



Tracy Subbasin: Historical Water Balance

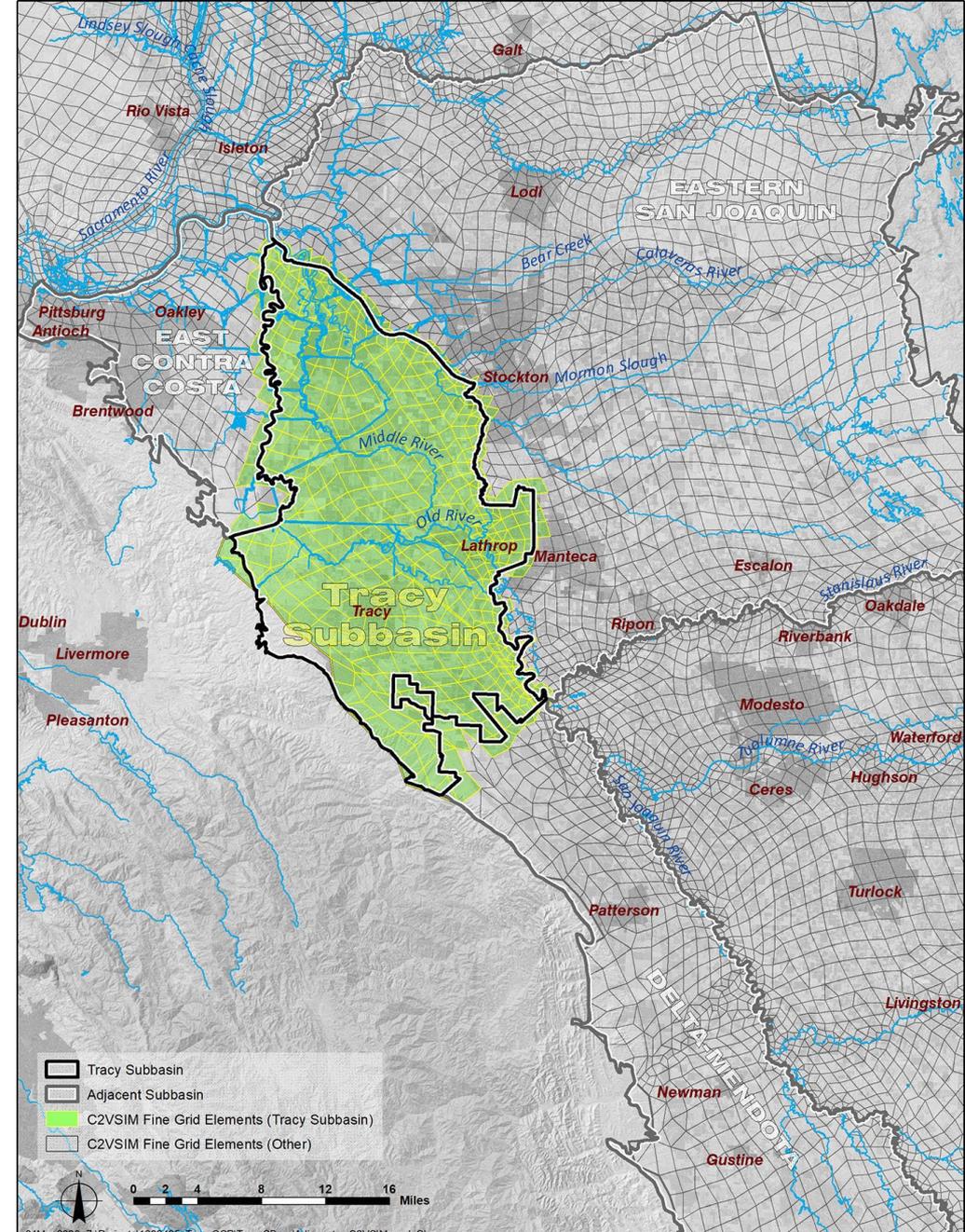
February 18, 2021

Tracy Subbasin Water Balance Review – Historical Results



C2VSIM FINE GRID

- California Central Valley Groundwater-Surface Water Simulation Model (C2VSIM)
 - Open-Source Model
 - Includes historical hydrology and inputs (1922-2015)
 - Version 1.0 released in December 2020
- Previous water budgets reflected the Beta version of the model



BASE PERIOD

- Tracy Subbasin
 - **2003-2013 (NEW)**
- What are other groups using for base periods?

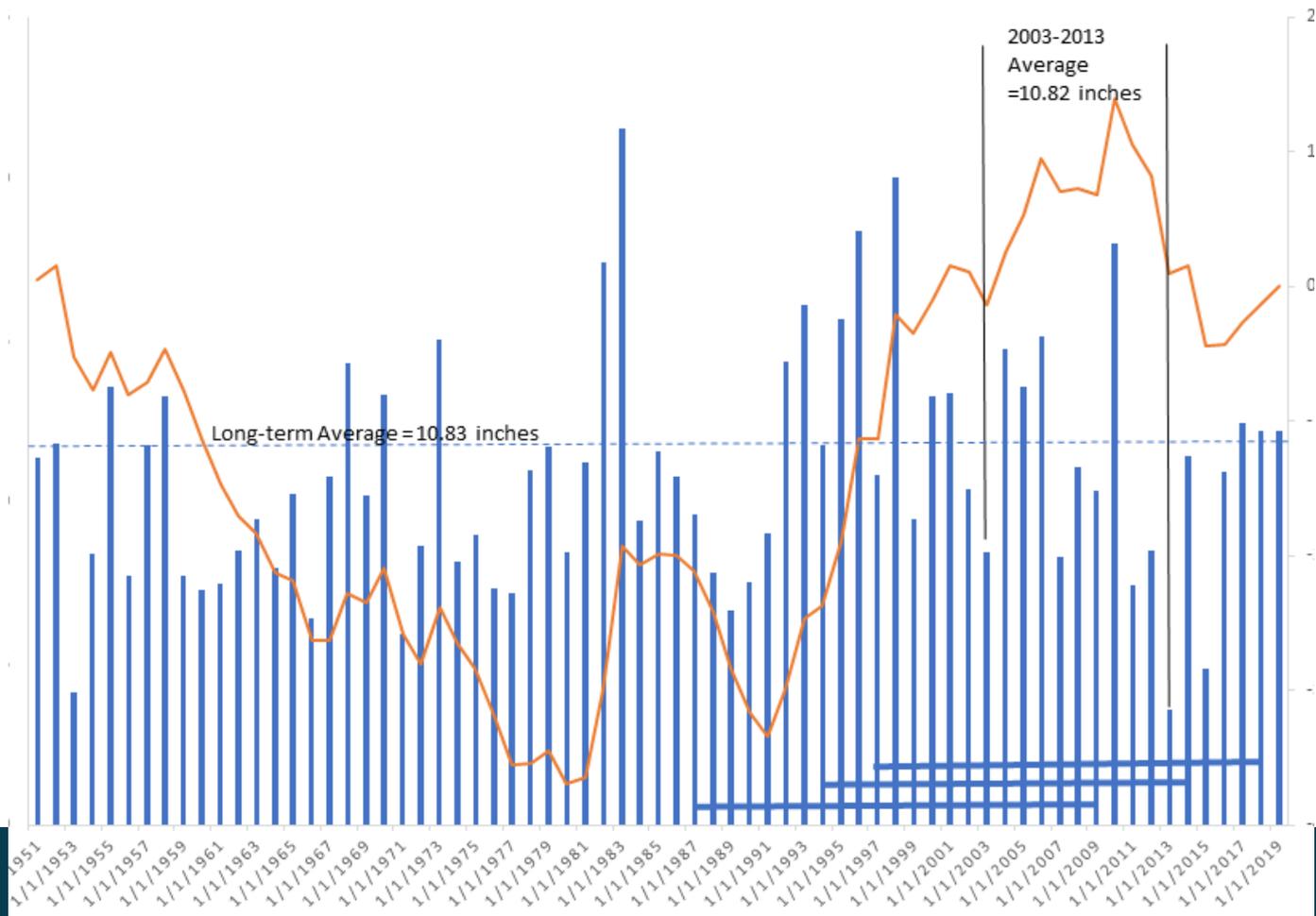
Base Period	Basin/Entity
1988-2009	CA Department of Water Resources
1995-2015	Eastern San Joaquin Subbasin
2003-2013	Delta Mendota Subbasin
1997-2018	Eastern Contra Costa Subbasin



BASE PERIOD- PRECIPITATION

BASE PERIOD SELECTION

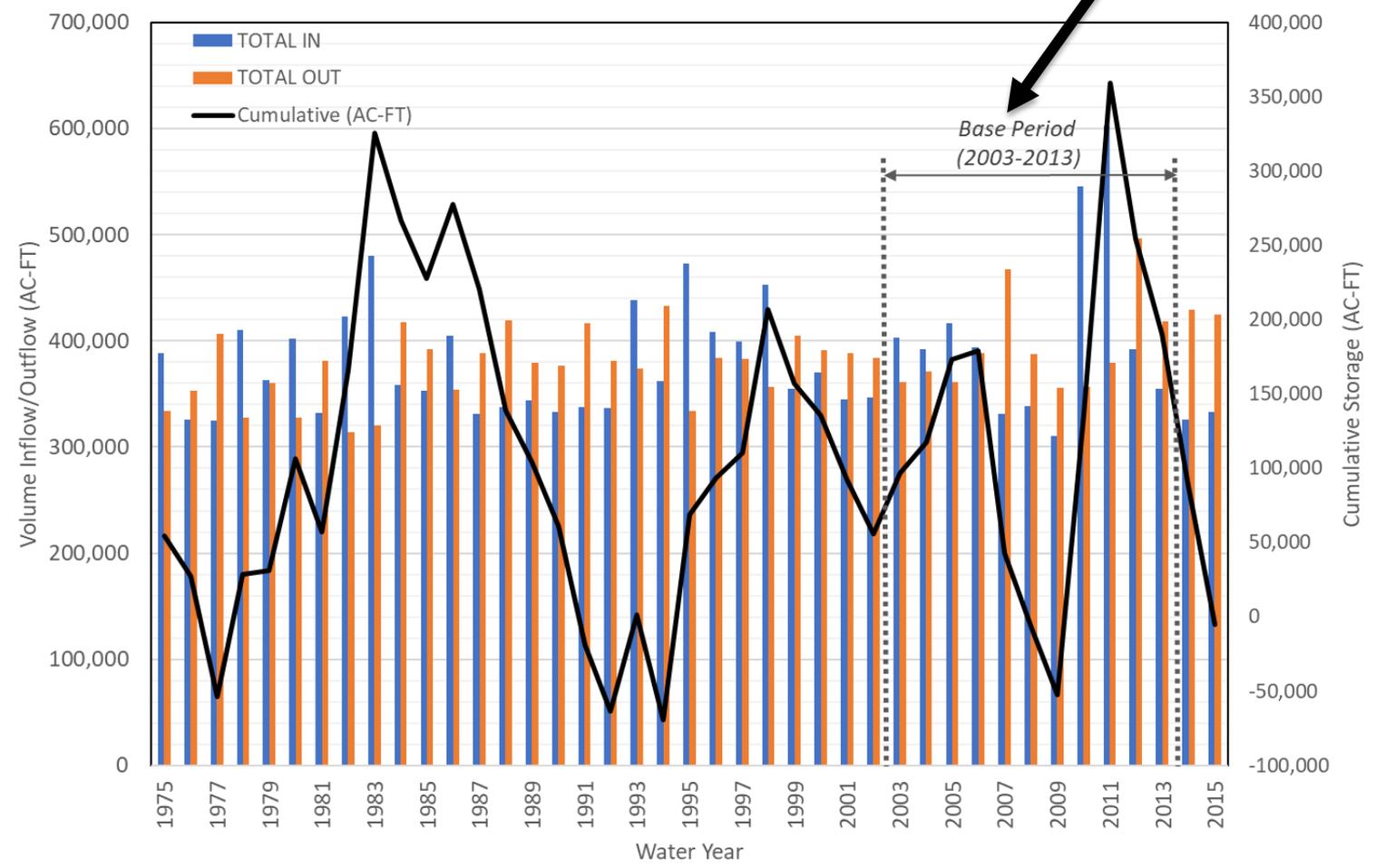
■ Annual Precipitation — Cumulative Departure



TRACY GROUNDWATER BALANCE

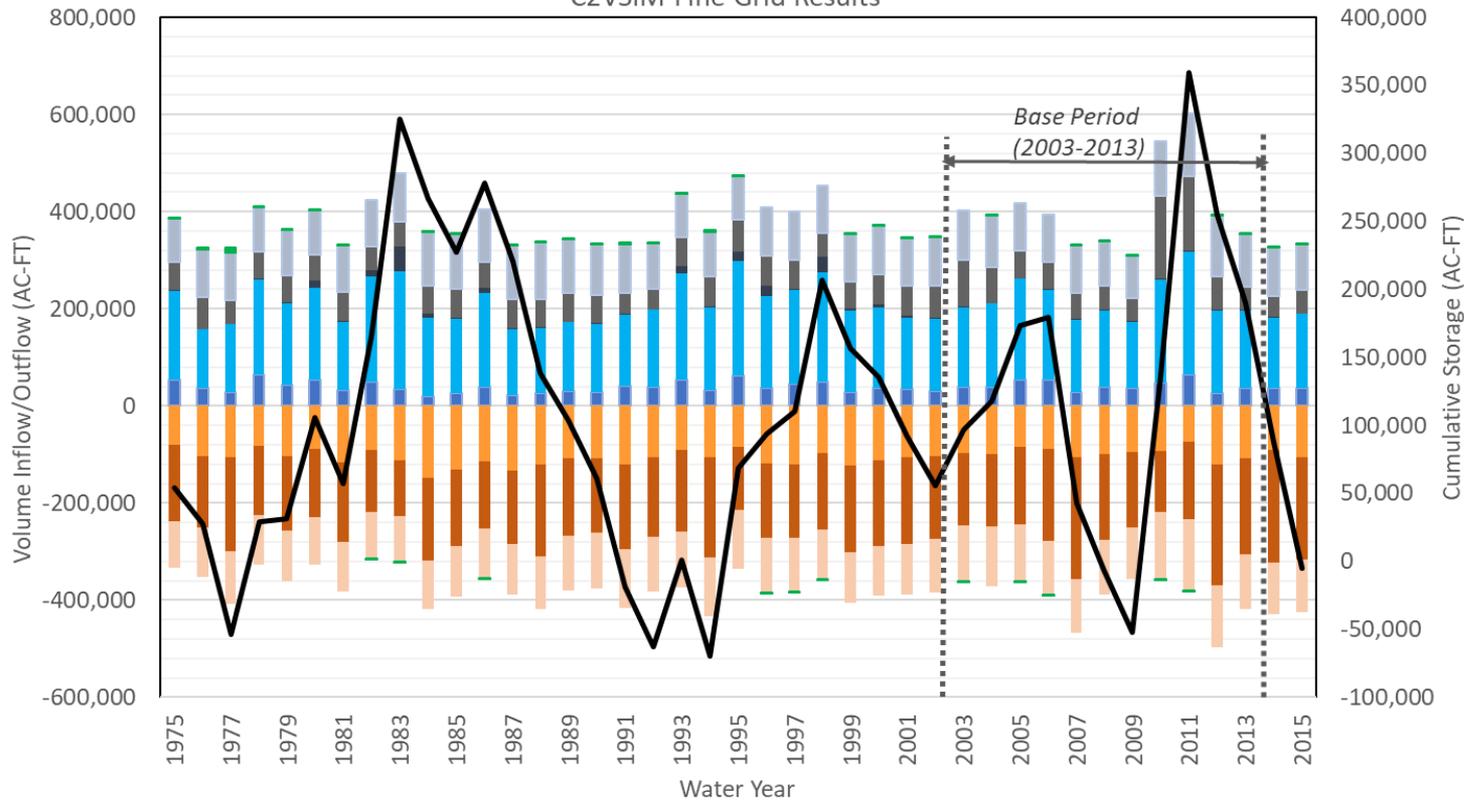
**Base Period
Cumulative Change in Storage
134,500 AF**

Tracy Subbasin Groundwater Balance
C2VSIM Fine Grid Results



TRACY GROUNDWATER BALANCE - DETAIL

Tracy Subbasin Groundwater Balance
C2VSIM Fine Grid Results



Deep Percolation and Pumping have the largest influence.

Subsurface inflow and outflow also contribute significantly.

- Streams In
- Diversion Recharge
- Pumping
- Cumulative (AC-FT)
- Deep Percolation
- Subsurface In
- Subsurface Flow out
- Small Watersheds In
- Streams Out
- Subsidence (inflow-outflow)

TRACY GROUNDWATER BALANCE – ANNUAL AVERAGE

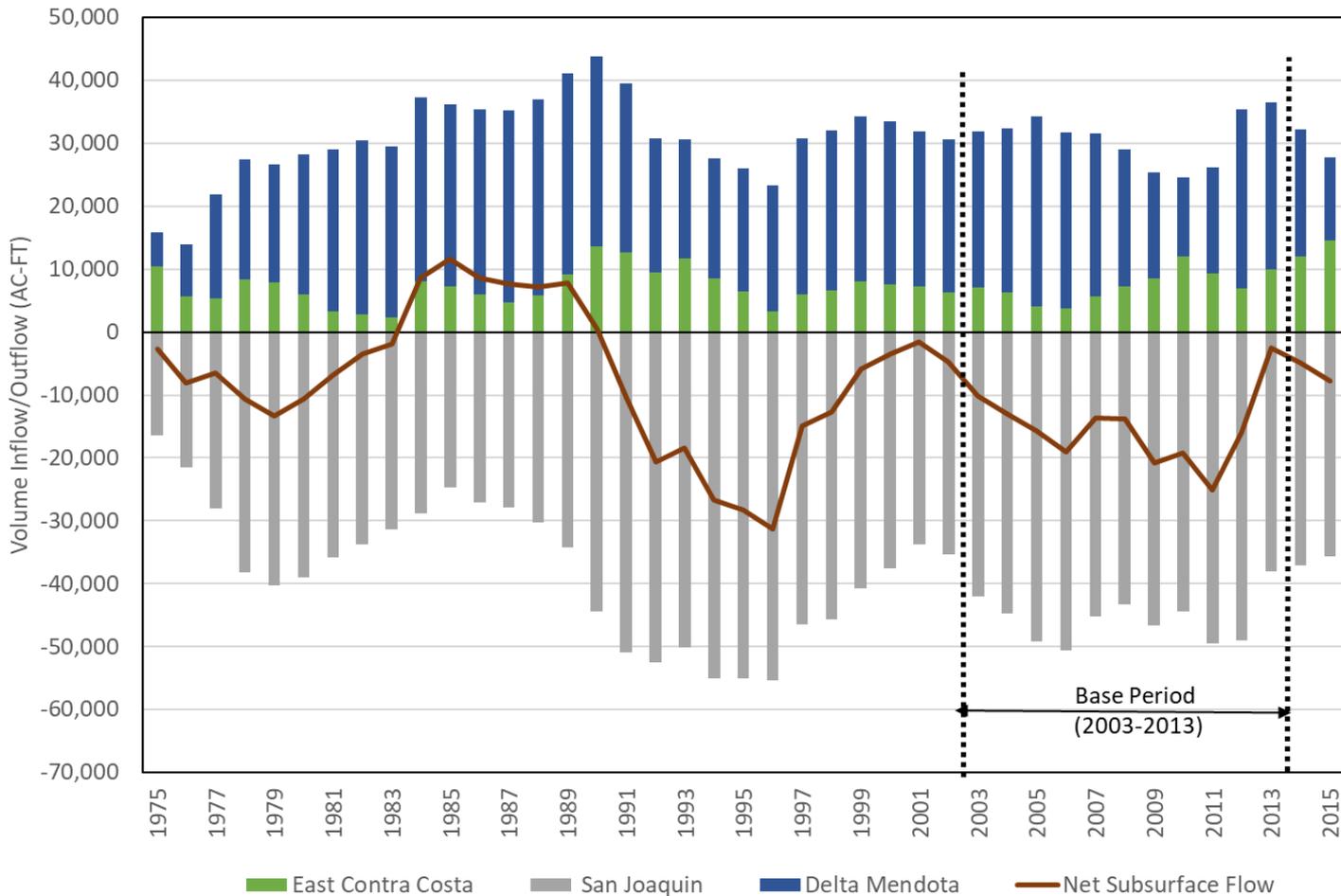
<i>2003-2013 Annual Average (AFY)</i>			
<i>Streams IN</i>	42,350	<i>Streams OUT</i>	96,700
<i>Deep Percolation</i>	178,810	<i>Pumping</i>	178,280
<i>Small Watersheds</i>	1,490		
<i>Diversion Recharge</i>	79,300		
<i>Subsidence</i>	140		
<i>Subsurface IN</i>	105,140	<i>Subsurface OUT</i>	120,010
<i>Total IN</i>	407,220	<i>Total OUT</i>	394,990

**Annual Average
Change in Storage
12,230 AFY**



TRACY GROUNDWATER BALANCE - SUBSURFACE

Tracy Subbasin Subsurface Flows
C2VSIM Fine Grid Results



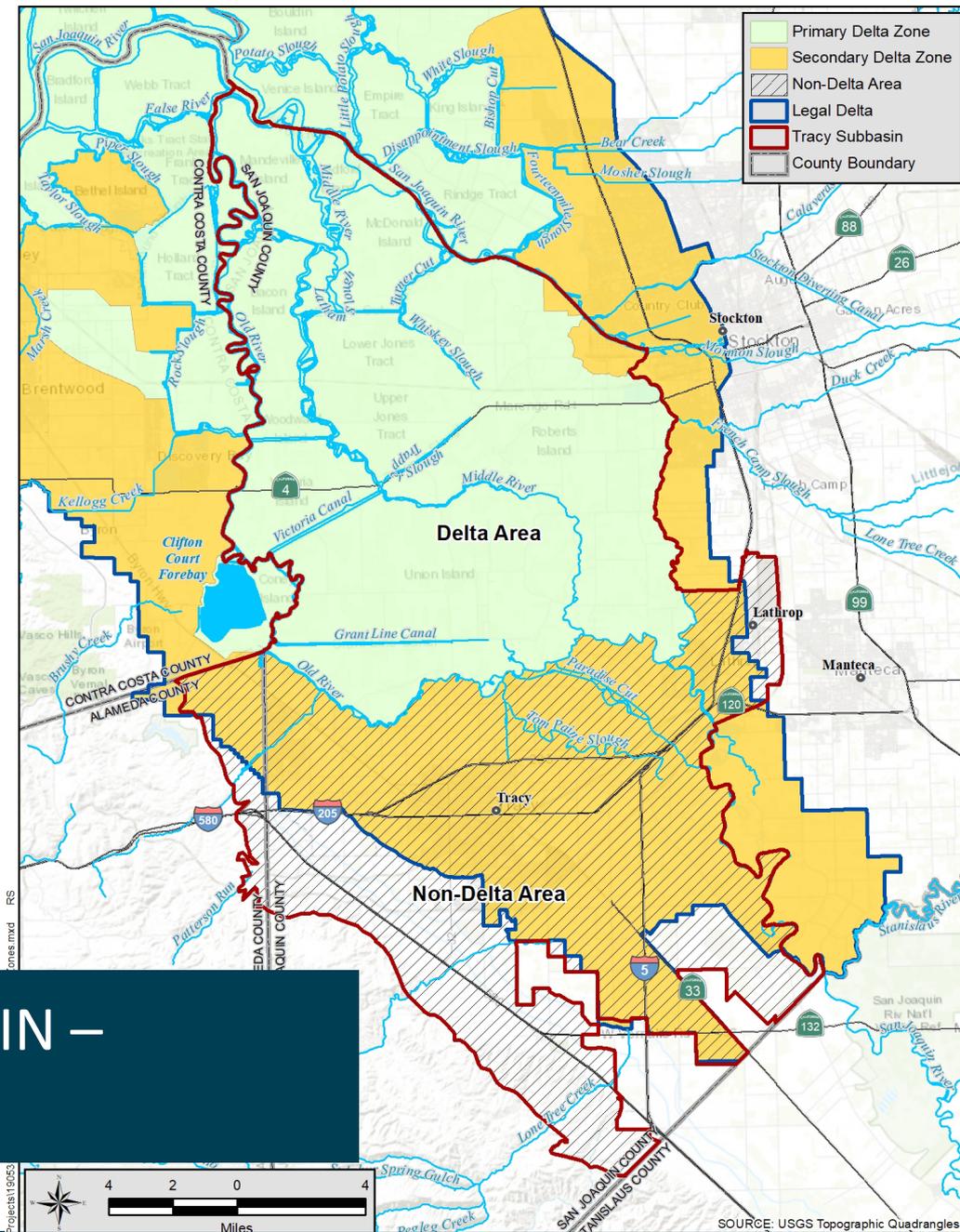
**Outflow
consistent to
East San
Joaquin**

**2003-2013
Average Net
-15,350
AFY**

Delta and Non-Delta Areas

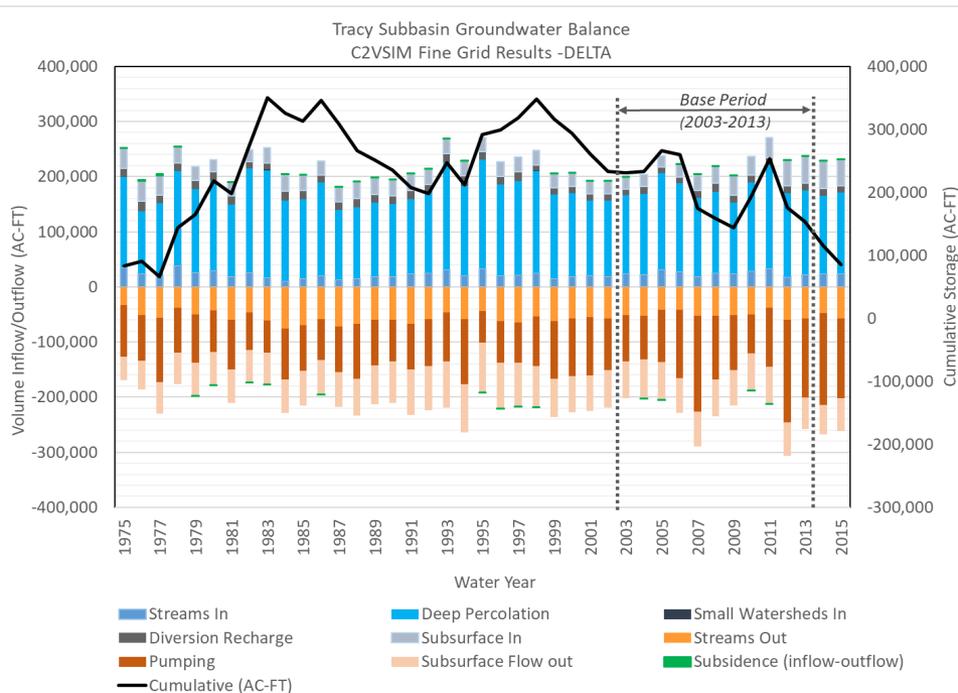


TRACY SUBBASIN – DELTA AREAS



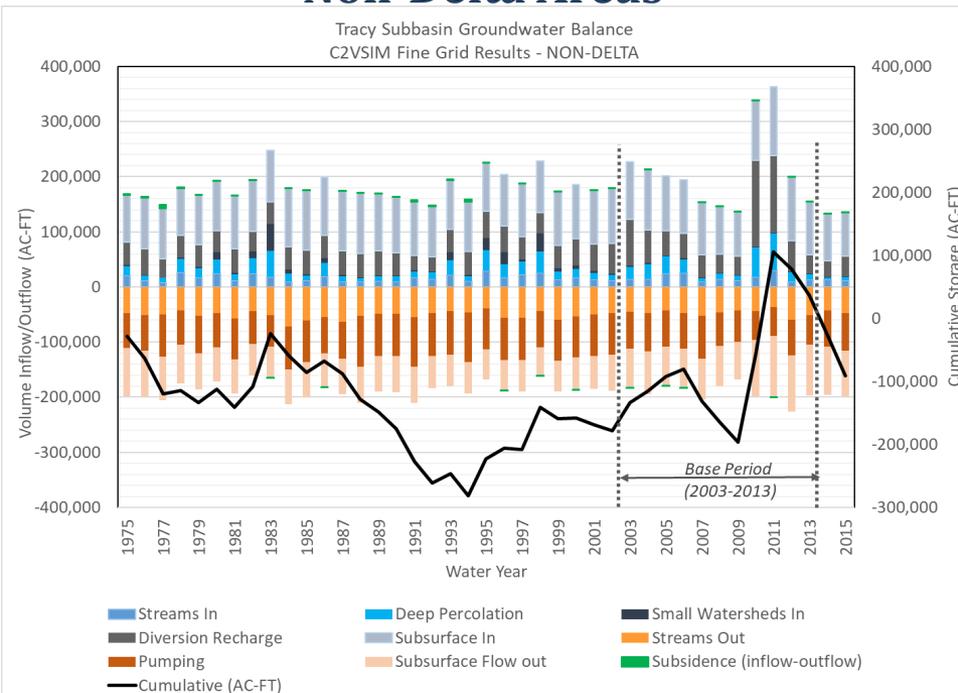
DELTA AND NON-DELTA

Delta Areas



Deep Percolation and Pumping are largest influence in the Delta.

Non-Delta Areas



Subsurface inflows contribute significantly to non-Delta area.



DELTA AND NON-DELTA

Sustainable Yield is **62,000AFY**



Delta Areas

Base Period Average (AFY)			
<i>Streams IN</i>	25,310	<i>Streams OUT</i>	49,860
<i>Deep Percolation</i>	153,800	<i>Pumping</i>	116,180
<i>Small Watersheds</i>	0		
<i>Diversion Recharge</i>	13,020		
<i>Subsidence</i>	66		
<i>Subsurface IN</i>	31,550	<i>Subsurface OUT</i>	64,950
<i>Total IN</i>	223,750	<i>Total OUT</i>	230,985



Pumping – 50% of Outflows
Subsurface – 28% of Outflows

Non-Delta Areas

Base Period Average (AFY)			
<i>Streams IN</i>	17,050	<i>Streams OUT</i>	46,860
<i>Deep Percolation</i>	25,030	<i>Pumping</i>	62,130
<i>Small Watersheds</i>	1,490		
<i>Diversion Recharge</i>	66,290		
<i>Subsidence</i>	70		
<i>Subsurface IN</i>	101,420	<i>Subsurface OUT</i>	82,900
<i>Total IN</i>	211,340	<i>Total OUT</i>	191,880



Pumping – 32% of Outflows
Subsurface – 43% of Outflows



DELTA AND NON-DELTA

Delta Areas

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Average Annual Change in Storage

Delta

-7,230 AFY

Non-Delta

19,470AFY

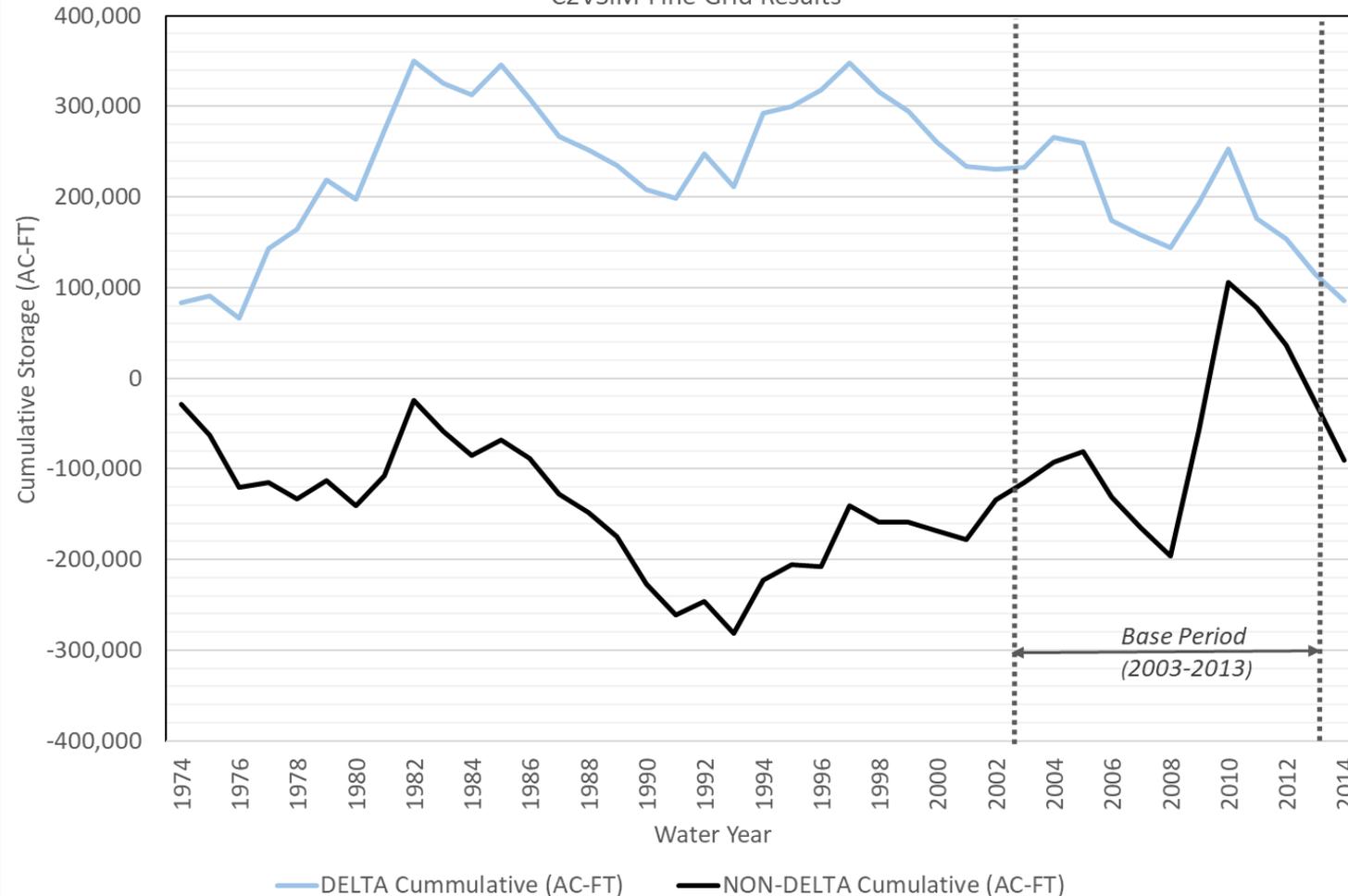
Deep Perc. - 69% of Inflows
Subsurface - 14% of Inflows

Deep Perc. - 12% of Inflows
Subsurface - 48% of Inflows



COMPARISON OF DELTA AND NON-DELTA AREAS

Tracy Subbasin Groundwater Balance
C2VSIM Fine Grid Results



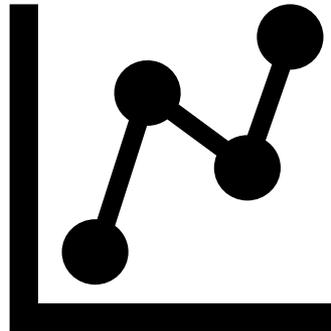
**Base Period
Cumulative
Change in
Storage**

**Delta
-79,560**

**Non-Delta
214,120**

What this means...

- Base period shows the basin in balance (with surplus).
- Delta and Non-Delta areas show different conditions.
- Basin management actions can target areas based on needs.



Next Steps



NEXT STEPS

- Complete Projected Model Runs
 - ✓ H1 – Historical (2003-2013)
 - P1 – Projected – Baseline
 - P3 – Projected - Land-use Changes
 - P4 – Projected – Near-term Actions Implemented
 - P5 – Projected – Long-term Actions Implemented
- Waiting for data for projected conditions



Questions



GEI



Consultants

Consulting
Engineers and
Scientists

BASE PERIOD RESULTS

Tracy Subbasin Results with Different Base Periods

Base Period	Basin/Entity	Average Annual Change in Storage (AFY)	Cum. Change in Storage (AF)
1988-2009	CA Dept. of Water Resources	-12,400	-273,000
1995-2015	Eastern San Joaquin Subbasin	3,100	64,600
2003-2013	Delta Mendota Subbasin	12,200	134,500
1997-2018	Eastern Contra Costa Subbasin	-5,200	-98,300

Tracy Subbasin Base Period

