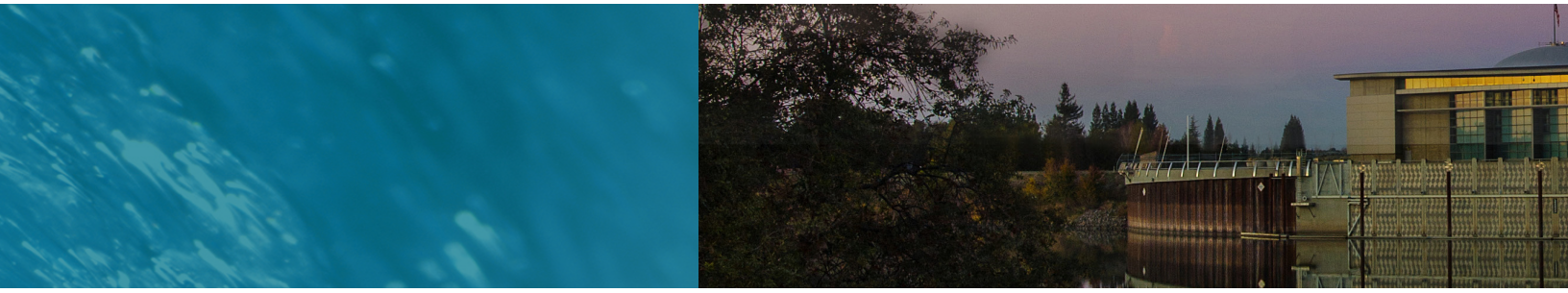
Imperative to Invest in Innovation and Infrastructure



Freeport Intake Facility on the Sacramento River. In 2002, after years of conflict, the Freeport Water Authority began a successful collaborative effort to build the Freeport Regional Water Project. The Intake Facility includes a state-of-the art fish screen and a drinking water distribution system that benefits over 40,000 customers in Sacramento County. In addition, the project will serve 1.3 million customers in Alameda and Contra Costa counties during dry years.

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Chapter 2. Imperative to Invest in Innovation and Infrastructure

About This Chapter

This chapter describes the urgency behind continuing to invest in integrated water management (IWM) in California. Strategic investments in both innovation and infrastructure (human-made and natural) will provide for future public safety enhancements, environmental stewardship, and economic stability. This course of action will help avert several foreseeable societal catastrophes, such as loss of life and property from floods, unreliable water supplies, and adverse impacts of droughts; depletion of groundwater basins; irreversible land subsidence; and declining ecosystems.

The primary purpose of this chapter is to guide strategic, disciplined investment and remove implementation impediments by working to achieve the California Water Plan's (CWP's) vision, mission, goals, and objectives, which are described herein. This chapter (in conjunction with more specific actions in Chapter 8, "Roadmap For Action") will help reduce uncertainty and improve the reliability of the California's watersheds and water systems for all uses. In turn, California's business climate and quality of life will be improved. An open and transparent planning process will lead to stakeholder and decision-maker support for investment in various areas of resource management.

This chapter describes the following:

- A Critical Time to Invest.
- Fundamental Lessons.
- Focus of Update 2013 — Three Overarching Themes.
- Role of State Government in Integrated Water Management.
- Looking to the Future.

A Critical Time to Invest

Water planners, managers, and stakeholders throughout California agree that our state is facing a convergence of unprecedented challenges. Such challenges range from social (e.g., complicated governance, divergent priorities among stakeholders, unwillingness or inability to pay for public infrastructure or services) to geophysical (e.g., climate change, limitations of natural resources, limitations of existing physical infrastructure). State, federal, and local agencies need to step up efforts to enhance California's business and finance climate by increasing the certainty that flood

damages will be averted, surface water and groundwater supplies will be reliable and predictable, and recreational opportunities and environmental sustainability will be improved.

Resolving these challenges is becoming more difficult as time passes. While many of the most cost-effective system infrastructure improvements have already been constructed, past implementation did not always adequately account for costs of ecosystem or other improvements that society values today. As a result, future system improvements are going to cost more. Adequate funding will be further complicated by the lingering effects of the financial crisis that State, federal, and local agencies have faced in recent years.

California still faces many of the conditions that were highlighted in *California Water Plan Update 2009* (Update 2009). While the drought that the state faced in 2009 has passed, January and February 2013 (when much of the snowpack should accumulate) were observed as the driest January and February since 1921, indicating a high probability that California is entering another critical drought. In many cases, the effects of the challenges described below can combine to create problems larger than their sum. Over the longer term, climate change has the potential to reduce our snowpack storage, increase sea level, and degrade water quality in the estuaries — all of which reduce water supply reliability. In addition, the timing, magnitude, and duration of precipitation and snowmelt runoff in some areas may increase flood risk and reduce seasonal recharge and long-term aquifer storage. Court decisions and regulations have resulted in the reduction of water deliveries from the Sacramento-San Joaquin Delta (Delta) by about 20 to 30 percent. Key fish species continue to decline. In some areas of the state, our ecosystems and quality of underground and surface waters are unhealthy.

California needs to increase and sustain investment in innovation and infrastructure (constructed and ecosystem) as described in *California Water Plan Update 2013* (Update 2013) (see Chapter 7, "Finance Planning Framework") or live with an unacceptable reduction in public safety, quality of life, and environmental stewardship for generations to come. The challenges identified in Chapter 3, "California Water Today," though often interrelated, can be viewed as independent issues facing water management. Combinations of these challenges can be summarized as the critical conditions discussed below, the potential consequences of which make this a critical time to invest. For example, population, land use, and geophysical variability, as well as other factors that can pose challenges, have an impact on how droughts affect each region.

Folsom Lake bed in the summer of 2013.

Greater Drought Impacts

Droughts cause economic harm to urban and rural communities and loss of crops, heighten the potential for species collapse and extreme fire danger, degrade water quality, and increase stresses on groundwater aquifers. Even a single dry year can negatively affect activities that are wholly dependent on unmanaged water supplies, such as dryland farming, livestock grazing, and many recreational water uses. Multiple consecutive dry years have and will continue to occur, a condition that exponentially increases impacts of reductions in available surface and groundwater supplies. Vulnerabilities to drought are increasing due to the several factors, including population growth, increases in permanent crops, aging or limited water distribution

infrastructure, previous implementation of the most cost-effective or implementable resource management strategies (e.g., water users who have already increased efficiency may find it more challenging to achieve additional water use reductions during droughts), more volatile and unpredictable climate patterns, and ecosystems that are already struggling as a result of other factors. During dry years, water management becomes more complex when various water users may seek to use the same diminished water supply. (See Figure 2-1, "Historical Droughts in California.")

Figure 2-1 Historical Droughts in California

Increasing Flood Risk

The California Department of Water Resources has estimated that nearly $600 billion of assets (buildings, crops, and public infrastructure) and over 7 million people are at risk of flooding. Flooding can affect California at different times of year and in different forms, such as stormwater flooding and alluvial fan flooding (see Figure 2-2). Every Californian, however, is exposed to the significant impacts that result from flooding, including disruption of commerce, emergency response and the secondary impacts that ripple through the state's economy (e.g., redirection of funding from other State government services). In effect, all California taxpayers participate in recovery from floods. People continue to move into floodplains and flood-prone areas throughout the state. Sacramento, California's capital, has one of the lowest levels of flood protection of any major city in the nation. Under certain circumstances, some urbanized communities in the region could be flooded by more than 20 feet of water. The threat of catastrophic flooding, especially in the deep floodplains of the Central Valley and the Delta, is a continuing concern. If not proactively managed in the future, devastating economic, environmental, and social impacts resulting from catastrophic flood events will occur, as experienced in other areas of the country as a result of Hurricanes Sandy and Katrina.

Depleting Groundwater Basins

California's groundwater supplies and aquifer storage capacities play a very significant role in IWM. Thirty million Californians depend on groundwater for a portion of their drinking water supply. Reliance on groundwater will continue to increase as the population grows, as limitations on available surface water continue, and as potential impacts of climate change occur. Groundwater provides about 40 50 percent of total annual agricultural and urban water uses. Some cities, coastal basins, and rural areas are 100-percent dependent on groundwater for their water supply. A number of groundwater basins in California have experienced alarming declines in groundwater levels, degradation in

Figure 2-2 Types of Flooding in California

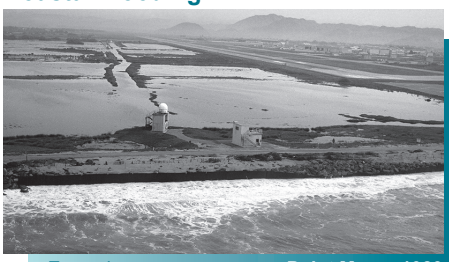
Tsunami Flooding

Example Crescent City, 1964

Engineered Structure Flooding

Example Sweetwater Dam Failure,1916

Coastal Flooding



Example Point Mugu, 1983

Debris Flow Flooding

Example Laguna Canyon Channel, 1969

Flash Flooding

Example Perris, 1916

Slow Rise Flooding

Examples Yuba City, 1955

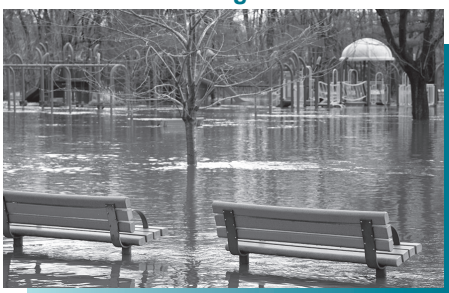
Sacramento, 1878

Salinas River Basin, 1969

Alluvial Fan Flooding

Example Borrego Palm Canyon, 1979

Stormwater Flooding



Example Borrego Springs, 2003

water quality, irreversible land subsidence, decreases in base-flow contribution to surface water systems, and subsequent loss of vital ecosystem services.

The Central Valley aquifer of California is the second most pumped aquifer in the U.S. and contributes 7 percent of the total U.S. food supply ($21 billion annually) and contains one-sixth of the nation's irrigated land. Groundwater storage depletion in the Central Valley aquifer from 2005 to 2010 ranges between 5.5 and 13.0 million acre-feet. Declines in groundwater levels in Tulare Lake hydrologic region have reached 25 feet for the same period (refer to Figure 2-3). (See Chapter 3, "California Water Today," for more detailed information on groundwater conditions.) Update 2013 advanced and applied a method for calculating the change in the amount of water stored in the aquifer. The purpose of applying this method is to better inform the actions needed to help align statewide policy, focus limited financial resources, and ultimately improve groundwater and surface water management practices. Linking the local management of the two inseparable resources of groundwater and surface water, within the context of a broader IWM plan, will be an important step toward the goal of creating a sustainable and resilient water portfolio for the future. (See Chapter 6, "Integrated Data and Analysis," for more information.)

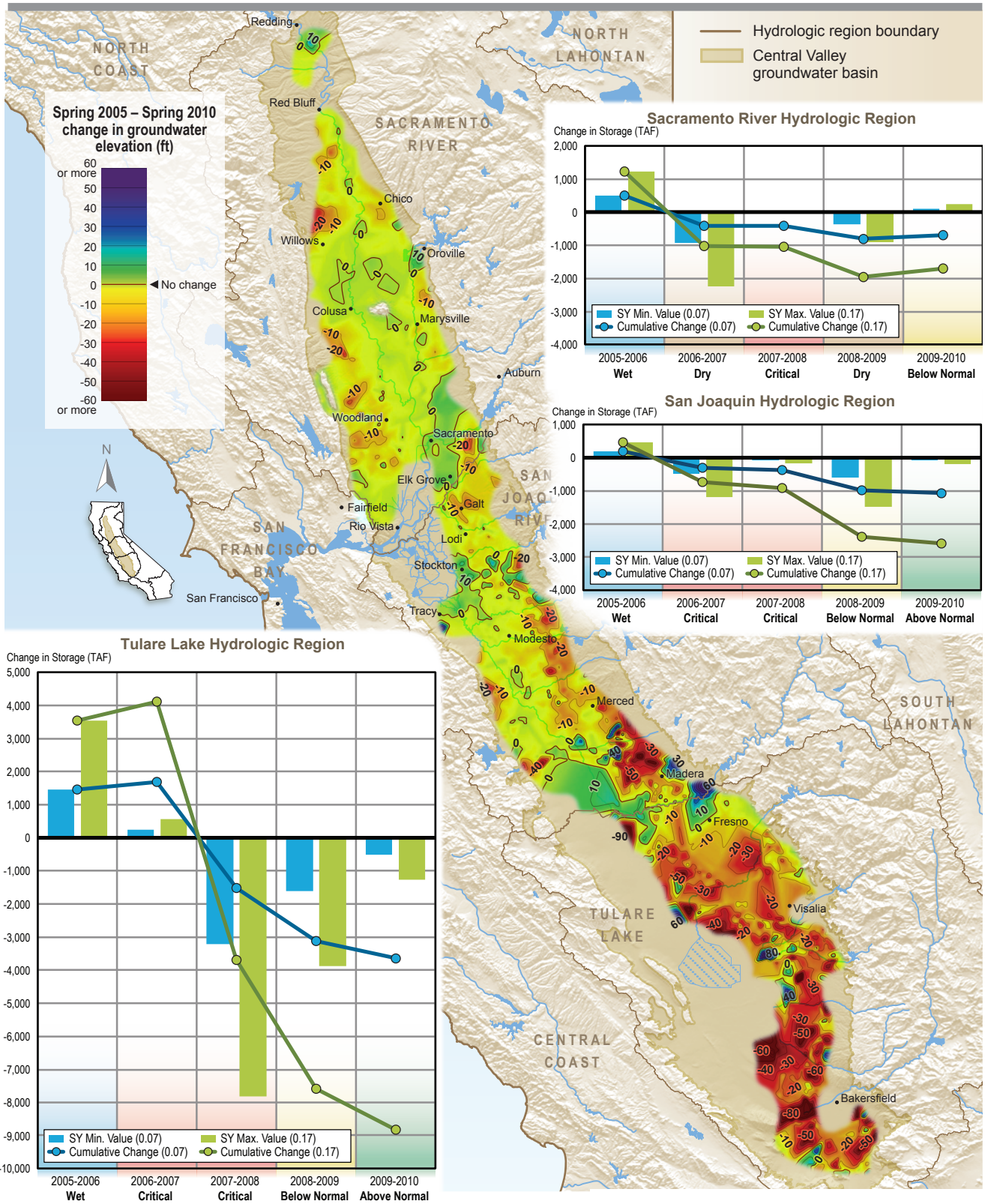
Declining Ecosystems

California has lost more than 90 percent of the wetlands and riparian forests that existed before the Gold Rush. Successful restoration of aquatic, riparian, and floodplain species and communities ordinarily depends on at least partial restoration of physical processes that are driven by water. The diminution of these physical processes often leads to displacement of native species, presenting another huge barrier to ecosystem restoration. The ecosystems in many areas of the state have declined; many species have been listed as threatened or endangered. Watershed health, including lack of suitable habitat, competition with invasive species, pollution, and water management activities contribute to the decline. One of the most obvious examples of an ecosystem in crisis is the Delta. Salmon, delta smelt, and other species are at their lowest levels since records were first kept about 50 years ago. This decline has led to court restrictions and new regulations on Delta diversions. (Refer to Figure 2-4, "State-Listed and Federally Listed Species in California.")

Degraded Surface and Groundwater Quality

The quality of groundwater and surface waters varies significantly throughout the state. Degradation is occurring naturally and as a result of human activities. Improvements must be made in drinking water treatment, cleanup of polluted groundwater, salt management, and urban runoff management. High priority must be given to creating healthy watersheds to keep source water free of pollutants, such as pathogens and chemicals that are regulated or will be regulated in the near future. Recently, some unregulated chemicals and pollutants have emerged as actual or potential contaminants. They can occur in pharmaceuticals and personal care products, byproducts of fires and fire suppression chemicals and agents, or discarded elements of technology.

Figure 2-3 Change in Groundwater Storage in the Central Valley Aquifer of California (2005-2010)



Aging Infrastructure

Conditions today are much different than when most of California's water system was constructed, and upgrades have not kept pace with changing conditions, especially considering the growing population; changing societal values, regulations, and operational criteria; and the future challenges accompanying climate change. Many of California's water supply and flood protection systems are composed of aging infrastructure with decades of accumulated maintenance deficiencies. To compound the problem, State and regional budget shortfalls and a tightened credit market may delay new projects and programs.

Figure 2-4 State-Listed and Federally Listed Species in California

Changing Water Demands

California's changing and potentially competing demands for water come from many sectors. All uses generally can be characterized as urban, agricultural, or environmental. The state's population continues to grow and the trend has been faster growth in warmer inland regions. From 1990 to 2010, California's population increased from about 30 million to about 37.3 million. The California Department of Finance projects that this trend means a state population of roughly 51 million by 2050. Chapter 5, "Managing an Uncertain Future," presents scenarios of future changes in water demand through 2050 that consider uncertainties surrounding future population growth, land use decisions, and climate change. Although these uncertainties can affect future demand for water supply, future urban water demands, under many scenarios, could increase by several million acre-feet.

Physical Variability and Social Diversity

Providing solutions under the critical conditions described above becomes more difficult in the face of physical variability and social diversity. California is often recognized as a land of extremes in relation to its diversity of cultures, ecosystems, geography, and water resources. Precipitation, which is a primary source of California's water supplies, varies from place to place, season to season, and year to year. Most of the state's snow and rain fall in the northern mountains and eastern regions, and the most water is used in the valleys and along the coast.

Moreover, the state's ecosystem, agricultural, and urban water users have variable needs for the quantity, quality, timing, and place of use. The water and flood systems face the dual threats of too little water to meet needs during droughts and too much water during floods — sometimes within the same year. The physical and social realities within California do not allow for a one-size-fits-all approach to water management and planning. California's State, federal, tribal, regional, and local projects and programs must work together to make water available in the right places and times and to safely move floodwaters.

California's *anthrodiversity* (e.g., the human aspect of biodiversity that denotes the public interest and value of varied human habitats, such as rural, suburban, and urban communities) creates additional IWM planning complexities. The state's various cultures, organizations, and individuals naturally assign different values and priorities to IWM-related assets, services and benefits. They also naturally have different reliance on, or rates of consumption of, IWM-related resources. Disparate priorities, practices, and resource consumption rates define California's rich social diversity. To further complicate planning, various regions of the state experience differences in natural hydrology, ecosystem condition, water supply and use, flood risk, and opportunities and needs for system improvements. Therefore, while investments for statewide water management must be made, the focus of planning and investment needs to be on a regional basis.

See Chapter 3, "California Water Today," for a more complete description of variability and diversity throughout California.

Climate Change

The above conditions become more difficult and uncertain given potential future climate change. Water sector vulnerability to climate change stems from changes in hydrology that affect frequency, magnitude, and duration of extreme events, including flooding and drought. In turn, these affect water quantity, quality, and infrastructure. Reduction in snowpack storage affects water supply reliability, hydropower, and the amount of runoff during extreme precipitation that leads to flooding. Rising sea levels increase susceptibility to coastal flooding. These climate change conditions also affect Delta levee integrity and water quality. Changes in Delta water quality and the need to meet water quality requirements may require changes in upstream water management and resultant changes in local water supply reliability and water quality. Recreation and tourism are also likely to suffer due to lower water levels in waterways and reservoirs and declining snowpack. (Refer to Figure 2-5, "Climate Change Effects.")

Specific consequences of climate change are that higher temperatures will melt the Sierra snowpack earlier and drive the snowline higher, resulting in higher peak flood flows and less snowpack to supply water to California users. Rainfall events may become more frequent and intense, contributing to increased flood risk. Droughts may become more frequent and persistent this century. Accelerating sea level rise will produce higher storm surges during coastal storms. Together, higher winter runoff and sea level rise will increase the probability of levee failures in the Delta. Sea level rise will also place additional constraints on water management and exports from the Delta, especially as a

King tides make their way onto Capitola Beach on Wednesday, January 8, 2013.

result of increased salinity from tidal exchange in the Delta. By the end of the 21st century, the magnitudes of the largest floods may increase from 110 to 150 percent of historical magnitudes (Das et al. 2011; Pierce et al. 2012).

Future Uncertainty

California must invest in IWM activities in the face of many uncertainties. There are enormous uncertainties facing water managers in planning for the future. How water demands will change in the future; how ecosystem health will respond to human use of water resources; what disasters may disrupt the water system; and how climate change may affect water availability, water use, water quality, and the ecosystem are just a few uncertainties that must be considered. The goal is to anticipate and reduce future uncertainties, and to develop water management strategies that will perform well despite uncertainty about the future. Uncertainties will never be eliminated, but better data collection and management and improved analytical tools will allow water and resource managers to better understand risks within the system. Chapter 5, "Managing an Uncertain Future," provides more detail on risk and uncertainty in California water resources management.

The CWP acknowledges that planning for the future is uncertain and change will continue to occur. It is not possible to know for certain how population growth, land use decisions, water demand patterns, environmental conditions, the climate, and many other factors that affect water use and supply may change by 2050. To anticipate change, the approach to water management and planning for the future needs to consider and quantify uncertainty, risk, and sustainability. IWM promotes a diversified portfolio of management actions, along with seeking flexibility in water management. This approach helps ensure that water supply reliability and other IWM actions are effective under a wide range of possible water futures (i.e., resilient solutions).

Consequences of Foregone Investment

The opportunity provided by IWM includes a future in which water demands are met, the quality of surface-water and groundwater sources and supplies are improved, system flexibility and resiliency are improved to deal with droughts and floods, and ecosystems are restored and enhanced to sustain our natural resources. Insufficient investment in IWM, on the other hand, would bring severe threats to public safety, environmental stewardship, and economic stability. (See Box 2-1, which underscores the importance of timely investment.) Just as a car needs to be regularly maintained and rehabilitated to avoid risking an unsafe or costly breakdown, IWM requires continuous investment even to sustain current levels of performance and avoid a costly and less prosperous future that puts businesses and investments at risk, destroys cherished ecosystems, and makes communities less safe and less desirable. Much of the state's vital water infrastructure was the result of investments made by previous generations. California cannot afford to sacrifice the future by failing to invest in water today. Volume 4, "Reference Guide," provides more information on the cost of forgone investment.

Fundamental Lessons

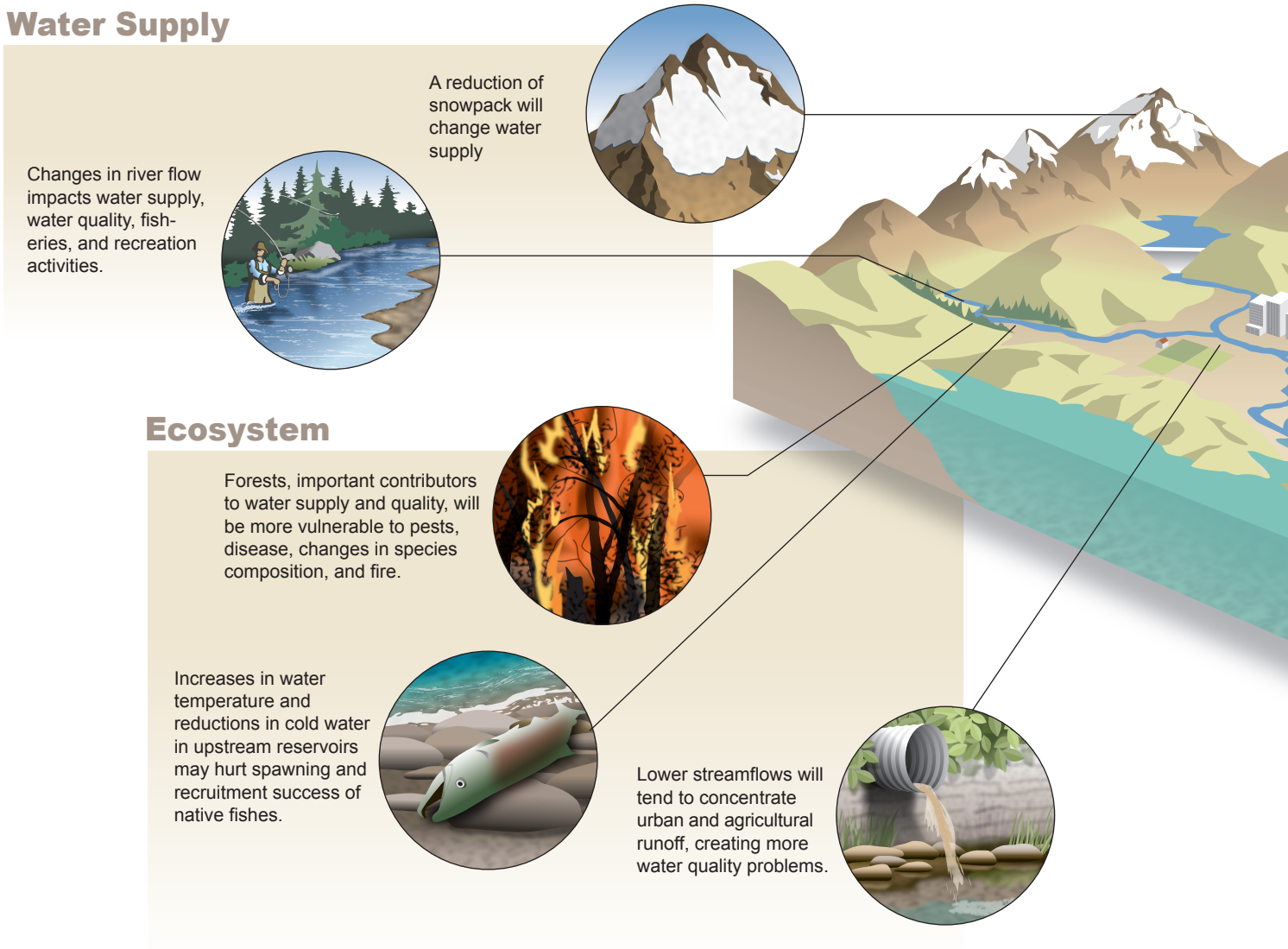
The Update 2013 strategic plan sets an urgent course for action that is informed by fundamental lessons learned by California's water community through the experience of recent years. Update 2013 embodies these fundamental lessons:

Figure 2-5 Climate Change Effects

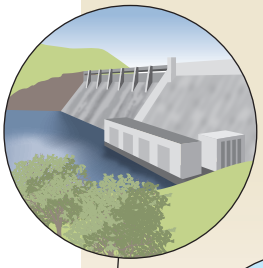
What are the Expected Impacts from These Changes?

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

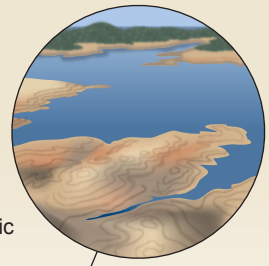
The impacts of these changes will gradually increase during this century and beyond. California needs to plan for water system modifications that adapt to the following impacts of climate change:



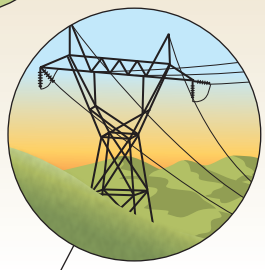
Water & Power Operations



Operation of the 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.



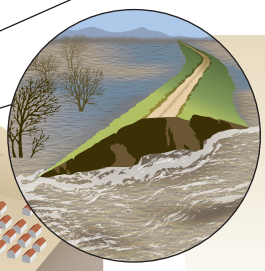
Water supply reliability will be compromised.



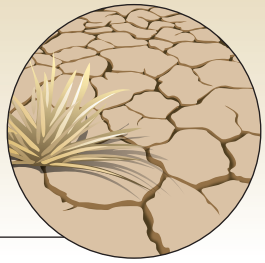
California's hydroelectric power generation may be less reliable; at the same time, higher air temperatures may increase energy consumption through increased use of air conditioning.

Warmer temperatures will affect water demands.

Flooding & Drought

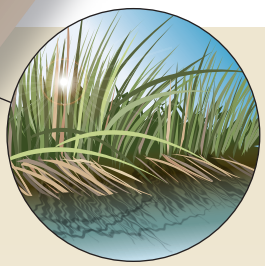


Increased flooding potentially causes more damage to the levee system.



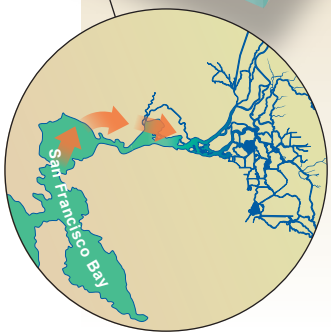
Higher temperatures and changes in precipitation will lead to droughts.

Coast & Delta



Higher water temperatures will make the Delta intolerable to some native species and also more attractive to some non-native invaders that may compete with natives.

Sea level rise threatens coastal communities and infrastructure, in particular, the water system in the Sacramento-San Joaquin Delta where the existing Delta levees were not designed or constructed to withstand these higher water levels.



Increased salinity in the Delta will degrade drinking and agricultural water quality and alter ecosystem conditions.

Box 2-1 Failure to Act

"Of all the infrastructure types, water is the most fundamental to life, and is irreplaceable. … Much of the drinking-water infrastructure is old and in need of replacement. …

"Failures in drinking-water infrastructure can result in water disruptions, impediments to emergency response, and damage to other types of essential infrastructure."

Source: American Society of Civil Engineers 2013

- Sustainable development and water use, as well as environmental stewardship, foster a strong economy, protect public health and the environment, and enhance quality of life. Managing for sustainability relies on the full consideration of social, economic, and environmental values in all phases of planning and policy- and decision-making. Sustainable water use ensures development and management of surface water and groundwater and related resources in a way that meets present needs while protecting and enhancing watersheds and the environment, and assures the ability to meet the needs of the future.
- IWM on regional and statewide scales is the basis of planning for California's water future with actions that provide multiple benefits. Reducing uncertainties and assessing risks to the surface water and groundwater supply and flood systems are essential for developing plans that also allow for sustainability of water uses, systems, and resources.
- Californians face an unacceptable risk of flooding. California must invest to help prevent flood disasters and to reduce the impacts of flooding, or billions more will be needed to recover from inevitable flooding. All levels of government should work toward implementing the recommendations identified in California's Flood Future Report.
- A diversified portfolio of resource management strategies improves system flexibility and resiliency for changing and extreme hydrologic conditions.
- Solutions to California's water and flood management challenges are best planned and carried out on a regional basis. Hydrologic, demographic, geopolitical, socioeconomic, and other differences among California's regions demand that the mix of water management strategies be suited to meet each region's needs for the long term.
- Water conservation, recycling, and greater system efficiency in California must continue to be a fundamental strategy for all regions and individual water users in California. The cumulative effect of each decision to use water more efficiently has an enormous impact on future water supplies and water quality.
- California can better prepare for future droughts and climate change, as well as improve water supply reliability and water quality, by taking advantage of the extensive water storage capacity of groundwater basins when managed in closer coordination with surface storage and other water supply sources, when available. These supplies include, but are not limited to, recycled municipal water, surface runoff and flood flows, urban runoff and stormwater, imported water, water transfers, and desalination of brackish and sea water.
- California must protect the quality of its surface water and groundwater and use available supplies with greater care because water will always be a precious resource.
- California needs additional groundwater and surface water storage capacity. Storage gives water managers tremendous flexibility to invest in a greater number of resource management strategies, meet multiple needs, and provide vital reserves in drier years. In many cases, storage is necessary for benefits from other resource management strategies to occur, such

as water-dependent recreation, conjunctive management, conveyance, and environmental stewardship.

- When technically, legally, and environmentally feasible, available aquifer space should be used for managed recharge for implementing multi-benefit projects that generate source water for groundwater storage by capturing water not used by other water users or the environment.
- California must develop and implement aquifer recharge area delineation and mapping required by Assembly Bill (AB) 359 and promote groundwater planning transparency and public education.
- Management to sustain the Delta will require that a healthy Delta ecosystem and a reliable water supply for California be coequal goals, and that we recognize the Delta as a unique and valued area.
- State government has a lead role in coordinating the water management activities of federal, tribal, regional, and local governments and agencies and developing stable strategies for financing water management actions.
- Science and technology are providing new insights into threats to our watersheds — including our waterways and groundwater basins — from climate change and other stressors. California must use this knowledge to take protective actions and manage water in ways that protect and restore the environment.
- California must strengthen and expand the California Statewide Groundwater Elevation Monitoring (CASGEM) Program for its long-term sustainability, complete groundwater management and planning assessments for all Senate Bill (SB) 1938 groundwater management plans and develop guidelines to promote best practices in groundwater management, and undertake statewide groundwater basin assessment for the CASGEM high-priority basins.

Focus of Update 2013 — Three Overarching Themes

The complete Update 2013 (all volumes) contains a large variety of information. This information serves many purposes among a wide variety of audiences, such as elected officials, planners, tribal entities, academia, the general public, and others. While Update 2013 contains many refinements from Update 2009, Update 2013 has significantly advanced the State's strategic plan in three critical areas. To address challenges and build upon past successes, the *California Water Plan Update 2013* recommends additional strategies and actions to:

- Enhance regional and statewide IWM.
- Strengthen government agency alignment.
- Invest in innovation and infrastructure.

These three themes, which emerged during the development of Update 2013, provide focus for refining and advancing the strategic plan and are applicable to every level of resource planning. These themes are interconnected and never considered separately. The strategic plan embraces the themes (described below) as the basis for developing tools, plans, actions, and achieving results portrayed in Update 2013. These three themes, in addition to the Update 2013 vision, mission, goals, guided the development of the objectives and related actions, all of which are described in Chapter 8, "Roadmap For Action."

Enhancing Regional and Statewide Integrated Water Management

The first theme for Update 2013 is to improve IWM and covers both regional and statewide scales. With Update 2013, the State is renewing its commitment to IWM. IWM is a strategic approach to planning and implementing water management programs that combines flood management, environmental stewardship, and water supply actions to deliver multiple economic, environmental, and social benefits across watershed and jurisdictional boundaries. The strategic plan included in Update 2013 builds on the foundation for IWM presented in Update 2009. (See Box 2-2.)

IWM provides a set of principles and practices that include strengthening government agency alignment through open and transparent planning process. This leads to stakeholder and decision-maker support for investment in various aspects of resource management, such as innovation and infrastructure. This support provides increased advocacy, as well as a greater number and variety of potential implementers and financiers.

IWM and integrated regional water management (IRWM) practices have made strides over the past 12 years, and Update 2013 encourages the expansion and enhancement of these practices.

The following key concepts enhance successful IWM planning:

- **Broad-based Knowledge** — The IWM approach relies on blending knowledge from a variety of disciplines, including engineering, economics, environmental sciences, public policy, and public information. It includes information gathering and other tools, policies, planning, regulations, and investments. Technical analyses simultaneously consider flood management, water supply, water quality, land use, water supply, ecosystem, and other actions to deliver multiple benefits at watershed and basin scales. This approach also promotes system flexibility and resiliency to accommodate changing conditions, such as regional preferences, ecosystem needs, climate change, flood or drought events, and financing capabilities.
- **High Value, Multiple Benefits** — IWM recognizes that localized, narrowly focused projects are not always the most cost-effective use of public and ratepayer resources and can have negative unintended consequences within regions. The IWM approach helps deliver more benefits at a faster pace, while using fewer resources, than is sometimes possible with single-benefit projects. While IWM seeks to leverage multiple benefits and partners, IWM does not promote the exclusion of single-purpose projects. In many localities, such projects can and do deliver cost-effective benefits.
- **Broad Access to Funding Sources** — One of the benefits of using an IWM approach is the potential to access funding sources that may not have been available to single-benefit projects. This is particularly important to achieving sufficient and stable funding for long-term flood management.
- **Collaboration and Alignment Are Necessary** — Efforts to effectively manage California natural resources will require unprecedented alignment and cooperation among public agencies, tribal entities, landowners, interest-based groups, and other stakeholders. Collaboration is required to prioritize actions and garner enough community support for investment to occur and be sustained. Better agency alignment of plans, policies, and regulations is needed to improve and expedite implementation.

Box 2-2 Integrated Water Management — What and Why

- Integrated Water Management (IWM) is a strategic approach to planning and implementing water management programs that combines flood management, ecosystem enhancement, and water supply actions to deliver multiple benefits *across watershed and jurisdictional boundaries.*
- The IWM approach maximizes limited resources to provide for *increased public well-being.*
- Well-implemented IWM projects *enjoy broader support* and thus are less likely to be delayed or stopped during the implementation phase.
- Fostering broader implementation of IWM is intended to improve or restore expected levels of service within flood and water management systems statewide, while also *improving system resiliency* (the ability of systems to respond to and recover from significant stressors).
- IWM program delivery will be conducted using measurable objectives that *provide for accountability of public investment* and transparency on the value that society will attain from investing in IWM initiatives.

The objectives and the related actions described in Chapter 8, "Roadmap For Action," collectively are the proposed improvements in IWM.

Update 2013 represents an important next step in advancing IWM by articulating the outcomes or types of benefits of greatest value to the broad range of stakeholders represented as part of the various Update 2013 advisory groups (see Figure 2-6). These desired outcomes define the scope of IWM. See Box 2-3 for a list of desired outcomes as expressed by stakeholders. This list also represents the scope of IWM. For example, actions that produce one or more of the desired outcomes fall within the scope of IWM.

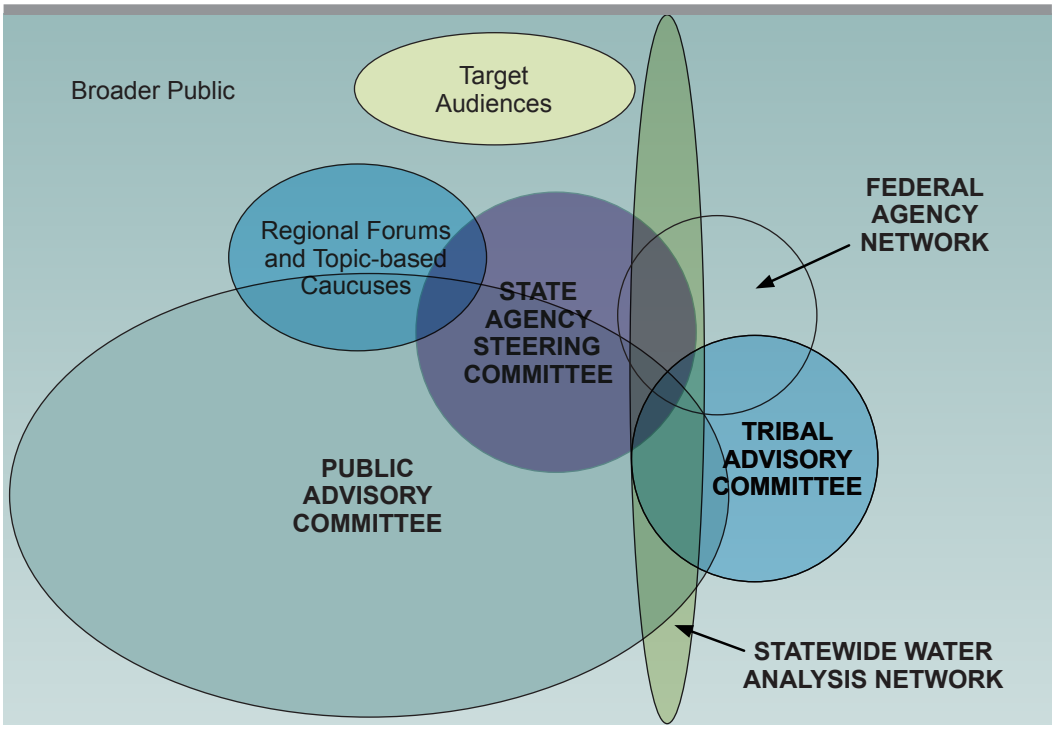
Strengthening Government Alignment

The second theme for Update 2013 is strengthening government agency alignment. Update 2013 includes actions to make significant improvements in agency alignment from that presented in Update 2009. The primary purpose for improving alignment of government agencies is to expedite implementation of resource management strategies and help assure efficient achievement of multiple objectives. This includes collaboration with regulatory agencies to reduce time and costs required to implement IWM projects while protecting and enhancing natural resources.

Labyrinth of Laws

Currently, project implementers must navigate and comply with California's labyrinth of uncoordinated and at times conflicting laws and regulations that lead to project delays and mounting planning and compliance costs. These ultimately create significant difficulties in meeting basic community safety and water supply needs, along with goals outlined in Update 2013. For example, implementation of State-government-incentivized groundwater recharge projects have been delayed or abandoned owing to a State permitting process that places risks on the implementer's water rights (i.e., regulations require surface-water-right holders to reopen

Figure 2-6 Water Plan Update 2013 Collaboration Graphic



historic water-rights agreements, subjecting water rights holders to the risk of various unrelated water rights challenges, so as to include groundwater recharge as a approved beneficial use of the original surface-water right). This is even true for small projects that are well planned, have the voluntary support of private landowners, and would provide multiple benefits. In fact, project participants (e.g., landowners and financiers) that have gone through the permitting process are often not willing to tackle the process again. Those who have heard second hand about the process tend to opt out when presented with opportunities to contribute.

Other examples of impacts from insufficient government alignment include the fact that planning and permitting costs of projects have been increasing as a portion of total planning and implementation costs. For some smaller infrastructure and ecosystem enhancement activities, permitting costs have exceeded the implementation and acquisition costs. In many other cases, program or project implementation has yet to occur despite decades of planning activities, even as the intended benefits of these programs and projects are forgone as a result of the delays. Addressing this challenge represents a critical scope of work. It is important to acknowledge that regulations can and do also provide basic community safety and water supply needs. They also help meet many CWP goals. Update 2013 promotes innovation for all IWM tools, including all regulation and administrative tools.

Social and Technical Complexities

At the same time, planning a project within the current regulatory environment is technically complex, making it difficult for a single entity to comprehend all the geophysical and social complexities and dynamics of resource management and planning. California's anthrodiversity, as previously described, as well as the state's large size, only further increases the complexity of

Box 2-3 IWM Desired Outcomes

In addition to the four key concepts that enhance successful integrated water management (IWM), which are introduced in the Enhancing Regional and Statewide Integrated Water Management section of this chapter, the scope of IWM was further defined and clarified for Update 2013. The approach for such descriptions is expressed in terms of the matters of most importance (or desired benefits/outcomes) to stakeholders. The list below summarizes the types of desired outcomes that define the scope of IWM. For example, actions that produce one or more of these desired outcomes fall within the scope of IWM. A more detailed description of these topics is provided in Chapter 3, "California Water Today."

- Achieve environmental water quality objectives.
- Control invasive species.
- Control water-borne disease vectors.
- Create and sustain diverse portfolio of economic activity for each region.
- Create conditions for relaxation and refreshment of mind and body.
- Create diverse portfolio of climate change adaptation and mitigation strategies.
- Enhance economic stability.
- Enhance efficiency of use of energy used to move and treat water.
- Ensure in-stream flows for restoration, a healthy ecosystem, fish population, and water temperature.
- Facilitate access to safe drinking water for disadvantaged communities.
- Facilitate human/nature connections.
- Improve or maintain ambient water quality — do no harm.
- Improve water infrastructure (green and grey) levels of service.
- Improve water supply reliability.
- Increase beneficial effects of flood for critical habitats.
- Maintain a reasonably high standard of living and quality of life.
- Minimize greenhouse gas emissions in water management activities.
- Modify operations to meet existing or new objectives.
- Provide the conditions to foster economic development and reliable utility services.
- Recover sensitive species.
- Reduce direct property damages resulting from floodwater.
- Reduce disaster recovery costs.
- Reduce high-severity wildfires.
- Reduce potential for loss of life.
- Restore declining groundwater basins, reverse land subsidence, and maintain and improve ecosystem services provided by groundwater.
- Sustain groundwater supplies and aquifers.
- Sustain the activities, culture/expertise, and overall capabilities to produce food and fiber in California.

management and planning tasks for any single entity. Accordingly, data management, planning, policy-making, and regulation must occur in a very collaborative, regionally based manner, with the ultimate product being a composite of input and data from a large variety of elected officials, opinion leaders, stakeholders, scientists, and subject experts. Sound outcomes rely on a blend of subject expertise and perspectives woven together (e.g., hydrology, climatology, engineering, earth sciences) into comprehensive policies and implementation decisions that are place based and regionally appropriate.

Collaborating For Alignment

The California Biodiversity Council has created an initiative to improve the alignment of relevant plans, programs, policies, and regulations (see Box 2-4). Update 2013 leverages, expands (to the full scope of IWM), and evolves this work. Chapter 4, "Strengthening Government Alignment," elaborates on existing water management governance and the move toward improved government alignment.

Strides have been made to improve alignment, such as the formation and engagement of the Water Plan State Agency Steering Committee, Water Plan Federal Agency Network (FAN), and 48 regional water management groups. However, local, State, federal, and tribal governments often do not collaborate to the degree necessary to effectively manage the challenges described above. Update 2013 used the collaborative approach shown in Figure 2-7 for structuring conversations intended to help planners understand what stakeholders value with respect to water resources (resource-dependent values), help participants work from a common understanding and assumptions about drivers that affect how and where water resources occur in California, and to ultimately guide the conversations toward development of potential actions. The Update 2013 outreach and engagement process is described in Volume 4, *Reference Guide*, in the article, "Process Guide — California Water Plan Update 2013." Figure 2-6 illustrates the breadth of participants that contributed to Update 2013.

Update 2013 has taken a first step in aligning State government by incorporating information and recommendations from IWM-related planning documents of the State Agency Steering Committee member agencies. Featured State plans and initiatives are those plans and programs by State, federal, tribal, and local government agencies that have a direct connection with the CWP. Chapter 4, "Strengthening Government Alignment," in this volume describes plans used to develop and augment the content in the Update 2013.

Investing in Innovation and Infrastructure

The third theme for Update 2013 is to improve investment in innovation and infrastructure. A stable, effective funding stream is an essential component of successful water resource implementation. Update 2013 provides strategies for future funding, a major improvement over Update 2009.

California's Flood Future Report estimated that more than $150 billion in potential projects and other expenditures will be required to address flood risk throughout the state (California Department of Water Resources and U.S. Army Corps of Engineers 2013). There are also over 10,000 projects identified within the 48 integrated regional water management plans. In total, resource management actions will require up to $500 billion of future investment over the

Box 2-4 California Biodiversity Council

The California Biodiversity Council (CBC) was formed in 1991 to improve coordination and cooperation among the various resource management and environmental protection organizations at federal, State, and local levels.

The CBC's initiative to improve the alignment of the plans, programs, policies, and regulations of its member agencies will enable the CBC to achieve its founding goals with:

- More consistent vision of desired conditions for natural resource management, conservation, and stewardship across California (less fragmented work in silos).
- More efficient and cost-effective planning and implementation of natural resource conservation projects (less duplication and waste).
- More holistic, watershed-scale policies and regulations (fewer agency conflicts).
- More outcome-based and regionally appropriate agency policies and regulations (focus on the What and less on How).
- Better sharing of information, expertise, and tools (less duplication by leveraging resources).
- Expedited conservation project implementation with more consistent and effective technical and financial assistance to project proponents (lower project cost and fewer delays).

In April 2013, the CBC renewed its commitment to agency alignment with their resolution, *Strengthening Agency Alignment for Natural Resource Conservation* (California Biodiversity Council 2013).

The resolution is formed around four goals:

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

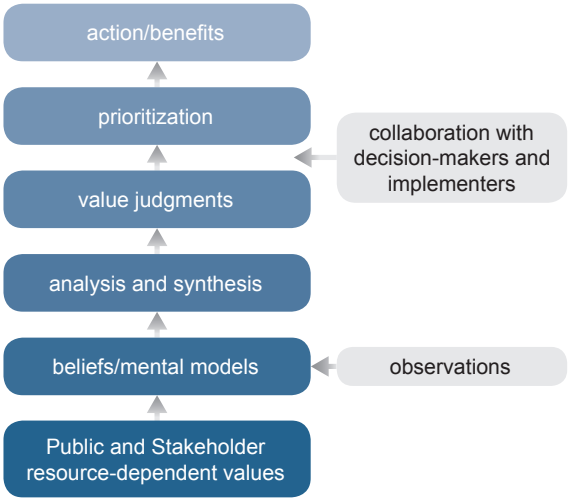
These goals are supported by guiding principles, practices, and tools, and recommended organizational improvements. See Volume 4, *Reference Guide*, for a copy of the resolution.

next few decades to reduce flood risk, provide reliable and clean water supplies, and enhance ecosystems and their services. We are beginning to integrate resource management and planning, but funding remains fragmented, unstable, and inefficient, which limits opportunities for further integration.

Other compounding challenges include the fact that debt is at near-record levels, existing bond funds will be fully allocated by 2018, willingness of the public to pay for government activities is waning, investment in infrastructure and ecosystem values and services has been deferred for decades, and future federal funding is highly uncertain. This debt level increases pressure on developing alternative financing strategies that capitalize on local, State, and federal cost sharing and IWM.

Very little of the total state IWM funding allows discretion or flexibility. Bond and legislative language designates funding purposes. General obligation bonds backed by property taxes and

Figure 2-7 Water Plan Update 2013 Collaboration Approach



The collaborative process for updating the California Water Plan has been expanded for Update 2013, as well. The project team continues to incorporate input from the Statewide Water Analysis Network, a Public Advisory Committee, and a steering committee of State agency representatives. This time,the State Agency Steering Committee has been increased to include 28 State agencies. A new Tribal Advisory Committee has been established, with representatives from 34 California tribes, bands, and rancherias who can share approaches taken and provide advice pertaining to tribal lands and cultural practices involving water. A Federal Agency Network has been added, as well.

the General Fund are required to be used for capital projects, not operation and maintenance. Revenue and lease-revenue bonds, typically used by local agencies, offer more flexibility. In general, the discrete nature of bond money makes this financing source better suited for one-time investments.

From 1995 to 2010, average annual State expenditures were about $2 billion per year, with a peak of just over $2.5 billion in fiscal year (FY) 2010. This is largely attributable to bond money from continued appropriations of Propositions 1E and 84. For that same time frame, federal expenditures averaged $1.2 billion per year, with a peak of $1.4 billion in FY 2001 and again in FY 2005. Local expenditures comprise the largest component, averaging $14.5 billion per year. Local expenditures peaked at about $18 billion in FY 2010. This is likely a result of increased subventions and loans from DWR related to Propositions 1E and 84. While overall IWM expenditures in California have been increasing in recent years, federal investment is shrinking relative to State and local investment.

Through intensive collaboration with the Update 2013 Finance Caucus, the investment categories presented in Box 2-5 helped support a common understanding of potential investments and an effective role for State government. This approach was useful for aligning funding and finance planning processes across over 2,300 local, State, and federal government agencies, each with its own planning processes and scales.

Update 2013 provides a more comprehensive approach to State IWM funding and finance compared with historical and current practices of prioritizing activities and projects by a combination of funding earmarks and a project's readiness for construction.

Chapter 3, "California Water Today," describes existing local, State, and federal IWM spending and debt levels. Currently, projects that tend to be most implementable, most consistent with priorities of a particular funding source, or that happen to be at the front of the queue when money becomes available, are often not linked to multi-faceted strategic objectives. The approach used for Update 2013 promotes proactive planning and prioritization of activities to drive future investment decisions and funding. See Chapter 7, "Finance Planning Framework," for a description of finance categories and strategies, including general obligation bonds, fees, taxes, and public-private partnerships.

Box 2-5 Categories of Integrated Water Management Investment

Innovation:

- Governance of State integrated water management (IWM) improvements.
- Planning and public engagement improvements.
- Information technology (data and analytical tools).
- Government agency alignment improvements.
- Water technology and science advancements.

Infrastructure (human and ecosystem), implemented at the following scales:

- Local.
- Groundwater basin.
- Watershed.
- Regional.
- Interregional.
- State.
- Interstate.
- International.
- Tribal.

Two primary categories of investment are innovation and infrastructure. Infrastructure includes structures and facilities that support human activities, but it also includes green infrastructure (e.g., wetlands, riparian habitat, watershed systems). Innovation includes development of new analytical tools and other planning process improvements. Both categories may include the capital cost of constructing a facility or restoring habitat and the long-term operation and maintenance costs, which have often been an afterthought to implementation and not adequately financed over their useful life.

Innovation and infrastructure are further broken down into investment categories (again, for State government policy-making purposes), as shown in Box 2-5. In addition to the categories of investment shown in Box 2-5, there are many resource management and administrative tools included in Update 2013.

There are 30 resource management strategies presented in Volume 3, which are grouped according to these seven categories:

- Reduce water demand.
- Improve operational efficiency and transfers.
- Increase water supply.
- Improve flood management.
- Improve water quality.

- Practice resource stewardship.
- People and water.

Similar to the resource management strategies described in Volume 3 of Update 2013, which focus on actions, there are also several administrative tools that can be used to generate IWM benefits. See Chapter 7, "Finance Planning Framework," for more information on administrative tools.

There are seven categories of administrative tools:

- Collaborative decision-making.
- Education.
- Legislation.
- Voter-approved propositions.
- Regulation.
- Permitting.
- Litigation.

The Update 2013 approach to guiding future investment improves the apportioning and better informs the use of different financial strategies. The Investment in Innovation and Infrastructure theme has a major role in advancing Update 2013 from Update 2009. In weaving the theme throughout this Update 2013 strategic plan, the following related needs played a major role in the preparation of Chapter 7, "Finance Planning Framework," and the financing actions in Chapter 8, "Roadmap For Action." Development of the finance strategy for Update 2013 considered ways to:

- Increase the reliability, predictability and level of State IWM funding for statewide and regional water programs and projects.
- Provide a consistent method for allocating, awarding, and disbursing State funding for water innovation and infrastructure programs and projects.
- Avoid funding earmarks.
- Include regional accounts to continue IRWM to increase flexibility, reflect local and regional conditions, and advance regional goals and investment priorities.
- Provide proactive planning and implement consistent rules and standards for allocating State funding.

Role of State Government in Integrated Water Management

The guidance provided by the Update 2013 vision, mission, goals, objectives, and principles (see Chapter 8) are applicable to all levels of planning and by federal, State, and local agencies and other implementing entities. As noted above, local agencies' expenditures on IWM have comprised the largest component of all agency investments — a trend that is expected to continue. Local agencies will continue to be primarily responsible for funding projects and programs that create local benefits and to participate in larger systemwide projects that benefit them.

The role of State government in IWM is to fulfill its basic obligations, commitments, and responsibilities, as well as to invest in IWM innovation and infrastructure.

Basic Obligations

The obligations of State government include:

- **Representing California in government-to-government interactions** with the federal government, other states, and other sovereign nations and tribal governments.
- **Meeting basic public health and safety needs for all Californians** by regulating minimum public health standards and by providing assistance to communities that are unable to meet regulations.
- **Protecting public trust resources** by regulation and in planning and allocation of water resources. The public trust doctrine recognizes that certain natural resources, including water, tide and submerged lands, the beds and banks of navigable rivers, and fish and wildlife resources, are owned by the public and held in trust for present and future generations of Californians.
- **Protecting unique real property interests.** The State has a fundamental responsibility to California taxpayers to protect the real property assets owned by the State and reduce State liabilities.

Commitments and Responsibilities

- **Operate and manage the State Water Project.** State government is the owner and operator of the State Water Project (SWP) and has the responsibility (and contractual commitments) to provide reliable water supplies to the water contractors, the financiers and beneficiaries of the SWP.
- **Plan, implement, and maintain the State Plan of Flood Control.** State government has responsibility for providing assurances to construction access, operations, and maintenance for portions of the State's federally authorized flood protection system.
- **Planning, policy research, and technical assistance.** State government performs many critical planning and research activities in support of resource management (executive, legislative, and local government) decisions and advancing water science and technology.
- **Integrate water rights and water quality planning.** Basin Plans are prepared for each of the 10 hydrologic regions and by statute become part of the CWP.

Investing in Innovation and Infrastructure

Investing in innovation and infrastructure is a shared responsibility across local, State, federal, tribal, and private entities. State government has traditionally delegated IWM investment decisions to local governments and regions. State government should continue to focus its investments within a framework that empowers local governments and regions, supports regional decision-making, and encourages regional self-reliance.

State government should take a lead role in investing in innovation actions for the benefit of all regions. Innovation includes a broad range of activities that comprises governance, planning and process improvements, data, tools, and water technology

The Groundwater Replenishment System (GWRS) has been operating since January 2008. Jointly developed by Orange County Water District (OCWD) and Orange County Sanitation District (OCSD), GWRS is the largest water purification project of its kind in the world.

research and development. The State's investment in innovation will provide processes and information that will aid decision-making throughout the state and support more cost-effective infrastructure investments by regional and local entities.

The State invests in its own real property infrastructure (i.e., State Water Project and State-federal flood management system). The State also has a role in creating incentives for the planning, construction, and management of natural and human infrastructure in fulfillment of the State's strategic objectives. This is implemented throughout the state at various geographical and jurisdictional scales, including local, groundwater basin, watershed, regional, interregional, State, interstate, international and tribal. Although this infrastructure may be owned and operated by other entities, the State has a role in creating incentives that help achieve the State's goals.

The State's role in investing in innovation and infrastructure should be focused in the following four areas to provide:

1. **What regions cannot accomplish on their own.** The State has a role in assisting regions if they cannot accomplish necessary water management services on their own, such as assisting regional water management groups in developing their IRWM Plans and helping to ensure that all Californians are provided with basic public health and safety. The State predominantly delegates the responsibility to provide basic public health and safety needs for local governments to achieve while the State enforces regulations to ensure that minimum standards are met. However, the State has a role in assisting regions that cannot accomplish basic public health and safety needs on their own, such as disadvantaged communities or some tribal communities. The State can provide technical and financial assistance to these communities. In some circumstances, the State can also function as a service provider of last resort and provide these basic services itself when justified.

2. **What involves interregional, interstate, or international issues.** It is common for natural streams and infrastructure to cross regional, state, and international boundaries. In its role as representing California in government-to-government relationships, the State must take the lead in addressing international, interstate, or trans-boundary issues that extend beyond the geographical reach and jurisdictional authority of local and regional agencies. This includes, for example, negotiation with other states or Mexico regarding California's rights and interests in resources provided by the Colorado River. In addition to interstate and international issues, the State also has a role in promoting collaboration within and among regions for the benefit of the entire state.

3. **What the State can do more efficiently.** The State is uniquely suited to implement some activities more efficiently than other agencies or organizations because it can leverage resources and can provide economies of scale. The State has a responsibility to leverage these advantages to address specific needs common to all agencies involved in IWM. Information from these activities benefits the entire state. Operating on a statewide scale can also reduce inconsistencies or redundancies among regions. Examples of activities that the State can perform more efficiently and that provide value statewide include:

    A. **Facilitate process improvement and government agency alignment.** The State can play a major role in working with agencies to improve planning and project development processes.

    B. **Provide regulatory oversight and alignment.** The State is uniquely suited to provide regulatory oversight to protect public health and safety and public trust values — including water quality, environmental protection, flood management, and dam

safety — through several State agencies. In addition to establishing, monitoring, and enforcing regulations, the State also has a role in promoting and facilitating alignment of regulatory processes involving federal and State regulations. Better interagency regulatory alignment helps improve consistency and predictability in regulatory standards and addresses unclear, conflicting, inconsistent, or mutually exclusive regulatory objectives or requirements for projects.

C. **Provide data, information, decision support, modeling tools, and expertise in specialty areas.** The State is uniquely suited to collect, store, and disseminate water-resources-related data and information to support regional and statewide water system modeling, analytical tools, and decision support tools. State government expertise in specialty water resource areas should also be used to address the critical water-related issues of the state. (See Chapter 3, "California Water Today," for complete descriptions of water-related issues.) For example, State government expertise in climate change research should help monitor, predict, and prepare for the effects of climate change on California's water and flood protection systems and the environment.

D. **Conduct and coordinate public outreach and policy guidance on water-related issues.** The State is uniquely suited to assist water agencies, local governments, tribes, and non-governmental organizations to educate the public and legislature on water issues. Providing a unified, coordinated message on key water issues can help convey their importance to the public and the legislature.

E. **Facilitate systemwide management.** The State is uniquely suited to facilitate development and implementation of water projects that have impacts on a systemwide scale (i.e., across multiple regions of the state), such as major storage, large system flood management, and Delta improvements. Local agencies often are limited in their ability to work on a systemwide scale because of jurisdictional limitations. The State has more flexibility to assert leadership in interregional projects on a systemwide scale that spans geographic and agency boundaries. The State may therefore find it advantageous to incentivize local and regional projects that provide benefits to the state, but which may not be financially feasible at the local or regional level. For example, investing in a rural region located in an upper watershed may be the most cost-effective solution for increasing overall water supplies to the state, but local agencies within that region may lack the resources or may not find it in their interest to make that investment themselves.

F. **Conduct statewide master planning.** The State is uniquely suited to conduct statewide master planning. This includes, for example, preparing CWP updates as a public forum to integrate State, federal, tribal, regional, and local plans to meet the state's future agricultural, urban, and environmental water demands and water management objectives.

4. **What provides broad public benefits.** The State has a role in implementing activities (and incentivizing local and regional activities) that have broad public benefits and in advancing sustainability through public safety, environmental stewardship, and economic stability. Public benefits are defined as very diffuse benefits that cannot be easily associated with specific user groups or a particular set of beneficiaries. This includes reducing environmental impacts created long ago, known as legacy impacts, which no longer have responsible parties to pay for mitigation.

How California decides to prioritize and pay for necessary water resource management improvements is one of the most significant issues the state faces today. Past investments have

provided a down payment and a good basis for further improvements; however, the financing methods of the past are no longer sustainable. The stakes are high as future investment decisions will significantly affect public safety, environmental stewardship, and economic stability. What is at stake includes flood risk to Californians' lives and assets; sustainability of natural resources, including the stewardship or extinction of species/habitats and the ecosystem services they can provide; and California's $2 trillion economy, which has significant value, both nationally and globally, and directly affects the fate of existing businesses, their employees, and their employees' families.

The price tag for needed water resource management improvements is daunting, but failure to address these challenges will put more and more Californians at risk. We are beginning to integrate resource management and planning, but funding remains fragmented, unstable, and inefficient, which limits opportunities for further integration. In fact, many current funding practices and constructs, developed decades ago, drive investment priorities more so than emerging plans and stakeholder priorities (which have significantly changed over the last several decades). These rigid funding constructs also do not allow for the adaptability necessarily to respond to emerging challenges.

Update 2013 calls for more strategic, disciplined, and aligned investments in innovation and infrastructure and identifies shared stakeholder values and potential mechanisms for future financing. Moving forward, the State needs to clarify funding purposes, as well as assess and articulate the value of current and future expenditures, to secure the necessary investments that will deliver sustainable and resilient water resources, both natural and human-made. It will take decades to upgrade the aging water-related infrastructure and accomplish ecosystem improvements. However, we need to continue taking steps toward financing implementation of a diverse portfolio of water management actions with an equally diverse portfolio of funding sources, including locally funded, cost-sharing, and State and federal sources.

Locally funded programs are primarily financed through revenue bond sales that are supported through users' fees. Many local major water-supply projects, including local and regional water-supply conveyance, treatment, distribution, and wastewater treatment, are included in this category. Some systemwide projects can also be included in this category. Small and isolated disadvantaged communities are one exception, as many of their water supply systems need upgrades to provide adequate water supply and/or address their water quality issues. Typically, local/regional water purveyors' and wastewater agencies' user fees, with some exceptions, provide adequate funding for operation and maintenance of their water systems. Nonetheless, operation and maintenance of the flood management system by the State and local flood assessment districts is more challenging.

Cost-sharing programs have local and regional benefits, as well as State and national benefits. Many of the proposed infrastructures fit within this category and are generally funded through a cost-shared agreement among the federal, State, and local agencies, depending on the program/project beneficiary. Examples of these types of projects include some regional water supply security projects and most flood protection projects. Many flood and community districts sell bonds secured by specific tax assessments to fund their capital improvements. Passage of Proposition 218 in 1996 put new restrictions on this type of financing by requiring approval by two-thirds of voters. The result has been delays in some capital improvements and failure to approve others.

State-funded and federally funded programs have broad statewide and public (or societal) benefits. They are generally supported by State and federal public funding. Examples of these projects are the systemwide ecosystem enhancements, systemwide flood-risk reduction projects, as well as implementation and operation of large-scale water supply infrastructure. Cities, counties, and the State generally finance their capital improvement programs through General Obligation bonds, which are secured by full faith of the credit issuer. Many local agencies and disadvantaged communities may not have adequate funding or means of financing local shares of their infrastructure improvement through bond sales (i.e., lack of credit or high interest rates). In these cases, providing low-interest State and/or federal loans to local agencies to cover their local cost share of the project will be helpful.

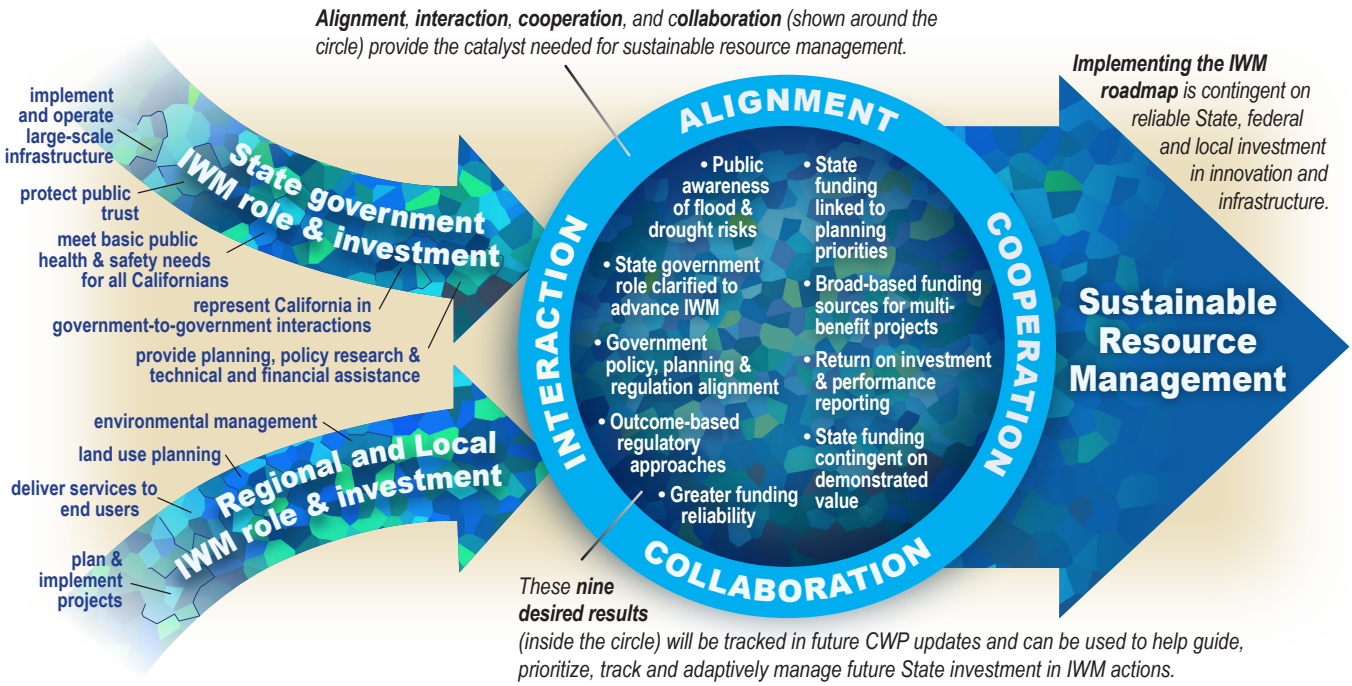
Integrated Water Management in Action

The immediate and changing conditions, priorities, and challenges described in Update 2013 require that Californians step up existing efforts to provide integrated, reliable, sustainable, and secure water resources and management systems for our health, public safety, economy, and ecosystems — today and for generations. The State needs to continue to invest in innovation and infrastructure, as detailed in Chapter 7, "Finance Planning Framework." To accomplish this requires implementing a strategic water plan with vision and goals, and an implementation plan with objectives and near-term and long-term actions. The plan must build on State and stakeholder accomplishments since Update 2009, as well as the fundamental lessons of water resource management learned in recent years. Figure 2-8 (below) emphasizes how State, regional, and local entities must come together (align) to deliver the resources needed to effectively implement (invest in) IWM actions. Several key IWM activities are summarized (in the arrows located on the left side of Figure 2-8) for State, regional, and local government roles and investment. The roles of the respective government entities cannot be accomplished without significant new collaboration and alignment, particularly regarding international, interstate, statewide, and interregional IWM activities.

In Figure 2-8, the desired results shown in the circle represent key accomplishments that must occur to achieve the Update 2013 IWM vision and objectives. Volume 1, Chapter 8, lays out 17 objectives and a menu of more than 300 actions that can move California toward accomplishing the desired outcomes. These results will be tracked in future CWP updates and can be used to help guide, prioritize, track, and adaptively manage future State investment in IWM actions. Alignment, interaction, cooperation, and collaboration (shown around the circle of Figure 2-8) provide the catalyst needed for sustainable resource management.

Figure 2-8 Integrated Water Management in Action

State, regional and local entities must come together to effectively implement IWM actions. These roles cannot be accomplished without significant new collaboration and alignment, particularly regarding international, statewide, and interregional IWM activities.



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