



Fillmore and Piru Basins Groundwater Sustainability Agency

FPBGSA Stakeholder Workshop

Water Budgets

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Water Budgets and SGMA/GSP Context

- California Code of Regulations (CCR)

<https://govt.westlaw.com/calregs/Document/186E380AB2D89470B951D8393BE80E831?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=sc.Default>

23 CCR §354.18(c): Each Plan shall quantify the current, historical, and projected water budget for the basin.

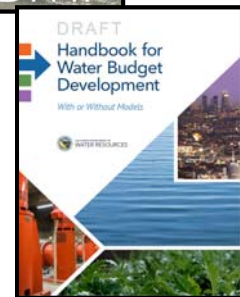
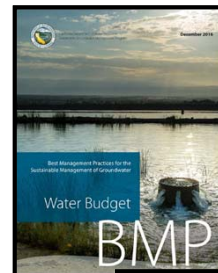
- CA Department of Water Resources (DWR)

- BMP #4 – Water Budget

<https://water.ca.gov/Programs/Groundwater-Management/SGMA-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents>

- Water Budget Handbook

<https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Data-and-Tools/Files/Water-Budget-Handbook.pdf>

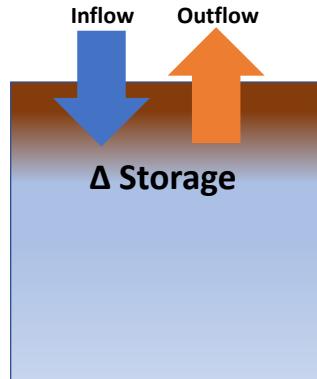


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Water Budget Fundamentals

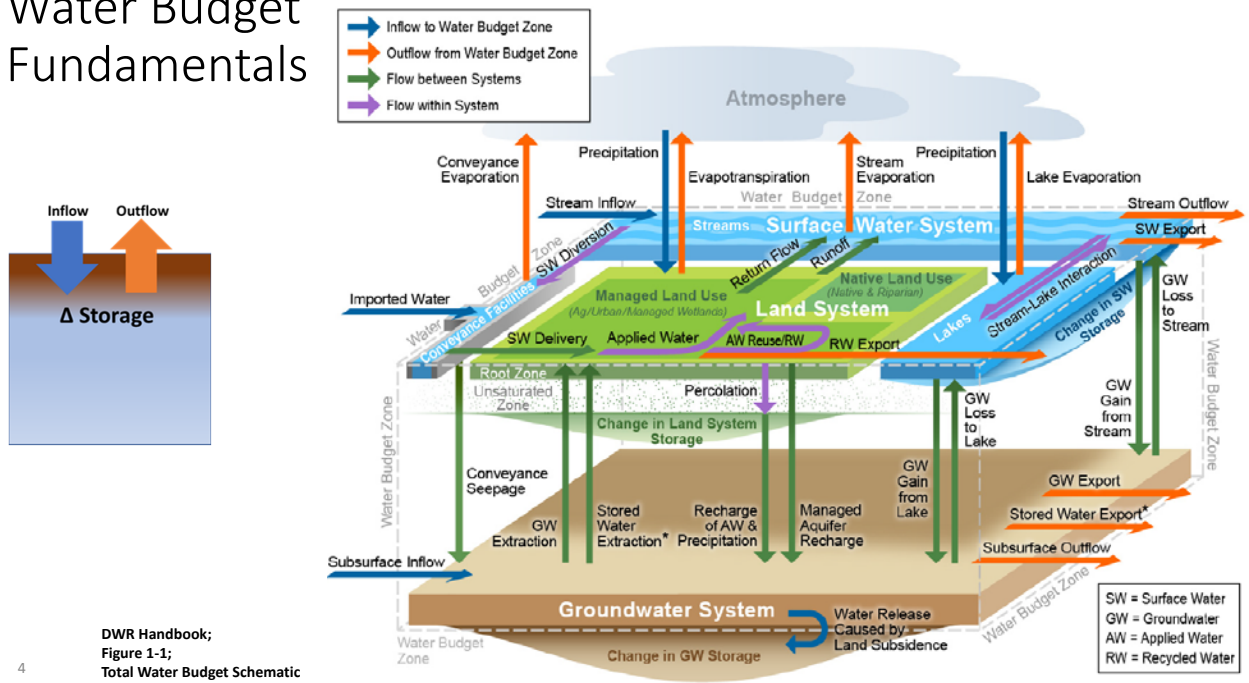
- A **water budget** is an accounting of all the water that flows into and out of the system (e.g. GSA groundwater basin boundary)



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Water Budget Fundamentals

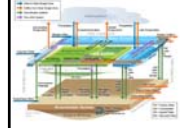


DWR Handbook; Figure 1-1; Total Water Budget Schematic

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Water Budget Fundamentals



Water Year:
Water Year Type:

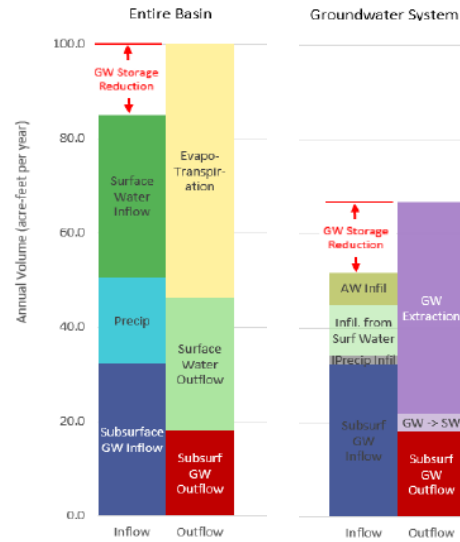
	INFLOWS		OUTFLOWS	
	Inflow Source	Volume (af/yr)	Outflow Sink	Volume (af/yr)
Surface Water System	Surface Water Inflow ¹ Precipitation Subsurface Groundwater Inflow	_____	Surface Water Outflow ^{1,3} Evapotranspiration ^{1,4} Subsurface Groundwater Outflow	_____
Groundwater System	Subsurface Groundwater Inflow Infiltration of Precipitation Infiltration from Surface Water Systems ² Infiltration of Applied Water ³	_____	Subsurface Groundwater Outflow Groundwater Extraction ^{1,4} Discharge to surface water systems ³	_____
		Change in Surface Storage Volume		
		Change in Groundwater Volume		

¹ by water source type
² lakes, streams, canals, springs, conveyance systems
³ includes applied surface water, groundwater, recycled water, and reused water
⁴ by water use sector

DWR BMP #4;
Table 1;
Water Budget Tabulation Example

Note:
Water Year: October 1 – September 30

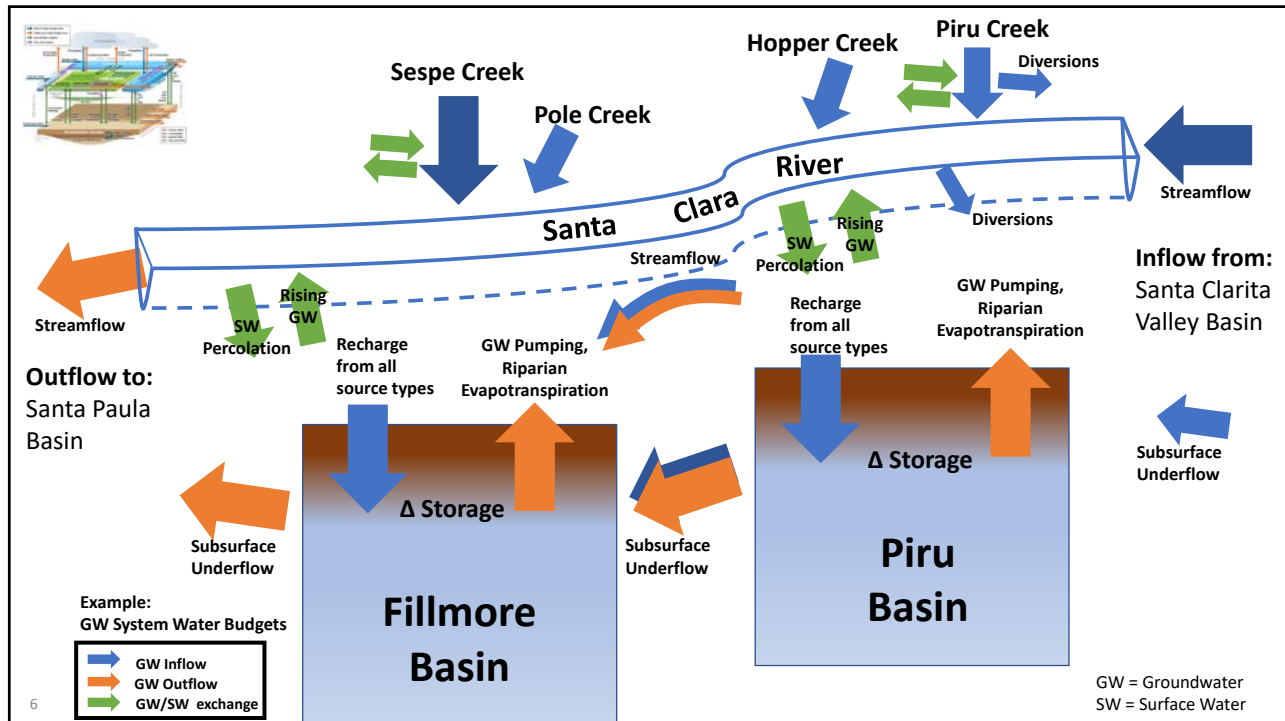
CA DWR Example



DWR BMP #4;
Modified from Figure 6;
Paired Bar Water Budgets

CA DWR Example

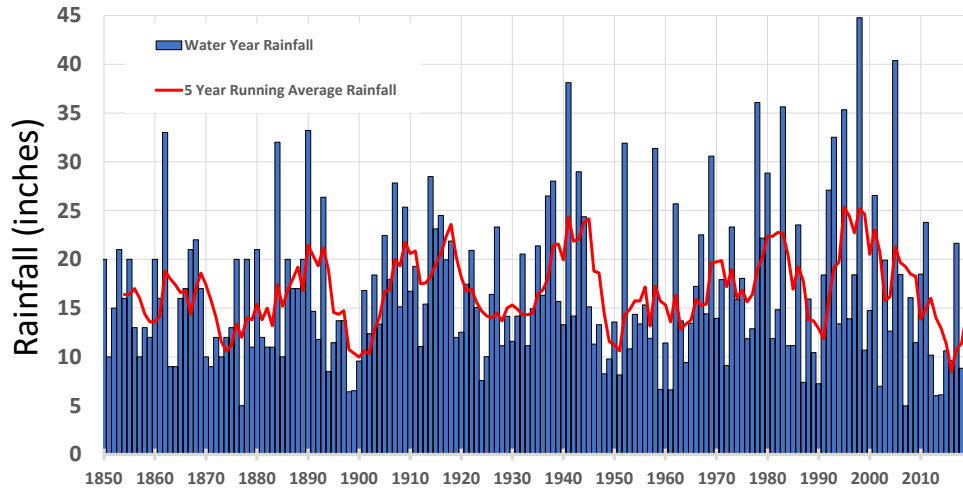
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Variability in precipitation extends to other water budget components

Santa Paula Gage #245
Historical Rainfall Record
Water Years 1850 - 2019



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Summary of Previous Investigations					Summary of Previous Groundwater System Water Budget Components				
Entity	Year Published	Reference	Water Budget Components Provided?	Representative Years	Piru		Fillmore		
					Lower	Upper	Lower	Upper	
California Department of Public Works, Division of Water Resource	1933	DWR, 1933	Piru and Fillmore, various	1927 - 1932	Budget Components (AFY¹)				
California State Water Resources Board	1956	DWR, 1956	Piru and Fillmore, various	1936 - 1951	Inflows				
John F. Mann and Associates	1959	Mann, 1959	Piru and Fillmore, various	1936 - 1957	Subsurface underflow	240	18,800	12,570	111,210
California Department of Water Resources	1974	DWR, 1974a	Piru, subsurface inflow	1956 - 1967	Stream Percolation	6,400	61850	1,790	4,9130
Law/Crandall Inc.	1993	Law/Crandall, 1993	Fillmore, subsurface outflow	1956 - 1990	Precipitation Recharge	190	20200	470	5,4200
United States Geological Survey	2003	USGS, 2003	Fillmore, subsurface outflow	1984 - 1993	Mountain Front Recharge	2,620	2620	3,530	3530
CH2M HILL	2004	CH2M HILL 2004	Piru, subsurface inflow	1980 - 1999	Managed Recharge	0	11800	--	--
CH2M HILL	2005	CH2M HILL 2005	Piru, subsurface inflow	1980 - 2005	Wastewater Treatment Percolation	210	210	1,040	1040
CH2M HILL/ HydroGeologic Inc; HydroMetrics (United-sponsored analysis)	2008	CH2M HILL/ HGL, 2008	Piru and Fillmore, subsurface inflow	1975 - 2005	Imported	0	5840	4,900	11,770
HydroMetrics (United-sponsored updates)	2015	LWA and others, 2015	Piru and Fillmore, various	1996 - 2012	Outflows				
Steve Bachman	2015	Bachman, 2015	Fillmore, subsurface outflow	1947 - 2014	Subsurface underflow	12,570	111,210	3,900	30,910
Daniel B. Stephens and Associates, Inc/ Richard C. Slade and Associates LLC	2017	DBS&A and RCS, 2017	Fillmore, subsurface outflow	1999 - 2012	Rising groundwater	0	37,800	6,030	48,200
					Consumptive use ²	6,820	15,000	20,590	36,200
					Exported	2,200	6450	0	5160
					Change in Groundwater Storage³				
					-19,600	44,600	-20,170	49,300	

¹Values rounded to nearest 10 AF
²Of applied water and precipitation on basin (including phreatophytes)
³Reported changes in storage, largely from DWR (1956) and Mann (1959)

Draft Review

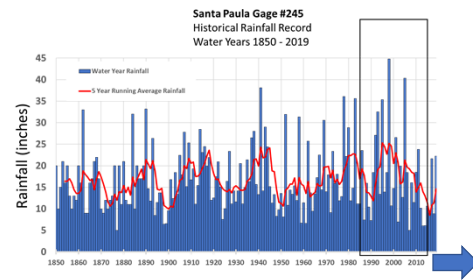
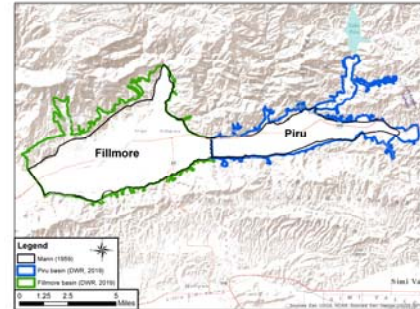
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Groundwater model use addresses several needs for GSP development:

- Basin boundary changes
- Relevant time-period for analysis
- Detailed water levels and water budgets
 - Historical
 - Current
 - Future projections

23 CCR §354.18(c): Each Plan shall quantify the current, historical, and projected water budget for the basin.

- Note: More to come...
- Note: Filling data gaps



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Previous Studies References

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Thank You

Questions?



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