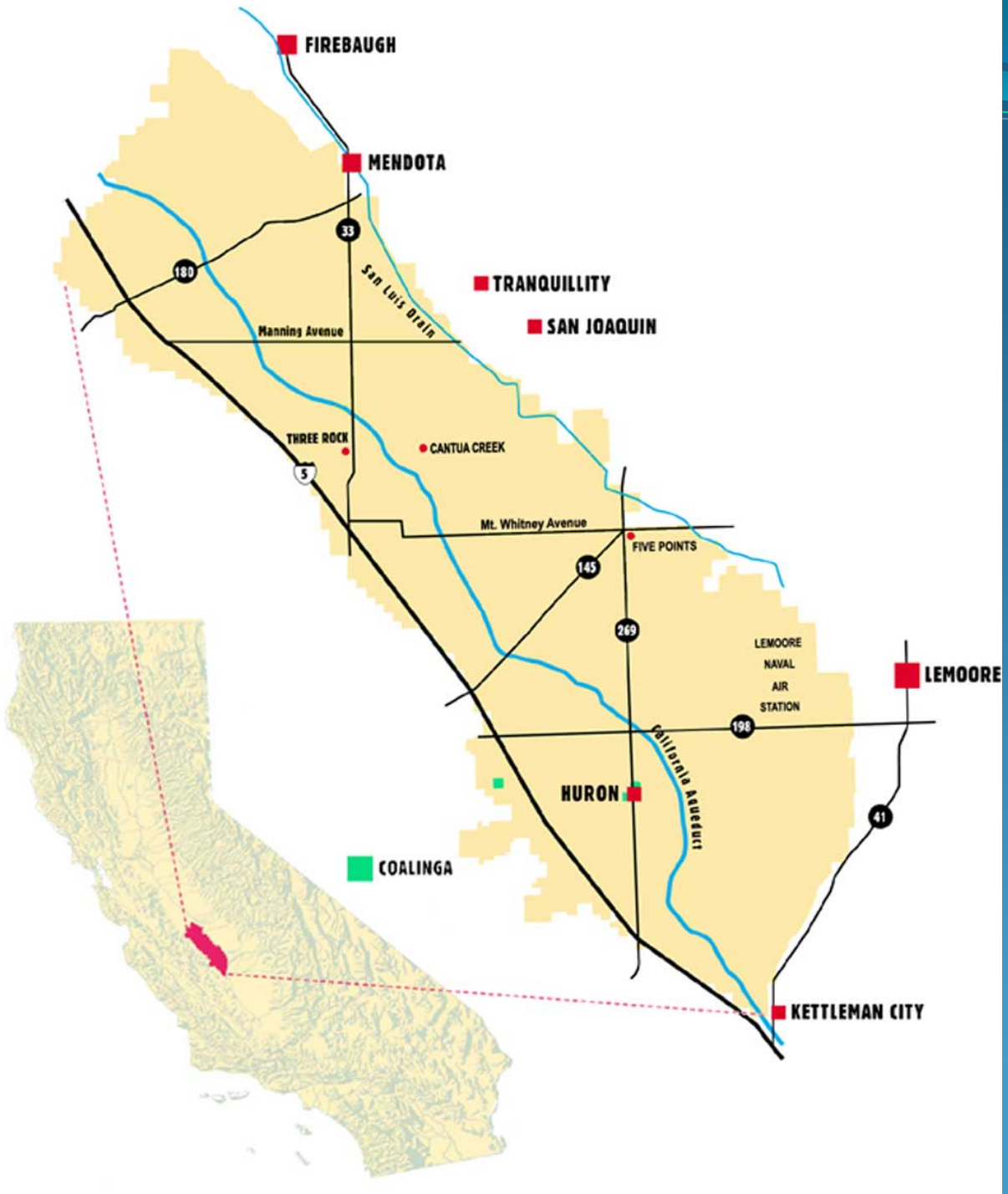
Sustainable Groundwater in Westlands

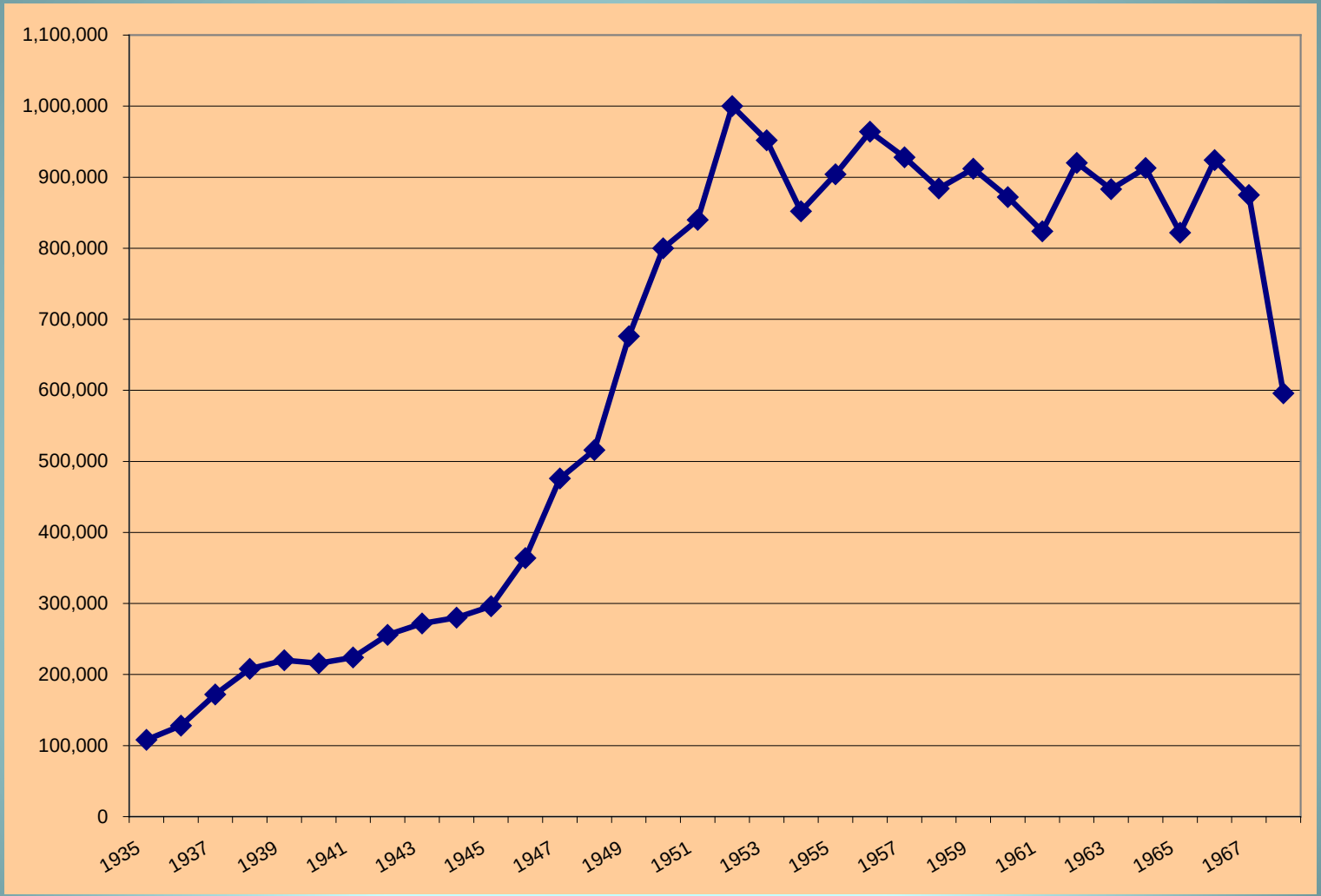
Westlands Water District



Our District averages
15 miles wide by
70 miles long of prime agricultural land through the Central Valley.

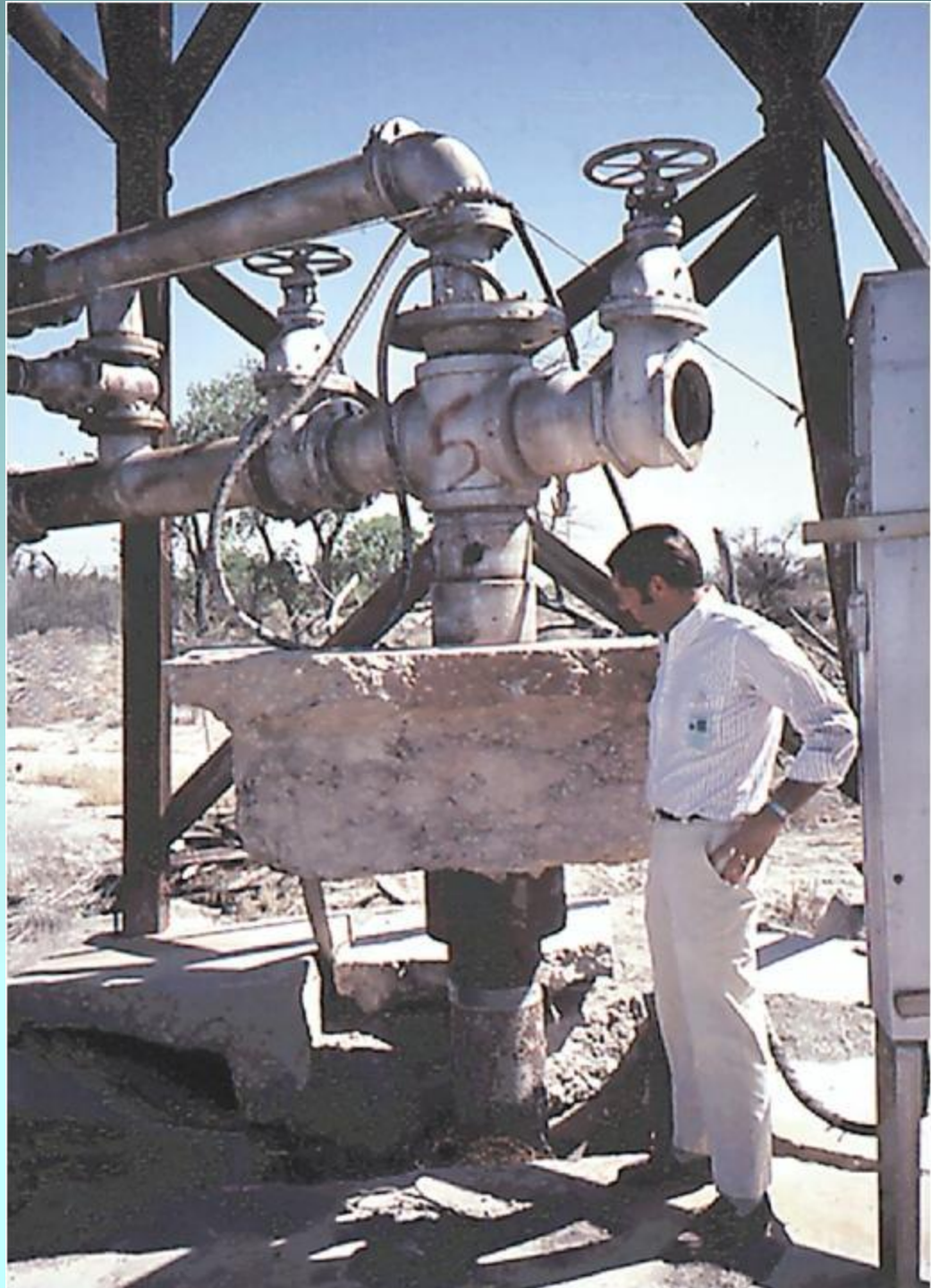
Annual CVP Allocation of 1,150,000 AF

1935-1968 Groundwater Pumping in WWD



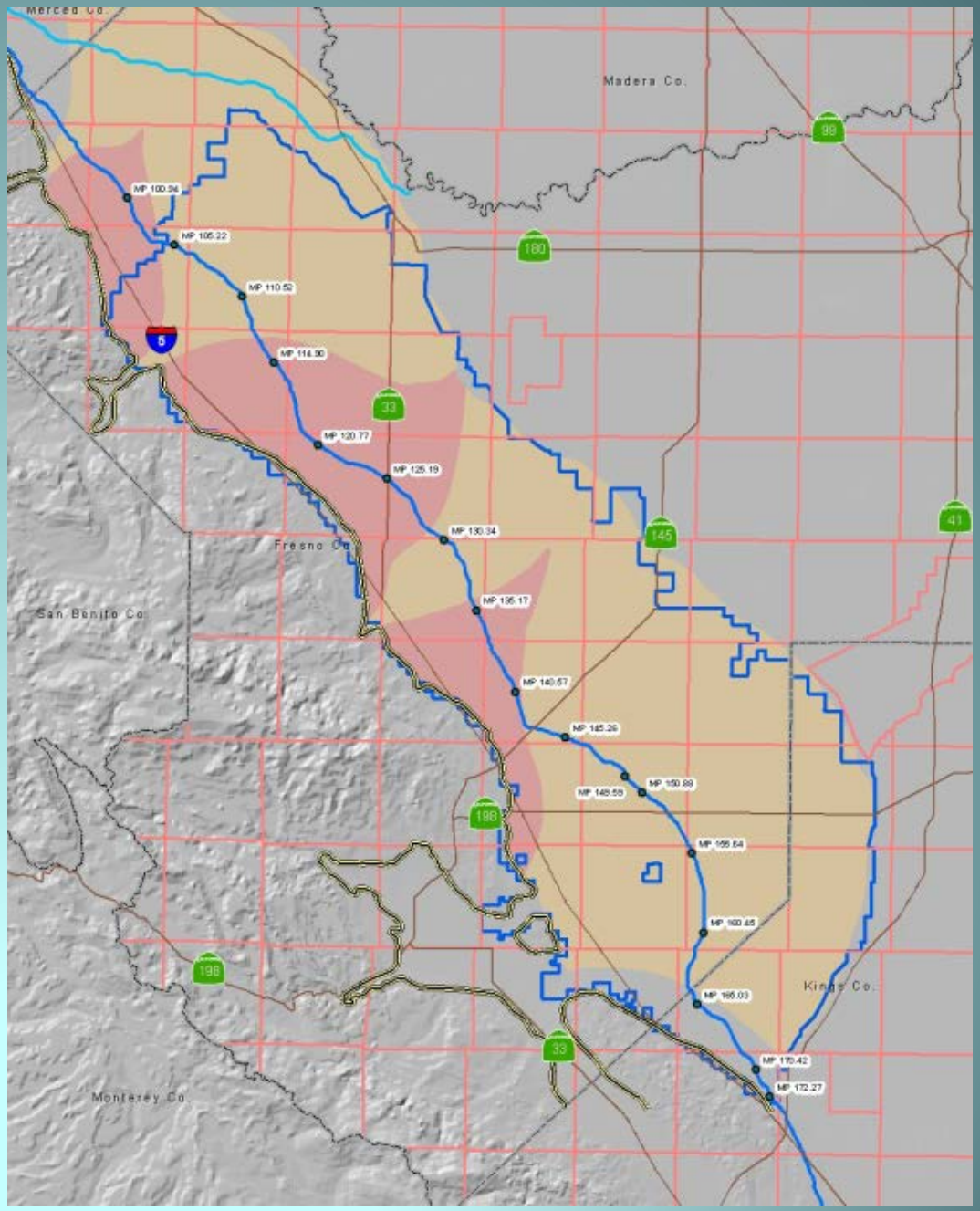
Subsidence from Groundwater Pumping

- The USGS characterizes deep subsidence as the largest human alteration of the earth's surface and occurs almost entirely below the Corcoran Clay
- Deep subsidence in the SJV is caused by accelerated groundwater pumping and water level declines in the lower aquifer
- Falling water levels reduce sub-Corcoran clay layer pressure levels, squeezing the interbedded clays and causing subsidence
- A one time mining of the water



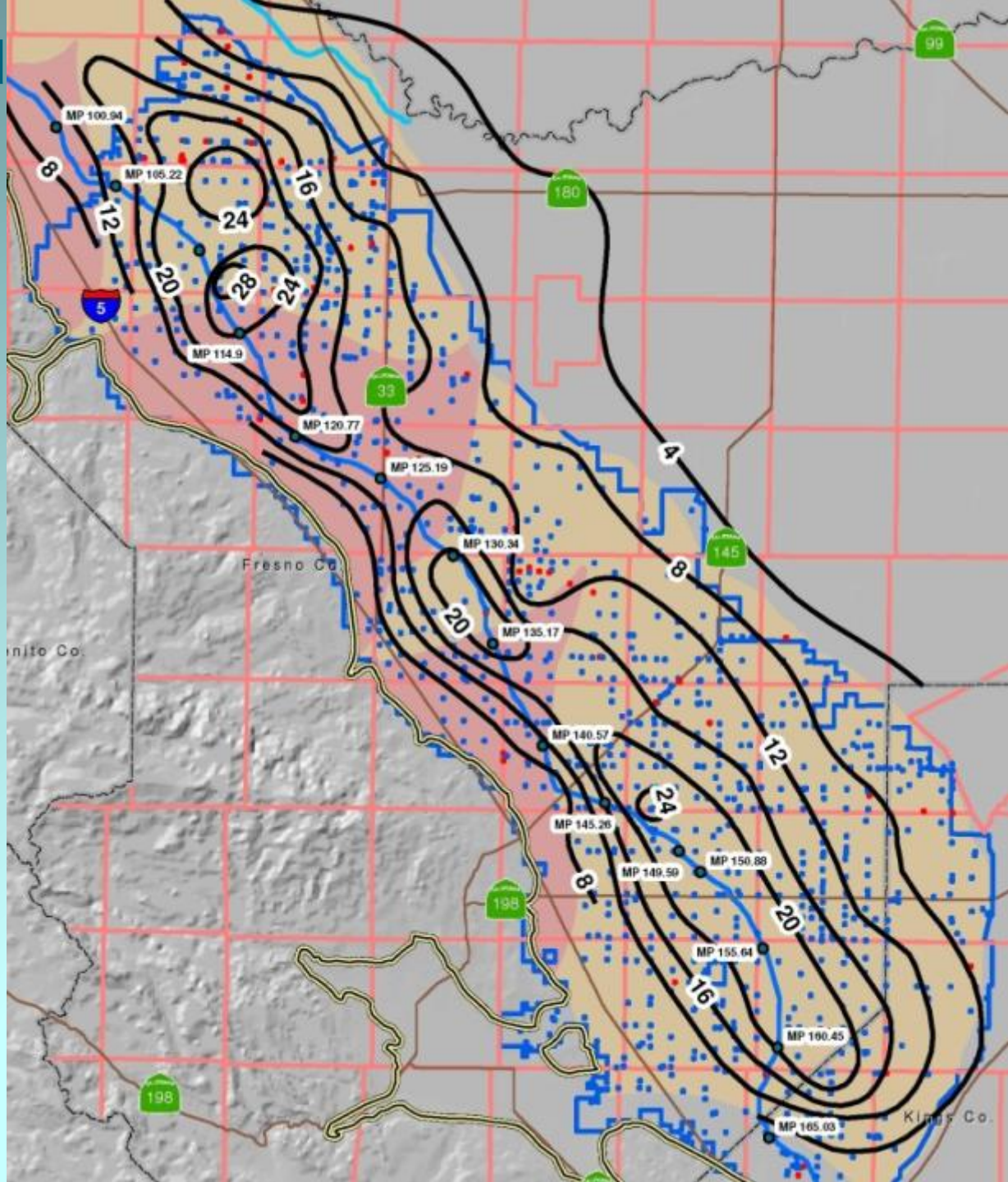
Alluvial Fans

- Subsidence is the story of three alluvial fans (tan shade), Panoche Creek, Cantua Creek and Los Gatos Creek.
- Interfan areas prone to shallow subsidence (area in pink).
- During periodic Coast Range uplift, the alluvial fans grew, dumping large amounts of sediments into the valley. These sediments carried types of clays prone to producing deep subsidence.

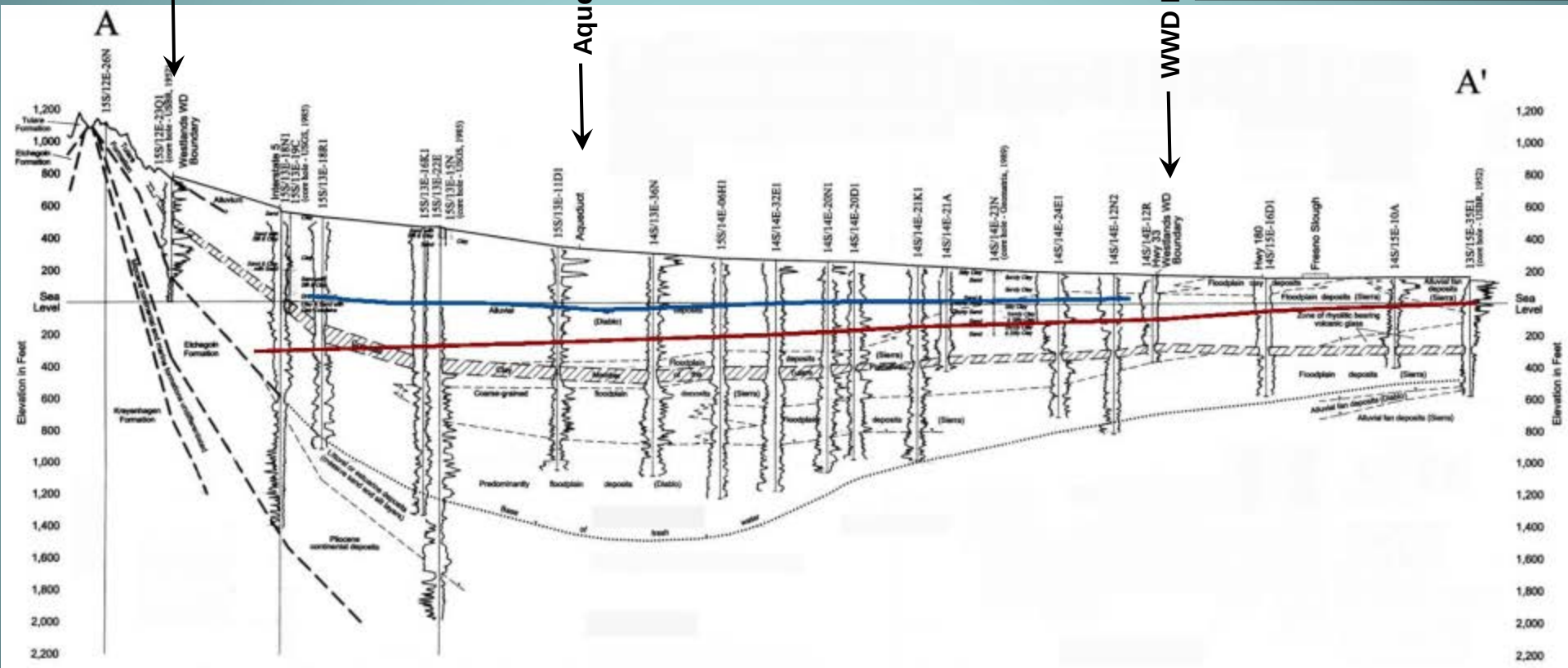


Alluvial Fans and Deep Subsidence

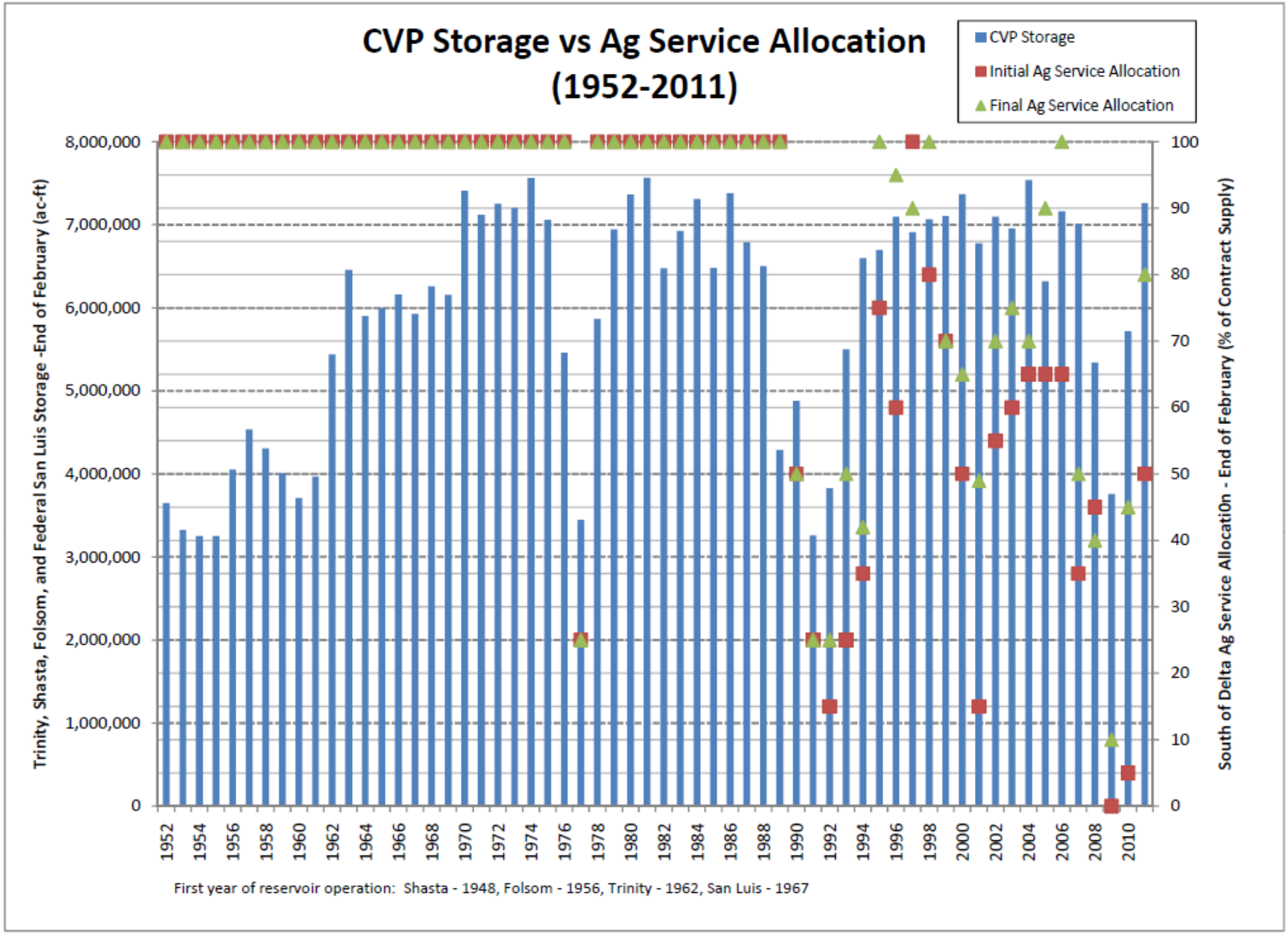
- Subsidence in feet 1926 to 1972.



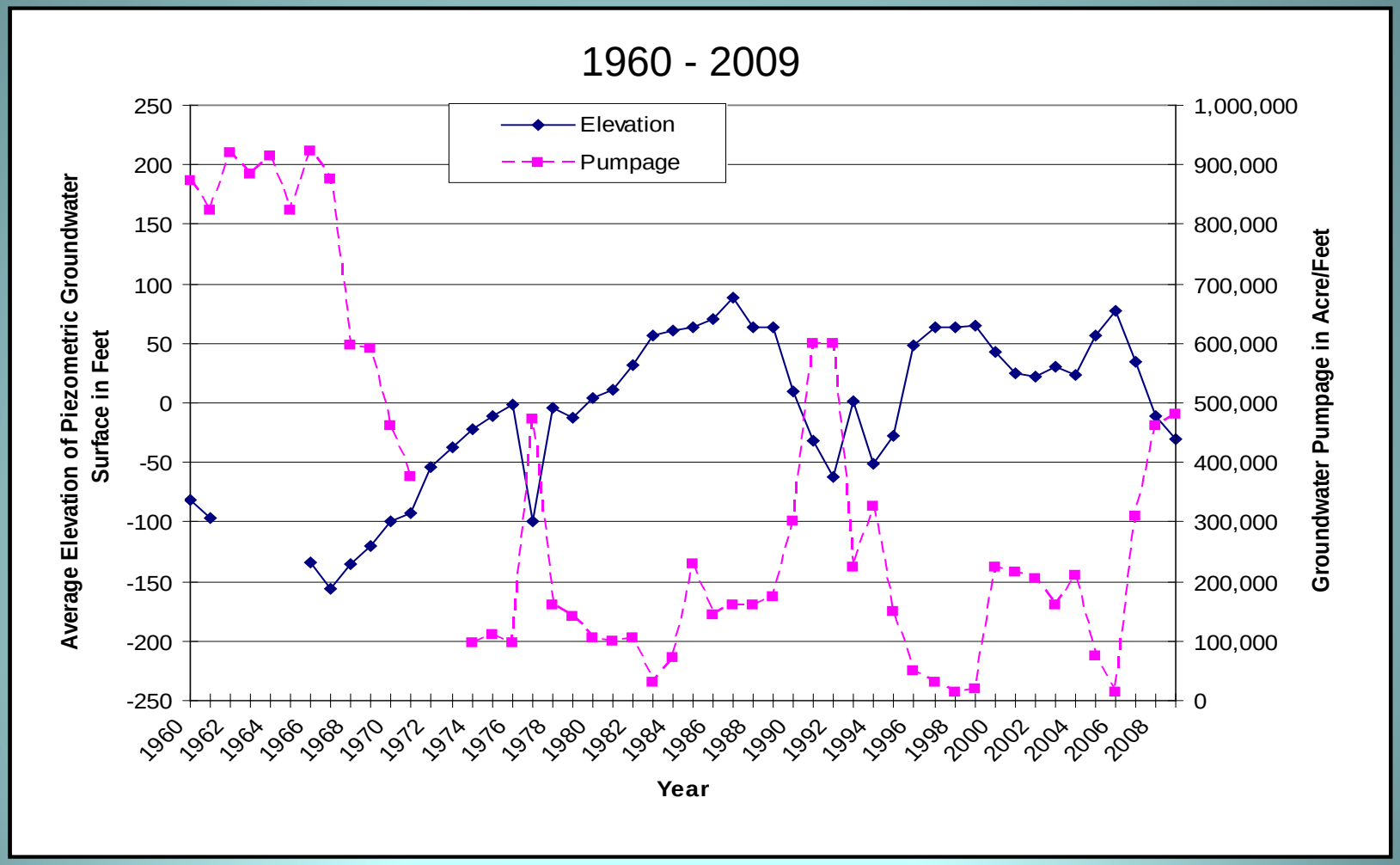
Cross-Section A-A'



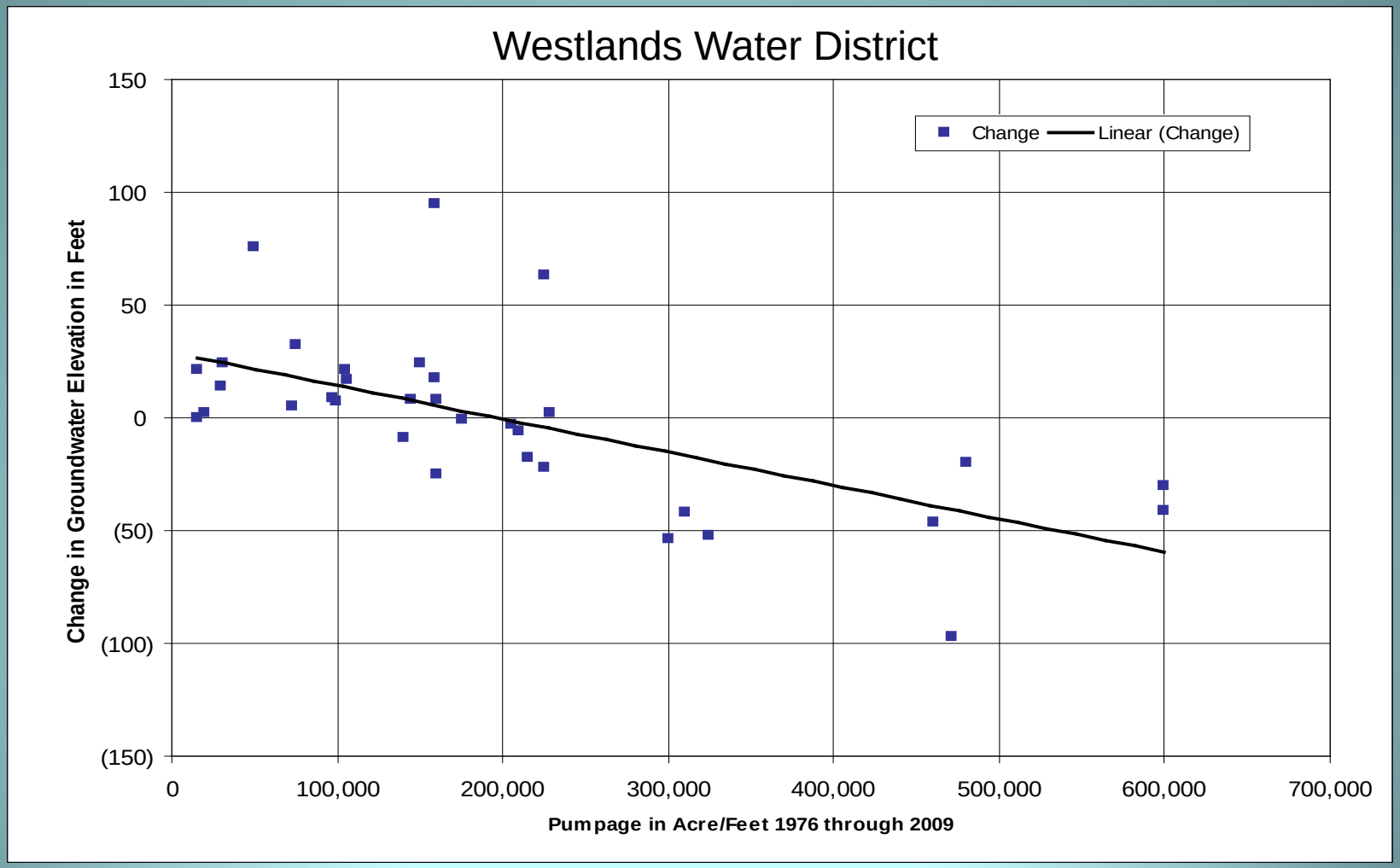
Cross-Section A-A'. Southwest/Northeast Geologic Section near Panoche Creek


CVP Storage vs Ag Service Allocation
(1952-2011)
CVP Storage
Initial Ag Service Allocation
Final Ag Service Allocation
Trinity, Shasta, Folsom, and Federal San Luis Storage -End of February (ac-ft)
South of Delta Ag Service Allocati0n - End of February (% of Contract Supply)
8,000,000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
100
90
80
70
60
50
40
30
20
10
0
1952
1954
1956
1958
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
First year of reservoir operation: Shasta - 1948, Folsom - 1956, Trinity - 1962, San Luis - 1967

Groundwater Pumpage vs. Sub-Corcoran Water Surface Elevation



Estimated Safe Yield for WWD Confined Aquifer



The Groundwater Management Plan (AB 3030)

- AB 3030 became law on January 1, 1993 permits local agencies to adopt programs to manage groundwater.
- The District adopted a Groundwater Management Plan on September 8, 1996.
- Groundwater Management Plan Primary Goals:
  - Preserve and enhance the reliability of groundwater resources of the District.
  - Ensure the long-term availability of high quality groundwater .
  - Maintain local monitoring of groundwater resources within the District
  - Minimize the cost and impacts of groundwater use.

Groundwater Monitoring and Groundwater Management Plan

- Since 1977, Westlands annually surveys the shallow and deep groundwater conditions within the District.
- In December 2010 there were 690 operational wells within the District, with 94% having meters.
- A program is currently underway to implement a Capital Improvement Program to ensure that all wells within the District are metered and read on a semi-annual basis.

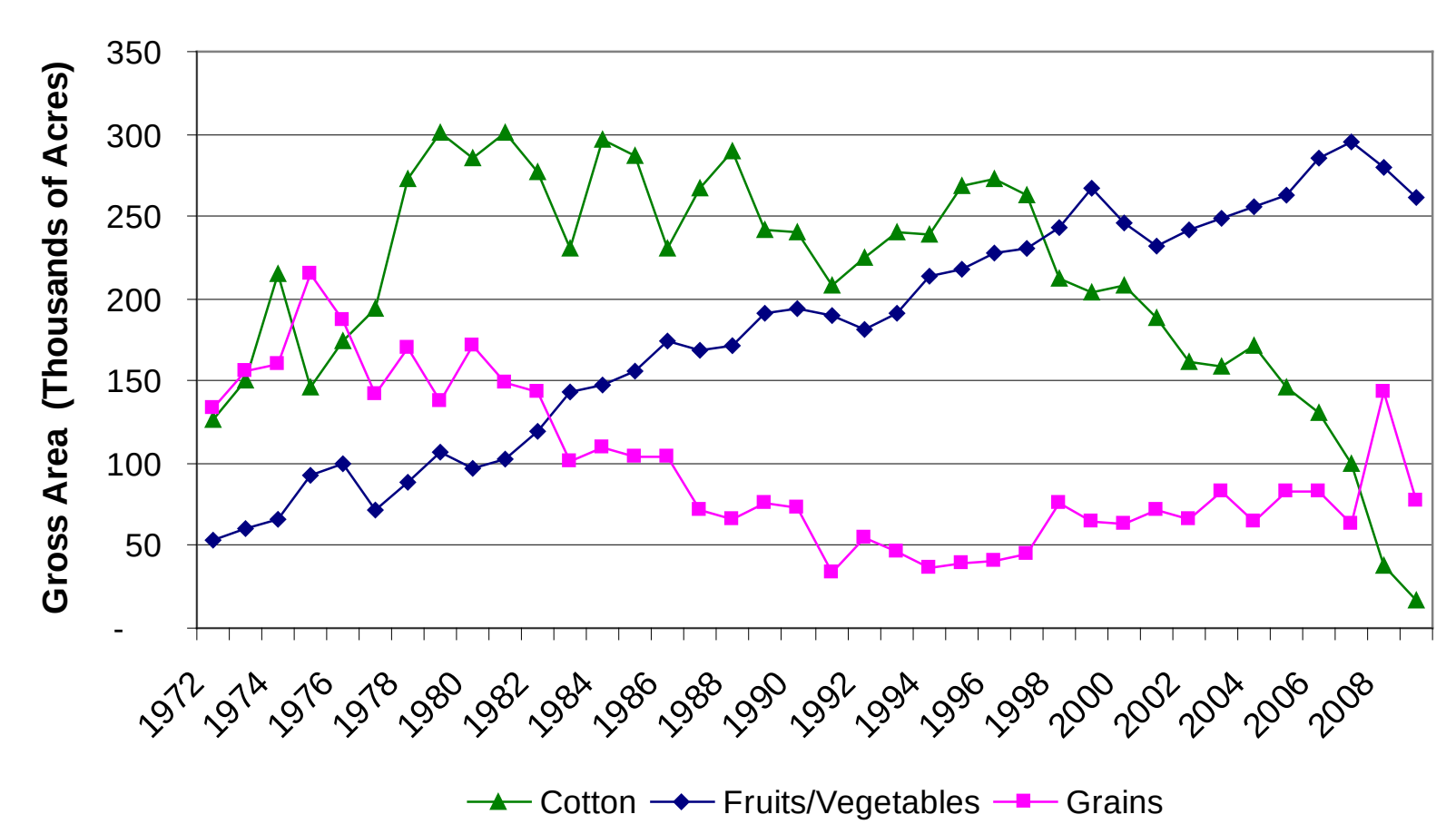
Irrigation Systems

- District water users are continuing to increase the use of Drip/Trickle irrigation systems.

On-Farm Irrigation Systems

	Percent of Land Irrigated															
Type of System	***1985***	***1990***	***1996***	***1997***	***1998***	***1999***	***2000***	***2001***	***2002***	***2003***	***2004***	***2005***	***2006***	***2007***	***2008***	***2009***
Surface																
Furrow	60	38	34	32	31	29	28	26	22	22	23	20	19	18	11	9
Border Strip	3	5	2	2	2	2	2	1	2	2	2	3	2	2	5	4
Combination Sprinkler/Furrow	15	38	43	44	43	45	44	45	45	42	39	34	28	24	19	10
Pressurized																
Sprinkler	21	16	15	14	15	13	14	13	12	13	11	10	10	9	13	15
Drip/Trickle	1	3	6	8	9	11	13	15	18	22	25	33	41	46	51	62
	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Crop Acreage Trends



Sustainable Groundwater in Westlands

- The following is needed to sustain groundwater use within Westlands Water District:
  - Foremost a reliable, timely and adequate surface water supply.
  - Groundwater pumping near the safe yield of 250,000 AF per year.
  - Continued focus on efficient use of water within the District
    - Increase use of sprinkler/drip/trickle where applicable.
    - Increase seasonal application efficiency.