Eastern San Joaquin Subbasin

Groundwater Sustainability Workgroup

September 11, 2018

EASTERN SAN JOAQUIN
GROUNDWATER AUTHORITY

Agenda

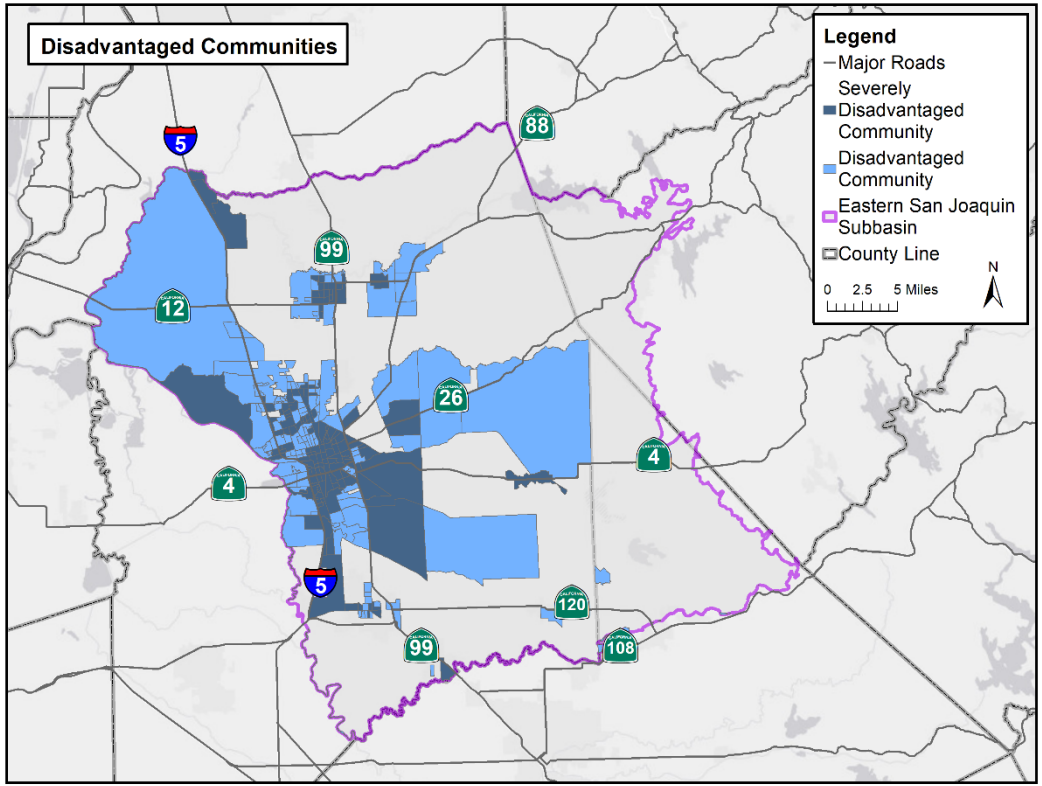
EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

- Comments on Meeting Notes
- Update on Background Conditions
- Undesirable Results & Minimum Thresholds Continued
- Historical Water Budget & Current Conditions Baseline
- Recap of Open House
- Announcements
- Other Topics

Update on Background Conditions

Disadvantaged Community (DAC) Definitions

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

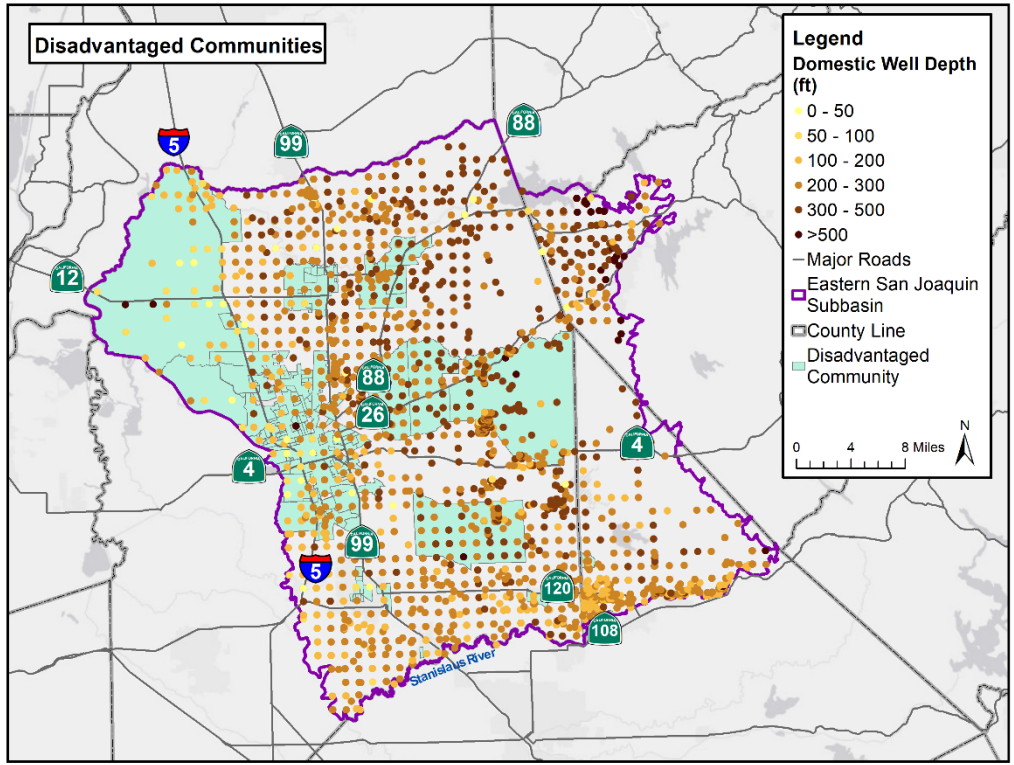


Disadvantaged Communities (DACs) are defined as census geographies with a median household income less than 80% of the statewide average.

Severely Disadvantaged Communities (SDACs) are defined as census geographies with a median household income less than 60% of the statewide average.

Disadvantaged Communities and Domestic Well Depth

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY



Median domestic well depth in DAC areas is very slightly lower (~5 ft) than in non-DAC areas.

This may be due to the largely western placement within the subbasin.

Well Data Availability – Acronyms Defined

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

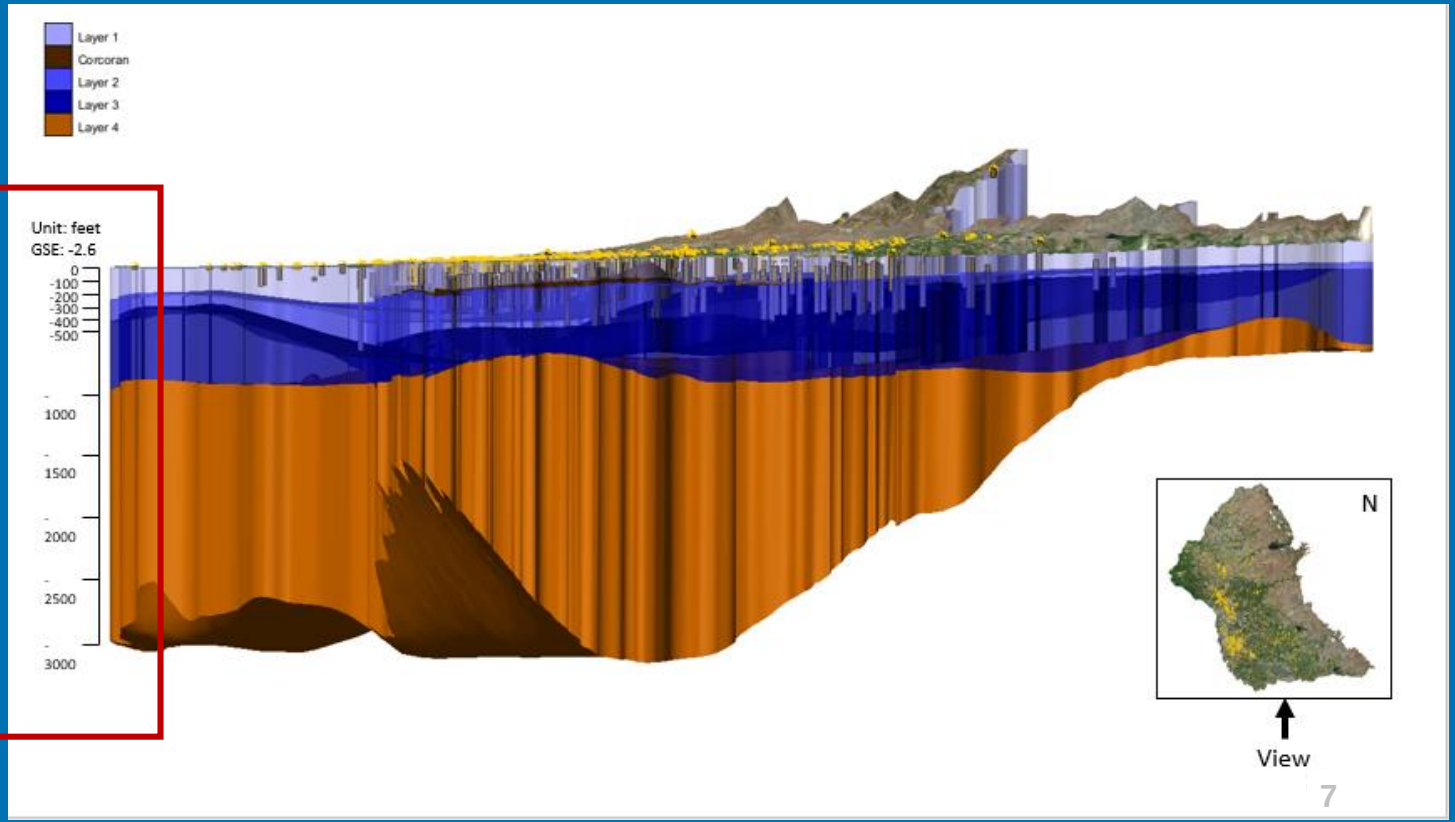
Dataset		Count	Data Provided				
			Well Type	Well Depth	Groundwater Levels	Groundwater Quality	Well Location
California Statewide Groundwater Elevation Monitoring (CASGEM)		147	(Limited)	(Limited)	X		X
CASGEM (Voluntary)		685	(Limited)	(Limited)	X		X
Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS)	*California Department of Public Health (CDPH)*	650	X	X		X	X
	Dairies	534	X	X		X	X
	GeoTracker	650	X	X		X	X
Data Received Directly from GSAs		243	X (Public and monitoring wells)	X	(Limited)	X	X
Groundwater Ambient Monitoring and Assessment (GAMA)		225	X	(Limited)		X	X
Online System for Well Completion Reports (OSWCR)	*Domestic*	10,034	X	X			
	Agricultural	2,909	X	X			
	Public Supply	364	X	X			
San Joaquin County		193	(Limited)	(Limited)	X		X

Freshwater and Saline Aquifer Depths

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Layers 1-3 are freshwater; layer 4 is saline

There is a high likelihood of high quality freshwater deeper than 1,000 ft but very few wells at this depth



Comments Received

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

To address:

- Subsidence
- Public Trust Doctrine Nexus
- DACs
- Nitrates – what is regulated under existing programs?

Not applicable within ESJ Subbasin:

- Loss of desert habitat

Undesirable Results & Minimum Thresholds Continued

Understanding Undesirable Results and Setting Minimum Thresholds

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

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

Recap of Last Month's Discussion

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

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

Undesirable Results for Chronic Lowering of Groundwater Levels

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Chronic Lowering of Groundwater Levels

Why is this a concern? What are we trying to avoid?

- **Reduced productivity, wells going dry, and increased pumping/drilling costs for all users, including Disadvantaged Communities**
- **Cones of depression impacting viability of adjacent shallower wells (beyond ability to recharge)**
- **Surface water impacts**

Undesirable Results for Reduction in Groundwater Storage

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Reduction in Groundwater Storage

Why is this a concern? What are we trying to avoid?

- **This is not a major concern due to large basin storage**
- **Undesirable result = running out of sufficient storage to get through drought**
- **Can include a threshold to consider future water markets but elevation thresholds will be more protective**

****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.*

Undesirable Results for Seawater Intrusion

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

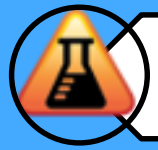
Seawater Intrusion

Why is this a concern? What are we trying to avoid?

- **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**

Undesirable Results for Degraded Water Quality

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY



Degraded Water Quality

Why is this a concern? What are we trying to avoid?

- **Localized salinity issues – connate water and delta brackish water intrusion from reduced water levels**
- **Salinity solutions should not further aggravate current "salt sink"**
- **Do not want to hold basin responsible for conditions that are outside of its control**

Continuing On From Last Month's Discussion

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

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

Understanding Undesirable Results and Setting Minimum Thresholds

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

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

Undesirable Results for Land Subsidence

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Land Subsidence

Why is this a concern? What are we trying to avoid?

- **Impacts to private and public infrastructure**

Discussion: other potential effects to consider?

Understanding Undesirable Results and Setting Minimum Thresholds

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

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

Undesirable Results for Depletion of Interconnected Surface Water

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Depletion of Interconnected Surface Water

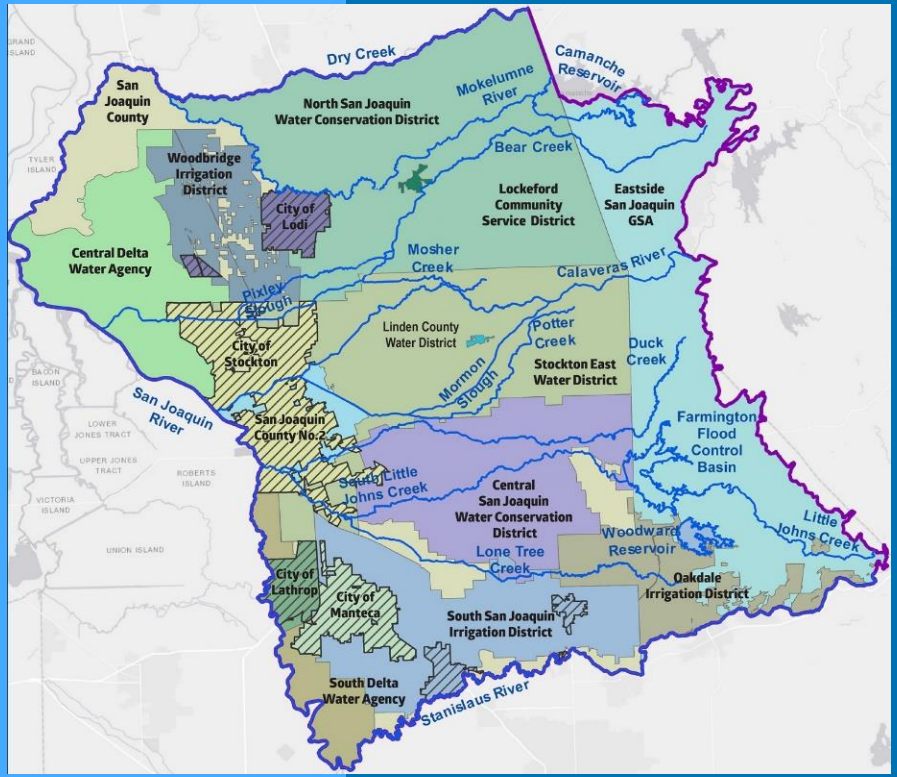
Why is this a concern? What are we trying to avoid?

- **Ability to meet minimum flow requirements**
- **Recreation impacts**
- **Fisheries impacts/temperature**
- **Habitat impacts**
- **GDEs**
- **Impacts to water supply for reservoirs**
- **Water rights issues**
- **Water quality issues**

Discussion: other potential effects to consider?

Minimum Threshold Development for Depletion of Interconnected Surface Water

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY



Major river systems in the Subbasin are highly managed.

Instream flow requirements, water quality standards, and water rights govern upstream releases.

Approach for Developing Minimum Thresholds for Interconnected Surface Waters

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

1) Recognize existing management and regulatory programs in place

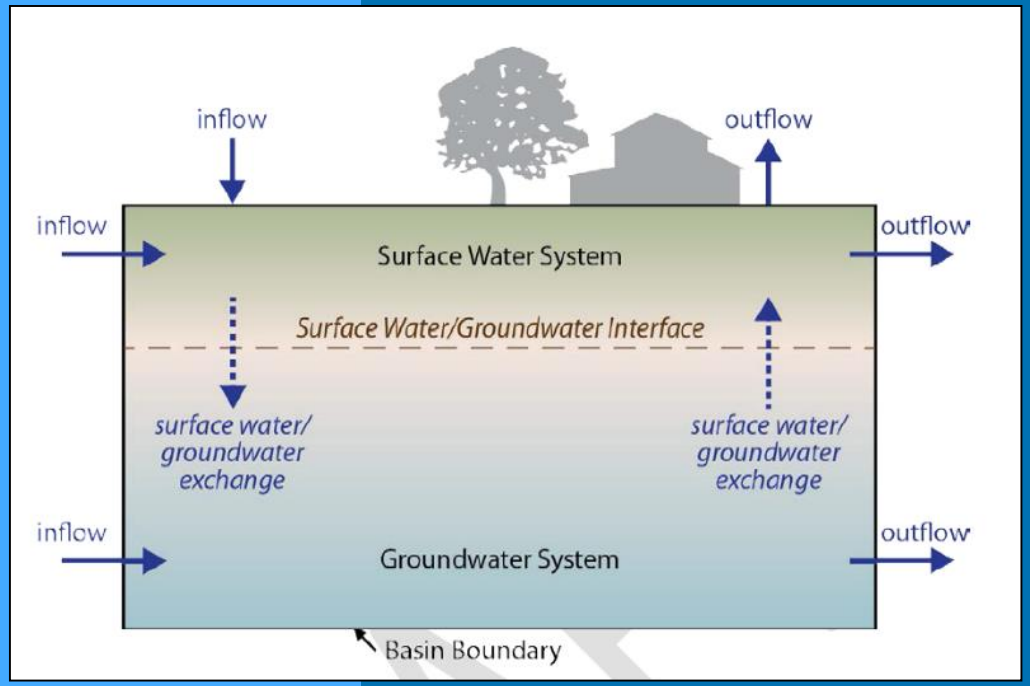
2) Identify coordination and management activities that integrate with existing programs

3) Identify losing streams and consider elevation thresholds to protect against significant and unreasonable stream depletion

Historical Water Budget & Current Conditions Baseline

What is a Water Budget?

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

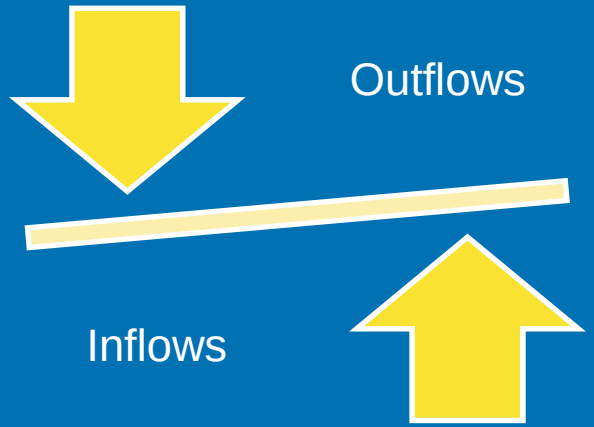


A Water Budget is an accounting of the total groundwater and surface water entering and leaving a groundwater basin.

A Water Budget Operates like a Bank Account

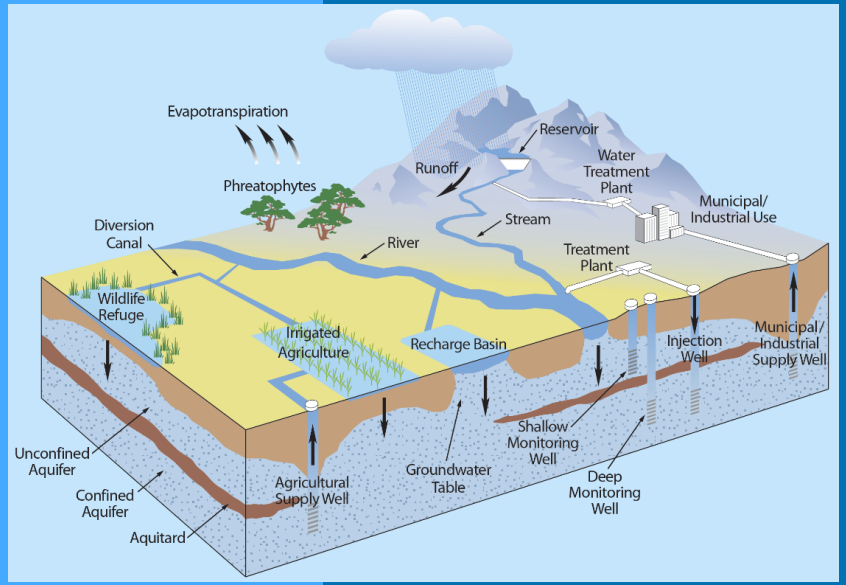
EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Inflows (supplies) and outflows (demands) are tracked and compared over time to identify change in amount of water stored.



Water Budgets Quantify the Movement of Water

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY



A Water Budget takes into account the storage and movement of water between the four physical systems of the hydrologic cycle:

- Atmospheric system
- Land surface system
- River and stream system
- Groundwater system

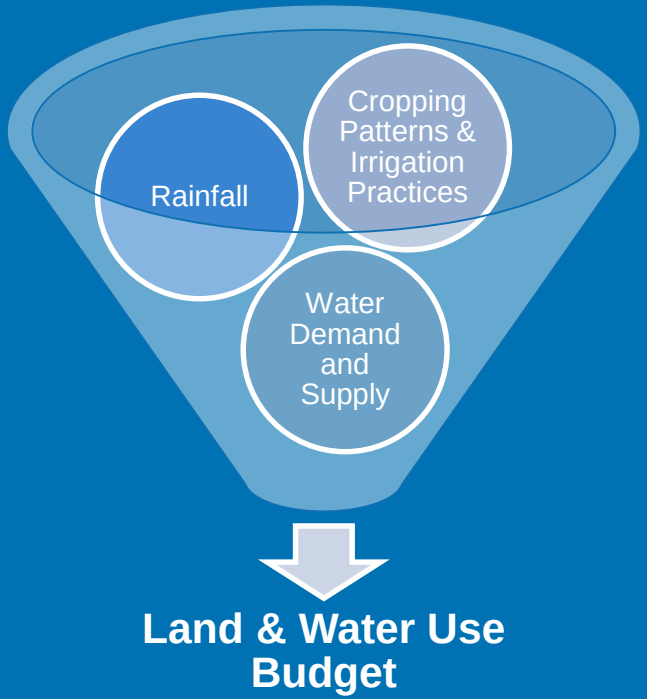
Why are Water Budgets Important?

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

- "You can't manage what you don't measure"
- A series of ongoing negative balances can result in long-term conditions of overdraft (the ESJ Subbasin is currently classified as "critically overdrafted")
- Carefully calculated Water Budgets increase the likelihood that planned projects and management actions will achieve the intended outcome within the intended timeframe

The Water Budget for the ESJ GSP Combines Land and Water Use

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY



Water Budget Time Frames

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Historical Water Budget

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

Discussing today

Current Conditions Baseline

Uses the most recent data on population, land use, temperature, year type, and hydrologic conditions projected out over 50 years of hydrology.

Discussing today

Projected Water Budget

Uses estimated future population growth, land use changes, climate change, and sea level rise projected out over 50 years of hydrology.

Historical Water Budget

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Historical Water Budget

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

Current Conditions Baseline

Uses the most recent data on population, land use, temperature, year type, and hydrologic conditions projected out over 50 years of hydrology.

Projected Water Budget

Uses estimated future population growth, land use changes, climate change, and sea level rise projected out over 50 years of hydrology.

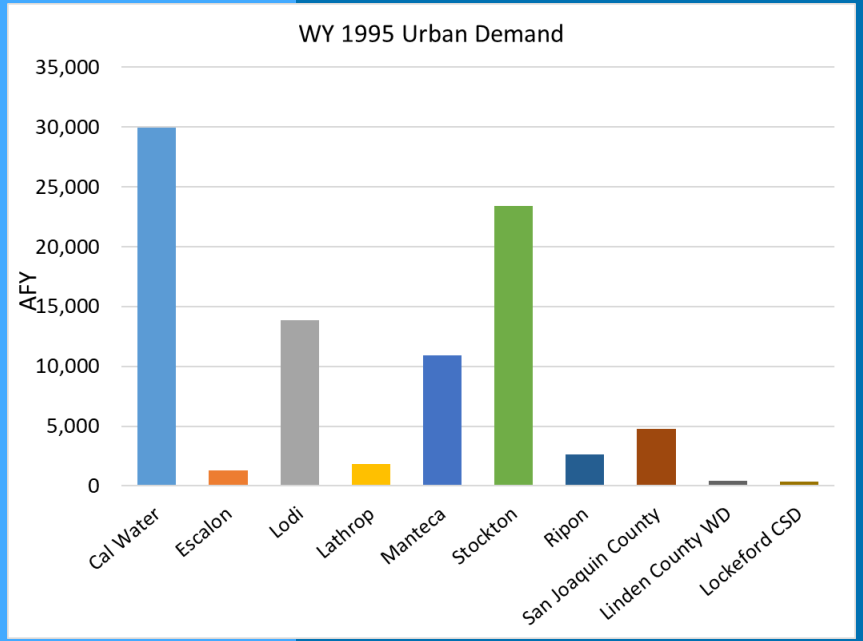
Water Demands are Based on Urban and Agricultural Water Use Estimates

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

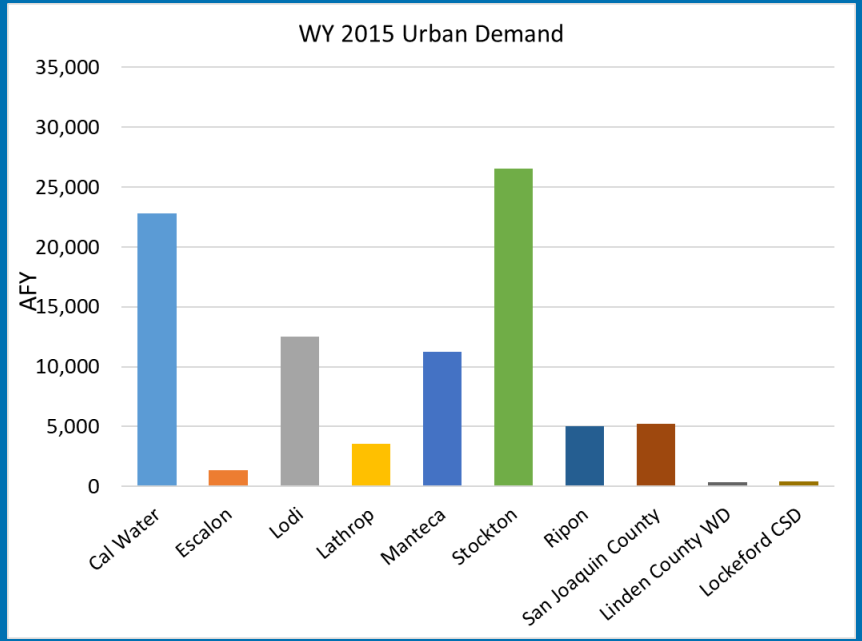
- Urban water use based on:
  - Population
  - Water Use Per Person
  - Agency projections
- Agricultural water use based on
  - Crop type and acreage
  - Soil conditions
  - Irrigation practices
  - Hydrogeology and climate

Urban Water Demand: Changes in Use Over Time

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY



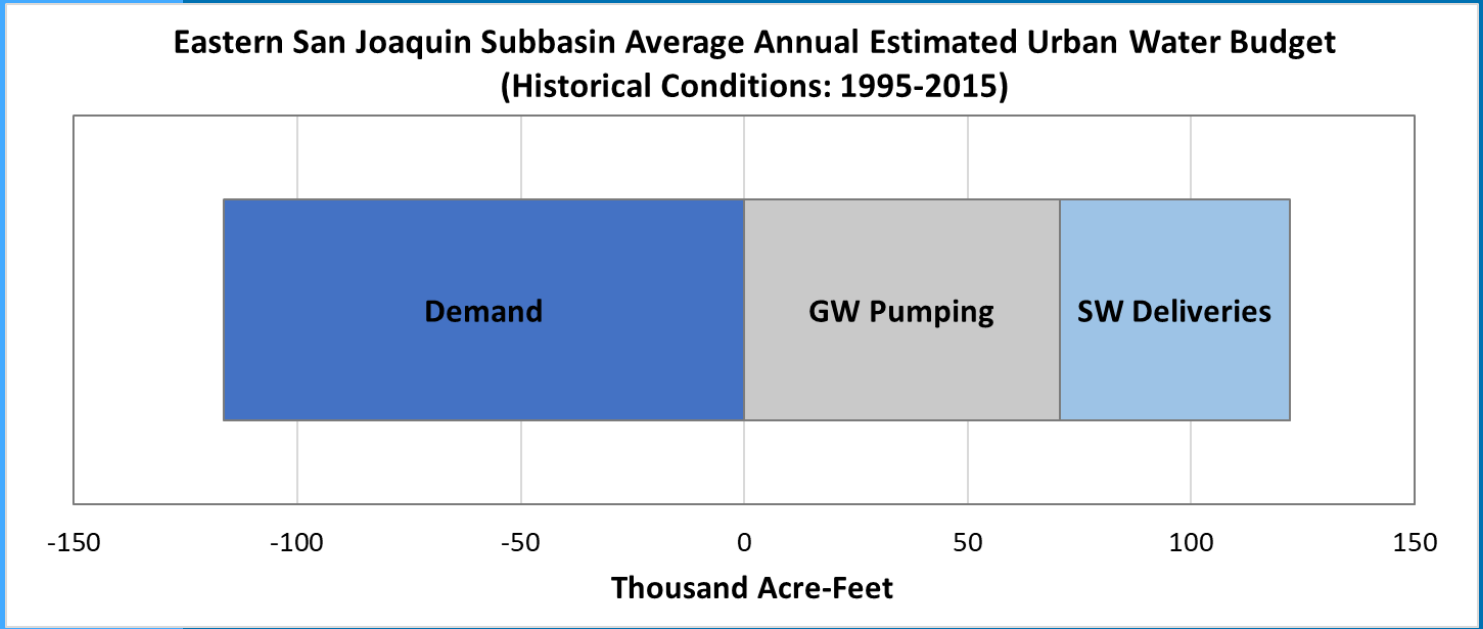
1995



2015

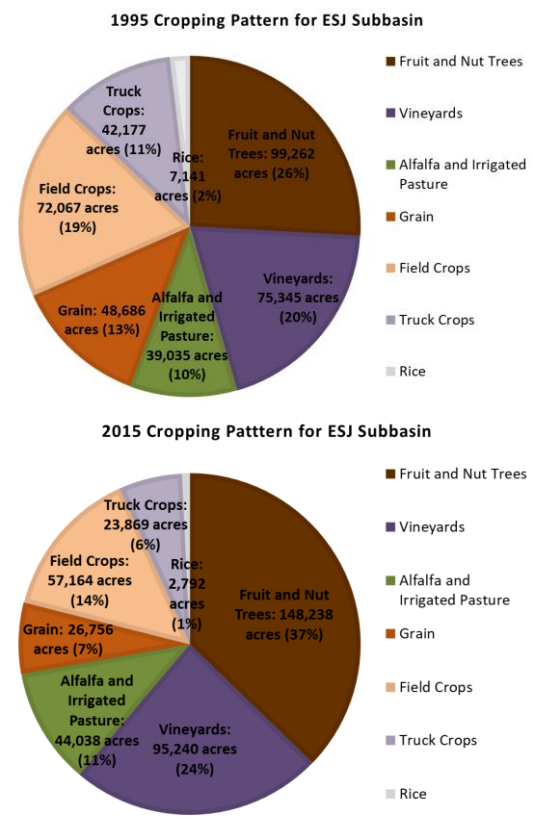
Estimated Annual Urban Land and Water Use Budget

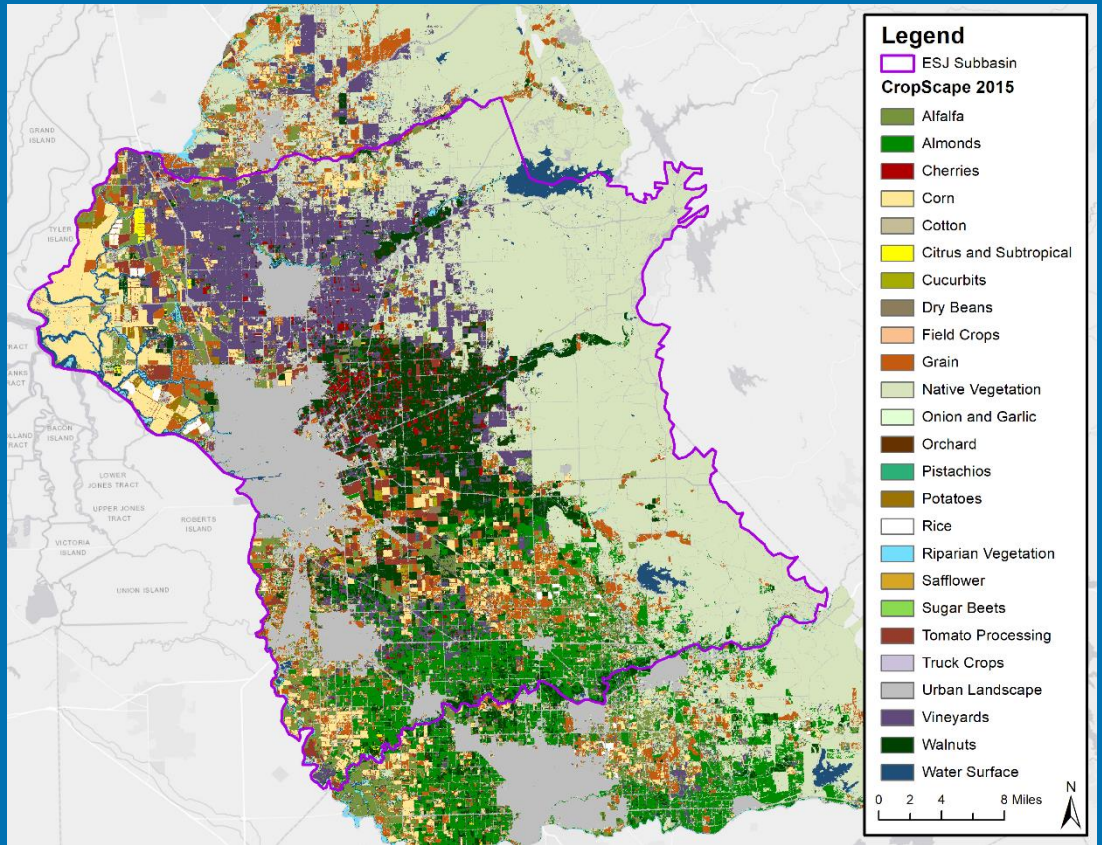
EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY



Historical Agricultural Water Demand: Changes in Crop Type Over Time

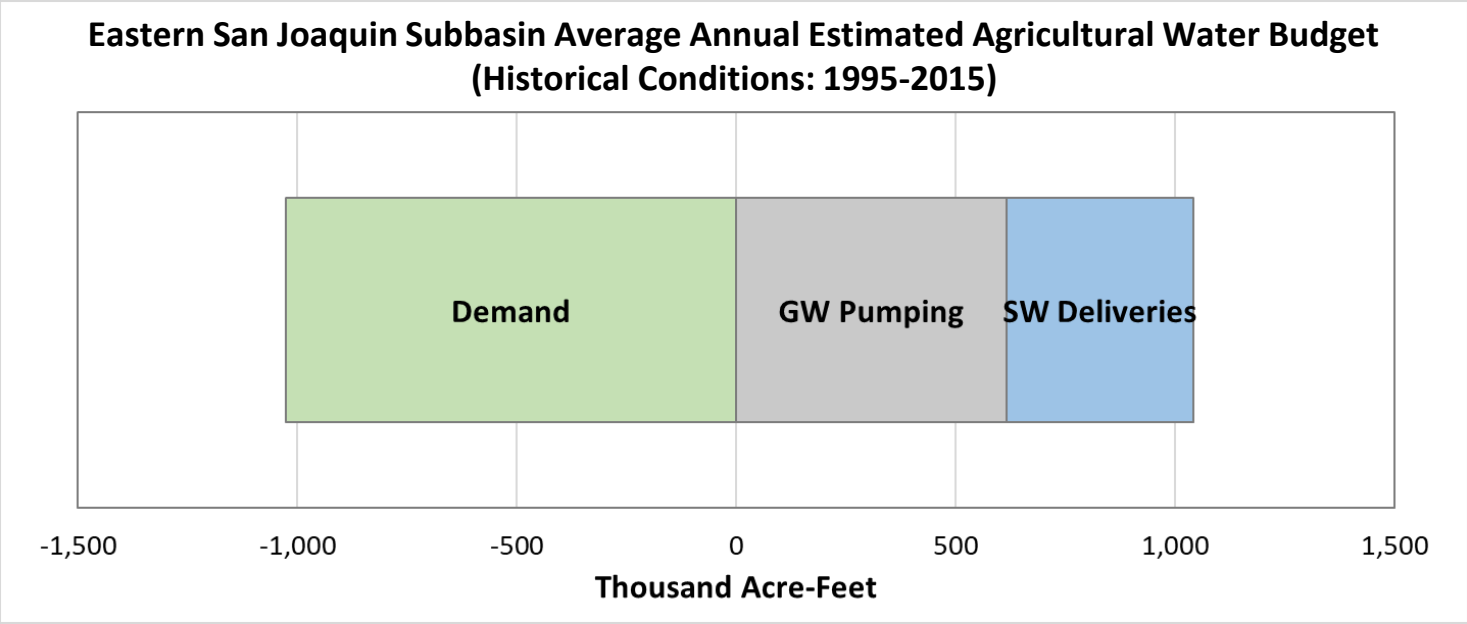
EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY





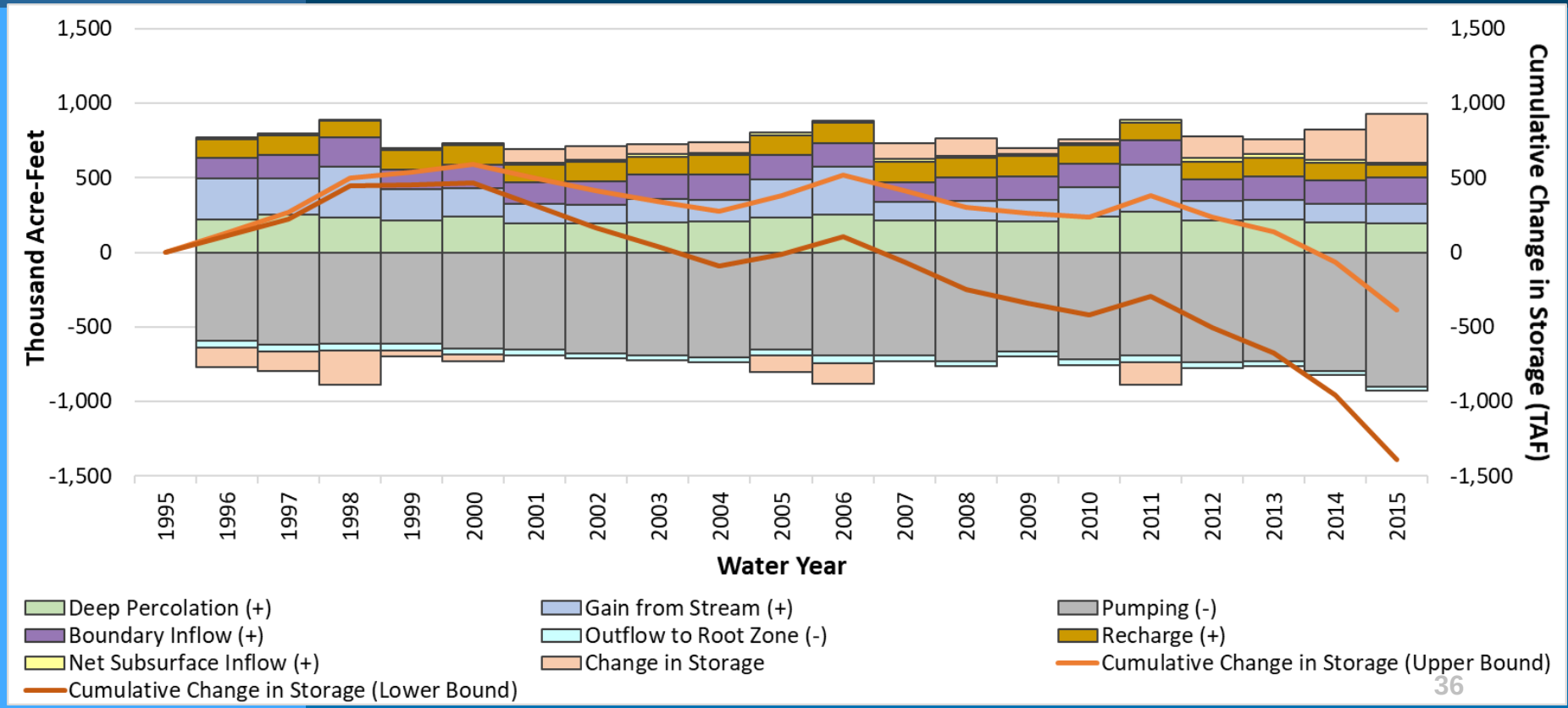
Estimated Annual Agricultural Land and Water Use Budget

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY



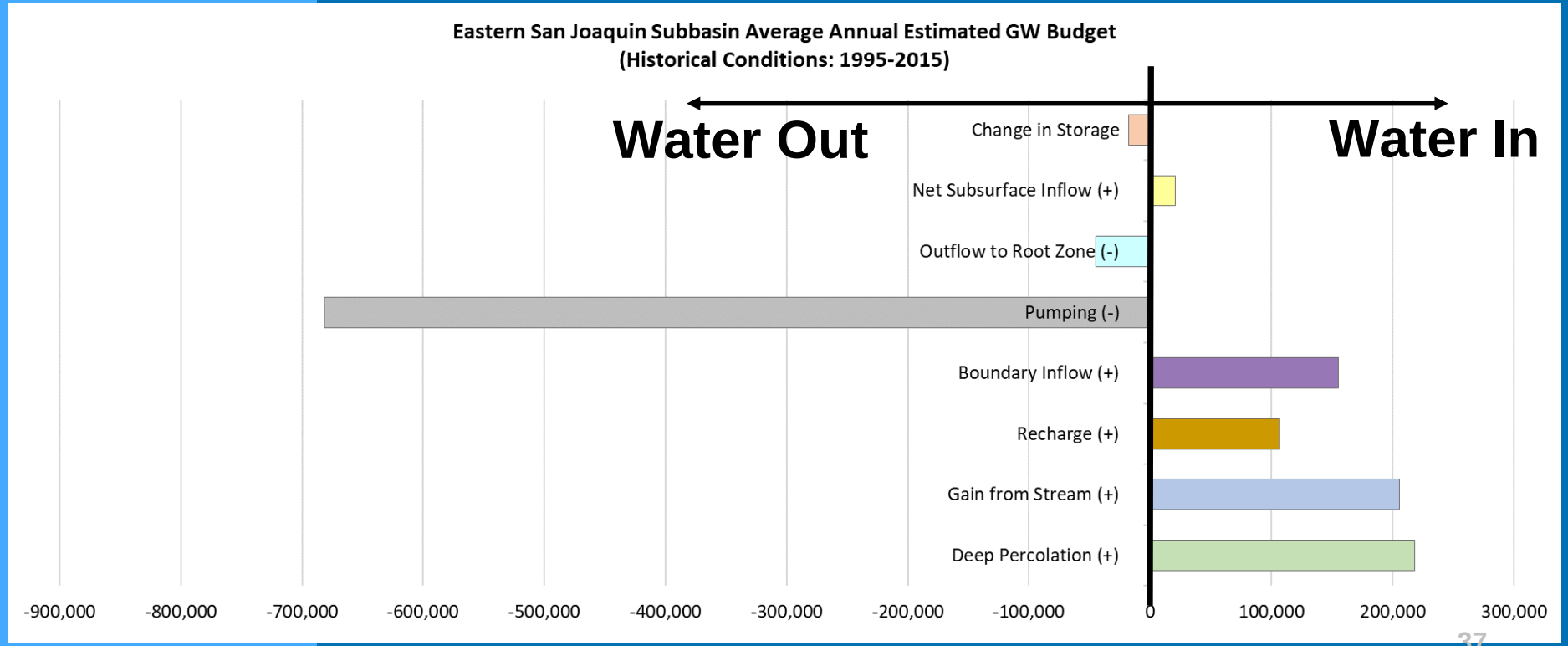
Time Series of Cumulative Storage

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY



Estimated Annual Groundwater Use

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY



Current Conditions Baseline

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Historical Water Budget

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

Current Conditions Baseline

Uses the most recent data on population, land use, temperature, year type, and hydrologic conditions projected out over 50 years of hydrology.

Projected Water Budget

Uses estimated future population growth, land use changes, climate change, and sea level rise projected out over 50 years of hydrology.

Assumptions for Current Conditions Baseline

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Urban Demand:

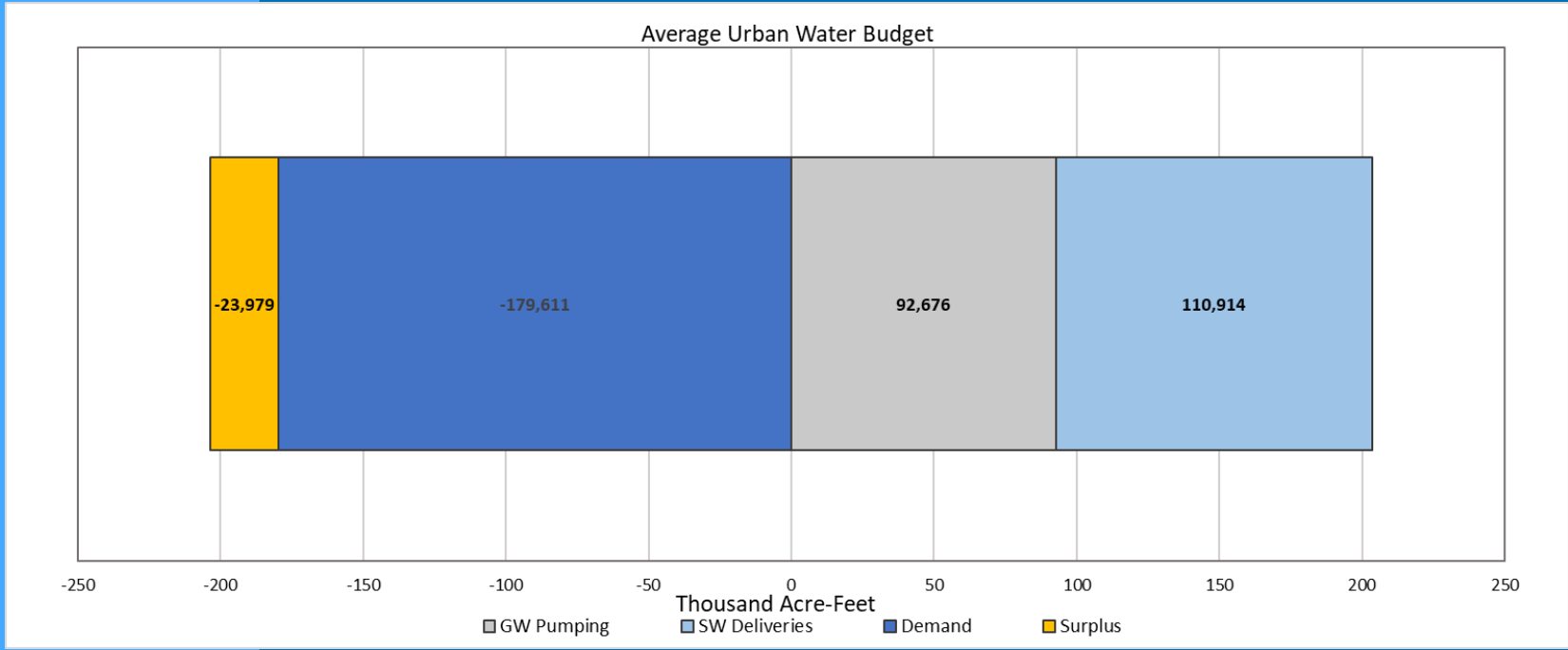
- Assume 2015 population level
- Pre-drought duty factors (2013 level GPCD)

Land Use and Cropping Pattern:

- 2014 DWR land use and cropping patterns used (LandIQ)

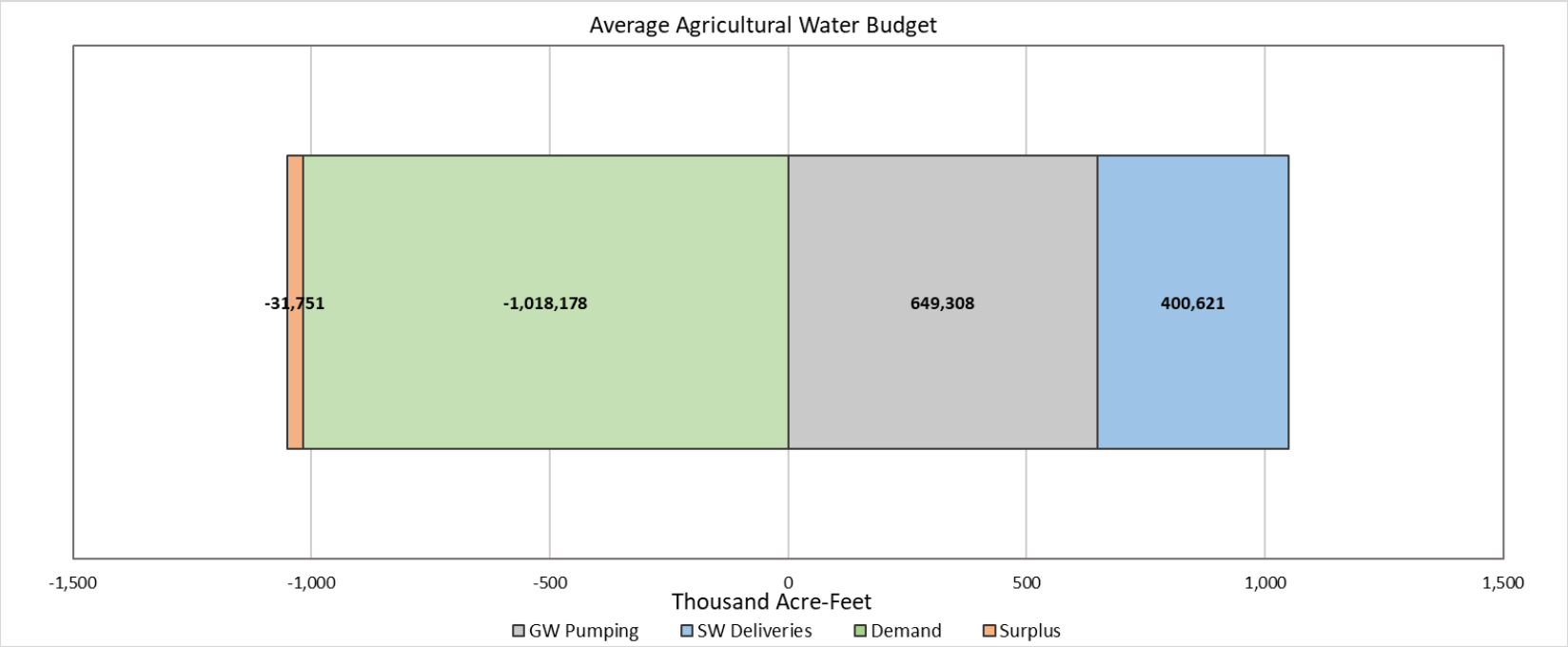
Current Conditions Baseline L&WU: Urban Water Use

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY



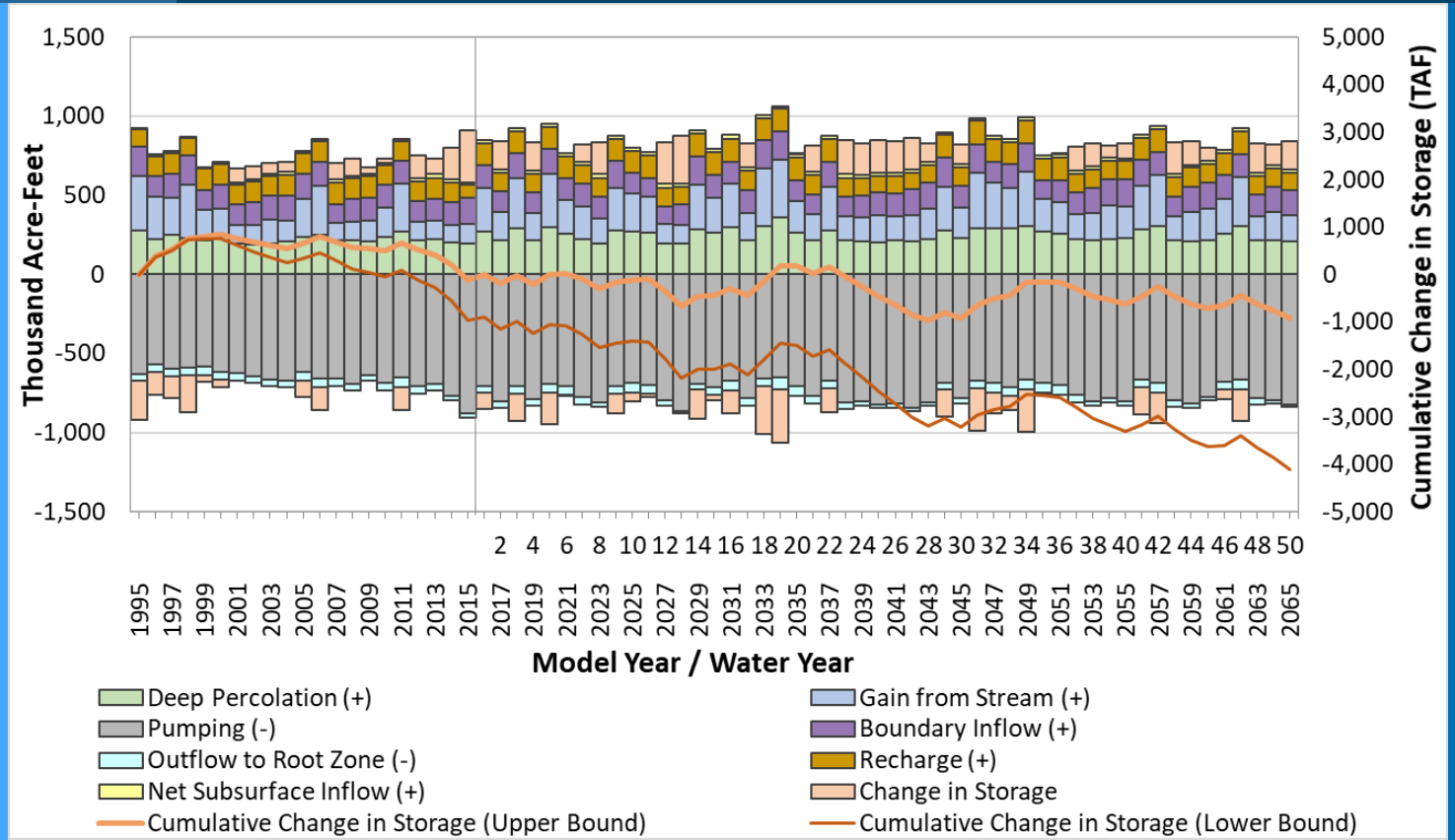
Current Conditions Baseline L&WU: Agricultural Water Use

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY



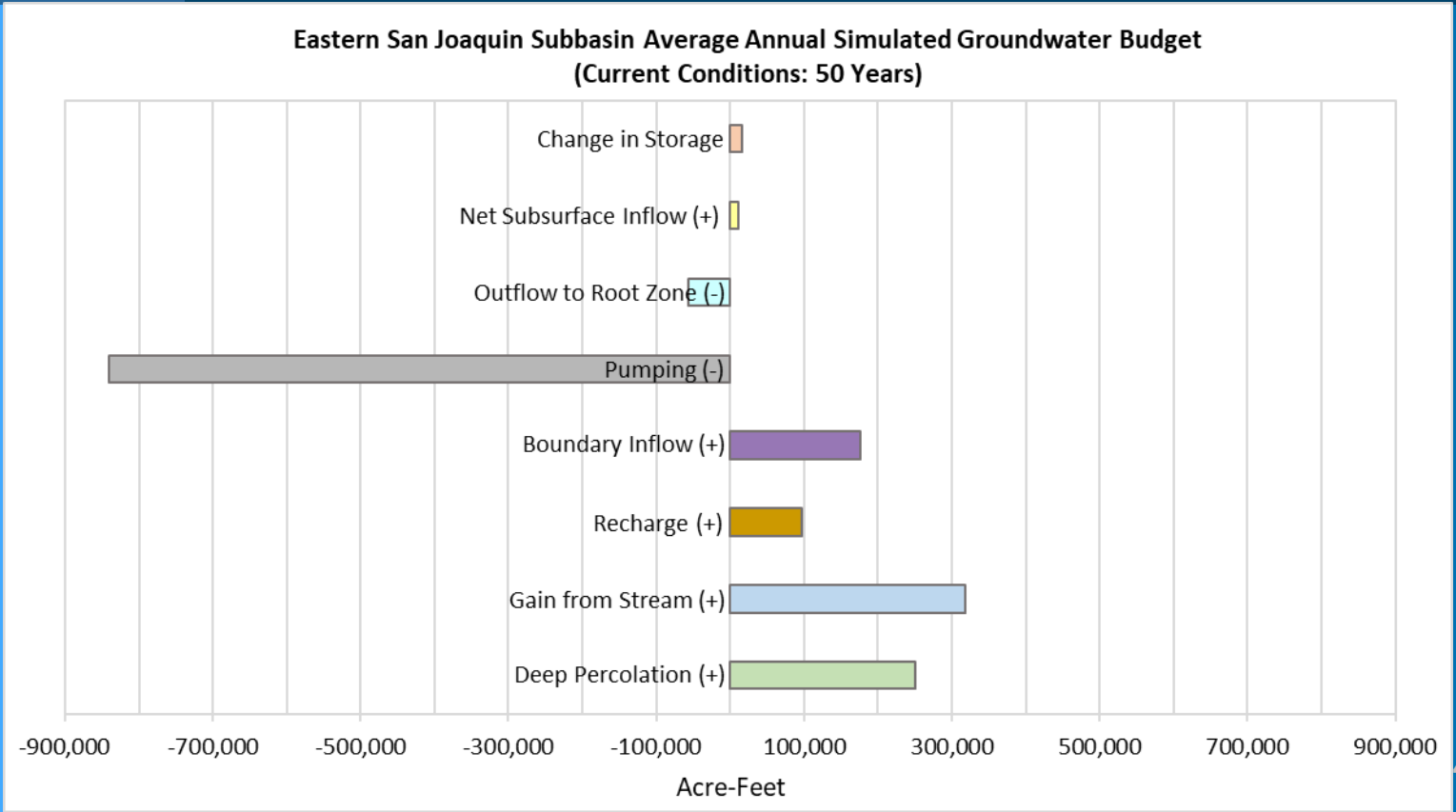
Time Series of Cumulative Storage

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY



Estimated Annual Groundwater Use

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY



Recap of Open House

Open House Recap

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

- Thank you for participating!
- ~50 members of the public in attendance
- Great showing by GSAs
- Open House materials will be posted to the website

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Discussion: For those who attended the Open House, what was your impression of the event?

Suggestions for future locations?

Eastern San Joaquin Subbasin

Groundwater Sustainability Workgroup

September 11, 2018

EASTERN SAN JOAQUIN
GROUNDWATER AUTHORITY