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July 29, 2010

Jeanine Townsend
Clerk to the Board
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-0100

RE: Comments On The Draft Report On The Development Of Flow Criteria For The Sacramento-San Joaquin Delta Ecosystem

Dear Ms. Townsend:

The California Farm Bureau Federation is a non-governmental, non-profit, voluntary membership California corporation whose purpose is to protect and promote agricultural interests throughout the state of California and to find solutions to the problems of the farm, the farm home and the rural community. Farm Bureau is California's largest farm organization, comprised of 53 county Farm Bureaus currently representing approximately 81,000 members in 56 counties. Farm Bureau strives to protect and improve the ability of farmers and ranchers engaged in production agriculture to provide a reliable supply of food and fiber through responsible stewardship of California's resources.

The Board's Draft Criteria Ignore Growth (Both Past and Future)

a. Historic and Projected Future Growth, Water Use, and Califonia's Economy

California's population has grown from 92,597 in 1850, to 6,907,387 in 1940, to 10,586,223 in 1950, to 15,717,204 in 1960, to 29,760,021 in 1990, to an estimated 36,961,664 in 2009 (official 2010 census data still pending).[1] In other words, the state's population has nearly quadrupled since the main components of the Central Valley Project came on line in the 1950s and early 1960s, and roughly doubled since completion

[1] Attachment 1: U.S. Census Bureau, Historical Census Statistics on Population Totals By Race, 1790 to 1990, and By Hispanic Origin, 1970 to 1990, For The United States, Regions, Divisions, and States, Working Paper Series No. 56—September 2002, Table 19: California Race and Hispanic Origin: 1850 to 1990, http://www.census.gov/population/www/documentation/twps0056/twps0056.html, http://www.census.gov/population/www/documentation/twps0056/tab19.pdf); U.S. Census Bureau, Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2000 to July 1, 2009 (NST-EST2009-01), http://www.census.gov/popest/states/NST-ann-est.html.

of most of the State Water Project as we know it, in the late 1960s and early 1970s.[2] The California Department of Finance projects that the State's population will reach 44,135,923 by 2020, 49,240,891 by 2030, 54,266,115 by 2040, and 59,507,876 by 2050[3]—that is, nearly double what it is today within the next 40 years.

Along with its population, California's economy has steadily grown from a GDP of $68 billion in 1963 to $1.8 trillion in 2008.[4] In response to agricultural development during much of the 20th century and rapidly accelerating population growth somewhat later, diversions upstream of the Delta increased significantly in the 1940s, then essentially plateaued or rose only more modestly after about 1970.[5] Delta exports by the CVP and (later) the SWP began in the 1950s, then ramped up steadily through around 2005 (although exports have also fluctuated much more significantly year-to-year in response to California's variable hydrology than have historical upstream or in-Delta diversions, especially during droughts).[6]

b. California Agriculture

In addition to its inestimable importance as a critical drinking water supply to the state's major urban centers in both Southern California and the Bay Area, the Delta and its tributaries irrigate over 7 million acres of some of the most productive and diverse cropland in the world. California is the No. 1 agricultural producer and exporter, and the leading dairy state in the U.S. (22 percent of U.S. milk supply), grows more than 400 different commodities statewide, and supplies roughly half of U.S.-grown fruits, nuts, and vegetables, including 3/4 of all lettuce.[7] Of a total $36.6 billion in direct farm sales for California in 2007,[8] upwards of 60 percent would have been produced in the valley floor of the Delta's watershed, also known as the Central Valley,[9] with a large of portion of the

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[2] Attachment 2: Delta Vision Blue Ribbon Task Force report, dated January 29, 2008, pages 36-37: Figure 7a. Historic Diversions from within the Delta.
[3] Attachment 3: California Department of Finance, "Population Projections by Race / Ethnicity, Gender and Age for California and Its Counties 2000-2050" (July 2007) (http://www.dof.ca.gov/research/demographic/reports/projections/p-3/).
[4] Attachment 5: U.S. Department of Commerce, Bureau of Economic Analysis: Gross Domestic Product by State (millions of current dollars) California, 1963-2009 (http://www.bea.gov/regional/gsp/).
[5] See Attachment 2: January 2008 Delta Vision Blue Report Task Force report: Figure 7b. Historic Diversions before the Delta, in-Delta Uses and Exports from the Delta, plus Outflows.
[6] Ibid.
[7] See Attachment 5: "California Agricultural Highlights, 2008-2009," California Department of Agriculture" (http://www.cdfa.ca.gov/Statistics/). Attachment 6: 2008 Agricultural Overview, USDA, NASS, California Field Office (http://www.cdfa.ca.gov/Statistics/). Attachment 7: *The State of the Great Valley—Assessing the Region Via Indicators*, Great Valley Center, "Agricultural Indicators—Productivity and Diversity of California Agriculture" (http://www.greatvalley.org/indicators/docs/economic/ag/diversity.pdf).
[8] Attachment 5: "California Agricultural Highlights, 2008-2009," California Department of Agriculture" (http://www.cdfa.ca.gov/Statistics/).
[9] See Attachment 8: The State of the Great Central Valley of California: Assessing the Region Via Indicators—The Economy (Third Edition, 2009), Great Valley Center, page 26 (63 percent of agricultural

State's remaining agricultural production occurring in areas also receiving a portion of their water supplies from the Delta in Southern California and California Central Coast area. $36.6 billion represents 12.8 percent of farm sales nationally,[10] yet in terms of acreage the Central Valley amounts to just 1 percent of farmland nationwide.[11] "Including multiplier effects," says the U.C. Davis Agricultural Issues Center, "California farms and related processing industries generate 7.3 percent of the state's private sector labor force [...] and account for 5.6 percent of state labor income."[12] "Excluding ripple effects," says the same source, "agriculture directly accounts for 12.6 percent of jobs and 8.4 percent of labor income" statewide, while in the Central Valley itself "[a]gricultural production and processing [...], including ripple effects, generate 24.2 percent of private sector employment and 18.5 percent of the private sector labor income."[13] For every $1 billion in direct farm sales, the Issues Center estimates, "there 18,000 jobs created in the state, about 11,000 in the farm sector itself plus about 7,000 in other industries."[14]

California is the top agricultural producing state in the nation, well of ahead of the closest contenders, Iowa, Texas, Nebraska, and Illinois.[15] California is the nation's leading producer of over 70 different crops.[16] Of the nation's 10 agricultural top counties, 9 are located in California.[17] California also leads the nation in agricultural exports, with $10.9 billion in exports to some 156 counties worldwide in 2007.[18] Almonds, wine, dairy products, cotton, table grapes and walnuts make up nearly 50 percent of California agricultural exports.[19] About 70 percent of California farm cash receipts are linked to markets in the U.S., while the remaining 30 percent derives from exports.[20]

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output in 2007 occurred in Central Valley)
(http://www.greatvalley.org/artman2/uploads/1/econindicators09_final.pdf).

[10] Attachment 5: "California Agricultural Highlights, 2008-2009," California Department of Agriculture" (http://www.cdfa.ca.gov/Statistics/).

[11] Attachment 7: *The State of the Great Valley—Assessing the Region Via Indicators*, Great Valley Center, "Agricultural Indicators—Productivity and Diversity of California Agriculture" (http://www.greatvalley.org/indicators/docs/economic/ag/diversity.pdf).

[12] See Attachment 9: U.C. Davis Agricultural Issues Center, The Measure of California Agriculture Highlights (http://aic.ucdavis.edu/publications/moca/moca09/mocacard09.pdf).

[13] Ibid.

[14] Ibid.

[15] Attachment 6: USDA 2008 CA Agricutural Overview.

[16] Attachment 8: The State of the Great Central Valley of California: Assessing the Region Via Indicators—The Economy (Third Edition, 2009), Great Valley Center, page 26 (http://www.greatvalley.org/artman2/uploads/1/econindicators09_final.pdf).

[17] Attachment 5: "California Agricultural Highlights, 2008-2009," California Department of Agriculture (http://www.cdfa.ca.gov/Statistics/).

[18] Ibid.

[19] Attachment 9: U.C. Davis Agricultural Issues Center, The Measure of California Agriculture Highlights (http://aic.ucdavis.edu/publications/moca/moca09/mocacard09.pdf).

[20] Ibid.

c. Agricultural Water Use Efficiency

Despite dwindling water supplies, an increasingly difficult regulatory environment, and gradual loss of acreage statewide, California farmers have invested hundreds of million of dollars to achieve more "crop per drop" of water applied. For example, it is estimated that between 2003 and 2008, growers in the San Joaquin Valley invested over $1.5 billion dollars in high-efficiency irrigation equipment, infrastructure, and technology.[21] According to DWR's recently released 2009 California Water Plan Update, agricultural water use statewide ("crop applied water use") has fallen 14.6 percent over the last 40 years (1967-2007), from 31.2 million acre-feet to an estimated 26.7 million acre-feet in 2007.[22] Despite this reduction in total applied water use, however, DWR estimates that "real, inflation-adjusted gross revenue" for California agricultural during the same time period increased 84 percent, from $19.9 billion in 1967 to $36.6 billion in 2007.[23]

d. Past Regulatory Reallocation of Water Supply to Instream Environmental Use

Regulatory changes over the last several decades have greatly eroded the quantity and reliability of agricultural water supplies in California: Prime examples include rededication of 800,000 acre-feet of CVP yield under the 1992 Central Valley Project Improvement Act, subsequent loss of Trinity River supplies, additional dedications to instream flows and water quality under the Bay-Delta Accord, the 1995 Bay-Delta Water Quality Control Plan, the Vernalis Adaptive Management Plan, the Yuba Accord and, most recently, the existing NMFS and USFWS OCAP biological opinions and the San Joaquin River Restoration Agreement. Whereas agriculture in the year 2000 accounted for about 41 percent of applied water use from both surface and groundwater in a normal year, environmental and urban water use accounted for approximately 48 and 11 percent respectively.[24] Here again, recent significant regulatory reallocations since 2000 under the NMFS and USFWS OCAP biological opinions, under the San Joaquin River Restoration Agreement, and other developments would notably increase proportion of water going to environmental uses and substantially reduce current allocations to urban and agricultural use.

e. Future Water Demand

According to DWR, growing water demand in each of three possible future scenarios considered in the recently released 2009 Update of the California Water Plan will occur in the urban and environmental sectors. In all three scenarios, demand from agriculture is

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[21] See Attachment 10: Source given as California Farm Water Coalition per DWR California Water Plan Update 2009, Volume 2, Resource Management Strategies, Chapter 2, Agricultural Water Efficiency, p. 2-12.

[22] See Attachment 11: Department of Water Resources, California Water Plan Update 2009, Volume 1, Strategic Plan, Chapter 4, "California Water Today," page 4-13, "Comparing Changes in Applied Water Use and the Real Gross Value of Output for California Agriculture: 1967 to 2007."

[23] Ibid.

[24] Attachment 9: U.C. Davis Agricultural Issues Center, The Measure of California Agriculture Highlights (http://aic.ucdavis.edu/publications/moca/moca09/mocacard09.pdf).

expected to decline somewhat from current levels and yet, in all three, remains important and significant nonetheless.[25] Climate change is expected to significantly increase demand overall, while at the same time likely rendering several components of the State's existing water supply (e.g., snowpack, groundwater, surface water, and existing infrastructure) less reliable than in the past.[26] As shown in DWR's Water Plan Update 2009, California's current statewide "water balance" of both surface and groundwater is significantly negative in all but the wettest of years.[27] While shifting some water from agriculture to the urban and environmental sectors, for example, or from the agricultural and urban sectors to the environmental, perhaps, may help to meet some of the unmet demands elsewhere in the system, it is still quite clear, water to meet the State's competing needs is not consistently there currently, and will be in much shorter supply in the future.

f. The Water Board's Flow Criteria in the Face of Past and Future Growth and Current and Future Water Demand

(1) Water Supply Impacts

The Water Board has provided us a set of the instream outflow, inflow, and in-Delta flow criteria that reduce the State's existing water supply north, south, up and downstream of the Delta by nearly 5.4 million acre-feet. According to the water supply modeling completed for the Board by DWR's Modeling Support Branch and included as Appendix B of Draft Report, north-of-Delta CVP and SWP deliveries to the Sacramento Valley and North Bay would be reduced by an average of 67 percent or some 2.2 million acre-feet; south-of-Delta deliveries would be further reduced 21 to 25 percent or 1 million acre-feet below current, already significantly depressed levels under the existing NMFS and USFWS OCAP biological opinions; and 1.6 to 1.9 million acre-feet in additional flows would be taken from an unspecified combination of upstream sources on either the mainstem San Joaquin or the tributaries to increase flows at Vernalis by 53 to 61 percent.[28] Despite the average 5.4 million acre-foot, statewide reduction in water supply described above, the modeling report observes "even with these delivery reductions, the [Board's draft flow criteria] were not always met."[29] Despite the cumulative, annual, average reduction of 5.4 million acre-foot in water supply as described, the modeling

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[25] See Attachment 12: California Water Plan Update 2009 Highlights, pages 14-16 (http://www.waterplan.water.ca.gov/docs/cwpu2009/0310final/highlights_cwp2009_spread.pdf).
[26] Id. at 8-11. (http://www.waterplan.water.ca.gov/docs/cwpu2009/0310final/highlights_cwp2009_spread.pdf).
[27] Attachment 11: California Water Plan Update 2009, Volume 1, Strategic Plan, Chapter 4, "California Water Today," page 4-22, Table 4-2: California water balance summary, 1998-2005" (http://www.waterplan.water.ca.gov/cwpu2009/index.cfm).
[28] See Attachment 13: SWRCB Draft Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem (July 20, 2010)—Appendix B: Water Supply Modeling. Table 1: CVP/SWP deliveries and San Joaquin River flows (in thousands of acre-feet) associated with criteria.
[29] Attachment 13: Appendix B at 179.

report observes that "even with these delivery reductions, the [Board's draft flow criteria] were not always met."[30]

(2) Coldwater Pool Impacts

While the modeling report indicates that simply "turning off" *all* North-of-Delta surface water diversions reduced (yet still could not *eliminate*) the frequency of modeled dead pool occurrences under the criteria, an assumed 73 percent reduction in north-of-Delta CVP and SWP deliveries under the proposed criteria resulted in 67, 20, and 21 and 57, 17, and 17 percent increases, respectively, in dry and critical year occurrences of dead storage levels under two modeled scenarios, for three seasonal cold water pool targets below Trinity, Shasta and Folsom reservoirs.[31]

The Board's Draft Criteria Ignore the California Constitution's Prohibition On Waste and Unreasonable Use

California Constitution Article X, Section 10 prohibits "waste or unreasonable use" and requires "the water resources of the State be put to beneficial use to the fullest extent of which they are capable."[32] This Constitutional prohibition on waste applies to all beneficial uses of water, both consumptive and instream. "The right to water or to the use or flow of water *in or from* any natural stream or water course in this State is and shall be limited to such water as shall be *reasonably required* for the beneficial use to be served, and such right *does not and shall not extend to the waste or unreasonable use* or unreasonable method of use or unreasonable method of diversion of water." If implemented, as the "Water Supply Modeling" results in Appendix B to the report clearly show (see related discussion above), the SWRCB's recommended flow criteria would likely constitute a wasteful and unreasonable use of the state's water resources in violation of the California Constitution.

"Feasibility" and the "Public Interest" as Fundamental Constraints on Protection of Public Trust Values

As described by the California Supreme Court in *National Aubudon Society v. Superior Court* (1983) 33 Cal.3d 419 and Justice Robie in *State Water Resources Control Board Cases* (2006) 136 Cal.App.4th 674, protection of fish and wildlife and other public trust values must occur on balance with all other beneficial uses and "competing interests," and then only "whenever feasible" and "so far as consistent with the public interest."[33] In light of severe water supply and upstream coldwater pool impacts, as again shown in the Water Supply Modeling of the Board's draft criteria (see related discussed above), it is

[30] Attachment 13: Appendix B at 179.
[31] Attachment 13: Appendix B. Table 2: Reservoir storage and cold water pool impacts associated with criteria (in thousands of acre-feet).
[32] Cal. Const., art. X, sec. 2.
[33] See *National Aubudon Society v. Superior Court* (1983) 33 Cal.3d 419,446-447; *State Water Resources Control Board Cases* (2006) 136 Cal.App.4th 674, 777-779.

quite apparent that implementation of the proposed draft or any similar criteria would be impossible as a practical and legal matter, and that the criteria are therefore not "feasible."

The Board's Analysis of Public Trust Needs May Not Occur in a Void

Notwithstanding that this is precisely what the Legislature asked the Board to do, the fact is that a complete analysis of public trust needs may not consider select aspects of the public trust (i.e., aquatic species and estuarine aquatic habitats) in isolation from all other public values (e.g., upstream habitats and requirements of species, navigation, commerce, recreation, etc.); nor can such an analysis occur without considering the broader public interest and other competing needs, since what is "feasible," "reasonable" and consistent with other beneficial uses ultimately requires such consideration. Put another way, until some reasoned determination as what is "feasible," "reasonable," "in the public interest" is made, it is not possible to say what level of protection of the public trust is either desirable or possible. The absence of any such consideration in the current process should be recognized as a fundamental limitation of the process itself, and also an important distinction in terms of what the public trust doctrine in fact requires in a broader public policy and water rights context.

The Board's Draft Criteria Ignore Water Rights

The Board's proposed criteria ignore existing water rights and established beneficial uses of water. Water rights in California are considered a species of property right, so long as the water user has duly perfected and is entitled to the water (that is, under an appropriative or riparian right or some other claim of right), has applied it to a beneficial use, and avoids violation of the above-mentioned constitutional prohibition against waste, unreasonable use, method of diversion. As noted above, the Water Board must consider the public trust in administering water rights "whenever feasible," and water rights are subject to this requirement—but only again "so far as consistent with the public interest" and in relation to all other beneficial uses.[34] In addition, the Fifth Amendment of the United States Constitution requires "just compensation" for a regulatory (or physical) taking of an established property right. In the case of regulations that impair but do not result in absolute physical invasion or strip a property owner of all possible economic enjoyment of a private property right, a multi-factor balancing of the public interest against the burden to a citizen's private property interest is required. Where the impact on investment-backed expectations of a private landowner or the economic value of a property is sufficiently great, courts may find either that the underlying regulation is invalid, or that the property owner is due compensation for his loss. Much depends on the facts of the particular case but, as Justice Oliver Wendell Holmes, Jr. recognized long ago in the 1922 U.S. Supreme Court case of the in *Pennsylvania Coal Company v.*

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[34] See *National Audubon Society, SWRCB Cases* above. See also *El Dorado Irrigation District v. State Water Resources Control Board* (2006) 142 Cal.App.4th 937, 965-967.

Mahon (1922) 260 U.S. 393, "while property may be regulated to a certain extent, if regulation goes too far it will be recognized as a taking."[35]

The Board's Draft Criteria Cannot Be Used in Subsequent Water Rights or Water Quality Proceedings

The stated statutory purpose of the flow criteria is to "inform" the Bay-Delta Conservation Plan and the Delta Stewardship Council's eventual Delta Plan. The Board flow criteria and report were developed in just 9 months using information from a three-day informational workshop proceeding, without formal presentation of evidence, cross-examination, balancing against competing demands, or other formal procedures required in water rights and water quality proceedings pursuant to the Water Code. As expressly stated in Water Code section 85086, the flow criteria are "predecisional with regard to any subsequent board consideration of a permit, including any permit in connection with a final BDCP," and therefore without legal or regulatory effect. Given these conspicuous limitations, and contrary to various assertions in the report, the Board flow criteria *cannot* be used as a basis to "inform" future or on-going water rights and water quality proceedings before the Board (including, for example, water quality certifications in connection with pending or approaching FERC relicensing proceedings, the Board's San Joaquin River Flow Standard review for the Bay-Delta WQCP, or a future petition to add one or more Sacramento River points of diversion for the Central Valley Project and State Water Project).

Flows Alone, in Isolation from All Other Factors, Do Not Address Root Problems

To look at flows in isolation from the complex interaction of flows with all other factors in the Delta, its watershed, and beyond is to take an oversimplified view. As noted in the Board's Draft Report itself, the inadequacy of flow alone to address complex ecological problems in the Delta emphasizes the need for a more integrated and comprehensive approach that likewise addresses the co-equal goal of a more reliable water supply for the State of California.

Closing

The California Farm Bureau Federation appreciates the opportunity to provide these comments on what is a matter of far-reaching importance to our statewide membership. Placing California's population, economy, and water supply in the balance opposite the very large water supply and coldwater impacts of the Board's draft criteria as modeled in Appendix B to the Draft Report, it appears that we are faced with a fairly severe real-world disconnect. On the other hand, it may be that the Board should be credited and commended here for so dramatically highlighting the theoretical cost of do-or-die protection of so-called "public trust resources," without any balancing of the public interest. In point of fact, the Board may be contributing much here to a potential

[35] *Penn. Coal Co. v. Mahon, supra*, 260 U.S. at 413-416.

breakthrough in the impasse in the water debate in California if these criteria will only serve as a starting point for a return to reality: If as the Board's draft criteria suggest, the cost of protecting the public trust is to sacrifice much of the State's economy, this may be a sign that it is to time to begin to look at more comprehensive, rational and realistic solutions to the State's water issues, including both flow and non-flow measures and continued investment in science, water efficiency, and alternative supplies, but also in new infrastructure and new operational paradigms that can better equip us to meet future challenges and the competing needs of both human beings and the environment. In the end, this is not an either-or proposition, but rather a question of absolute necessity. If nothing else then, Farm Bureau invites the Board and other parties to take this report not as a opportunity for further division, but rather as an opportunity to breakthrough the California's water policy impasse and begin to work on a real implementable plan to secure our State's future. Such a spirit of constructive pragmatism would indeed "inform" not only the BDCP and Delta Plan, but all of our water-related efforts here in California.

Very truly yours,

CHRISTIAN C. SCHEURING
Managing Counsel

CCS/JEF/pkh

Attachments

US Census Bureau: www.census.gov/population/www/documentation/twps0056/tab19.pdf

Table 19. California - Race and Hispanic Origin: 1850 to 1990

(See text for sources, definitions, and explanations)

Census year	Total population	Race					Hispanic origin (of any race)	White, not of Hispanic origin
		White	Black	American Indian, Eskimo, and Aleut	Asian and Pacific Islander	Other race		
NUMBER								
1990	29 760 021	20 524 327	2 208 801	242 164	2 845 659	3 939 070	7 687 938	17 029 126
Sample	29 760 021	20 555 653	2 198 766	248 929	2 847 835	3 908 838	7 557 550	17 093 961
1980	23 667 902	18 030 893	1 819 281	201 369	1 253 818	2 362 541	4 544 331	15 763 992
Sample	23 667 902	18 221 353	1 818 660	231 702	1 312 973	2 083 214	4 541 300	15 850 775
1970	19 953 134	17 761 032	1 400 143	91 018	552 364	148 577	(NA)	(NA)
15% sample [1]	19 957 304	17 856 046	1 397 138	88 271	(NA)	(NA)	2 738 513	15 222 210
5% sample	19 953 134	17 849 792	1 399 558	(NA)	(NA)	(NA)	2 369 292	15 563 814
1960	15 717 204	14 455 230	883 861	39 014	318 376	20 723	(NA)	(NA)
1950	10 586 223	9 915 173	462 172	19 947	183 704	5 227	(NA)	(NA)
1940 [2]	6 907 387	6 596 763	124 306	18 675	167 643	(X)	*415 113*	*6 181 650*
5% sample [2]	(NA)	6 613 080	(NA)	(NA)	(NA)	(X)	416 140	6 196 940
1930	5 677 251	5 408 260	81 048	19 212	168 731	(X)	(NA)	(NA)
1920	3 426 861	3 264 711	38 763	17 360	106 027	(X)	(NA)	(NA)
1910	2 377 549	2 259 672	21 645	16 371	79 861	(X)	(NA)	(NA)
1900	1 485 053	1 402 727	11 045	15 377	55 904	(X)	(NA)	(NA)
1890 [3]	1 213 398	1 111 833	11 322	16 624	73 619	(X)	(NA)	(NA)
1890 [4]	1 208 130	1 111 672	11 322	11 517	73 619	(X)	(NA)	(NA)
1880	864 694	767 181	6 018	16 277	75 218			
1870	560 247	499 424	4 272	7 241	49 310			
1860	379 994	323 177	4 086	17 798	34 933			
1850	92 597	91 635	962	(NA)	(NA)			

	Black		
	Total	Free	Slave
1880	4 086	4 086	-
1870	962	962	-

PERCENT								
1990	100.0	69.0	7.4	0.8	9.6	13.2	25.8	57.2
Sample	100.0	69.1	7.4	0.8	9.6	13.1	25.4	57.4
1980	100.0	76.2	7.7	0.9	5.3	10.0	19.2	66.6
Sample	100.0	77.0	7.7	1.0	5.5	8.8	19.2	67.0
1970	100.0	89.0	7.0	0.5	2.8	0.7	(NA)	(NA)
15% sample [1]	100.0	89.5	7.0	0.4	(NA)	(NA)	13.7	76.3
5% sample	100.0	89.5	7.0	(NA)	(NA)	(NA)	11.9	78.0
1960	100.0	92.0	5.6	0.2	2.0	0.1	(NA)	(NA)
1950	100.0	93.7	4.4	0.2	1.7	-	(NA)	(NA)
1940	100.0	95.5	1.8	0.3	2.4	(X)	(NA)	(NA)
5% sample [2]	(NA)	(NA)	(NA)	(NA)	(NA)	(X)	*6.0*	*89.5*
1930	100.0	95.3	1.4	0.3	3.0	(X)	(NA)	(NA)
1920	100.0	95.3	1.1	0.5	3.1	(X)	(NA)	(NA)
1910	100.0	95.0	0.9	0.7	3.4	(X)	(NA)	(NA)
1900	100.0	94.5	0.7	1.0	3.8	(X)	(NA)	(NA)
1890 [3]	100.0	91.6	0.9	1.4	6.1	(X)	(NA)	(NA)
1890 [4]	100.0	92.0	0.9	1.0	6.1	(X)	(NA)	(NA)
1880	100.0	88.7	0.7	1.9	8.7			
1870	100.0	89.1	0.8	1.3	8.8			
1860	100.0	85.0	1.1	4.7	9.2			
1850	100.0	99.0	1.0	(NA)	(NA)			

	Black		
	Total	Free	Slave
1880	100.0	100.0	-
1870	100.0	100.0	-

Footnotes:

- Rounds to 0.0. (X) Not applicable. (NA) Not available. [1] Hispanic origin based on Spanish language. [2] Hispanic origin based on the White population of Spanish mother tongue. Percentages shown based on sample data prorated to the 100-percent count of the White population and on the 100-percent count of the total population. These estimates are in italics. See Table E-6 and text. [3] Includes Indian reservations. [4] Excludes Indian reservations.

Source: U.S. Census Bureau

Internet Release Date: September 13, 2002

US Census Bureau: www.census.gov/popest/states/NST-ann-est.html

Table 1. Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2000 to July 1, 2009

Geographic Area	Population Estimates										April 1, 2000	
	July 1, 2009	July 1, 2008	July 1, 2007	July 1, 2006	July 1, 2005	July 1, 2004	July 1, 2003	July 1, 2002	July 1, 2001	July 1, 2000	Estimates Base	Census
United States	307,006,550	304,374,846	301,579,895	298,593,212	295,753,151	293,045,739	290,326,418	287,803,914	285,081,556	282,171,957	281,424,602	281,421,906
Northeast	55,283,679	55,060,196	54,879,379	54,710,026	54,598,185	54,514,298	54,364,452	54,167,735	53,930,017	53,667,506	53,594,828	53,594,378
Midwest	66,836,911	66,595,597	66,359,247	66,082,058	65,806,421	65,587,713	65,319,024	65,074,729	64,815,413	64,493,956	64,395,190	64,392,776
South	113,317,879	112,021,022	110,573,419	108,930,843	107,411,036	105,874,018	104,431,612	103,185,017	101,868,637	100,559,939	100,235,832	100,236,820
West	71,568,081	70,698,031	69,767,850	68,870,285	67,937,509	67,069,710	66,211,330	65,376,433	64,467,489	63,450,556	63,198,752	63,197,932
Alabama	4,708,708	4,677,464	4,637,904	4,597,688	4,545,049	4,512,190	4,490,591	4,472,420	4,464,034	4,451,849	4,447,382	4,447,100
Alaska	698,473	688,125	682,297	677,325	669,488	661,569	650,884	642,691	633,316	627,499	626,931	626,932
Arizona	6,595,778	6,499,377	6,362,241	6,192,100	5,974,834	5,759,425	5,591,206	5,452,108	5,304,417	5,166,697	5,130,607	5,130,632
Arkansas	2,889,450	2,867,764	2,842,194	2,815,097	2,776,221	2,746,161	2,722,291	2,704,732	2,691,068	2,678,288	2,673,386	2,673,400
California	36,961,664	36,580,371	36,226,122	35,979,208	35,795,255	35,558,419	35,251,107	34,876,194	34,485,623	33,994,571	33,871,648	33,871,648
Colorado	5,024,748	4,935,213	4,842,259	4,753,044	4,660,780	4,599,681	4,548,775	4,504,265	4,433,068	4,328,070	4,302,015	4,301,261
Connecticut	3,518,288	3,502,932	3,488,633	3,485,162	3,477,416	3,474,610	3,467,673	3,448,382	3,428,433	3,411,726	3,405,607	3,405,565
Delaware	885,122	876,211	864,896	853,022	839,906	826,639	814,905	804,131	794,620	786,411	783,557	783,600
District of Columbia	599,657	590,074	586,409	583,978	582,049	579,796	577,777	579,585	578,042	571,744	572,055	572,059
Florida	18,537,969	18,423,878	18,277,888	18,088,505	17,783,868	17,375,259	16,981,183	16,680,309	16,353,869	16,047,118	15,982,839	15,982,378
Georgia	9,829,211	9,697,838	9,533,761	9,330,086	9,097,428	8,913,676	8,735,259	8,585,535	8,419,594	8,230,161	8,186,781	8,186,453
Hawaii	1,295,178	1,287,481	1,276,832	1,275,599	1,266,117	1,252,782	1,239,298	1,228,069	1,218,305	1,211,566	1,211,538	1,211,537
Idaho	1,545,801	1,527,506	1,499,245	1,464,413	1,425,862	1,391,718	1,364,109	1,342,149	1,321,170	1,299,551	1,293,955	1,293,953
Illinois	12,910,409	12,842,954	12,779,417	12,718,011	12,674,452	12,645,295	12,597,981	12,558,229	12,507,833	12,437,645	12,419,658	12,419,293
Indiana	6,423,113	6,388,309	6,346,113	6,301,700	6,253,120	6,214,454	6,181,789	6,149,007	6,124,967	6,091,649	6,080,520	6,080,485
Iowa	3,007,856	2,993,987	2,978,719	2,964,391	2,949,450	2,941,358	2,932,799	2,929,264	2,929,424	2,928,184	2,926,380	2,926,324
Kansas	2,818,747	2,797,375	2,775,586	2,755,700	2,741,771	2,730,765	2,721,955	2,712,598	2,701,456	2,692,810	2,688,811	2,688,418
Kentucky	4,314,113	4,287,931	4,256,278	4,219,374	4,182,293	4,147,970	4,118,627	4,091,330	4,069,191	4,048,903	4,042,288	4,041,769
Louisiana	4,492,076	4,451,513	4,376,122	4,240,327	4,497,691	4,489,327	4,474,726	4,466,068	4,460,816	4,468,979	4,468,972	4,468,976
Maine	1,318,301	1,319,691	1,317,308	1,314,963	1,311,631	1,308,253	1,303,102	1,293,938	1,284,791	1,277,211	1,274,915	1,274,923
Maryland	5,699,478	5,658,655	5,634,242	5,612,196	5,582,520	5,542,659	5,496,708	5,439,913	5,375,033	5,310,579	5,296,544	5,296,486
Massachusetts	6,593,587	6,543,595	6,499,275	6,466,399	6,453,031	6,451,279	6,451,637	6,440,978	6,411,730	6,363,015	6,349,119	6,349,097
Michigan	9,969,727	10,002,486	10,050,847	10,082,438	10,090,554	10,089,305	10,066,351	10,038,767	10,006,093	9,955,308	9,938,492	9,938,444
Minnesota	5,266,214	5,230,567	5,191,206	5,148,346	5,106,560	5,079,344	5,047,862	5,017,458	4,982,813	4,933,958	4,919,492	4,919,479
Mississippi	2,951,996	2,940,212	2,921,723	2,897,150	2,900,116	2,886,006	2,867,678	2,858,643	2,853,313	2,848,310	2,844,666	2,844,658
Missouri	5,987,580	5,956,335	5,909,824	5,861,572	5,806,639	5,758,444	5,714,847	5,680,852	5,643,986	5,606,065	5,596,684	5,595,211
Montana	974,989	968,035	957,225	946,230	934,801	925,887	916,750	909,868	905,873	903,293	902,190	902,195
Nebraska	1,796,619	1,781,949	1,769,912	1,760,435	1,751,721	1,742,184	1,733,680	1,725,083	1,717,948	1,713,345	1,711,265	1,711,263
Nevada	2,643,085	2,615,772	2,567,752	2,493,405	2,408,804	2,328,703	2,236,949	2,166,214	2,094,509	2,018,211	1,998,260	1,998,257
New Hampshire	1,324,575	1,321,872	1,317,343	1,311,894	1,301,415	1,292,766	1,281,871	1,271,163	1,256,879	1,240,446	1,235,791	1,235,786
New Jersey	8,707,739	8,663,398	8,636,043	8,623,721	8,621,837	8,611,530	8,583,481	8,544,115	8,489,469	8,430,921	8,414,378	8,414,350
New Mexico	2,009,671	1,986,763	1,968,731	1,942,608	1,916,538	1,891,829	1,869,683	1,850,035	1,828,809	1,820,813	1,819,041	1,819,046
New York	19,541,453	19,467,789	19,422,777	19,356,564	19,330,891	19,297,933	19,231,101	19,161,873	19,088,978	18,998,044	18,976,811	18,976,457
North Carolina	9,380,884	9,247,134	9,064,074	8,866,977	8,669,452	8,531,283	8,416,451	8,316,617	8,203,451	8,079,383	8,046,406	8,049,313
North Dakota	646,844	641,421	638,202	636,771	635,365	636,303	632,809	633,617	636,267	641,200	642,195	642,200
Ohio	11,542,645	11,528,072	11,520,815	11,492,495	11,475,262	11,464,593	11,445,180	11,420,981	11,396,874	11,363,844	11,353,150	11,353,140
Oklahoma	3,687,050	3,644,025	3,612,186	3,574,334	3,532,769	3,514,449	3,498,687	3,484,754	3,464,729	3,453,943	3,450,638	3,450,654
Oregon	3,825,657	3,782,991	3,732,957	3,677,545	3,617,869	3,573,505	3,550,180	3,517,111	3,470,382	3,430,891	3,421,437	3,421,399
Pennsylvania	12,604,767	12,566,368	12,522,531	12,471,142	12,418,161	12,388,368	12,357,524	12,326,302	12,299,533	12,285,504	12,281,071	12,281,054
Rhode Island	1,053,209	1,053,502	1,055,009	1,060,196	1,064,989	1,071,414	1,071,504	1,066,034	1,058,051	1,050,736	1,048,315	1,048,319
South Carolina	4,561,242	4,503,280	4,424,232	4,339,399	4,256,199	4,201,306	4,146,474	4,103,934	4,062,701	4,023,570	4,011,832	4,012,012
South Dakota	812,383	804,532	797,035	788,519	780,084	774,283	766,975	762,107	758,983	755,694	754,835	754,844
Tennessee	6,296,254	6,240,456	6,172,862	6,089,453	5,995,748	5,916,762	5,856,522	5,803,306	5,755,443	5,703,243	5,689,276	5,689,283
Texas	24,782,302	24,304,290	23,837,701	23,369,024	22,801,920	22,418,319	22,057,801	21,710,788	21,332,847	20,945,963	20,851,818	20,851,820

Table 1. Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2000 to July 1, 2009

Geographic Area	Population Estimates										April 1, 2000	
	July 1, 2009	July 1, 2008	July 1, 2007	July 1, 2006	July 1, 2005	July 1, 2004	July 1, 2003	July 1, 2002	July 1, 2001	July 1, 2000	Estimates Base	Census
Utah	2,784,572	2,727,343	2,663,796	2,583,724	2,499,637	2,438,915	2,379,938	2,334,473	2,291,250	2,244,314	2,233,204	2,233,169
Vermont	621,760	621,049	620,460	619,985	618,814	618,145	616,559	614,950	612,153	609,903	608,821	608,827
Virginia	7,882,590	7,795,424	7,719,749	7,646,996	7,563,887	7,468,914	7,373,694	7,283,541	7,191,304	7,104,533	7,079,048	7,078,515
Washington	6,664,195	6,566,073	6,464,979	6,372,243	6,261,282	6,184,289	6,113,262	6,056,187	5,987,785	5,911,122	5,894,143	5,894,121
West Virginia	1,819,777	1,814,873	1,811,198	1,807,237	1,803,920	1,803,302	1,802,238	1,799,411	1,798,582	1,806,962	1,808,344	1,808,344
Wisconsin	5,654,774	5,627,610	5,601,571	5,571,680	5,541,443	5,511,385	5,476,796	5,446,766	5,408,769	5,374,254	5,363,708	5,363,675
Wyoming	544,270	532,981	523,414	512,841	506,242	502,988	499,189	497,069	492,982	493,958	493,783	493,782
Puerto Rico	3,967,288	3,954,553	3,941,235	3,926,744	3,910,722	3,893,931	3,876,637	3,858,272	3,837,768	3,814,413	3,808,603	3,808,610

Note: The April 1, 2000 Population Estimates base reflects changes to the Census 2000 population from the Count Question Resolution program and geographic program revisions. See Geographic Terms and Definitions at http://www.census.gov/popest/geographic/ for a list of the states that are included in each region.

Suggested Citation:

Table 1. Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2000 to July 1, 2009 (NST-EST2009-01)

Source: U.S. Census Bureau, Population Division

Release Date: December 2009

DELTA

Our Vision for the California Delta

Our Vision for the California Delta

Arnold Schwarzenegger
Governor of California

Governor's Delta Vision Blue Ribbon Task Force

Philip Isenberg
Chair

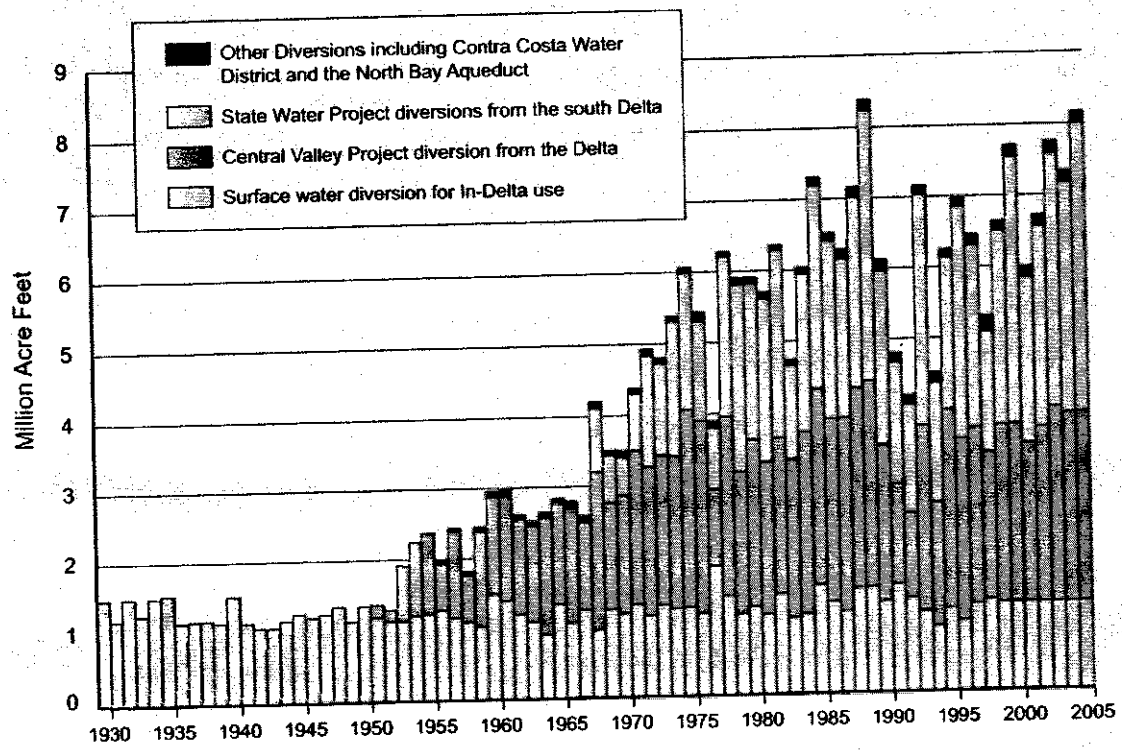
Monica Florian
Richard M. Frank
Thomas McKernan
Sunne Wright McPeak
William K. Reilly
Raymond Seed

January 29, 2008
(Second printing)

and to efficiently move it to areas of need. Building new conveyance alone, without new storage, would seriously compromise the ability to protect the estuary and provide sufficient environmental flows. Storage and conveyance must be coupled in order to operate the system with sufficient flexibility to protect both the environment and economy. The storage and conveyance systems should also meet water quality standards (which are tightening) and also allow operation of legal water markets.

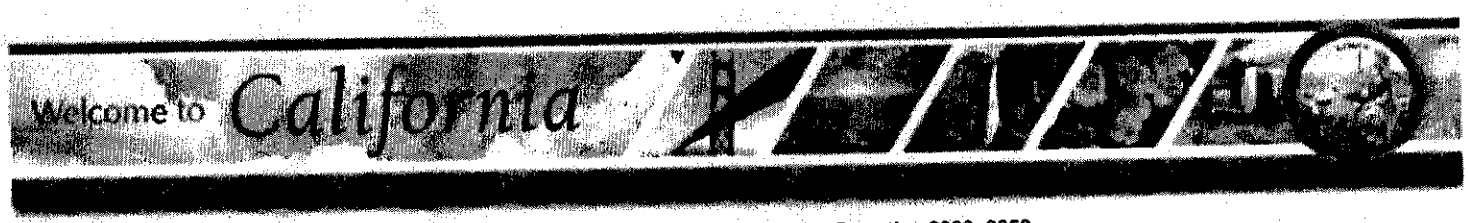
Figure 8 shows how water from the Delta watershed is used both within that watershed, in coastal urban areas, and in the Tulare Basin (where most use is for agriculture). As a result of these conveyance projects, the majority of Californians, in one way or another, use water from the Delta and its watershed. However, it is important also to understand that most water systems in California are local projects and that the State Water Project and the federal Central Valley Project provide modest supplies of the total dedicated water used in the state.

Figure 7a. Historic Diversions from within the Delta



Source: Measured, calculated and modeled from an array of data sources as compiled by Tully & Young, Inc.

Over time, reliance on levees should be reduced.



Population Projections by Race / Ethnicity, Gender and Age for California and Its Counties 2000–2050

July 2007

Acknowledgments

Mary Heim and Melanie Martindale prepared this population projection series. Programming expertise was furnished by Iris Wang.

Suggested Citation

State of California, Department of Finance, *Population Projections for California and Its Counties 2000-2050, by Age, Gender and Race/Ethnicity,* Sacramento, California, July 2007.

Data Sources

The California Department of Health Services provided the vital statistics (births and deaths) used in this projection series. In response to a 2006 survey, planning experts of several counties and Councils of Government contributed assessments of future migration and population for their jurisdictions.

Authority

These population projections were prepared under the mandate of Government Code, Sections 13073 and 13073.5. In addition, the State Administrative Manual, Section 1100 on state plans, sets the general policy of . . . "(3) The use of the same population projections and demographic data that is provided by the State's Demographic Research Unit."

Technical Notes

Basic Method

The Department of Finance uses a baseline cohort-component method to project population by age, gender and race/ethnicity. For this projection series, there are seven mutually exclusive race/ethnic groups: Hispanics and non-Hispanic American Indians, Asians, Blacks, Multirace persons, Pacific Islanders and Whites. A baseline projection assumes people have the right to migrate where they choose and no major natural catastrophes or war will befall the state or the nation. A cohort-component method traces people born in a given year through their lives. As each year passes, cohorts change as specified in the mortality and migration assumptions. New cohorts are formed by applying the fertility assumptions to women of childbearing age.

Special Populations

Special (institutionalized) populations are populations that do not age normally. They are found primarily in prisons, college dorms, and group housing on military installations. These populations tend to remain static in age as people enter and leave the institutions. In counties where special populations represent a significant proportion of a specific race/ethnic group's population, they were removed from the base and projected separately. For prison and military populations, the determination was made based on an examination of sex ratios. Adjustments to college dorm populations were based on an examination of age structure. Forecasts from the

POPULATION PROJECTIONS BY RACE/ETHNICITY, GENDER AND AGE REPORT 06 P-3

CALIFORNIA TOTAL JULY 1, 2020

AGE	TOTAL	MALE	FEMALE
ALL	44,135,923	21,963,727	22,172,196
0-4	3,235,445	1,650,764	1,584,681
5-9	3,053,738	1,558,060	1,495,678
10-14	2,866,240	1,460,099	1,406,141
15-19	2,943,028	1,504,322	1,438,706
20-24	3,010,814	1,562,100	1,448,714
25-29	3,349,629	1,729,601	1,620,028
30-34	3,137,584	1,597,816	1,539,768
35-39	2,824,798	1,423,744	1,401,054
40-44	2,546,490	1,272,439	1,274,051
45-49	2,656,223	1,321,468	1,334,755
50-54	2,781,914	1,392,046	1,389,868
55-59	2,806,527	1,390,347	1,416,180
60-64	2,572,779	1,255,760	1,317,019
65-69	2,125,486	1,010,555	1,114,931
70-74	1,682,052	779,320	902,732
75-79	1,088,692	485,878	602,814
80-84	696,183	293,113	403,070
85+	758,301	276,295	482,006

WHITE JULY 1, 2020

AGE	TOTAL	MALE	FEMALE
ALL	16,508,783	8,199,155	8,309,628
0-4	846,169	431,654	414,515
5-9	846,881	432,000	414,881
10-14	847,083	432,079	415,004
15-19	831,886	425,499	406,387
20-24	905,829	472,076	433,753
25-29	1,011,609	523,699	487,910
30-34	1,058,703	541,914	516,789
35-39	987,519	503,248	484,271
40-44	872,228	438,840	433,388
45-49	976,451	490,064	486,387
50-54	1,143,204	574,775	568,429
55-59	1,308,634	655,409	653,225
60-64	1,312,967	654,268	658,699
65-69	1,151,127	559,576	591,551
70-74	968,423	459,046	509,377
75-79	635,603	289,566	346,037
80-84	391,022	167,098	223,924
85+	413,445	148,344	265,101

HISPANIC JULY 1, 2020

AGE	TOTAL	MALE	FEMALE
ALL	18,261,267	9,234,485	9,026,782
0-4	1,803,346	920,061	883,285
5-9	1,613,377	822,975	790,402
10-14	1,426,597	725,542	701,055
15-19	1,472,605	752,337	720,268
20-24	1,503,438	780,847	722,591
25-29	1,680,436	873,374	807,062
30-34	1,414,263	724,391	689,872
35-39	1,196,930	605,363	591,567
40-44	1,081,440	550,449	530,991
45-49	1,066,100	542,243	523,857
50-54	1,031,377	531,443	499,934
55-59	897,039	452,679	444,360
60-64	706,282	345,582	360,700
65-69	508,912	240,310	268,602
70-74	348,274	158,170	190,104
75-79	217,961	94,126	123,835
80-84	139,942	57,279	82,663
85+	152,948	57,314	95,634

ASIAN JULY 1, 2020

AGE	TOTAL	MALE	FEMALE
ALL	5,527,783	2,651,913	2,875,870
0-4	315,187	160,957	154,230
5-9	327,671	167,520	160,151
10-14	343,352	175,434	167,918
15-19	307,500	156,950	150,550
20-24	312,893	159,828	153,065
25-29	343,425	173,458	169,967
30-34	359,458	179,778	179,680
35-39	381,959	188,021	193,938
40-44	377,706	180,892	196,814
45-49	412,278	194,440	217,838
50-54	394,459	184,355	210,104
55-59	373,577	174,265	199,312
60-64	344,249	157,095	187,154
65-69	300,823	134,677	166,146
70-74	239,935	105,860	134,075
75-79	154,990	67,154	87,836
80-84	111,327	45,780	65,547
85+	126,994	45,449	81,545

PACIFIC ISLANDER JULY 1, 2020

AGE	TOTAL	MALE	FEMALE
ALL	196,576	96,578	99,998
0-4	14,468	7,363	7,105
5-9	14,708	7,507	7,201
10-14	14,535	7,422	7,113
15-19	9,783	5,017	4,766
20-24	11,908	6,169	5,739
25-29	14,362	7,286	7,076
30-34	15,180	7,564	7,616
35-39	15,500	7,651	7,849
40-44	15,074	7,311	7,763
45-49	13,539	6,396	7,143
50-54	12,435	5,815	6,620
55-59	11,715	5,472	6,243
60-64	9,649	4,482	5,167
65-69	7,589	3,383	4,206
70-74	5,922	2,703	3,219
75-79	3,891	1,801	2,090
80-84	2,791	1,340	1,451
85+	3,527	1,896	1,631

BLACK JULY 1, 2020

AGE	TOTAL	MALE	FEMALE
ALL	2,390,459	1,161,813	1,228,646
0-4	167,720	85,501	82,219
5-9	171,376	87,337	84,039
10-14	161,920	82,532	79,388
15-19	137,842	71,026	66,816
20-24	166,728	87,051	79,677
25-29	198,446	100,589	97,857
30-34	199,261	98,564	100,697
35-39	165,930	81,594	84,336
40-44	138,908	65,415	73,493
45-49	130,685	60,629	70,056
50-54	143,327	67,864	75,463
55-59	155,447	73,617	81,830
60-64	142,537	67,179	75,358
65-69	110,501	50,588	59,913
70-74	82,189	36,185	46,004
75-79	50,912	21,406	29,506
80-84	33,629	13,582	20,047
85+	33,101	11,154	21,947

AMERICAN INDIAN JULY 1, 2020

AGE	TOTAL	MALE	FEMALE
ALL	299,599	146,851	152,748
0-4	14,424	7,392	7,032
5-9	15,974	8,184	7,790
10-14	17,023	8,677	8,346
15-19	11,481	5,864	5,617
20-24	20,996	10,800	10,196
25-29	22,737	11,497	11,240
30-34	22,374	11,204	11,170
35-39	21,150	10,507	10,643
40-44	19,738	9,658	10,080
45-49	19,883	9,544	10,339
50-54	21,025	10,257	10,768
55-59	22,270	10,718	11,552
60-64	20,518	9,655	10,863
65-69	16,716	7,824	8,892
70-74	12,802	5,965	6,837
75-79	8,308	3,807	4,501
80-84	5,294	2,353	2,941
85+	6,886	2,945	3,941

MULTIRACE JULY 1, 2020

AGE	TOTAL	MALE	FEMALE
ALL	951,456	472,932	478,524
0-4	74,131	37,836	36,295
5-9	63,751	32,537	31,214
10-14	55,730	28,413	27,317
15-19	171,931	87,629	84,302
20-24	89,022	45,329	43,693
25-29	78,614	39,698	38,916
30-34	68,345	34,401	33,944
35-39	55,810	27,360	28,450
40-44	41,396	19,874	21,522
45-49	37,287	18,152	19,135
50-54	36,087	17,537	18,550
55-59	37,845	18,187	19,658
60-64	36,577	17,499	19,078
65-69	29,818	14,197	15,621
70-74	24,507	11,391	13,116
75-79	17,027	8,018	9,009
80-84	12,178	5,681	6,497
85+	21,400	9,193	12,207

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CALIFORNIA TOTAL JULY 1, 2030

AGE	TOTAL	MALE	FEMALE
ALL	49,240,891	24,418,763	24,822,128
0-4	3,457,447	1,764,070	1,693,377
5-9	3,413,149	1,741,481	1,671,668
10-14	3,338,313	1,701,331	1,636,982
15-19	3,259,554	1,666,639	1,592,915
20-24	3,188,563	1,649,813	1,538,750
25-29	3,231,192	1,665,806	1,565,386
30-34	3,231,018	1,647,571	1,583,447
35-39	3,507,143	1,767,216	1,739,927
40-44	3,201,343	1,596,457	1,604,886
45-49	2,831,238	1,403,771	1,427,467
50-54	2,517,109	1,238,046	1,279,063
55-59	2,582,773	1,265,031	1,317,742
60-64	2,646,732	1,302,041	1,344,691
65-69	2,581,614	1,249,089	1,332,525
70-74	2,248,957	1,059,065	1,189,892
75-79	1,720,016	775,156	944,860
80-84	1,201,571	514,247	687,324
85+	1,083,159	411,933	671,226

WHITE JULY 1, 2030

AGE	TOTAL	MALE	FEMALE
ALL	16,377,652	8,102,467	8,275,185
0-4	790,121	403,084	387,037
5-9	838,601	427,845	410,756
10-14	876,368	447,135	429,233
15-19	896,725	458,743	437,982
20-24	900,671	466,920	433,751
25-29	820,218	422,080	398,138
30-34	884,742	452,310	432,432
35-39	1,032,564	525,420	507,144
40-44	1,069,662	541,406	528,256
45-49	987,905	500,253	487,652
50-54	859,931	430,724	429,207
55-59	940,234	467,863	472,371
60-64	1,073,095	532,379	540,716
65-69	1,181,262	579,486	601,776
70-74	1,117,173	538,017	579,156
75-79	897,573	412,797	484,776
80-84	658,591	286,444	372,147
85+	552,216	209,561	342,655

HISPANIC JULY 1, 2030

AGE	TOTAL	MALE	FEMALE
ALL	22,335,895	11,231,816	11,104,079
0-4	2,050,078	1,045,940	1,004,138
5-9	1,949,444	994,349	955,095
10-14	1,823,032	927,902	895,130
15-19	1,701,931	869,887	832,044
20-24	1,618,927	840,155	778,772
25-29	1,714,092	891,180	822,912
30-34	1,690,770	868,745	822,025
35-39	1,757,061	888,353	868,708
40-44	1,422,558	707,333	715,225
45-49	1,177,309	580,473	596,836
50-54	1,050,365	521,504	528,861
55-59	1,026,511	510,684	515,827
60-64	977,554	493,406	484,148
65-69	827,662	406,359	421,303
70-74	624,618	293,993	330,625
75-79	421,744	189,016	232,728
80-84	259,566	110,010	149,556
85+	242,673	92,527	150,146

ASIAN JULY 1, 2030

AGE	TOTAL	MALE	FEMALE
ALL	6,334,719	3,037,530	3,297,189
0-4	338,129	172,662	165,467
5-9	340,780	174,274	166,506
10-14	353,475	180,810	172,665
15-19	377,882	192,965	184,917
20-24	402,433	204,489	197,944
25-29	360,578	181,073	179,505
30-34	365,337	181,288	184,049
35-39	399,662	196,523	203,139
40-44	406,117	199,496	206,621
45-49	416,180	202,207	213,973
50-54	402,195	190,584	211,611
55-59	425,266	198,657	226,609
60-64	397,001	182,995	214,006
65-69	367,184	167,492	199,692
70-74	328,008	145,001	183,007
75-79	270,176	115,967	154,209
80-84	193,480	80,071	113,409
85+	190,836	70,976	119,860

PACIFIC ISLANDER JULY 1, 2030

AGE	TOTAL	MALE	FEMALE
ALL	246,363	120,569	125,794
0-4	16,108	8,212	7,896
5-9	15,937	8,149	7,788
10-14	16,554	8,456	8,098
15-19	16,936	8,672	8,264
20-24	17,039	8,697	8,342
25-29	13,068	6,600	6,468
30-34	15,963	8,009	7,954
35-39	18,120	8,928	9,192
40-44	17,877	8,745	9,132
45-49	17,172	8,336	8,836
50-54	16,151	7,692	8,459
55-59	14,174	6,539	7,635
60-64	12,639	5,728	6,911
65-69	11,570	5,179	6,391
70-74	9,258	4,170	5,088
75-79	6,887	3,089	3,798
80-84	4,934	2,293	2,641
85+	5,976	3,075	2,901

BLACK JULY 1, 2030

AGE	TOTAL	MALE	FEMALE
ALL	2,475,477	1,197,311	1,278,166
0-4	155,153	79,114	76,039
5-9	164,232	83,734	80,498
10-14	173,413	88,457	84,956
15-19	179,234	92,231	87,003
20-24	171,143	89,675	81,468
25-29	138,106	70,753	67,353
30-34	163,373	81,042	82,331
35-39	195,031	95,383	99,648
40-44	189,210	91,459	97,751
45-49	150,244	72,131	78,113
50-54	122,647	55,861	66,786
55-59	116,030	52,056	63,974
60-64	127,525	59,037	68,488
65-69	134,075	62,000	72,075
70-74	115,105	52,172	62,933
75-79	80,630	34,469	46,161
80-84	52,503	20,933	31,570
85+	47,823	16,804	31,019

AMERICAN INDIAN JULY 1, 2030

AGE	TOTAL	MALE	FEMALE
ALL	350,649	170,795	179,854
0-4	14,177	7,245	6,932
5-9	16,315	8,323	7,992
10-14	19,320	9,819	9,501
15-19	21,187	10,791	10,396
20-24	21,556	11,053	10,503
25-29	14,575	7,338	7,237
30-34	23,448	11,739	11,709
35-39	25,855	12,841	13,014
40-44	26,130	12,857	13,273
45-49	25,057	12,195	12,862
50-54	23,138	11,166	11,972
55-59	22,208	10,593	11,615
60-64	21,923	10,567	11,356
65-69	21,505	10,238	11,267
70-74	18,526	8,558	9,968
75-79	14,267	6,380	7,887
80-84	9,984	4,300	5,684
85+	11,478	4,792	6,686

MULTIRACE JULY 1, 2030

AGE	TOTAL	MALE	FEMALE
ALL	1,120,136	558,275	561,861
0-4	93,681	47,813	45,868
5-9	87,840	44,807	43,033
10-14	76,151	38,752	37,399
15-19	65,659	33,350	32,309
20-24	56,794	28,824	27,970
25-29	170,555	86,782	83,773
30-34	87,385	44,438	42,947
35-39	78,850	39,768	39,082
40-44	69,789	35,161	34,628
45-49	57,371	28,176	29,195
50-54	42,682	20,515	22,167
55-59	38,350	18,639	19,711
60-64	36,995	17,929	19,066
65-69	38,356	18,335	20,021
70-74	36,269	17,154	19,115
75-79	28,739	13,438	15,301
80-84	22,513	10,196	12,317
85+	32,157	14,198	17,959

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CALIFORNIA TOTAL JULY 1, 2040

AGE	TOTAL	MALE	FEMALE
ALL	54,266,115	26,831,403	27,434,712
0-4	3,754,471	1,915,693	1,838,778
5-9	3,620,285	1,847,226	1,773,059
10-14	3,564,302	1,816,937	1,747,365
15-19	3,621,228	1,851,534	1,769,694
20-24	3,662,160	1,891,855	1,770,305
25-29	3,553,924	1,831,498	1,722,426
30-34	3,416,622	1,740,899	1,675,723
35-39	3,399,624	1,712,387	1,687,237
40-44	3,305,454	1,653,487	1,651,967
45-49	3,515,923	1,747,712	1,768,211
50-54	3,169,925	1,559,877	1,610,048
55-59	2,767,017	1,352,444	1,414,573
60-64	2,416,702	1,169,210	1,247,492
65-69	2,408,251	1,153,150	1,255,101
70-74	2,356,709	1,122,345	1,234,364
75-79	2,140,204	986,810	1,153,394
80-84	1,670,904	732,115	938,789
85+	1,922,410	746,224	1,176,186

WHITE JULY 1, 2040

AGE	TOTAL	MALE	FEMALE
ALL	16,033,854	7,898,036	8,135,818
0-4	777,318	396,578	380,740
5-9	781,691	398,871	382,820
10-14	817,636	417,302	400,334
15-19	887,053	453,961	433,092
20-24	933,540	483,709	449,831
25-29	893,579	459,213	434,366
30-34	886,031	450,607	435,424
35-39	845,398	427,559	417,839
40-44	900,355	455,497	444,858
45-49	1,034,691	523,215	511,476
50-54	1,055,540	531,570	523,970
55-59	956,742	480,651	476,091
60-64	813,933	402,484	411,449
65-69	858,881	418,842	440,039
70-74	930,179	446,896	483,283
75-79	946,024	440,639	505,385
80-84	793,196	352,815	440,381
85+	922,067	357,627	564,440

HISPANIC JULY 1, 2040

AGE	TOTAL	MALE	FEMALE
ALL	26,551,422	13,297,993	13,253,429
0-4	2,299,429	1,173,220	1,126,209
5-9	2,164,837	1,104,313	1,060,524
10-14	2,070,721	1,054,497	1,016,224
15-19	2,035,019	1,039,938	995,081
20-24	2,007,376	1,038,359	969,017
25-29	1,936,033	1,005,515	930,518
30-34	1,802,159	927,568	874,591
35-39	1,790,692	908,043	882,649
40-44	1,698,377	851,998	846,379
45-49	1,733,177	861,009	872,168
50-54	1,388,242	676,962	711,280
55-59	1,138,168	550,032	588,136
60-64	1,000,534	486,944	513,590
65-69	953,518	462,556	490,962
70-74	872,388	426,215	446,173
75-79	696,181	326,959	369,222
80-84	476,545	211,702	266,843
85+	486,026	192,163	293,863

ASIAN JULY 1, 2040

AGE	TOTAL	MALE	FEMALE
ALL	7,132,504	3,418,518	3,713,986
0-4	388,886	198,546	190,340
5-9	378,674	193,556	185,118
10-14	377,756	193,138	184,618
15-19	393,233	200,864	192,369
20-24	415,323	211,230	204,093
25-29	434,104	218,457	215,647
30-34	458,680	227,571	231,109
35-39	420,488	205,775	214,713
40-44	414,657	202,192	212,465
45-49	436,013	211,657	224,356
50-54	432,369	209,897	222,472
55-59	431,097	207,234	223,863
60-64	406,455	189,997	216,458
65-69	418,306	191,218	227,088
70-74	378,902	169,324	209,578
75-79	330,833	144,934	185,899
80-84	267,212	111,209	156,003
85+	349,516	131,719	217,797

PACIFIC ISLANDER JULY 1, 2040

AGE	TOTAL	MALE	FEMALE
ALL	294,678	143,924	150,754
0-4	19,461	9,930	9,531
5-9	18,690	9,534	9,156
10-14	17,952	9,157	8,795
15-19	17,886	9,144	8,742
20-24	18,661	9,523	9,138
25-29	19,822	10,061	9,761
30-34	20,914	10,499	10,415
35-39	16,817	8,353	8,464
40-44	18,569	9,196	9,373
45-49	19,685	9,570	10,115
50-54	16,841	9,076	9,765
55-59	17,655	8,412	9,243
60-64	16,189	7,524	8,665
65-69	13,907	6,229	7,678
70-74	11,963	5,272	6,691
75-79	10,264	4,516	5,748
80-84	7,431	3,273	4,158
85+	9,971	4,655	5,316

BLACK JULY 1, 2040

AGE	TOTAL	MALE	FEMALE
ALL	2,573,246	1,240,660	1,332,586
0-4	162,808	83,015	79,793
5-9	162,716	82,975	79,741
10-14	164,056	83,757	80,299
15-19	175,606	90,524	85,082
20-24	185,239	97,157	88,082
25-29	180,828	92,825	88,003
30-34	169,220	84,482	84,738
35-39	137,586	67,157	70,429
40-44	156,803	75,702	81,101
45-49	181,602	86,907	94,695
50-54	173,913	82,164	91,749
55-59	137,276	64,231	73,045
60-64	111,756	49,852	61,904
65-69	103,037	45,345	57,692
70-74	106,710	47,720	58,990
75-79	102,310	44,475	57,835
80-84	77,980	32,284	45,696
85+	83,800	30,088	53,712

AMERICAN INDIAN JULY 1, 2040

AGE	TOTAL	MALE	FEMALE
ALL	395,591	191,737	203,854
0-4	16,010	8,198	7,812
5-9	17,116	8,736	8,380
10-14	18,873	9,572	9,301
15-19	21,378	10,858	10,520
20-24	23,706	12,157	11,549
25-29	24,177	12,261	11,916
30-34	23,912	11,978	11,934
35-39	17,575	8,656	8,919
40-44	27,092	13,364	13,728
45-49	29,656	14,506	15,150
50-54	29,435	14,288	15,147
55-59	27,259	13,099	14,160
60-64	23,990	11,399	12,591
65-69	21,612	10,147	11,465
70-74	19,979	9,445	10,534
75-79	18,499	8,470	10,029
80-84	14,709	6,332	8,377
85+	20,613	8,271	12,342

MULTIRACE JULY 1, 2040

AGE	TOTAL	MALE	FEMALE
ALL	1,284,820	640,535	644,285
0-4	90,559	46,206	44,353
5-9	96,561	49,241	47,320
10-14	97,308	49,514	47,794
15-19	91,053	46,245	44,808
20-24	78,315	39,720	38,595
25-29	65,381	33,166	32,215
30-34	55,706	28,194	27,512
35-39	171,068	86,844	84,224
40-44	89,601	45,538	44,063
45-49	81,099	40,848	40,251
50-54	71,585	35,920	35,665
55-59	58,820	28,785	30,035
60-64	43,845	21,010	22,835
65-69	38,990	18,813	20,177
70-74	36,588	17,473	19,115
75-79	36,093	16,817	19,276
80-84	31,831	14,500	17,331
85+	50,417	21,701	28,716

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CALIFORNIA TOTAL JULY 1, 2050

AGE	TOTAL	MALE	FEMALE
ALL	59,507,876	29,381,371	30,126,505
0-4	4,132,215	2,108,562	2,023,653
5-9	3,996,576	2,039,354	1,957,222
10-14	3,861,303	1,968,551	1,892,752
15-19	3,828,185	1,957,239	1,870,946
20-24	3,888,409	2,007,738	1,880,671
25-29	3,915,548	2,016,293	1,899,255
30-34	3,889,121	1,982,048	1,907,073
35-39	3,721,750	1,877,592	1,844,158
40-44	3,492,980	1,747,972	1,745,008
45-49	3,417,193	1,698,496	1,718,697
50-54	3,281,963	1,621,792	1,660,171
55-59	3,445,736	1,692,532	1,753,204
60-64	3,058,741	1,483,942	1,574,799
65-69	2,603,594	1,246,106	1,357,488
70-74	2,186,015	1,025,511	1,160,504
75-79	2,048,562	938,394	1,110,168
80-84	1,822,037	813,426	1,008,611
85+	2,917,948	1,155,823	1,762,125

WHITE JULY 1, 2050

AGE	TOTAL	MALE	FEMALE
ALL	15,712,119	7,727,702	7,984,417
0-4	794,000	405,175	388,825
5-9	801,451	409,022	392,429
10-14	804,984	410,870	394,114
15-19	830,357	425,123	405,234
20-24	875,224	454,171	421,053
25-29	884,292	454,676	429,616
30-34	919,250	467,601	451,649
35-39	919,105	464,864	454,241
40-44	903,104	454,691	448,413
45-49	852,423	428,487	423,936
50-54	893,103	450,042	443,061
55-59	1,006,929	505,754	501,175
60-64	1,007,387	501,607	505,780
65-69	884,913	436,439	448,474
70-74	716,162	343,623	372,539
75-79	703,839	326,753	377,086
80-84	688,037	306,543	381,494
85+	1,227,559	482,261	745,298

HISPANIC JULY 1, 2050

AGE	TOTAL	MALE	FEMALE
ALL	31,028,375	15,492,673	15,535,702
0-4	2,618,079	1,335,846	1,282,233
5-9	2,465,459	1,257,755	1,207,704
10-14	2,320,190	1,181,847	1,138,343
15-19	2,250,493	1,149,948	1,100,545
20-24	2,255,128	1,165,012	1,090,116
25-29	2,268,557	1,175,123	1,093,434
30-34	2,189,233	1,124,662	1,064,571
35-39	2,012,045	1,021,837	990,208
40-44	1,810,304	911,055	899,249
45-49	1,769,095	882,198	886,897
50-54	1,662,711	820,736	841,975
55-59	1,684,443	824,420	860,023
60-64	1,331,621	638,499	693,122
65-69	1,066,313	503,271	563,042
70-74	903,798	426,258	477,540
75-79	816,294	379,828	436,466
80-84	685,977	316,907	369,070
85+	918,635	377,471	541,164

ASIAN JULY 1, 2050

AGE	TOTAL	MALE	FEMALE
ALL	7,889,183	3,784,476	4,104,707
0-4	423,781	216,355	207,426
5-9	427,925	218,685	209,240
10-14	428,178	218,849	209,329
15-19	430,578	219,874	210,704
20-24	439,194	223,349	215,845
25-29	449,355	226,311	223,044
30-34	471,323	234,212	237,111
35-39	493,439	242,858	250,581
40-44	507,276	248,065	259,211
45-49	456,679	220,875	235,804
50-54	441,081	212,714	228,367
55-59	451,076	216,787	234,289
60-64	436,651	209,189	227,462
65-69	425,363	200,125	225,238
70-74	389,347	176,556	212,791
75-79	378,755	166,630	212,125
80-84	314,231	132,837	181,394
85+	524,951	200,205	324,746

PACIFIC ISLANDER JULY 1, 2050

AGE	TOTAL	MALE	FEMALE
ALL	343,169	167,469	175,700
0-4	21,881	11,164	10,717
5-9	21,714	11,086	10,628
10-14	21,305	10,875	10,430
15-19	20,639	10,529	10,110
20-24	20,059	10,224	9,835
25-29	20,792	10,553	10,239
30-34	22,595	11,379	11,216
35-39	23,610	11,836	11,774
40-44	23,604	11,750	11,854
45-49	18,564	9,131	9,433
50-54	19,674	9,618	10,056
55-59	20,261	9,738	10,523
60-64	18,921	8,951	9,970
65-69	17,282	8,030	9,252
70-74	15,258	6,862	8,396
75-79	12,316	5,317	6,999
80-84	9,523	3,981	5,542
85+	15,171	6,445	8,726

BLACK JULY 1, 2050

AGE	TOTAL	MALE	FEMALE
ALL	2,682,828	1,292,908	1,389,920
0-4	169,016	86,199	82,817
5-9	172,722	88,090	84,632
10-14	171,754	87,678	84,076
15-19	174,170	89,820	84,350
20-24	176,095	92,612	83,483
25-29	177,447	91,279	86,168
30-34	183,447	92,037	91,410
35-39	180,187	89,152	91,035
40-44	163,075	79,397	83,678
45-49	126,322	59,963	66,359
50-54	143,811	67,717	76,094
55-59	168,981	79,222	89,759
60-64	161,705	75,127	86,578
65-69	124,500	57,238	67,262
70-74	96,592	41,854	54,738
75-79	82,388	34,417	47,971
80-84	76,902	31,789	45,113
85+	133,714	49,317	84,397

AMERICAN INDIAN JULY 1, 2050

AGE	TOTAL	MALE	FEMALE
ALL	437,454	210,968	226,486
0-4	17,131	8,760	8,371
5-9	18,845	9,619	9,226
10-14	20,706	10,525	10,181
15-19	22,179	11,271	10,908
20-24	23,259	11,910	11,349
25-29	24,370	12,330	12,040
30-34	26,076	13,096	12,980
35-39	27,168	13,570	13,598
40-44	27,584	13,627	13,957
45-49	21,456	10,371	11,085
50-54	30,422	14,792	15,630
55-59	31,846	15,372	16,474
60-64	30,178	14,419	15,759
65-69	26,634	12,562	14,072
70-74	22,267	10,335	11,932
75-79	19,008	8,631	10,377
80-84	16,306	7,269	9,037
85+	32,019	12,509	19,510

MULTIRACE JULY 1, 2050

AGE	TOTAL	MALE	FEMALE
ALL	1,414,748	705,175	709,573
0-4	88,327	45,063	43,264
5-9	88,460	45,097	43,363
10-14	94,186	47,907	46,279
15-19	99,769	50,674	49,095
20-24	99,450	50,460	48,990
25-29	90,735	46,021	44,714
30-34	77,197	39,061	38,136
35-39	66,196	33,475	32,721
40-44	58,033	29,387	28,646
45-49	172,654	87,471	85,183
50-54	91,161	46,173	44,988
55-59	82,200	41,239	40,961
60-64	72,278	36,150	36,128
65-69	58,589	28,441	30,148
70-74	42,591	20,023	22,568
75-79	35,962	16,818	19,144
80-84	31,061	14,100	16,961
85+	65,899	27,615	38,284

Department of Finance
Demographic Reearch Unit
2007

US Dept. Of Commerce, Bureau of Economic Analysis

The next release date is November 18, 2010.

Gross Domestic Product by State (millions of current dollars)
All industry total
California [06]

1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
68,039	73,727	78,495	84,925	89,897	99,037	106,955	112,298	120,696	133,609	147,718	162,261	178,827	197,872	228,519	261,456	291,892	324,407	365,182	389,932	423,883	483,246	528,012	568,368	620,177	678,774	734,406	786,322	801,193	819,389	833,656	862,481	908,963

SIC industry detail for the years 1987-97 is based on the 1987 Standard Industrial Classification (SIC). Industry detail for the years 1963-86 is based on the 1972 SIC.
(D) Not shown in order to avoid the disclosure of confidential information; estimates are included in higher level totals.
(L) Less than $500,000 in nominal or real GDP by state.
Source: Bureau of Economic Analysis, U.S. Department of Commerce.

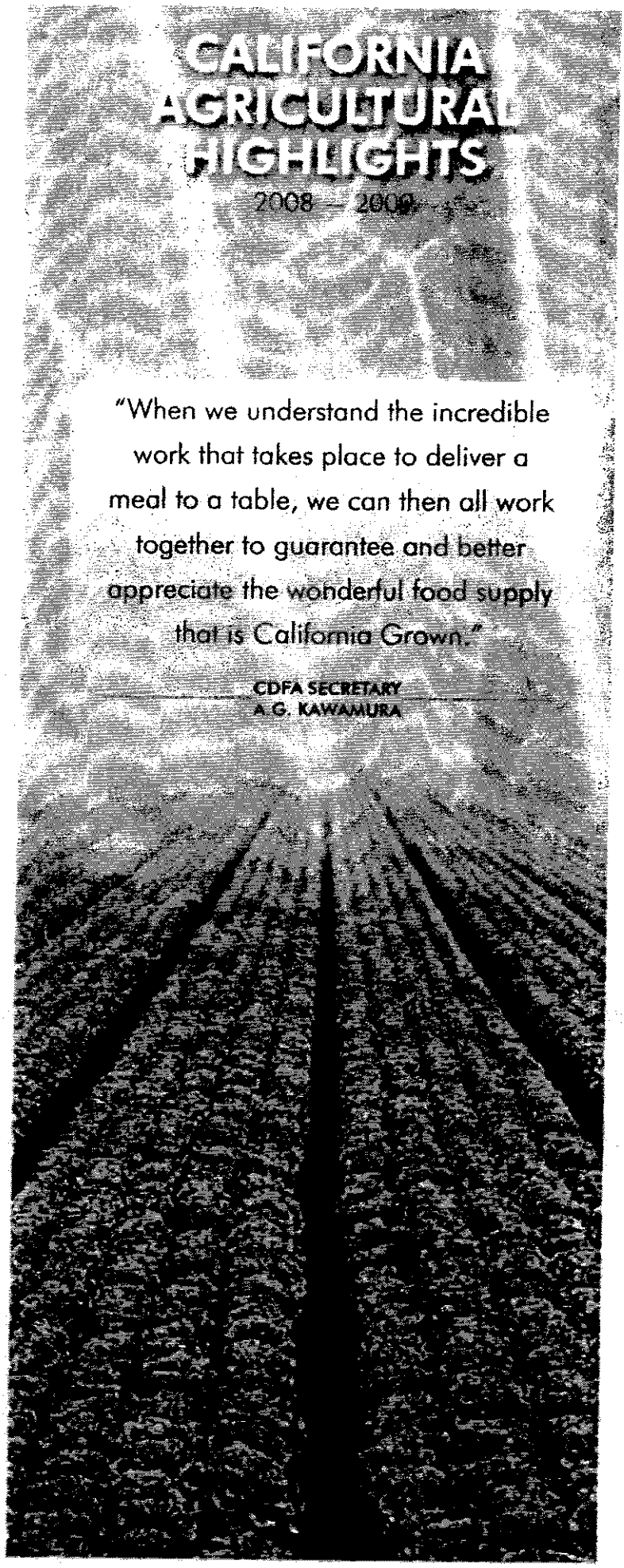
US Dept. of Commerce, Bureau of Economic Analysis

The next release date is November 18, 2010.

Gross Domestic Product by State (millions of current dollars)
All industry total
California [06]

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1,019,150	1,085,884	1,180,590	1,287,145	1,301,050	1,340,446	1,406,511	1,519,443	1,628,599	1,727,599	1,801,762	1,846,757

NAICS Industry detail is based on the 1997 North American Industry Classification System (NAICS).
(D) Not shown in order to avoid the disclosure of confidential information; estimates are included in higher level totals.
(L) Less than $500,000 in nominal or real GDP by state.
Source: Bureau of Economic Analysis, U.S. Department of Commerce.



State of California
Arnold Schwarzenegger, Governor

cdfa

California Department of Food and Agriculture
A.G. Kawamura, Secretary

1220 N Street
Sacramento, CA 95814
Phone (916) 654-0462
www.cdfa.ca.gov
www.cdfa.ca.gov/statistics

2008-2009

CA GROWN

Be Californian. Buy California Grown.

"California's leafy greens growers and handlers came together in March 2007 to create a third-party, government auditing and inspection program that has become a model for the nation. The program has already performed more than 1,000 farm inspections, and the industry has backed that up with millions of dollars in new research that will keep California on the leading edge of food safety."

CDFA SECRETARY
A.G. KAWAMURA

You are invited to read further in this brochure about some of California agriculture's impressive production highlights. In reviewing the numbers, however, it is important to keep in mind that statistics alone do not define the industry. It is also defined by innovators and visionaries: Farmers and ranchers, men and women who seek new and better ways to produce food and fiber of the highest quality and with the greatest care for the environment.

Ensuring a Safe, Affordable and Abundant Food Supply

Today, as fourth- and fifth-generation farming families forge ahead with new agricultural practices and innovations, they are implementing their own unique vision that will ensure a vibrant agricultural economy for our state. This unique blend of tradition and innovation is how California remains the nation's most agriculturally productive state. California now produces more than 400 commodities, and we produced $36.6 billion in direct farm sales in 2007.

For 90 years, the California Department of Food and Agriculture has worked to protect and promote our state's agriculture and provide the highest level of service to the public. The department is proud to fulfill this mission in a manner that encourages farming, ranching and agribusiness, while protecting consumers and our environment.

The California Department of Food and Agriculture has a diverse mission to:

- Ensure that only safe and high-quality food reaches the consumer.
- Protect against invasion of exotic pests and diseases.
- Ensure an equitable and orderly marketplace for California's agricultural products.
- Promote increased consumption of California-grown food and fiber.
- Build coalitions supporting the state's agricultural infrastructure to meet evolving industry needs.

The department provides valuable services to producers, merchants and the public. Many of the services described below are conducted in partnership with local county agricultural commissioner offices:

- Promotes food safety and protects public and animal health.
- Supports the local efforts of nearly 80 fairs statewide.
- Ensures that commodities meet quality and labeling standards.
- Oversees California agricultural marketing programs and 56 promotional boards.
- Certifies devices that weigh or measure commodities so that consumers "get what they paid for."
- Protects California from exotic and invasive plant pests and diseases.

Feeding California and the World

California is a major global supplier of food and agricultural commodities. We produce everything from world-renowned wines to specialty items such as almonds and pomegranates.

For more than 50 years, the men and women who work California's fertile fields have made this state the nation's No. 1 agricultural producer and exporter. If it's for breakfast, lunch, or dinner, it was probably grown right here in California.

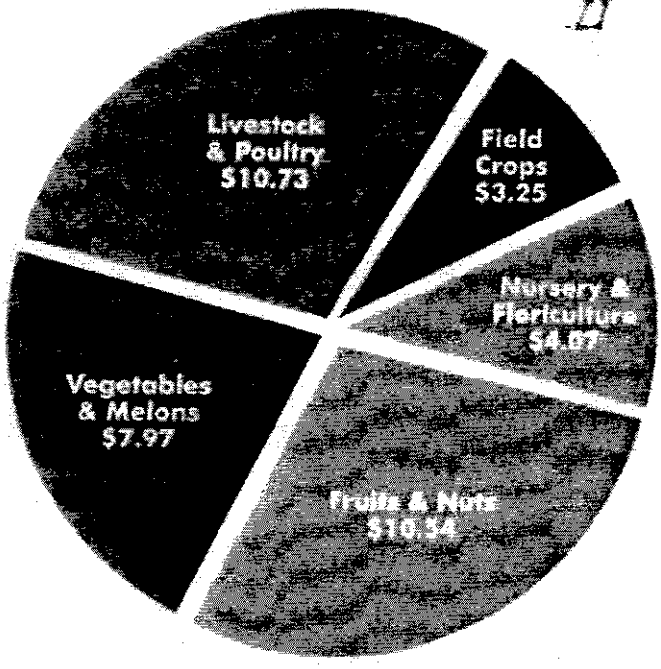
Grown Only in California

California is the nation's sole producer (99 percent or more) of a large number of specialty crops.

- Almonds
- Artichokes
- Clingstone Peaches
- Dried Plums
- Figs
- Olives
- Persimmons
- Pomegranates
- Raisins
- Seed, Ladino Clover
- Sweet Rice
- Walnuts

California's Gross Cash Receipts, 2007

Total: $36.6 Billion
Chart values in millions



The California Agricultural Resource Directory
is available online with more detailed statistics and other information:
www.cdfa.ca.gov/statistics

Specialty Crops Dominate Agricultural Production

California's agricultural sector gained a record 15 percent in the sales value of its products in 2007. Milk remained the No. 1 farm commodity, with a major recovery in 2007 compared to the depressed milk prices from a year earlier. The Golden State retained its ranking as the nation's leading dairy producer by a wide margin, producing 22 percent of the U.S. milk supply.

California's agricultural abundance includes 400 different commodities. Among these, the state produces about half of U.S.-grown fruits, nuts and vegetables.

California has 75,000 farms and ranches — less than 4 percent of the nation's total. Yet, the Golden State's agricultural production represents 12.8 percent of the nation's total value. California's top 20 crop and livestock commodities accounted for more than $30 billion in value. Each of the top 10 commodities exceeded $1 billion in value. A combination of stronger prices and higher production resulted in nine of the top 10 commodities registering an increase in value over 2006.

California's Top 20 Commodities, 2007

	(Millions)
1. Milk and Cream	$7,328
2. Grapes	3,078
3. Nursery and Greenhouse	3,066
4. Lettuce	2,178
5. Almonds	2,127
6. Cattle and Calves	1,784
7. Hay	1,435
8. Strawberries	1,339
9. Tomatoes	1,242
10. Floriculture	1,003
11. Walnuts	754
12. Chickens	713
13. Broccoli	669
14. Cotton	599
15. Rice	583
16. Pistachios	562
17. Oranges	518
18. Lemons	513
19. Carrots	495
20. Celery	401

Global Marketplace

California's agricultural exports reached an all-time high of $10.9 billion in 2007. This represents an 11 percent increase from 2006. In addition, 28 percent of California's agricultural production was shipped to overseas markets.

California exported agricultural products to more than 156 countries worldwide. The 10 top export destinations accounted for 83 percent of the 2007 export value. Three destinations — Canada, European Union (EU-27) and Japan — accounted for nearly 57 percent of the export total.

Even though the primary market for California agricultural production is still the rest of the nation, foreign markets have become more important in recent years. For instance, in 1999 only 16 percent of the state's production was being shipped to overseas markets compared with export gains made during this decade.

It is the quality, freshness and unparalleled flavor of California's food products that makes California's agricultural exports enjoyed around the world. With key international markets in Europe, Asia and North America, California agriculture is a "taste of sunshine" enjoyed by millions.

California's Top 10 Agricultural Export Markets, 2007

Rank/Country	Value *(Millions)*	Leading Exports
1. Canada	$2,222	Lettuce, Strawberries, Table Grapes
2. European Union	2,134	Almonds, Wine, Pistachios
3. Japan	957	Rice, Almonds, Lemons
4. China/Hong Kong	638	Cotton, Almonds, Beef and Products
5. Mexico	643	Dairy and Products, Table Grapes, Cotton
6. South Korea	386	Oranges and Products, Rice, Beef and Products
7. Taiwan	238	Rice, Peaches and Nectarines, Beef and Products
8. India	201	Almonds, Cotton, Table Grapes
9. Australia	150	Table Grapes, Walnuts, Wine
10. United Arab Emirates	126	Almonds, Walnuts, Table Grapes

California's Counties Lead the Nation

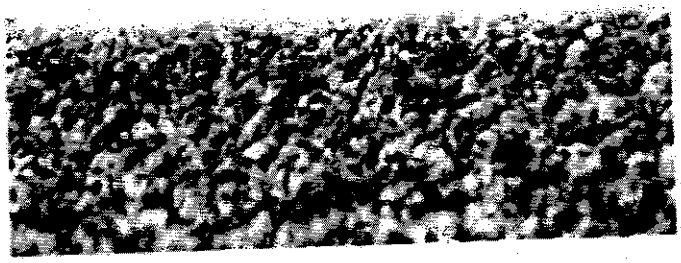
California has some of the most agriculturally productive counties in the nation. Of the top 10 agricultural producing counties nationwide, nine are located in California.

In 2007, Fresno remained the No. 1 county in the nation with $5.35 billion in agricultural value. Fourteen of the state's counties recorded more than $1 billion in agricultural value according to their county agricultural commissioner crop reports.

California's Top 10 Agricultural Counties, 2007

	(Millions)
1. Fresno (Grapes, Almonds, Milk, Poulty, Tomatoes)	$5,345
2. Tulare (Milk,Oranges, Cattle and Calves, Grapes, Alfalfa Hay and Silage)	4,874
3. Kern (Milk, Grapes, Citrus, Almonds and Byproducts, Carrots)	4,092
4. Monterey (Lettuce, Strawberries, Nursery, Broccoli, Grapes)	3,823
5. Merced (Milk, Chickens, Almonds, Cattle and Calves, Tomatoes)	3,002
6. Stanislaus (Milk, Almonds, Chickens, Cattle and Calves, Walnuts)	2,412
7. San Joaquin (Milk, Grapes, Cherries, Almonds, Walnuts)	2,005
8. Kings (Milk, Cotton, Cattle and Calves, Alfalfa, Pistachios)	1,762
9. Ventura (Strawberries, Nursery Stock, Lemons, Celery, Tomatoes)	1,547
10. San Diego (Foliage Plants, Trees and Shrubs, Bedding Plants, Avocados, Tomatoes)	1,536

California has 75,000 farms and ranches — less than 4 percent of the nation's total. Yet, the Golden State's agricultural production represents 12.8 percent of the total U.S. value.



Agricultural Overview

California agriculture saw a decrease in the sales value of its products in 2008, but still received its second highest value on record. The state's 81,500 farms and ranches received $36.2 billion for their output in 2008, down from last year's record high of $36.4 billion.

California remained the nations' leading dairy state, despite ending the year with prices recorded below the cost of production. Dairy producers received $6.92 billion for their milk production during the year, down from $7.34 billion in 2007. The state's dairy farms increased production by only 1.3 percent, lower than the five year average of 3.1 percent. The Golden State continued to produce 22 percent of the milk in the U.S., and ranked number one in the production of fluid milk, butter, ice cream, and nonfat dry milk.

California remained the number one state in cash farm receipts in 2008, with its $36.2 billion in revenue representing 11.2 percent of the U.S. total. The state accounted for 14 percent of national receipts for crops, and 7.5 percent of the U.S. revenue for livestock and livestock products.

California's agricultural abundance includes more than 400 commodities. The state produces nearly half of U.S.-grown fruits, nuts, and vegetables. Across the nation, U.S. consumers regularly purchase several crops produced solely in California.

Top 5 Agricultural States in Cash Receipts, 2008

State	Rank	Total Value *Billion Dollars*
California	1	36.2
Iowa	2	24.8
Texas	3	19.2
Nebraska	4	17.3
Illinois	5	16.4

Notable Increases in California Cash Receipts:

Corn for Grain	161%
Eggs	27%
Garlic	47%
Honey	83%
Oranges, Navel	30%
Plums, Dried	55%
Pumpkins	21%
Tangerines	91%
Winter Wheat	88%
Wool & Mohair	33%

Notable Decreases in California Cash Receipts:

Aquaculture	23%
Asparagus	27%
Boysenberries	55%
Olives	50%
Raspberries	31%
Winter Potatoes	18%

Crop and Livestock Commodities in which California Leads the Nation

Almonds
Apricots
Artichokes
Asparagus
Avocados
Beans, Dry Lima
Beans, Pink
Bedding/Garden Plants
Broccoli
Brussels Sprouts
Cabbage, Chinese
Carrots
Cauliflower
Celery
Chicory
Cotton, American Pima
Daikon
Dates
Eggplant
Escarole/Endive
Figs
Flowers, Bulbs
Flowers, Cut
Flowers, Potted Plants
Garlic
Grapes, Raisins
Grapes, Table
Grapes, Wine
Greens, Mustard
Hay, Alfalfa
Herbs
Kale
Kiwifruit
Kumquats
Lemons
Lettuce, Head
Lettuce, Leaf
Lettuce, Romaine
Limes
Melons, Cantaloupe
Melons, Honeydew
Milk
Milk Goats
Nectarines
Nursery, Bedding Plants
Nursery Crops
Olives
Onions, Dry
Onions, Green
Parsley
Peaches, Clingstone
Peaches, Freestone
Pears, Bartlett
Peas, Chinese
Peppers, Bell
Persimmons
Pigeons and Squabs
Pistachios
Plums
Plums, Dried
Pluots
Pomegranates
Rabbits
Raspberries
Rice, Sweet
Safflower
Seed, Alfalfa
Seed, Bermuda Grass
Seed, Ladino Clover
Seed, Vegetable and Flower
Spinach
Strawberries
Tangelos
Tangerines
Tomatoes, F.M.
Tomatoes, Processing
Vegetables, Greenhouse
Vegetables, Oriental
Walnuts
Wild Rice

California is the sole producer (99 percent or more) of the commodities in **bold**.

Farm Facts

In 2008, 81,500 farms operated in California, less than 4 percent of the national total. Almost 30% of California farms produced commodity sales totaling over $100,000, compared to 16% for the U.S. as a whole. During 2008, California lands devoted to farming and ranching totaled 25.4 million acres, the same as the final number reported for 2007. The average farm size decreased in California, but remained the same for the U.S. as a whole. California farm size decreased from 314 acres to 312 acres, while the U.S. average remained steady at 418 acres.

Top Commodities

California's top 20 crop and livestock commodities accounted for more than $29.6 billion in value for 2008. Eleven commodities exceeded $1.00 billion in value for 2008. Despite higher production costs for many growers, twelve of the 20 commodities registered an increase in value from the previous year. The same was not true for California's leading commodity, Milk and Cream, which decreased by $412 million in value, due to weak demand early in the year and diminished market price. Final grower returns could change the sales value for hay, berries and other commodities, resulting in an updated dollar amount in next year's report.

Leading Counties

California is home to the most productive agricultural counties in the nation. According to the 2007 Census of Agriculture's ranking of market value of agricultural products sold, nine of the Nation's top 10 producing counties are in California.

California's County Agricultural Commissioner reports showed a 2.9 percent increase in the value of their agricultural production for 2008. Fourteen counties reported a value of production in excess of $1.13 billion. Fresno continued as the leading county with an agricultural production value of $5.67 billion, an increase of 6.1 percent from the 2007 value. Tulare County was second in value of production with $5.02 billion, up 3 percent from 2007. Kern showed a decrease of 1.4 percent to $4.03 billion, though it remained the number three county.

Top 20 Commodities for 2006-2008

Commodity	Value and Rank					
	2006		2007		2008	
			$1,000			
Milk and Cream	4,492,229	(1)	7,336,603	(1)	6,924,121	(1)
Grapes, All	2,999,958	(2)	3,075,614	(2)	2,937,838	(2)
Almonds (shelled)	2,258,790	(4)	2,401,875	(4)	2,343,200	(3)
Nursery Products	2,890,497	(3)	2,961,891	(3)	2,273,500	(4)
Cattle and Calves	1,673,050	(6)	1,784,101	(5)	1,822,856	(5)
Hay, Alfalfa and Other	1,053,512	(9)	1,405,800	(8)	1,797,032	(6)
Lettuce, All	1,724,158	(5)	1,697,278	(6)	1,580,831	(7)
Berries, All Strawberries	1,199,341	(7)	1,410,652	(7)	1,578,175	(8)
Tomatoes, All	1,165,922	(8)	1,223,435	(9)	1,317,321	(9)
Rice	520,520	(15)	707,681	(13)	1,183,325	(10)
Flowers and Foliage	999,420	(10)	1,036,266	(10)	1,015,394	(11)
Chickens, All	629,619	(12)	713,218	(12)	787,679	(12)
Broccoli	580,844	(13)	626,325	(14)	663,319	(13)
Oranges, All	633,345	(11)	518,496	(15)	608,682	(14)
Pistachio	449,820	(16)	586,560	(17)	569,900	(15)
Walnuts	563,980	(14)	751,120	(11)	558,080	(16)
Carrots, All	431,225	(17)	461,976	(19)	517,663	(17)
Lemons	374,737	(19)	394,280	(18)	473,546	(18)
Eggs, Chicken	223,903	(27)	346,426	(21)	440,730	(19)
Celery	330,534	(21)	395,667	(20)	354,979	(20)

Top 10 Agricultural Counties

County	Total Value and Rank				Leading Commodities
	2007		2008		
	$1,000				
Fresno	5,345,352	(1)	5,669,527	(1)	Grapes, Almonds, Poultry, Milk, Tomatoes
Tulare	4,873,743	(2)	5,017,955	(2)	Milk, Oranges, Cattle and Calves, Grapes, Alfalfa Hay & Silage
Kern	4,092,088	(4)	4,032,830	(3)	Milk, Grapes, Citrus, Almonds and By-Products, Carrots
Monterey	3,823,287	(3)	3,829,123	(4)	Leaf and Head Lettuce, Strawberries, Nursery, Broccoli, Grapes
Merced	3,001,667	(5)	2,972,698	(5)	Milk, Chickens, Almonds, Cattle and Calves, Potatoes
Stanislaus	2,412,339	(6)	2,463,787	(6)	Milk, Almonds, Chickens, Cattle and Calves, Silage
San Joaquin	2,005,185	(7)	2,129,812	(7)	Milk, Grapes, Walnuts, Cherries, Almond Meats
Kings	1,761,852	(8)	1,760,168	(8)	Milk, Cotton, Cattle and Calves, Alfalfa, Tomatoes
Imperial	1,386,584	(11)	1,684,522	(9)	Cattle, Alfalfa, Wheat, Head and Leaf Lettuce, Broccoli
Ventura	1,547,263	(9)	1,611,091	(10)	Strawberries, Nursery Stock, Lemons, Celery, Raspberries

Source: Summary of California County Agricultural Commissioners' Reports, 2007-2008.

3. Productivity and Diversity of California Agriculture

Central Valley Agriculture: High Productivity and Diversity

Why Is This Important?

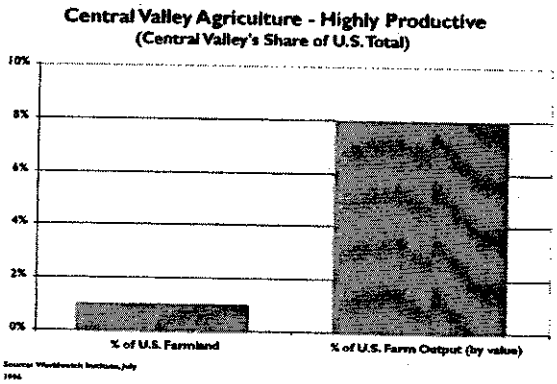
Compared to many agricultural regions, the Central Valley is not large. Some 400 miles long and averaging only 50 miles in width, it contains less than 1 percent of U.S. farmland. Thus, what it lacks in size, it must make up for in productivity. High levels of productivity will be especially critical as urban development continues in the Central Valley, bringing with it the conversion of important farmland to urban and built-up land.

The Central Valley and California are a vital source of food and fiber not only for the U.S., but for the rest of the world. Diversity of output means that the state is not dependent on a small number of crops (e.g., wheat or soybeans) whose prices may drop precipitously in any year due to temporary over-supply. Diversity of output also makes it more feasible to sell to a variety of foreign markets. In this way, California farmers are less likely to be devastated by economic problems in one part of the world.

How Are We Doing?

The Central Valley is an immensely productive agricultural area. On less than one percent of U.S. farmland, it supplies 8 percent of U.S. agricultural output (by value).

In spite of an ongoing loss in total cropland to urbanization, California's farmers have continued to increase the value of the state's agricultural output. The value of output in 1997 was 6% higher than a year before, and that of 1996 was 7% higher than that of 1995. (Sixty percent of this output was from the Central Valley in 1997.) California farmers have been able to raise the value of output on less total cropland by shifting from "extensive" crops such as barley, oats, and sugar beets to higher-value fruits, nuts, vegetables and ornamental horticultural crops.



The diversity of California's agricultural output and of its foreign markets is shown on pages 41 and 42. It is noteworthy that three out of the four most popular agricultural products sold in Europe — almonds, prunes, and raisins — are grown exclusively (99% or more) in California. Exports constitute about 20% of California's agricultural output. (Note: In addition to exports to other nations, California "exports" heavily to other states of the United States, e.g., lettuce to Ohio.)

California: An Agricultural Cornucopia

California's Top 10 Export Markets
(Value of Principal Exports[1]; Dollars in Millions)

Rank	Country	1997	1996	Leading Exports
1.	Japan	$1,307	$1,396	Cotton, Cattle & Calves, Hay
2.	Canada	$964	$857	Table Grapes, Oranges, Lettuce
3.	Hong Kong	$358	$265	Table Grapes, Oranges, Pistachios
4.	South Korea	$365	$262	Cotton, Cattle & Calves, Dairy
5.	Germany	$297	$340	Almonds, Wine, Prunes
6.	United Kingdom	$240	$228	Wine, Almonds, Raisins
7.	Taiwan	$207	$186	Cotton, Peaches/Nectarines, Plums
8.	China	$188	$189	Cotton, Tomatoes (Processed), Dairy
9.	Indonesia	$124	$142	Cotton, Dairy, Table Grapes
10.	Mexico	$118	$81	Table Grapes, Dairy, Peaches/Nectarines

Source: California Department of Food and Agriculture

[1] Reflects the principal commodities; the dollar values do not include all exports to these markets.

VI. Agricultural Indicators

California's Top 20 Farm Products for 1997
(Dollars in Millions)

Rank	Commodity	1997	1996	1995
	Total Production and Income	*$26.8 billion*	*$25.3 billion*	*$23.6 billion*
1.	Milk and Cream	$3,626	$3,714	$3,080
2.	Grapes	$2,819	$2,192	$1,862
3.	Nursery Products	$1,758	$1,661	$1,485
4.	Cattle and Calves	$1,323	$1,118	$1,290
5.	Lettuce	$1,251	$1,040	$1,454
6.	Almonds	$1,127	$1,018	$881
7.	Hay	$1,037	$841	$780
8.	Cotton Lint	$984	$1,070	$1,047
9.	Tomatoes	$870	$924	$853
10.	Flowers & Foliage	$729	$652	$673
11.	Strawberries	$686	$585	$611
12.	Oranges	$587	$489	$473
13.	Chickens	$473	$458	$384
14.	Broccoli	$449	$382	$366
15.	Walnuts	$352	$327	$328
16.	Rice	$347	$296	$311
17.	Carrots	$345	$278	$274
18.	Eggs, Chicken	$345	$367	$288
19.	Lemons	$266	$210	$226
20.	Garlic	$262	$196	$141

Source: California Department of Food and Agriculture

California's Principal Agricultural Exports for 1997
(Dollars in Millions)

Rank	Commodity	1997	1996	1995
1.	Cotton, Lint	$931.3	$1,078.5	$974.6
2.	Almonds	$818.3	$1,015.9	$780.5
3.	Wine	$374.9	$286.9	$209.9
4.	Table Grapes	$330.8	$289.2	$264.6
5.	Oranges	$307.4	$267.9	$291.5
6.	Cattle & Calves	$262.0	$278.8	$334.7
7.	Tomatoes, Processing	$226.3	$202.8	$196.4
8.	Dairy	$212.6	$135.1	$127.8
9.	Raisins	$199.8	$208.6	$197.6
10.	Walnuts	$153.0	$201.4	$177.2
11.	Rice	$144.4	$145.9	$146.1
12.	Hay	$141.2	$109.0	$112.4
13.	Prunes	$139.2	$139.1	$139.3
14.	Lettuce	$120.8	$109.7	$122.5
15.	Strawberries	$116.5	$110.6	$111.8
16.	Pistachios	$113.4	$85.6	$86.6
17.	Lemons	$110.1	$110.2	$116.9
18.	Peaches/Nectarines	$103.3	$89.8	$55.7
19.	Broccoli	$87.9	$79.8	$82.3
20.	Plums	$55.6	$55.8	$40.4

Source: California Department of Food and Agriculture

1. California produces 350 different crops and commodities. Products exclusively (99% or more) grown in California include: almonds, artichokes, dates, figs, kiwifruit, olives, persimmons, pistachios, prunes, raisins, and walnuts. Additionally, the state accounts for 90 percent or more of all the U.S. apricots, grapes, and avocados.

2. California produces more than half the nation's fruits, nuts, and vegetables including three-quarters of the lettuce crop. In 1997, California produced nearly 39 million tons of fruits, nuts, and vegetables.

3. California agriculture is among the most diversified in the world, with no one crop dominating. Only two products exceed 10% of the total value of the state's agricultural output.

ASSESSING THE REGION VIA INDICATORS

The Economy

(Third Edition)

THE STATE OF THE GREAT CENTRAL VALLEY OF CALIFORNIA

Supporting the economic, social, and environmental well-being of California's Great Central Valley

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ABOUT THE GREAT VALLEY CENTER

Founded in 1997, the Great Valley Center is a nonprofit organization working in partnership with the University of California, Merced to support the economic, social and environmental well-being of California's Great Central Valley.

WE WELCOME YOUR COMMENTS

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AGRICULTURE

Agriculture remains the economic base of the Central Valley, the most productive agricultural region in the county and a critical part of the state's economy and the nation's food supply.

- If the Central Valley were a state, it would be ranked first in the nation in agricultural production.
- Agriculture provides more than 10% of jobs in the Central Valley. Five years ago it was twice that rate (20%).
- Seven of the top eight agriculture-producing counties in California are located in the Central Valley.
- Between 2000 and 2006, 4.9% (or 35,488 acres) of the Central Valley's prime agricultural land was converted to urban uses.

Planning for Vibrant Agriculture

By Karen Ross

President, California Association of Winegrape Growers
Member, State Board of Food and Agriculture

Our world is in constant flux. New technologies, pressing demands, limited resources, evolving contradictions and constantly changing markets are today's norm. Amid these changes, agriculture is being profoundly affected and that has implications for the economy and culture of the Central Valley and the citizens of our state.

California leads the nation in agricultural production valued at over $38 billion annually. More than three-fifths (63%) of that value comes from the 19 counties of the Great Central Valley, home of world-class soils, a climate for growing anything and innovative, resourceful farmers. California agriculture is a strategic asset providing for one of the fundamental needs of society — a safe, secure, and affordable food supply.

Growers today are expected to not only stay ahead of change but, in many cases, to anticipate it years in advance and react appropriately. Where nature used to be the growers' great unknown, today it's a myriad of decisions and actions by consumers and policy makers far from the farm gate that dictate success and failure.

Given these unpredictable and overwhelming pressures, it would be easy to hunker down and take a defensive position. But success in today's complex and inter-linked world economy demands inclusion of many parties and many voices. Under the leadership of California's Agriculture Secretary A.G. Kawamura, and the State Board of Food and Agriculture, a bold step to face that actuality has been initiated with California Ag Vision 2030.

Ag Vision is a strategic planning process that is a vital demonstration of agriculture's ability to step out of its comfort zone and react to a rapidly changing environment. By drawing on the input of disparate groups inside and outside production agriculture, Ag Vision hopes to create a 20-year plan that will be used to guide policy, budgetary and regulatory decisions. It should inform public policy and industry practices with an eye to environmental stewardship and public health that ensures a vibrant future for California with a thriving agriculture and food production system.

Our future is intrinsically tied to our consumers, our neighbors and the political interests that shape California. Accordingly, the individuals involved in Ag Vision understand this reality. Utilizing an open planning approach, we are courageously stating status quo is not an option.

With so few in the state actively engaged in farming, the lack of consumer understanding of agriculture has been well chronicled. Without that knowledge, it isn't surprising that non-farm citizens view agriculture's concerns as unrelated to their own. Yet conflicting demands from population growth, land use and natural resources are impacting our food production system. If the value of agriculture is not recognized, it is easy to view ag issues — like water availability or invasive pest control — as competitive to your own interests.

And while we may decry the lack of understanding that urban and non-farm populations have of agriculture, we have to ask: How much effort do we expend to fully understand and empathize with their issues and concerns? Are we as detached as we complain our non-farm neighbors are?

Ag Vision strives to reduce the level of disconnect between all sides. By bringing non-traditional stakeholders together to discuss agriculture and food

production from varying perspectives, we believe we have the best chance to hammer out approaches that will provide long-term support for California's food and fiber system.

When Ag Vision stakeholders started meeting in the midst of California's water and budget crisis, some may have questioned the timing. Frankly, I think it helped cement the need for bold, non-traditional thinking. It allowed us to seriously consider the role agriculture and food production plays as an economic engine. The Ag Vision planners are dedicated to recasting agriculture as a strategic resource for this state — a source of food security, employment opportunities tied to emerging science and technology, and a provider of environmental services. As California struggles to pull out of its fiscal dilemma, we are intent on not only highlighting agriculture's amazing bounty but also making sure the dots are connected between our communities of greatest need to ensure all of our citizens are well-fed and nourished.

If the value of agriculture is not recognized, it is easy to view ag issues as competitive to your own interest.

This inclusive process aims to develop a dynamic roadmap reflective of the complex challenges before us and the varied interests that have a stake in overcoming them. The three guiding Ag Vision principles are:

- **Better Health and Well-Being:** Priority is set not only on delivering the safest, highest quality food and fiber while protecting California's natural resources, but also on ensuring that all Californians have access to healthy foods and understand how that food is grown and prepared for their table.

- **A Healthier Planet:** The symbiotic nature of agriculture and the environment is established in this theme with a renewed commitment not only to be good stewards of the land but also for agriculture to play a consistent and dominant role in helping the state address water, climate, energy and air issues. A key element of this principle is to ensure that agricultural resources are preserved and supported by regulators and governments in their attempts to achieve these objectives.

- **Thriving Communities:** Because food production is a driver of sustainable economic growth, this principle aims to unleash agriculture and food production to grow and diversify while being supported with research and a trained, well-educated, stable workforce.

With these guiding priorities, the diverse Ag Vision participants are hammering out a series of strategies. Some deal with perennial and traditional challenges like water and land use, while others are looking to a bigger, and as yet undefined, role for agriculture in California's future. By sitting at the table with advocates representing urban, environmental, labor, shipping, investment and hunger issues, agriculture has stepped up to a higher plateau, searching for common ground that not only allows it to survive into the future but to once again be a dominant factor in the environmental, social and cultural fabric of the state.

The end result of the Ag Vision effort will be a concrete document that guides policymakers, agriculture and affiliated interests in harnessing the power of California's largest industry. The report will set the stage for future public investments. With a belief that agriculture in our state should be a leader—a positive entity whose impact stretches beyond the traditional role of delivering quality, affordable, safe products to the market—California agriculture will be out front on evolving issues, lending its expertise, counsel and resources to reinstitute California as a viable, stronger state.

We believe we are positioning agriculture as an integral player in a host of state issues. We can show our impact to California citizens, politicians and our new partners in a myriad of ways. We can help all of these influential audiences reconnect with our work and understand its importance and value. With added prestige, we can anticipate a warmer reception to those issues that dictate our viability—things like regulation, labor, water and pest control. We are casting our role as leading actors in the economic, environmental and well-being of all Californians, while constantly working to build a vibrant future for California agriculture. §

FARM EMPLOYMENT AND WAGES

The number of agricultural jobs as a percentage of total employment varies by subregion.

Definition:

This indicator measures the impact of agriculture on employment in the Central Valley and wages for farm workers. In this case, "farm" and "agriculture" are used interchangeably.

Why is it important?

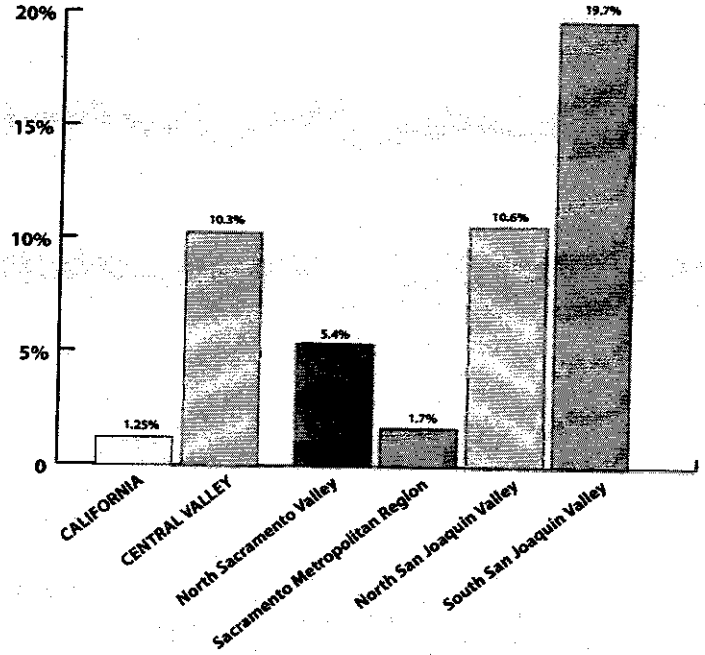
Agriculture provides jobs directly through farming operations. It also generates jobs in related industries such as food processing, transportation, equipment sales, and other vertically integrated production processes.

How are we doing?

Agriculture in the Central Valley provides more than 10 percent of all jobs. Contrary to the majority of California, the economy of the Central Valley relies heavily on agricultural based jobs. The Central Valley's least agricultural job dependent subregion is the Sacramento Metropolitan sub region being only 1.7 percent of all jobs, however that is still higher than the California average of 1.25 percent. South San Joaquin Valley is the most heavily dependent on agricultural jobs consisting of nearly 20 percent of all jobs in the region. The North San Joaquin Valley is closer to the Central Valley average at 10.6 percent. This further reinforces the Central Valley's dependence upon agriculture.

Wages in agricultural jobs vary considerably by region ranging from just over $9 per hour to more than $14 per hour. The average hourly wage in agriculture in the Central Valley is $10.82, a dollar above the California state average of $9.83. The highest salary for agricultural jobs is found in the North Valley with an average of $14.04 per hour.

AGRICULTURAL JOBS AS A PERCENTAGE OF TOTAL JOBS
2008



Source: State of California, Employment Development Department, Labor Market Information Division

MEAN FARM WAGE
2008

Region	Hourly	Annual
North Sacramento Valley	$14.04	$29,203
Sacramento Metropolitan Region	$10.43	$21,694
North San Joaquin Valley	$9.66	$20,093
South San Joaquin Valley	$9.16	$19,053
Central Valley	$10.82	$22,506
California	$9.83	$20,446

Source: State of California, Employment Development Department, Labor Market Information Division

VALUE OF AGRICULTURAL PRODUCTION

The Central Valley is becoming more indispensable to the state's total agricultural production.

Definition:

This indicator measures the annual market value of agricultural products grown in California and the Central Valley. The annual market value is the U.S. Department of Agriculture estimate of the value of the crop, whether or not it is sold on the market.

Why is it important?

Agriculture plays a vital role in California's economy, with a gross value of more than $36 billion in 2007. Agriculture contributes positively to the U.S. balance of trade payments.

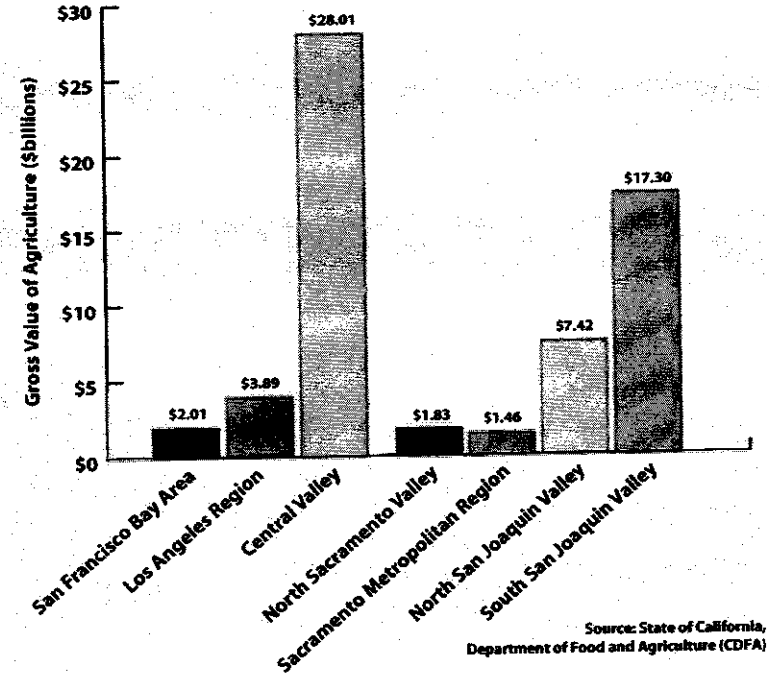
How are we doing?

In 2002 the Central Valley provided 57 percent of California's agricultural production. In 2007 the state's gross cash receipts for agricultural products was $36.6 billion, of which the Central Valley provided 76.5 percent of all the agricultural production in California, an increase of nearly 20 percent from the previous five years.

Within the Central Valley, the San Joaquin Valley leads in agricultural production. In 2007, the San Joaquin Valley accounted for 88% of the Central Valley's agricultural output, compared with 6.5 percent for the North Sacramento Valley and over 5 percent for the Sacramento Metropolitan Region. From 2002 to 2008 these percentages scarcely changed.

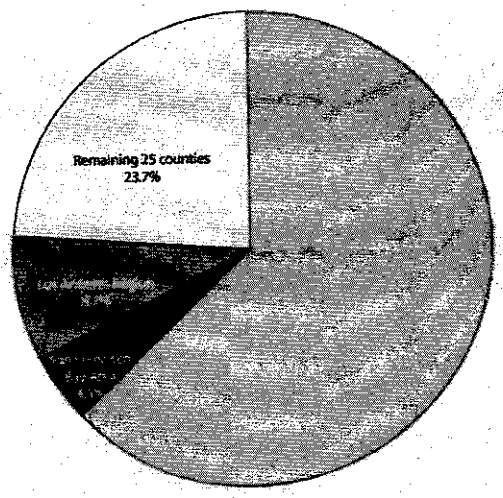
The agricultural production in the Central Valley is primarily focused throughout the entire San Joaquin Valley. The South San Joaquin Valley's production value alone is worth over $17 billion which is 62 percent of the total output from the Central Valley and 47 percent of the total gross value of agricultural output from California. The North San Joaquin Valley is still responsible for over 20 percent of the state's total.

VALUE OF AGRICULTURAL PRODUCTION
2007



Source: State of California, Department of Food and Agriculture (CDFA)

VALUE OF AGRICULTURAL PRODUCTION, CALIFORNIA TOTAL
2007



Source: State of California, Department of Food and Agriculture (CDFA)

AGRICULTURAL OUTPUT RANKING

California, and the Central Valley, are the nation's leading agricultural areas.

Definition:

This indicator compares the dollar value of agricultural output of California with the rest of the country. It also compares the agricultural output of the Central Valley with the rest of California.

Why is it important?

Agriculture is a major component of the economy of the Central Valley and California. Domestically-grown food provides the country with food security.

How are we doing?

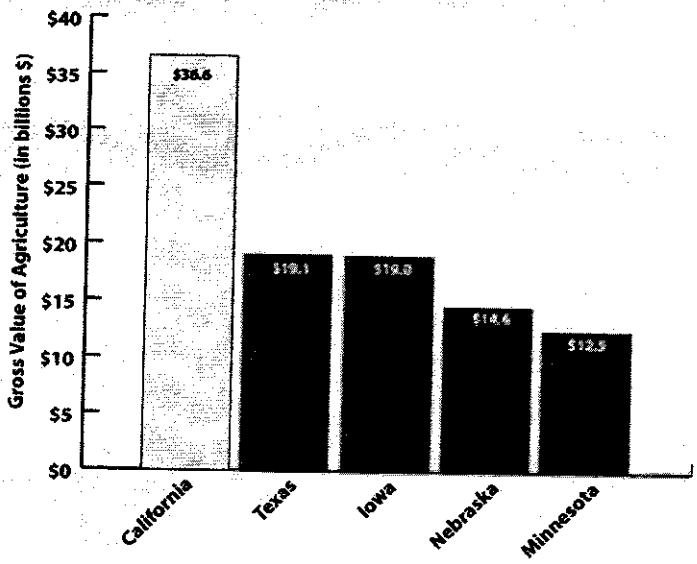
The state of California is by far the most agriculturally productive state in the country, producing over 12 percent of the entire national agricultural output. California surpasses Texas, the second highest agriculturally productive state, by almost 92 percent.

California grows over half the United States' fruits, nuts, and vegetables and produces more than 400 different crops and commodities. The state leads the nation in the production of over 70 crops and also leads in agricultural exports, shipping over $10.9 billion in products around the globe. Canada is the number one recipient of Californian produce, followed by the European Union and Japan.

Six of California's top seven agriculturally producing counties are located in the Central Valley, with the exception of Monterey County, located just south of the San Francisco Bay Area in the Central Coast subregion. If the Central Valley were its own independent state, it would easily rank highest in agricultural production by nearly 47 percent more than Texas.

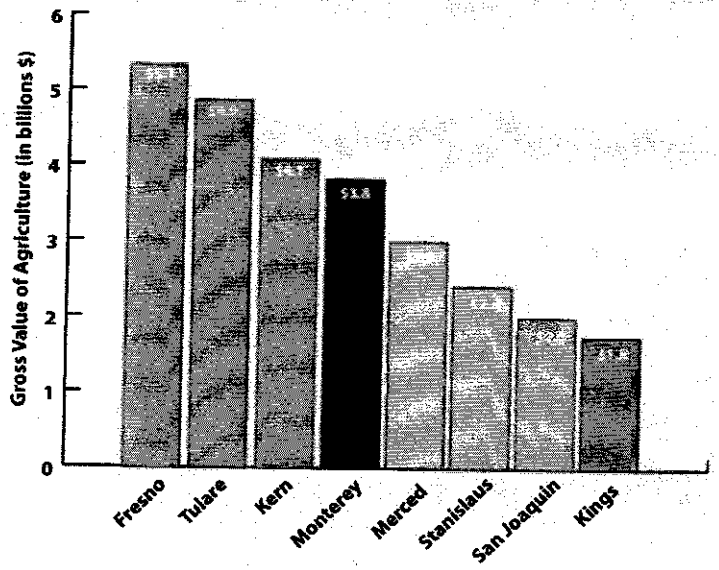
In California, the Central Valley generated over 63 percent of the state's agricultural output in 2007. Compared to the Central Coast, for example, the Central Valley has a smaller total economy, so agriculture in the region directly accounts for a much greater share of the Central Valley economy (UC Agricultural Issues Center, 2009).

REVENUES FROM THE TOP 5 AGRICULTURAL STATES IN THE U.S. 2007



Source: State of California, Department of Food and Agriculture

REVENUES FROM THE TOP 8 AGRICULTURAL COUNTIES IN CALIFORNIA 2007



Source: State of California, Department of Food and Agriculture

LEADING COMMODITIES OF CALIFORNIA'S TOP 10 AGRICULTURAL COUNTIES
2007

Rank	County	Leading Commodities
1	Fresno	Grapes, Almonds, Milk, Poultry, Tomatoes
2	Tulare	Milk, Oranges, Cattle & Calves, Grapes, Alfalfa Hay & Silage
3	Kern	Milk, Grapes, Citrus, Almonds & Byproducts, Carrots
4	Monterey	Lettuce, Strawberries, Nursery, Broccoli, Grapes
5	Merced	Milk, Chicken, Almonds, Cattle & Calves, Tomatoes
6	Stanislaus	Milk, Almonds, Chickens, Cattle & Calves, Walnuts
7	San Joaquin	Milk, Grapes, Cherries, Almonds, Walnuts
8	Kings	Milk, Cotton, Cattle & Calves, Alfalfa, Pistachios
9	Ventura	Strawberries, Nursery Stock, Lemons, Celery, Tomatoes
10	San Diego	Foliage Plants, Trees & Shrubs, Bedding Plants, Avocados, Tomatoes

CALIFORNIA'S TOP 20 COMMODITIES
2007

Rank	Commodity	Value (millions of dollars)
1	Milk and Cream	$7,328
2	Grapes, All	$3,078
3	Nursery & Greenhouse Products	$3,066
4	Lettuce, All	$2,178
5	Almonds	$2,127
6	Cattle & Calves	$1,784
7	Hay, All	$1,435
8	Strawberries, All	$1,339
9	Tomatoes, All	$1,242
10	Floriculture	$1,003
11	Walnuts	$754
12	Chickens, All	$713
13	Broccoli	$669
14	Cotton, All	$599
15	Rice	$583
16	Pistachios	$562
17	Oranges, All	$518
18	Lemons	$513
19	Carrots, All	$495
20	Celery	$401

CALIFORNIA'S TOP 20 AGRICULTURAL EXPORTS
2006-2007

Rank	Commodity	Value (Millions of dollars)
1	Almonds	$1,879
2	Dairy and Products	$963
3	Wine	$816
4	Table Grapes	$553
5	Cotton	$505
6	Walnuts	$444
7	Pistachios	$364
8	Rice	$313
9	Tomatoes, Processed	$300
10	Strawberries	$297
11	Lettuce	$274
12	Oranges and Products	$260
13	Raisins	$213
14	Beef and Products	$199
15	Dried Plums	$175
16	Lemons	$169
17	Peaches and Nectarines	$147
18	Hay	$134
19	Broccoli	$119
20	Carrots	$100

Source: State of California, Department of Food and Agriculture, California Agricultural Resource Directory, 2008-2009

AGRICULTURAL LAND CONVERSION

Nearly 28 percent of land in the Central Valley converted to urban and built-up land between 2000 and 2006 was prime farmland.

Definition:

This indicator measures the changes in land use to urban and built-up land in the Central Valley from 2000 to 2006, emphasizing changes in prime farmland. As defined by the California Department of Conservation urban and built-up land is land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. Prime farmland is defined as farmland with the best combination of physical and chemical features able to sustain long term agricultural production.

Why is it important?

Prime farmland is the highest quality agricultural land available and is considered a limited resource. The conversion of prime farmland to urban development is of particular significance to the Central Valley's agricultural economic base.

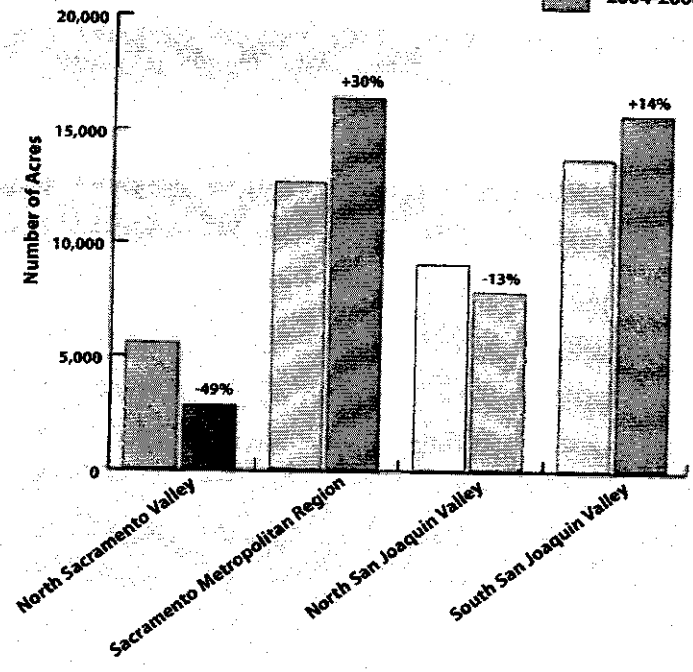
How are we doing?

From the 2000-2002 period to the 2004-2006 period, 128,715 acres of land in the Central Valley were converted for urban uses. While it is not possible to identify precisely how all the land was used prior to the conversion, a significant amount of the land, 35,488 acres (27.6%) was prime farmland.

Overall, the rates of urbanization and prime farmland conversion to urbanized land have increased slightly in the entire Central Valley region, 4.4 percent and 4.9 percent respectively. However, rates in subregions and individual counties differ significantly. The Sacramento Metro Region experienced the highest increase in the rate of urbanization (30%) while the North Valley rate of urbanization had the greatest decline (-49%).

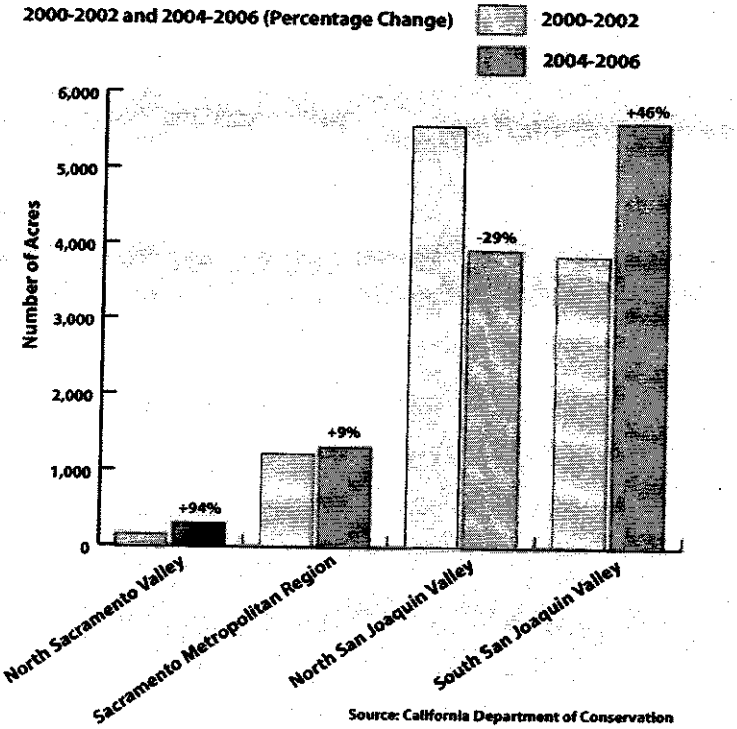
South San Joaquin Valley, which contains the top three agricultural counties in the state, is experiencing the greatest amount of prime farmland loss, at more than 16,000 acres over this six-year period.

TOTAL LAND CONVERTED TO URBAN LAND USE IN THE CENTRAL VALLEY SUBREGIONS
2000-2002 and 2004-2006 (Percentage Change)



Source: California Department of Conservation

PRIME FARMLAND CONVERTED TO URBAN LAND USE IN THE CENTRAL VALLEY SUBREGIONS*
2000-2002 and 2004-2006 (Percentage Change)



Source: California Department of Conservation

* no data available for Butte County (part of North Sacramento Valley)

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California agriculture is large, diverse, complex and dynamic. It generated nearly $36.6 billion in cash receipts in 2007. California has been the nation's top agricultural state in cash receipts every year since 1948 and has gradually increased its share of U.S. farm cash receipts from 9.5 percent in 1960 to 12.8 percent in 2007.

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The UC Agricultural Issues Center is a forum for the identification and analysis of important issues affecting the agricultural sector. AIC provides broadly based, objective information on a range of critical, emerging agricultural issues and their significance for the economy and natural resources through studies, conferences and publications.

We study topics such as international markets, invasive pests and diseases, the value of agricultural research and development, agricultural policy and the rural environment among others. The issues are often global, but we emphasize implications for agriculture and natural resources in California.

The audience for AIC research and outreach includes decision makers in agriculture and government, scholars and students, journalists and the general public.

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Agricultural Issues Center

University of California
AGRICULTURE AND NATURAL RESOURCES

THE MEASURE OF CALIFORNIA AGRICULTURE THE MEASURE OF CALIFORNIA AGRICULTURE THE MEASURE OF CALIFORNIA AGRICULTURE

Broad Economic Impacts

Including multiplier effects, California farms and closely related processing industries generate 7.3 percent of the state's private sector labor force (including part-time workers) and account for 5.6 percent of the state labor income (2002).

A $1 billion increase of the value added from agricultural production results in a total of $1.9 billion of Gross State Product (2002).

For every $1 billion in farm sales, there are 18,000 jobs created in the state, about 11,000 in the farm sector itself plus about 7,000 in other industries.

Agricultural production and processing are especially significant to the economy of California's Central Valley where, including ripple effects, they generate 24.2 percent of the private sector employment and 18.5 percent of the private sector labor income. Excluding ripple effects, agriculture directly accounts for 12.6 percent of jobs and 8.4 percent of labor income (2002).

Resources and Farm Productivity

2003 California farm assets totaled $97 billion (more than $1 million per farm). The average value of machinery and equipment per farm is approximately $58,000.

In a normal precipitation year, agriculture accounts for about 41 percent of the total annual applied surface and groundwater use in California. Environmental uses account for 48 percent and urban areas use 11 percent in a normal year (2000).

Surface supplies provide 70 percent of the water for agriculture and urban consumption in a normal year. The remainder comes from groundwater (2004).

Average yield has increased significantly for important California crops in the past two decades. For example, almond yields grew by 64 percent, processing tomato yields by 30 percent, and cotton yields by 22 percent. Broccoli and cauliflower increased by over 50 percent. Milk production per cow increased by 33 percent (2007).

California accounts for about 13 percent of national cash receipts from agriculture, but receives only about 4 percent of direct government payments to agriculture depending on the year (2007).

Land and People

More than one-quarter of California's landmass is used for agriculture—about 25.4 million acres. Just over half of this total is pasture and range, and 37.4 percent is cropland (2007).

Harvested cropland covers about 7.6 million acres. About 37 percent of California's harvested cropland is planted to orchards and vineyards, 23 percent to hay, and 15 percent to vegetables (2007).

Roughly 844,500 acres, or 2.9 percent of the state's total agricultural land available was converted to urban uses between 1988 and 2004.

In 2007 there were 81,033 farms in California, with an average size of 313 acres.

Farms that have annual sales of more than $500,000 accounted for 10.6 percent of the total, while 47 percent have sales at less than $10,000. The 5,642 largest farms (those with over $1 million in sales) account for 84 percent of California's agricultural sales (2007).

Roughly 18 percent of the state's farm operators are less than 45 years old. About 26 percent are older than 65 (2007).

Women accounted for more than 18 percent of total principal farm operators in the state in 2007, up from 16 percent in 2002 and 11 percent in 1987.

About 11 percent of California principal farm operators are of Hispanic origin while about 4.5 percent have Asian or Pacific Islander origins (2007).

The hired farm labor workforce in California is mainly foreign born (70%) and largely young, with an average age of 33 years. Three-quarters of the labor force is male (2006).

About 57% of all hired farm workers in the state were hired for less than 150 days (2002).

Demand and Supply

The most important market for California agricultural production is the United States. The domestic market accounts for about 70 percent of California farm cash receipts. The remaining 30 percent is exported (2007).

Export markets typically take between one-third and two-thirds of California almonds, cotton, walnuts, rice, dried plums and pistachios.

In 2007, international exports were valued at about $10.9 billion. Together, the top six, almonds, wine, dairy products, cotton, table grapes and walnuts accounted for close to 50 percent of exports. The other 50 percent was spread across dozens of commodities.

The top export destinations in 2007 were Canada (24%), the European Union (23%), Japan (10%), Mexico (7%), China/Hong Kong (7%), and South Korea (4%).

Americans spent about 12 percent of their income on food in 2007, compared with 23 percent in 1947. Meals away from home represented 43 percent of expenditures on food, compared to 26 percent in 1970.

Over the past three decades per capita consumption has grown rapidly for fresh fruits (26%), fresh vegetables (36%), and tree nuts (90%). These are important categories for California as more than half of California agricultural cash receipts are from fruits, vegetables, and tree nuts (2007).

Dairy is the top agricultural commodity in California, with more than $7.0 billion in cash receipts. California is the nation's largest dairy producer, with 21 percent of national production value (2007).

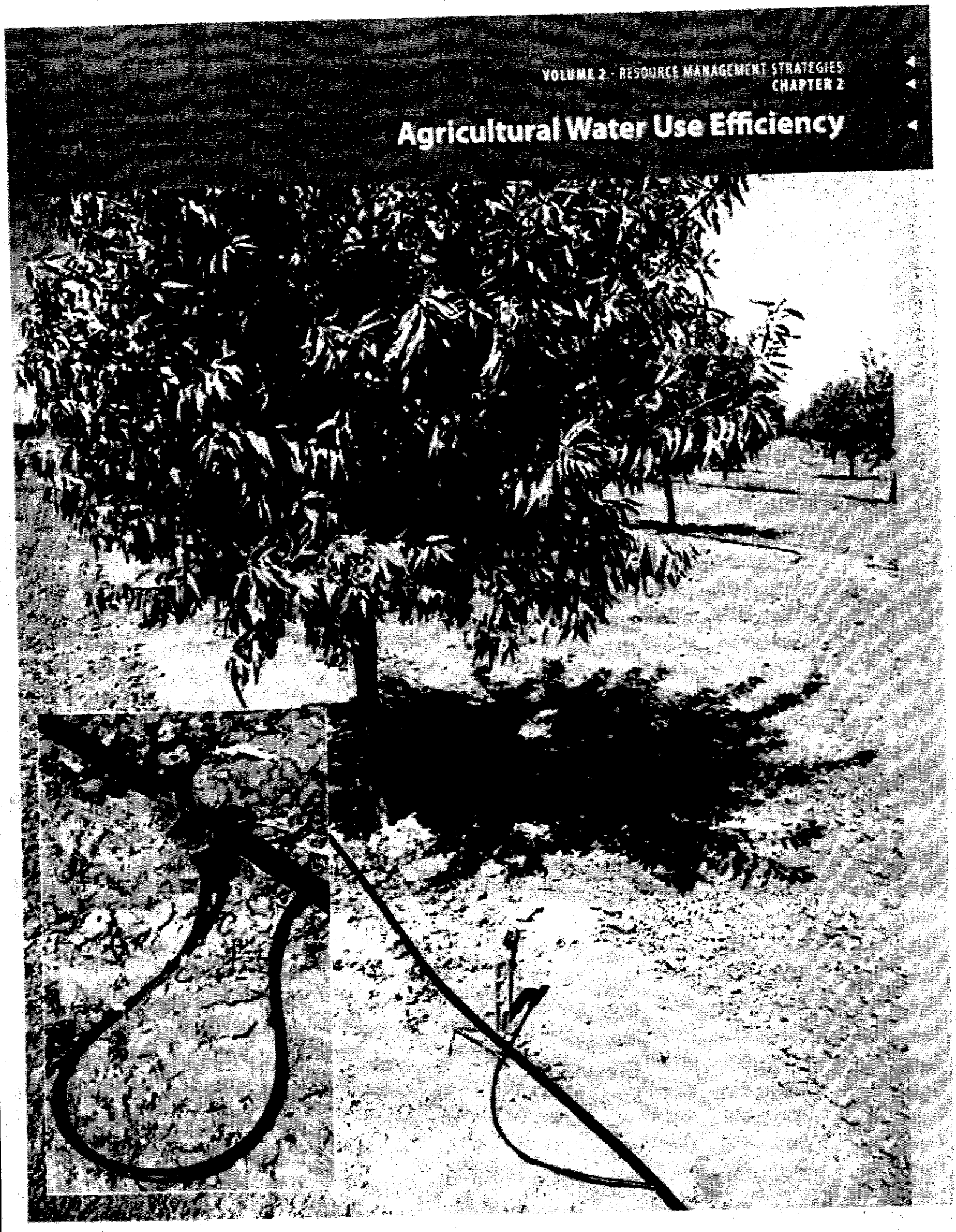
Greenhouse and nursery products are the second most valuable group of commodities, with sales of about $4 billion (2007).

Grapes (all types combined) produced $3.1 billion in cash receipts (2007). Winegrape acreage increased dramatically, from 300,000 acres in the early 1990s to 480,000 in 2007.

In 2007, registered organic growers in California reported almost $840 million in gross sales on about 402,333 acres. Organic sales more than doubled since 1997, but still represent only about 1 percent of the state's agriculture.

July, 2006, revised March 2009

Agricultural Water Use Efficiency



Agricultural Water Use Efficiency Efforts in California

Agriculture is an important element of California's economy, with 88,000 farms and ranches generating $36.6 billion in gross income in 2007, according to the California Department of Food and Agriculture and generating $100 billion in related economic activity. California farm and closely related processing industries employ 7.3 percent of the state's private sector. The Department of Water Resources (DWR) estimated 2005 irrigated acreage was 8.7 million acres, with 540,000 acres of multi-crops, thus making 9.2 million acres of irrigated cropped area. The irrigated acreage changes from year-to-year. For example, in 2000, California irrigated an estimated 9.6 million acres of irrigated cropland with about 34.2 million acre-feet (MAF) of applied water as irrigation. The total irrigated agriculture in 2000 includes multi-cropping acreage (about 600,000 acres). Actual irrigated acreage is 9 million acres. It does not include rain-fed acreage.

In California, growers and water suppliers implement state-of-the-art design, delivery, and management practices to increase production efficiency and conserve water. As a result, they continue to make great strides in increasing the economic value and efficiency of their water use. One indicator of agricultural water use efficiency improvement is that agricultural production per unit of applied water (tons/acre-foot) for 32 important California crops increased by 38 percent from 1980 to 2000 Another indicator is that inflation-adjusted gross crop revenue per unit of applied water (dollars/acre-foot) increased by 11 percent from 1980 to 2000.

The Agricultural Water Suppliers Efficient Water Management Practices Act of 1990 (AB 3616) and the federal Central Valley Project Improvement Act of 1992 (CVPIA) established guidance for improving agricultural water use efficiency. As of July 2009, the Agricultural Water Management Council (AWMC), through a Memorandum of Understanding (MOU), united 79 agricultural water suppliers and four environmental organizations in an effort to improve water use efficiency through implementation of efficient water management practices (AWMC, 1999). The council recognizes and tracks water supplier water management planning and implementation of cost-effective efficient water management practices through a review and endorsement procedure. The signatory agricultural water suppliers voluntarily commit to implement locally cost-effective management practices (see Box 2-3). Agricultural water supplier signatories represent more than 4.6 million acres of retail irrigated acreage and a total of 5.86 million acres of agricultural land. Sixty-six signatories to the MOU have submitted water management plans, six signatories are not subject to development and submittal of Water Management (WM) Plans, and the remaining seven signatories are in the process of development and submittal of their WM Plans. All submitted WM Plans have council-endorsed plans.

As part of a comprehensive package of water legislation in the 2009-2010 legislative session, the Agricultural Water Management Planning Act in SBx7 7 requires

Box 2-3 Agricultural Water Management Efficient Water Management Practices (EWMPs)

The Agricultural Water Management Council has three classifications of EWMPs as follows:

List A - Generally Applicable Efficient Water Management Practices—Required of all signatory water suppliers

1. Prepare and adopt a water management plan
2. Designate a water conservation coordinator
3. Support the availability of water management services to water users
4. Where appropriate, improve communication and cooperation among water suppliers, water users, and other agencies
5. Evaluate the need, if any, for changes in policies of the institutions to which a water supplier is subject

List B - Conditionally Applicable Efficient Water Management Practices—Practices Subject to Net Benefit Analysis and Exemption from Analysis

1. Facilitate alternative land use (drainage)
2. Facilitate use of available recycled water that otherwise would not be used beneficially
3. Facilitate the financing of capital improvements for on-farm irrigation systems
4. Facilitate voluntary water transfers that do not unreasonably affect the water user, water supplier, the environment, or third parties
5. Construct improvements (lining and piping) to control seepage from ditches and canals
6. Within operational limits, increase flexibility in water ordering by, and delivery to, the water users
7. Construct and operate water suppliers' spill- and tail-water recovery systems
8. Optimize conjunctive use of surface and groundwater
9. Automate canal-control structures

List C - Practices Subject to Detailed Net Benefit Analysis without Exemption

1. Water measurement and water use report
2. Pricing or other incentives

For detailed information on the agricultural water management planning and implementation process, implementation of EWMPs, net benefit analysis and schedules, see the Memorandum of Understanding at the Agricultural Water Management Council Web site (AWMC, 1999, 2009)

agricultural water suppliers who provide water to 10,000 or more irrigated acres to develop and adopt a water management plan with specified components, and implement cost-effective efficient water management practices. But any agricultural water supplier that provides water to less than 25,000 irrigated acres shall not implement the requirement of the bill unless sufficient funding has been provided to that water supplier to implement its provisions.

The bill's requirements also include:

- Agricultural water suppliers are required to submit their water management plan to DWR.
- Agricultural water suppliers are required, on or before July 31, 2012, to implement efficient water management practices including the following critical efficient water management practices: 1) Measure the volume of water delivered to customers with sufficient accuracy to comply with provisions of the bill, and 2) Adopt a pricing structure for water customers based on at least in part on quantity of water delivered.
- Agricultural water suppliers are required to use a standardized form to report which efficient water management practices have been implemented and are planned to be implemented, an estimate of water use efficiency improvements that have occurred since the last report, and an estimate of water use efficiency improvements estimated to occur five and 10 years in the future. If an agricultural water supplier determines that an efficient water management practice is not locally cost effective or technically feasible, the supplier shall submit information documenting that determination.
- DWR is required, in consultation with the State Water Resources Control Board (State Water Board), the California Bay-Delta Authority (CBDA) or its successor agency, the State Department of Public Health, and the Public Utilities Commission, to develop a single standardized water use reporting form to meet the water use information needs of each agency.
- DWR is required, in consultation with the State Water Board, to submit to the Legislature a report on the agricultural efficient water management practices that have been implemented and are planned to be implemented and an assessment of the manner in which the implementation of those efficient water management practices has affected and will affect agricultural operations, including estimated water use efficiency improvements.
- DWR is required to make available all submitted water management plans on DWR's web site.
- DWR is also required, in consultation with the AWMC, academic experts, and other stakeholders, to develop a methodology for quantifying the efficiency of agricultural water use. Alternatives to be assessed, shall include, but not be limited to, determination of efficiency levels based on crop types or irrigation system distribution uniformity.

It should be noted that in addition to the efficient water management practices (EWMPs) listed in Box 2-3, there are important cultural practices such as soil management, cover crops, changes in tillage practices, land management practices, winter storm water capture and use, dry farming and rain-fed farming that can reduce applied water and increase water use efficiency.

Growers invest in on-farm water management improvements to stay economically competitive. Likewise, local water suppliers invest in cost-effective, system-wide water management improvements in order to provide quality service at a fair and competitive

Table 2-1 Trends in irrigation method area (in million acres)

Irrigation method	1990		2000		Change from 1990 to 2000	
	Area (MA)	% of total	Area (MA)	% of total	Percent change in acreage & reduction of area in Million Acres	
Gravity (furrow, flood)	6.5	67	4.9	51	-16%	-1.6 MA
Sprinkler	2.3	24	2.8	29	5 %	+0.5 MA
Drip/micro	0.8	9	1.9	20	11 %	+1.1 MA
Total	**9.6**	**100**	**9.6**	**100**	**1.6 MA Reduction in Gravity Systems 1.6 MA Increase in Pressurized Systems**	

Source: DWR MA = million acres

price. In addition to water savings, efficiency measures can provide water quality and flow-timing benefits. The CALFED Bay-Delta Program's (CALFED) Quantifiable Objectives (QOs) and Targeted Benefits (TBs) — which can be local, regional, or statewide — are numeric targets that address CALFED objectives of water supply reliability, water quantity, water quality, flow and timing for ecosystem improvements, and other benefits such as energy efficiency. Due to the complexity of QOs and lack of technical information on QOs for different CALFED solution regions, DWR, in consultation with CALFED, has increasingly emphasized TBs and has incorporated TBs into its water management planning and implementation efforts as well as emphasizing TBs through the grant program.

Substantial financial support for research, development, and the demonstration of efficient water management practices in agriculture comes from the agricultural industry and State and federal efforts. Support also comes from the early adopters of new technology who often risk their crops, soils, and money when cooperating to develop and demonstrate technology innovations. Further investments in research and demonstration are critical, especially in support of university-based research, field station studies, and cooperative extension demonstration projects.

Improvements in agricultural water use efficiency primarily occur from three activities:

- **Hardware.** Improving on-farm irrigation systems and water supplier delivery systems
- **Water management.** Improving management of on-farm irrigation and water supplier delivery systems
- **Crop water consumption.** Reducing non-beneficial evapotranspiration

Hardware Upgrades

Due to water delivery system limitations, growers are often unable to apply the optimal amount of irrigation water. Water delivery system improvements such as integrated supervisory control and data acquisition systems (SCADA), canal automation, regulating reservoirs, and other hardware and operational upgrades, can provide flexibility to

Box 2-4 Examples of Irrigation Efficiency Improvement

Reclamation District 108 reports significant improvements in irrigation efficiency. Reclamation District 108 is located in the Sacramento Valley, serving nearly 48,000 irrigated acres planted to orchards, row crops and rice. In 2007 the District initiated a creative incentive program that included rebates to farmers who reduced or eliminated spill of applied irrigation water. Through the farmers' efforts to reduce spill and applied water, the District was able to reduce the volume of water being pumped in and around the District. The avoided energy costs associated with pumping enabled the District to fund the rebates given to the farmers. After the first year the program results were astounding. By 2009 over 67 percent of the district acreage was enrolled in the program. Reclamation District 108 reduced drainage water by approximately 30,000 AFY.

Kern County Water Agency (KCWA) reports significant improvements in irrigation efficiency. An analysis of data in 1986 compared to 1975 showed an 8 percent improvement (from 67 percent in 1975 to 75 percent in 1986). This improvement reduced the total applied water use in the San Joaquin Valley portion of Kern County by about 250,000 AF, enough water to irrigate about 70,000 acres. Since 1986 Kern County has added 61,500 acres of trees and vines. These now make up 37 percent of the total irrigated crop area. Nearly all of this new crop area has low volume drip irrigation systems installed. KCWA estimates the overall on-farm water use efficiency now is about 78 percent. Note that the remaining 22 percent constitutes a leaching requirement, irrigation system distribution non-uniformity, and cultural practices, which includes both recoverable and/or irrecoverable flows

deliver water at the time, quantity, and duration required by the grower. At the on-farm level, many old and most new orchards and vineyards, as well as some annual fruits and vegetables, are irrigated using pressurized irrigation systems. Almost all trees and vines established since 1990 are irrigated using micro-irrigation. Between 1990 and 2000, the crop area under micro-irrigation in California grew from 0.8 million to 1.9 million acres, a 138 percent increase (see Table 2-1 and Box 2-4).

A recent report (Orang et al., 2008) providing results of a survey of 10,000 growers in California (excluding rice, dry-land, and livestock producers), indicated that between 1972 and 2002, the area planted to orchard increased from 15 to 31 percent and the area planted to vineyards increased from 6 to 16 percent, while the area planted to vegetables remained relatively unchanged. Meanwhile, the area planted to field crops decreased from 67 to 42 percent. The survey also indicates that the land irrigated by low-volume (drip and micro sprinklers) irrigation has increased by about 33 percent while the amount of land irrigated by surface irrigation methods has decreased by about 31 percent.

Many growers use advanced irrigation systems for irrigation, fertilizer application, and pest management. Advanced technologies include geographic information system (GIS), global positioning system (GPS), and satellite crop and soil moisture sensing systems. These technologies allow growers to improve overall farm water management.

The use of pressurized irrigation systems, such as sprinkler, drip, and micro-spray, in addition to being energy intensive, often requires modernization of water supplier delivery systems to provide irrigation water at the time, quantity, and duration required

by the grower. Increasingly, water suppliers are upgrading and automating their systems to enable accurate, flexible, and reliable deliveries to their customers. Also, suppliers are lining canals, developing spill recovery and tail water return systems, employing flow regulating reservoirs, improving pump efficiency, and managing surface water conjunctively with groundwater. With the advancement of both water supplier and on-farm water management systems, there is potential to improve irrigation efficiencies at both on-farm and water supplier levels.

Growers continue to make significant investments in on-farm irrigation system improvements, such as lining head ditches and using micro-irrigation systems. Many growers take advantage of mobile laboratory services to conduct in-field evaluation of irrigation systems. Once considered innovative technologies, these are now standard practice. In terms of future improvements, the California Polytechnic State University, San Luis Obispo, Irrigation Training and Research Center estimates that an additional 3.8 million acres could be converted to precision irrigation such as drip or micro-spray irrigation (Burt, et al., 2002). While this will not reduce crop water consumption, it can improve the uniform distribution of water and reduce evaporation, thus allowing more efficient use of water. Research on drip irrigation of alfalfa has shown an applied water reduction of two to three percent with yields increasing from 19 to 35 percent, an increase in productivity of 30 percent with the same amount of applied water. Conversion of traditional irrigation systems to pressurized systems and installation of advanced technologies on water supplier delivery systems require more investment in facilities as well as use of additional energy that increases farm production costs and water supplier operational costs. The additional cost of such improvements is a challenge for many water suppliers. California Farm Water Coalition, based on industry contacts, reports that in the six-year period from 2003 through 2008, San Joaquin Valley farmers invested over $1.5 billion in high efficiency irrigation equipment (not annualized cost).

Water Management

Both on-farm and water supplier delivery systems must be managed to take advantage of new technologies, science, and hardware. Personal computers connected to real-time communication networks and local area networks allow transmission of data to a centralized location. These features enable water supplier staff to monitor and manage water flow and to log data. With such systems, the water supplier staff spends less time manually monitoring and controlling individual sites, allowing them to plan, coordinate system operation, and potentially reduce costs. Such systems improve communications and provide for flexible water delivery, distribution, measurement, and accounting.

Some of today's growers use satellite weather information and forecasting systems to schedule irrigation. Many growers employ evapotranspiration and soil moisture data for irrigation scheduling. Users generate more than 70,000 inquiries per year to the California Irrigation Management Information System (CIMIS), DWR's weather station program that provides Evapotranspiration (ET) data. Universities, water suppliers,

and consultants also make this information available to a much wider audience via newspapers, Web sites, and other media.

Growers use many other water management practices. Furrow, basin, and border irrigation methods have been improved to ensure that watering meets crop water requirements while limiting runoff and deep percolation. Growers use organic or plastic mulch to reduce non-essential evaporation of applied water, minimize weed growth, and improve crop growth and productivity value. Agricultural land stewardship practices (see Chapter 20) also reduce water use and contribute to sound on-farm water management.

Agricultural land stewardship practices (see Chapter 20) also reduce water use and contribute to sound on-farm water management.

Reducing Evapotranspiration (ET)

ET is the amount of water that evaporates from the soil and transpires from the plant. Growers can reduce ET by reducing unproductive evaporation from the soil surface, eliminating weed ET, and shifting crops to plants that need less water, or reducing transpiration through deficit irrigation. In addition, some growers deficit irrigate their crops during water short periods and for agronomic purposes. Management practices such as mulching, use of cover crops, no-till and minimum tillage, and dust-mulching associated with dry farming reduce unnecessary evaporation from soil surfaces. Some of these management/cultural practices have energy conservation components as well.

Potential Benefits and Costs of Agricultural Water Use Efficiency

Several analyses have been performed since 2000 to quantify water savings and associated costs. The following is a summary of those analyses.

The CALFED Programmatic Record of Decision (ROD) estimates of 2000 estimated that efficiency improvements could result in a water savings (reduction in irrecoverable flows, also referred to as net water savings) ranging from 120,000 to 563,000 acre-feet per year (AFY) by 2030 at a cost ranging from $35 to $900 per acre-feet (CALFED, 2000a). The total cost of this level of agricultural water use efficiency to year 2030 is estimated at $0.3 billion to $2.7 billion, which includes $220 million for lining the All-American Canal and Coachella Branch Canal. The cost estimates are derived from potential on-farm and water supplier efficiency improvements associated with savings in irrecoverable flows. Details of estimates and assumptions are in the CALFED Water Use Efficiency Program Plan (CALFED, 2000b).

The analysis was based on improving on-farm efficiency up to 85 percent. It was assumed that the achieved 85 percent on-farm efficiency would be maintained afterward. Technical, management, and hardware limitations to achieve high performance levels for irrigation systems restrict irrigation distribution uniformities and on-farm efficiencies up to 85 percent, beyond which a sustainable and healthy soil environment cannot be

State of California
California Natural Resources Agency
Department of Water Resources

California Water Plan Update 2009

Integrated Water Management

Volume 1 - The Strategic Plan

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Governor
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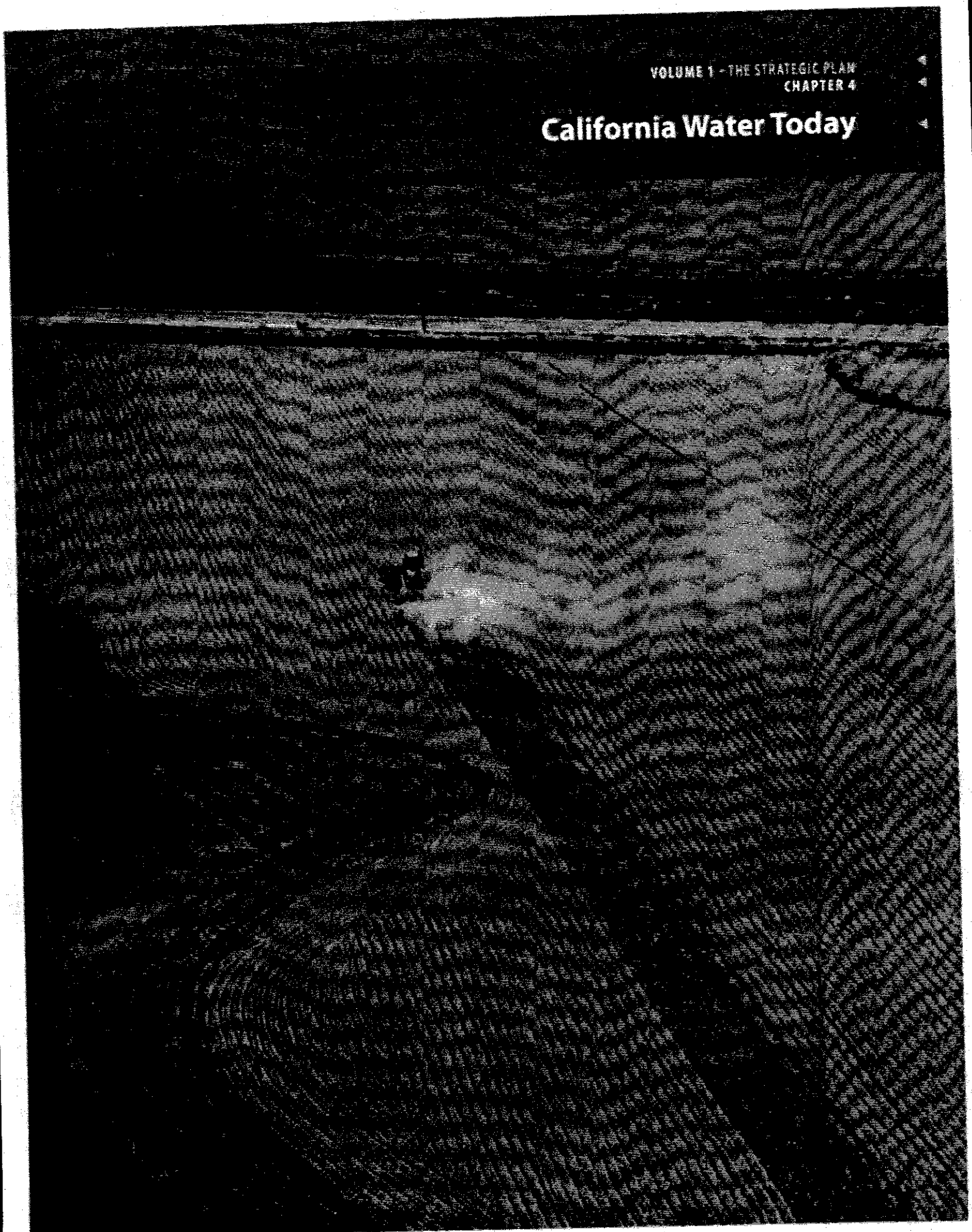
Lester A. Snow
Secretary for Natural Resources
The Natural Resources Agency

Mark W. Cowin
Director
Department of Water Resources

California Water Today



Box 4-3 The Rising Economic Efficiency of California Agricultural Water Use

Comparing Changes in Applied Water Use and the Real Gross Value of Output for California Agriculture: 1967 to 2007

By Jim Rich, Economist, DWR
July 31, 2009

DWR economists recently analyzed how over the past 40 years the real value of California agricultural output has changed with respect to the water applied to California's farmland. The value of livestock and livestock products were included in this analysis because the vast majority of California's animal-based agriculture depends, in part, on our irrigated crops.

DWR estimates that the real, inflation-adjusted gross revenue for California agriculture increased about 84 percent between 1967 and 2007, from $19.9 billion (in 2007 dollars) to $36.6 billion. During that period, total California crop applied water use fell by 14.6 percent, from about 31.2 million acre-feet (maf) in 1967, to a preliminary estimate of 26.7 maf in 2007.

The rising real value of our agricultural output, coupled with falling crop water use, has more than doubled the "economic efficiency" of agricultural water use in California during the past 40 years. In 1967 about $638 (in 2007 dollars) of gross agricultural revenue was produced in California for each acre-foot of applied agricultural water. By 2007 this measure had risen to $1,373 per acre-foot. That represents a 115 percent increase in 40 years. Much of this increase has occurred since 2000 (see note below).

The main reason for the rise in the economic efficiency of California agricultural water use is the long-term shift out of lower-valued field crops, and into riskier, higher-valued truck, tree, and vine crops. Although such crops may bring in more average gross revenue per acre, they are subject to overproduction and sharp market swings, sometimes resulting in large net losses for the farmers who grow them.

NOTE: The source of the estimates in the second and third paragraphs is a draft DWR paper, Comparing Changes in Applied Water Use and the Real Gross Value of Output for California Agriculture: 1967 to 2007; March 2009. Find in Volume 4 Reference Guide.

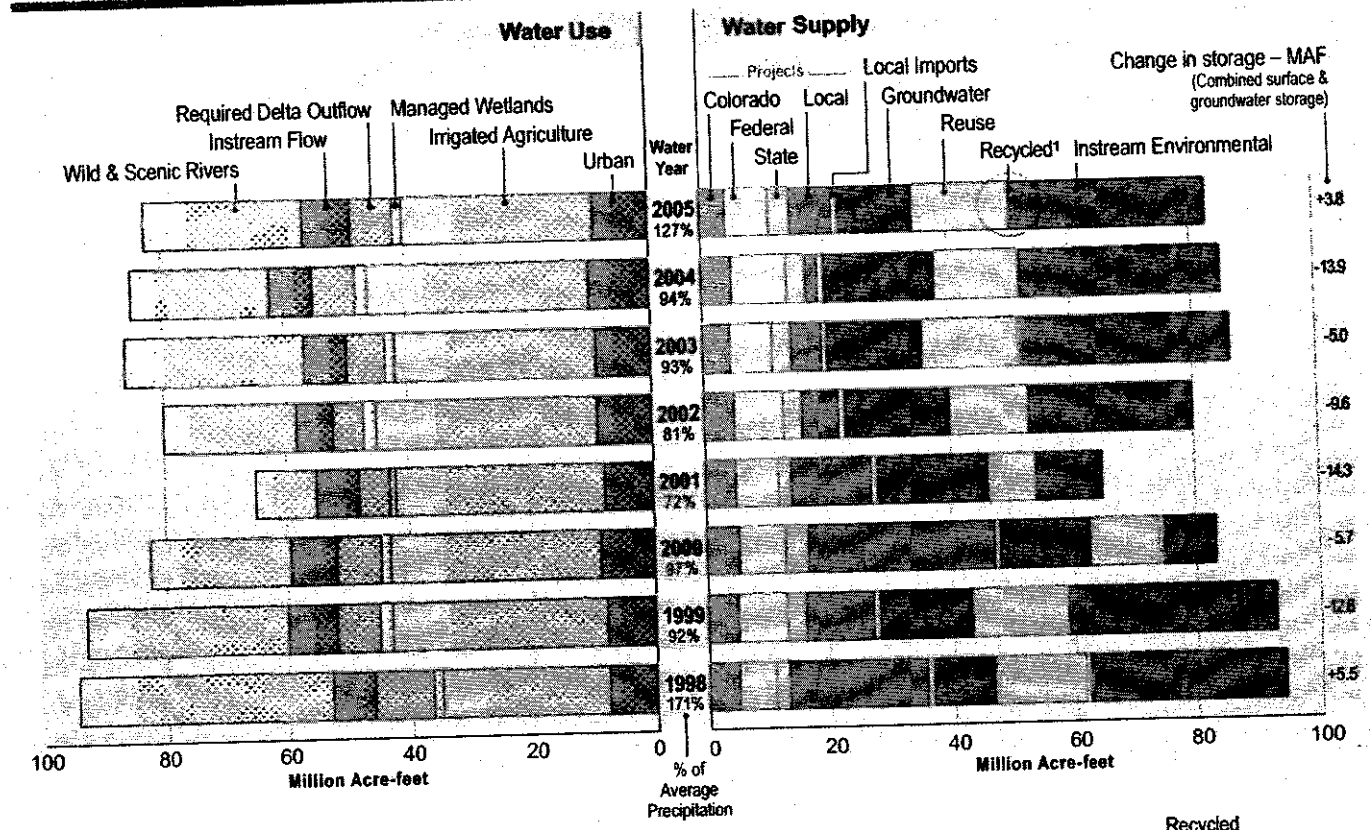
Box 4-4 Land Use Jurisdiction

Cities and counties have the primary jurisdiction over land use and planning and regulation. Their authority derives from the State and its constitutional powers to regulate land use to protect the public health, safety, and welfare. Also, several statutes specifically authorize the preparation of local general plans and specific plans. The Governor's Office of Planning and Research provides advisory guidance in the preparation of the State's General Plan Guidelines that assist local governments in land use planning and management.

State and regional agencies play a limited role in local land use planning and regulation, for example:

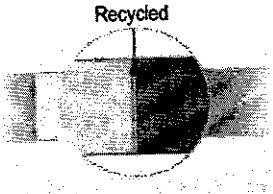
- The California Coastal Commission regulates land use planning and development in the coastal zone, together with local agencies (cities and counties).
- The California Energy Commission has exclusive permitting authority for thermal powerplants 50 megawatts or greater and serves as a lead agency under the California Environmental Quality Act for projects within its jurisdiction.
- Three regional land use agencies have regulatory responsibilities: San Francisco Bay Conservation and Development Commission, the Coastal Commission and the Tahoe Regional Planning Agency. The regional Delta Protection Agency does not have permitting or regulatory authority.
- Regional Councils of Government (COGs) serve as metropolitan planning organizations for federal transportation planning and funding purposes although they differ from region to region in organization and regional effectiveness; COGs prepare regional growth plans to meet regional housing and transportation demand.

Figure 4-7 California water balance by year, 1998-2005



Stippling in bars indicates **depleted (irrecoverable) water use** *(water consumed through evapotranspiration, flowing to salt sinks like saline aquifers, or otherwise not available as a source of supply)*

¹ **Detail of bar graph:** *For water years 1998-2005, recycled municipal water varied from 0.2 to 0.5 MAF of the water supply .*



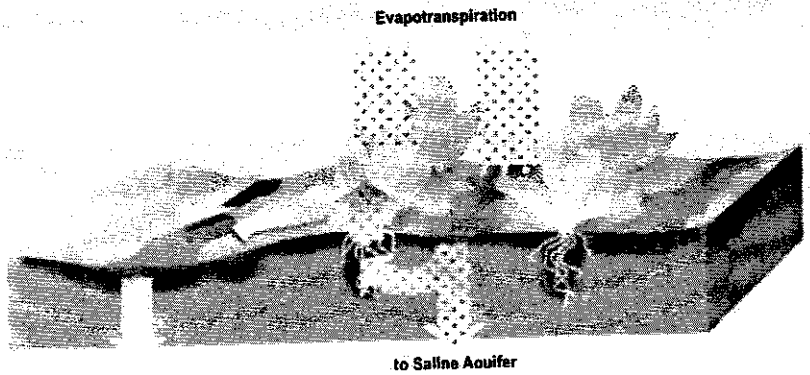


Table 4-2 California water balance summary, 1998-2005. (Numbers in million acre-feet)

Statewide	Water Year (Percent of average precipitation)							
	1998 (171%)	1999 (92%)	2000 (97%)	2001 (72%)	2002 (81%)	2003 (93%)	2004 (94%)	2005 (127%)
Water Entering the Region								
Precipitation*	329.6	181.3	187.7	139.2	160.1	184.4	186.5	251.9
Inflow from Oregon/Mexico	2.3	2.4	1.7	1.1	1.1	1.1	1.1	1.0
Inflow from Colorado River	5.0	5.1	5.3	5.2	5.4	4.5	4.8	4.2
Imports from Other Regions	NA	NA	NA	NA	NA	NA	NA	NA
Total	**336.9**	**188.8**	**194.7**	**145.5**	**166.7**	**190.0**	**192.4**	**257.2**
Water Leaving the Region								
Consumptive Use of Applied Water ** (Ag, M&I, Wetlands)	22.5	27.6	27.9	27.8	29.3	26.7	29.2	24.4
Outflow to Oregon/Nevada/Mexico	1.6	1.7	0.9	0.7	0.8	1.1	0.8	1.4
Exports to Other Regions	NA	NA	NA	NA	NA	NA	NA	NA
Statutory Required Outflow to Salt Sink	43.8	51.8	28.0	13.9	29.6	39.8	36.7	37.3
Additional Outflow to Salt Sink	73.0	34.0	37.1	17.7	24.0	29.9	24.7	22.7
Evaporation, Evapotranspiration of Native Vegetation, Groundwater Subsurface Outflows, Natural and Incidental Runoff, Ag Effective Precipitation & Other Outflows	190.5	86.3	106.5	99.7	92.7	97.7	114.9	167.6
Total	**331.4**	**201.4**	**200.4**	**159.8**	**176.4**	**195.2**	**206.3**	**253.4**
Storage Changes in the Region								
[+] Water added to storage [-] Water removed from storage								
Change in Surface Reservoir Storage	7.2	-4.1	-1.3	-4.6	0.1	3.7	-4.1	7.9
Change in Groundwater Storage ***	-1.7	-8.5	-4.4	-9.7	-9.7	-8.7	-9.8	-4.1
Total	**5.5**	**-12.6**	**-5.7**	**-14.3**	**-8.6**	**-5.0**	**-13.9**	**3.8**
Applied Water ** (compare with Consumptive Use)	33.9	41.3	41.8	41.2	43.9	40.6	44.1	38.2

* The percent precipitation is based upon a running 30-year average of precipitation for the region; discrepancies can occur between information calculated for Update 2009 and earlier published data.

** Definition: Consumptive use is the amount of applied water used and no longer available as a source of supply. Applied water is greater than consumptive use because it includes consumptive use, reuse, and outflows.

*** Change in Groundwater Storage is based upon best available information. Basins in the north part of the state (North Coast, San Francisco, Sacramento River and North Lahontan regions and parts of Central Coast and San Joaquin River Regions) were modeled - spring 1997 to spring 1998 for the 1998 water year and spring 1999 to spring 2000 for the 2000 water year. All other regions and years were calculated using the following equation:

GW change in storage = intentional recharge + deep percolation of applied water + conveyance deep percolation and seepage - withdrawals

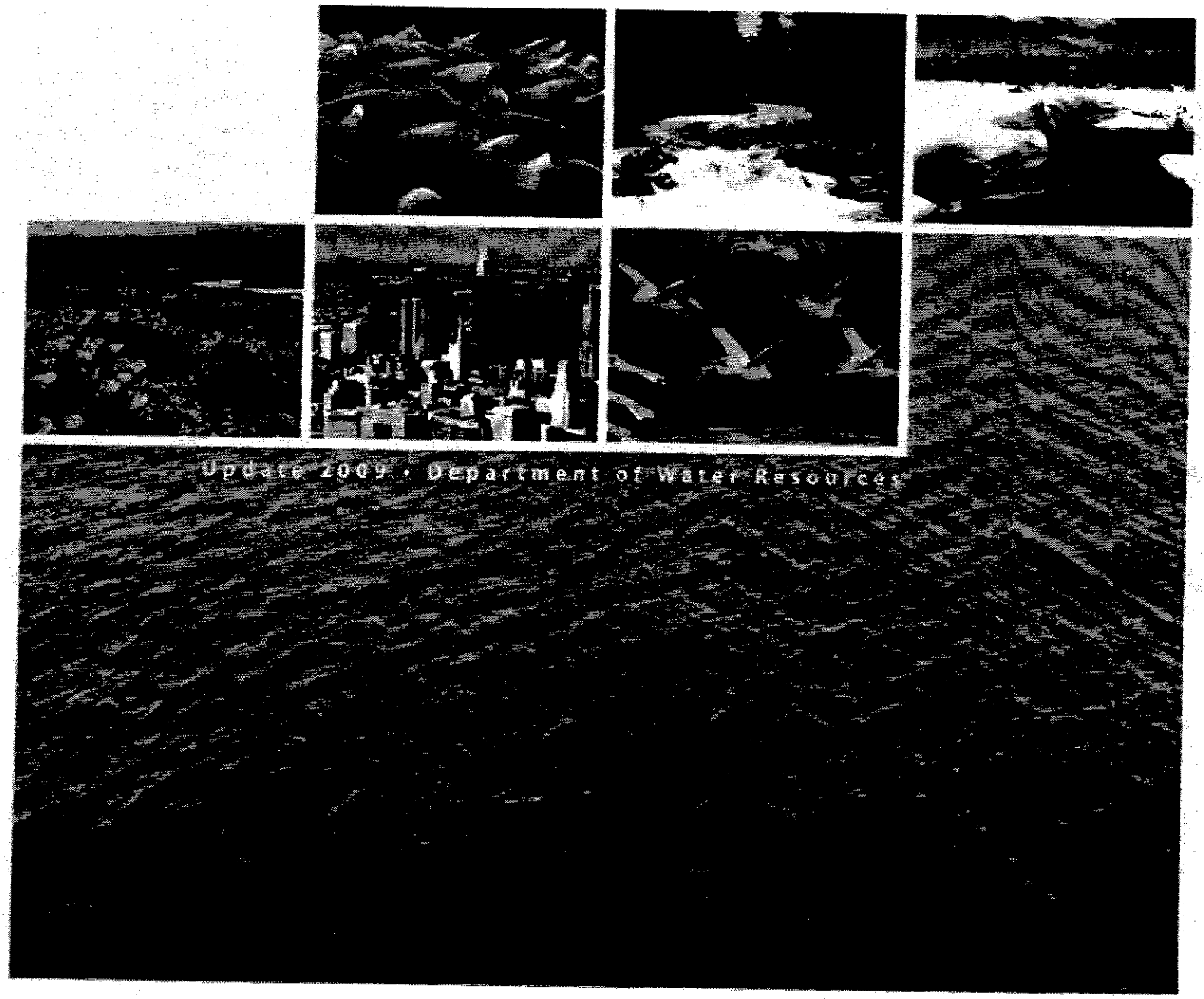
This equation does not include the unknown factors such as natural recharge and subsurface inflow and outflow.

NA=Not Applicable

Attachment 12

California **Water Plan** Highlights

INTEGRATED WATER MANAGEMENT



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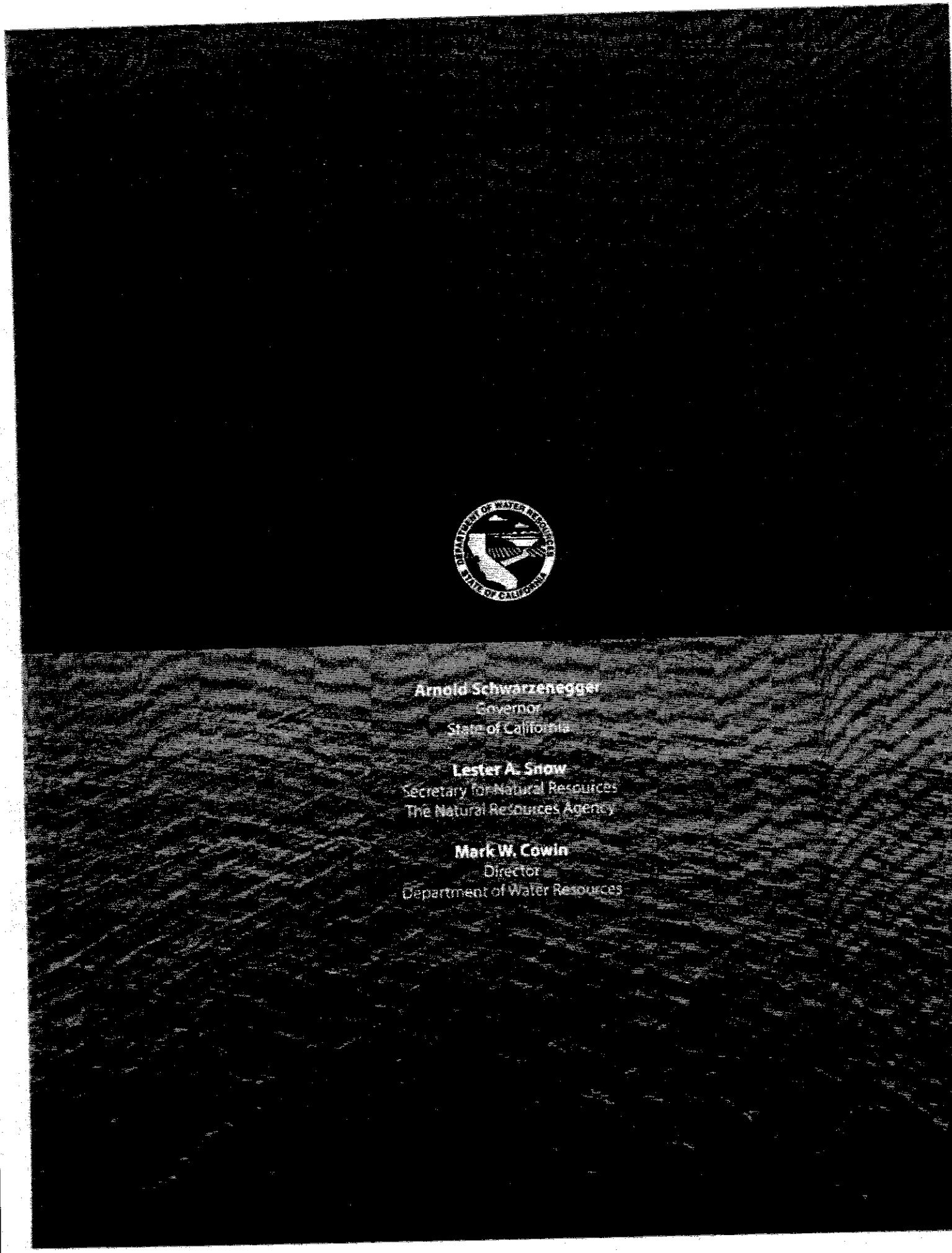


Arnold Schwarzenegger
Governor
State of California

Lester A. Snow
Secretary for Natural Resources
The Natural Resources Agency

Mark W. Cowin
Director
Department of Water Resources

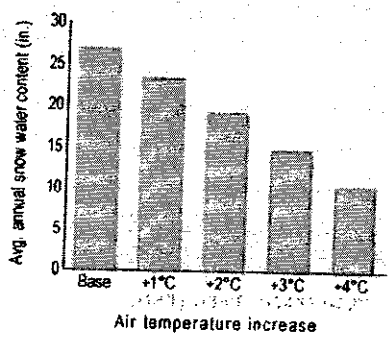
Climate Change:

By and large, California's reservoirs and water delivery systems were designed, and operating rules have been developed, using historical hydrology – an assumption that the past is a good guide to the future. With climate change, that assumption may no longer be valid.

What Has Already Happened?

Looking over the past century, the following changes are evident:

- California's temperature has risen one degree Fahrenheit, mostly at night and during the winter, with higher elevations experiencing the greatest increase.
- Average early spring snowpack in the Sierra Nevada has decreased by about 10 percent, a reduction of 1.5 million acre-feet of water in storage (one acre-foot of water is enough for one to two families for one year). Seasonal snowpack of the Sierra Nevada is California's largest surface water storage.
- Sea level along California's coast has risen 7 inches.
- Flood peaks in the state's rivers have increased.
- Climate patterns are more variable.



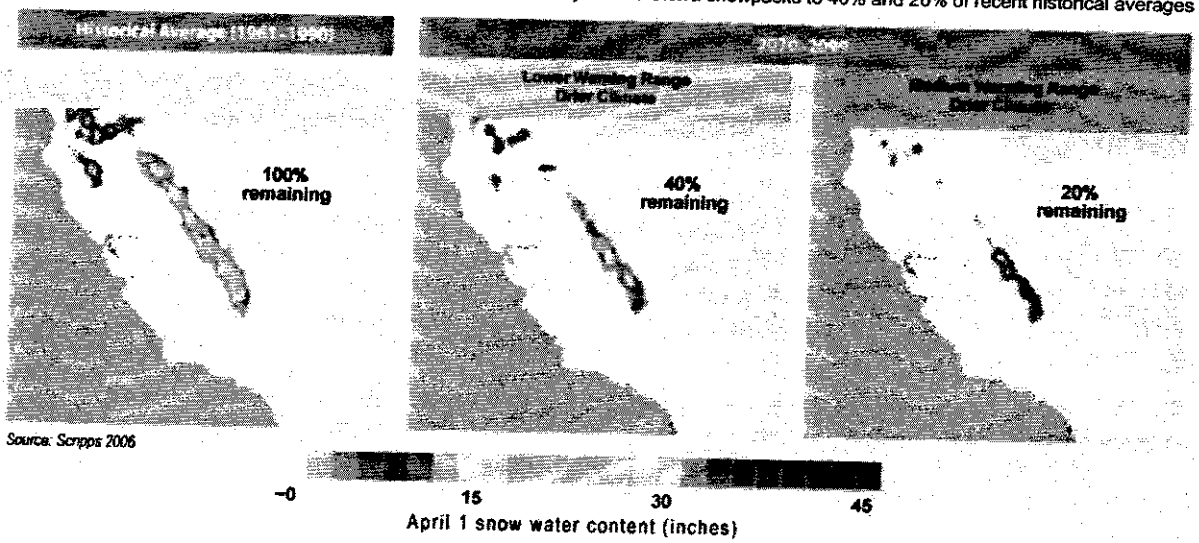
Average Annual Snowmelt for Upper Feather River Basin

Warming air temperatures may cause some of our precipitation to shift from snow to rain. This would lead to a reduction in the amount of snowpack, an important natural reservoir for storing water in the winter and later augmenting the water supply as spring snowmelt. Climate-change-induced shifts in the timing and the amount of snowmelt runoff may require revising traditional water planning practices. The Upper Feather River Basin provides water for Lake Oroville, the main water supply reservoir for the State Water Project.

Source: DWR 2008

Decreasing California Snowpack

These figures show projections of how two climate scenarios may reduce Sierra snowpacks to 40% and 20% of recent historical averages



Source: Scripps 2006

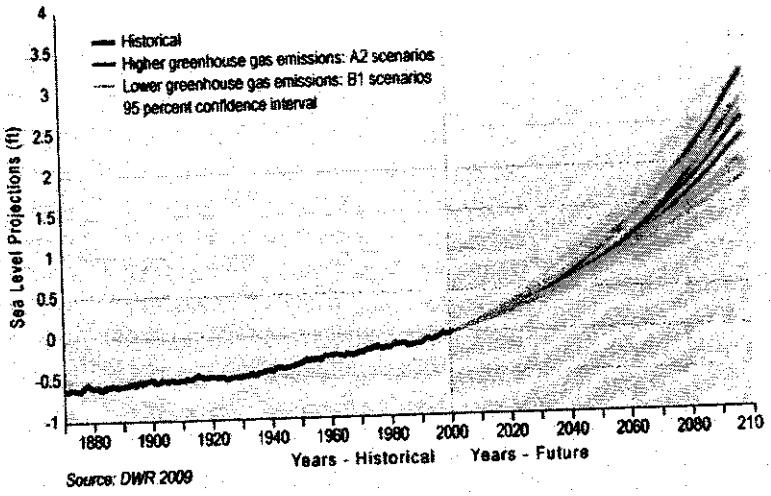
Future Hydrology Unlike the Past

What More is Expected?

Looking forward to the year 2050 and on to the end of the century, more changes can be expected:

- California's mean temperature may rise 1.5 degrees to 5.0 degrees Fahrenheit by 2050 and 3.5 degrees to 11 degrees by the end of the century.
- Sierra Nevada snowpack may decrease by 25 to 40 percent by mid-century, a storage volume about 3.8 million acre-feet to 6 million acre-feet, from a little less to a little more than the capacity of California's largest constructed surface reservoir.
- Average annual precipitation may show little change, but more intense wet and dry periods can be expected – more floods and more droughts.
- Flood peaks will become higher and natural spring/summer runoff will become lower.
- Studies show a possible global sea level rise of 4 to 16 inches by mid-century and 7 to 55 inches by the end of the century.
- Higher sea levels will increase salinity in the Delta.

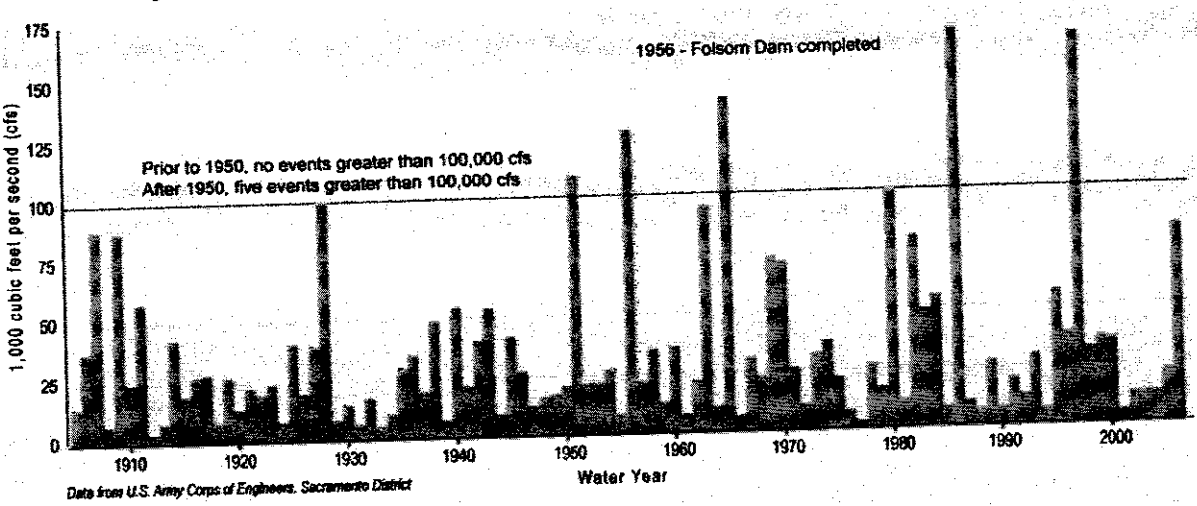
Historical and Projected Sea Level at Golden Gate



Source: DWR 2009

American River Runoff Annual Maximum 3-Day Flow

The five highest floods of record on the American River have occurred since 1950.



Data from U.S. Army Corps of Engineers, Sacramento District

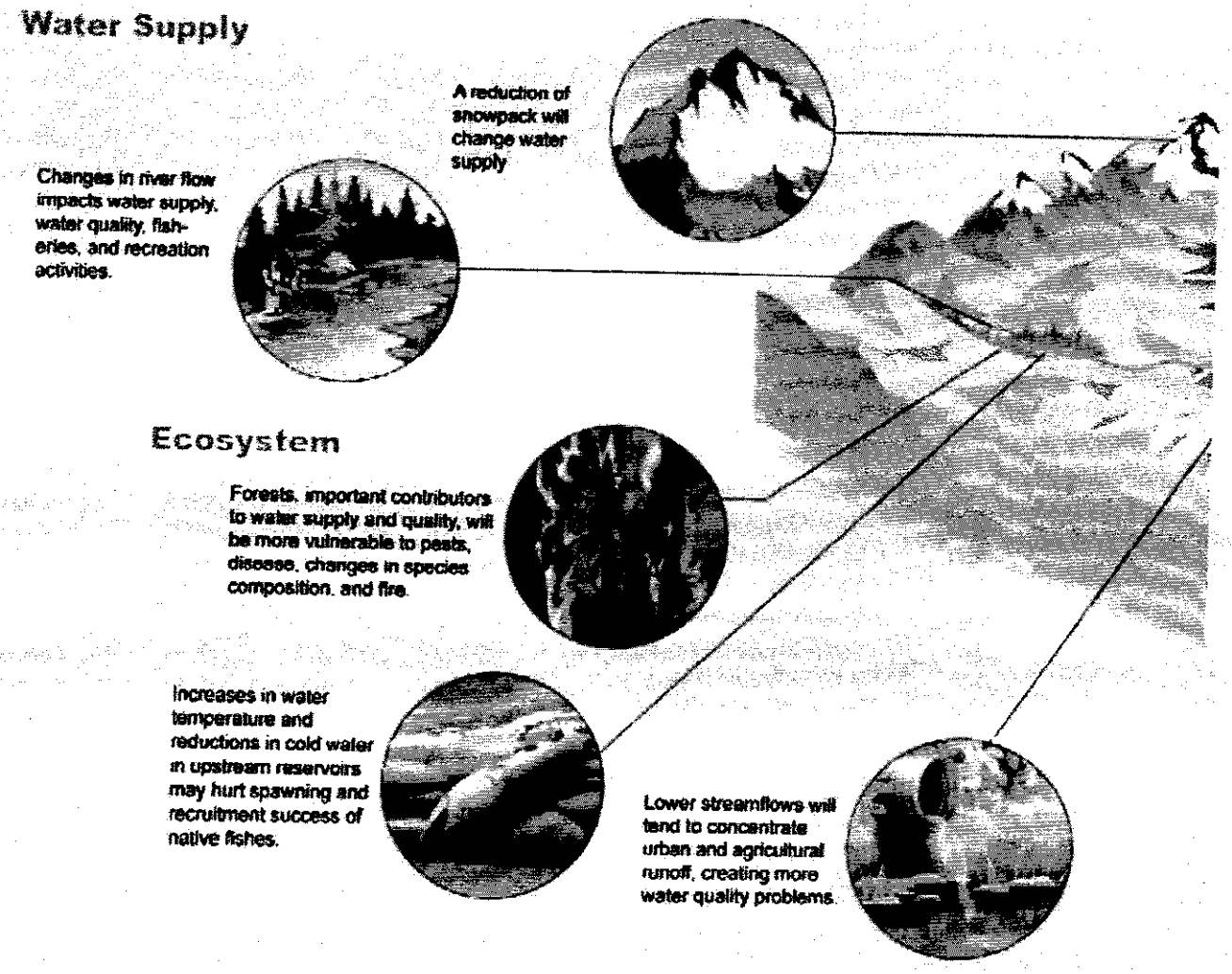
Read more on climate change in Volume 1 Chapter 5 Managing an Uncertain Future and Chapter 6 Integrated Data and Analysis. Find technical and support articles in Volume 4 Reference Guide.

Climate Change:

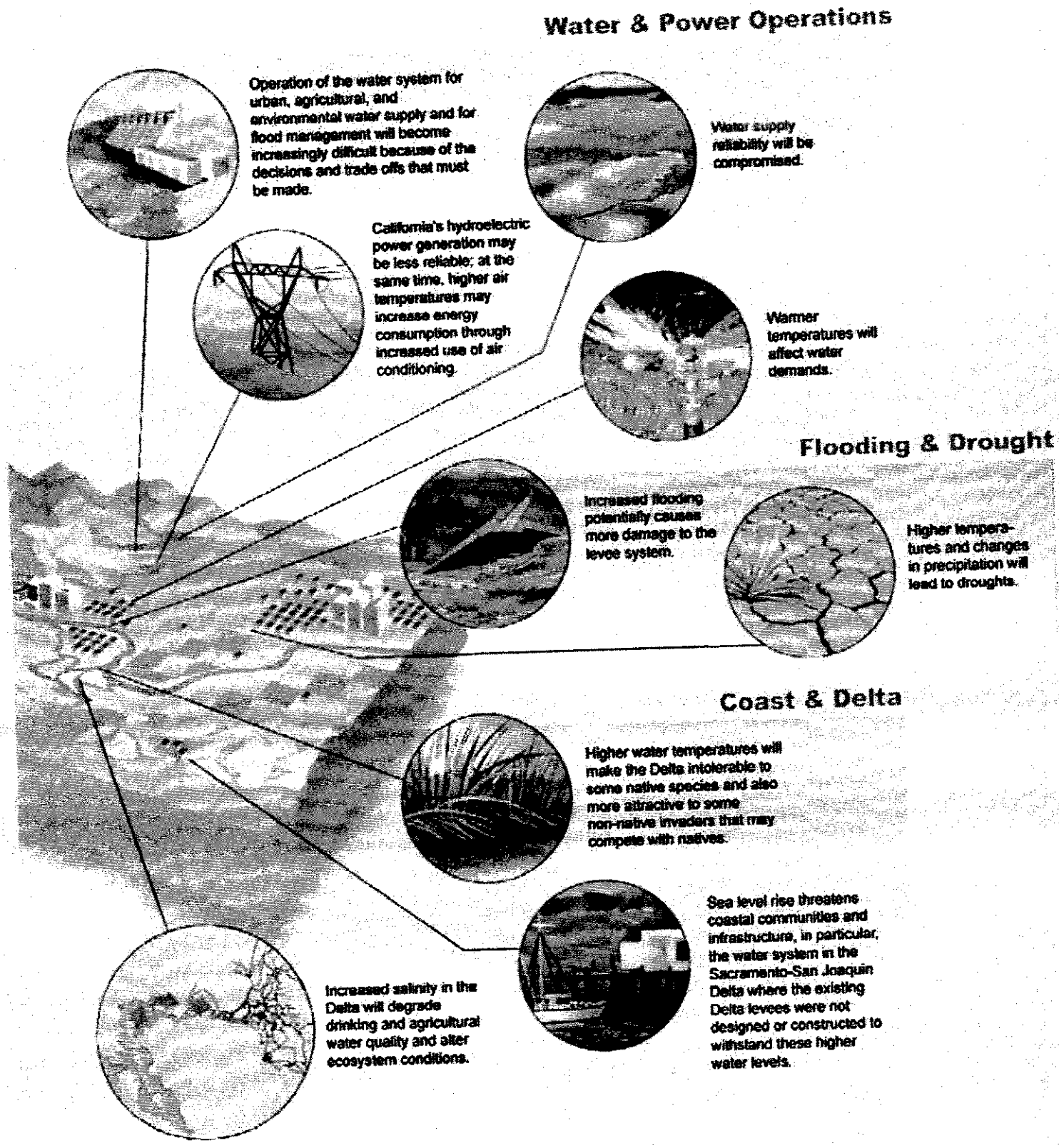
What are the Expected Impacts from These Changes?

Climate change is already having a profound effect on California's water resources as evidenced by changes in snowpack, river flows, and sea levels. Scientific studies show these changes will increase stress on the water systems in the future. Because some level of climate change is inevitable, the water systems must be adaptable to change.

The impacts of these changes will gradually increase during this century and beyond. California needs to plan for water system modifications that adapt to the following impacts of climate change:



Stressing Our Water Systems



Water Scenarios 2050:

What will California look like in 2050? Will the population growth keep pace with recent trends? Will the pattern of climate change continue? Will the protection of water quality and endangered species be driven mostly by lawsuits, creating a patchwork of legal requirements? We have no way of predicting the future, but we can construct some plausible scenarios. Future scenarios can be used to help us better understand the implications of future conditions on water management. Update 2009 made significant improvements to the scenarios by considering the potential effect of long-term climate change on future water demands. (See more on climate change in Highlights pages 8 through 11.)

The California Water Plan acknowledges that planning for the future is uncertain and that change will continue to occur. It is not possible to know for certain how population, water demand patterns, environmental conditions, the climate, and many other factors that affect water use and supply may change by 2050. To anticipate change, our approach to water management and planning for the future needs to incorporate consideration of uncertainty, risk, and sustainability.

Factors of Uncertainty

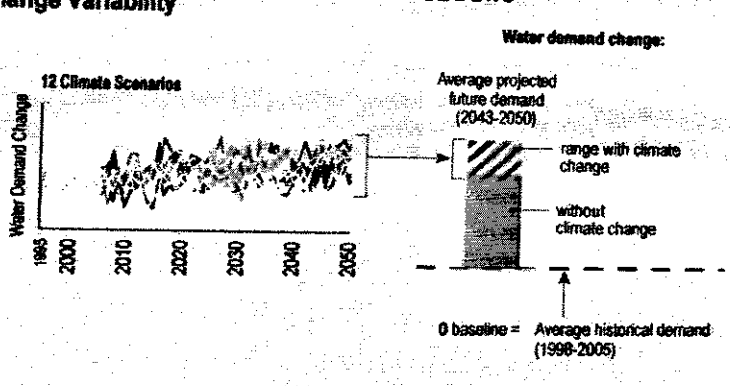
- Population
- Land Use
- Irrigated Crop Area
- Environmental Water
- Background Water Conservation

Update 2009 uses three future scenarios for year 2050 to illustrate how the water community would need to respond to a variety of future conditions. Regions respond by implementing a mix of resource management strategies. (See more about resource management strategies on Highlights pages 18 and 19 and examples of regional strategies on Highlights pages 20 and 21.) The title of each scenario—Current Trends, Slow & Strategic Growth, and Expansive Growth—tells us something about how different factors, like population, irrigated farmland, or background water conservation (plumbing code changes, natural replacement, actions water users implement on their own, etc.), are assumed to change over time. These are factors over which the water community has little control yet affect future water demand for the urban, agricultural, and environmental sectors.

Water Demand Changes and Climate Change Variability

The graph under each scenario represents future water demand change (the difference between the average demands for 2043-2050 and 1998-2005.) This change could be either an increase (above baseline) or a decrease (below baseline) in water use.

Climate change adds another dimension of variability to demand changes. In figure at right, historical period shows actual demand (blue line). Each colored line represents 1 of 12 climate scenarios. This variability is represented on the water demand change graph by the hatched area.



Factors That Shape Our Future

An uncertain future to which the water community will need to respond

Current Trends

Recent trends are assumed to continue into the future. Regulations are not coordinated or comprehensive, creating uncertainty for planners and managers. The state continues to face lawsuits, from flood damages to water quality and endangered species protections.

59.5 million* (22.8 million increase)

Continued development

8.6 million acres (0.7 mil. acre decrease)

1.0 additional MAF

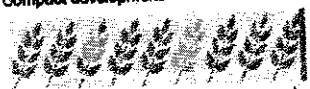
10% more efficient

Slow & Strategic Growth

Private, public, and governmental institutions form alliances to provide for efficient planning and development that is less resources intensive than current conditions. State government implements comprehensive and coordinated regulatory programs to improve water quality, protect fish and wildlife, and protect communities from flooding.

44.2 million (7.5 million increase)

Compact development



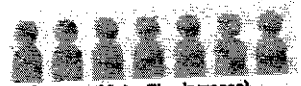
9.0 million acres (0.2 mil. acre decrease)

1.5 additional MAF

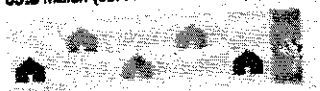
15% more efficient

Expansive Growth

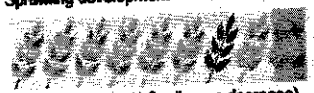
Future conditions are more resource intensive than existing conditions. Protection of water quality and endangered species is driven mostly by lawsuits. State government has responded on a case-by-case basis, creating a patchwork of regulations and uncertainty for planners and water managers.



69.8 million (33.1 million increase)



Sprawling development



8.2 million acres (1.0 mil. acre decrease)

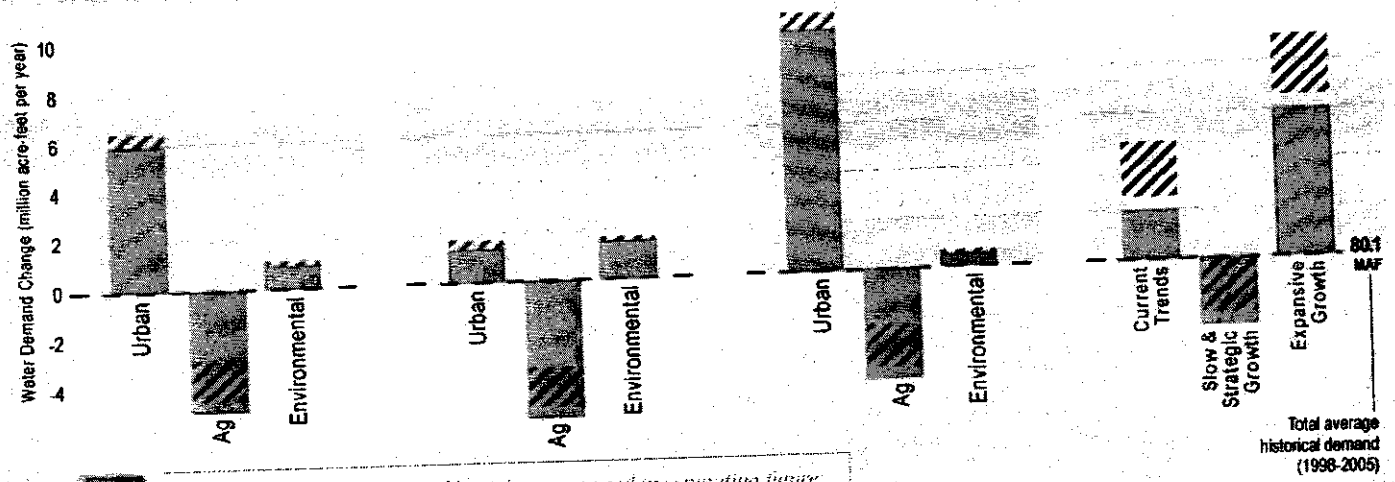
0.6 additional MAF

5% more efficient

The charts at the bottom of this page show net change in statewide water demand between 2005 and 2050 for each scenario. (See pages 16 and 17 for potential water demand changes for each hydrologic region.)

* Department of Finance population projection

2050 Water Demand Changes by Scenario



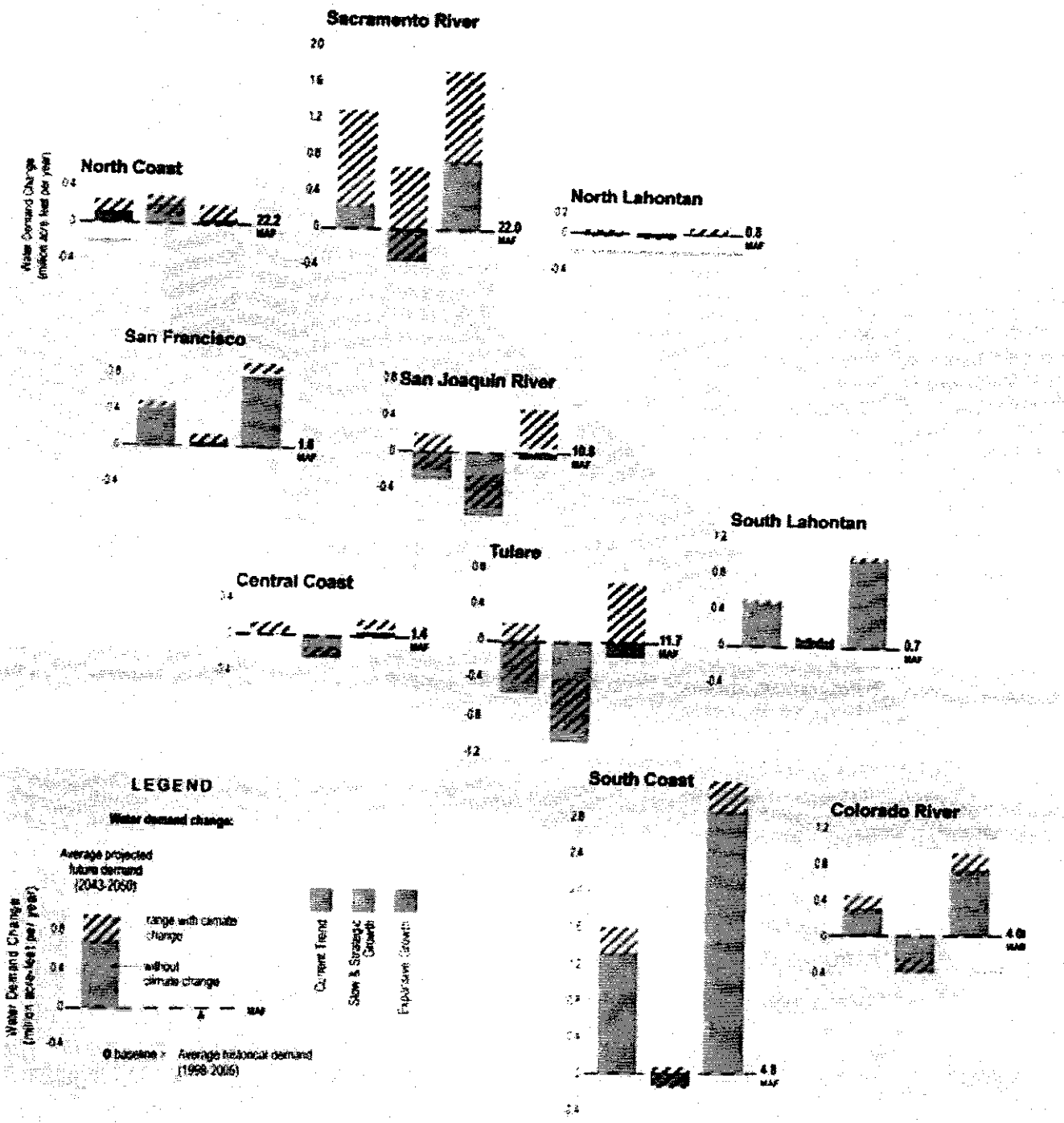
Combined Water Demand Change by Scenario

Read more on scenarios and how they were used in estimating future water demand in Volume 1, Chapter 5, Managing an Uncertain Future

Water Scenarios 2050:

Future Regional Water Demand Changes by Scenario

Hydrologic regions expecting higher population growth show higher changes in water demands. Water demand changes in Central Valley agricultural areas were most sensitive to the warmer and drier climate change scenarios.



Attachment 13

State Water Resources Control Board
California Environmental Protection Agency

-DRAFT-

Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem

Prepared Pursuant to the Sacramento-San Joaquin Delta Reform Act of 2009

July 20, 2010

Appendix B: Water Supply Modeling

Background

This appendix provides a rough estimate of the theoretical impact of the flow criteria on water supplies in the Central Valley and Delta. To assist Water Board staff, Department of Water Resources (DWR) Modeling Support Branch staff modeled the criteria using the latest version of the CALSIMII model. The main purpose of this modeling study is to: 1) estimate water supply impacts of meeting the criteria; and 2) determine to what extent the criteria conflict with the needs to preserve cold water in tributaries.

The latest version of the CALSIM model was used as the baseline for this modeling study. A similar version was used in the DWR March 2010 draft *State Water Project Delivery Reliability Report 2009*. Major assumptions for the baseline model run include:

- State Water Board D-1641 (implementing Bay-Delta Plan flow and salinity objectives)
- U.S. Fish and Wildlife Service's Delta Smelt Biological Opinion as released on December 15, 2008.
- National Marine Fisheries Service's (NMFS) Biological Opinion (BO) on the Long-Term Operations of the Central Valley Project and State Water Project as released on June 4, 2009.
- Water Year 2010 Interim Flows Project for San Joaquin River below Friant Dam/Mendota Pool.
- Full entitlements for CVP and SWP contractors.

Modeling Approach

Two model scenarios were performed and results compared with those from the baseline model run. Scenario A applied the Category A criteria to the baseline model, and Scenario B applied both Category A and B criteria to the baseline model. Some simplification of the criteria was required to expedite their representation in the model. The following describes various assumptions included in the two new model scenarios:

- The scenarios were created by superimposing the new criteria on D-1641 and other flow requirements already in the baseline model, with the higher requirement governing. As such, water supply impacts could be slightly less (and flows more variable) if the criteria completely replaced D-1641 flow requirements.
- Flow requirements in the baseline model remain unchanged in months not covered by the proposed criteria. Water quality requirements in the baseline model are not affected by the criteria and remain unchanged in all months.
- CALSIM II does not have the ability to model those criteria that are contingent upon the presence or absence of fish in the system.
- North-of-Delta CVP and SWP settlement contractor surface diversions were manually reduced in the model to provide the additional water needed to satisfy the criteria.

- Agricultural demands were reduced in the two scenarios to compensate for reduced surface diversions. Demands were reduced to levels that maintained groundwater pumping rates similar to those in the baseline.
- SWP and CVP exports to south of the Delta are automatically limited by the model to levels that are available after all flow and other criteria are met (i.e. storage withdrawals are not made from project reservoirs for SWP/CVP export purposes).
- In both scenarios OMR restrictions of >-1,500 cfs supercede the OCAP requirements already in the baseline during March, April, May and June, in Critical and Dry water year types. For other water year types the OCAP OMR requirements remain unchanged.
- The NMFS BO contains Shasta cold water pool storage requirements. The CALSIM II model can determine compliance with these requirements, but cannot use them as constraints for controlling operation of the model.
- CALSIM II limits flows attributable to the criteria to levels that would not cause flooding in the Delta or tributaries.
- The San Joaquin River (SJR) module of CALSIM II could not be modified in time for this study, so inflows to the Delta at Vernalis were developed by manually adding flow to the baseline output from that location as needed to satisfy the criteria. Baseline flows at Vernalis were not modified if they were already above the criteria. (Note: The model was run with the SJR criteria set at 75%, not 60% of unimpaired flow. As such the model results may slightly underestimate CVP/SWP delivery impacts.)

Model Results

The tables and discussion below compare the CALSIM II model results for Scenarios A and B against those for the baseline.

Table 1 presents the required reduction in deliveries in thousands of acre-feet (from the baseline) as needed to satisfy the criteria. Also shown is the effect the criteria would have on San Joaquin River flows at Vernalis. The results in Table 1 are averages over all water years from 1922 to 2003. As discussed further below, even with these delivery reductions, the criteria were not always met.

Table 1. CVP/SWP deliveries and San Joaquin River flows (in thousands of acre-feet) associated with criteria.

Study	Total CVP and SWP north-of-Delta delivery			Total CVP and SWP South-of-Delta delivery			Vernalis Flow		
	Delivery	diff.	pct. diff.	Total	diff.	pct. diff.	flow	diff.	pct. diff.
Baseline	3,355	-	-	4,906	-	-	3,024	-	-
Scenario A	1,109	-2,246	-67%	3,685	-1,221	-25%	4,876	1,852	61%
Scenario B	1,097	-2,258	-67%	3,876	-1,031	-21%	4,633	1,609	53%

When considering dry and critical years only over this same period, flow at Vernalis was increased by 97% on average for both scenarios and CVP/SWP north of Delta deliveries were reduced by 73% for both scenarios, while CVP/SWP south of Delta deliveries remained about the same as shown in Table 1 for both scenarios.

Table 2 presents the effect of the criteria on reservoir storage and compliance with cold water pool requirements. The results in Table 2 are averages over all water years from 1922 to 2003. Nearly all occurrences of dead storage at Trinity, Shasta and Folsom shown in Table 2 happened in association with dry and critical years. Reservoirs reaching dead storage levels also corresponded with criteria not being met. Likewise, compliance with NMFS BO cold water pool storage requirements was not always met.

Table 2. Reservoir storage and cold water pool impacts associated with criteria (in thousands of acre-feet)

Study	End-of-September storage (taf)				Number of months at dead storage (984 months total)				NMFS BO Shasta Cold Water Pool Storage		
	Trinity	Shasta	Oroville	Folsom	Trinity	Shasta	Oroville	Folsom	Req. #1 (87%)	Req. #2 (82%)	Req. #3 (40%)
Baseline	1,393	2,656	1,849	502	3	9	0	13	81%	69%	24%
Scenario A	1,179	2,442	1,674	454	33	40	0	40	67%	20%	21%
Scenario B	1,070	2,203	1,774	417	71	82	0	77	57%	17%	17%

Req. #1 = End of September storage > 2,200 TAF in 87% of years
Req. #2 = Previous end of September storage > 2,200 TAF & end of April > 3,800 TAF in 82% of years
Req. #3 = End of September storage > 3,200 TAF in 40% of years

For comparison, separate CALSIM II model runs of Scenarios A and B were performed with *all* surface water diversions north of the Delta turned off. This reduced occurrences of dead storage in Scenario A to a level similar to the baseline, and reduced them by

about a third for Scenario B. Eliminating all diversions also led to 83%, 32%, and 59% compliance with NMFS BO cold water pool requirements #1, #2, and #3 respectively.

Table 3 shows the effect of meeting the criteria on OMR and X2 position. In general, Old and Middle River reverse flows and X2 position were significantly improved by the criteria.

Table 3. Old and Middle River flows and X2 position associated with criteria.

Study	Old and Middle River flow (average monthly cfs)						X2 position (average monthly kilometer)									
	Jan	Feb	Mar	Apr	May	Jun	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Baseline	-3,647	-3,265	-2,848	874	348	-3,769	61	61	64	68	75	80	85	84	84	82
Scenario A	-1,585	71	1,286	2,376	5,458	1,422	58	56	55	56	61	75	86	84	84	82
Scenario B	-2,627	-1,482	-624	2,736	4,471	717	58	56	55	56	61	75	86	84	84	81

Note: For X2 position: Port Chicago = 65km and Chipps Island = 74km