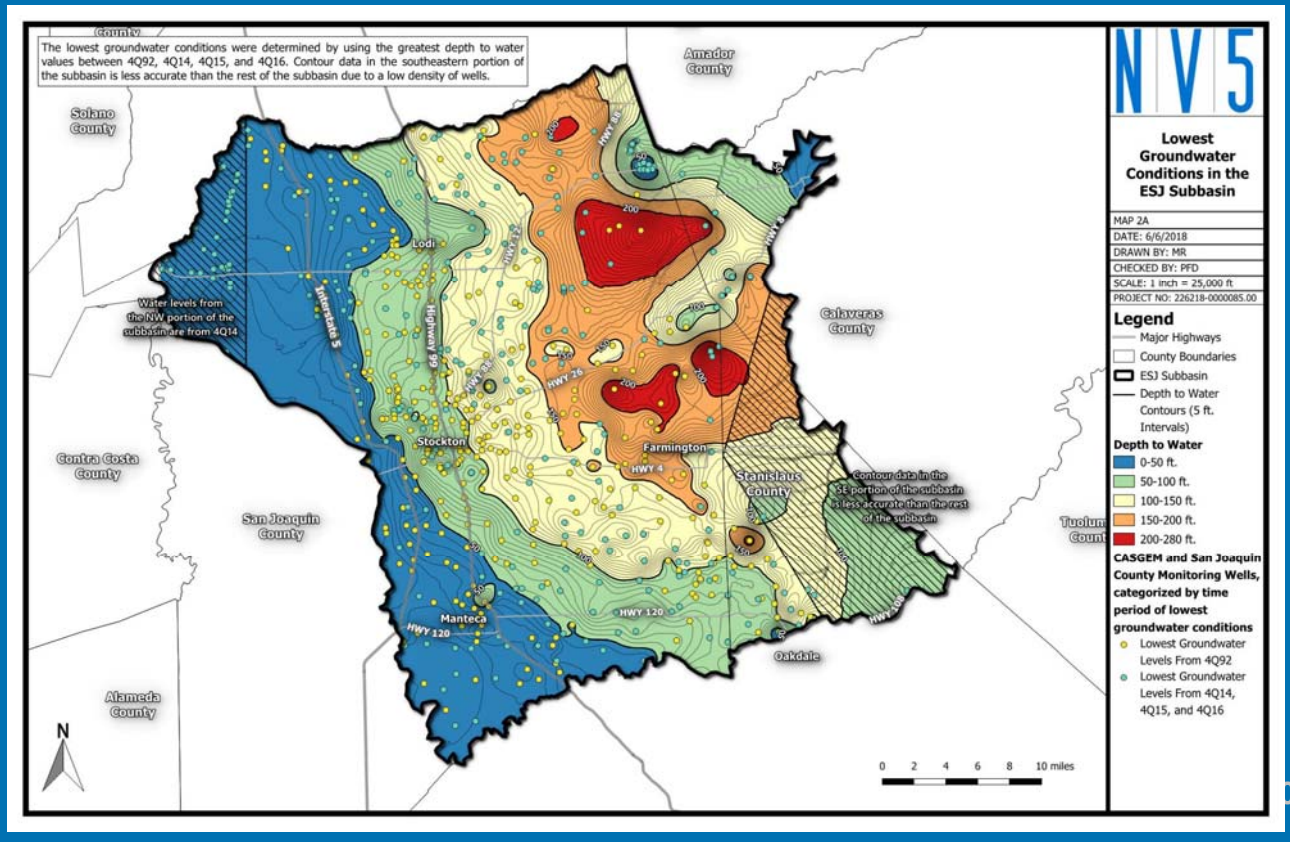
Minimum Thresholds

Proposed Threshold with Wells Categorized by Lowest Year

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

(Yellow) – Areas where threshold is based on 1992 levels

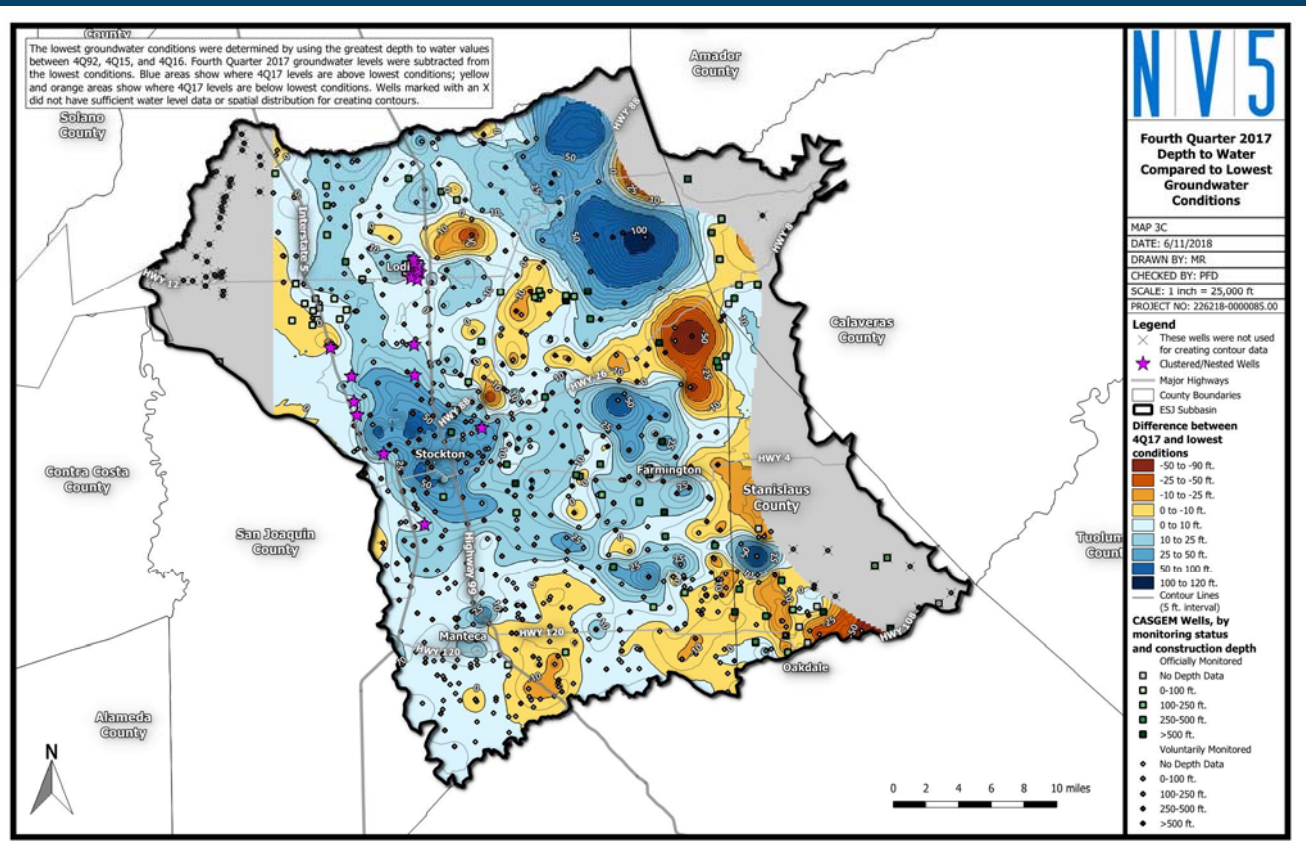
(Blue) – Areas where threshold is based on 2015 levels



Difference Between Fall 2017 Levels and Proposed Threshold

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

All CASGEM wells shown



Difference Between Fall 2017 Levels and Proposed Threshold

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

All CASGEM wells shown

GSA boundaries included