California Water – Managing Under an Uncertain Future

WRPI Annual Conference
June 16, 2014

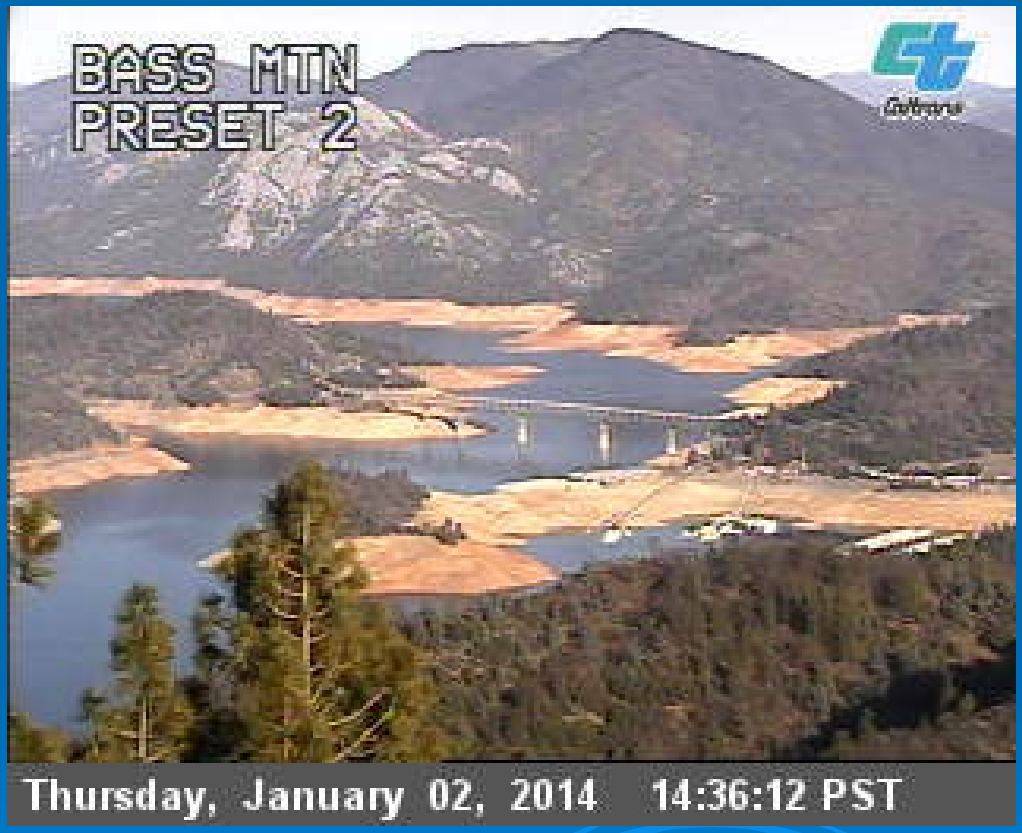
State of California Actions

- EO to streamline water transfers (May 2013)
- PRD Governor's Water Action Plan & CA Water Plan Update 2013 (Oct 2013)
- State Drought Task Force Established (Dec 2013)
- Governor's Drought Proclamation & Water Action Plan (Jan 2014)
- Drought Emergency Funding (March)
- EO to redouble Drought Response (April)

2013-2014 Drought Conditions on May 16

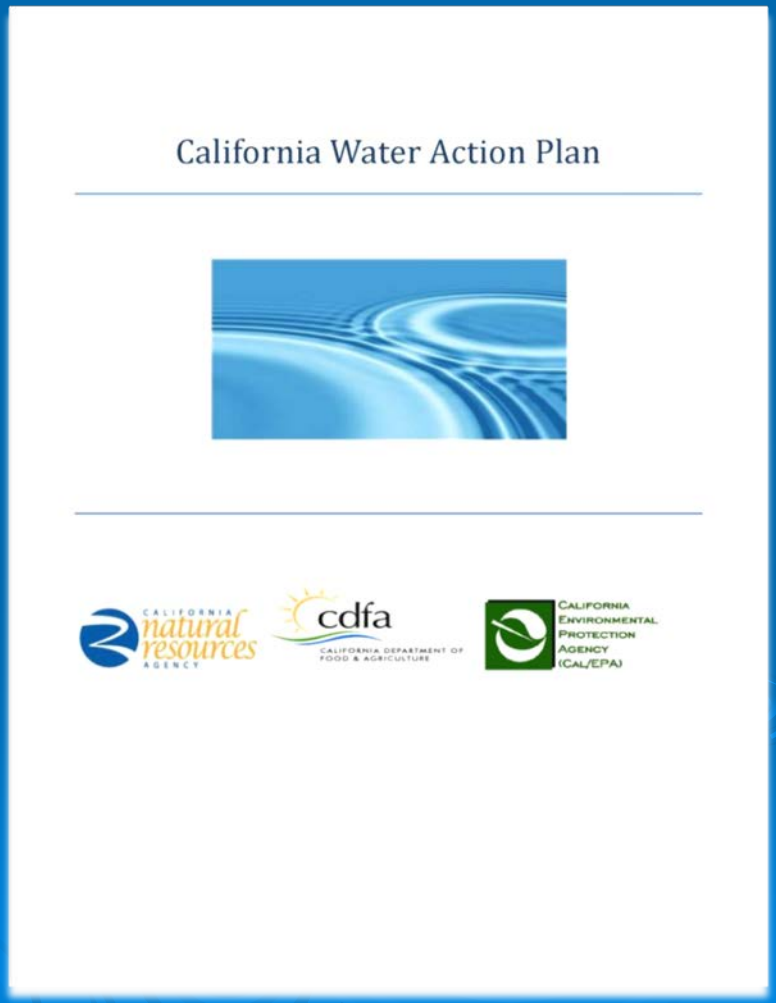
- 3rd consecutive dry year
- Statewide Snow water content – May 1 - 18% of average as of June 3 - 0%
- Northern Sierra Precip – 61% of average
- Southern Sierra Precip – 49% of average
- Statewide unimpaired river runoff - 36% avg (April)
- Most major reservoirs well below historical average
- SWP allocation - 5% in Sept.

Lake Shasta / I-5 Bridge



Governor's Water Action Plan
A 5-Year Plan to Meet 3 Broad Goals

- **Reliability --**
  more reliable water supplies for our farms & communities
- **Restoration –**
  restoring important wildlife habitat & species
- **Resilience --**
  more resilient, sustainably managed water systems & environment (supply, quality, flood protection & ecosystems)



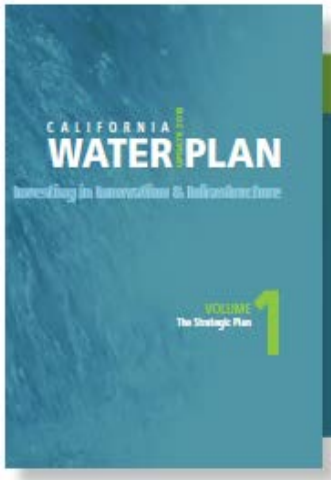
Governor's Water Action Plan

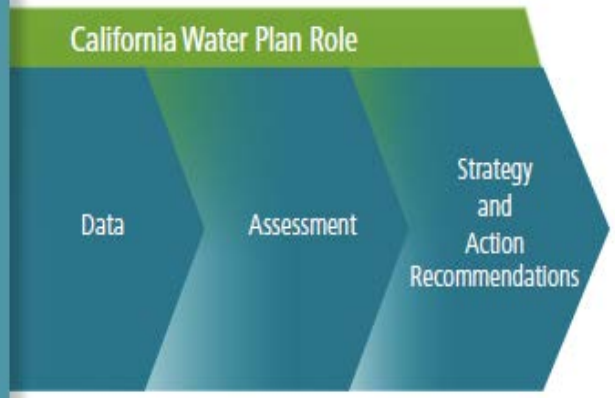
A Diverse Water Portfolio of 10 Priority Actions

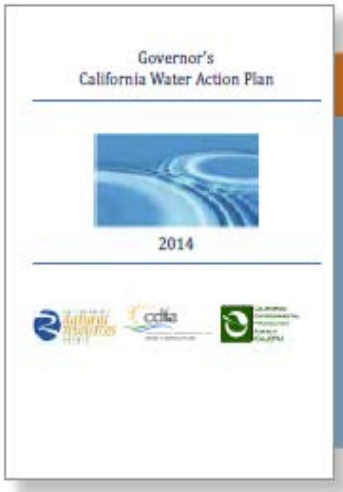
1. Make conservation a California way of life
2. Increase regional self-reliance and integrated water management across all levels of government
3. Achieve the co-equal goals for the Delta
4. Protect and restore important ecosystems
5. Manage and prepare for dry periods
6. Expand water storage capacity and improve groundwater management
7. Provide safe water for all communities
8. Increase flood protection
9. Increase operational and regulatory efficiency
10. Identify sustainable and integrated financing opportunities

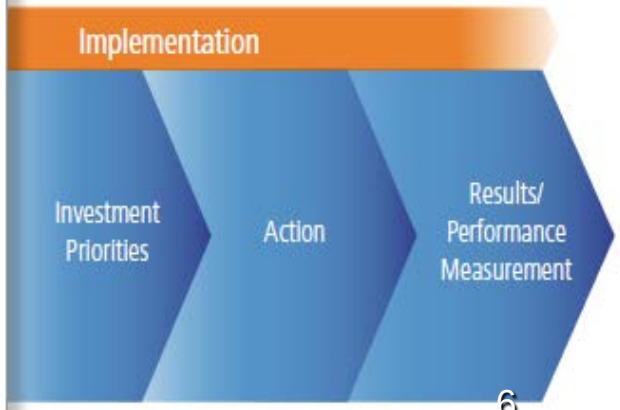
Update 2013 informed & helps implement 5-year Water Action Plan

- Roadmap for Action
  17 Objectives & 350+ Actions
- 30 Resource Management Strategies
- 12 Regional Reports
- Water Portfolios & Balances
- Future Scenarios & Responses
- Reference & Technical Guides









A Resource for Implementing the Governor's Water Action Plan

Water Action Plan's 10 Essential Actions	Make conservation a California way of life	Invest in integrated water management and increase regional self-reliance	Achieve the coequal goals for the Delta	Protect and restore important ecosystems	Manage and prepare for dry periods	Expand water storage capacity	Provide safe drinking water and secure wastewater systems to all communities	Increase flood protection	Improve operational and regulatory efficiency	Identify sustainable and integrated financing opportunities
Update 2013 Objectives and Management Strategies										
Update 2013 Objectives (Volume 1, Chapter 8)	#2 – Use and Reuse Water More Efficiently	#1 –Strengthen Integrated Regional Water Management Planning #17 – Improve Integrated Water Management Finance Strategy and Investments	#7 – Manage the Delta to Achieve the Coequal Goals for California	#4 – Protect and Restore Surface Water and Groundwater Quality #5 – Practice Environmental Stewardship #9 – Reduce the Carbon Footprint of Water Systems and Water Uses #14 – Public access to waterways, lakes, and beaches	#2 –Use and Reuse Water More Efficiently #3 – Expand Conjunctive Management of Multiple Supplies #7 – Manage the Delta to Achieve the Coequal Goals for California #8 – Prepare Prevention, Response, and Recovery Plans	#3 – Expand Conjunctive Management of Multiple Supplies (includes groundwater and surface storage)	#4 –Protect and Restore Surface Water and Groundwater Quality #12 – Strengthen Tribal/State relations and natural resources management #13 – Ensure Equitable Distribution of Benefits	#6 – Improve Flood Management Using an Integrated Water Management Approach	#3 – Expand Conjunctive Management of Multiple Supplies #16 – Strengthen Alignment of Government Processes and Tools	#17 – Improve Integrated Water Management Finance Strategy and Investments
Resource Management Strategies (Volume 3)	• Ag Water Use Efficiency • Urban Water Use Efficiency • Recycled Municipal Water • Outreach and Engagement • Economic Incentives	All 30+ RMSs can enhance regional self-reliance, depending on where they are implemented and how the benefits are allocated.	All 30+ RMSs have the potential to help meet Delta coequal goals, depending on where they are implemented and how the benefits are allocated.	• Six RMSs pertaining to water quality • Ag Lands Stewardship • Ecosystem Restoration • Forest Mgmt. • Land Use Planning and Mgmt. • Recharge Area Protection • Sediment Mgmt. • Watershed Mgmt.	(Partial list) • Ag Water Use Efficiency • Urban Water Use Efficiency • Recycled Municipal Water • Conjunctive Mgmt. of Surface and Groundwater • CALFED/Local/ Regional Surface Storage	• Conjunctive Mgmt. of Surface and Groundwater • CALFED Surface Storage • Local/Regional Surface Storage	Nearly all 30+ RMSs can help provide safe water and wastewater to all communities, depending on where they are implemented and how the benefits are allocated.	• Flood Management • Seven RMSs in the category of Resource Stewardship that can contribute to flood management	• Conveyance Delta • Conveyance Regional/Local • System Reoperation • Water Transfers	

- #10 – Improve Data, Analysis, and Decision-Support Tools
- …logy and Science
- …e Relations and Natural Resources Management
- …bution of Benefits
- #15 – Strengthen Alignment of Land Use Planning and Integrated Water Management
- #16 – Strengthen Alignment of Government Processes and Tools
- #17 – Improve Integrated Water Management Finance Strategy and Investments

CALIFORNIA WATER PLAN UPDATE 2013

Water Plan Highlights

- Core Messages
- Why We Should Care
- What We Should Do
- How We Should Invest in IWM
- What We Must Know
- What Happens If We Delay

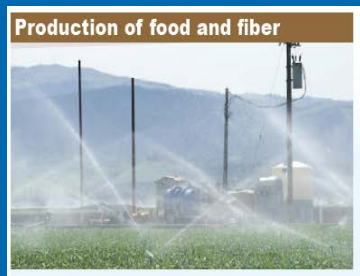
CALIFORNIA WATER PLAN UPDATE 2013

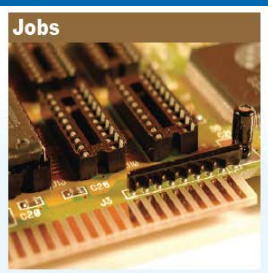
Core Messages

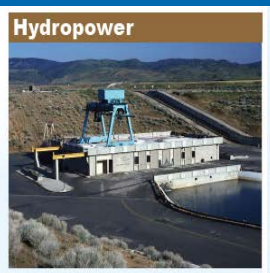
- **Water is the Essence of Life for California.** Every living thing in the state, as well as our economy, depends on reliable, clean water to thrive.
  - **California's Complex Water System is in Crisis.** Our interconnected system of water resources – natural and human made – is severely threatened on many fronts.
    - **A Diverse Portfolio Approach is Required.** The complexity of our water resources systems and the associated risks demand a diverse set of actions and investment strategies. There is no silver bullet.
      - **Solutions Require Integration, Alignment, and Investment.** Commitment to the IWM approach, alignment towards a common vision, and stable financing are essential to ensuring future resiliency.
        - **We All Have a Role to Play in Securing Our Future.** Decision-makers, resource agencies, water resource managers, interest groups, and water users at the State, federal, Tribal and local levels need to actively engage in the solutions.

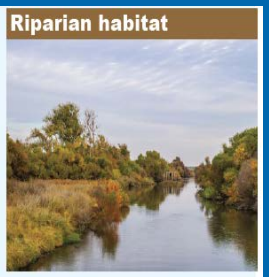
Why We Should Care

Water – The Essence of Life









PUBLIC SAFETY | ENVIRONMENTAL STEWARDSHIP | ECONOMIC STABILITY

- *Provide safe drinking water.*
- *Ensure clean, safe water supplies.*
- *Reduce flood risk statewide.*
- *Improve water quality for fisheries and recreation.*

- *Improve watershed Management.*
- *Restore terrestrial and aquatic habitats.*
- *Enhance Bay-Delta and degraded ecosystems.*
- *Raise awareness and increase stewardship.*

- *Enhance the state's economic output.*
- *Contribute to job creation and security.*
- *Promote food production security.*
- *Provide stable funding for infrastructure.*

CALIFORNIA WATER PLAN UPDATE 2013

A System in Crisis
Our Challenges Are Growing

- Greater Drought Impacts - Unreliable Water Supplies
- Increasing Flood Risk
- Groundwater Depletion and Subsidence
- Degraded Water Quality
- Declining Environmental Conditions
- Aging Infrastructure

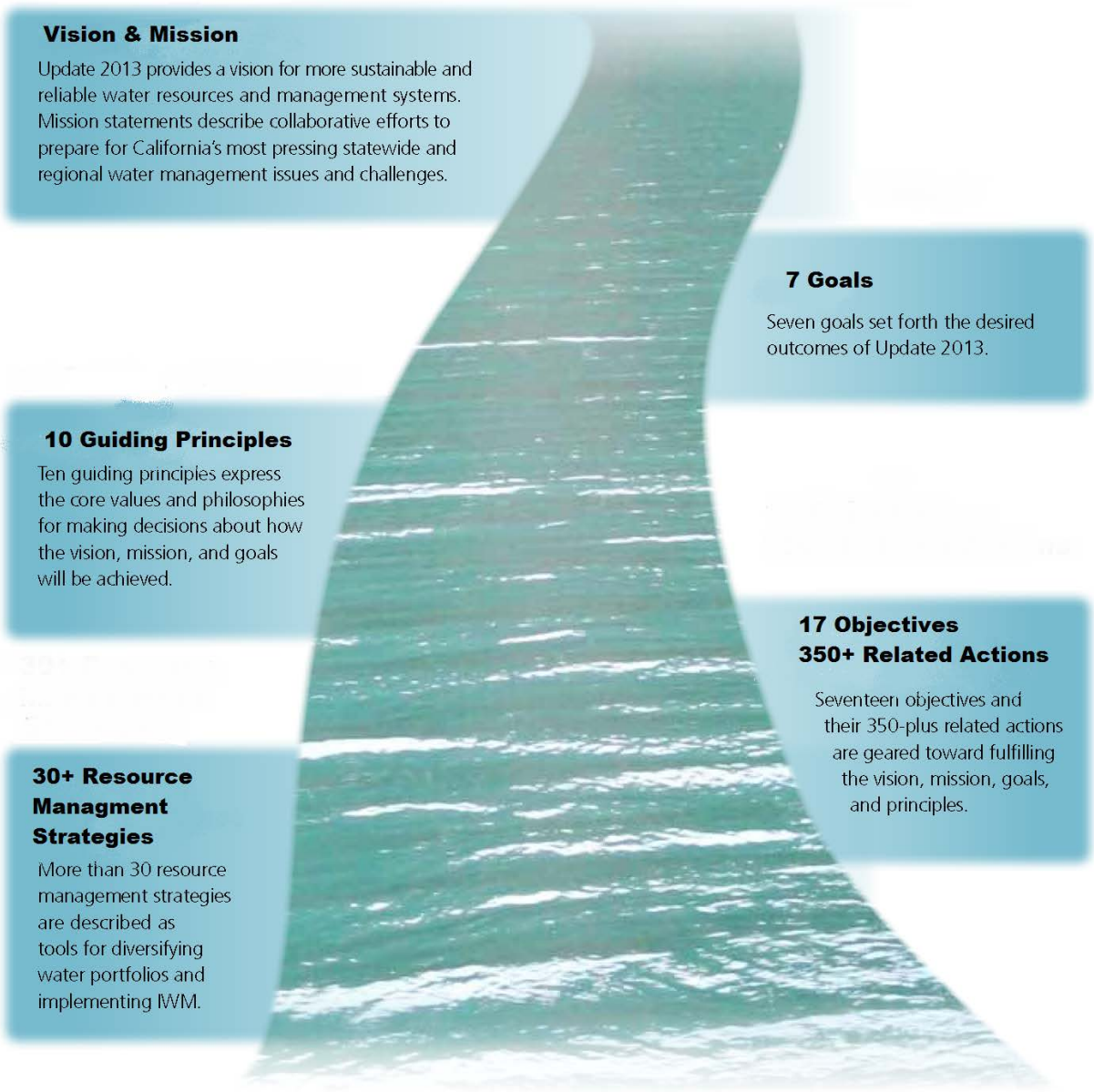
How We Got Here

Critical State Roles are Underfunded

- Unstable and Inadequate Funding
- Emerging Impacts of Funding Limitations

What We Should Do

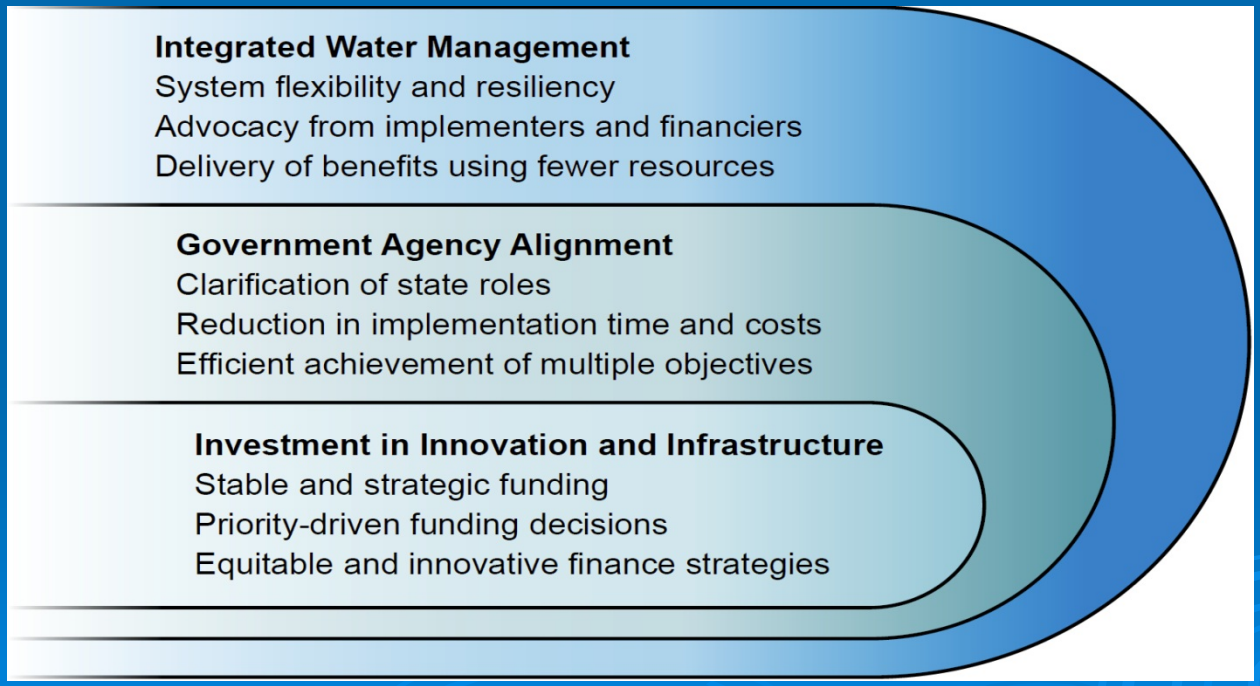
Roadmap for Implementing Integrated Water Management



- **Desired future for CA water & Purpose of Water Plan**
- **Desired outcomes for the 2050 planning horizon**
- **Core values & philosophies**
- **Statements of intent /Implementing IWM Actions**
- **A Range of Choices**

Three Themes of Update 2013

- Enhance Regional and Statewide IWM
- Strengthen Government Agency Alignment
- Invest in Innovation and Infrastructure

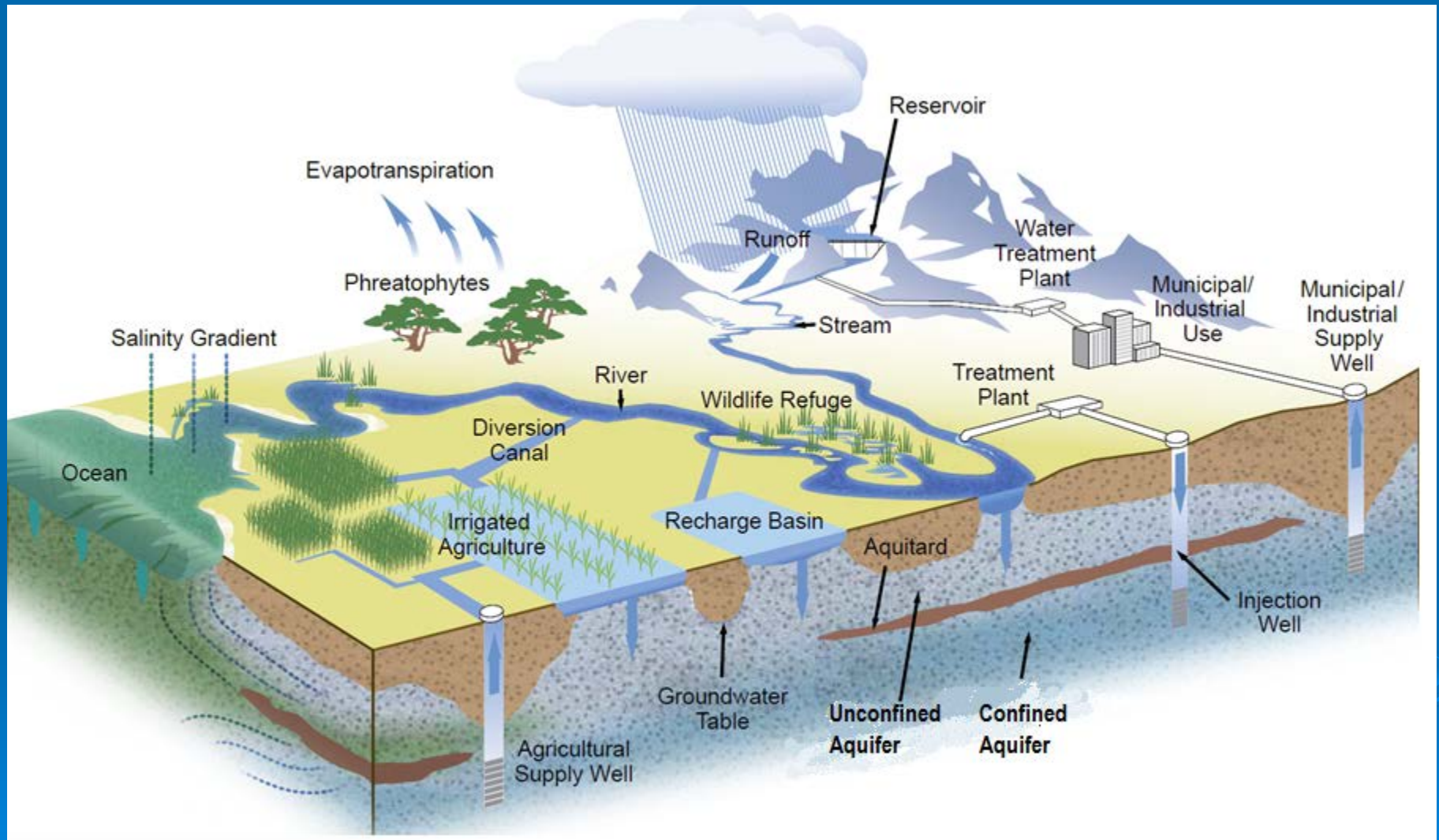


Theme One – A Call to Integrate

Integrated Water Management Delivers VALUE in the following ways:

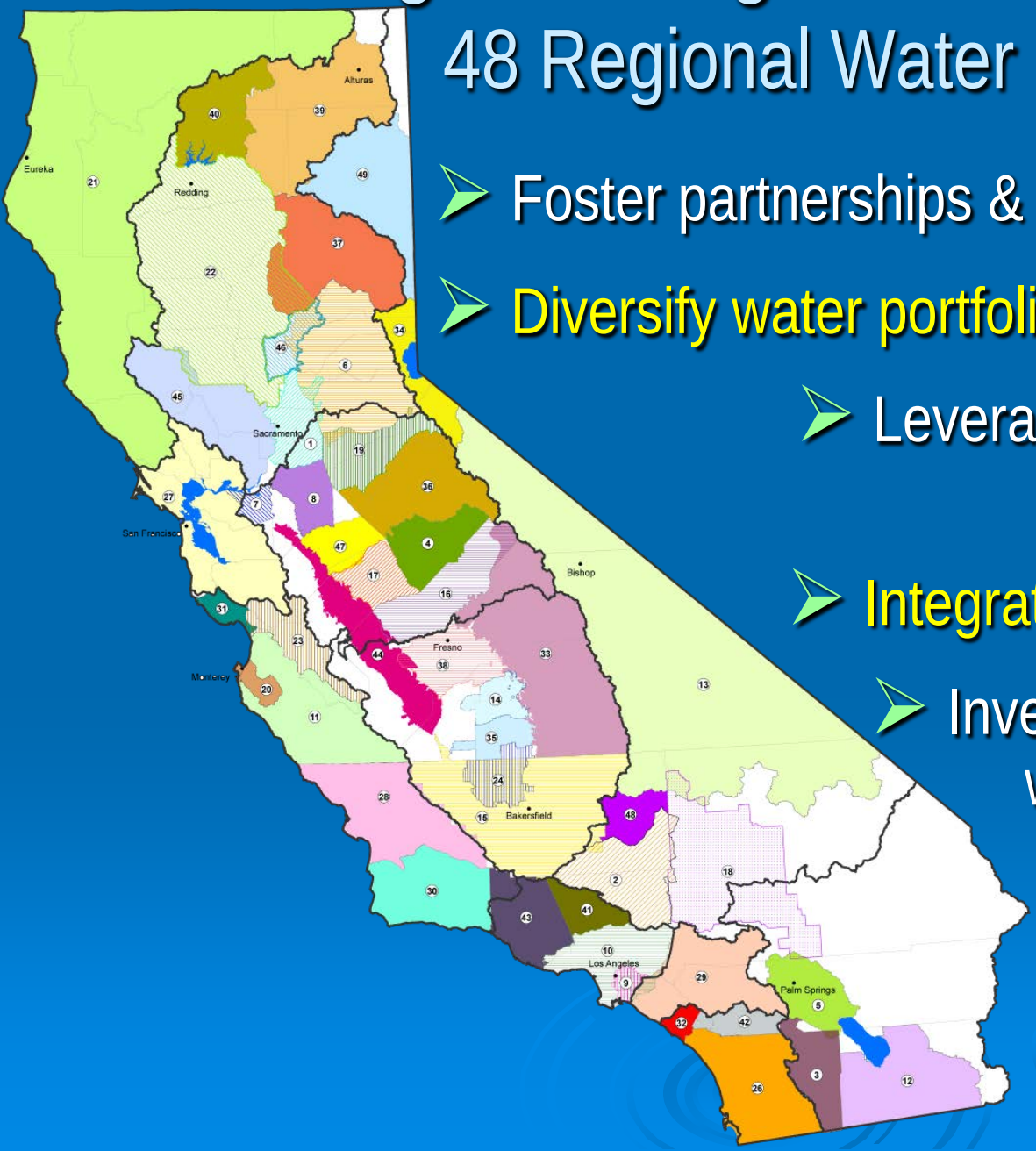
- Maximize limited resources to provide for increased public well-being
- Broader support for projects to accelerate implementation.
- Improve or restore expected levels of service within flood and water management systems statewide.
- Improve system resiliency to respond to and recover from significant stressors.
- Use measurable indicators about return on investments.

Interconnected Systems Require Integrated Solutions



Integrated Regional Water Management

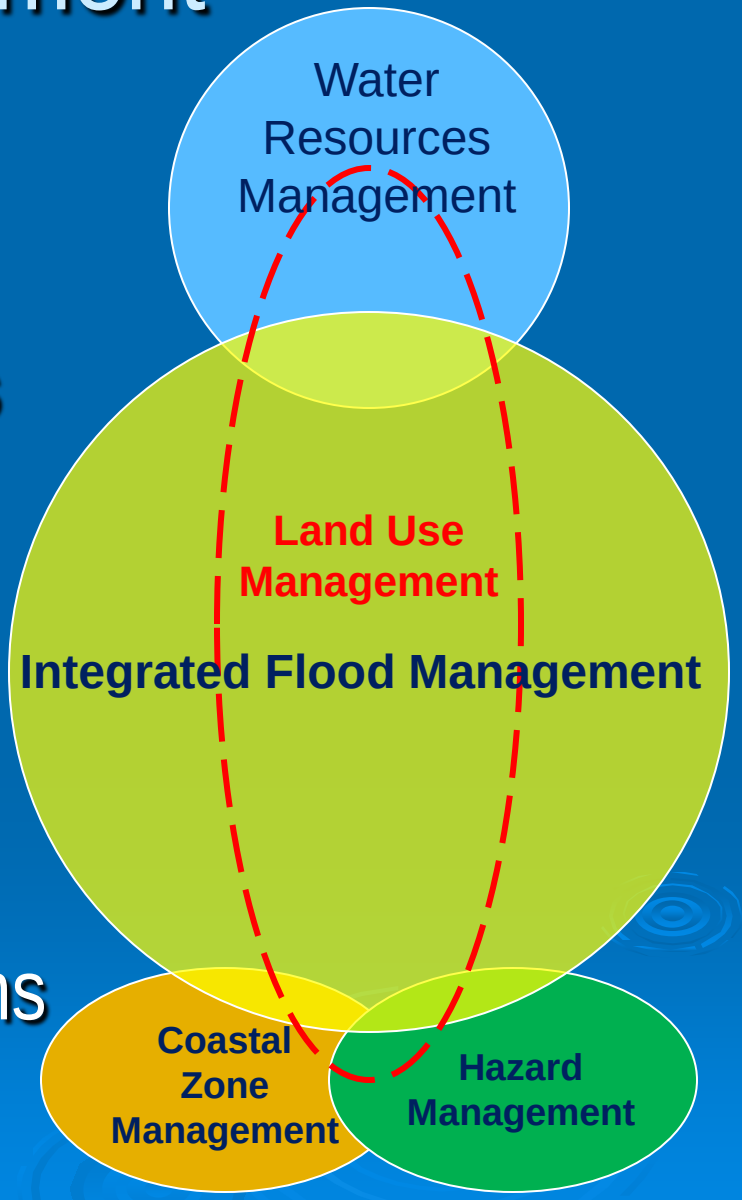
48 Regional Water Mgmt Groups



- Foster partnerships & promote regional solutions
- Diversify water portfolios & integrate supplies
- Leverage economies of scale to reduce costs
- Integrate data, tools & resources
- Invest in multi-benefit projects with sustainable outcomes
- Increase regional self-reliance

Integrated Flood Management

- Comprehensive approach to flood management
- Considers land & water resources at watershed scale
- Minimizes loss of life and property damage from flooding
- Maximizes benefits of floodplains
- Recognizes benefits to ecosystems from periodic floods



Adapted from World Meteorological Organization

Theme Two – A Call to Align

Principles for Improving State Government Alignment

- Increased coordination with all levels of government and agencies (federal, tribal, State, local), stakeholder groups, private landowners, and others.
- Increased effectiveness through leveraging of existing networks, relationships, and multi-agency venues.
- Improved sharing of data, information, tools, and science among government agencies and academia.
- Better alignment of planning, policies, and regulations across governments and agencies, as well as coordinated and streamlined permitting to increase regulatory certainty.

Improving Coordination
Land Use Planning & Water Management

- Land use planning controlled locally
- Water management decentralized -- over 2,300 counties, cities, public agencies, and private water companies
- IRWM coordinates land use planning with water supply, quality, flood management, and climate adaptation
- State Government provides technical assistance and financial incentives
- More coordination among State agencies & with IRWM Partnerships

Theme Three – A Call to Invest (In Innovation and Infrastructure)

Over the next decade, California needs $200 billion to maintain current levels of service and system conditions.

California needs up to $500 billion of future investment over the next few decades to reduce flood risk, provide reliable and clean water supplies, and restore and enhance ecosystems.

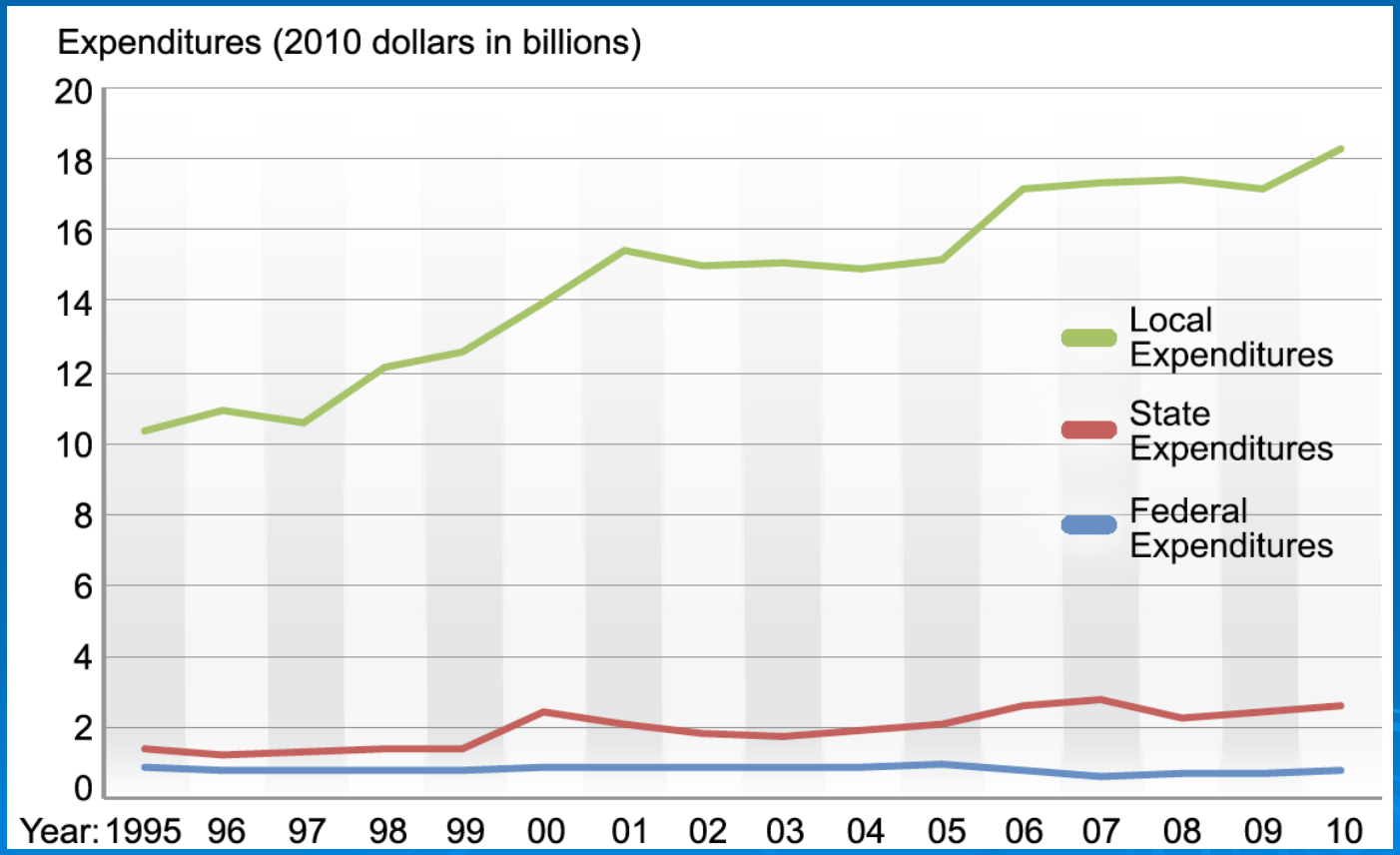
Theme Three – A Call to Invest (In Innovation and Infrastructure)

- Innovation includes:
  - Governance of State IWM improvements.
  - Planning and public engagement improvements.
  - Strengthening government agency alignment.
  - Water technology and science advancements.
  - Implementation incentives

- Infrastructure includes:
  - Structures and facilities that support human activities.
  - Natural infrastructure such as wetlands, riparian habitat, and floodplains.

Theme Three – A Call to Invest (In Innovation and Infrastructure)

Investments Over Previous Decade: A Good Down Payment



How We Should Invest in IWM

How We Should Invest in IWM

Update 2013 Finance Planning Framework provides:

- A structure for developing a comprehensive, well-supported finance plan.
- A logical structure and steps for discussing multiple requirements, perspectives, and previously non integrated financing information.
- Ability for stakeholders, collectively and in context, to consider the issues to be addressed and the decisions to be made.

Update 2013 Water Finance Planning

- **New Finance Planning Framework**
  - Provides context, structure and strategies
  - 8-step finance planning storyboard
- **Shared Values for Guiding State Government Investments**
  - Prioritization of State government investments
  - Fiduciary responsibility and accountability
  - Beneficiary and stressor responsibilities
- **Attributes of future finance strategies**
  - Improve cost effectiveness, efficiencies, and accountability.
  - Avoid stranded costs and funding discontinuity.
  - Leverage funding across State government agencies.
  - Increase certainty of desired outcomes.

How We Should Invest in IWM

Shared Values for Guiding State Government Investment

- Prioritization of State Government Investments — Investment decisions will include equal regard for economic, environmental, and social criteria.
- Fiduciary Responsibility — State government will be fiscally responsible with State funding
- Beneficiary and Stressor Responsibilities — Those receiving benefits or creating impacts pay for them

How We Should Invest in IWM

Attributes of Future Finance Strategies

- Improve cost effectiveness, efficiencies, and accountability.
- Avoid stranded costs and funding discontinuity.
- Leverage funding across State government agencies.
- Increase certainty of desired outcomes.

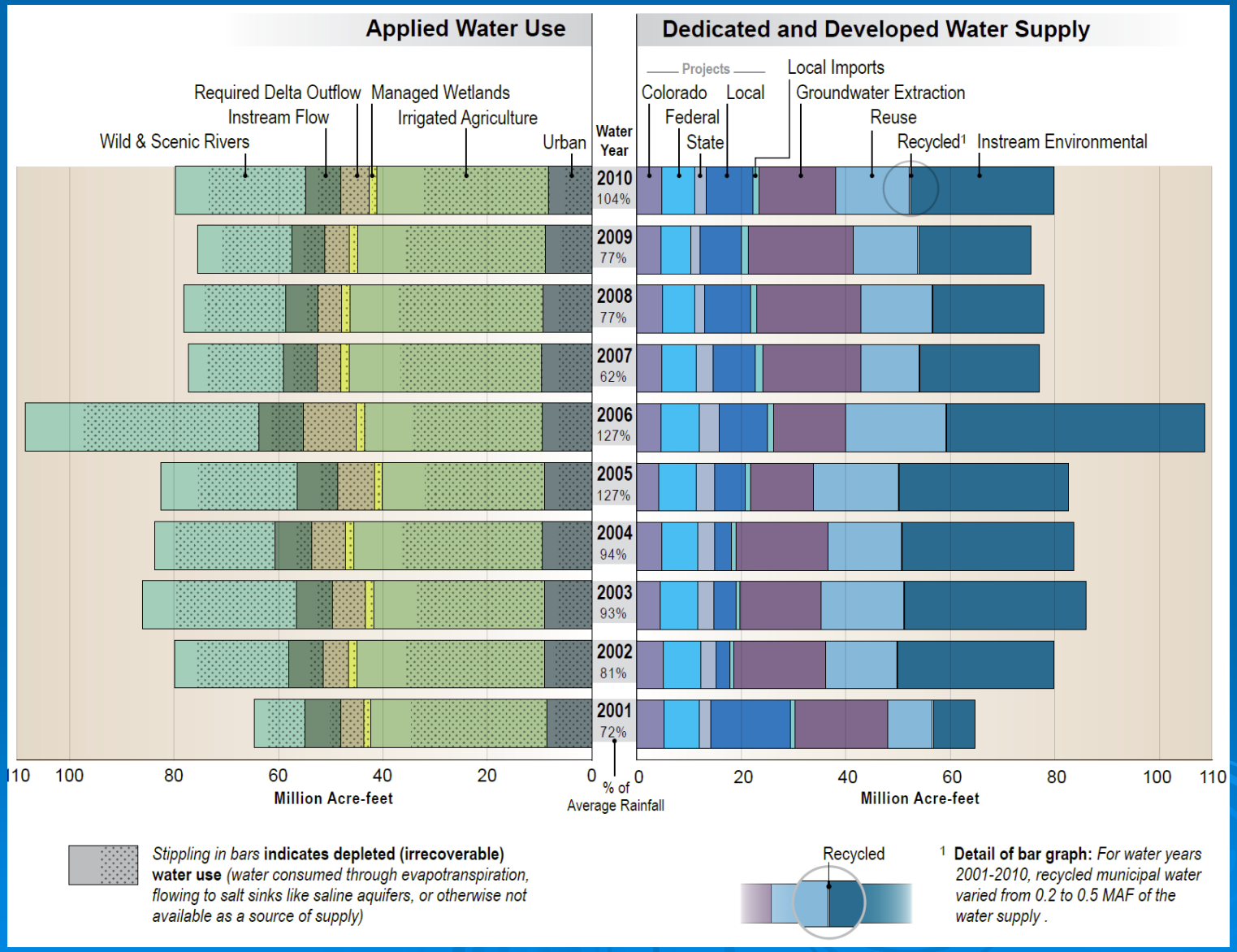
Financing Framework

Table 7-2 State and Local Water Management Revenue Sources

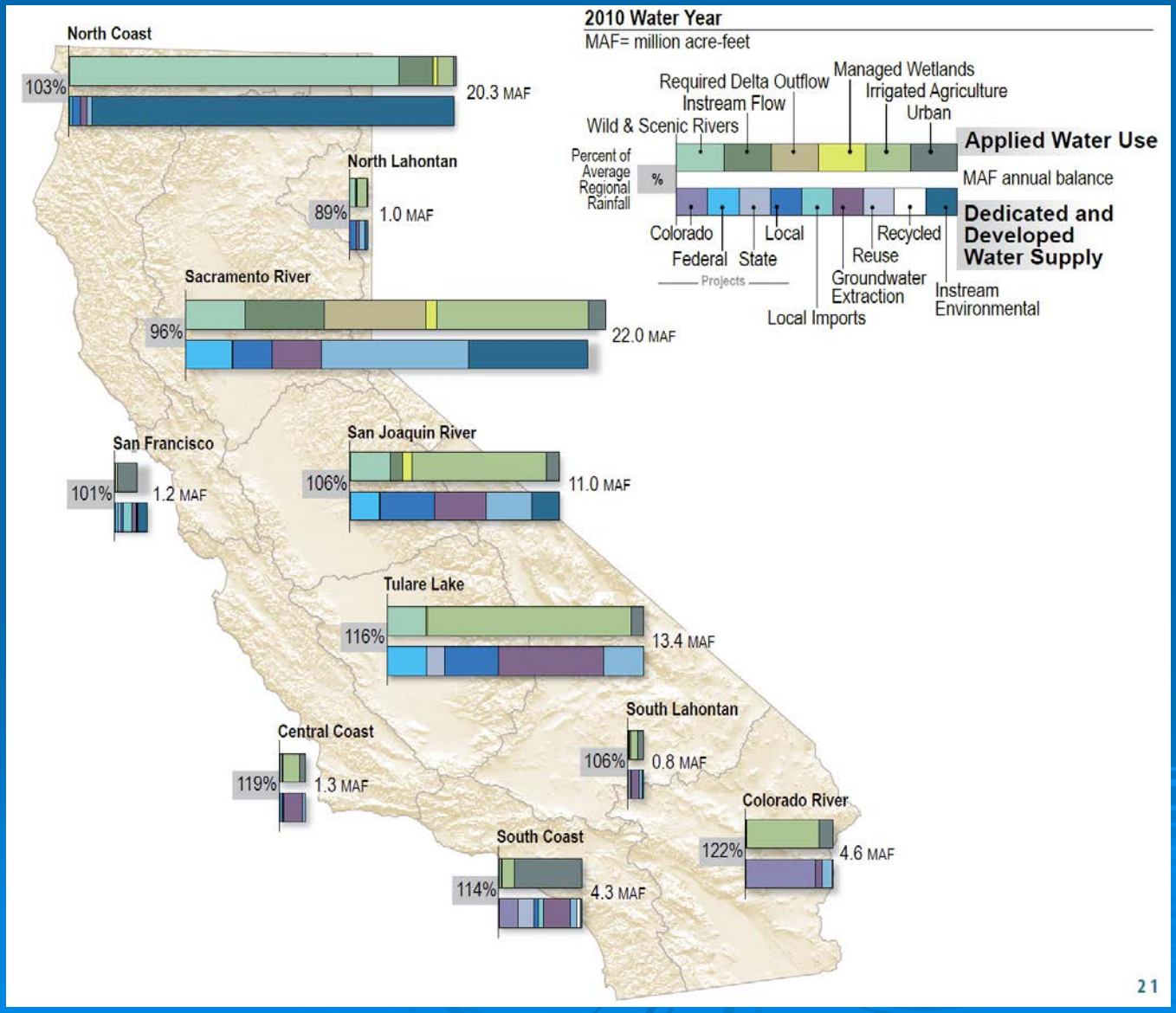
Revenue Source	Appropriate Uses	Feasibility	Key Tradeoffs	Application in California
General Fund	Activities that benefit the general public	Available each year, but subject to competing uses	Funds are limited	A common source of funding
General Obligation Bonds	Projects that benefit the general public	Commonly used	Subject to a vote	Commonly used, but some concern about getting future bonds approved
Revenue Bonds	Projects where a dependable revenue stream is available	A standard method of financing	None	A typical method of financing for local and state projects
User Fees	Projects where direct beneficiaries are easily identified.	Potentially works well with clearly defined beneficiaries, less likely to work for projects with significant public benefits.	Will focus projects to those with local scope which may undermine IWM efforts. May limit state's ability to increase fees and taxes to support other projects.	State Water Project is an excellent example as over 90% of project cost will be repaid by direct beneficiaries (contractors)
Assessment Districts	Can be formed by majority vote but must support local projects that do not provide a "general" publi... benefit. Wate...	The state could ...	Assessment districts cannot be used to support general ...	1911 and 1913/1915 assessment districts are widely used by local ...

What We Must Know

California's Water Supply and Use



Understanding Regional Diversity



30 Resource Management Strategies

Tools for Diversifying Regional Water Portfolios

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

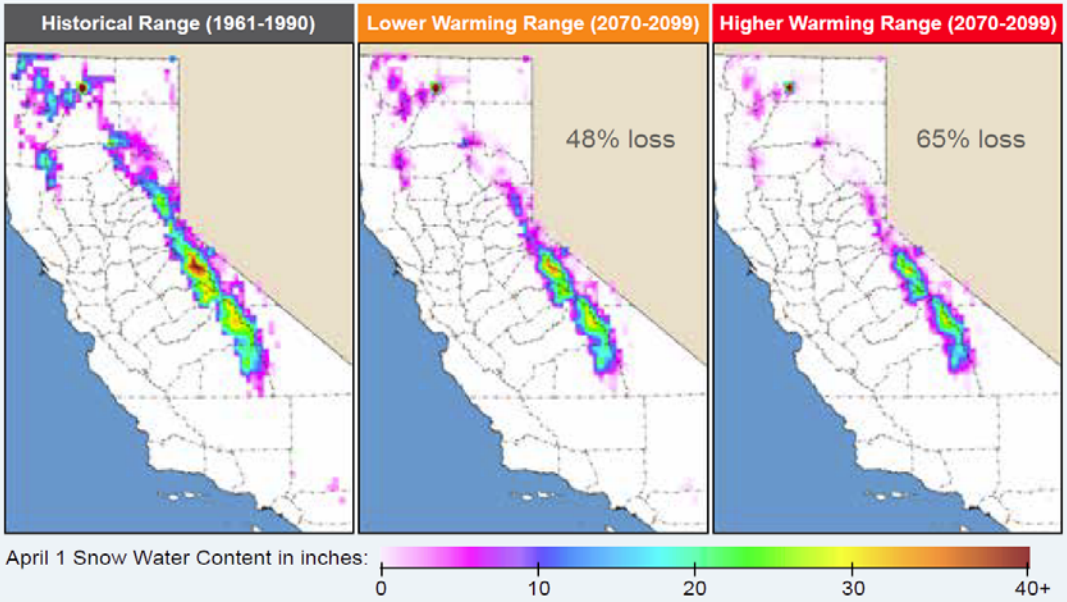
Practice Resource Stewardship

- 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

New – Education & Outreach
Sediment Management
Water & Culture

Climate Change Future Impacts

Historical and Projected April 1 Snow Water Content for the Sierra

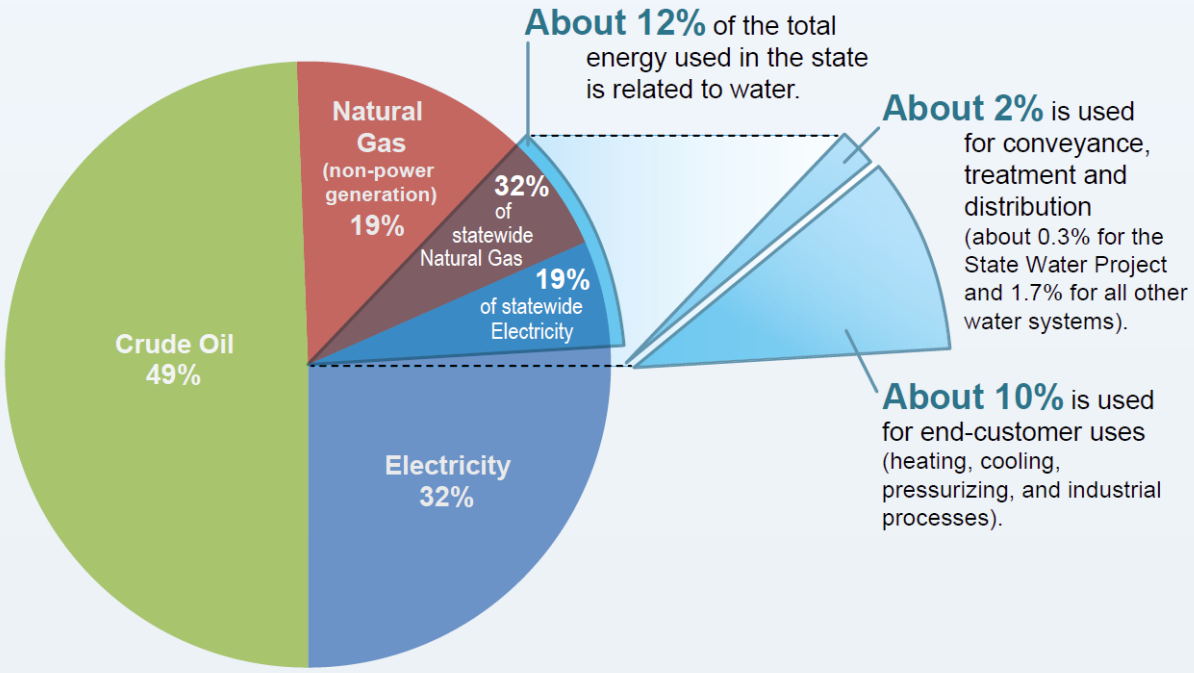


Historical and projected April 1 Snow Water content for the Sierra for lower and higher warming scenarios depicting the effect of human generated greenhouse gases and aerosols on climate. By the end of this century, the Sierra snowpack is projected to experience a 48 to 65 percent loss from its average at the end of the previous century (Pierce and Cayan, 2013).

- Sierra Nevada snowpack could be reduced by 48 to 65 percent by the end of the century. California relies on snowpack as a major water supply.
- Earlier runoff timing and increased water demand in a warmer climate could mean greater water scarcity.
- Increased flood risk resulting from warmer and stronger winter storms may affect the state's economy and public safety.
- As water demands increase and the reliability of surface water is reduced, demands on groundwater are expected to increase.

The Water-Energy Nexus

Energy Use Related to Water



- Water is used by the energy sector, and energy is used by the water sector.
- The water-energy nexus provides opportunities for conservation of these natural resources, as well as reduction of GHGs.
- Customers have a large role to play in reducing energy and GHG emissions.

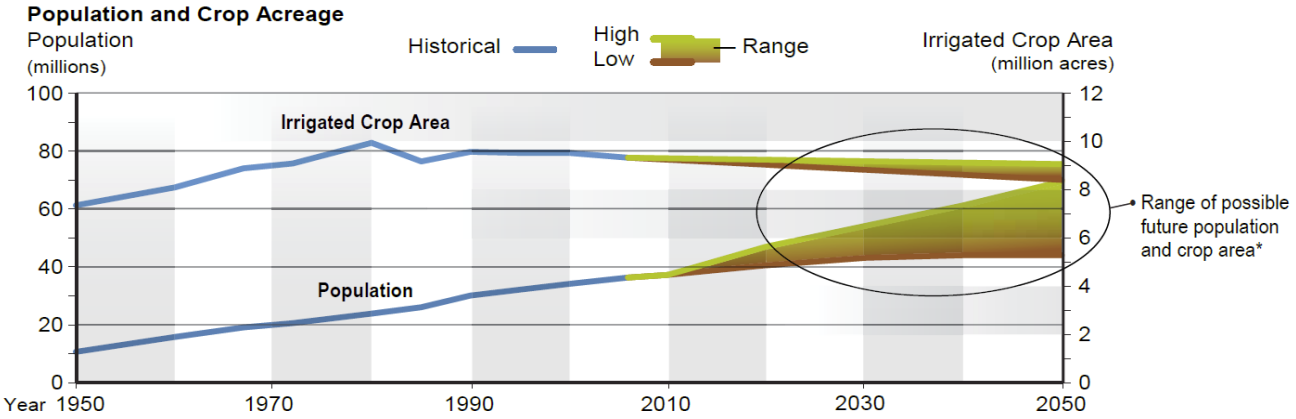
Informed and Transparent Decisions

Effective action requires an informed and common understanding of conditions, trends and solution trade-offs.

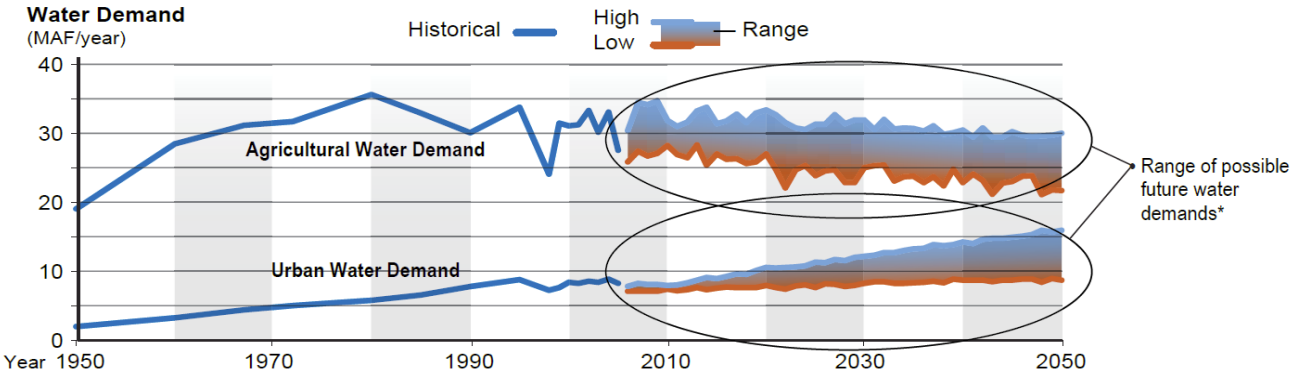
Critical research areas where technical enhancements are needed to support IWM include:

- Linking collaborative processes with technical enhancements.
- Providing effective analytical tools.
- Improving and sharing data and information.

Water Scenarios 2050
Preparing for the Future



Scenarios considered a 2050 California population between 43.9 and 69.4 million people compared to 37 million people in 2010. Scenarios considered a range of irrigated crop area in 2050 between 8.4 and 9.2 million acres compared to 9.4 million acres in 2010.

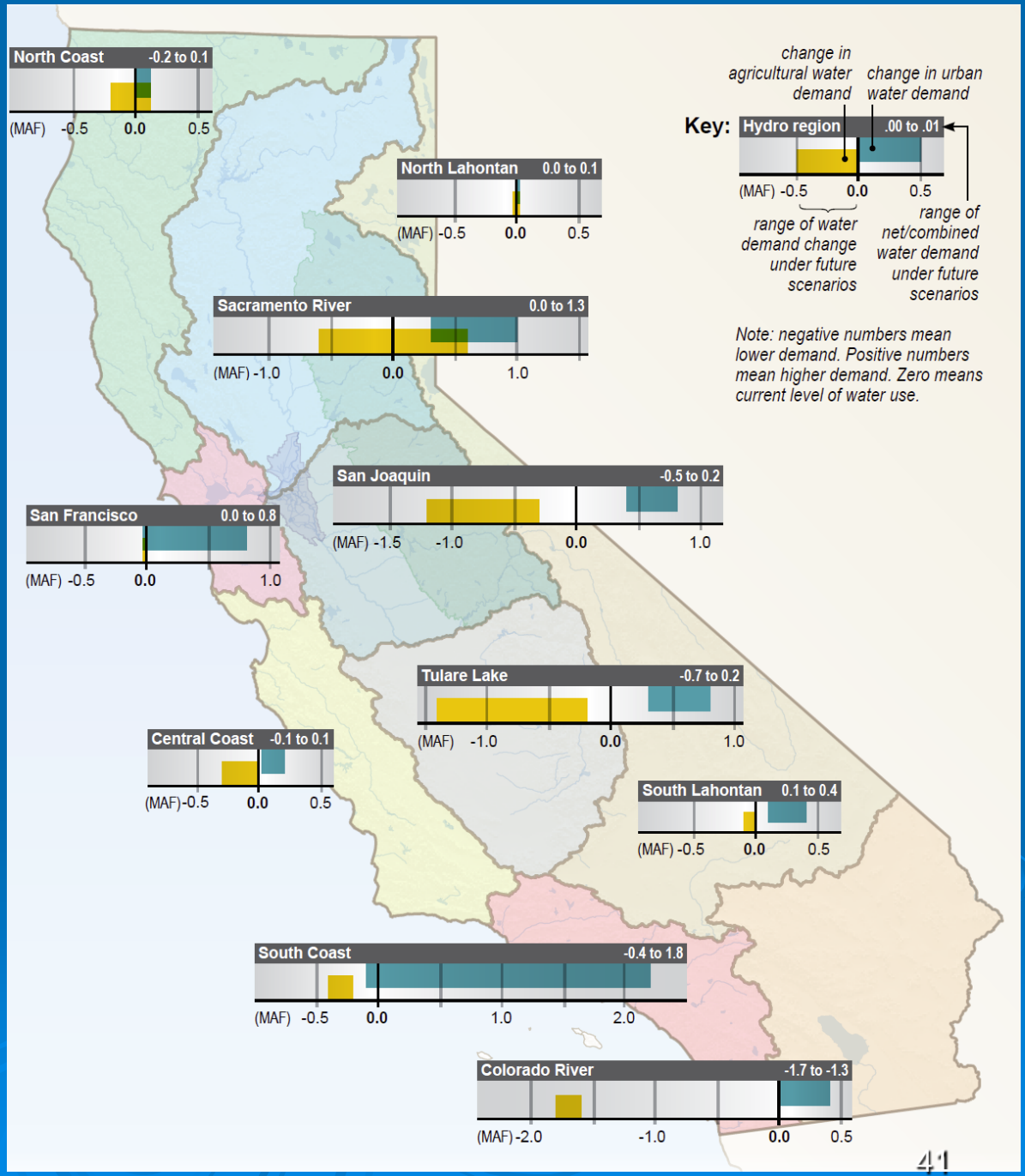


By 2050 the study estimates an increase in urban water demand ranging between 1.0 and 6.7 million acre-feet per year and a reduction in agricultural water demand ranging between 2.0 and 5.9 million acre-feet per year.

*assuming no new actions or policies are implemented.

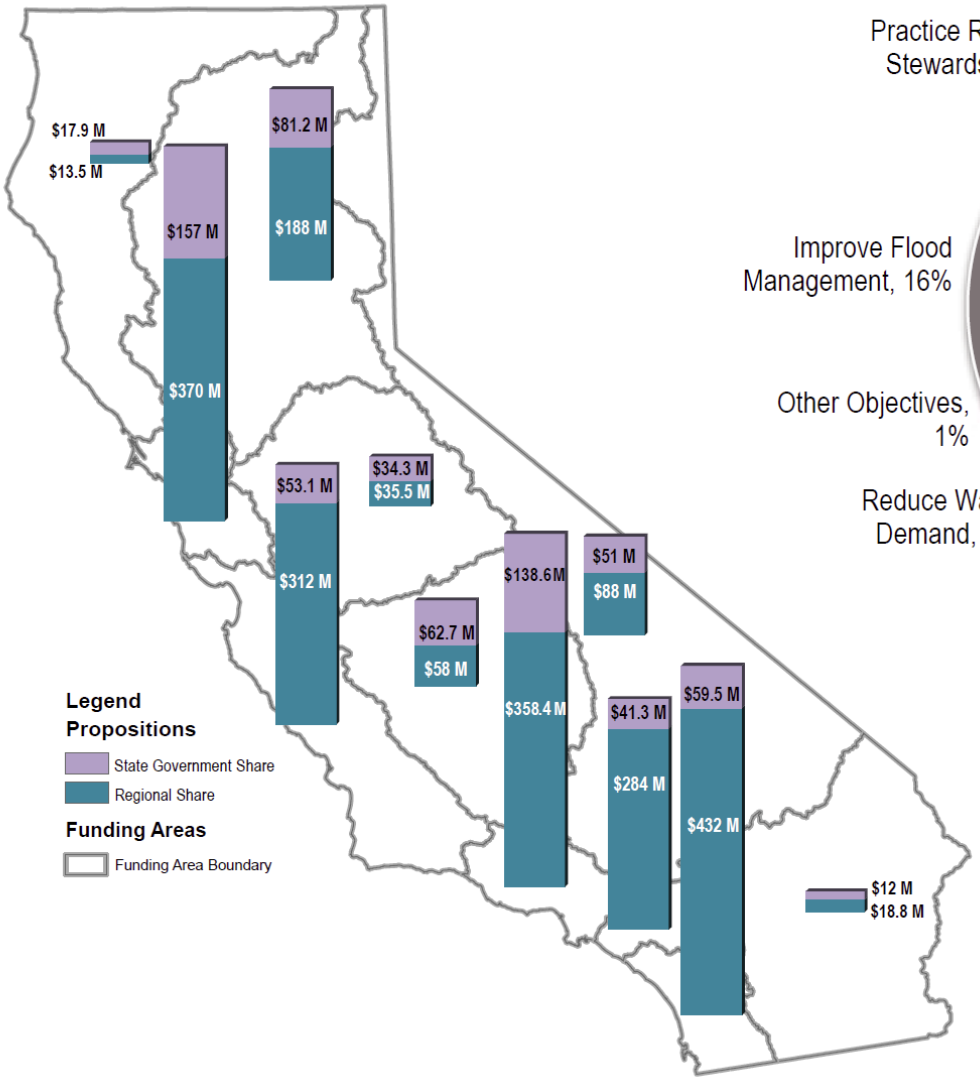
Water Scenarios 2050

Future Regional Water Demand Changes

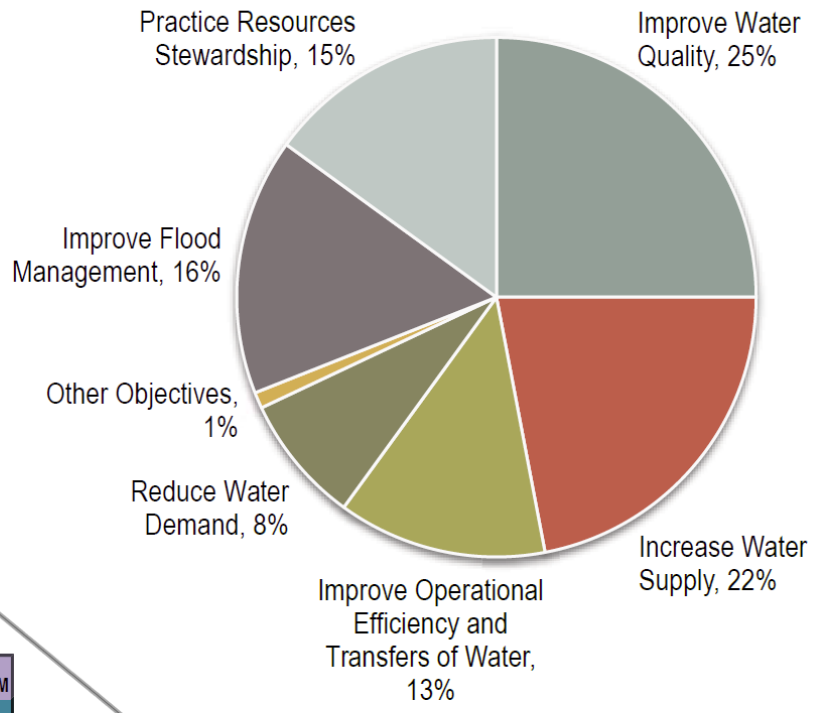


A Decade of Regional Investment

Local and State IRWM Expenditures

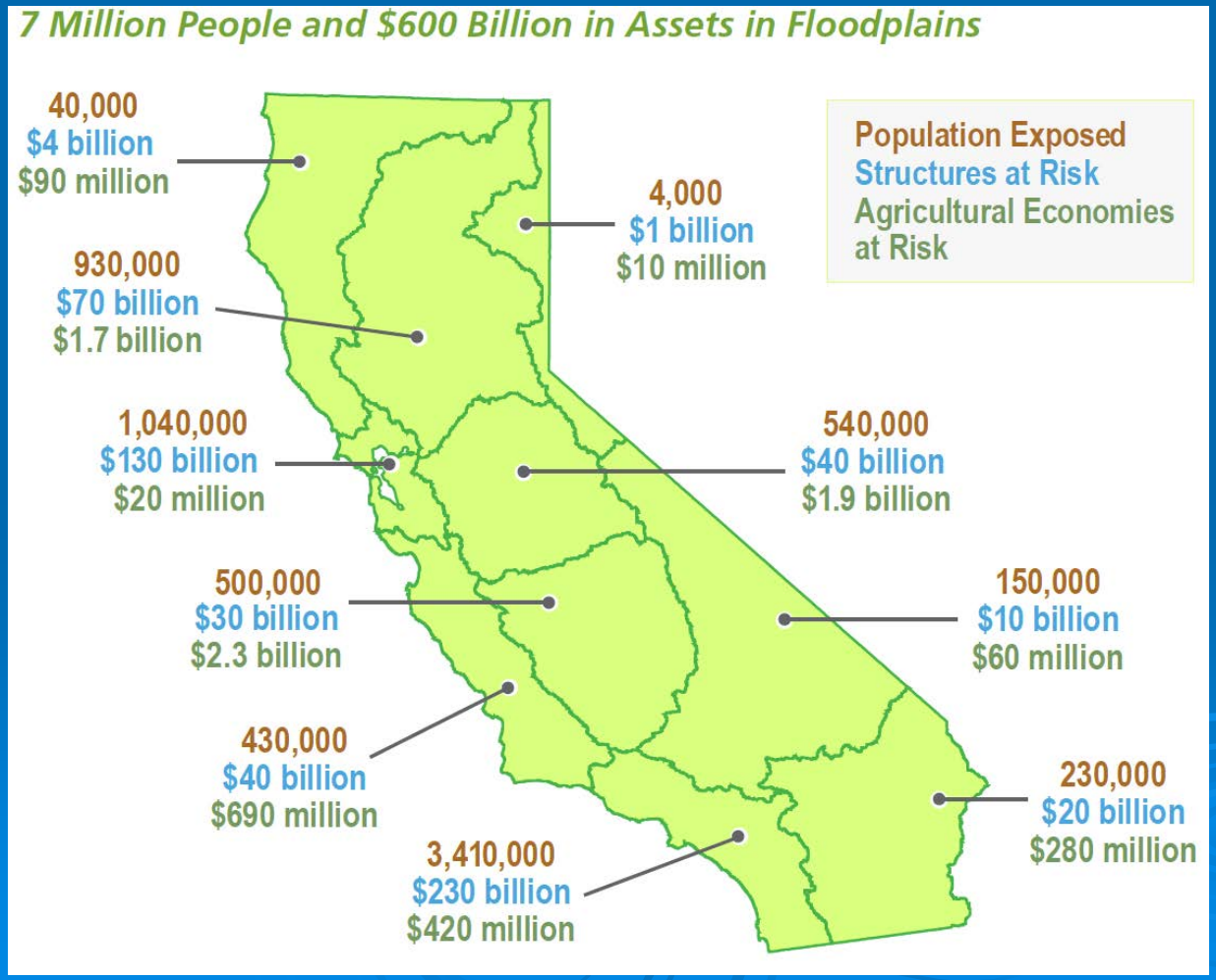


Types of IRWM Investments



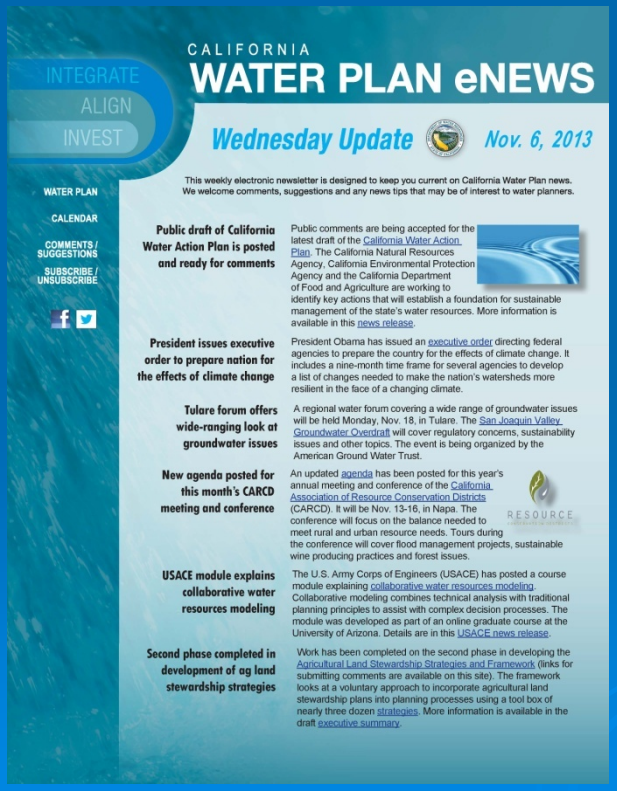
What Happens If We Delay

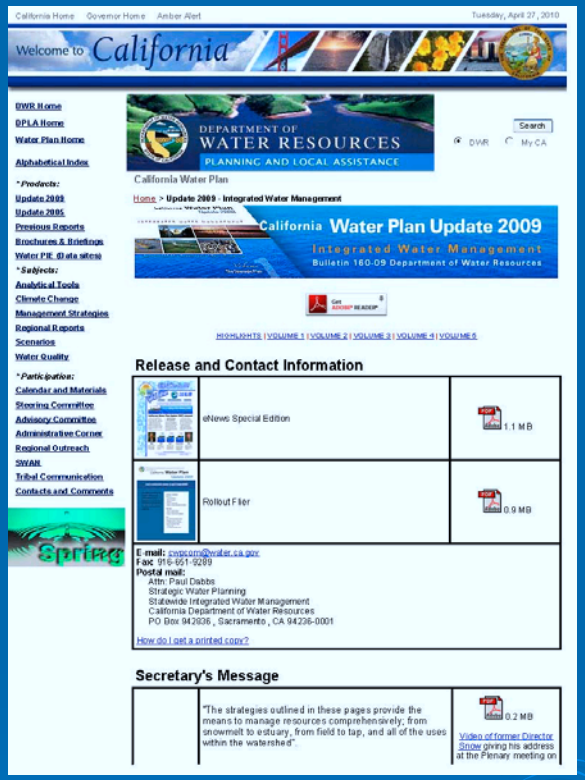
Delay At Our Own Peril



Ways to Access Water Plan Information

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





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Questions & Comments

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