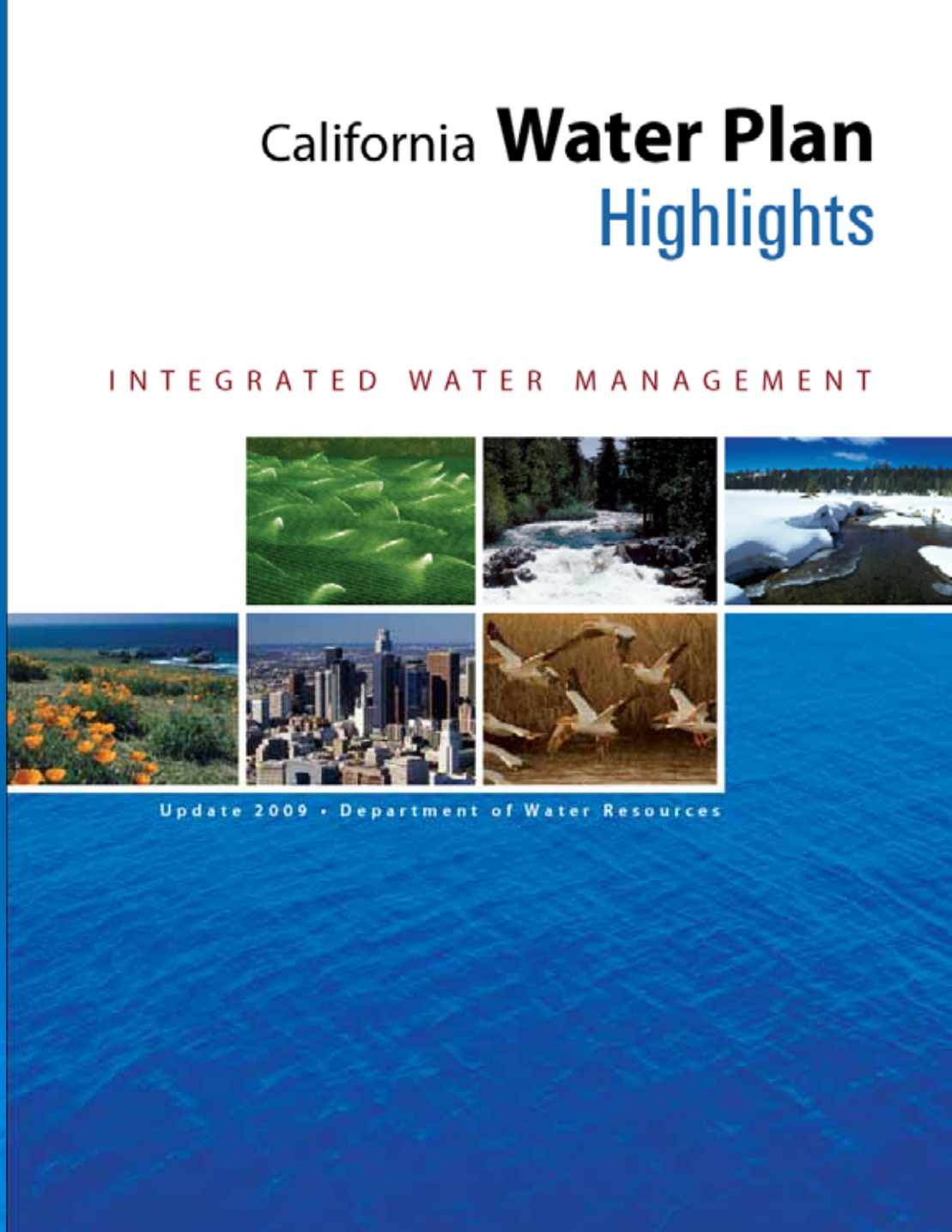
Agricultural Water Use & Efficiency in California Water Plan Update 2009

SWRCB WUE Workshop
July 20, 2011



Update 2009 – State's Blueprint
Integrated Water Management & Sustainability

3 I's - Invest in Innovation & Infrastructure

California State Government in partnership with others should invest in water innovation & infrastructure to support integrated water management and sustainable outcomes

➢ Innovation

- Governance improvements
- Planning & public process improvements
- Information technology (data & tools)
- Water technology R&D

➢ Infrastructure

- Regional projects
- Inter-regional projects
- Statewide systems

➢ State Investments - Finance Plan

- Stable funding with focus on innovation investments
- Seed money to incentivize infrastructure improvements

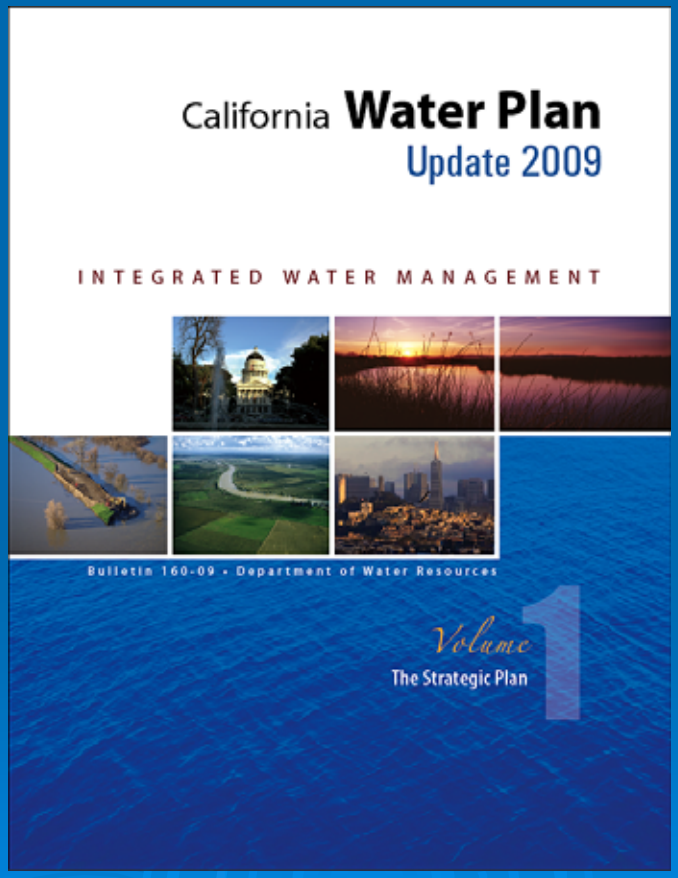
Integrated Regional Water Management

~50 Regional Water Mgmt Groups

- Foster partnerships & expand opportunities for regional place-based solutions
- Diversify water portfolios & integrate supplies
- Leverage resources & economies of scale to reduce costs
- Integrate data, tools & resources
- Implement multi-benefit actions with sustainable outcomes

California Water Plan Update 2009
Objective – Use and Reuse Water More Efficiently

- One of 13 Water Plan Objectives
- Use water more efficiently with significantly greater water conservation, recycling, and reuse to help meet future water demands and adapt to climate change.
- 8 Related Actions – several taken from Companion State Plans & 2009 Water Legislation



27 Resource Management Strategies

A Range of Choices

Reduce Water Demand

- Agricultural Water Use Efficiency
- Urban Water Use Efficiency

Improve Operational Efficiency & Transfers

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

Increase Water Supply

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

Improve Flood Management

- Flood Risk Management

Improve Water Quality

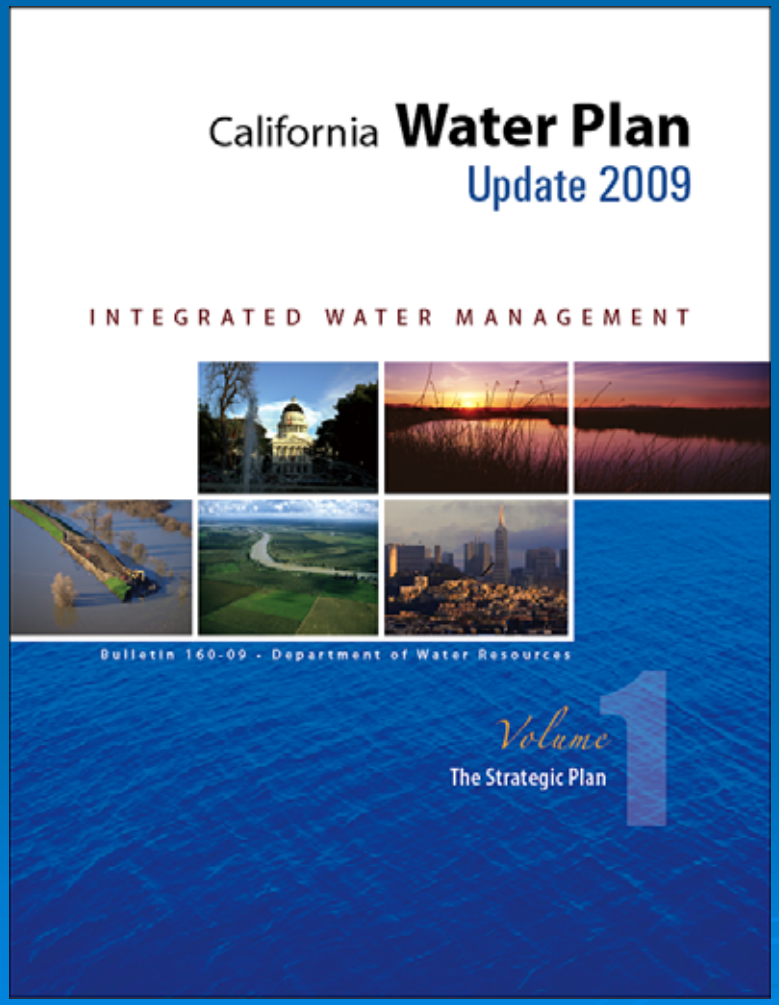
- Drinking Water Treatment & Distribution
- Groundwater / Aquifer Remediation
- Matching Quality to Use
- Pollution Prevention
- Salt & Salinity Management
- Urban Runoff Management

Practice Resource Stewardship

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

Other-- Crop idling, dew vaporization, fog collection, irrigated land retirement, rainfed agriculture, waterbag transport

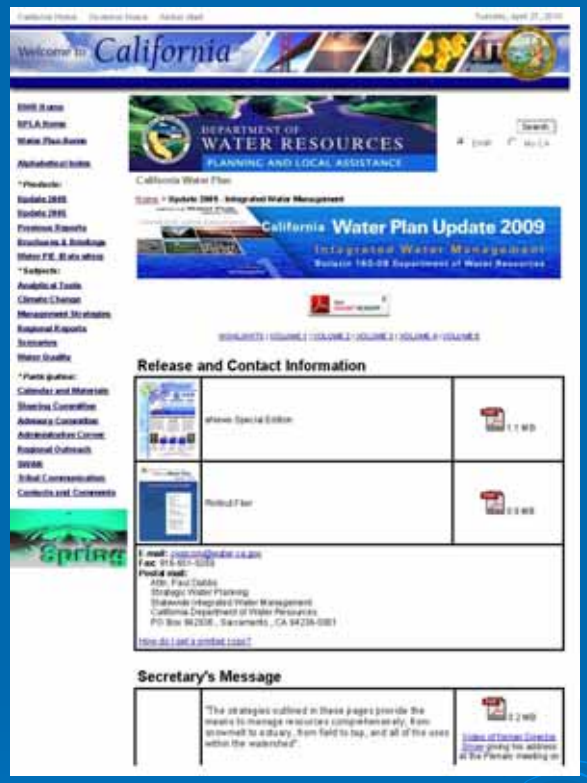
Water Plan Update Organization



- Water Plan Highlights
  - CD - Entire Water Plan
  - CD - Tribal Water Summit Proceedings
- Vol. 1 > The Strategic Plan
- Vol. 2 > 27 Resource Management Strategies
- Vol. 3 > 12 Regional Reports
- Vol. 4 > Reference Guide (120+ articles)
- Vol. 5 > Technical Guide (Online documentation)

Ways to Access Water Plan Information

- Visit the *Water Plan Web Portal*
  www.waterplan.water.ca.gov



- Subscribe to *Water Plan eNews*
  a weekly electronic newsletter
  www.waterplan.water.ca.gov/enews

California Agriculture Facts

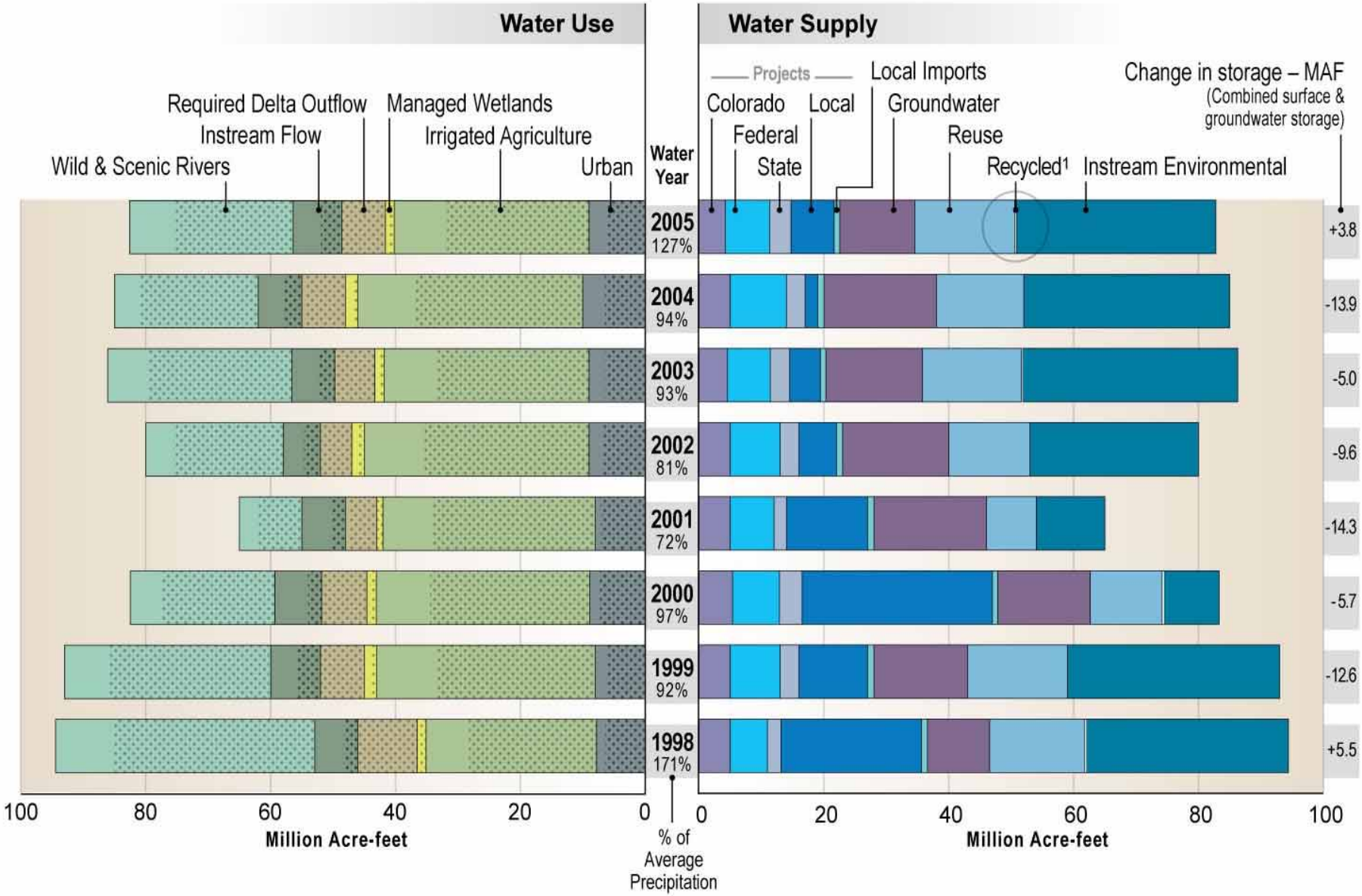
- 88,000 farms & ranches in 2007 grossing $36.6 billion + $100 billion in related economic activity
- 9.6 million irrigated crop acres in 2000 (9.0 million land + 0.6 million multi-crop)
- 34.2 MAF applied by irrigated Ag in 2000; of which 25.6 MAF was consumptive use.
- ~ 80 Ag suppliers signed AWMC MOU; covering > 4.6 million irrigated acres; 66 have submitted AWMPs

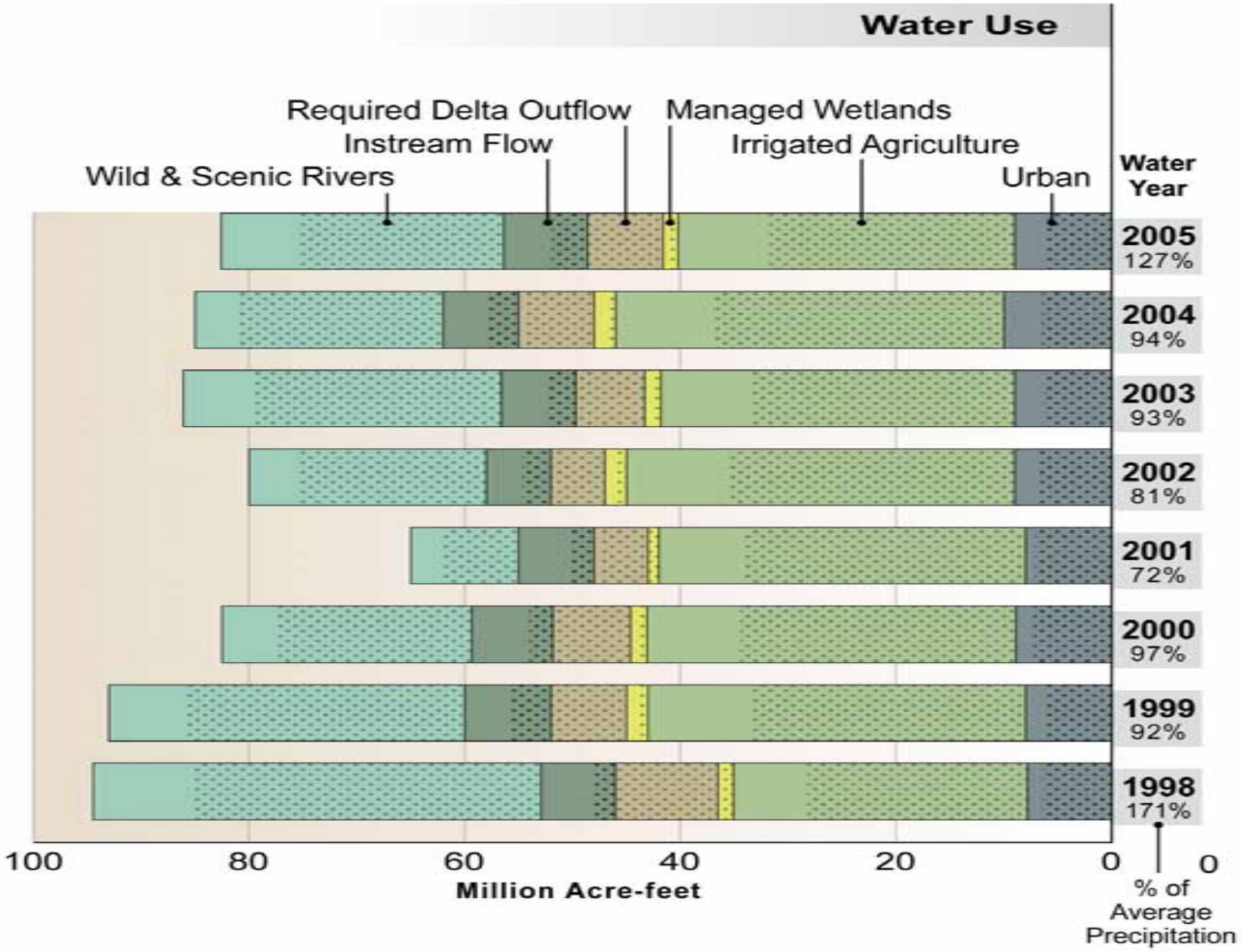
Water Use & Efficiency Definitions

- Applied water use / recoverable flows
- Net water use / irrecoverable flows
- Consumptive water use / depletion
- Water use efficiency
- Agricultural water stewardship

California's Water Resources: Variable & Extreme

Butterfly Chart




Water Use
Required Delta Outflow
Managed Wetlands
Instream Flow
Irrigated Agriculture
Wild & Scenic Rivers
Urban
Water Year
2005
127%
2004
94%
2003
93%
2002
81%
2001
72%
2000
97%
1999
92%
1998
171%
100
80
60
40
20
0
0
Million Acre-feet
% of Average Precipitation

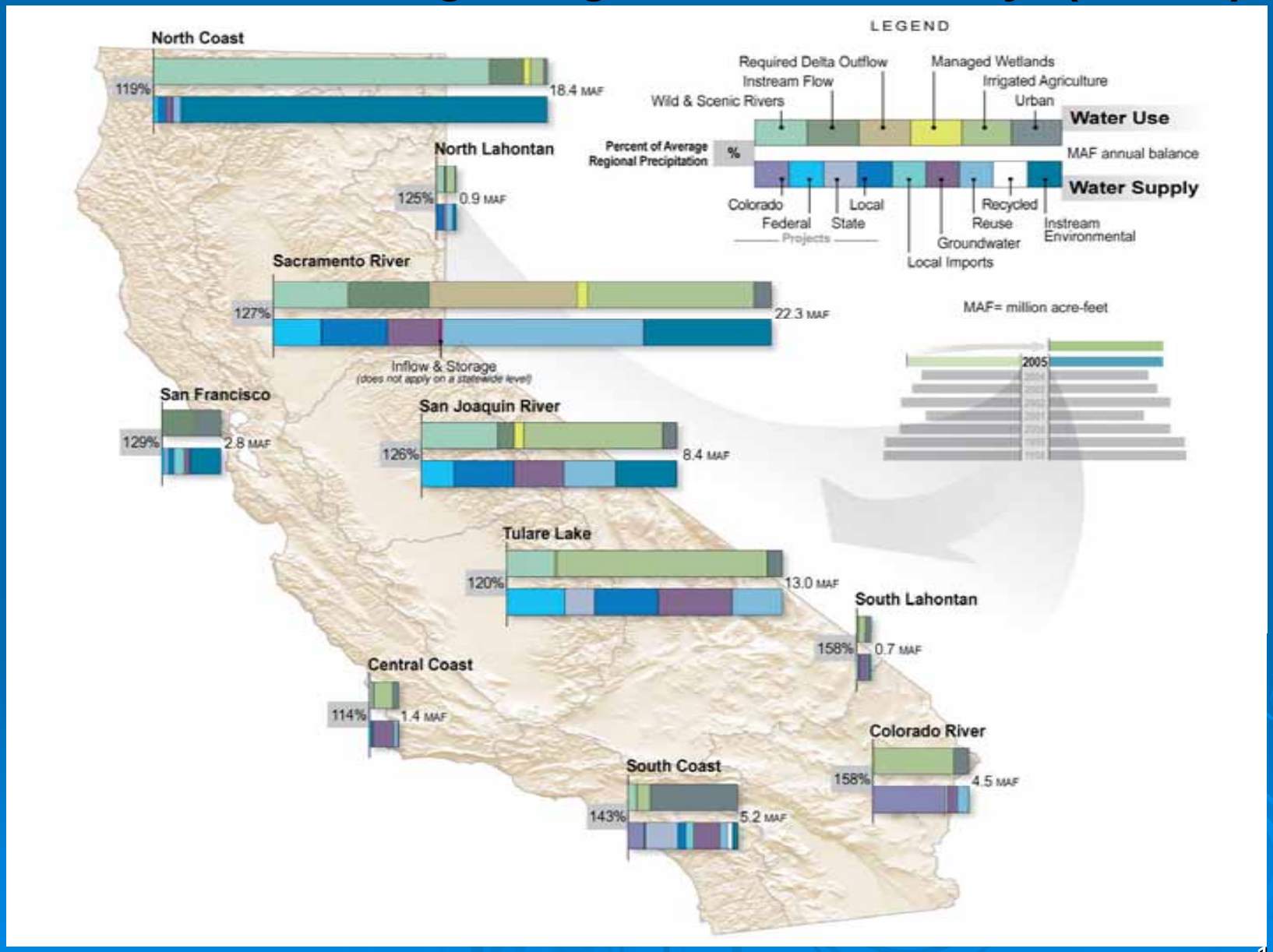
Agricultural Water Use Observations

- Agricultural water uses vary according to the wetness or dryness of a given year.
- In very wet water years, agricultural and urban landscape water demands are lower.
- Applied water uses are usually highest during average to below-average water years when irrigated agricultural & outdoor water demands are more fully met.
- During very dry/critical water years, demands for water are reduced as a result of urban and agriculture water conservation practices in response to less available surface water supplies.

Variability & Proportion of Ag Water Use

Million Acre-Feet	1998 (WET)			2000 (AVG)			2001 (DRY)			1998 - 2005 Average		
	Applied Water Use	Net Water Use	Depletion	Applied Water Use	Net Water Use	Depletion	Applied Water Use	Net Water Use	Depletion	Applied Water Use	Net Water Use	Depletion
WATER USE INCLUDING ENVIRONMENTAL WATER												
Urban Use	7.8	6.3	6.3	8.9	7.2	7.2	8.6	7.0	7.0	8.8	6.5	6.5
	8.3%	8.6%	8.9%	10.8%	11.3%	11.7%	13.3%	14.1%	14.8%	10.5%	10.4%	10.6%
Agricultural Use	27.3	22.6	20.4	34.2	27.8	25.6	33.7	28.0	26.0	33.2	25.8	24.7
	28.9%	30.7%	28.5%	41.5%	43.6%	41.7%	52.1%	56.4%	54.6%	39.8%	41.3%	40.3%
Environmental Use	59.4	44.8	44.7	39.4	28.7	28.5	22.5	14.7	14.5	41.4	30.1	30.1
	62.8%	60.8%	62.6%	47.8%	45.1%	46.6%	34.7%	29.5%	30.6%	49.6%	48.2%	49.1%
TOTAL USE & OUTFLOW	94.5	73.8	71.4	82.5	63.6	61.3	64.8	49.7	47.5	83.3	62.4	61.2
NON INSTREAM WATER USE												
Urban Use	7.8	6.3	6.3	8.9	7.2	7.2	8.6	7.0	7.0	8.8	6.5	6.5
	21.4%	21.1%	23.0%	19.9%	19.9%	21.3%	19.7%	19.4%	20.8%	20.1%	19.8%	20.5%
Agricultural Use	27.3	22.6	20.4	34.2	27.8	25.6	33.7	28.0	26.0	33.2	25.8	24.7
	74.8%	75.6%	74.0%	76.7%	77.0%	75.8%	77.3%	77.8%	76.7%	76.4%	78.3%	77.5%
Managed Wetlands Use	1.4	1.0	0.8	1.5	1.1	1.0	1.3	1.0	0.9	1.5	0.6	0.6
	3.8%	3.3%	3.0%	3.4%	3.1%	2.9%	3.0%	2.8%	2.6%	3.5%	1.9%	2.0%
TOT NON-INSTREAM USES	36.5	29.9	27.5	44.6	36.1	33.7	43.7	36.0	33.9	43.5	33.0	31.8

Understanding Regional Diversity (2005)



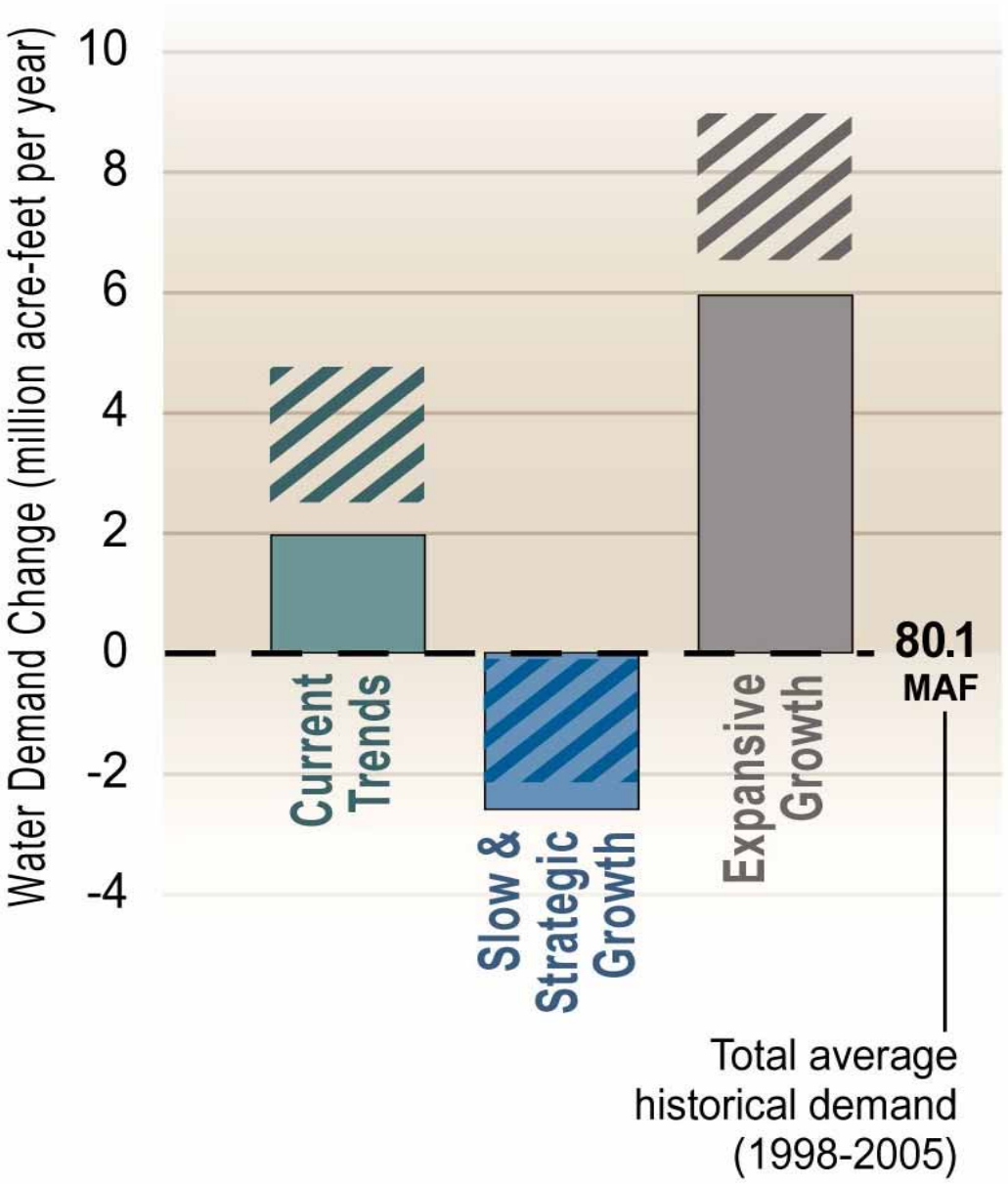
3 Future Scenarios: Key Factors of Uncertainty

2050 Planning Horizon

Factors of Uncertainty	Current Trends	Slow & Strategic Growth	Expansive Growth
	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.	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.	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.
Population	**59.5** million* (22.8 million increase)	**44.2** million (7.5 million increase)	**69.8** million (33.1 million increase)
Land Use	Continued development	Compact development	Sprawling development
Irrigated Crop Area	**8.6** million acres (0.7 mil. acre decrease)	**9.0** million acres (0.2 mil. acre decrease)	**8.2** million acres (1.0 mil. acre decrease)
Environmental Water	**1.0** additional MAF	**1.5** additional MAF	**0.6** additional MAF
Background Water Conservation	**10%** more efficient	**15%** more efficient	**5%** more efficient

Statewide Water Demand Change for 2050 Scenarios

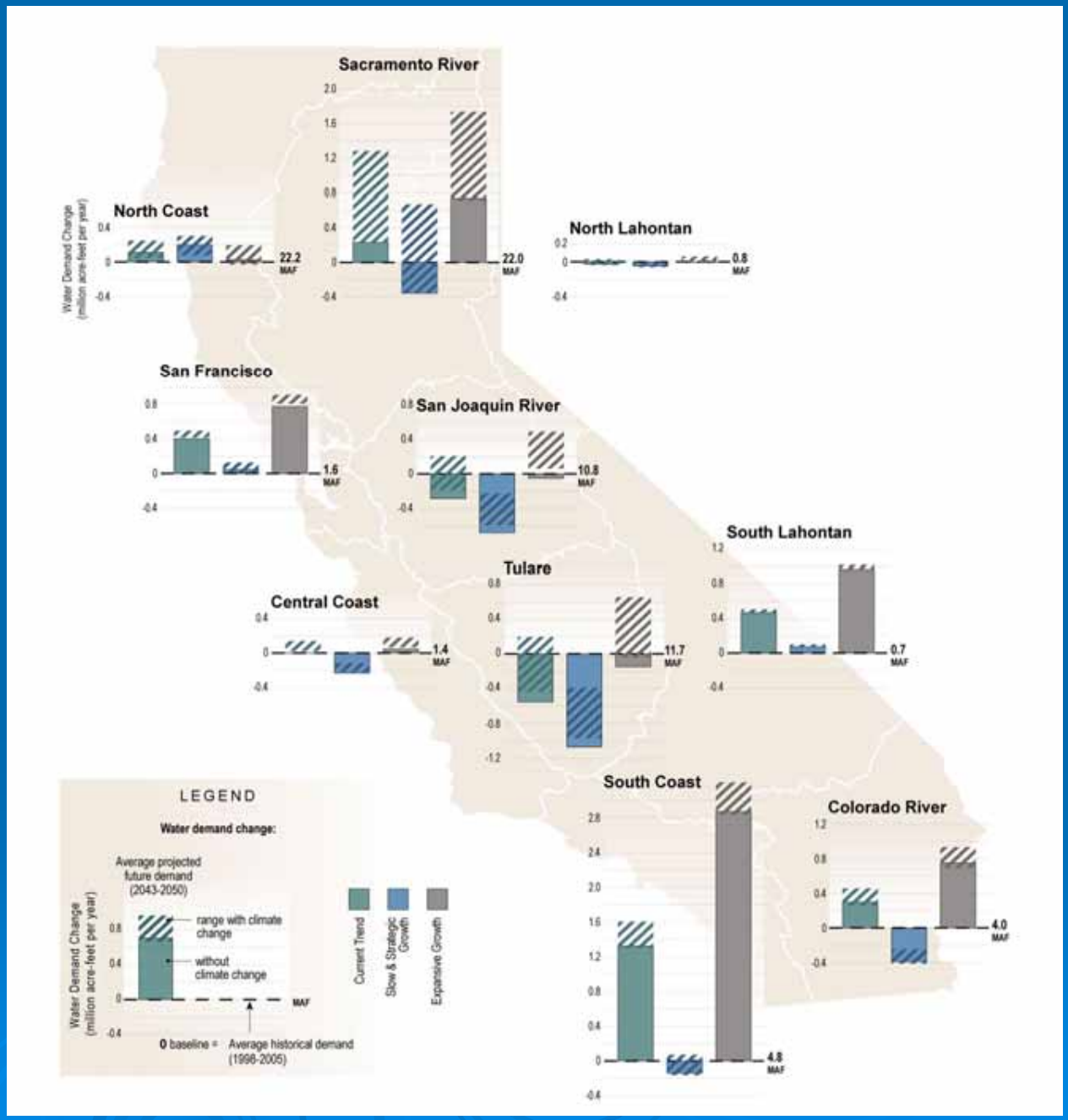
Without & With Climate Change



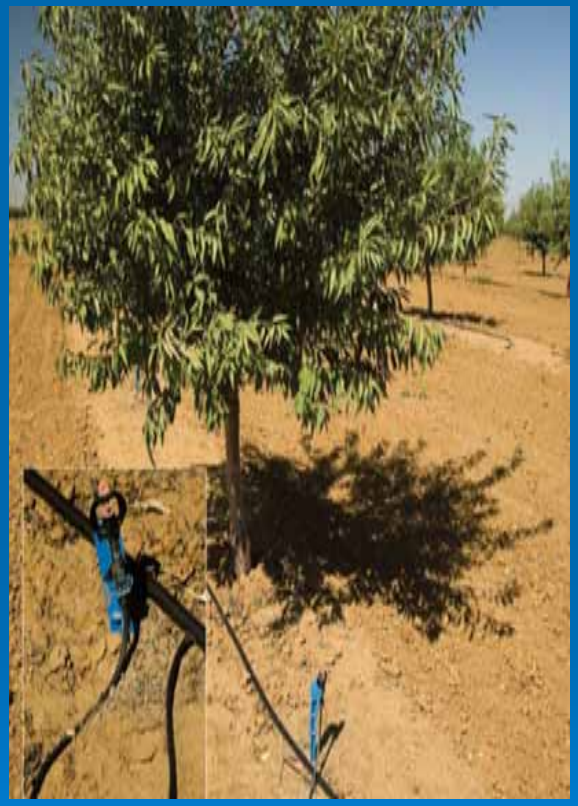
Water Demand Change for 2050 Scenarios

From a Regional Perspective

Wide-ranging climate variability



Describing Ag Water Use Efficiency



- Reduction in water use -- AW or NW
  - Ag AW decreased 14.5% (1967-2007)
- Crop production efficiency - crop/drop
  (Tons per acre-foot applied water)
  - Increased 38% (32 crops 1980-2000)
- Economic efficiency -- $/drop
  (Adjusted $ per acre-foot applied water)
  - Increased 11% (1980-2000)
  - Increased 115% (1967-2007)
- Quantifiable Objectives & Targeted Benefits

Trends in Irrigation Methods 1990-2000

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

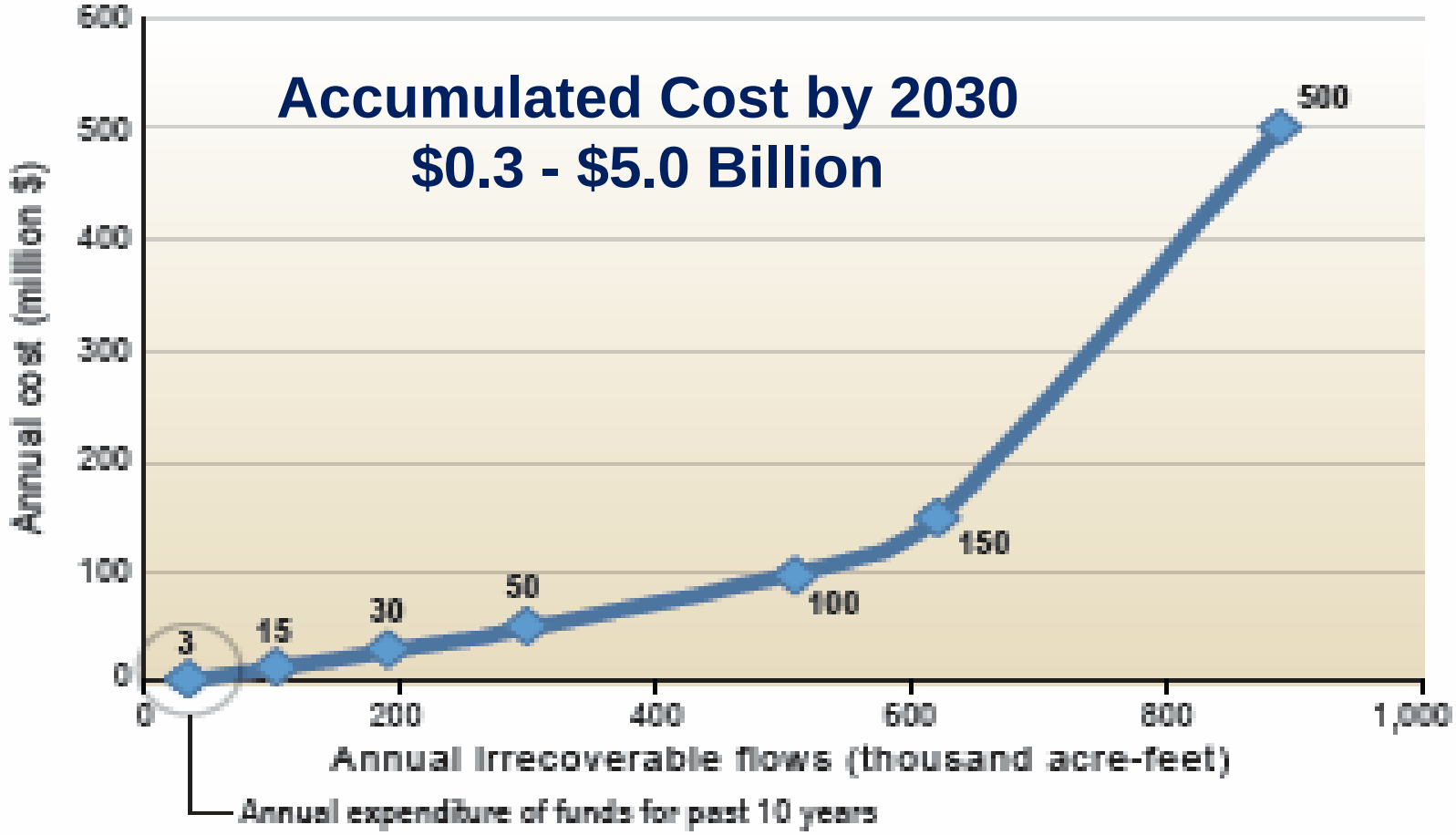
Ag WUE Potential Water Supply Benefits

Table 2-2 On-farm and water supplier recoverable and irrecoverable flow reductions

Estimates of 2030 On-farm and District Agricultural Water Use Efficiency Potential					
Projection Level (PL)	Local Agency Investment Assumption	CALFED Grant Funding Assumption	**Applied Water** Recoverable Flows (1,000 acre-feet/ year)	**Net Water** Irrecoverable Flows (1,000 acre-feet/ year)	Regulated Deficit Irrigation (1,000 acre-feet/ year)
PL-1	Historic Rate	Prop. 50 only	150	34	142
PL-2	Locally Cost-Effective	Prop. 50 only	No change in locally cost-effective rate-results same as PL-1		
PL-3	Historic Rate	Prop. 50 + $15 million/year	565	103	142
PL-4	Locally Cost-Effective	Prop. 50 + $15 million/year	No change in locally cost-effective rate-results same as PL-1		
PL-5	Locally Cost-Effective	Prop. 50 + $40 million/year (2005-14) $10 million/year (2005-30)	947	190	142
PL-150	Locally Cost-Effective	Prop. 50 $150 million/year (2006-2030	2006	620	142
PL-500	Locally Cost-Effective	Prop. 50 $500 million/year (2006-2030)	2,930	888	142

Ag WUE Potential Water Supply Benefits

Figure 2-2. **Investment levels and associated reduction of irrecoverable flows anticipated from state/federal agencies**

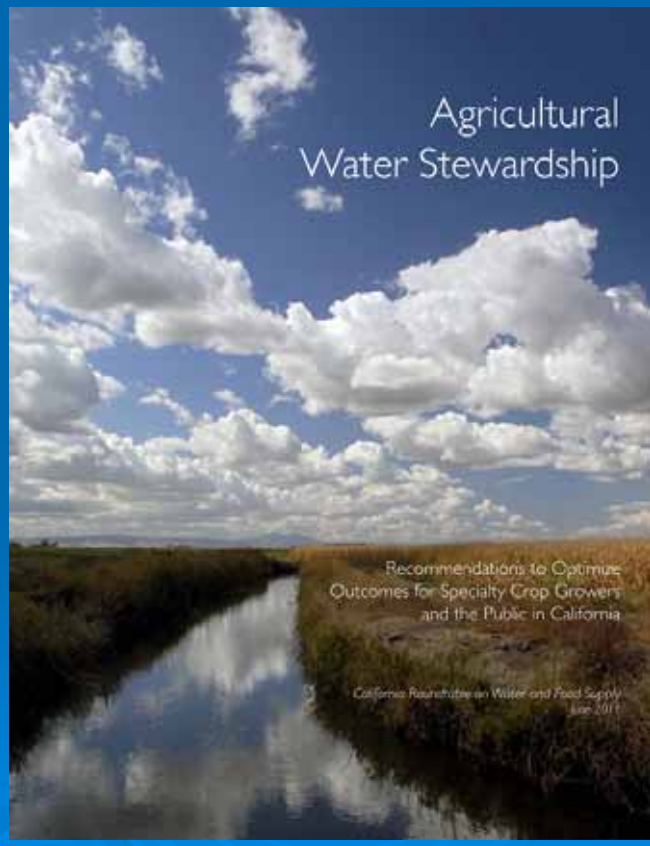


Agricultural Water Stewardship

CRWFS Recommendations Report

Agricultural use of water in a manner that optimizes agricultural water use while addressing the co-benefits of water for food production, the environment, and human health.

- Create a stronger knowledge base
  - Research priorities
  - Communications improvements
- Improve support mechanisms for growers
  - Expand tech, funding & peer support
  - Advance AWS through IRWM
- Move toward outcome-based policy & regulatory frameworks to foster AWS



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Questions & Comments