

# California Water Plan Update 2009

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## Nearing the End

### Final Meeting Advisory Committee January 20, 2010

# California **Water Plan** Highlights

INTEGRATED WATER MANAGEMENT



Update 2009 • Department of Water Resources

# Process Recap Since Plenary Meeting

# Water Plan Activities

1. Update 2009 Pre-Final Draft released for October 14-15, 2009 Plenary Meeting
2. 62 Comment letters/emails received
3. 2 Steering Committee meetings – Nov & Jan
4. November 4-5 Tribal Water Summit
5. November 18 – Desalination RMS posted for public review and comment
6. November 24 – Workshops on Urban and Agricultural Water Use Efficiency RMS
7. Tribal Water Summit Planning Team met several times Oct – Dec; final meeting scheduled for January 27

**California Water Plan 2009**  
**Wednesday's Update** Feb. 27, 2008

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This weekly electronic newsletter is designed to keep you current on California Water Plan news. We welcome comments, suggestions and any news tips that may be of interest to water planners.

**Regional Workshops get under way next week in Southern California**

If you plan to attend, please don't forget to RSVP

- Tuesday, March 4, Desert Hot Springs. Meeting materials, including the Initial Draft Regional Report for the Colorado River Region, [can be found here](#).
- Wednesday, March 5, Apple Valley. Meeting materials, including the Initial Draft Regional Report for the South Lahontan Region, [can be found here](#).
- Thursday, March 6, San Diego. Meeting materials, including the Initial Draft Regional Report for the South Coast Region, [can be found here](#).

DWR encourages attendance by the public and representatives of water agencies and associations, local, state, tribal (recognized and non-recognized), federal government, watershed and community groups, and conservancies. Eight more Regional Workshops will be held across the state this year. [You can find more information about them here.](#)

**Free Delta Vision workshop to be held in Suisun City**

The Water Education Foundation is offering a free Delta Vision Workshop on Friday, March 7, in Suisun City. The free workshop will run from 8:45 a.m. to 5 p.m. and will outline the Delta Vision plan's recommendations and what they mean to you. Not only is the workshop free, organizers are giving all registered attendees a free box lunch. [Learn more here.](#)

**DV Blue Ribbon panel will meet tomorrow and Friday**

The Delta Vision Blue Ribbon Task Force will meet tomorrow and Friday in West Sacramento to continue developing a strategic plan to implement its vision for the California Delta. The meeting will focus on the Delta as an estuarine ecosystem, water and governance and strategic finance. [Read more.](#)

**RAND releases two water management studies**

The RAND Corporation has released two studies detailing uncertainties about future water-management. The first is "Presenting Uncertainty About Climate Change to Water-Resource Managers: A Summary of Workshops with the Inland Empire Utilities Agency," [find it here](#). The other report is "Preparing for an Uncertain Future Climate in the Inland Empire: Identifying Robust Water-Management Strategies," [find it here](#).

Click on links below for more information.

Upcoming Meetings Water Plan Web site

# Related Activities

1. Governor & Legislature passed comprehensive Water Package (SBx7 -- 1, 2, 6, 7 & 8) in November
2. Multi-State Agency Team preparing final 20x2020 Plan – out soon
3. DWR released final decisions for IRWM Regional Acceptance Process
4. Governor & Legislature in process of convening Delta Stewardship Council and Delta Conservancy
5. DWR and other State agencies developing work plans to implement provisions of new Water Legislation

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[Upcoming Meetings](#) [Water Plan Web site](#)

# 33-Month Collaboration Statistics

March 2007 – December 2009

Comparison w/  
Update 2005

135% of collaboration  
in  
55% of the time

Meeting	Number	Person Hours
Steering Committee	15	1308
Advisory Committee	9	4987
Regional Workshops	33	6740
Mgmt Strategy Workshops	37	1694
All-Regions Forum	2	1928
Plenary	3	3839
SWAN Workshops	9	1990
Scenarios Workshops	3	182
Climate Change TAG	4	464
Tribal Communication Committee	12	770
Tribal Water Summit Planning	10	870
Tribal Water Plenary	8	1739
Tribal Water Summit	1	5112
<b>Totals</b>	<b>147</b>	<b>31,623</b>

\* Not including briefings

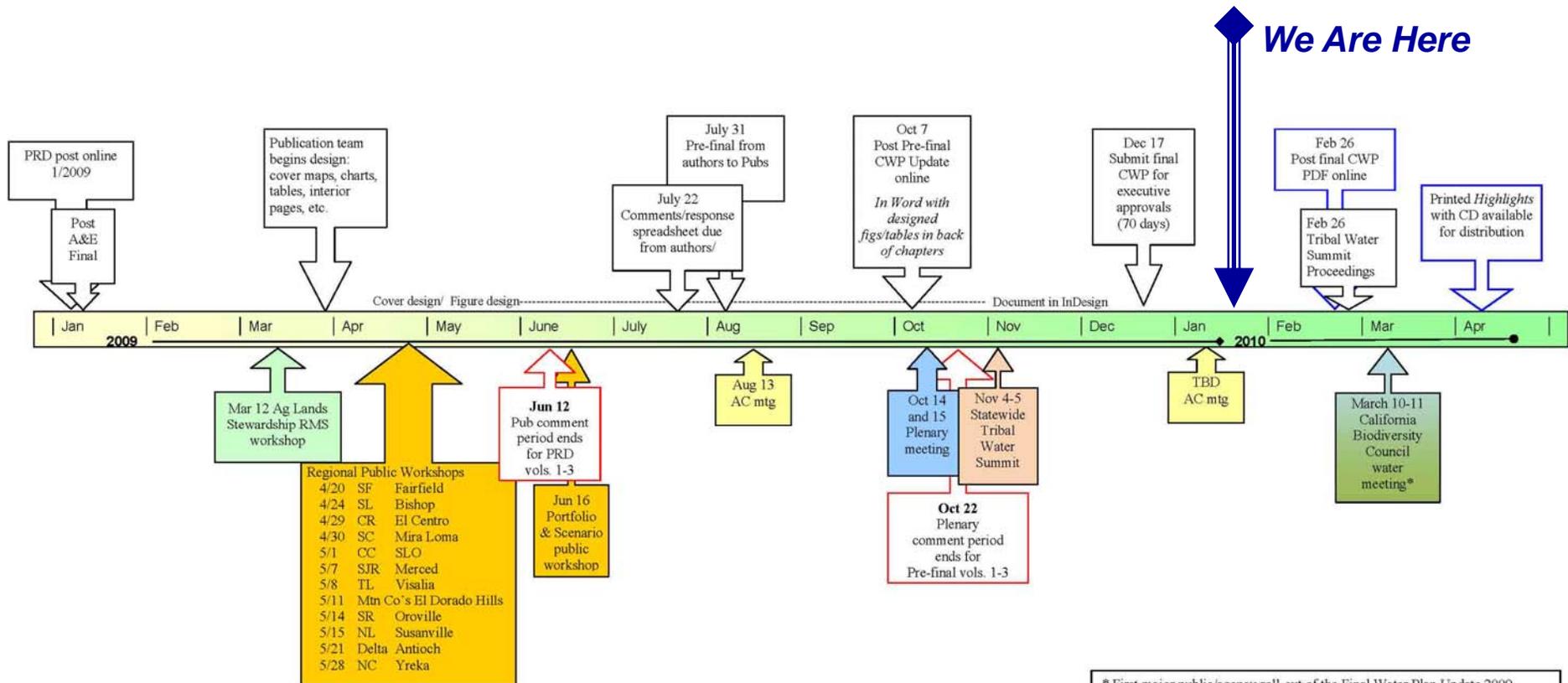
# Document & Venue Schedule

## Documents Above & Venues Below Timeline

2009

2010

### California Water Plan Update 2009 timeline, 2009 and 2010



\* First major public/agency roll-out of the Final Water Plan Update 2009

# Ways to Access Water Plan Information

- Visit the Water Plan Web Portal  
[www.waterplan.water.ca.gov](http://www.waterplan.water.ca.gov)

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Click on links below for more information.

Upcoming Meetings | Water Plan Web site



California Home | Governor Home | Amber Alert | Friday, February 29, 2008

Welcome to **California**

**DEPARTMENT OF WATER RESOURCES**  
PLANNING AND LOCAL ASSISTANCE

California Water Plan

The California Water Plan provides a framework for water managers, legislators, and the public to consider options and make decisions regarding California's water future. The Plan, which is updated every five years, presents basic data and information on California's water resources including water supply evaluations and assessments of agricultural, urban, and environmental water uses to quantify the gap between water supplies and uses. The Plan also identifies and evaluates existing and proposed statewide demand management and water supply augmentation programs and projects to address the State's water needs.

Our goal for the California Water Plan Update is to meet [State Code](#) requirements, receive broad support among those participating in California's water planning, and be a useful document for the public, water planners throughout the state, legislators and other decision-makers.

**California Water Plan News**

- **Water Plan eNews** – DWR and the CA Water Plan publishes a weekly electronic newsletter to keep you current on Water Plan news. We welcome comments, suggestions and any news tips that may be of interest to water planners, email us at [wpenews@water.ca.gov](mailto:wpenews@water.ca.gov).  
► [February 27, 2008](#) ► [eNews archives](#)
- **2008 Regional Workshops Announced** – DWR in cooperation with other State agencies, invites you to participate in a series of regional public workshops to gather and share information about the California Water Plan Update 2009. (02/20/2008)  
[More info...](#)
- **Delta Vision Workshop, March 7** – The Water Education Foundation presents a FREE one-day workshop to outline the Delta Vision Blue Ribbon Task Force implementation plan and includes a unique opportunity to provide input to key decision makers about the future of the Delta. The workshop is all-day on March 7, 2008 and will be held in Suisun City. (02/06/2008)  
[Workshop Date, Work Site](#)

- Subscribe to Water Plan eNews  
a weekly electronic newsletter  
[www.waterplan.water.ca.gov/enews](http://www.waterplan.water.ca.gov/enews)

# Pre-Final Draft Comments

# Distribution of Pre-Final Draft Comments

Source	General	Highlights	Vol. 1	Vol. 2	Vol. 3	TOTAL
62 Letters & Emails	5	5	8	28	16	62

# Preparing the Final Update 2009

## ➤ Changes reflect comments from

- Advisory and Steering Committees
- Members of the public
- Subject matter experts
- Technical reviewers

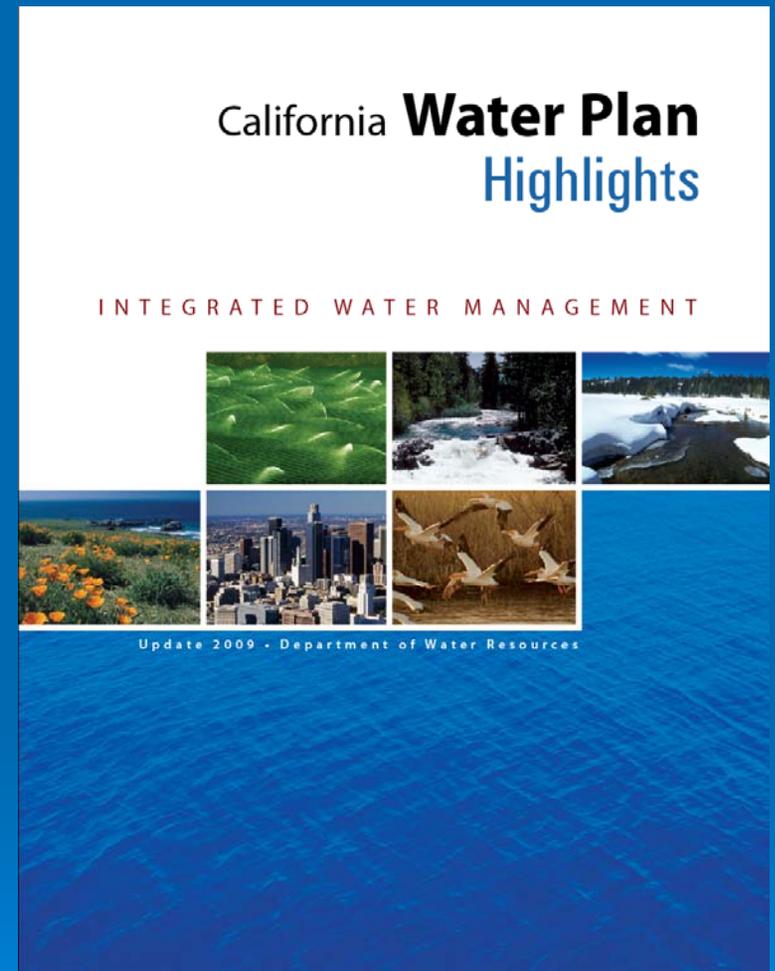
## ➤ Approval -to-print review (70-day process)

- Director's Policy Advisor
- Legislative Affairs
- Chief Counsel
- Public Affairs Office
- Deputy and Chief Deputy Directors
- Director
- Secretary for Natural Resources
- Governor

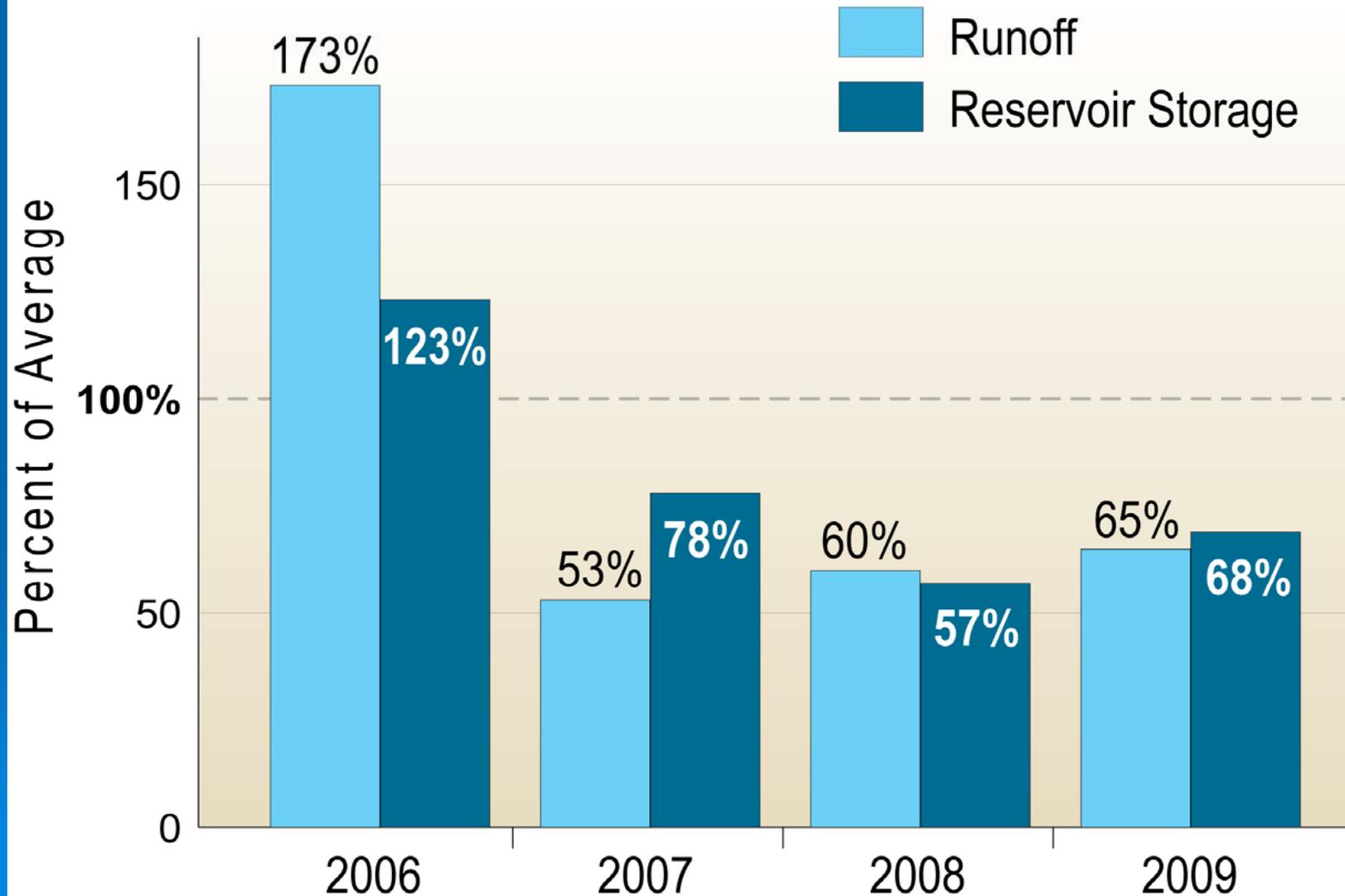
# Changes to Highlights

# Changes to Highlights

- Added graphic showing both runoff and storage 2006 – 2009
- Revised figure legends and added captions and sources
- Changed scenario name to “Slow & Strategic Growth”
- Updated numbers and added footnotes to RMS Summary Table
- Adding 2<sup>nd</sup> CD for Tribal Water Summit Proceedings & materials



# Statewide runoff and key reservoir storage for water years 2006-09



# Resource Management Strategies:

# A Range of Choices

Integrated water management undertakes water and flood management at all fronts and on many levels—regionally and statewide, for multiple uses and benefits, for sustaining watersheds, water uses, and water and flood management systems, while weighing the risks of uncertain futures.

The 27 resource management strategies presented here provide a range of choices and are the building blocks for this approach. The strategies are grouped by their intended outcome, and the potential benefits and implementation cost are presented for each strategy.

Potential Strategy Benefits <sup>1</sup>									
Provide Water Supply Benefit	Improve Drought Preparedness	Improve Water Quality	Operational Flex & Efficient	Reduce Flood Impacts	Environmental Benefits	Energy Benefits	Recreational Opportunities	Reduce GW Overdraft	Accumulated Cost by 2030 (\$ Billions)

## Reduce Water Demand

Water conservation has become a viable long-term supply option because it saves considerable capital and operating cost for utilities and consumers, avoids environmental degradation, and creates multiple benefits.

Strategy	MAF/year <sup>2</sup>	Potential Strategy Benefits	Accumulated Cost by 2030 (\$ Billions) <sup>3</sup>
Agricultural Water Use Efficiency	0.1 - 1.0 <sup>4</sup>		0.3 - 5.0
Urban Water Use Efficiency	1.2 - 3.1		2.5 - 6.0

## Improve Operational Efficiency & Transfers

California's water system responds to our need to move water from where it occurs to where it will be used.

Strategy	MAF/year <sup>2</sup>	Potential Strategy Benefits	Accumulated Cost by 2030 (\$ Billions) <sup>3</sup>
Conveyance—Delta	N/A		1.2 - 17.2
Conveyance—Regional/Local	N/A		N/A
System Reoperation	N/A		N/A
Water Transfers	N/A		N/A

## Increase Water Supply

California's communities are finding innovative ways to generate new supplies.

Strategy	MAF/year <sup>2</sup>	Potential Strategy Benefits	Accumulated Cost by 2030 (\$ Billions) <sup>3</sup>
Conjunctive Management & Groundwater Storage	0.5 - 2.0		N/A
Desalination - Brackish & Seawater	0.3 - 0.4		2.0 - 3.0
Precipitation Enhancement	0.3 - 0.4		0.1 - 0.2
Recycled Municipal Water	1.8 - 2.3		6.0 - 9.0
Surface Storage—CALFED	0.1 - 1.1		0.7 - 9.2
Surface Storage—Regional/Local (under development)	N/A		N/A

1. Actual resource management strategy benefits, e.g., reducing groundwater overdraft, will depend on how strategies are implemented.  
 2. Additional information is found in resource management strategies and Volume 5 Technical Guide.  
 3. Value is Net Water to account for water reuse among agricultural water users.

N/A= Not Available

As California changes, local agencies and governments continue to use different methods for managing water resources. Growing population, changing regulations, and evolving public attitudes and values are a few conditions that are influencing water decisions. No single response package will work for all areas of California. Facing an uncertain future, regions need to invest in an appropriate mix of strategies based on integrated regional water management plans that are diversified, satisfy regional and state needs, meet multiple resource objectives, include public input, address environmental justice, mitigate impacts, protect public trust assets, and are affordable.

## Improve Water Quality

Improved water quality can directly improve the health of Californians and our ecosystem.

Strategy	MAF/year <sup>2</sup>	Potential Strategy Benefits	Accumulated Cost by 2030 (\$ Billions) <sup>3</sup>
Drinking Water Treatment and Distribution	N/A		1.4/year
Groundwater/Aquifer Remediation	N/A		20.0
Matching Quality to Use	N/A		0.1
Pollution Prevention	N/A		21.0
Salt and Salinity Management	N/A		>10.0
Urban Runoff Management	N/A		N/A

## Practice Resource Stewardship

We must protect other resources as we make water supplies available for other beneficial uses.

Strategy	MAF/year <sup>2</sup>	Potential Strategy Benefits	Accumulated Cost by 2030 (\$ Billions) <sup>3</sup>
Agricultural Lands Stewardship	N/A		5.3
Economic Incentives (Loans, Grants, Water Pricing)	N/A		N/A
Ecosystem Restoration	N/A		N/A
Forest Management <sup>4</sup>	0.1 - 0.5		0.3 - 0.8
Land Use Planning and Management	N/A		N/A
Recharge Area Protection	N/A		N/A
Water-dependent Recreation	N/A		N/A
Watershed Management	N/A		0.5 - 3.6

## Improve Flood Management

Strategy	MAF/year <sup>2</sup>	Potential Strategy Benefits	Accumulated Cost by 2030 (\$ Billions) <sup>3</sup>
Flood Risk Management	N/A		N/A

4. Numbers are for Meadow Restoration only.

NOTE: The water supply benefits are not additive. Additional select unit cost information is found in Box 1-2 of Volume 2. Although presented individually, the resource management strategies are alternatives that can complement each other or compete for limited system capacity, funding, water supplies, or other components necessary for implementation. Assumptions, methods, data, and local conditions vary per strategy.

N/A= Not Available

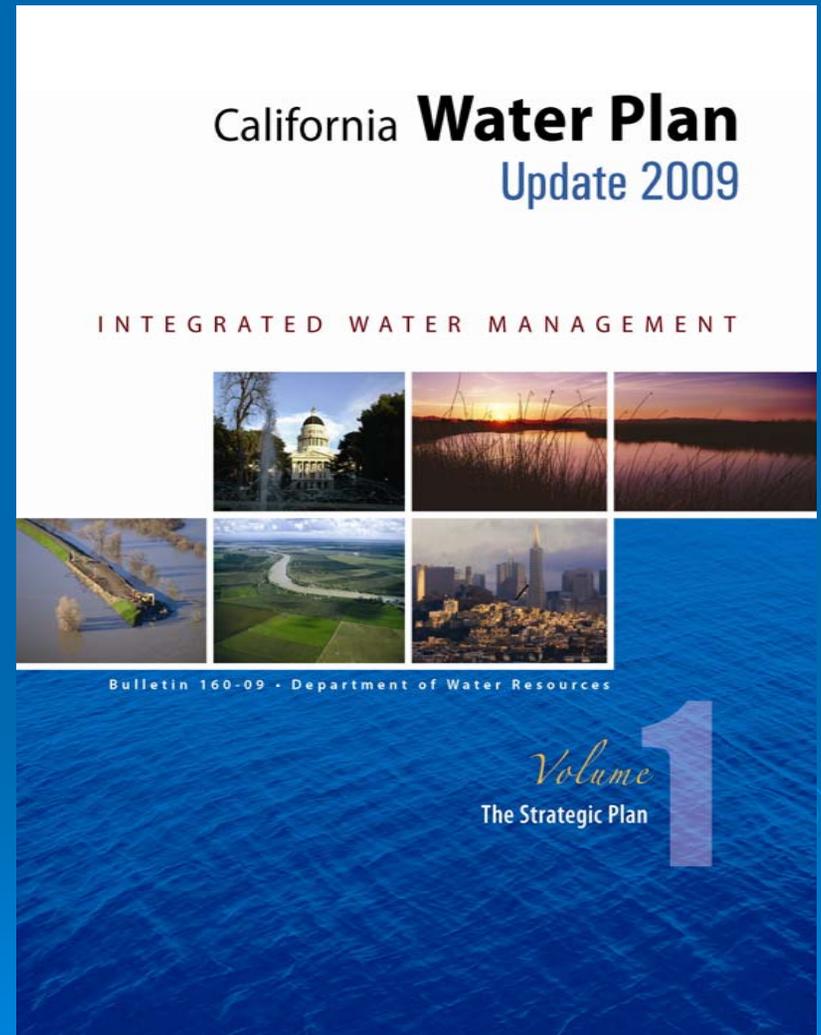


Find descriptions of 27 resource management strategies in Volume 2.

# Changes to Volume 1

# Changes to Volume 1

- **Converted from Word to Report Layout**
  - Added Front Matter / Acknowledgements
  - Added "Navigating CWP Volumes"
  - Includes report-quality tables & figures
- **Chapter 1 Introduction**
  - Revised *Process Diagram*
- **Chapter 2 Imperative to Act**
  - Added urgent challenges from Highlights
- **Chapter 4 CA Water Today**
  - Updated to include current events like Water Legislation Package
- **Chapter 7 Implementation Plan**
  - Checked 115+ related actions for currency and described linkages to provisions of Water Legislation Package

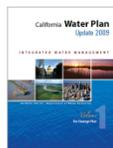


# Navigating Through Water Plan Volumes

California Water Plan Update 2009 presents the latest statewide strategic plan for water management – a roadmap to year 2050. Use this reader’s guide to navigate the many volumes that describe California’s diverse water conditions and statewide and regional integrated water management.

## The Roadmap

*Where are we and how should California proceed?*



## Volume 1 The Strategic Plan California Resources

Variable and Extreme  
Critical Challenges

- Climate change, population growth, dry years, floods, vulnerable ecosystems and Delta, water quality, aging infrastructure (levees), catastrophic events, data gathering, funding, disadvantaged communities

## Managing our Resources

Sustainability

- Water use efficiency, water quality, stewardship

Reliability

- IRWM, water/flood systems

Reduction of Risk and Uncertainty

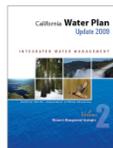
Companion State Plans

Integrated Data and Analysis

Statewide Objectives and Actions

## Options/decision-making

*What can we do?*

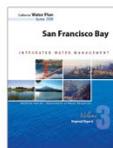


## Volume 2 Resource Management Strategies A Range of Choices

27+ management strategies to

- Reduce water demand
- Increase Water Supply
- Improve Water Quality
- Practice Resource Stewardship
- Improve Flood Management

*How does it look and work at the regional level?*



## Volume 3 Regional Reports

10 regions and 2 areas of interest

- Setting
- Water Conditions
- Relations with Other Regions
- Water and Flood Management
- Water Balances
- Looking to the Future
- Scenario Results

## Digging deeper

*Want more on what we know and what we want to know?*



## Volume 4 Reference Guide

An encyclopedic look

- Background on California Water Resources
- Water Resources Analysis
- Emerging Issues

*What’s the metadata on the data?*



## Volume 5 Technical Guide

Documentation

- Assumptions
- Data
- Analytical Tools and Methods



## Cover photos

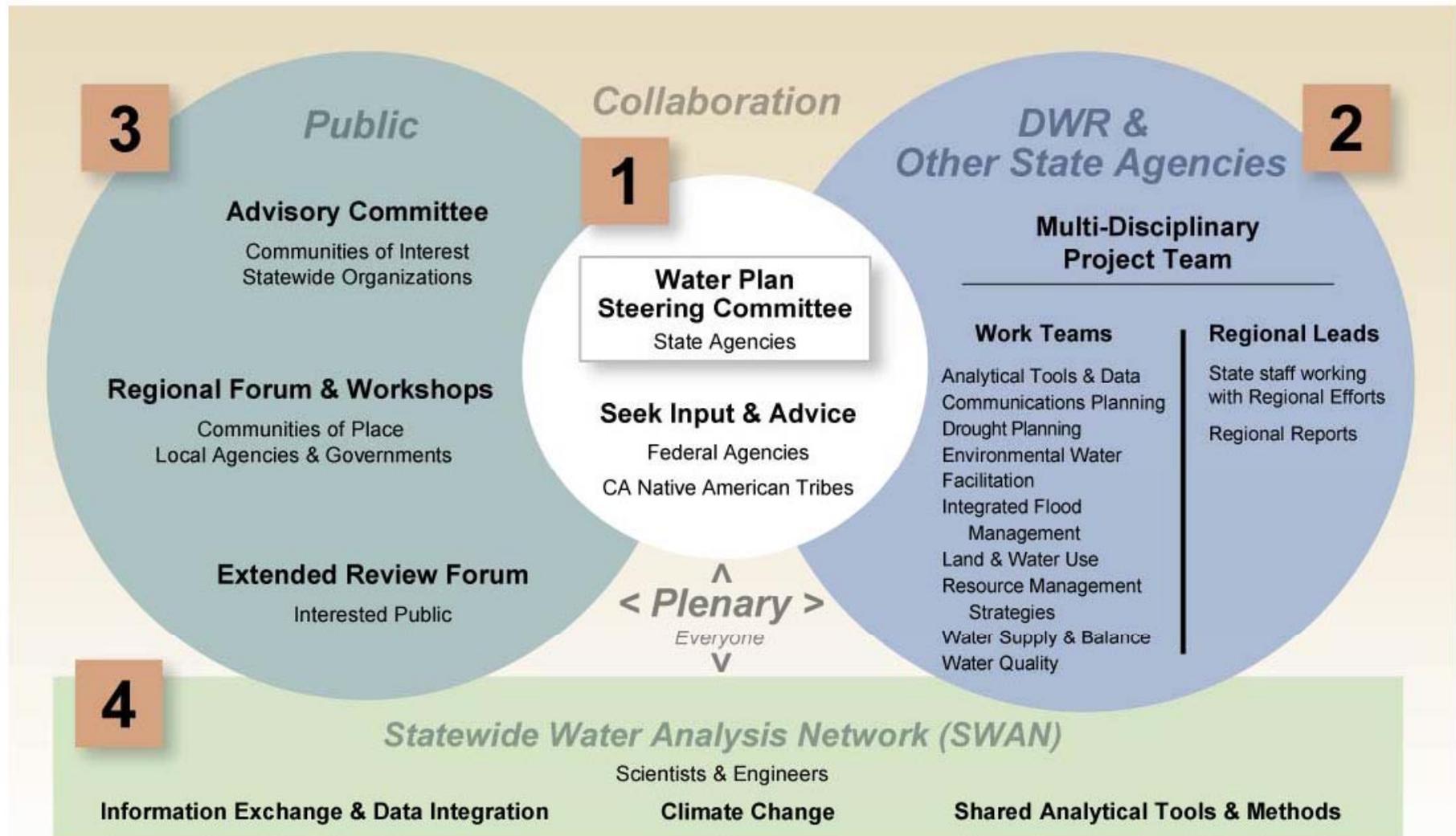
1. California State Capitol.
- 2-3. Sacramento-San Joaquin Delta.
4. Levee break.

5. Agriculture in the Sacramento-San Joaquin Delta.

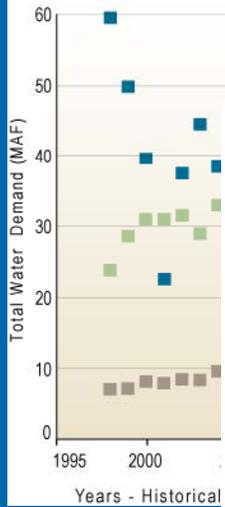
6. San Francisco skyline.

All photos courtesy of DWR Photo Lab.

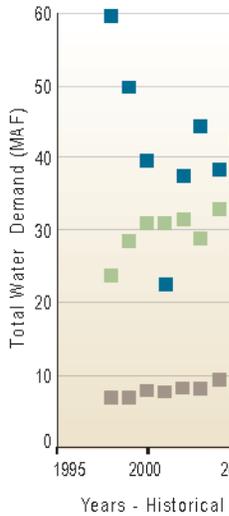
# Project Organization and Public Process California Water Plan Update 2009



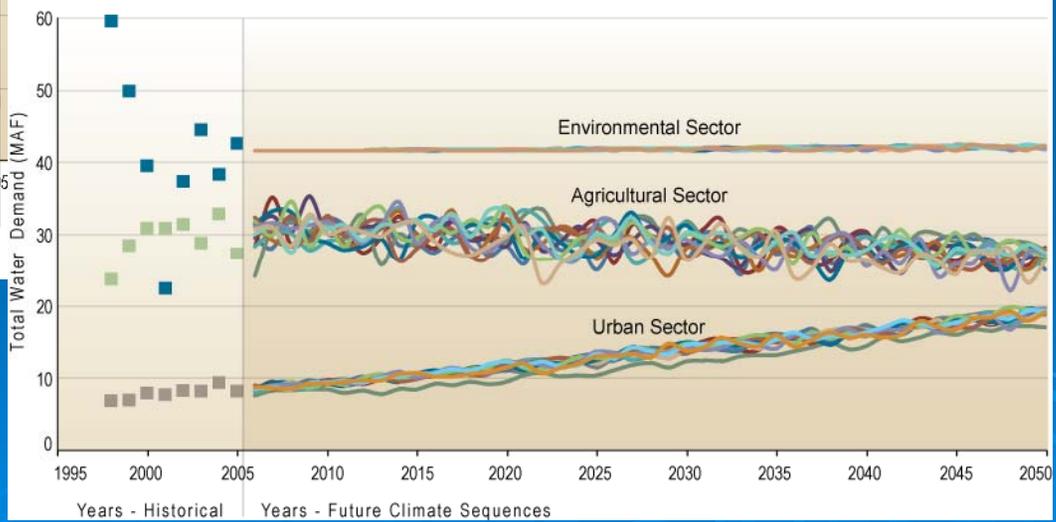
**Figure 6-4 Statewide annual water demand under 12 future climate sequences (Current Trends scenario)**



**Figure 6-5 Statewide annual water demand under 12 future climate sequences (Slow & Strategic Growth scenario)**



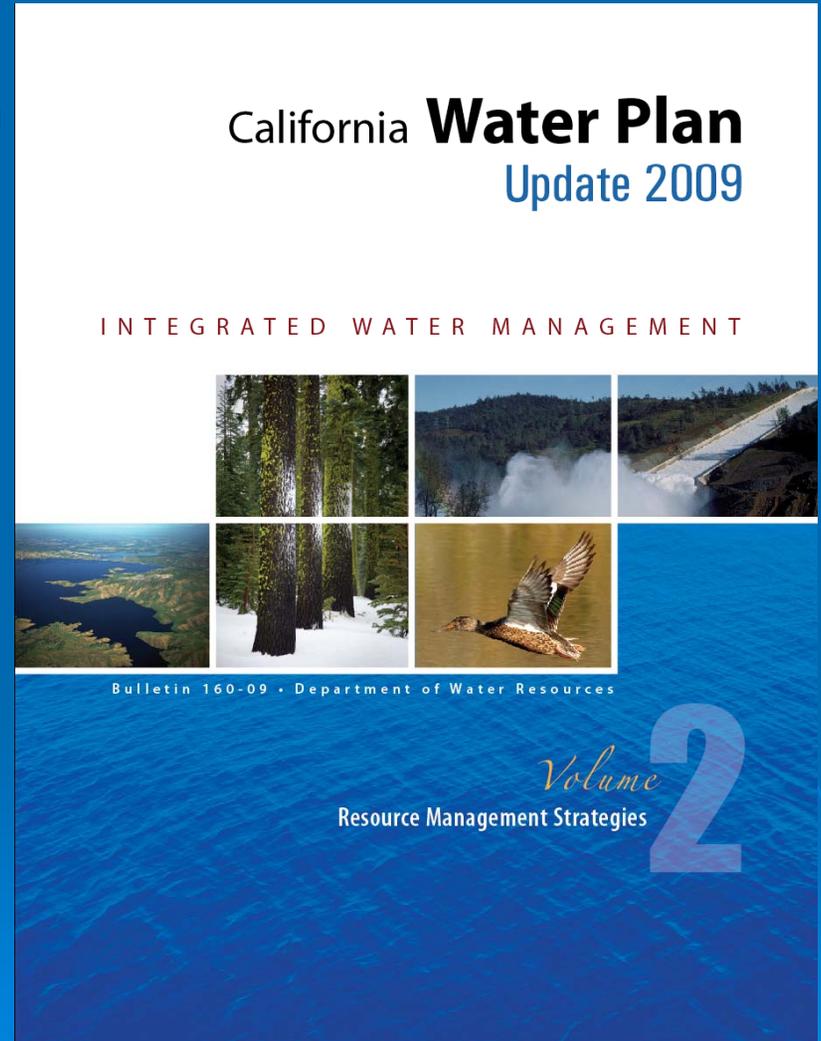
**Figure 6-6 Statewide annual water demand under 12 future climate sequences (Expansive Growth scenario)**



# Changes to Volume 2 Resource Management Strategies

# Changes to Volume 2

- **Converted from Word to Report Layout**
  - Included photos to represent content of each RMS chapter
- **Chapter 1 Introduction**
  - Revised/updated RMS Summary Table
  - Added table of unit water cost (some RMS)
- **Significant changes to Urban and Agricultural Water Use Efficiency RMS**
- **Changes to other RMS in response to comments**
  - Updated to include linkages to Water Legislation Package



VOLUME 2 - RESOURCE MANAGEMENT STRATEGIES  
CHAPTER 23

## Forest Management



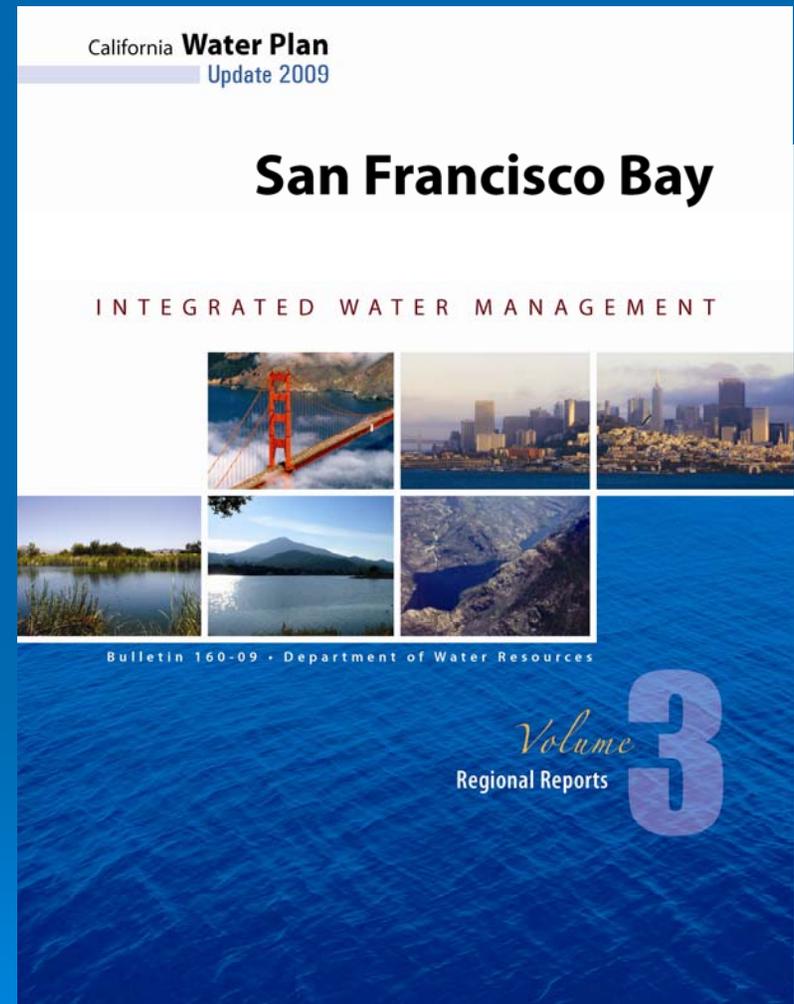
STRATEGY GROUP P – PRACTICE RESOURCE STEWARDSHIP



# Changes to Volume 3 Regional Reports

# Changes to Volume 3

- **Converted from Word to Report Layout**
  - Included photos to represent content of each Regional Report Booklet - separately bound
  - Each booklet has CD of Update 2009
- **Added Regional Water Portfolio Tables & Figures**
- **Added Regional Graphics for 3 Future Scenarios**
- **Added map showing regional inflows and Outflows**
- **Added Information to inside cover about relevant DWR Region Office**



## North Central Region Office

The Division of Integrated Regional Water Management is responsible for assisting public and private agencies as well as the general public with various water issues throughout the state. Therefore, it is necessary to maintain close contact with local interests to facilitate communication on water-related matters and to help carry out the work. To achieve this, four regional offices are strategically located throughout California. The offices are the Northern Region, North Central Region, South Central Region, and Southern Region.

Each of the regional offices offer technical guidance and assistance in water resource engineering, project management, hydrology, groundwater, water quality, environmental analysis and restoration, surveying, mapping, water conservation, and other related areas within the boundaries of their respective districts.

### These boundaries are divided by counties.

Northern Region in Red Bluff consists of 13 counties which include the following: Del Norte, Siskiyou, Modoc, Humboldt, Trinity, Shasta Lassen, Tehama, Plumas, Butte, Glenn, Colusa and Lake.

North Central Region in Sacramento consists of 24 counties: Mendocino, Sonoma, Napa, Yolo, Sutter, Yuba, Nevada, Sierra, Placer, El Dorado, Alpine, Tuolumne, Calaveras, Amador, Sacramento, San Joaquin, Solano, Contra Costa, Alameda, Santa Clara, San Mateo, San Francisco, Marin and a portion of Mono.

South Central Region in Fresno includes 11 counties: Santa Cruz, Monterey, San Benito, Stanislaus, Merced, Mariposa, Madera, Fresno, Tulare, Kings, and a portion of Kern.

Southern Region in Glendale encompasses 12 counties which include: San Luis Obispo, Santa Barbara, Ventura, Los Angeles, Orange, San Diego, Imperial, Riverside, San Bernardino Inyo and the other portions of Kern and Mono.



### Department of Water Resources phone number:

(916) 376-9600

### Street Address:

3500 Industrial Blvd.  
West Sacramento, CA 95691

### Mailing Address:

PO Box 942836  
Sacramento, CA 94236

### Regional Contact for the Water Plan

Pierre Stephens jrstephe@water.ca.gov (916) 376-9656

### Website:

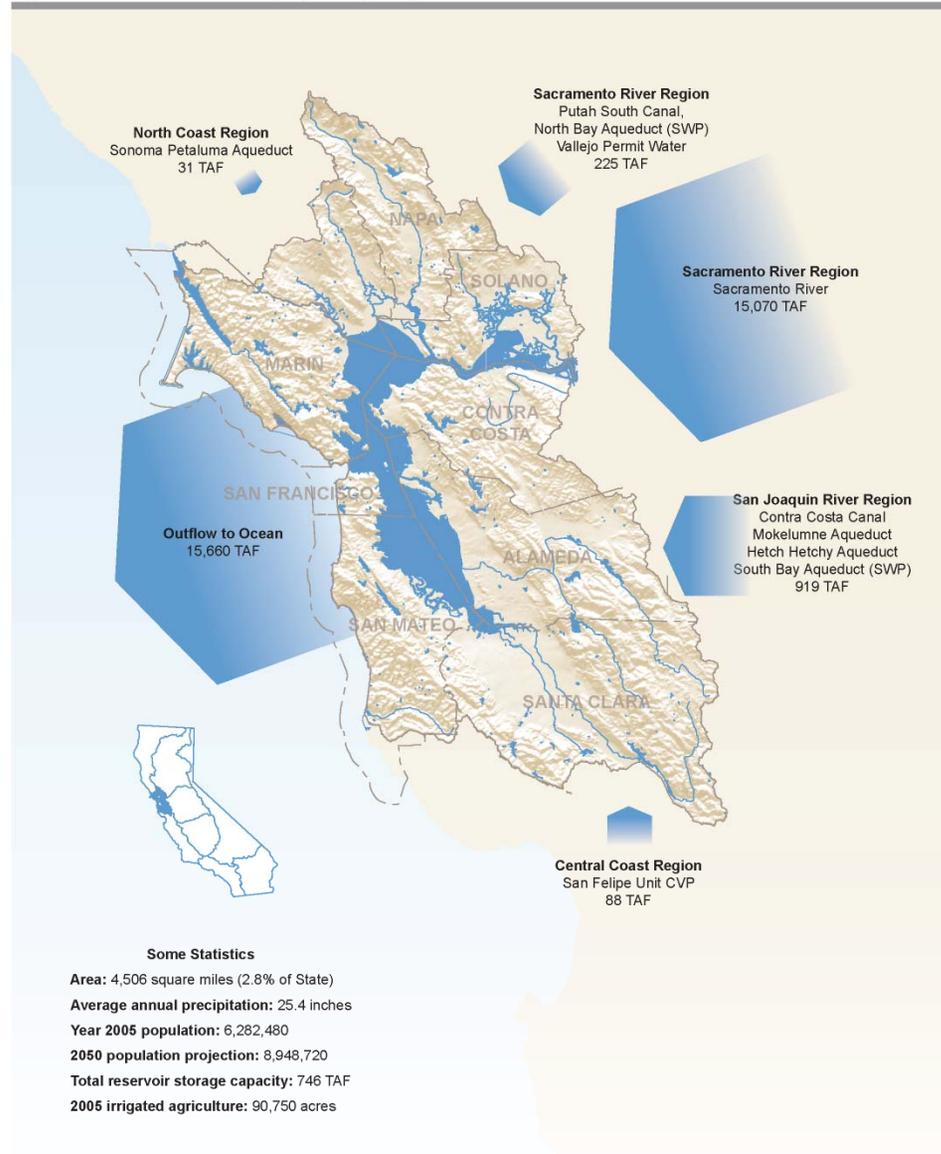
<http://www.cd.water.ca.gov/>



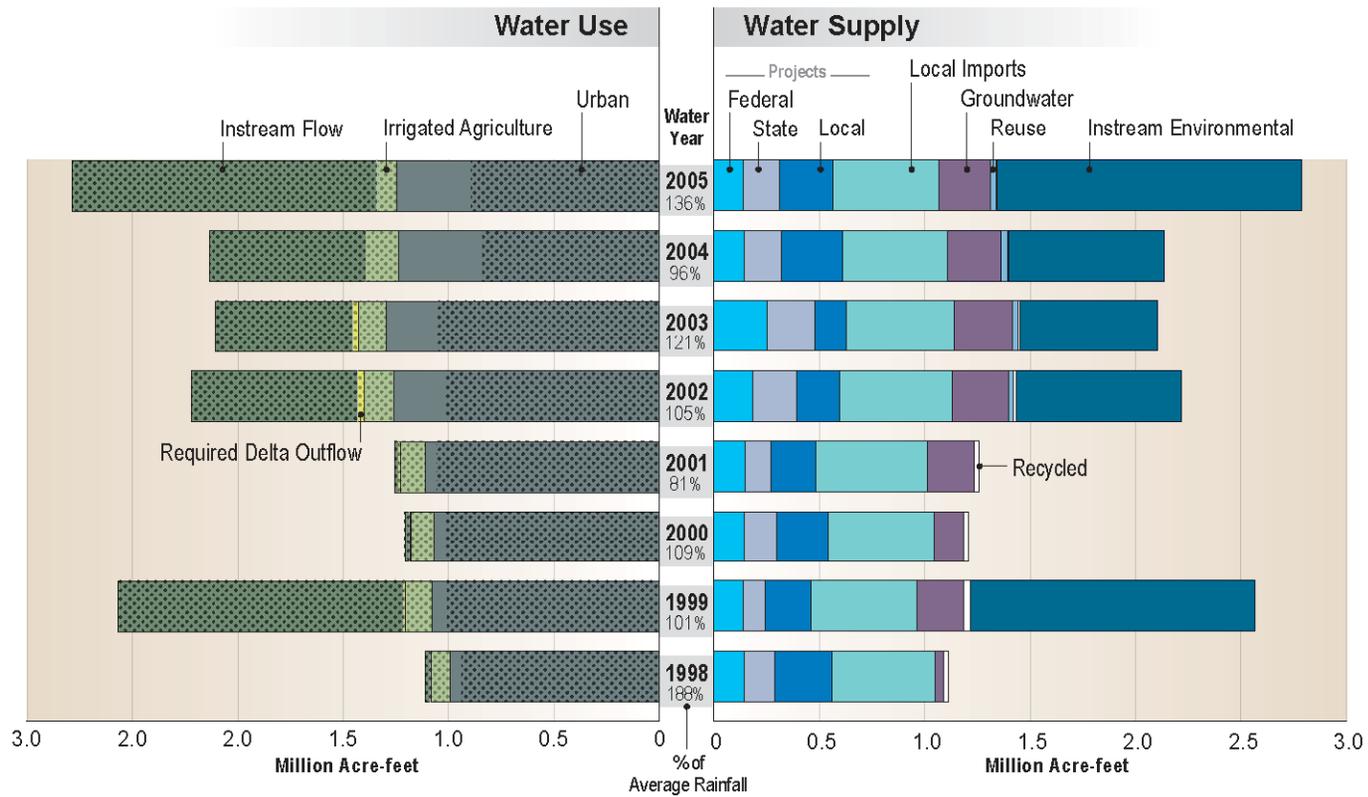
### Cover Photos:

- 1 Aerial view of Golden Gate Bridge. Photo courtesy of DWR Photo Lab.
- 2-3 San Francisco skyline. Photo courtesy of DWR Photo Lab.
- 4 Russian River Watershed: Photo courtesy of the Russian River Watershed Council and RMC Water and Environment.
- 5 Portion of Marin Municipal Water District's service area--Mount Tamalpais in background with San Francisco Bay in the foreground: Photo courtesy of Marin Municipal Water District
- 6 Aerial view of Hetch Hetchy Reservoir: Photo courtesy of San Francisco Public Utilities Commission (SFPUC) and RMC Water and Environment.

Figure SF-1 San Francisco Bay Hydrologic Region: inflows and outflows in 2005

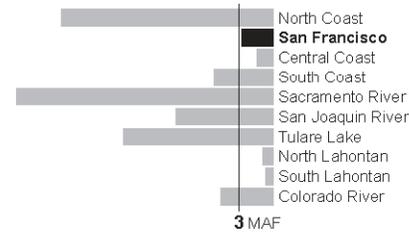


# San Francisco



**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)*

**Comparison of 2005 total water use among hydrological regions**



**Table SF-2 San Francisco Hydrologic Region water balance summary (taf), 1998–2005**

San Francisco Bay	Water year (percent of average precipitation)							
	1998 (188%)	1999 (109%)	2000 (109%)	2001 (81%)	2002 (98%)	2003 (89%)	2004 (98%)	2005 (129%)
<b>Water Entering the Region</b>								
Precipitation	11,438	6,784	6,644	4,908	6,061	5,539	6,072	8,047
Inflow from Oregon/Mexico	0	0	0	0	0	0	0	0
Inflow from Colorado River	0	0	0	0	0	0	0	0
Imports from Other Regions	764	926	823	872	950	1,157	1,163	1,175
<b>Total</b>	<b>12,202</b>	<b>7,710</b>	<b>7,467</b>	<b>5,780</b>	<b>7,011</b>	<b>6,696</b>	<b>7,235</b>	<b>9,222</b>
<b>Water Leaving the Region</b>								
Consumptive Use of Applied Water * (Ag, M&I, Wetlands)	363	545	394	415	474	438	452	394
Outflow to Oregon/Nevada/Mexico	0	0	0	0	0	0	0	0
Exports to Other Regions	0	0	0	0	0	0	0	0
Statutory Required Outflow to Salt Sink	23	1,353	22	20	787	651	739	1,444
Additional Outflow to Salt Sink	664	589	727	759	662	706	518	569
Evaporation, Evapotranspiration of Native Vegetation, Groundwater Subsurface Outflows, Natural and Incidental Runoff, Ag Effective Precipitation & Other Outflows	11,146	5,408	6,234	4,795	5,052	4,774	5,397	6,630
<b>Total</b>	<b>12,196</b>	<b>7,895</b>	<b>7,377</b>	<b>5,989</b>	<b>6,975</b>	<b>6,568</b>	<b>7,106</b>	<b>9,037</b>
<b>Storage Changes in the Region</b>								
[+] Water added to storage								
[-] Water removed from storage								
Change in Surface Reservoir Storage	76	-37	-25	-56	-37	40	-39	52
Change in Groundwater Storage **	-70	-148	115	-153	73	88	168	133
<b>Total</b>	<b>6</b>	<b>-185</b>	<b>90</b>	<b>-209</b>	<b>36</b>	<b>128</b>	<b>129</b>	<b>185</b>
<b>Applied Water * (compare with Consumptive Use)</b>	<b>1,060</b>	<b>1,192</b>	<b>1,158</b>	<b>1,214</b>	<b>1,288</b>	<b>1,290</b>	<b>1,237</b>	<b>1,180</b>

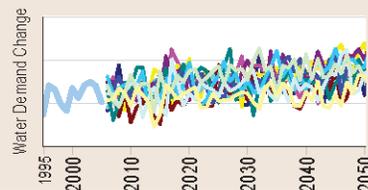
\* Definition - Consumptive use is the amount of applied water used and no longer available as a source of supply. Applied water is greater than consumptive use because it includes consumptive use, reuse, and outflows.

**Figure SF-6 2050 Water Demand Changes**

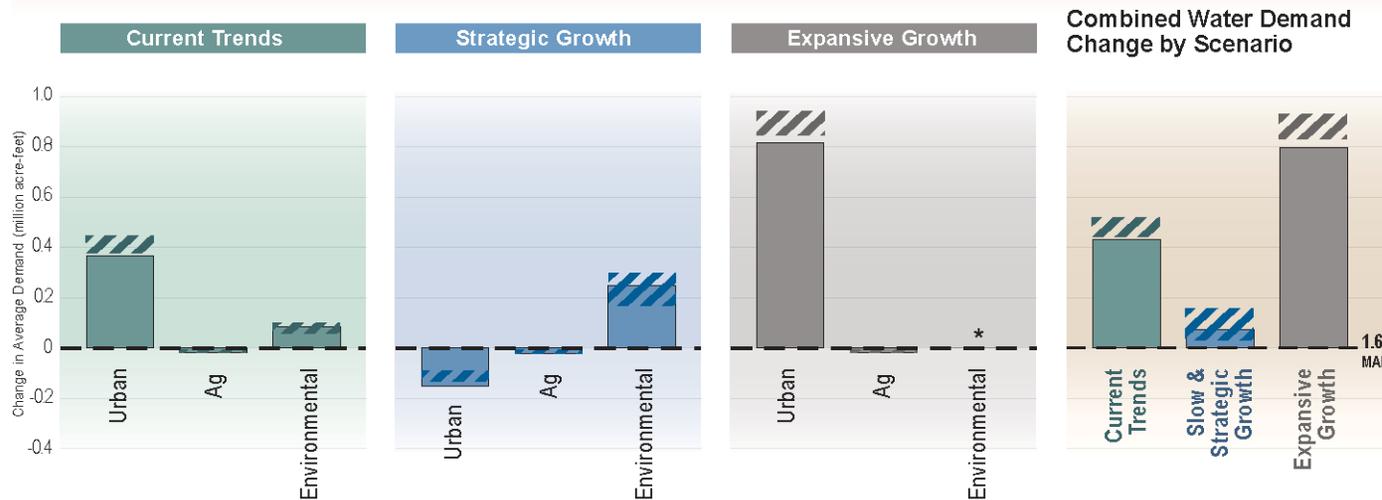
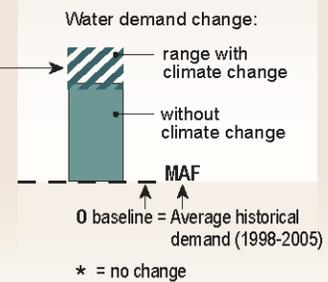
**Water Demand Changes and Climate Change Variability**

The graph under each scenario represents future water demand change (the difference between average historical water demand for 1998-2005 and projected future average demand for 2043-2050.) 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.



**LEGEND**



## Appendix C. Selected References

Bay Area Regional

California Departm  
Web site: [ww](#)

Napa County. 2005  
[napawatershc](#)

Online Source: Lar

San Francisco Basi

San Francisco Bay

San Francisco Bay  
Bay Conserv.

Solano Agencies Ir

The Green Gate. N  
Area. [www.n](#)

The Tomales Bay I

Watershed Manage  
[ca.gov/rwqct](#)

### Water Quality

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Nonpoint Source P  
Resources Cc

Regional Water Qu

Regional Water Qu

San Francisco Bay  
[swrcb.ca.gov](#)

State Water Resou  
Control Boar

## San Francisco Bay Hydrologic Region. Appendix B - Water Quality

## Appendix B. Water Quality

### Surface Water Pollution Issues

The main pollution challenges are associated with agricultural and urban and rural runoff.

**Toxic Pollutants.** San Francisco Bay and reservoirs around the San Francisco Bay area have elevated levels of mercury in fish tissue due to historical mercury mining and past mining activities. Large amounts of contaminated sediment from local watersheds include the Bay, the Guadalupe River (Walker Mine) and Walker Creek in Marin County. Significant amounts of methylmercury (contaminant in the environment) from contaminated sediment adopted Basin Plan amendments to improve mercury in San Francisco Bay, the Central Valley, and the Sacramento-San Joaquin River Delta.

**San Francisco Bay Seaport/Vessel Water Quality.** San Francisco Bay is a growing pollution threat as they have native species, disrupted food webs, and other water contact recreation -- San Francisco Bay is highly invaded estuaries in the world. It worked with the Department of Fish and Game and the recent *California Aquatic Invasive Species* in January 2008. The plan focuses on an assessment of the primary introduction and control of nonnative species with agency partners.

**San Francisco Estuary, Water Diversions.** San Francisco Bay freshwater flows are among the most important and biological conditions in the Estuary. The Estuary is trapped upstream by the dams, canals, and projects, which provide vital water to in throughout the state. The San Francisco Bay Water Board, the Central Valley Water Board (together to maximize positive results for

## San Francisco Bay Hydrologic Region. Appendix A - Flood Management

## Appendix A. Flood Management

### Historic Floods

#### Flood Parameters

Table SFA-1, Record floods for selected streams, is based on US Geological Survey records. The selected stations were selected from all USGS gaging stations in the hydrologic region, according to the criteria in Box SFA-1.

#### Flood Descriptions

**Early Floods.** Records of flooding in California have been kept for over 150 years. A devastating flood in 1861-1862 (the "Great Flood") inundated large areas of the West Coast, including the San Francisco Bay area. The Napa River has flooded Napa Valley numerous times, often causing widespread losses of structures and damage to agricultural lands.

**Repeated Flooding.** Several San Francisco Bay region streams have a history of repeated flooding. Corte Madera Creek has damaged San Anselmo, Ross, Kentfield, Larkspur, Fairfax, and vicinity numerous times, notably in 1914, 1951, 1955, 1958, 1960, 1962, 1963, 1967, 1969, 1982-1983, 1986, and 2006. Berryessa Creek in San Jose floods about every four years. The Guadalupe River flooded downtown San Jose and Alviso in 1862, 1895, 1911, 1955, 1958, 1963, 1969, 1982, 1986, and 1995. The Napa River flooded Napa 27 times between 1862 and 1997, and has also flooded St. Helena.

**Table SFA-1 Record floods for selected streams, San Francisco Bay Hydrologic Region**

Stream	Location	Mean annual runoff (taf)	Peak stage of record (ft)	Peak discharge of record (cfs)
Guadalupe R.	above Highway 101, at San Jose	57	14.6	6,070

### Box SFA-1 Selection Criteria

- The watercourse must be a natural stream with a watershed of at least 100 square miles.
- The station must have a reasonably continuous record of discharge from 1996 to the present.
- The station must be far enough from other stations on the same river to reasonably represent a separate condition.
- Stations in well defined watercourse locations such as deep canyons are omitted, unless particularly important to the overall flood situation.

# Status of Vol. 4 Reference Guide & Vol. 5 Technical Guide

# Questions & Comments

