

# California **Water Plan** **Highlights**

California Water Plan Update 2009 (Bulletin 160-09)  
Administrative Draft, October 28, 2008

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**\*\*\*print document front and back\*\*\***

**Note to reader of this administrative draft:**

Because the analysis is still under way, many of the graphics are placeholders or just descriptions of what a graphic may present when available. Some text will need to be modified or added to capture the results.

Each set of facing pages (2) is under a single major heading. Once the message content of the *Highlights* is settled, page layout, including photographs, can be completed. Text and related graphics will be reorganized on 2-page spreads.

This draft has 24 pages. If more material is added that changes the page count, it will need to be in increments of 4 pages at a time due to the printing method.

**The California Water Plan Update 2009  
is organized into five volumes:**

**Volume 1: The Strategic Plan**

**Volume 2: Resource Management Strategies**

**Volume 3: Regional Reports**

**Volume 4: Reference Guide**

**Volume 5: Technical Guide**

The Department of Water Resources and its partners completed the final California Water Plan Update 2009 and the Water Plan Highlights briefing book in December 2009. The first four volumes of the update, the Highlights document, and the \_\_\_\_\_ **will there be a video?** \_\_\_\_\_, are contained on the CD and DVD attached below. All volumes of the update and related materials are also available online at [www.waterplan.water.ca.gov](http://www.waterplan.water.ca.gov). For printed copies of the Highlights, Volume 1, 2, or 3, call 1-916-653-1097. If you need this publication in alternate form, contact the Public Affairs Office at 1-800-272-8869.

**\*\*\*insert holder for CD and DVD on inside of front cover\*\*\***

## Director's Message

\*\*\*insert 1 page message signed by director\*\*\*

## California's Water Resources -- Variability

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\*\*\*insert full page graphic\*\*\*

### California Water Balance

- Map of CA showing the 10 hydrologic regions, each with 3 cylinders to represent water use for wet, average, and dry years, each divided into ecosystem, agricultural, and urban portions to show regional distribution of water use
- Show statewide water supply cylinders for each of the years 1998 through 2005 side-by-side, each divided into instream environmental, reuse/recycling, groundwater, state/federal projects, Colorado River project, and local projects.
- Show each water supply cylinder flowing down (arrow) into its corresponding statewide applied water use cylinder, all shown side-by-side.

California's water resources vary significantly from year to year. Eight recent years show a sample of this variability for water supply and water use. The water source shows where water comes from each year and the applied water use shows how water was used by urban and agricultural sectors and dedicated to the environment. On average, each year about 2 million acre-feet more groundwater is used than what naturally recharges. In addition, about 120 million acre-feet of precipitation in an average year either evaporates, is used by native vegetation, provides rainfall for agriculture and wetlands, or flows out of the state or to salt sinks.

## California's Water Resources -- Variability

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California is often recognized for its diversity in cultures, ecosystems, geography, and water resources. However, “variable” may be a more accurate term to describe its water resources. Precipitation, which is the root of water supplies, varies from place to place, season to season, and from year to year. Most of the state’s snow and rain fall in the mountains in the north and eastern parts of the state, and most water is used in the valleys and coastal plains. The state’s ecosystem, agricultural, and urban water users have variable needs for the quantity, quality, timing, and place of use. The water system faces both the threat of too little water to meet needs during droughts and too much water during floods.

Given this variability, the purposes of California’s large (State/federal) and smaller (local/regional) projects and programs are to work together to make water available at the right places and times. In the past, this system on a statewide basis has allowed California to meet most of its agricultural and urban water management objectives and flood management objectives in most years. Generally, during a single dry year or two, surface and groundwater storage can maintain most water deliveries. Longer droughts can create numerous problems, including extreme fire danger, economic harm to urban and rural communities, loss of crops, and the potential to degrade water quality in some regions, in addition to critically low water reserves.

Update 2005 began the process of developing water balances to show sources of water and water used for individual years. With Update 2009, statewide balances for eight years (1998 through 2005) are available – future updates will expand this practice to include year 2006 and beyond. Year \_\_\_\_ was the driest in this eight-year sequence; statewide precipitation was \_\_ percent of average. Year \_\_\_\_ was the wettest in this sequence; statewide precipitation was \_\_ percent of long-term average. The eight year sequence did not include any major floods. This sequence by no means encompasses the possible range of far wetter and far drier years in the record.

California’s water supplies come from many different sources which vary significantly by region. During dry periods, less water is dedicated to the environment and agriculture. Dry years require greater reliance on groundwater. Growing recognition of deteriorating ecosystems, growing population, and climate change promises even more variability in the future.

## California Water Today – Imperative to Act

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For many decades, the 1928 through 1932 drought was used as a basis for designing major portions of California's water system. Similarly, floods in 1907 and 1909 prompted the construction of many of the levees that now line the rivers in the Central Valley. Conditions in California today are much different than when most of the water system was constructed, and improvements to the system have not kept pace with changing conditions.

### Drought

California's most recent extended multi-year drought spanned years 1987-1992. The years 1976 and 1977 produced a very severe two-year drought that took California's major surface storage reservoirs to the lowest levels in history. Today, we are facing the threat of our next major drought. After a dry year in 2007, spring 2008 was the driest on record within the Sacramento River watershed, a major source of water for California's farms, cities, and ecosystems. The initial estimate of water allocation to the State Water Project (SWP) made in early October 2008 called for only 10 (?) percent of contract amounts, matching the lowest allocation in SWP history. Water reservoir levels in 2008 rivaled the low levels reached in 1977. Because of two back-to-back dry years, not even a wet winter will end the drought.

Although the current drought appears to be comparable to that faced in 1977, conditions in California today have changed dramatically since 1977:

- The state's population is larger by nearly 75 percent, a growth of more than 16 million people.
- There have been significant losses of water to California's cities and farms from the Colorado River due to growing needs of other states along the river, from the Owens River watershed due to reallocations for environmental needs, and from the Central Valley Project Improvement Act (CVPIA) dedication of water for environmental uses.
- There are more restrictions on how water is moved within the state, especially through the Sacramento-San Joaquin Delta, often recognized as hub of California's water delivery system.
- Climate change threatens to make future droughts even more severe (see Climate Change on following pages).

These result in much less flexibility in operating the water system than existed in 1977.

## California Water Today – Imperative to Act

### Flooding

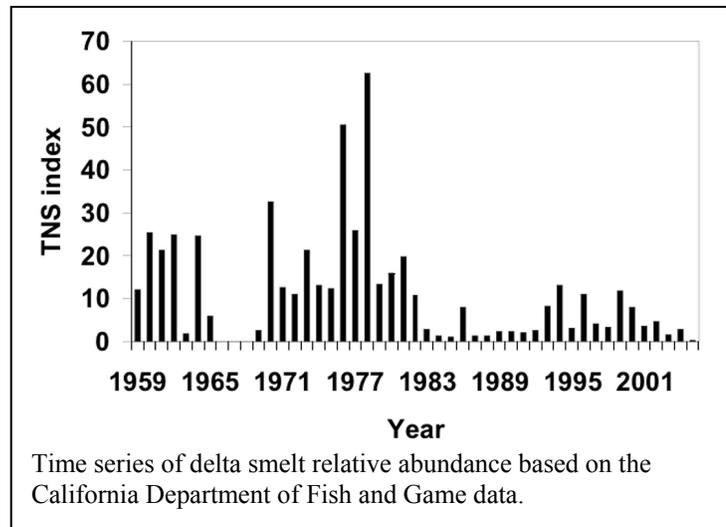
Over the years, major storms and flooding have taken many California lives, caused significant property losses and resulted in extensive damage to public infrastructure. A combination of recent factors has put public safety and the State's financial stability at risk for even greater calamity from flooding in the future. These include:

- Escalating development in floodplains increases the potential for flood damage to homes, businesses, and communities.
- California's flood protection system, comprised of aging infrastructure with major design deficiencies, has been further weakened by lack of maintenance.
- Court decisions have resulted in greater liability to State government when flooding occurs.
- Climate change threatens to increase the frequency and intensity of flooding.

Much of the state's flood system is also part of its water supply system.

### Ecosystem

The ecosystem in many areas of the state is in decline, with perhaps the most obvious examples occurring in the Sacramento-San Joaquin Delta. One example is the decline in pelagic or open water fish (delta smelt, longfin smelt, striped bass, and threadfin shad). Intensive research suggests that several factors, including lack of suitable habitat, competition with invasive species, toxicity, and water operations contribute to the decline. To improve conditions for delta smelt, a 2007 federal court ruling restricted the amount of water that could be diverted from the Delta for the State Water Project and federal Central Valley Project.



### Financial Crisis

The recent global financial crisis has made it even more difficult to make needed water system improvements. State and regional budget shortfalls because of lower revenues from taxpayers and a tightened credit market may delay new projects and programs.

See Volumes 1 and 3 for more detail

## **Climate Change – Increasing Stress on the Water System**

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By and large, California's reservoirs and water delivery systems were designed, and operating rules have been developed, from historical hydrology on the assumption that the past is a good guide to the future. With global warming, that assumption is no longer 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.
- The average early spring snowpack in the Sierra Nevada has decreased by about 10 percent, a loss of 1.5 million acre-feet of water in storage. The seasonal snowpack of the Sierra Nevada is California's largest reservoir of surface storage.
- Sea level along California's coast rose 7 inches.
- Flood peaks in the state's rivers have increased.
- Climate patterns are more variable.

### **What More is Expected?**

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

- California's mean temperature may rise 3.5 degrees to 11 degrees Fahrenheit.
- Sierra Nevada snowpack will decrease by 25 to 40 percent by mid-century, a storage volume about four to six times that of Folsom Lake. Up to 90 percent reduction in snowpack can be expected, especially in the northern Sierra.
- The 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 estimate a sea level rise between 7 and 55 inches, with the potential for higher rises, along California's coast.
- Salinity in the Delta will increase.

## **Climate Change – Increasing Stress on the Water System**

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### **What are the Expected Impacts from These Changes?**

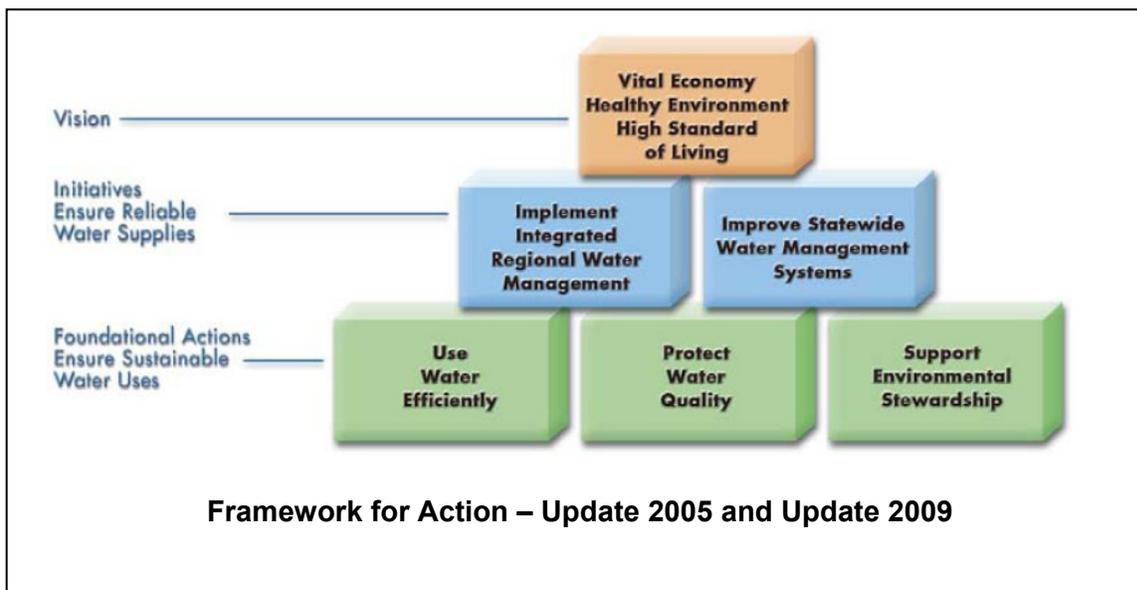
The impacts of these changes will gradually increase during this century. California needs to plan for water system modifications that adapt to these impacts of climate change:

- Increased threat of flooding potentially causes more damage to the levee system.
- Sea level rise threatens coastal communities and, in particular, the water system in the Sacramento-San Joaquin Delta where the existing Delta levees were not designed to withstand these forces.
- Water supply reliability will be compromised by many factors.
- Operation of the existing water system for urban, agricultural, and environmental water supply and for flood management will become increasingly difficult because of the decisions and trade offs that must be made.
- Lower streamflows will tend to concentrate agricultural runoff and urban wastewater discharges creating more water quality problems.
- Forests, important contributors to water supply, will be more vulnerable to pests, disease, changes in species composition, and fire.
- Warmer temperatures will affect water demands.
- Increased salinity in the Delta will degrade drinking and agricultural water quality and alter ecosystem conditions.
- Higher water temperatures will make the Delta intolerable to some native species and also more attractive to some non-native invaders that compete with natives.
- Increases in water temperature and reductions in cold water in upstream reservoirs may hurt spawning and recruitment success of native fishes.
- Climate change will reduce the reliability of California's hydroelectric operations, which constitute the state's largest source of greenhouse gas emissions-free energy.
- Higher air temperatures may increase energy consumption.

Climate change is already having a profound effect on water resources as evidenced by changes in snowpack, river flows, and sea levels. Scientific studies show these changes will increase stress on the water system in the future.

**See Volumes 1 and 4 for more detail**

## Update 2009 – California’s Water Plan



The California Water Plan and updates have been important sources of information for water planners since 1957. Unlike prior Water Plan updates, which were primarily products of the Department of Water Resources, Update 2009 truly can be viewed as the state’s Water Plan. It has benefited from the first interagency California Water Plan steering committee representing 20 State government agencies with jurisdictions over different aspects of water resources. In addition, a 40-member advisory committee, expanded regional outreach, and coordination with federal agencies provided broad participation in plan preparation.

*California Water Plan Update 2005* followed a new direction for statewide resource planning by promoting and supporting two major initiatives: (1) integrated regional water management and (2) improved statewide water management systems. The two initiatives (see figure Framework for Action) are supported by three foundational actions: (1) use water efficiently, (2) protect water quality, and (3) support environmental stewardship.

### Water Plan Vision for 2050

California has integrated, reliable and secure water resources and management systems that:

- Enhance public health, safety, and quality of life in all its communities
- Sustain economic growth, business vitality, and agricultural productivity
- Protect and restore California’s unique biological diversity, ecological values, and cultural heritage

The water plan is a strategic planning document that describes the role of State government and the growing role of California’s regions in managing the state’s water resources. Update 2009 integrates companion planning documents of other State agencies, providing further evidence that this update is California’s Water Plan.

## Update 2009 – California’s Water Plan

Update 2009 uses the same framework presented in Update 2005, but enhances the planning approach by incorporating consideration of uncertainty, risks, and sustainability into planning for the future:

- **Uncertainty.** There are enormous uncertainties facing water managers in planning for the future. The goal is to recognize existing uncertainties, anticipate future uncertainties, and to reduce the uncertainties to the extent possible, especially those associated with climate change.
- **Risks.** Each undesirable event, such as drought or flood, has a certain chance of occurring and a set of consequences should it occur. By reducing the uncertainties, the “true” risks can be better understood and incorporated into planning for the future.
- **Sustainability.** Given the uncertainties and risks in the water system, some management strategies may provide for more sustainable water supply, flood management, and ecosystem than another set of management strategies.

### Sustainability

A system that is sustainable should meet today’s needs without compromising the ability of future generations to meet their own needs. A sustainable system generally provides for the economy, the ecosystem, and equity.

Over the past few decades, questions have been raised about how sustainable are our ecosystems and water, land, and other uses given current management practices and expected future changes. California’s water resources are finite and require more careful management for sustainability of resources than has been practiced during the first 150 years of the state’s history.

To achieve sustainability, water and resource managers and planners must transition from the past model that places value primarily on water supply yield and move to valuing the sustainability of the system.

Some observations about the Update 2009 strategic planning process are:

- Update 2009 builds upon the framework presented in Update 2005.
- Recognizing that change will continue to occur and that additional uncertainties and risks are likely to surface in the future, water management must be dynamic, adaptive, and durable.
- Given changing conditions, each future Water Plan update must continue to evolve by including improved data, analytical tools, and information management and exchange.
- Incorporating the concept of resource sustainability into the planning is an ongoing process or approach that will continue to be developed in future Water Plan updates.

See Volume 1 for more detail

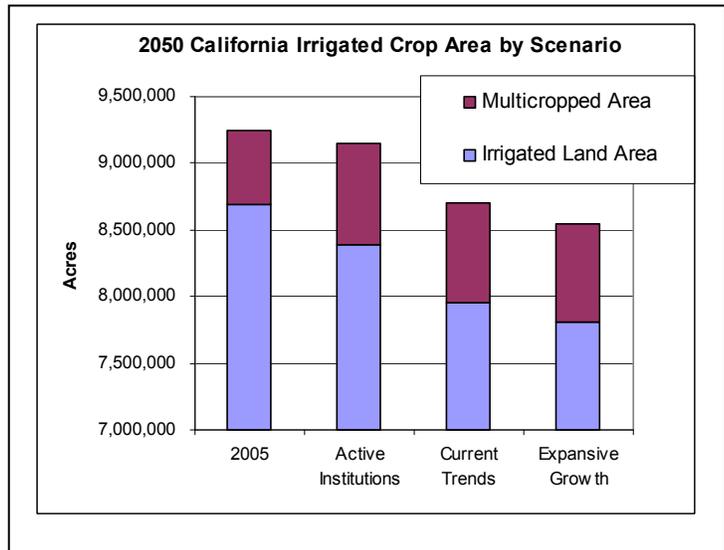
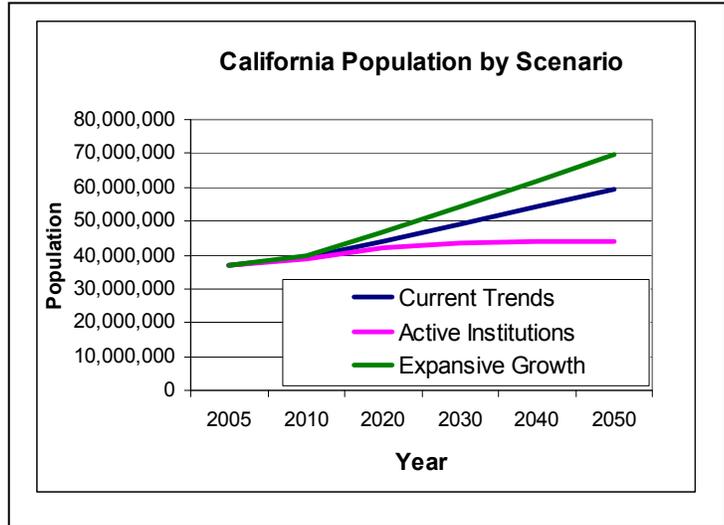
## Water Use 2050 – Consider a Range of Conditions

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 may change between today and 2050. By considering a range of different plausible future conditions (scenarios), Update 2009 provides broad information on what future water use may be.

This Water Plan uses three baseline scenarios to help understand the implications of future conditions on water management. Each scenario affects water demands and supplies differently.

- **Scenario 1 – Current Trends.** For this scenario, recent trends are assumed to continue into the future.
- **Scenario 2 – Active Institutions.** Population growth is slower than currently projected by the Department of Finance and active institutions provide for more efficient planning and development that is less resource intensive than current conditions.
- **Scenario 3 – Expansive Growth.** Population growth is faster than currently projected by the Department of Finance and that future conditions are more resource intensive than existing conditions.

Each scenario includes assumptions about how different factors including population, irrigated farmland, climate change, and others would describe its future. These are factors over which the water community has little control.



## Water Use 2050 – Consider a Range of Conditions

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These charts show how water demands in the state could change between 2005 and 2050 based on estimates for the three future scenarios. The top left chart shows estimated total water demand changes for the entire state. The top right chart shows estimated water demand changes by sector. The map in the bottom chart shows estimated water demand changes for the ten regions of the state.

### Changes in Statewide Water Demands

**\*\*three bars, one for each scenario showing total water demand change between 2005 and 2050\*\***

To eliminate groundwater overdraft statewide may require an additional 2 million acre-feet per year for each scenario.

### Changes in Water Demands by Sector

**\*\*set of bars for each scenario to show indoor urban use, outdoor urban use, agricultural use, and environmental use\*\***

### Changes in Water Demand by Region

**\*\*map of California's regions, each showing changes in water demand between 2005 and 2050 for each of the three scenarios\*\***

## **Resource Management Strategies – Range of Choices**

A resource management strategy is a project, program, or policy to manage water and related resources. These strategies reduce water demand, improve operational efficiency, increase water supply, improve water quality, practice resource stewardship, and improve flood management. Each region chooses an appropriate mix of resource management strategies based on its own water management objectives, goals and opportunities.

### **Resource Management Strategies**

#### **Reduce Water Demand**

Strategies that encourage more efficient use of water are essential for all regional water portfolios. Reduced water demand means that water supplies are available for more uses.

- Agricultural Water Use Efficiency
- Urban Water Use Efficiency

#### **Improve Operational Efficiency**

Operating the existing water system more efficiently allows California to receive more benefits from its water supply. These can include structural facilities to move water, changes in operating rules, and water exchanges (transfers) between water users.

- Conveyance – Delta
- Conveyance – Regional/Local
- System Reoperation
- Water Transfers

#### **Increase Water Supply**

Strategies that generate new supplies of water are the primary ways to increase the flexibility of the water system.

- Conjunctive Management & Groundwater Storage
- Desalination - Brackish and Seawater
- Precipitation Enhancement
- Recycled Municipal Water
- Surface Storage – CALFED
- Surface Storage – Regional/Local

#### **Improve Flood Management**

Much of the California's water supply system is also a flood management system. Update 2009 adds integrated flood management to the evolving strategic plan.

- Flood Impact Reduction
- Floodflow Management

#### **Improve Water Quality**

Improved water quality can directly improve the health of Californians and its ecosystems. These strategies protect existing water supplies and can improve the utility of existing supplies and make new supplies available.

- Drinking Water Treatment and Distribution
- Groundwater / Aquifer Remediation
- Matching Water Quality to Use
- Pollution Prevention
- Salt Management
- Urban Runoff Management

#### **Practice Resource Stewardship**

California must protect and enhance other resources in its quest to achieve water supply reliability and improved flood management for year 2050. Many of these strategies protect and improve conditions at water sources.

- Agricultural Lands Stewardship
- Economic Incentives (Loans, Grants, and Water Pricing)
- Ecosystem Restoration
- Forest Management
- Land Use Planning and Management
- Recharge Areas Protection
- Water-Dependent Recreation
- Watershed Management

#### **Other Strategies**

There are a variety of less common water management strategies that can potentially generate resource benefits. These generally involve emerging technologies that require more research and development or require temporary tradeoffs. At this time, the expected benefits are unpredictable and limited in their capacity to strategically address long-term regional water planning needs within the time horizon of this California Water Plan Update.

## Resource Management Strategies – Range of Choices

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By making the right choices, regions diversify their water portfolios, make smart investments, and meet their water demands in 2050. Resource management strategies are not equally effective or practical in all regions of the state. No single strategy can meet all needs in a given region – a diversified combination of strategies is required to provide flexibility needed to successfully face the uncertain future. Strategies can be implemented to produce multiple benefits. Finally, the strategies are not interchangeable – an acre-foot (one acre-foot of water is enough for one to two families for one year) of water conservation in the South Coast region cannot be used to produce an acre-foot of water in the Sacramento River region for ecosystem restoration.

### Range of Potential Increase in Annual Water Availability from Resource Management Strategies

This graph shows the estimated potential annual increase in demand reduction and supply augmentation. Low estimates are shown in the lower (dark blue) portion of each bar and high estimates are shown in the upper (light blue) portion of each bar.

\*\*\*insert graph of 8 strategies in MAF/yr\*\*\*

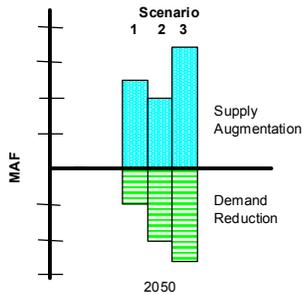
Due to the complexity of the water system and interactions among strategies, the estimated amounts shown in the graph are *not additive*.

## Example 2050 Management Response – Packages of Strategies

A response package is a set of resource management strategies designed to provide benefits for a given future scenario. The performance of several different response packages can be compared for each scenario to determine the best performing package. Having response packages for multiple future scenarios can help identify management responses that perform well when compared across the array of possible future conditions.

Estimates of how the response packages can change supply augmentation and demand reduction between years 2005 and 2050 are shown by region for each scenario on map.

**\*\*insert map of California regions, each with a small graphic (see example insert) to show the broad summary of response package for each scenario in terms of total amount of supply augmentation and total amount of demand reduction\*\***



## Example 2050 Management Response – Packages of Strategies

No single response package will work for all of California as each region has its own needs, constraints, and opportunities. Water Plan participants and regional representatives have been working to define response packages for each region. The table shows examples of possible resource management strategies that may be part of response packages for each region. As shown in the table, the response packages are likely to vary significantly among the regions.

RESOURCE MANAGEMENT STRATEGIES		REGIONS										
		Central Coast	Colorado River	Mountain Counties	North Coast	North Lahontan	Sacramento River	San Francisco Bay	San Joaquin River	South Coast	South Lahontan	Tulare Lake
<b>STRATEGIES TO REDUCE WATER DEMAND</b>												
	Agricultural Water Use Efficiency	○	●	○	●		○	○	●	●		●
	Urban Water Use Efficiency	○	●	○	○	○	○	●	○	●	●	●
<b>STRATEGIES TO IMPROVE OPERATIONAL EFFICIENCY</b>												
	Conveyance -- Delta	○					●	○	●			○
	Conveyance -- Regional/Local	●	○	●		○	○	○	○	●	○	○
	System Reoperation	●	○	●			○	○	○	●	○	○
	Water Transfers	○	●	○		○	○	○	○	●	○	○
<b>STRATEGIES TO INCREASE WATER SUPPLY</b>												
	Conjunctive Management and Groundwater Storage	●	●	○	○	○	○	○	○	●	●	●
	Desalination - Brackish and Seawater	○	○					○	○	●	○	○
	Precipitation Enhancement	○								●		
	Recycled Municipal Water	●	○	○	○		○	○	○	●	○	●
	Surface Storage - CALFED	○					○	○	○	○	○	●
	Surface Storage – Regional / Local	○	○	○			○	○	○	●	○	
<b>STRATEGIES TO IMPROVE WATER QUALITY</b>												
	Drinking Water Treatment and Distribution	○	○	○	●	○	○	○	○	○	○	○
	Groundwater Remediation / Aquifer Remediation	○					●	○	○	○	○	●
	Matching Water Quality to Water Use	○	○		○			○	○	○	○	○
	Pollution Prevention	●	○	○	●	●	●	○	○	●	○	○
	Salt Management		●			○		○	○	○	○	○
	Urban Runoff Management	○	○	○			●	○	○	○	○	○
<b>STRATEGIES TO PRACTICE RESOURCE STEWARDSHIP</b>												
	Agricultural Lands Stewardship	○	○	○			○		○	○	○	○
	Economic Incentives (Loans, Grants, and Water Pricing)		○	○	○	○	○	○	○	○	○	○
	Ecosystem Restoration	○	○	●	●	○	○	○	○	○	○	○
	Forest Management			○	○					○	○	
	Land Use Planning and Management	○		○			○	○	○	○	○	
	Recharge Areas Protection	○		○	○		○			○	○	○
	Water-Dependent Recreation	○	○	○		○	○	○	○	○	○	○
	Watershed Management	○	○	○	○	○	○	○	○	○	○	○
<b>STRATEGIES TO IMPROVE FLOOD MANAGEMENT</b>												
	Floodflow Management	●	○	○			○	○		○		○
	Flood Impact Reduction		○	○			○	○	○	○	○	○
<b>OTHER STRATEGIES</b>												
	Crop Idling for Water Transfers											
	Dewvaporation or Atmospheric Pressure Desalination											
	Fog Collection											
	Irrigated Land Retirement											
	Rainfed Agriculture											
	Waterbag Transport/Storage Technology											
Legend												
	● Primary resource management strategies included in the response package for the region											
	○ Other resource management strategies included in the response package for the region											

Mockup for Example only - Dot placement will change with analysis

## Conclusion

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California's management of its water system and its water uses must continue to evolve between now and 2050 to keep pace with ever changing conditions. Population is continually growing while water supply is relatively static or even decreasing. Climate change is already having a profound impact on water resources as evidenced by changes in snowpack, river flows, and sea levels. This water plan update presents a strategic plan for providing a clean and reliable supply of water and protecting California's natural environment, the health of its people, and its economy.

For California's water system to be reliable, water management must promote and practice integrated regional water management and maintain and improve statewide water systems. Management decisions about the system must incorporate consideration of uncertainty, risk, and sustainability into planning for the future. A critical aspect of this management will be finding ways to adapt to climate change while enhancing drought contingency and flood management.

Consideration of different plausible future conditions for 2050 allowed Update 2009 to present a range of future water demands and supplies and develop a set of responses to meet future needs. No single resource management strategy can meet all needs in a given region – a diversified combination of strategies is required to provide flexibility needed to successfully face the uncertain future. Resource management strategies are not equally effective or practical in all regions of the state, and are definitely not interchangeable. Strategies should be implemented to produce multiple benefits. By making the right choices, regions will diversify their water portfolios, make sound investments, and meet their water demands, flood management needs, and stewardship goals in 2050.

Future Water Plan updates will continue to refine our knowledge about our water, water quality, and flood systems through improved data, analytical tools, and information management and exchange. For now, Update 2009 provides a guide for future investments to reduce water demand, improve operational efficiency, increase water supply, improve water quality, practice resource stewardship, and improve flood management. Working together, State, federal, and local agencies and individual water users can make the right investments to secure the future of California.



See Volume 1 and 3 for more detail

## Recommendations

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California Water Plan Update 2009 identifies the most pressing water management issues and challenges faced by the state and regions and available opportunities and assets. Through the Water Plan process, we have developed recommendations in the form of policies, strategies, and approaches that will help reduce and remove impediments and leverage resources and opportunities to help implement the Water Plan's actions and achieve its goals and objectives through 2050.

The recommendations for Update 2009 :

- Describe changes needed to reduce or eliminate constraints and impediments, or to harness opportunities, to help achieve the actions, objectives, goals, and vision.
- Are directed at decision-makers and water users throughout California (referred to as *California*) and at the executive and legislative branches of State government, the Department of Water Resources and other State agencies (referred to as *State government*.)
- Are as varied as the constraints they are intended to change—institutional, legal, knowledge, information, skills/capacity, resources, funding, schedule, public awareness, etc.

We need to act on these recommendations in light of the need for drought contingency planning and climate change adaptations. We need to invest the water and flood bond funds that the public has approved to implement these recommendations and realize this Water Plan.

### Recommendations

1. California should implement the Water Plan's related actions as the key to achieving its goals and objectives.
2. California needs a water finance plan with stable and continuous funding from an array of revenue sources for statewide and regional integrated water management. The finance plan should recognize the critical role of public-private partnerships and the principle of beneficiary pays; include alternative revenue sources; and guide investment decisions based on sustainability indicators.
3. State government should manage California's water resources with ecosystem health and water supply reliability and quality as equal goals, with full consideration of public trust uses whenever feasible.
4. State government should lead and support planning, monitoring, and scientific research to help California adapt and mitigate for climate change impacts with an emphasis on drought and flood contingency planning.
5. California should take action to improve the integration of land use policies and practices, economic development decisions, and water, flood, and natural resource planning and management.
6. California should maintain, rehabilitate, and improve its aging water, wastewater, and flood infrastructure.
7. State government should effectively lead, assist, and oversee California's water resources and flood planning and management activities.
8. California should articulate and update as needed the roles, authorities, rights, and responsibilities of the various entities responsible for water resource and flood planning and management.
9. California should increase public understanding and awareness on the value and importance of water, water quality, and water conservation.

## Update 2009 Strategic Plan Elements

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Update 2009 sets us on a strategic path to managing our water resources in a way that provides reliable and clean water supplies for all beneficial uses today and for generations.



### Desired future for California water

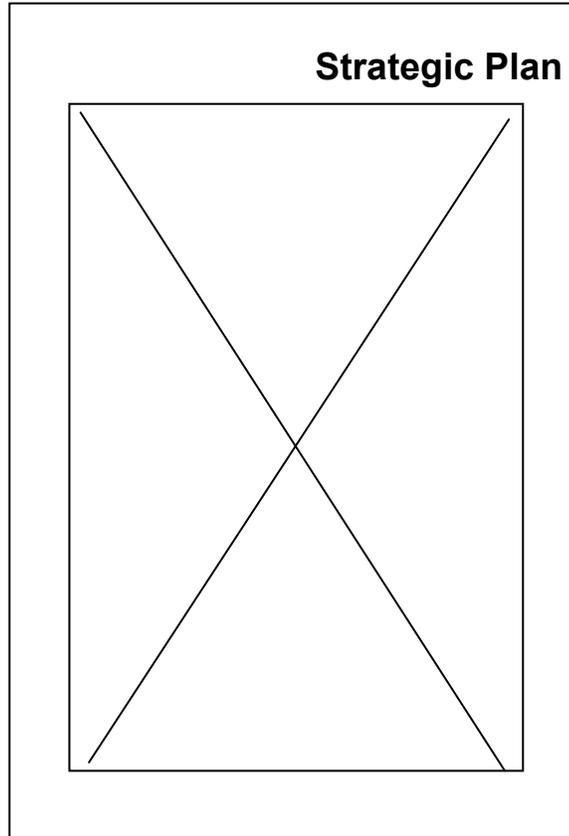
California has integrated, reliable and secure water resources and management systems that

- enhance public health, safety, and quality of life in all its communities;
- sustain economic growth, business vitality, and agricultural productivity; and
- protect and restore California’s unique biological diversity, ecological values, and cultural heritage.



### Desired outcomes over the planning horizon 2050

1. California has water supplies that are adequate, reliable, secure, affordable, sustainable, and of suitable quality for beneficial uses to protect, preserve, and enhance watersheds, communities, and environmental and agricultural resources.
2. State government supports integrated water resources planning and management through leadership, oversight, and public funding.
3. Regional and interregional partnerships play a pivotal role in California water resources planning, water management for sustainable water use and resources, and increasing regional self-sufficiency.
4. Water resource and land use planners make informed and collaborative decisions and implement integrated actions to increase water supply reliability, use water more efficiently, protect water quality, improve flood protection, promote environmental stewardship, and ensure environmental justice in light of drivers of change and catastrophic events.
5. California is prepared for climate uncertainty by developing adaptation strategies and investing in a diverse set of actions that reduce the risk and consequences posed by climate change, that make the system more resilient to change, and that increase the sustainability of water and flood management systems and the ecosystems they depend on.
6. Integrated flood management, as a part of integrated water management, increases flood protection, improves preparedness and emergency response, enhances floodplain ecosystems, and promotes sustainable flood management systems.
7. The benefits and consequences of water decisions and access to State government resources are equitable across all communities.



## Update 2009 Strategic Plan Elements

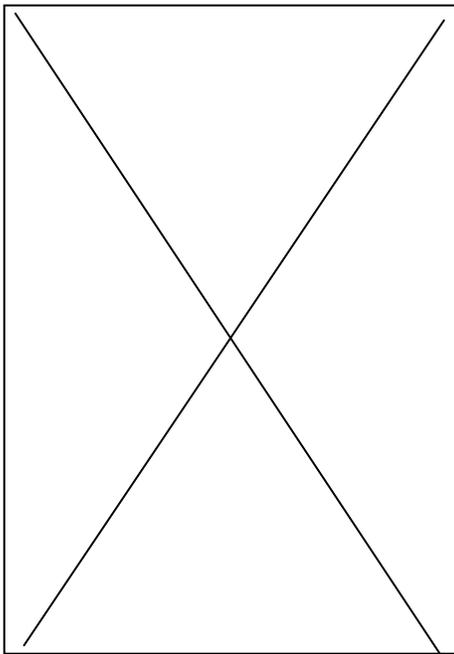
### Mission

#### Purpose of the Water Plan

Updating the California Water Plan provides State, federal, Tribal, regional, and local governments and organizations a continuous strategic planning forum to collaboratively:

- Recommend strategic goals, objectives, and near-term actions that would conserve, manage, develop, and sustain California's water resources and management systems;
- Prepare response plans for floods, droughts, and catastrophic events that would threaten water resources and management systems, the environment, property, and the health, welfare and livelihood of the people of California; and
- Evaluate current and future water conditions, challenges, and opportunities.

### Elements



### Guiding Principles

#### Core values and philosophies / How to make decisions

1. Use a broad, stakeholder-based, long-view perspective for water management.
2. Promote management for sustainable resources on a watershed basis.
3. Increase regional drought and flood preparedness.
4. Increase regional self-sufficiency.
5. Promote regional coordination and collaboration among local governments and agencies, public and private organizations, and Tribal governments and Tribal communities.
6. Determine values for economic, environmental, and social benefits, costs, and tradeoffs to base investment decisions on sustainability indicators.
7. Incorporate future variability, uncertainties, and risk in the decision-making process.
8. Apply California's water rights laws, including the longstanding constitutional principles of reasonable use and public trust, as the foundation for public policymaking, planning, and management decisions on California water resources.
9. Promote environmental justice - the fair treatment of people of all races, cultures, and incomes.
10. Use science, best data, and local and indigenous peoples' knowledge in a transparent and documented process.

## The Implementation Plan

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Update 2009's implementation plan has 13 objectives that will help us achieve the Water Plan goals. Meeting these objectives, and planning and investing in their 92 related actions, will help California deal with a changing climate and other uncertainties and risks, and provide more adaptive and resilient ecosystems and more sustainable water and flood systems.

### Objectives & Actions

### Statements of intent / Focus on what and when

#### 1. Expand Integrated Regional Water Management

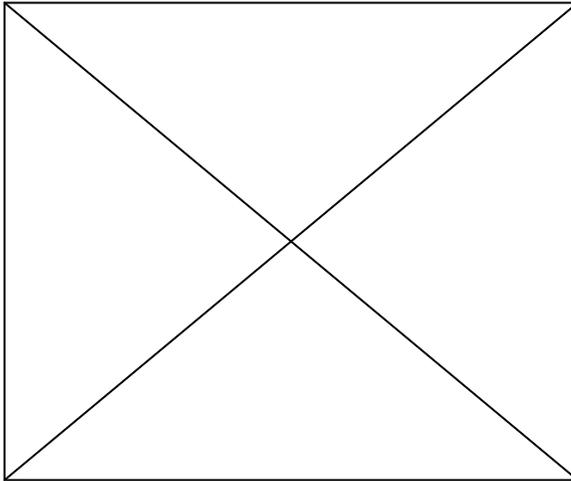
Promote, improve, and expand integrated regional water management to create and build on existing partnerships that are essential for California water resources planning, sustainable watershed and floodplain management, and increasing regional self-sufficiency.

#### 2. Use Water More Efficiently

Use water more efficiently with significantly greater water conservation, recycling, and reuse to help meet future water demands and adapt to climate change.

#### 3. Expand Conjunctive Management

Advance and expand conjunctive management of multiple water supply sources to prepare for future droughts and climate change.



#### 4. Protect Water Quality

Protect and restore surface water and groundwater quality to safeguard public and environmental health and secure California's water supplies for their beneficial uses.

#### 5. Expand Environmental Stewardship

Promote, improve, and expand environmental stewardship to improve watershed and floodplain functions and sustain water and flood management systems.

#### 6. Practice Integrated Flood Management

Promote and practice integrated flood management to provide multiple benefits including better emergency preparedness and response, higher flood protection, more sustainable flood and water management systems, and enhanced floodplain ecosystems

## The Implementation Plan

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### 7. Manage a Sustainable California Delta

Promote and practice management for a sustainable California Delta by setting as co-equal goals a healthy Delta ecosystem and a reliable water supply for California and by recognizing the Delta as a unique and valued place.

### 8. Prepare Prevention and Response Plans

Prepare prevention and response plans for floods, droughts, and catastrophic events to help residents and communities make decisions that reduce the consequences of these events when they occur.

### 9. Reduce Energy Consumption

Reduce the energy consumption of water and wastewater management systems to mitigate greenhouse gas emissions. (water-related strategies in AB 32 Proposed Scoping Plan)

Update 2009 integrates information and recommendations from key statewide planning documents of other State agencies, particularly those represented on the Steering Committee. Some are still draft documents.

- Climate Change Adaptation White Paper (DWR 2008)
  - Water Boards Strategic Plan Update 2008-2012 (Water Boards Sep 2, 2008)
  - California Wildlife Action Plan (DFG 2007)
  - Preparing for California's Next Drought – Changes Since 1987–1992 (DWR 2000)
  - Critical Water Shortage Contingency Plan, Governor's Advisory Drought Panel (2000)
  - Water Action Plan (CPUC, Nov 2005)
  - California Transportation Plan 2025 (April 2006) and 2030 (Caltrans Oct 2007)
  - California Drought, an Update (DWR April 2008)
  - FloodSafe Strategic Plan (DWR May 2008)
  - Bay-Delta Strategic Work Plan (Water Boards June 2008)
  - Update 2009 Tribal Communication Plan (TCC June 17, 2008)
  - Water-Energy Climate Change Mitigation Strategies (WETCAT Oct 2008)
  - Delta Vision Task Force Strategic Plan (DV, Oct 18, 2008)
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### 10. Improve Data & Analysis for Decision-making

Improve and expand monitoring, data management, and analysis to support decision-making in light of uncertainties that support integrated regional water management and statewide flood and water resources management systems

### 11. Invest in New Water Technology

Identify and fund applied research on new water technology to help carry out water programs and better manage water systems.

### 12. Improve Tribal Water & Natural Resources

Increase Tribal outreach, participation, and access to funding for water programs and projects to have more sustainable Tribal water and natural resources.

### 13. Ensure Equitable Distribution of Benefits

Increase the participation of disadvantaged communities in State processes and programs to achieve equitable distribution of benefits, to consider mitigation of impacts from the implementation of State programs and policies, and to ensure that State programs and policies address the most critical public health threats in disadvantaged communities.

See Volume 1 for more detail

\*\*\*back cover\*\*\*



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