



# Tracy Subbasin: Historical Water Balance

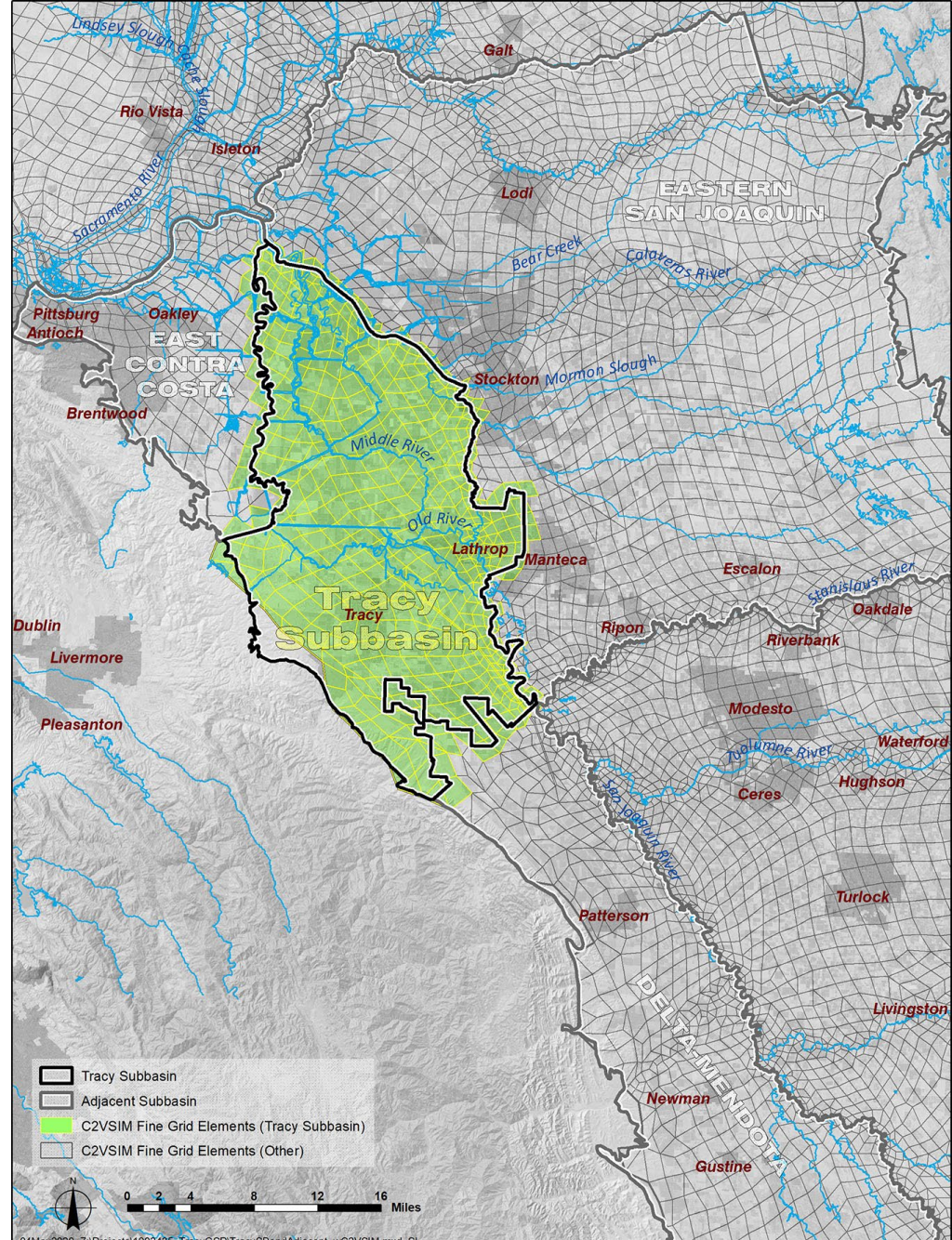
February 18, 2021

# 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



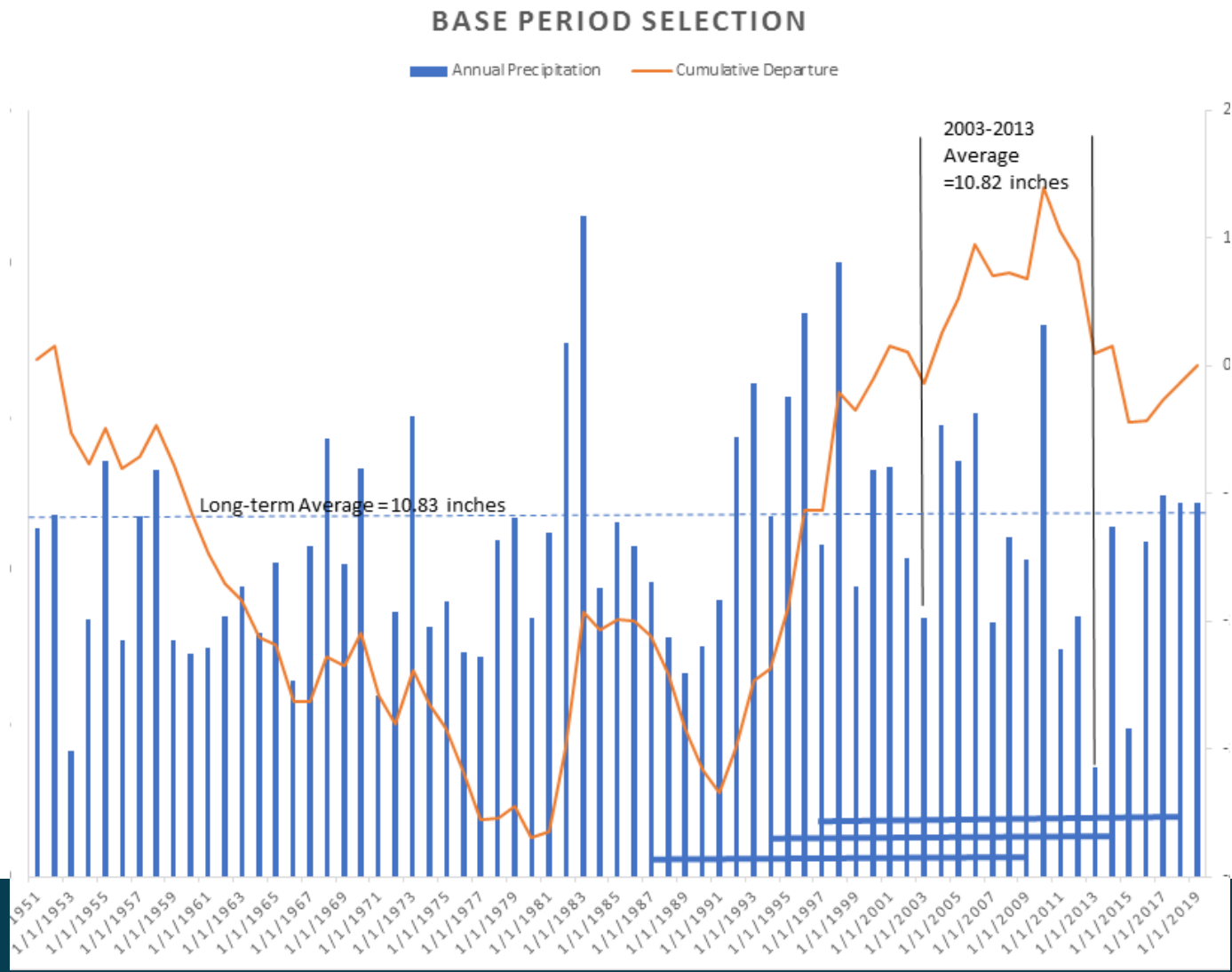
## BASE PERIOD

- 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

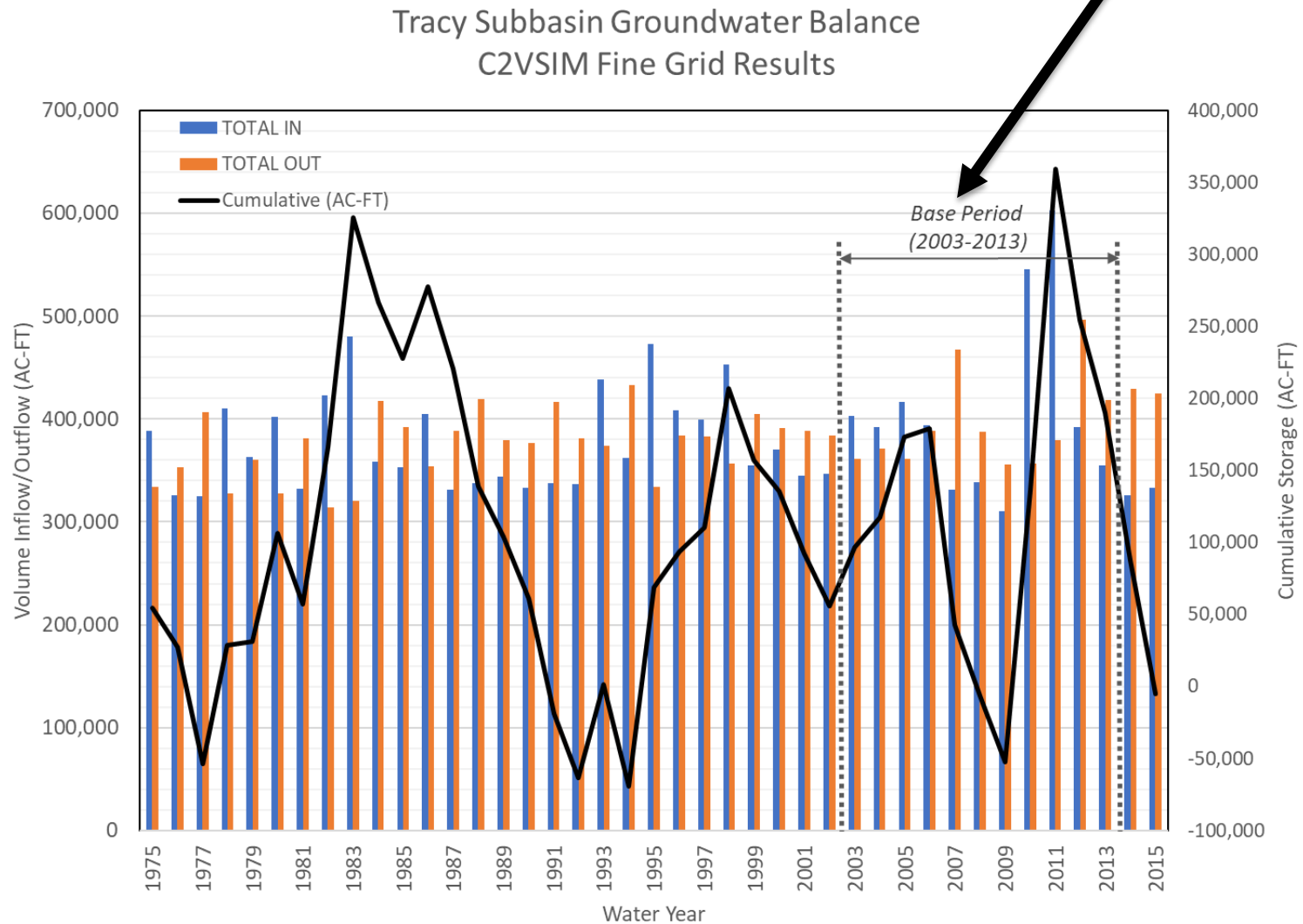


# BASE PERIOD- PRECIPITATION



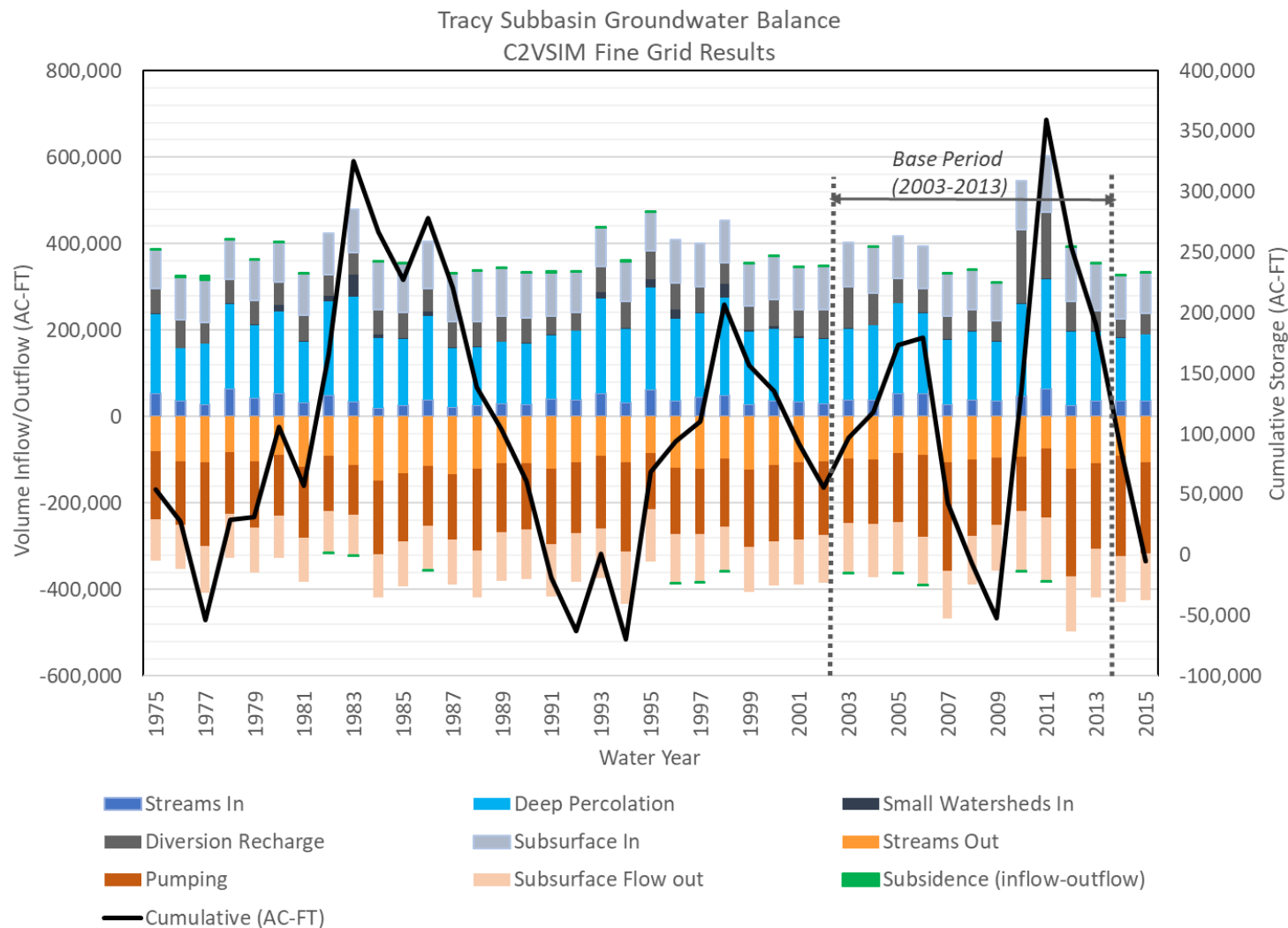
# TRACY GROUNDWATER BALANCE

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





# TRACY GROUNDWATER BALANCE - DETAIL



**Deep Percolation and Pumping have the largest influence.**

**Subsurface inflow and outflow also contribute significantly.**

# 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>	<b>178,810</b>	<i>Pumping</i>	<b>178,280</b>
<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
<b><i>Total IN</i></b>	<b>407,220</b>	<b><i>Total OUT</i></b>	<b>394,990</b>

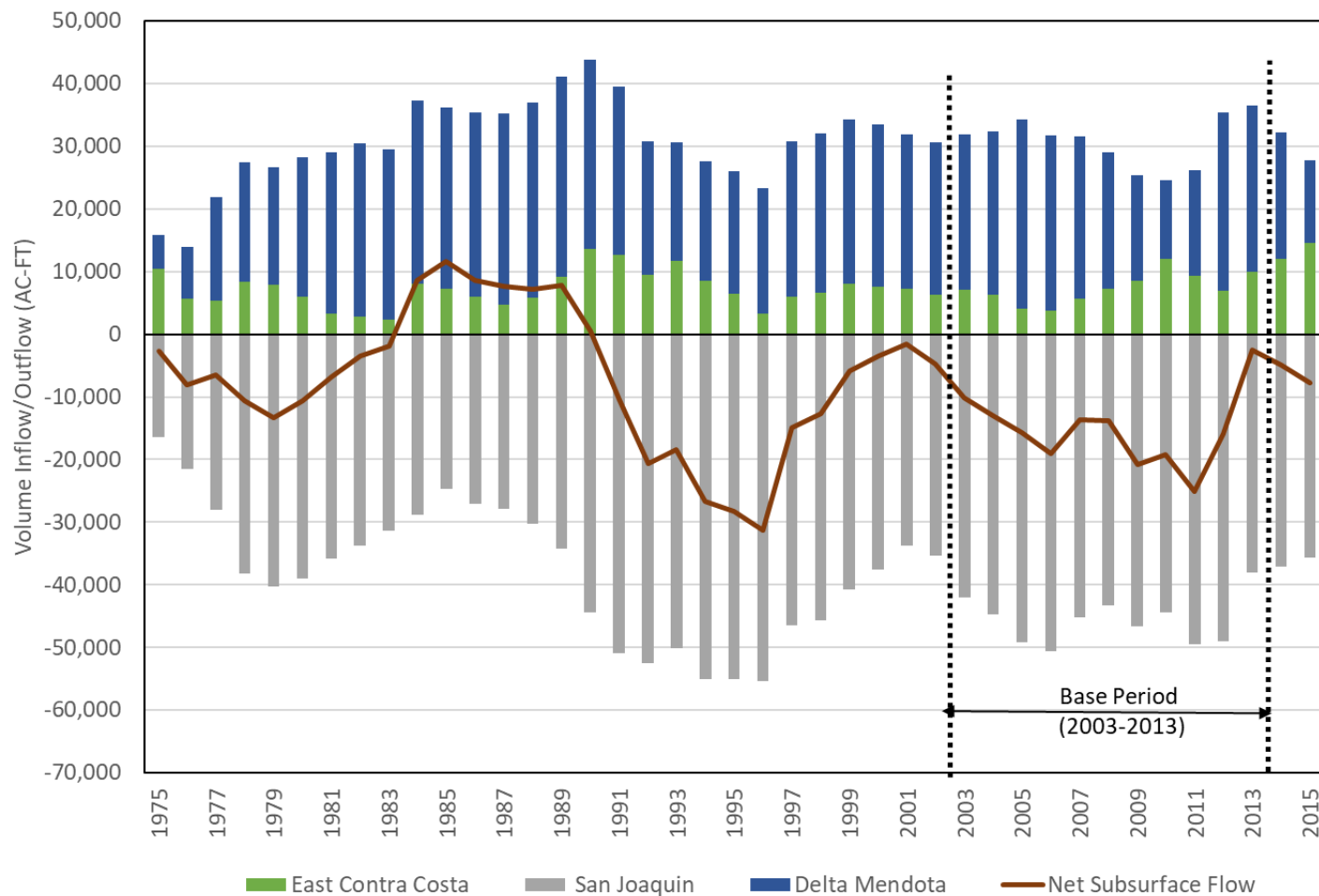
**Annual Average  
Change in Storage  
12,230 AFY**





# 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**

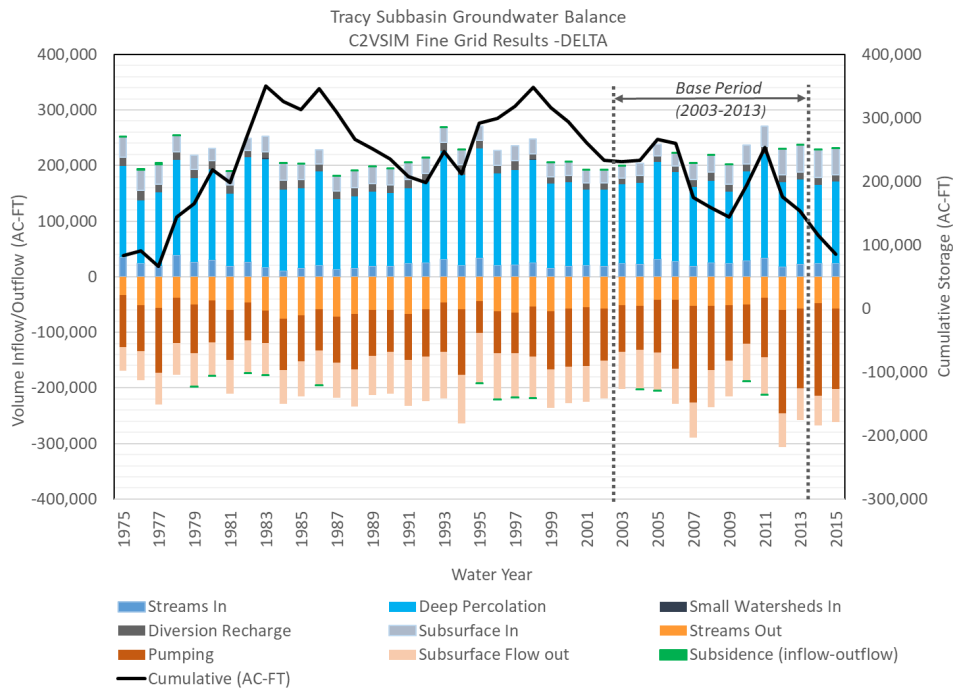
# Delta and Non-Delta Areas





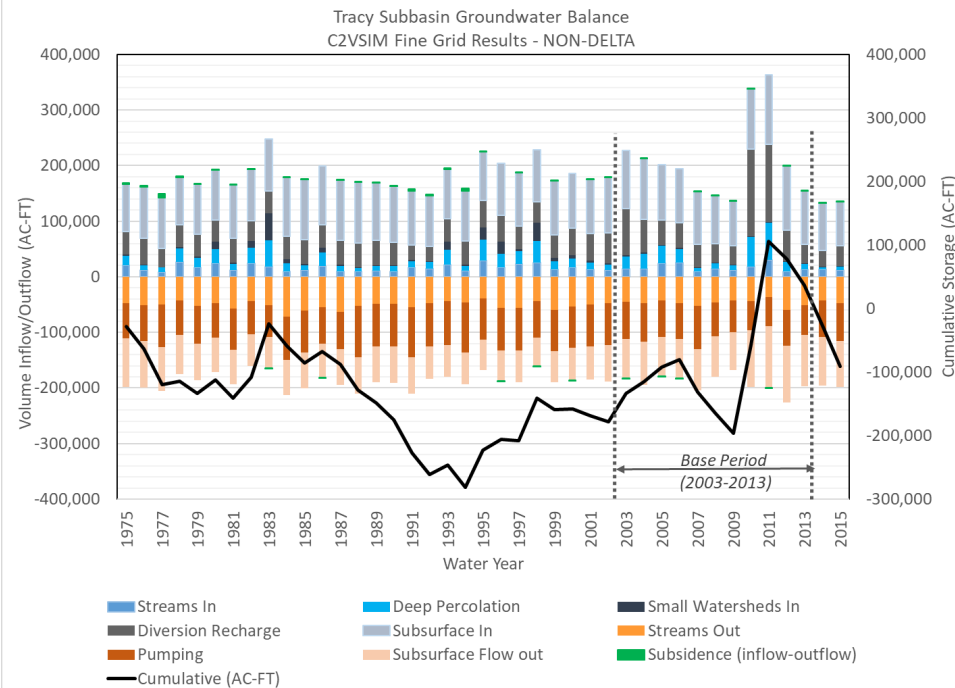
# DELTA AND NON-DELTA

## 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>	<b>153,800</b>	<i>Pumping</i>	<b>116,180</b>
<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>	<b>223,750</b>	<i>Total OUT</i>	<b>230,985</b>



**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>	<b>62,130</b>
<i>Small Watersheds</i>	1,490		
<i>Diversion Recharge</i>	66,290		
<i>Subsidence</i>	70		
<i>Subsurface IN</i>	<b>101,420</b>	<i>Subsurface OUT</i>	82,900
<i>Total IN</i>	<b>211,340</b>	<i>Total OUT</i>	<b>191,880</b>



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



# DELTA AND NON-DELTA

## Delta Areas

Base Period Average (AFY)			
<i>Streams IN</i>	25,310	<i>Streams OUT</i>	49,860
<b><i>Deep Percolation</i></b>	<b>153,800</b>	<b><i>Pumping</i></b>	<b>116,180</b>
<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
<b><i>Total IN</i></b>	<b>223,750</b>	<b><i>Total OUT</i></b>	<b>230,985</b>



**Deep Perc. – 69% of Inflows**  
**Subsurface – 14% of Inflows**

## Non-Delta Areas

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



**Deep Perc. – 12% of Inflows**  
**Subsurface – 48% of Inflows**

## Average Annual Change in Storage

### Delta

**-7,230 AFY**

### Non-Delta

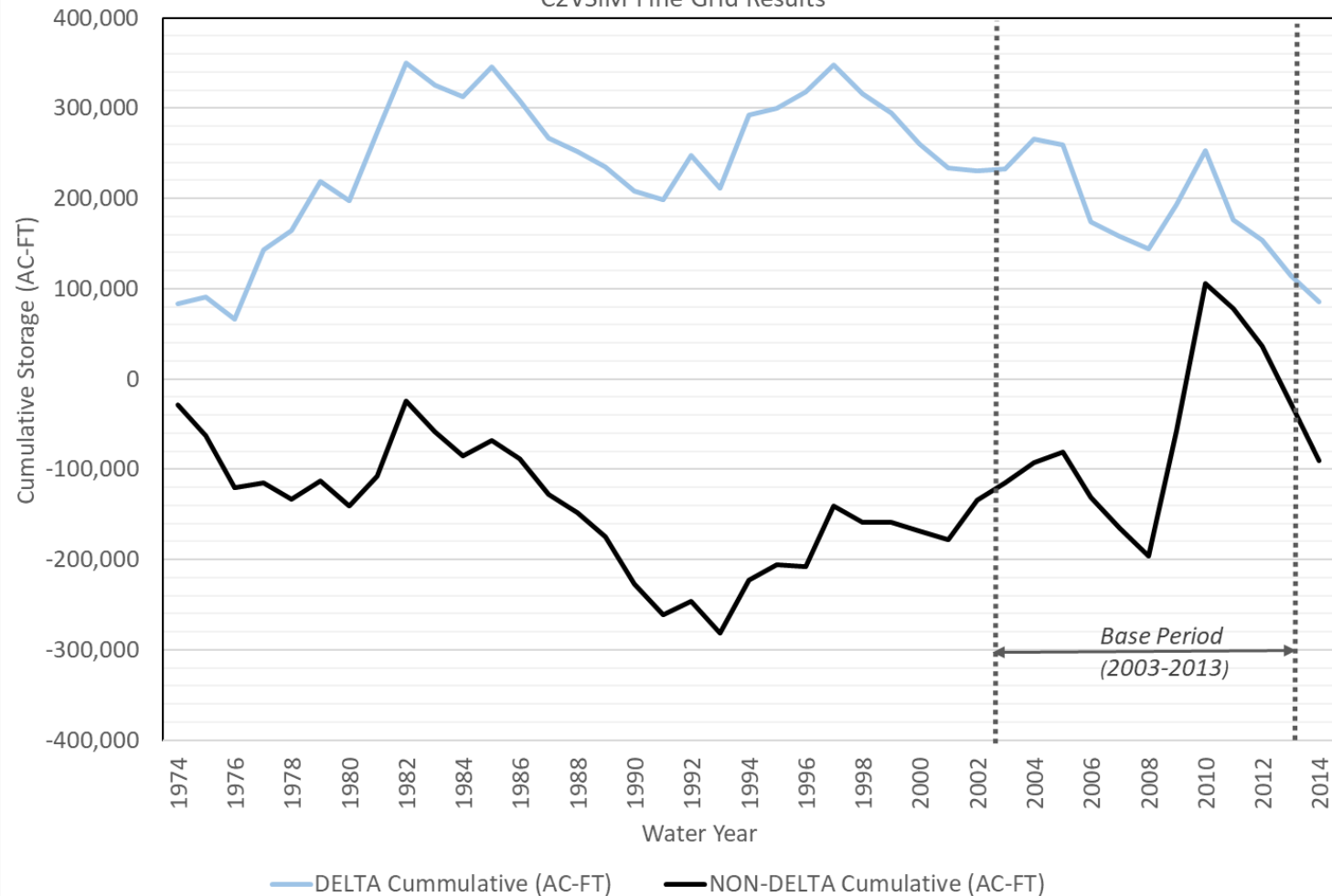
**19,470AFY**





# COMPARISON OF DELTA AND NON-DELTA AREAS

Tracy Subbasin Groundwater Balance  
C2VSIM Fine Grid Results



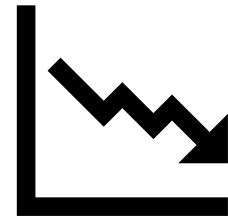
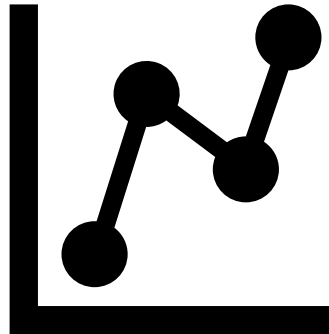
**Base Period  
Cumulative  
Change in  
Storage**

**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

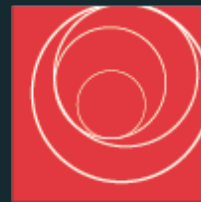
- Complete Projected Model Runs
  - ✓ H1 – Historical (2003-2013)
    - P1 – Projected – Baseline
    - P3 – Projected - Land-use Changes
    - P4 – Projected – Near-term Actions Implemented
    - P5 – Projected – Long-term Actions Implemented
- Waiting for data for projected conditions



# Questions



GEI



Consultants

Consulting  
Engineers and  
Scientists

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## 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

