Groundwater Management in California

California law provides for twenty different types of local agencies with authority to provide water. Many have authority to manage groundwater in some manner. Some special act agencies have broader groundwater management authority, including the ability to impose extraction limits and to charge an extraction fee for basin management purposes. California law also provides a mechanism for an entity to adopt a groundwater management plan, which may serve as the basis for assessment authority upon a majority vote. Groundwater use is also formally managed through county ordinances, which have been used primarily to limit extractions for transfer outside the county boundary.

Groundwater is also managed according to adjudications, which exist in 20 groundwater basins throughout California. (See attached map and table for the locations and names of the adjudicated basins.) An adjudicated groundwater basin is a basin in which groundwater extraction is apportioned judicially to each party based upon historic demands and long-term sustainability of the groundwater resource. (This oversimplifies what is notoriously a complex, time consuming and contentious process.) As provided in Table 1, in an average year, approximately six percent (6%) of groundwater pumped in California is from adjudicated basins.[1]

Table 1
Groundwater Extraction in Adjudicated Basins

	1998 (Wet) taf/yr	2000 (Avg.) taf/yr	2001 (Dry) taf/yr
GW (Adj.)	848	927	903
GW (Unadj.)	9,122	13,927	16,785
Total GW	9,969	14,853	17,689
% GW (Adj.)	9%	6%	5%
% GW (Unadj.)	91%	94%	95%

Groundwater Extraction in California

Table 2 indicates that groundwater is used to satisfy approximately 27-41% of urban, agricultural and managed wetland demands throughout the state depending upon hydrologic conditions.[2] The variation in quantity of groundwater used highlights the prevalence of conjunctive use in which surface water is used in wet/average years, and groundwater is used during dry years. A portion of the surface supply used to meet applied water demands includes reused surface water.

Table 2
Statewide Groundwater Extraction –
% of Agricultural, Urban and Managed Wetlands Demand

		1998 (Wet)		2000 (Average)		2001 (Dry)	
		taf/yr	% demand	taf/yr	% demand	taf/yr	% demand
Demand	Applied Water Demand	36,500		44,600		43,600	
Supply	GW Withdrawal	10,000	27%	14,800	33%	17,700	41%
	Surface Water	26,500	73%	29,800	67%	25,900	59%

[1] California Water Plan Update 2005, Vol. 3, p. 1.14 and 1.18.
[2] California Water Plan Update, 2005, Vol. 3, p. 1.14.

Groundwater Extraction in the Bay-Delta Watershed

Table 3 provides an indication of the approximate supply mix in an average year throughout the Delta Watershed.[3] In an average year in the Delta Watershed, the Sacramento River region uses slightly less groundwater in percentage terms than the San Joaquin River hydrologic region. Yet, both the Sacramento and San Joaquin River hydrologic regions use approximately 25-35% groundwater to meet demands depending on the water year type. Again, a portion of the surface supply used to meet applied water demands includes reused surface water.

Table 3
Delta Watershed Groundwater Extraction –
% of Agricultural, Urban and Managed Wetlands Demand
Average Year (2000)

			taf/yr	% demand
Sacramento River	Demand	Applied Water	10,045.0	
	Supply	Groundwater	2,815.2	28%
		Surface Water	7,229.8	72%
San Joaquin River	Demand	Applied Water	8,062.8	
	Supply	Groundwater	2,646.3	33%
		Surface Water	5,416.5	67%

Groundwater Extraction in "Export" Areas

As indicated in Table 4, average groundwater use in "export" areas varies widely.[4] Notably, in an average year, groundwater is used to meet only 12% of applied water demands in the San Francisco Bay region. Also, while the Tulare Basin supply mix is approximately 43% in an average year, groundwater may be used to meet upwards of 60% of demands in dry years. Regardless of the year type, the South Coast region retains a fairly consistent supply mix, with groundwater serving approximately 36-39% of demands in most year types.

Table 4
"Export" Area Groundwater Extraction
Average Year (2000)

	San Francisco Bay	South Coast	Tulare Basin
Groundwater	12%	36%	43%
Surface Water	88%	64%	57%

[3] California Water Plan Update 2005, Vol. 3, p. 6.7 and 7.7
[4] California Water Plan Update 2005, Vol. 3, p. 3.16, 5.8, and 8.16.

Adjudicated Groundwater Basins in California