

## Appendix C. Groundwater Use Data

While some types of groundwater uses are reported for some California basins, the majority of groundwater users are not required to monitor, meter, or record their annual groundwater extraction amounts. Groundwater use estimates for this report are based on water supply and balance information derived from California Department of Water Resources (DWR) land use surveys and from groundwater use information voluntarily provided to DWR by water purveyors or other State agencies.

Groundwater extraction estimates derived from land and water use methods typically assume that local surface-water supplies are used first to meet local water demands. Once surface water supplies have been fully allocated, if crop demand and water balance information indicates that additional water supplies are needed, groundwater supplies are then applied until the full water use is met and the overall supply and use for the area is balanced. For agricultural areas utilizing conjunctive management practices, which may involve optimally using surface water and groundwater supplies, accurate estimates of annual groundwater extraction using the land and water use method can be challenging.

DWR water supply and balance data are aggregated by hydrologic regions, which generally correspond to watershed boundaries. The land and water use data is first compiled and analyzed by detailed analysis units (DAUs). Water supply and balance data for DAUs are then compiled into larger planning areas (PA) and then into hydrologic regions, and finally into a statewide water supply and balance estimate. To assist local resource planning, DWR also generates water supply and balance information by county. Although some local groundwater management groups independently develop groundwater extraction estimates for their groundwater basins, DWR does not currently generate groundwater extraction information by groundwater basin area.

Water use is reported by water year (October 1 through September 30) and categorized according to urban, agriculture, and managed wetlands uses. Reference to total water supply for a region represents the sum of surface water, groundwater, and reused/recycled water supplies. Reused/recycled water supplies also include desalinated water supplies. Figures C-1 and C-2 show California's planning areas and counties and a breakdown of groundwater supply by planning area and county is provided in Tables C-1 and C-2. Information on water use analysis is provided in Appendix A.

**Figure C-1 California Hydrologic Regions and Planning Areas**



**Table C-1 Average Annual Groundwater Supply and Percentage of Total Supply Met by Groundwater, by Planning Area and Type of Use (2005-2010)**

Planning Area		Agriculture Use Met by Groundwater		Urban Use Met by Groundwater		Managed Wetlands Use Met by Groundwater		Total Water Use <sup>a</sup> Met by Groundwater	
PA Number	PA Name	taf	% <sup>b</sup>	taf	% <sup>b</sup>	taf	% <sup>b</sup>	taf	% <sup>b</sup>
101	Upper Klamath	182.6	22%	7.2	1%	2.5	0%	192.3	24%
102	Lower Klamath	8.2	21%	5.9	15%	0.0	0%	14.1	36%
103	Coastal	63.9	49%	18.1	14%	0.0	0%	81.9	62%
104	Russian River	46.7	31%	29.1	19%	0.0	0%	75.8	50%
201	North Bay	54.7	24%	23.8	10%	0.0	0%	78.6	34%
202	South Bay	21.4	2%	159.6	16%	0.0	0%	181.0	18%
301	Northern	550.3	72%	132.0	17%	0.0	0%	682.3	89%
302	Southern	355.9	67%	81.3	15%	0.0	0%	437.2	83%
401	Santa Clara	218.0	39%	57.8	10%	0.0	0%	275.9	49%
402	Metropolitan LA	3.0	0%	633.7	37%	0.0	0%	636.7	37%
403	Santa Ana	130.5	9%	492.8	35%	0.0	0%	623.3	45%
404	San Diego	33.9	3%	35.3	3%	0.0	0%	69.2	7%
501	Shasta - Pit	83.2	23%	11.3	3%	0.0	0%	94.5	26%
502	Upper Northwest	3.3	33%	0.4	4%	0.0	0%	3.7	37%
503	Lower Northwest	238.4	45%	47.9	9%	0.0	0%	286.3	55%
504	Northeast Valley	175.3	45%	41.5	11%	0.0	0%	216.8	56%
505	Southwest	42.1	69%	5.1	8%	0.0	0%	47.1	77%
506	Colusa Basin	498.7	24%	14.0	1%	9.2	0%	521.9	25%
507	Butte - Sutter - Yuba	508.3	18%	47.2	2%	10.9	0%	566.4	21%
508	Southeast	44.0	10%	23.3	5%	0.0	0%	67.3	15%
509	Central Basin West	473.0	53%	47.0	5%	0.0	0%	520.0	58%
510	Sacramento Delta	19.5	3%	4.6	1%	0.0	0%	24.2	4%
511	Central Basin East	208.5	24%	186.4	21%	0.0	0%	394.9	45%
601	Upper West Side	5.4	5%	7.4	7%	0.0	0%	12.8	12%
602	San Joaquin Delta	0.8	0%	37.8	4%	0.0	0%	38.6	4%
603	Eastern Valley Floor	427.2	50%	51.7	6%	0.1	0%	479.1	56%
604	Sierra Foothills	1.7	3%	2.6	4%	0.0	0%	4.3	6%
605	West Side Uplands	0.0	0%	0.2	100%	0.0	0%	0.2	100
606	Valley West Side	554.7	26%	27.8	1%	178.1	8%	760.6	36%
607	Upper Valley East	121.9	11%	102.9	10%	1.4	0%	226.3	21%
608	Middle Valley East	330.3	30%	74.9	7%	0.0	0%	405.2	37%
609	Lower Valley East	1,146.	53%	95.4	4%	11.1	1%	1,253.1	58%
610	East Side Uplands	3.1	16%	15.3	81%	0.0	0%	18.4	98%
701	Western Uplands	0.3	13%	2.0	87%	0.0	0%	2.3	100
702	San Luis West Side	598.5	41%	7.5	1%	0.0	0%	606.0	41%
703	Lower Kings-Tulare	1,429.	67%	44.5	2%	1.1	0%	1,474.5	69%
704	Fresno - Academy	56.8	7%	204.4	27%	0.0	0%	261.2	34%
705	Alta - Orange Cove	417.2	42%	59.3	6%	0.0	0%	476.4	48%

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706	Kaweah Delta	1,492.	57%	112.8	4%	3.2	0%	1,608.7	61%
707	Uplands	32.6	62%	14.3	27%	0.0	0%	46.9	89%
708	Semitropic - Buena	622.7	51%	17.7	1%	24.7	2%	665.0	54%
709	Kern Valley Floor	322.0	38%	31.9	4%	0.0	0%	353.9	42%
710	Kern Delta	580.3	38%	109.7	7%	0.0	0%	690.0	45%
801	Lassen	117.8	34%	18.9	6%	10.7	3%	147.5	43%
802	Alpine	0.6	0%	18.2	11%	0.0	0%	18.8	11%
901	Mono-Owens	137.4	72%	10.5	5%	0.0	0%	147.9	77%
902	Indian Wells	10.3	34%	19.4	65%	0.0	0%	29.7	99%
903	Death Valley	10.6	73%	4.0	28%	0.0	0%	14.7	100
904	Antelope Valley	57.6	28%	40.7	20%	0.0	0%	98.3	48%
905	Mojave River	54.7	24%	95.7	42%	0.0	0%	150.4	66%
1001	Twenty-Nine Palms -	11.1	37%	15.3	51%	0.0	0%	26.4	89%
1002	Coachella	21.0	3%	294.4	39%	0.0	0%	315.4	42%
1003	Chuckwalla	2.6	55%	2.1	43%	0.0	0%	4.7	98%
1004	Colorado River	0.4	0%	10.4	1%	0.0	0%	10.8	2%
1005	Borrego	14.9	29%	7.4	14%	0.0	0%	22.3	43%
1006	Imperial Valley	0.0	0%	0.1	0%	0.0	0%	0.1	0%
<b>California Total</b>		<b>12,546</b>	<b>29%</b>	<b>3,662</b>	<b>9%</b>	<b>253</b>	<b>1%</b>	<b>16,461</b>	<b>38%</b>

Notes:

PA = planning area; taf = thousand acre-feet

<sup>a</sup>Total water use = groundwater + surface water + reuse.

<sup>b</sup>Percent use is the percent of the total water supply that is met by groundwater, by type of use.

Statewide Precipitation for 2005-2010 equals 96 percent of the 30-year average.

**Figure C-2 California Hydrologic Regions and Counties**



**Table C-2 Average Annual Groundwater Supply and Percentage of Total Supply Met by Groundwater, by County and Type of Use (2005-2010)**

County Name	Agriculture Use Met by Groundwater		Urban Use Met by Groundwater		Managed Wetlands Use Met by Groundwater		Total Water Use <sup>a</sup> Met by Groundwater	
	taf	% <sup>b</sup>	taf	% <sup>b</sup>	taf	% <sup>b</sup>	taf	% <sup>b</sup>
Alameda	5.8	2%	35.9	15%	0.0	0%	41.7	17%
Alpine	0.0	0%	0.0	0%	0.0	0%	0.0	0%
Amador	3.5	14%	1.6	6%	0.0	0%	5.1	20%
Butte	367.7	28%	51.0	4%	9.1	1%	427.7	32%
Calaveras	1.3	6%	1.6	8%	0.0	0%	2.8	14%
Colusa	231.6	17%	7.9	1%	7.7	1%	247.2	18%
Contra Costa	0.8	0%	24.9	6%	0.0	0%	25.7	6%
Del Norte	4.6	34%	1.7	13%	0.0	0%	6.3	46%
El Dorado	0.6	1%	9.0	12%	0.0	0%	9.5	12%
Fresno	1,657.	41%	272.4	7%	1.1	0%	1,931.0	48%
Glenn	277.5	26%	11.0	1%	3.3	0%	291.8	27%
Humboldt	58.5	55%	17.9	17%	0.0	0%	76.4	72%
Imperial	0.0	0%	1.1	0%	0.0	0%	1.1	0%
Inyo	59.4	59%	11.1	11%	0.0	0%	70.5	70%
Kern	1,549.	43%	185.6	5%	24.7	1%	1,759.4	48%
Kings	939.8	56%	39.6	2%	0.0	0%	979.4	59%
Lake	36.5	67%	4.6	8%	0.0	0%	41.0	75%
Lassen	99.2	28%	18.7	5%	10.7	3%	128.6	36%
Los Angeles	54.5	3%	703.4	35%	0.0	0%	757.8	38%
Madera	673.1	64%	40.7	4%	0.0	0%	713.7	68%
Marin	3.1	7%	1.0	2%	0.0	0%	4.0	9%
Mariposa	3.1	40%	4.6	60%	0.0	0%	7.7	100%
Mendocino	24.3	35%	7.4	11%	0.0	0%	31.7	46%
Merced	764.6	29%	84.6	3%	189.	7%	1,038.3	40%
Modoc	90.9	20%	3.0	1%	0.0	0%	93.9	20%
Mono	82.9	36%	3.4	1%	0.0	0%	86.3	37%
Monterey	464.4	87%	67.1	13%	0.0	0%	531.5	99%
Napa	36.6	49%	7.4	10%	0.0	0%	44.0	59%
Nevada	1.0	1%	8.3	13%	0.0	0%	9.3	14%
Orange	1.8	0%	10.2	2%	0.0	0%	12.1	2%
Placer	17.7	6%	20.8	7%	0.0	0%	38.5	13%
Plumas	14.4	15%	9.0	10%	0.0	0%	23.4	25%
Riverside	138.6	7%	495.9	27%	0.0	0%	634.5	34%
Sacramento	179.1	21%	191.5	22%	0.1	0%	370.8	44%
San Benito	48.2	63%	7.7	10%	0.0	0%	55.9	73%
San Bernardino	116.9	15%	423.2	54%	0.0	0%	540.1	68%
San Diego	18.0	2%	27.7	3%	0.0	0%	45.6	5%
San Francisco	0.0	0%	0.1	0%	0.0	0%	0.1	0%

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San Joaquin	354.1	20%	81.8	5%	0.0	0%	435.8	25%
San Luis Obispo	161.2	74%	39.0	18%	0.0	0%	200.3	92%
San Mateo	2.0	2%	8.5	8%	0.0	0%	10.4	9%
Santa Barbara	186.6	62%	42.1	14%	0.0	0%	228.7	76%
Santa Clara	34.1	7%	135.7	27%	0.0	0%	169.8	34%
Santa Cruz	17.6	30%	28.9	49%	0.0	0%	46.5	79%
Shasta	24.1	8%	40.2	13%	0.0	0%	64.3	21%
Sierra	23.9	29%	1.0	1%	0.0	0%	24.9	30%
Siskiyou	175.0	27%	11.4	2%	2.5	0%	188.9	30%
Solano	254.6	40%	20.1	3%	0.0	0%	274.8	43%
Sonoma	43.7	30%	29.6	21%	0.0	0%	73.3	51%
Stanislaus	512.4	26%	162.8	8%	1.4	0%	676.6	35%
Sutter	252.8	23%	9.6	1%	0.0	0%	262.4	24%
Tehama	227.6	61%	20.6	6%	0.0	0%	248.2	67%
Trinity	3.2	24%	1.8	13%	0.0	0%	5.0	37%
Tulare	1,587.	56%	131.3	5%	3.2	0%	1,721.6	61%
Tuolumne	0.4	2%	1.3	7%	0.0	0%	1.7	9%
Ventura	224.3	47%	26.6	6%	0.0	0%	250.8	53%
Yolo	360.4	40%	38.8	4%	0.0	0%	399.2	44%
Yuba	74.4	19%	19.1	5%	0.0	0%	93.5	24%
<b>California Total</b>	<b>12,546</b>	<b>29%</b>	<b>3,662</b>	<b>9%</b>	<b>253</b>	<b>1%</b>	<b>16,461</b>	<b>38%</b>

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