

Sustainable Water Management Profile

Inland Empire Utilities Agency
and Its Region of Interest



August 2017



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Acronyms

CASGEM	California Statewide Groundwater Elevation Monitoring
CBWM	Chino Basin Watermaster
CDA	Chino Desalter Authority
CRA	California River Aqueduct
FEMA	Federal Emergency Management Agency
FY	Fiscal year (IEUA's fiscal years run from July 1 to June 30)
HCP	Habitat Conservation Plan
IEUA	Inland Empire Utilities Agency
IRP	Integrated Resource Plan
JPA	Joint Powers Authority
M&I	Municipal and Industrial
MWD	Metropolitan Water District of Southern California
MWELO	Model Water Efficient Landscape Ordinance
OWOW	One Water, One Watershed
SAR	Santa Ana River
SARCCUP	SAR Conservation and Conjunctive Use Program
SAWCO	San Antonio Water Company
SAWPA	Santa Ana Watershed Project Authority
SGMA	Sustainable Groundwater Management Act
SWM	Sustainable Water Management
SWP	State Water Project
TAF	Thousand acre-feet (equal to 325,851,432 gallons)
UWMP	Urban Water Management Plan

Preparers

The SWM Profile is a collaborative effort among experts in the field of water management and sustainability. Led by the Water Foundation, the SWM Profile project team includes representatives from Environmental Science Associates (ESA), The Bay Institute (TBI), and Sonoma Ecology Center (SEC), as well as technical support from M.Cubed and Mike Antos of California State University, Northridge (CSUN). The development of the SWM Profile benefited from consultation with private sector advisors, sustainability program developers, technical experts, and water utility and agency advisors.

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Preface

Despite a multi-year historic drought and mounting challenges to manage its water resources, California does not have a yard stick by which to measure sustainable water management. A standardized assessment tool would benefit decision-makers and water managers by recognizing progress and successes, identifying stressors, and offering solutions at a local and regional scale. Some sustainability assessment tools do exist, but they fail to account for:

- Region-specific information vital to providing an accurate assessment
- Steps agencies are already taking to address their water challenges
- Factors outside a water agency's jurisdictional boundaries that are difficult to assess and address without regional coordination

SWM Profile History

In 2012, the Water Foundation set out to create a tool to measure both water stress conditions on the ground, as well as progress towards sustainable water management. The Water Foundation formed a team of experts to develop the tool, and convened an advisory committee in 2012, prior to the development of the tool, and again in 2014, after developing the tool and just prior to launching a pilot test.

In July 2014, the Water Foundation launched a pilot project with the Sonoma County Water Agency (SCWA) to develop and test the SWM Profile. After the pilot's conclusion in January 2015, the Water Foundation conducted an outreach effort to engage a wide variety of stakeholders, including representatives from water agencies, the business and financial sector, state/federal government, NGOs, and academia, to get feedback on the SWM Profile. The Water Foundation launched a second pilot with Inland Empire Utilities Agency (IEUA) in Southern California in November 2015 to adjust the tool in response to the feedback received and to ensure that the Profile works for agencies throughout California. IEUA provided a good contrast to SCWA due to its location and reliance on imported water. The Water Foundation completed its second pilot in December 2016.

The Importance of Measuring Sustainability

A primary objective of the SWM Profile is to increase water supply sustainability by highlighting a water agency's successes and vulnerabilities, and encouraging sound investments, policies, and regional coordination. By making information more accessible and providing a standardized rating system that is easy to comprehend, the SWM Profile helps water managers communicate how well they are responding to water supply stressors within their region. Many other audiences can also use the SWM Profile to augment their capacity to help advance sustainable water management, including public utilities, residential and business customers, land use planning agencies, financial analysts, state and federal agencies, and others. The Water Foundation's goal is to incentivize water agencies and other regional entities and stakeholders to work together to sustainably manage the water of a region.

Answering the Water Challenge

Sustainable Water Management

Water is managed in a way that meets current economic, ecological, and quality of life needs without compromising the ability to meet those needs in the future.

California water supply agencies are embracing innovations in technology and management that relieve stress on their water supply systems. Nonetheless, they still face many challenges to achieving sustainable water supply management, including growing populations, aging infrastructure, degraded ecosystems, fragmented management systems, and uncertainty due to climate change. The reality is that no region in California can yet claim to be sustainable. Using a traditional sustainability framework, the SWM Profile defines Sustainable Water Management as the management of water in a way that meets current economic, ecological, and quality of life needs without compromising the ability to meet those needs in the future. Some take that definition a step further by identifying sustainable water management as a approach in which water supply operations become part of watershed and groundwater basin management, where rain is captured near where it falls, water provides many beneficial uses on its way to the ocean, and human uses of water are as efficient as possible. Looking beyond the specific objectives used to define the concept, sustainable water supply management—means that water managers need to look beyond their official jurisdictions, managing water as a natural resource, through regional collaboration and solutions. The Water Foundation developed the Sustainable Water Management Profile (SWM Profile) to drive improvement in regional water supply stewardship.

Introduction to the SWM Profile

The SWM Profile provides standards for assessing water supply vulnerability to key Stressors (i.e., risks or threats), and for evaluating management responses to those Stressors. The SWM Profile evaluates Stressors within four main themes: Environment, Supply, Demand, and Finance. The scoring system considers: 1) contextual information about the circumstances in which water is managed, unique to each region and **Profile Subject**; 2) the **Stress Level** for each of 10 Stressors, to highlight the greatest challenges to sustainable water supply management facing a Profile Subject and its region, and to pinpoint targets for management efforts; and 3) the breadth and success of **Management Responses**.

The SWM Profile sets a high bar, to move regions toward a sustainable water future. The SWM Profile's regional perspective and management standards, while difficult to meet, are necessary to achieve sustainability. The framework views Profile Subjects as regional actors that must look beyond their jurisdictions to achieve regional results. The SWM Profile gives Profile Subjects and their regions ratings based on points earned for the Management Response level for each Stressor, weighted by its Stress Level and additional criteria. There are five possible ratings: Not Rated, Bronze, Silver, Gold, and Platinum.

Very few, if any, Profile Subjects are expected to achieve a Gold or Platinum rating now, given the profound gap between what is presently considered to be “leading practice” water management and true sustainable water management. The SWM Profile’s purpose is to motivate faster progress toward truly sustainable water management.

SWM Profile Terms

Profile Subject – The water supply agency that is the focus of the SWM Profile Assessment.

Stress Level – A categorization of stress associated with a given Stressor, broken into the broad categories of High, Moderate, or Low.

Management Responses – The actions taken to address stressors, either by reducing the stress level directly or mitigating its effects.

SWM Action Levels

The SWM Profile recognizes that actions affecting sustainable water management occur at both the level of the Profile Subject—IEUA—and at regional scales, as defined below:

Agency Operations* – activities carried out by the Profile Subject within its sphere of direct responsibility.

Agency Collaboration – activities carried out by the Profile Subject with others in realms outside its sphere of direct responsibility and falling within the “Focused Scope of Analysis,” which is geographically limited to the surface water and groundwater source areas for supplies relied upon by entities located wholly or partially within the Profile Subject’s service area. Example: IEUA’s membership in MWD.

Regional-Scale Actions – activities carried out at a broad regional scale, in most cases well beyond the jurisdiction of the Profile Subject. Regional-Scale Actions must occur at a scale appropriate to address a given stressor and are typically carried out by organizations that operate at a large geographic scale (e.g., state and federal agencies, regional wholesalers, or joint powers authorities). Example: California’s emissions regulations.

*Note: Many Profile Subjects, including IEUA, are regional entities and operate at a regional scale. For the purposes of the SWM Profile, regional actions within the direct sphere of influence of the Profile Subject are included under “Agency Operations.”

SWM Profile as Applied to IEUA

The SWM Profile assesses the sustainability of the IEUA Region of Interest's water supply management, not merely the sustainability of IEUA's own water supply management or that of its member agencies. The score is attributed to IEUA as a means of recognizing and evaluating the role that IEUA plays, or can strive to play, within the larger region that can affect its ability to sustainably manage its water supply. As applied to IEUA, the SWM Profile is structured to assess IEUA actions at the operational level for its member agency requirements, as well as actions extending beyond its service area boundary and its member agencies' immediate contractual needs. IEUA's member agencies are not controlled by IEUA and are therefore considered as separate entities within the Region of Interest.

The SWM Profile does not directly assess IEUA's activities that are unrelated to water supply management, including sewage collection and treatment, treatment of municipal biosolids, and production of locally-distributed compost, production and use of renewable energy, and disposal of industrial wastewater and brine.

Summary of Findings

IEUA Rating



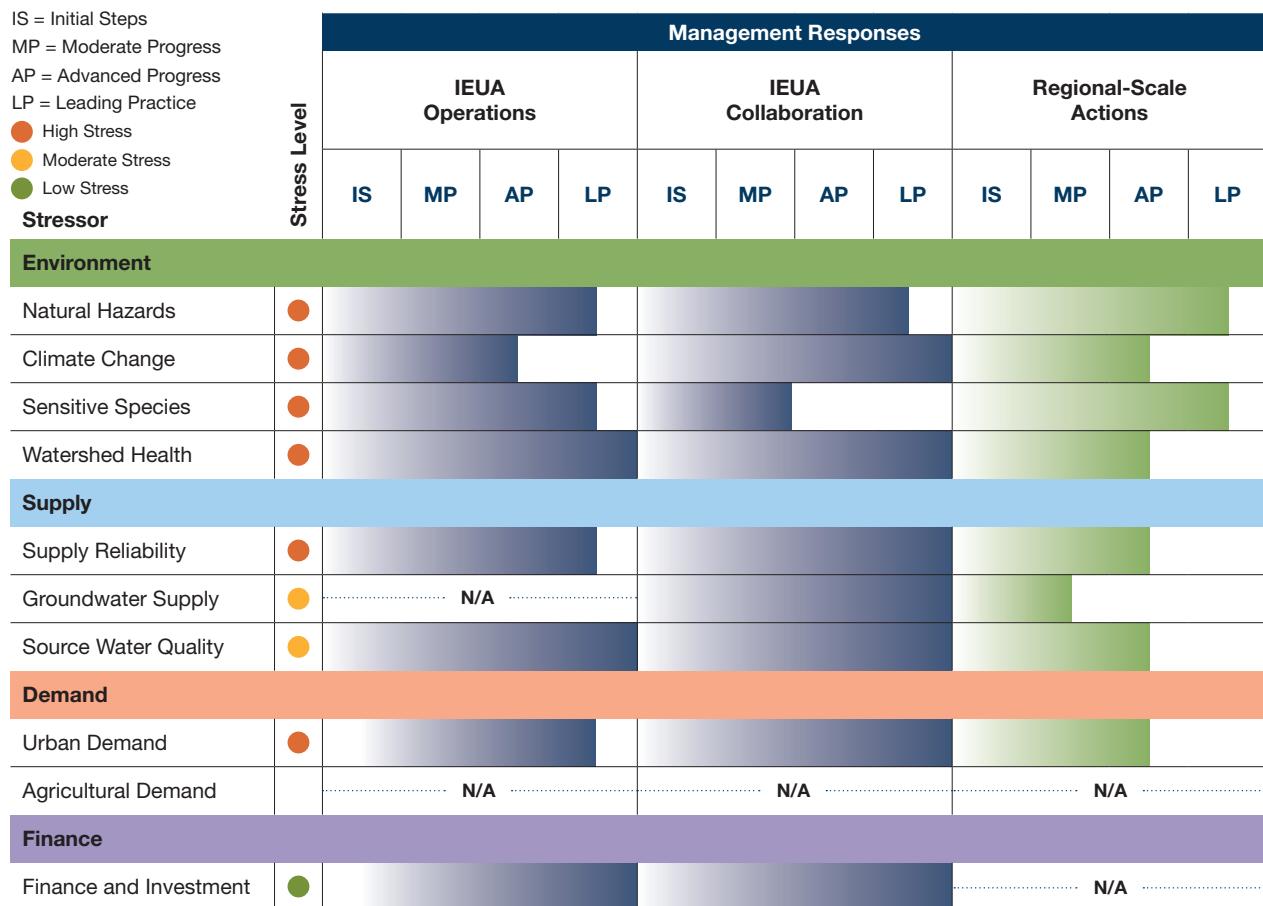
Profile Subject: Inland Empire Utilities Agency (IEUA)

This assessment has shown that IEUA does excellent water supply management planning, by identifying targets generally consistent with sustainable conditions, investing in collaboration, and successfully implementing its plans. IEUA recognizes how their operations and those of their member agencies are affected by forces over a large social and hydrological interest area, and have therefore created and joined with a range of partnerships and authorities, including the Chino Basin Watermaster (CBWM), the Chino Desalter Authority (CDA), the Santa Ana Watershed Project Authority (SAWPA), and the Metropolitan Water District of Southern California (MWD) to reduce its vulnerabilities. These efforts, especially in recycled water, groundwater clean-up and recharge, and water efficiency, have stabilized and increased local water supplies and improved water quality, thereby strengthening regional supply resiliency and reliability. Remaining vulnerabilities—climate change, watershed health, conflicts with species protection, and natural hazards—call for more action in collaboration with entities beyond traditional water management agencies, such as state and federal natural resource agencies, land use authorities, and stormwater agencies. Supported by its member agencies, IEUA, together with the Chino Basin Watermaster, as well as the two primary actors in IEUA's local region of interest, SAWPA and MWD are leaders in working collaboratively with multiple interests to foster a culture of stewardship, shared responsibility and accountability for regional supply reliability and resiliency.

IEUA and its region earned a Gold rating

The following table summarizes Stress Levels and Management Responses for IEUA and its region. Stresses facing IEUA and its region, based on the evaluated metrics, are predominantly High. In response to constrained new supplies and vulnerable imports, IEUA, SAWPA, MWD and other water supply management entities within the Local Region of Interest are highly proactive, innovative, collaborative leaders in assuring reliable water supplies. IEUA demonstrates and supports exemplary management practices for many Stressors. Regional-Scale Actions, those which occur within IEUA's broader Region of Interest, are also commendably moving towards advanced management practices.

IS = Initial Steps
 MP = Moderate Progress
 AP = Advanced Progress
 LP = Leading Practice
 ● High Stress
 ○ Moderate Stress
 ● Low Stress
Stressor



IEUA and Its Region of Interest

The SWM Profile evaluation of sustainable water supply management assesses levels of stress and management responses within the IEUA service area as well as a broader region that includes the watersheds and groundwater basins from and to which IEUA and its member agencies receive or deliver water. This larger area that influences IEUA is termed IEUA's "**Region of Interest**" (Figure 1). IEUA's Region of Interest extends into eight states and includes the Colorado River, San Francisco Bay-Delta, and Klamath-Trinity watersheds, all of which are sources of water for MWD, the supplier of imported water to IEUA and other agencies in the Santa Ana River (SAR) watershed. Within the Region of Interest, the watersheds and groundwater basins which provide the local supply sources for IEUA, MWD, and other SAR agencies are called the "**Local Region of Interest**" (Figure 2). This area generally corresponds to the area referenced as the South Coast Hydrologic Region in the California Water Plan.



Figure 1. Region of Interest. This region represents the geographic extent from which IEUA and its wholesale suppliers draw water supplies and deliver water to.

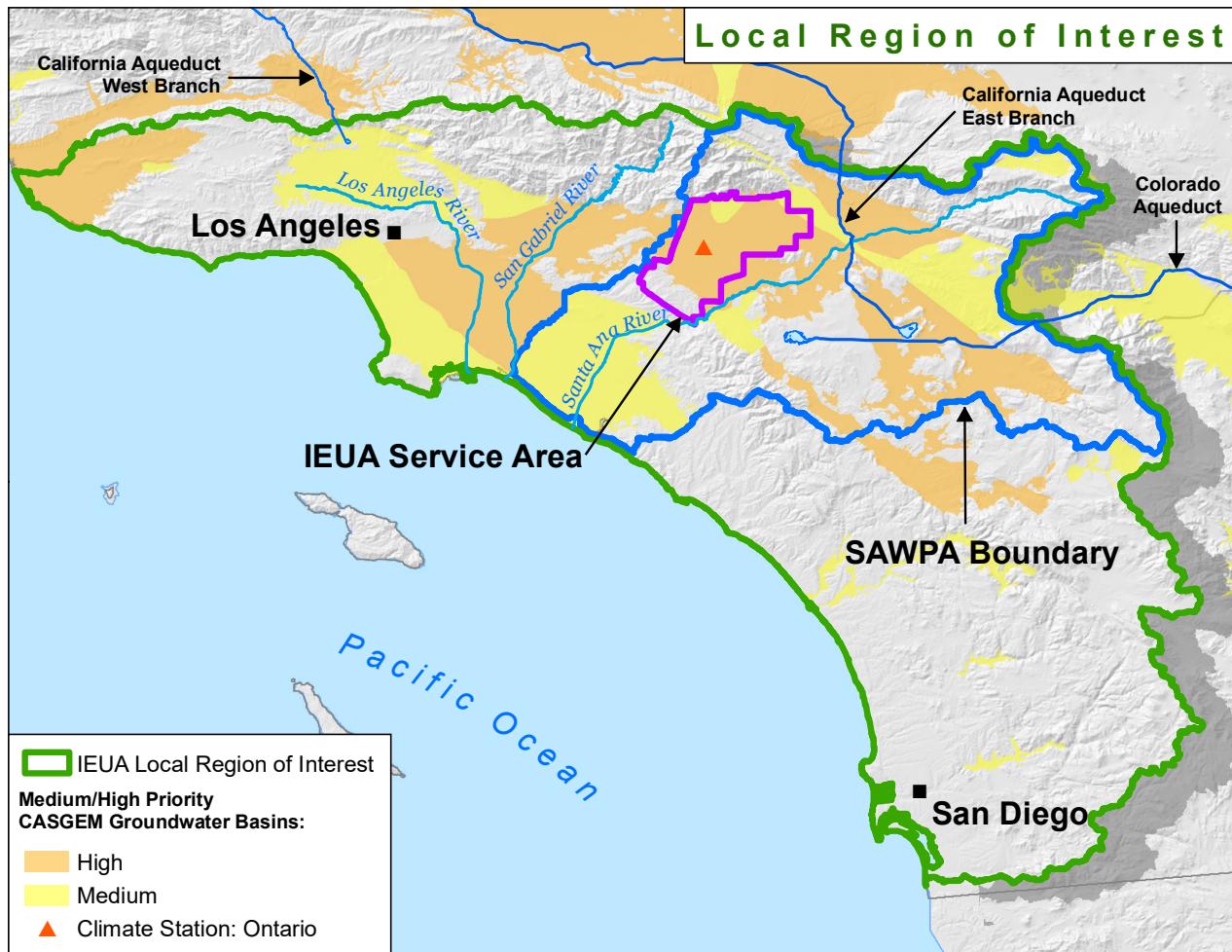


Figure 2. Local Region of Interest. This region is the subset of the Region of Interest that does not include the import watersheds (i.e., the entire watershed of the Bay-Delta, including the Klamath-Trinity watersheds, as well as the Colorado River Basin.) The geographic extent of the Local Region of Interest aligns very closely to the South Coast Hydrologic Region defined by the California Department of Water Resources.

IEUA is both a water and wastewater utility that operates at a regional scale. It provides wholesale distribution of imported water, production and wholesale distribution of recycled water, sewage collection and treatment, treats municipal biosolids, and produces locally-distributed compost, produces and uses renewable energy, and disposes of industrial wastewater and brine. The IEUA service area consists of the cities of Chino, Chino Hills, Montclair, Upland, Ontario, Rancho Cucamonga, and Fontana, and unincorporated areas within San Bernardino County. Its retail member agencies include Chino, Chino Hills, Cucamonga Valley Water District, Fontana Water Company, Monte Vista Water District, City of Ontario, San Antonio Water Company, and the City of Upland. IEUA also provides wastewater services to seven agencies including, the Cities of Chino, Chino Hills, Fontana, Montclair, Ontario, Upland, and CVWD in the City of Rancho Cucamonga. IEUA also provides reclaimed water to agricultural users who, along with some commercial and industrial users, are also self-supplied with groundwater. Two private mutual water agencies—the San Antonio Water Company (SAWCO) and West End Consolidated Water Company—provide additional wholesale and retail water service within the IEUA service area; SAWCO provides surface water from San Antonio Creek and potable groundwater to Upland, Ontario, and irrigation customers. IEUA is party to the CBWM, which oversees sustainable management of the Chino Groundwater Basin. It is a member agency of the CDA, a joint powers authority which pumps and treats saline groundwater, and SAWPA, a joint powers authority with five member agencies that strives for a sustainable SAR watershed. IEUA is also a member agency of MWD, a regional wholesaler which supplies State Water Project (SWP) water to IEUA. In the past MWD has also supplied Colorado River water to IEUA.

The 242-square-mile IEUA service area is in southwest San Bernardino County in the SAR watershed. It lies within one of the fastest-growing areas in the United States, with a population of 5.3 million (2010) that is projected to grow by 2 million by 2035. IEUA's service area encompasses multiple groundwater basins under the alluvial valley between the San Gabriel Mountains and the Chino Hills (Figure 3). The San Gabriel and San Bernardino mountains are the source of water and permeable sediments that make the IEUA and SAR groundwater basins very productive. The local groundwater basins are the primary supply source for the IEUA service area (Figure 4). The primary groundwater source is the Chino Groundwater Basin, which usually supplies about 30% to 50% of the total supply. Other smaller groundwater basins (Cucamonga, Rialto-Colton, and the Six Basins), collectively provide 10% to 20% of the supply. The watersheds of local surface streams flowing out of the local mountains supply about 5% of the directly used supply, but in wetter years can provide as much as 10% of the direct supply, and are also a primary source of managed groundwater basin recharge (Figure 5). Recycled water is an increasingly significant local supply source (currently about 15% of the total) for urban and agricultural irrigation, groundwater recharge (Figure 5), and flows in the SAR.

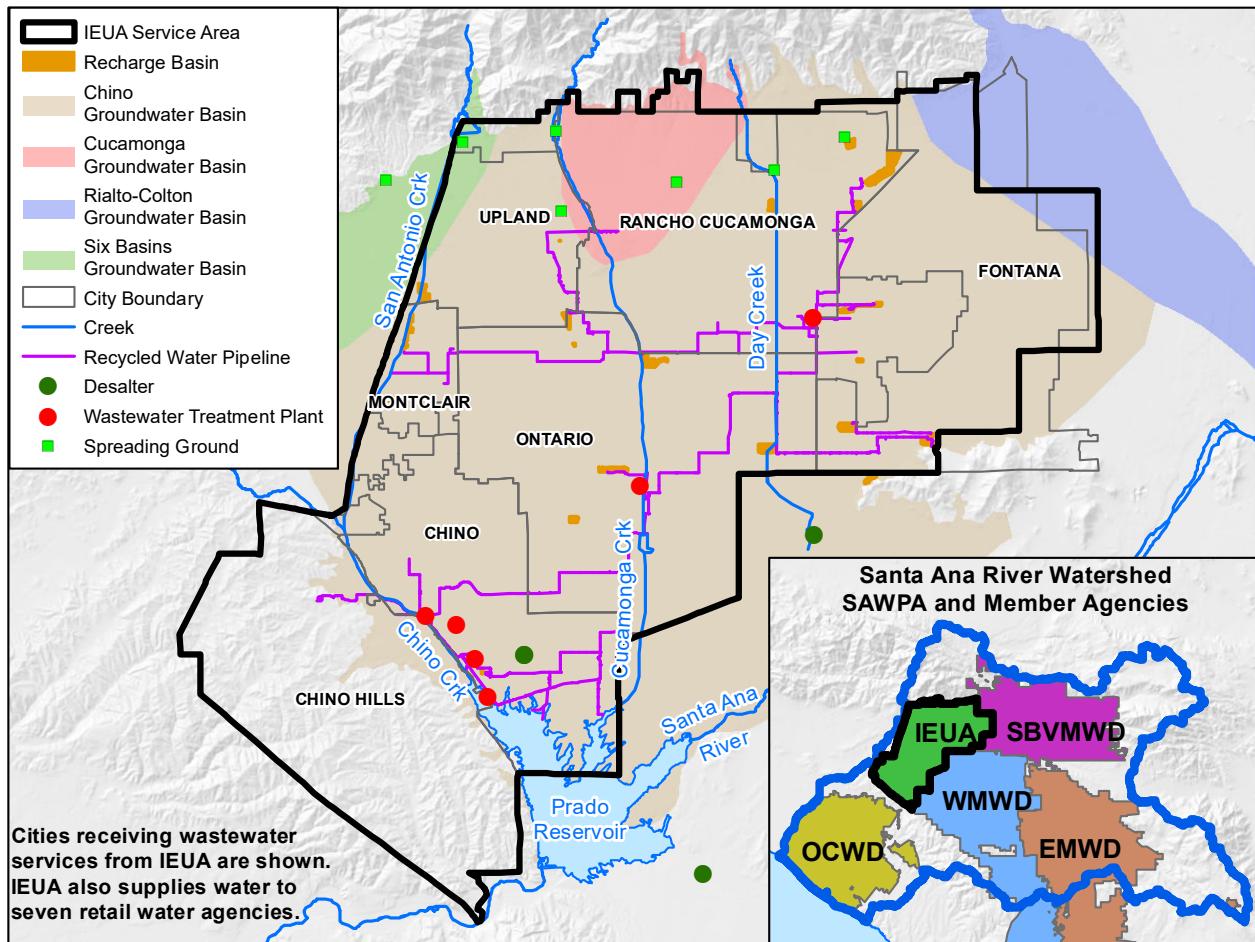
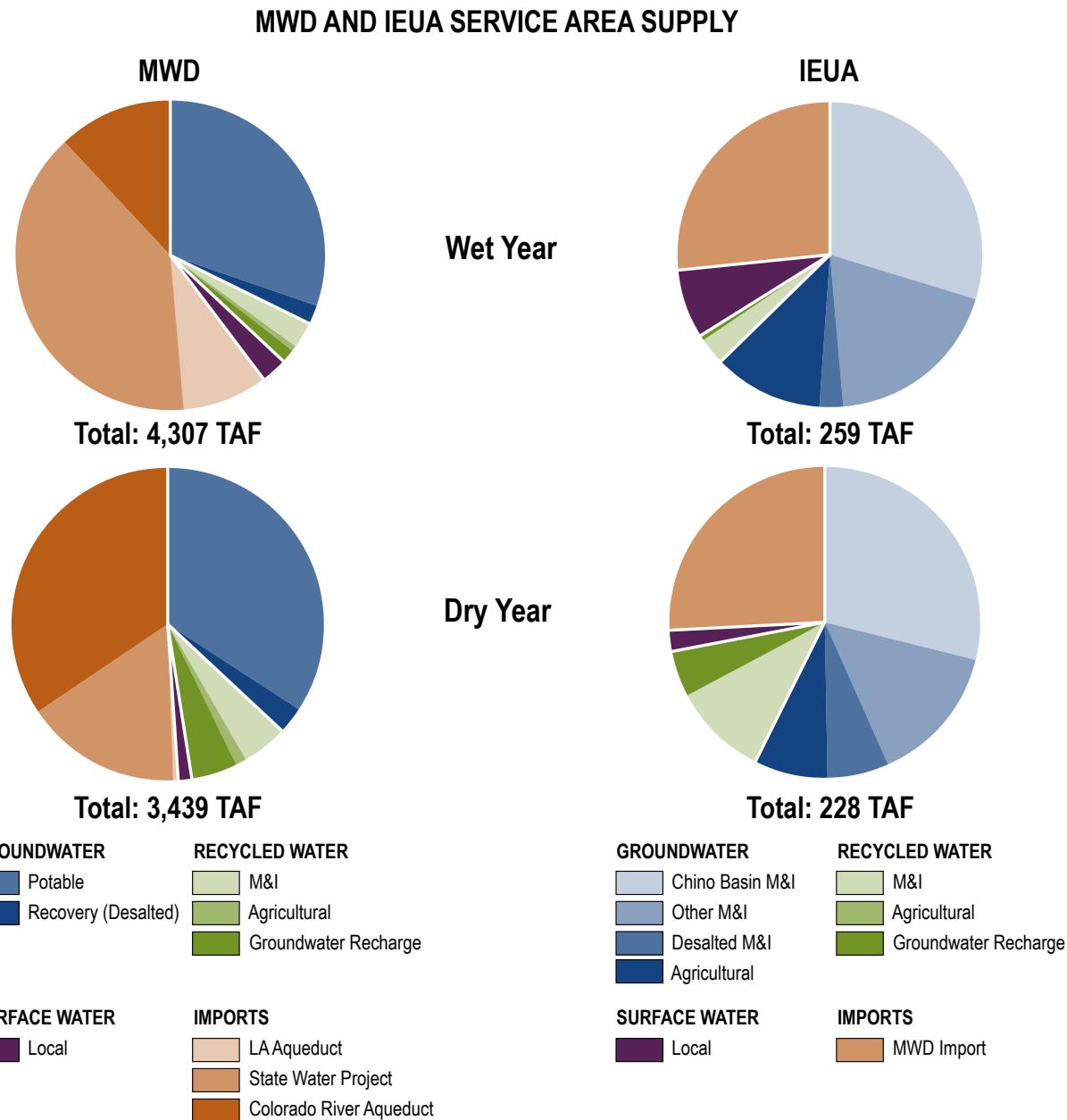


Figure 3. IEUA Service Area. The IEUA Service Area lies in the Santa Ana River Watershed and overlays most of the Chino Groundwater Basin. The other groundwater basins shown in the figure are also sources of supply for IEUA member agencies.



Note: Calendar years are used for MWD, 2006 for the Wet Year and 2015 for the Dry Year. FY05/06 and FY14/15 are used for IEUA. Local surface water supply includes only direct diversions from reservoirs and streams and does not include stormwater. Groundwater recharge includes injection to limit salinity intrusion. “M&I” stands for “Municipal and Industrial”.

Sources: Derived from data provided by MWD and, for 2015, data from IEUA’s FY14/15 Annual Water Use Report and CBWM FY14/15 38th Annual Report, and, for 2006, data from the 2010 IEUA UWMP.

Figure 4. MWD and IEUA Service Area Supply. The pie charts compare the supply sources from 2006 (wet) and 2015 (dry) for the MWD and IEUA service areas. The MWD supply represents approximately 90% of the supply used in the Local Region of Interest. The IEUA supply represents less than 7% of the MWD supply.

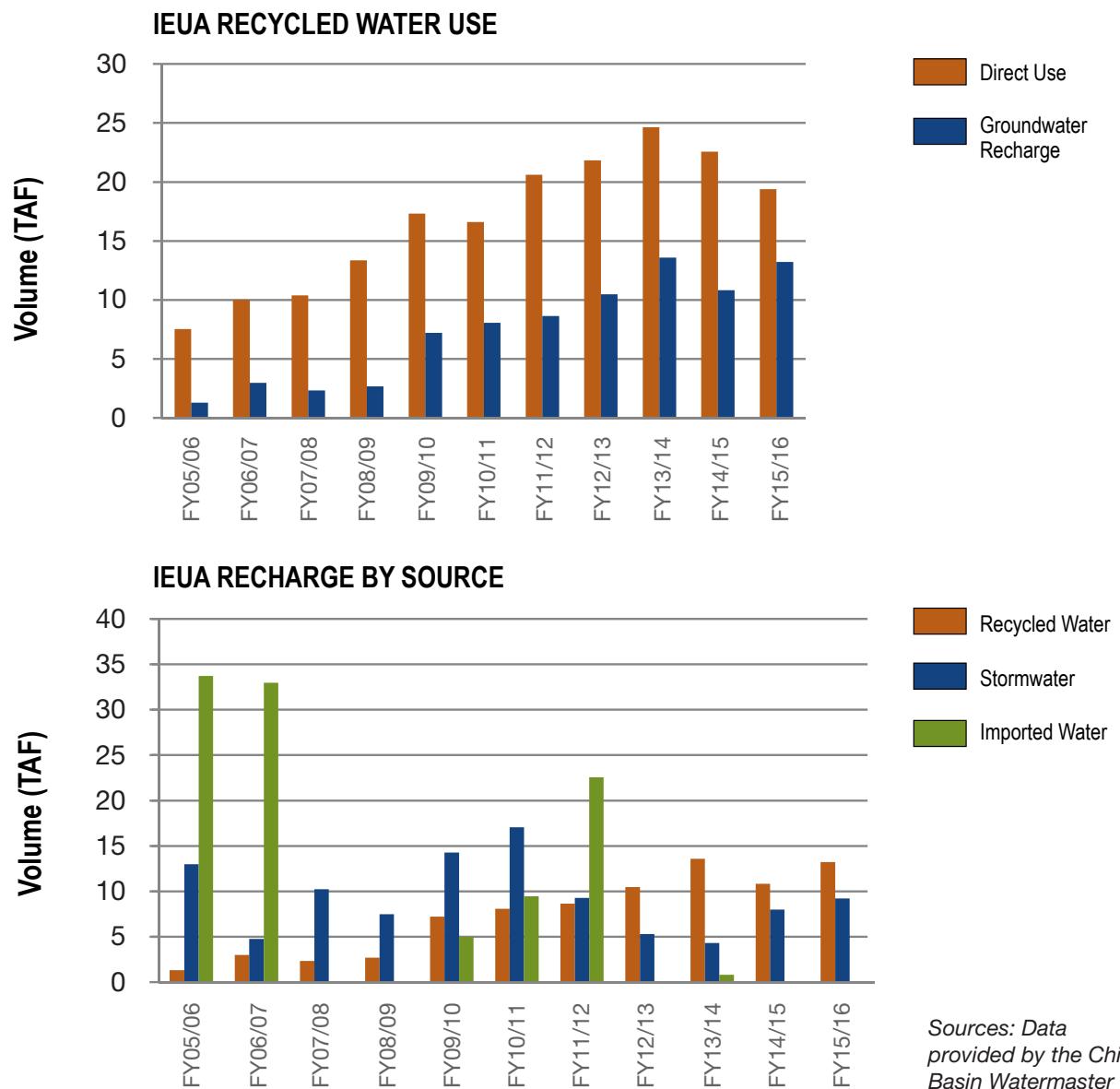
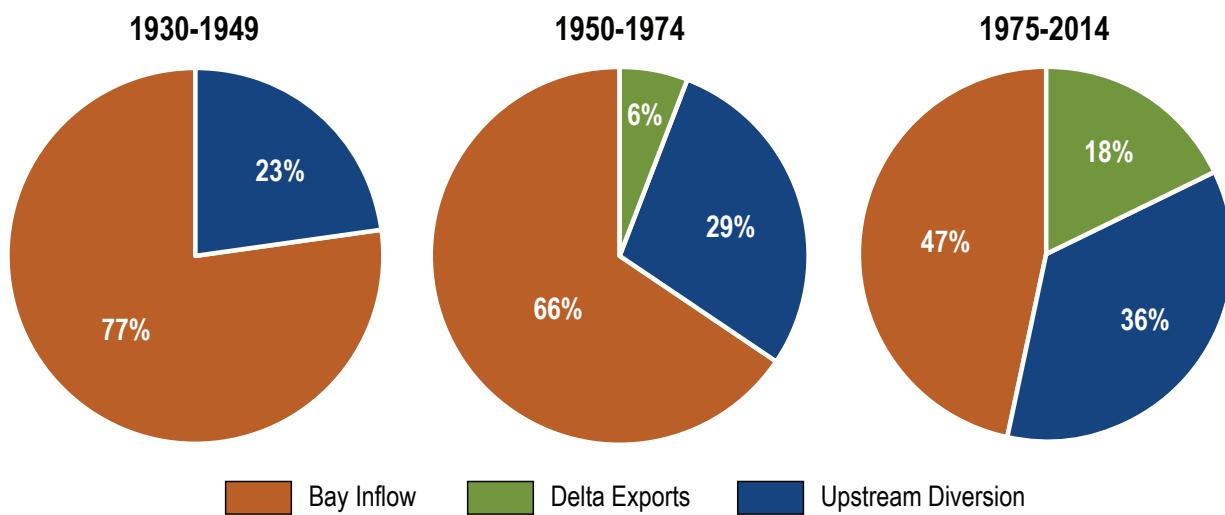


Figure 5. IEUA Recycled Water Use and Recharge by Source. IEUA's water recycling and groundwater recharge programs are foundational to their water supply resilience and sustainability strategies. The first graph above shows the general upward trend of recycled water use for direct use by urban and agricultural users, and for groundwater recharge. The second graph shows that drought virtually eliminated groundwater recharge from imported sources and reduced the recharge from local runoff, while recharge from recycled supplies steadily increased.

The drought of 2012-2016 reduced the MWD total supplies by 20%, as demonstrated above. These changes were driven by reductions in demand and significant reductions in import availability and local surface supplies. Use of recycled water increased nearly 80%, particularly for groundwater recharge, and now represents about 10% of the supply for MWD's service area. Drought also reduced IEUA's supply from MWD and local surface supplies. Those decreases were somewhat offset by a nearly 25 TAF increase in recycled supplies and increases in the recovered groundwater from the Chino Basin desalters.

Although the majority of water used within the IEUA service area is derived from local sources, imports from the SWP remain a significant source—20% to 25%—of the total supply. The SWP supply is derived from the San Francisco Bay-Delta Watershed (Figure 6), which also receives imported water from the Klamath-Trinity Watershed. The SWP shares the Bay-Delta Watershed supplies with a host of other users, including the federal Central Valley Project. The reliability of the imported supply from the Delta is decreasing because of the vulnerability of the Delta to rising sea levels and more extreme floods and droughts, and the obligation to meet Delta water quality and sensitive species flow requirements.

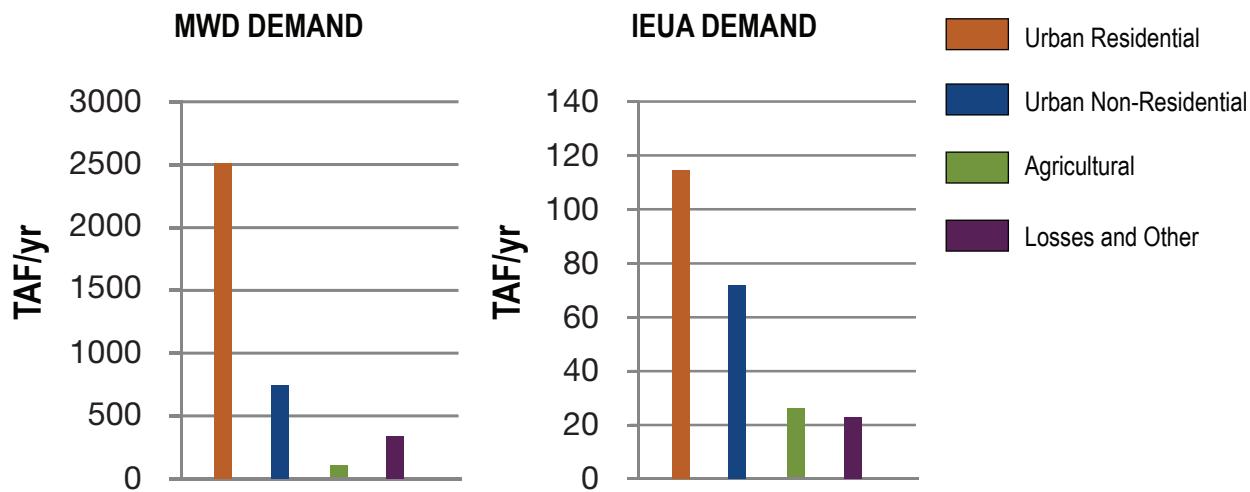


Note: Available water in the Bay-Delta watershed includes runoff, imports from the Trinity-Klamath Watershed, and runoff stored or released from reservoirs.

Source: Data provided by The Bay Institute.

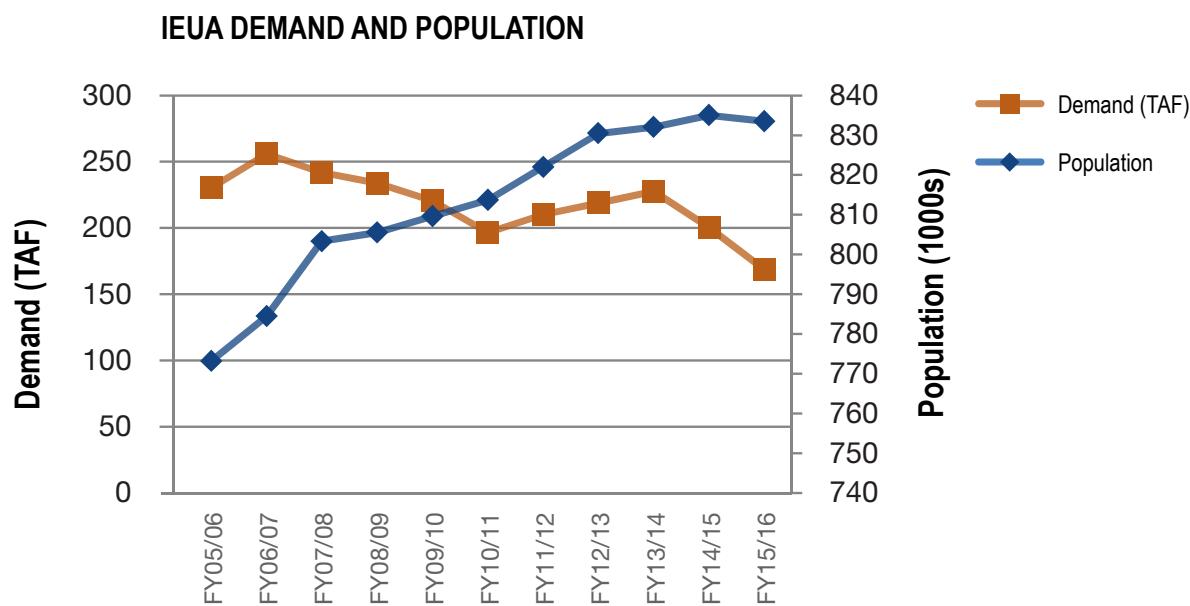
Figure 6. Bay-Delta Watershed Supply and Use. Central Valley river diversions and exports from the Delta have reduced runoff through the San Francisco Bay-Delta Estuary by over half and contribute to the decline in sensitive species and other beneficial uses. The reliability of the imported supply from the Delta is decreasing because of the obligations that State and Federal water projects have to meet Delta water quality and environmental flow requirements.

Water demand in the MWD and IEUA service areas is primarily for urban and suburban residential and non-residential use, including commercial and industrial uses, as illustrated by Figure 7. For the IEUA service area, about 63% of the residential water is used outdoors and about 36% of the non-residential water is used outdoors. Agricultural water use within the IEUA service area is gradually declining and currently represents about 10% of the demand and is expected to decrease as agricultural lands are converted into urban uses. Agricultural use is mainly self-supplied with groundwater although about 25% of the use is supplied with recycled water from IEUA.



Sources: Data from MWD's 2015 UWMP, IEUA's 2015 UWMP, the Chino Basin Watermaster FY14/15 38th Annual Report, and IEUA's 2016 IRP.

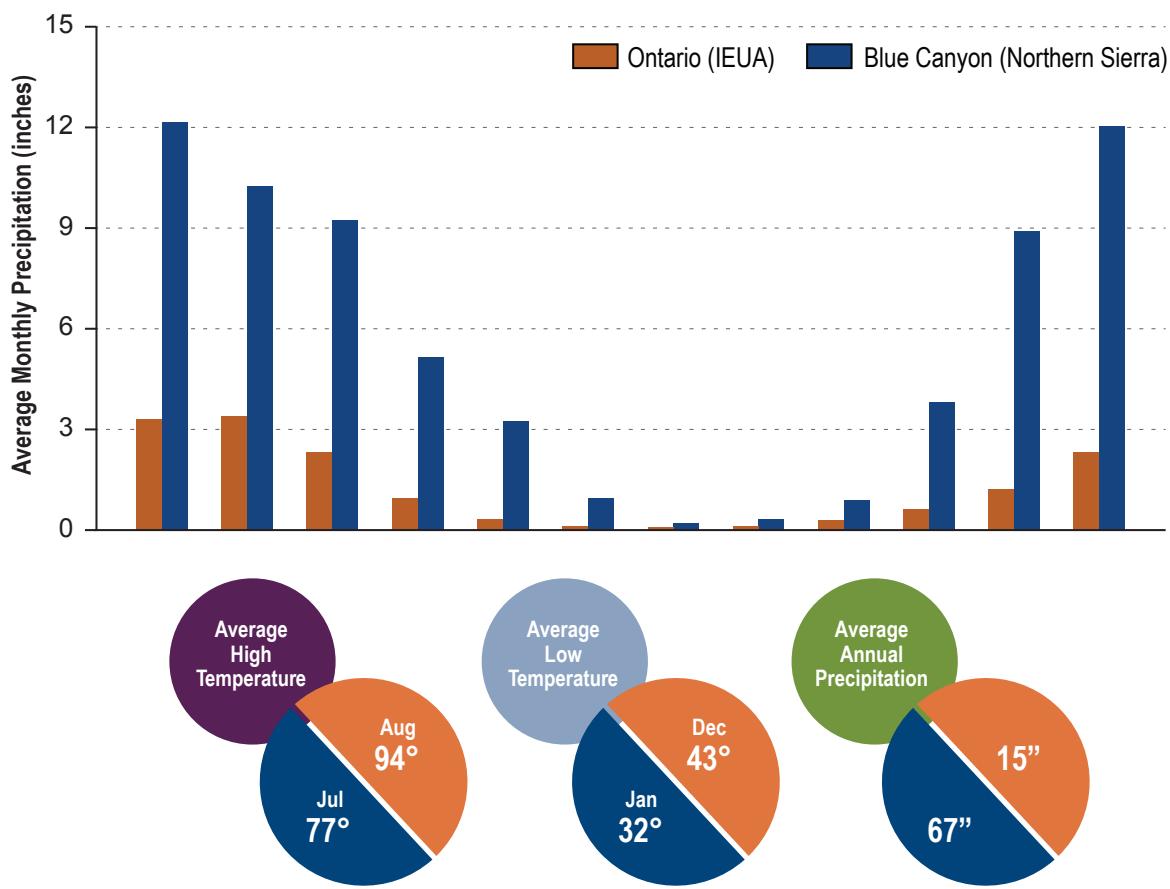
Figure 7. MWD and IEUA Demand. Different types of demand in MWD and IEUA service areas are shown above. Agricultural use includes recycled water provided by IEUA and groundwater pumped by individual users within the Chino Basin. System Losses include real losses in the distribution systems and non-revenue/unmetered water.



Sources: Data from IEUA's Annual Water Use Reports.

Figure 8. IEUA Demand and Population. The varying annual water demand by IEUA member agencies in the FY05/06-FY15/16 period reflects the influence of the weather, economic contraction and expansion, population growth, and water use efficiency programs. The 26% decline in water use from FY13/14 to FY15/16 reflects the increased water conservation and efficiencies required due to the persistent drought and cutbacks mandated by the State. The FY15/16 per-capita water use is below the 2020 water use targets required by 2009 legislation.

The California watersheds in the Region of Interest experience wet winters and dry summers, as illustrated in Figure 9, and high variability of precipitation and runoff from year to year. Elsewhere in the Region of Interest, in contrast to California's Mediterranean climate, parts of the Colorado River watershed receive significant summer rainfall, but little of it reaches the mainstem Colorado River. Snowmelt in the import watersheds provides about 40% of annual runoff, but the snowpack has been and is projected to continue decreasing. Snowmelt in the San Gabriel and San Bernardino Mountains, which receive up to 40 inches of precipitation on average, provides about 10% of the SAR runoff, some of which recharges the groundwater basins. Hot, dry summers in the IEUA region and SAR watershed, combined with a growing urban environment, increasing population, and the anticipated effects of climate change, put upward pressure on water demands.



Source: California Climate Data Archive (<http://www.calclim.dri.edu/>)

Figure 9. Representative Climate Data. Precipitation in the Local Region of Interest, represented by Ontario, CA, is dramatically less than that at Blue Canyon, CA, which represents the watershed of the Bay-Delta, the source of imported State Water Project (SWP) supplies. Although both have winter wet/summer dry Mediterranean climates, the snowpack in the Sierra-Cascade Mountains retains the winter precipitation, which runs off in the spring and early summer. Warming temperatures continue to reduce the contribution of snowmelt to water supplies, particularly from the Feather River, the primary SWP watershed.

SWM Profile Evaluation and Rating

The SWM Profile evaluates the sustainability of water management today and shows clear paths forward to the leading practices of sustainable water management. Each SWM Profile assessment focuses on a Profile Subject—a water supply agency—yet also considers how that Profile Subject affects, and is affected by, the system of water supply and management around them.

To understand the sustainability of water management from the perspective of a particular Profile Subject, the SWM Profile first describes the Profile Subject's unique geohydrologic and jurisdictional context. Second, the SWM Profile evaluates ten Stressors that can create vulnerabilities for water supply management by the Profile Subject. By characterizing these Stressors, the SWM Profile highlights the most important management challenges for the Profile Subject. Third, the SWM Profile evaluates the management response to the Stressors at three scales. Closest to home, the SWM Profile assesses the Profile Subject's own operations. Because water management sustainability is strongly influenced by forces beyond the control of the Profile Subject, the SWM Profile also assesses how well the Profile Subject engages with partners who can reduce stress on water supply resources directly or indirectly relied on by the Profile Subject. Further, the SWM Profile also looks beyond the actions of the Profile Subject to consider actions by other entities that influence Stressors.

This scale of analysis is critical, since many Stressors extend far beyond the influence of any Profile Subject. For instance, global climate change directly affects water managers, yet most water management agencies can play only a very small role in reducing global emissions. Therefore, the SWM Profile assesses and rates the sustainability of a Profile Subject's water supply management at three scales of analysis: agency operations, agency collaboration, and regional-scale actions.

SWM Terminology

As described in the preceding paragraph, the SWM Profile evaluates activities at three different levels: **Agency Operations**, **Agency Collaboration**, and **Regional-scale Actions**. Agency Operations focus on the Profile Subject's activities with respect to its water supply operations. Thus, if an agency has little or no groundwater in its supply mix, the assessment at the Agency Operations level will not address groundwater supply, though the agency's activities in this regard may be appropriately included in the Agency Collaboration level. For Regional-Scale Actions, the geographic scope qualifying as “regional scale” is not fixed, but instead reflects the geographic scope at which a given Stressor can be effectively addressed, and at which Stress Level metrics can be affected.

The SWM Profile strives to focus attention on the most important parts of the **Region of Interest** for each Stressor, within the limits of data availability. As previously described, the Region of Interest includes the IEUA service area as well as a broader region that includes the watersheds and groundwater basins from and to which IEUA and its member agencies receive or deliver water. Each Stressor assessment therefore focuses on specific entities or features within a specified maximum geography, collectively termed the “**Scope of Analysis**.” The Scope of Analysis for a given Stressor may include the watersheds from which the Profile Subject or its wholesaler supplier(s) import(s) water, termed the “**Import Watersheds**.” It will also include the more local watersheds and groundwater basins relied on by the Profile Subject, its customers, and its wholesaler supplier(s), termed the “**Local Region of Interest**.” For the Agency Collaboration actor level, the SWM Profile uses a subset of the full Scope of Analysis that includes the portion of the scope of analysis most relevant to the Profile Subject, referenced as the “**The Focused Scope of Analysis**.” The Focused Scope of Analysis includes the portion of the Scope of Analysis within the surface water and/or groundwater basins relied upon by those water supply entities located wholly or partially within the Profile Subject’s service area. Actions may be accounted for at multiple actor levels; a Profile Subject could be working with another entity on a regional-scale activity to address a given Stressor, allowing it to be accounted for in both the Agency Collaboration and Regional-Scale Actions assessments.

SWM Profile Limitations

The SWM Profile is still under development, and this assessment reflects that status. Some Stress Level metrics and Management Response criteria required data or information that was not readily available. Given the breadth of Regional-Scale Actions, we selected appropriate representative data sources as a basis to assess the full scope of those actions, capturing the most significant such actions. We relied heavily on information provided by the Profile Subject and key regional partners or actors (e.g., IEUA, SAWPA, MWD), supplemented by internet research, to identify significant Regional-scale Actions for consideration.

Stress Level

The SWM Profile calculates a Stress Level for each Stressor, based on evaluating one or more metrics against scoring thresholds. Stress Level results of High, Moderate, or Low highlight the greatest sustainability challenges for the Profile Subject and its region. Each Stressor has a “Scope of Analysis” indicating what geographic parts of the region and entities or features are evaluated. In many cases, the Scope of Analysis includes only a subset of the entire Region of Interest.

The following table (Table 1) provides the list of the Stress Level metrics.

Theme	Stressor	Metric
Environment	Natural Hazards	Water Supply Exposure
	Climate Change	Climate Risks to Water Supply: Snowpack-dependence of Water Supply
		Climate Risks to Water Supply: Percent of Water Supply at Risk from Sea Level Rise
		Climate Impacts of Water Supply: Reliance on Non-Renewable Energy Sources
	Sensitive Species	Sensitive Species Constraints on Supply Operations
	Watershed Health	Freshwater Ecosystems: Native Fish and Frog Populations
		Stream Water Quality: Impaired Waterbodies
		Watershed Condition: Proportion of Land in a Pervious Condition
Supply	Supply Reliability	Portfolio Strength: Source Vulnerability
		Incidence of Unplanned Mandatory Delivery Cutbacks
		Future Need for Additional Supplies
	Groundwater Supply	Declining Water Levels
	Source Water Quality	Surface Water: Drinking Water Source Water Quality Impairment
		Groundwater: Groundwater Quality Impairment
Demand	Urban Demand	Residential Indoor Water Use
		Urban Outdoor Water Use
		Urban Water Demand: Future Use Trend
	Agricultural Demand	Acreage and Use Trends
Finance	Finance & Investment	Debt Coverage Ratio
		Days of Working Capital
		System Renewal/Replacement Rate

Table 1. SWM Profile Stress Level Metrics

A goal without a plan is just a wish.

– Antoine de Saint-Exupéry

Management Responses

A key distinction of the SWM Profile is its evaluation of Management Responses to Stressors, assessing the level and quality of actions taken to address each Stressor based on specified criteria. The SWM Profile establishes a continuum of Management Responses along which Profile Subjects can progress, from an initial recognition of an issue, to developing plans, to undertaking actions and achieving responses that advance water supply management towards sustainability (Figure 10).

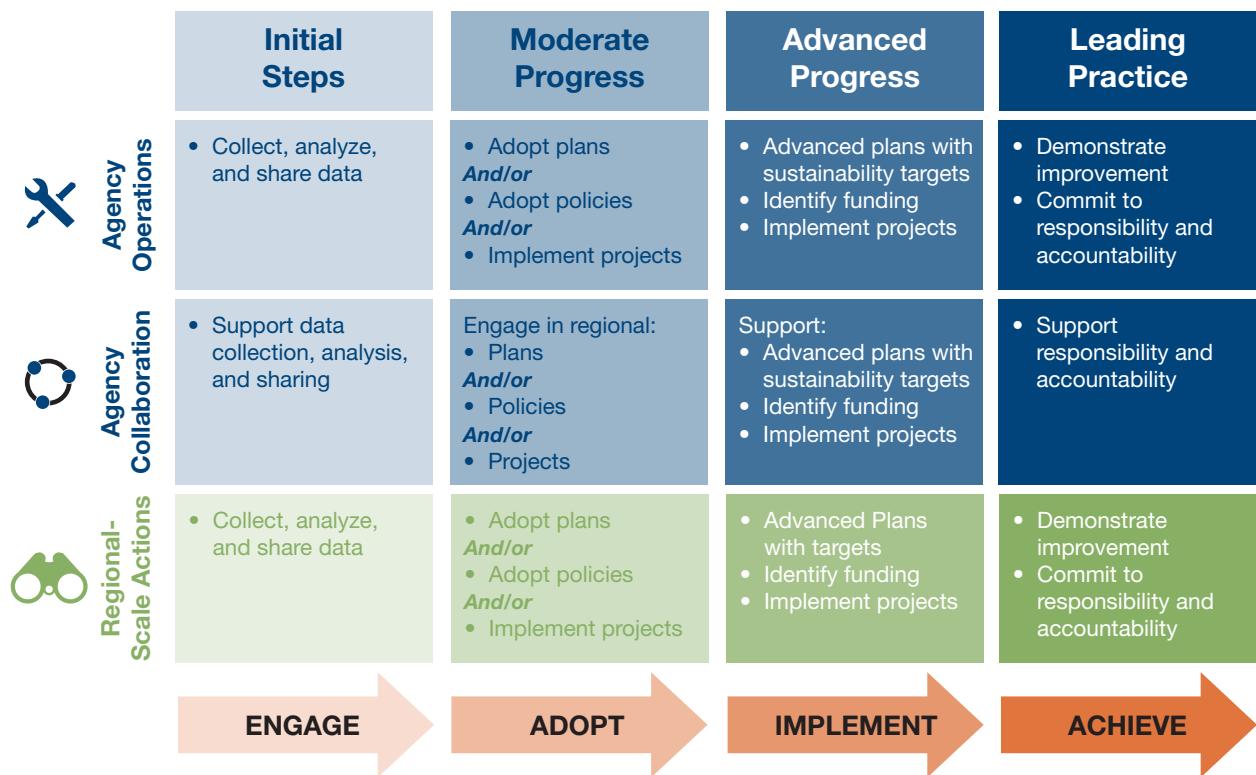


Figure 10. The Management Response Framework. As shown in simplified form, this framework includes three actor levels (rows) and the criteria associated with each of the four Management Response levels (columns). In the SWM Profile, each actor level is evaluated and rated against detailed criteria developed for each Stressor.

At the Leading Practice level, the detailed SWM Profile Management Response Framework includes a criterion in the Agency Operations and Regional-Scale Actions rows requiring that a type of benefit-cost assessment be carried out, which is referred to as an “Integrated Benefit-Cost Assessment.” This type of assessment is described in the call-out box below.

Integrated Benefit-Cost Assessment

An Integrated Benefit-Cost Assessment is part of the framework because this element of planning is evidence that an agency has adopted an integrated, regional perspective. The SWM Profile defines such an assessment as one that has a term of at least 25 years, assesses benefits and costs beyond water supply, and considers both economic and non-economic results of management decisions. An example of an Integrated Benefit-Cost Assessment that is used in the business world is a triple bottom line sustainability assessment, which covers economic, environmental, and social benefits.

Stressor Summaries

Introduction

The following pages provide summaries of each of the Stressor analyses, providing information on the findings of the Stress Level and Management Response analysis, together with recommendations. We present the Stressors by Theme, which share common geographic scales of analysis: first Environment, with the largest scale of analysis; then Supply and Demand (which share the same scale of analysis); and, lastly, Finance. An introductory sheet begins each geographic scale grouping with a map depicting the geography that applies to the pages that follow.

Stress Level

The summary begins with an icon that is color coded to reflect the Stress Level (reddish orange is High, golden yellow is Moderate, green is Low) and a text identification of the Stress Level finding. That is followed by bullets describing the findings for each of the Stress Level metrics, which are identified in bold.

Management Responses

The summary begins with a short description of the findings and an explanation of why the assessment arrived at the ratings presented. This opening paragraph is followed first by a section on the Profile Subject's Operations and Collaboration activities, and then, after a horizontal dividing line, by a section on Regional-Scale Actions. Both these sections contain a series of bullets that provide more detail on key findings associated with the rating given.

Recommendations

The final section on the page provides one or more recommended actions for the Profile Subject.

Environment Theme

Stressors:

- Natural Hazards
- Climate Change
- Sensitive Species
- Watershed Health

Applicable Scale for these Stressors: Region of Interest

The Region of Interest includes the IEUA service area as well as a broader region that includes the watersheds and groundwater basins from and to which IEUA and its member agencies receive or deliver water.



Source: Figure 1.

Scale: Region of Interest

Environment



Natural Hazards

Stress Level: High

Metric assessment findings:

- **Water Supply Exposure to Natural Hazards:** The IEUA service area and the Region of Interest are broadly affected by risk from multiple natural hazards, putting a significant portion of water management infrastructure at risk of damage or failure.

Management Response Levels

Within the IEUA service area, IEUA has demonstrated excellent effort towards mitigating natural hazards risks to its water infrastructure. Performance of broad benefit-cost analysis of potential mitigation actions would allow IEUA to advance to a fully-complete Leading Practice level. As a collaborator, IEUA has worked with many partners to develop Advanced Plans for natural hazard mitigation.¹ To achieve a full rating of Advanced Progress at the IEUA Collaboration level, IEUA needs to help its partners identify and secure funding for hazard mitigation efforts and implement projects. For Regional-Scale Actions, Advanced Plans are assumed to have been broadly developed, given the prevalence of hazard mitigation disaster planning, a prerequisite for federal disaster mitigation aid funding. This has not been independently verified.

IEUA Operations

Leading Practice (partial)

- IEUA has developed its own Hazard Mitigation Plan and develops and implements projects to mitigate hazard risk, including projects to diversify sources of water supply, as well as to enhance use of local sources less subject to natural hazard risk, such as groundwater and recycled water.

IEUA Collaboration

Moderate Progress

- IEUA is working with others to develop projects to diversify sources of water supply, as well as to enhance use of local sources less subject to natural hazard risk, such as SARCCUP.
- IEUA is a member of multiple hazard mitigation organizations and programs that facilitate communication, planning, training, and mutual aid in a disaster.
- IEUA actively participated in the development of the San Bernardino County Hazard Mitigation Plan, but does not typically support implementation of hazard mitigation projects led by others or their pursuit of hazard mitigation funding.

¹ FEMA-compliant hazard mitigation plans are assumed to be Advanced Plans.

**Regional-Scale Actions****Leading Practice (partial)**

- MWD hosts an organization for its member agencies to facilitate hazard mitigation planning, preparedness, and response.
- Several plans by MWD describe how the agency organizes and deploys resources to manage emergencies and ensure continuity of water system operations and critical business processes.
- The State's Delta Risk Management Strategy focuses on the specific threat to a major component of SWP operations.
- No specific planning exists for hazard mitigation associated with the Colorado River Project, which supplies water to the Colorado River Aqueduct (CRA).

Recommendations

To reduce Stress Levels and improve the SWM Rating for this Stressor, IEUA should do the following:

- Continue to support investment in diversification of water supply sources within the Local Region of Interest to reduce overall natural hazard risk.
- In an update to IEUA's Hazard Mitigation Plan (2011), consider the potential for climate change to enhance certain hazards (i.e., flood hazards and wildfire risk), and potential effects to infrastructure, including groundwater recharge basins, which could be impacted by debris and sedimentation flows, as well as increased flood risk from surrounding basins that could occur after wildfires.
- Encourage other water management agencies in the Local Region of Interest to conduct their own hazard mitigation planning focused on reducing risk and improving the speed of recovery following a disaster, using IEUA and MWD efforts as models.
- Lead regional efforts to share hazard planning information more widely online, both to raise public awareness and to facilitate inter-agency coordination.

Scale: Region of Interest

Environment



Climate Change

Stress Level: High

Two Stress Level metrics relate to climate change vulnerability of water supply operations, and one relates to the climate impacts of water supply operations.

Metrics assessment findings:

- **Snowpack-dependence of Water Supply:** The Region's reliance on the snowpack-dependent watersheds of the Bay-Delta and the Colorado River make it highly vulnerable to climate change, resulting in a Stress Level of High.
- **Percent of Water Supply at Risk from Sea Level Rise:** Imported water from the Bay-Delta watershed must be diverted from the Delta, which is anticipated to be greatly affected by sea level rise, resulting in a Stress Level of High.
- **Reliance on Non-Renewable Energy Sources:** Not available for assessment.²

Management Response Levels

IEUA and its collaborative partners in the Santa Ana River watershed have led the state in climate change response, earning the highest ratings.

In contrast, in the Region of Interest, MWD has not yet fully integrated future climate scenarios into the demand projections in its IRP, and states outside California have not made significant efforts to reduce climate vulnerabilities or greenhouse gas emissions.



IEUA Operations

Leading Practice

- IEUA's climate response is exemplary, both in reducing emissions related to water supply—documented in its 2015 IRP and its Energy Management Plan—and in insulating operations from climate impacts, primarily through increasing recycling and efficiency.

² Assessment of this metric was not possible, due to lack of readily available data at the scale of the Region of Interest. However, this fact did not affect the Stress Level score because the highest Stress Level score among the metrics is used to assign the Stress Level for this Stressor.

**IEUA Collaboration****Leading Practice**

- Through its membership in SAWPA and other partnerships, IEUA and its member agencies actively support, and in many cases lead, the California water sector in climate response. IEUA was one of the first agencies in the state to evaluate climate change impacts on its demand and water supply sources.
- California's regulations on emissions reduction and its evolving mandate for climate adaptation provide an effective backstop for climate response at the local level.

**Regional-Scale Actions****Advanced Progress (partial)**

- Water supply entities in the Local Region of Interest have increasingly relied on local water supplies over which they have greater control, and have invested in developing climate-resilient water supplies like recycled water and groundwater desalination, leading to great success in supplying more climate-reliable, lower-carbon local water, relative to imported supplies.
- California has leading policies for reducing greenhouse gas emissions. In contrast, its policies for climate preparedness—for buffering against the projected hazards of climate change—are evolving rapidly, but they currently lack targets.
- Investment in climate preparedness, throughout the Region of Interest, and particularly in the Colorado River watershed states, is insufficient given the scale of water supply vulnerability in southern California.

Recommendations

To reduce Stress Levels and improve the SWM Rating for this Stressor, IEUA should do the following:

- Continue developing local water supplies and local renewable energy generation as insurance against climate risks and as a curb on carbon emissions.
- Support regional and watershed-wide climate change analysis and subsequent updates for the Santa Ana River Watershed through SAWPA's OWOW.
- Work to assure that planning throughout the larger Region of Interest—for water supply, water management, and land use as it affects demand—is based on projected future conditions of climate and hydrology.
- Support federal agencies, states other than California, and local land use agencies throughout the Region of Interest to invest politically and financially in climate resilience and emissions reduction, commensurate with the magnitude of climate threats.

Scale: Region of Interest

Environment



Sensitive Species

Stress Level: High

Metrics assessment findings:

- **Sensitive Species Constraints on Supply Operations:** Water management operations throughout the Region of Interest have harmed sensitive aquatic animal and plant species in some of the supply source areas such that the supply operations are affected by protective legislation. For example, the protection of six endangered fish in the Bay-Delta Estuary intermittently limits imports from the Delta. Those sources represent more than 50% of the supply to the Local Region of Region of Interest, resulting in a Stress Level of High.

Management Response Levels

IEUA participates in development of the Upper SAR Watershed Habitat Conservation Plan (HCP) and Santa Ana River Conservation and Conjunctive Use Program (SARCCUP), both of which will reduce conflicts between water management and sensitive species in the SAR. Once these plans are in force, it appears that they would result in Leading Practice for both IEUA Operations and IEUA Collaboration.

At the Region of Interest scale in the import watersheds, many recovery plans and HCPs are being implemented, but often without sufficient funding or capacity to reverse species declines.

IEUA Operations

Advanced Progress (partial)

- Projects such as the SARCCUP and the Upper SAR HCP, which IEUA and its partners are now developing, will reduce harm to sensitive species when they are implemented.

IEUA Collaboration

Leading Practice

- IEUA collaborates regionally in the development of the Upper SAR Watershed HCP and the SARCCUP, contributing, for example, to Santa Ana sucker recovery efforts. IEUA has engaged with the Delta Stewardship Council to support development of the Delta Plan.

**Regional-Scale Actions****Advanced Progress (partial)**

- Throughout the Region of Interest, including the SAR and import watersheds, recovery plans and HCPs, whether completed or underway, address special status species that interact with water management operations. MWD is directly engaged in Delta species recovery, the Colorado River Multi-Species Conservation Program, and supports mitigation projects at its own initiative, such as the Battle Creek Salmon and Steelhead project.
- Implementation of plans and programs is not closely tied to the intended trajectories that are described in the plans and the recovery plans lack sustainable funding.

Recommendations

To reduce Stress Levels and improve the SWM Rating for this Stressor, IEUA should do the following:

- Continue to support Santa Ana sucker and sucker habitat recovery efforts through SAWPA, including the Santa Ana Sucker Conservation Team and the Upper SAR Valley HCP.
- Support water management strategies throughout the Region of Interest that reduce conflicts with special-status species, such as reducing demand, re-using water, acquiring and restoring land, increasing water use efficiency, and innovative inter-regional agreements on how water is to be managed.
- Engage and lead water supply and land use agencies to support state and federal agencies responsible for protection and recovery of special-status species to meet their timelines and mandates.
- Continue working with its SAR and Delta watershed partners to develop funding solutions that are not dependent on external grants to assure recovery mandates are met.

Scale: Region of Interest

Environment



Watershed Health

Stress Level: High

Metrics assessment findings:

- **Impervious surfaces:**³ While the mostly rural or undeveloped wider Region of Interest has primarily natural, pervious landscapes, the urbanized Local Region of Interest is almost entirely impervious, resulting in a Stress Level of High.
- **Freshwater-dependent wildlife:** Watersheds throughout the Region of Interest have multiple listed species of animals, such as fish and frogs that depend on healthy surface water ecosystems, resulting in a Stress Level of High.
- **Water quality impaired waterbodies:** Most waterbodies throughout the Region of Interest have water quality impairments, resulting in a Stress Level of High.

Management Response Levels

IEUA gets top marks for Watershed Health in the limited locations where it owns land. In the Local Region of Interest, while IEUA and its partners are doing exemplary work, the rating could be higher than Advanced Practice if IEUA and its partners could work with urban land use decision-makers to decrease effective impervious area over time and improve impaired waterways.

Regional-Scale Actions rate Moderate Progress because, in addition to the factors cited above, management plans that could improve watershed health cover only a small fraction of the Region of Interest, and agencies with authority to make improvements do not often intercede vigorously enough to produce sustainable conditions.

IEUA Operations

Leading Practice

- IEUA does an excellent job managing its own small natural areas and, as appropriate, using them to enhance public education and appreciation, as at the Chino Creek Wetlands and Educational Park.
- By working to reduce reliance on imported water, IEUA and its member agencies are gradually diminishing the impact of their operations on ecosystems at risk in the Bay-Delta and Colorado River watersheds.

³ Note that this single Stress Level metric in Watershed Health examines the Local Region of Interest rather than the full Region of Interest.

**IEUA Collaboration****Advanced Practice**

- IEUA actively supports many partnership efforts with entities that have authority to improve watershed health. SAWPA is the most integrative of these, covering the Santa Ana River watershed, in which IEUA operates. The SAWPA One Water, One Watershed (OWOW) plan, the Upper Santa Ana River Habitat Conservation Plan, and many other plans are collaborative and innovative. However, the plans collectively do not have ambitious enough targets or enough types of authority to reduce Stress Levels and achieve sustainably healthy watersheds.

**Regional-Scale Actions****Moderate**

- The many existing plans for recovering species, improving waterbody conditions, and managing development cannot be expected to reduce Stress Levels for a majority of the Region of Interest, which reaches into eight states. The plans, even collectively, cover too few species and too small an area and are insufficiently funded. Land use and natural resource agencies do not assert their authorities actively enough to produce widespread improvements.

Recommendations

To reduce Stress Levels and improve the SWM Rating for this Stressor, IEUA should do the following:

- Through broader collaboration, support decisions on the part of local water supply agencies, cities, and counties that advance the goals and mandates of state and federal wildlife and natural resource agencies, to reduce effective impervious area, enhance infiltration, and protect natural water features and related habitats. Such decisions span improved land use planning, transportation, recreation, water management, and climate change adaptation.
- Support the updating and use of watershed health tracking tools, such as the Santa Ana River Watershed Health Assessment.
- Through IEUA's individual actions and through its membership in multiple collaboratives, deepen support for wildlife and natural resources agencies—federal, California, and in other states—so that the goals and timelines in Basin Plans, species recovery plans, forest management plans, and other watershed improvement targets are met.
- Advocate for increased funding for species recovery and watershed protection, commensurate with the benefits gained in water supply reliability and economic and social well-being.

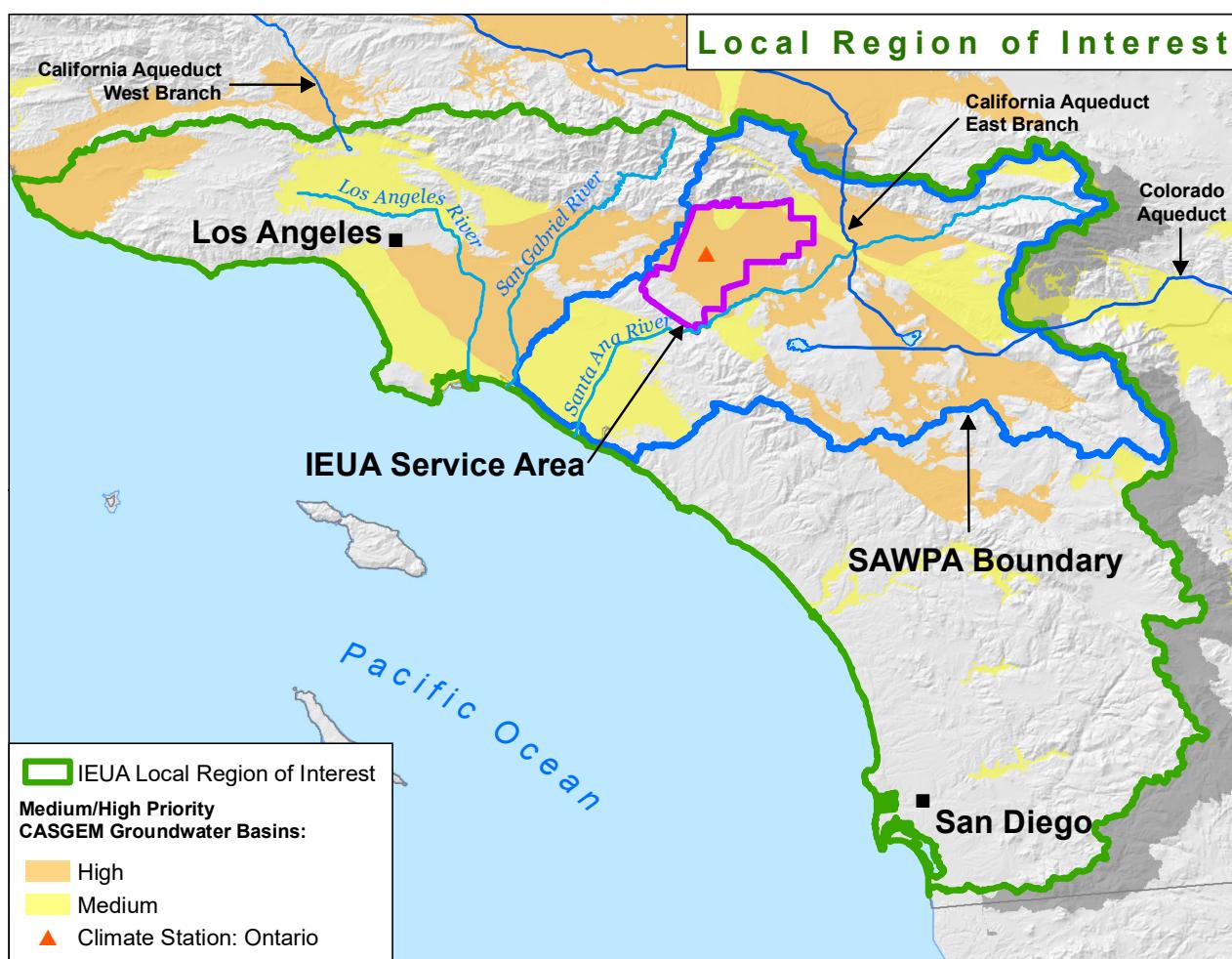
Supply and Demand Themes

Stressors:

- Supply Reliability
- Source Water Quality
- Groundwater Supply
- Urban Demand
- Agricultural Demand

Applicable Scale for these Stressors: Local Region of Interest

The Local Region of Interest includes the local watersheds and groundwater basins relied on by the Profile Subject, its customers, and its wholesaler supplier(s).



Source: Figure 2.

Supply

Scale: Local Region of Interest



Supply Reliability

Stress Level: High

Metrics assessment findings:

- **Source Vulnerability:** The Local Region of Interest relies on supplies a) from import watersheds with sensitive species that are impacted by supply operations b) groundwater basins designated by the state as “High Priority” (by DWR’s California Statewide Groundwater Monitoring Program, or CASGEM program) and c) are derived from sources with water quality issues which require blending or restrictions in its usability as a supply, resulting in a Stress Level of High.
- **Unplanned Cutbacks:** The State’s Emergency Order in May 2015 imposed mandatory cutbacks on many retail entities beyond reductions that were planned for in their drought contingency plans or regional shortage contingency plans, resulting in a Stress Level of High.
- **Future Supply:** Future additional supplies for IEUA and its member agencies, and its wholesale suppliers (MWD and San Bernardino Valley Municipal Water District) are projected to be obtained from sources with a high level of stress such as imports from the Delta or from sources that require transfers across the Delta, resulting in a Stress Level of High.

Management Response Levels

Leading Practice ratings in both Operations and Collaboration reflect a commitment over the past 15 years by IEUA and its member agencies to invest in collaboration to reduce stresses on the Local Region of Interest’s water supply. These investments have occurred through focused planning, projects, and policies to increase local supply with its recycled water and local runoff, improve groundwater quality, and integrate demand management into reliability planning with the goal to increase regional resiliency against droughts and climate change impacts, reduce dependence on imported water, and develop and implement programs for long-term water efficiency. IEUA can fully achieve Leading Practice for Supply Reliability in Operations and achieve supply resiliency by implementing Integrated Benefit-Cost analysis in Phase 2 of the IRP.

At the larger regional scale, MWD develops and finances region-wide integrated resource plans (IRPs), programs, and projects. These Regional-Scale Actions are commendable for the establishment of reliability goals and include elements of Leading Practice as MWD exercises its responsibility and authority to carry out programs to enhance imported and local supply reliability. The lack of quantitative analysis regarding climate change, future demand scenarios, and integrated benefit-cost evaluations in MWD’s IRPs results in a partially-completed Advanced Practice rating.

 IEUA Operations

Leading Practice (partial)

- IEUA recently assumed the responsibility of working with its member agencies and regional partners to develop its first Water Resources IRP, building upon 15 years of collaborative water resource planning and project implementation in its service area. The recently-completed Phase 1 analysis incorporates climate change into demand forecasts and recommends strategies to achieve supply reliability through optimal use of local resources and demand management to reduce dependence on imported supplies and achieve greater resilience in drought periods. The IRP strategies have been validated by evidence that storage was maintained in the Chino groundwater basin during a period of drought (2013-2016), while other groundwater basins in the region of interest exhibited declines.
- For the services and infrastructure it directly controls, IEUA develops policies and plans and implements projects to maximize use and recharge of recycled water.

 IEUA Collaboration

Leading Practice

- Beyond its immediate service area, IEUA actively engages in integrated regional water resources planning and management with a particular focus on the SAR watershed. Its membership in SAWPA and involvement in SAWPA's OWOW provides IEUA the opportunity to engage in watershed-wide multi-benefit and multi-agency management planning, and watershed-wide demand management and water use efficiency programs. Participation in SARCCUP will help achieve regional supply reliability through system-wide integration of local groundwater basins and their sources of supply.
- IEUA's IRP and participation in regional planning positions the region to pursue state and federal funding opportunities to optimally utilize local water resources, reduce dependence on imported water, and enhance watershed health.

 Regional-Scale Actions

Advanced Progress (partial)

- As the primary wholesale water supply agency in the Local Region of Interest, MWD uses its scope and authority to advance and finance region-wide integrated water supply and demand programs to help achieve regional-scale and member agency supply reliability. MWD's Local Resource Program investments in recycling and groundwater recovery facilitate implementation of projects at the retail level that replace an existing demand or prevent a new demand on imported water. MWD also invests in a broad portfolio of projects to maintain the reliability of imported supplies.

- MWD's initial IRP was adopted in 1996 with periodic updates through 2015, representing an early and significant and consistent investment in integrated planning.
- Although MWD's 2015 IRP acknowledges the significant challenge of climate change to regional supply reliability and builds upon the previous efforts towards comprehensive adaptation planning for climate change impacts, the IRP relies upon historic hydrology and does not incorporate a wide range of climate change or account for it by using a wide range of future supply and demand planning assumptions.

Recommendations

To reduce Stress Levels and improve the SWM Rating for this Stressor, IEUA should do the following:

- Incorporate Integrated Benefit-Cost Assessments in Phase 2 of IEUA's IRP, as is planned, to fully assess the broader benefits and costs of projects and management actions.
- To achieve its business plan goals for sustainability and resiliency in its service area, the SAR watershed and the larger Region of Interest, ensure that programs and projects that enhance regional supply reliability can continue, even if external funding opportunities—such as Federal and State grants—diminish.
- Continue its active engagement with MWD's IRP process to advocate for evaluation of a wider range of planning scenarios that incorporate future climates, shortfalls in SWP and CRA supplies, changes in development patterns, and more stringent water use targets.
- Continue to lead and support integrated efforts in its service area and the SAR watershed to engage with water supply and non-water entities to protect groundwater quality and quantity through stormwater management, optimizing reuse (including indirect and direct potable reuse), and being as efficient as possible in all uses.

Scale: Local Region of Interest

Supply



Source Water Quality

Stress Level: Moderate⁴

Metrics assessment findings:

- **Drinking water source water quality impairment:** Not available for assessment.⁵
- **Groundwater quality impairment:** For the groundwater basins included in the Scope of Analysis, there are some indications of water quality issues (e.g., high salinity), but not at a level that represents a significant issue for water supply within the Local Region of Interest, resulting in a Stress Level of Moderate. The assessment of non-significance is based primarily on the presence of assimilative capacity in most of the groundwater basins heavily relied on for water supply.

Management Response Levels

Within its operations, IEUA has a significant focus on source water quality management, both through its recycled water operations and that of the CDA. It invests heavily to achieve the goals outlined in the Chino Basin Optimum Basin Management Plan. It could achieve a full Leading Practice rating by developing Integrated Benefit-Cost Assessments of potential management activities under the plan to help prioritize projects and develop support for them. Much of the work carried out by IEUA on water quality occurs at the Collaboration level, through the CBWM, CDA, and SAWPA, and focusing on the Chino Basin and the SAR watershed. As a result of adopted water quality Advanced Plans being funded and implemented with IEUA support, IEUA achieves a Leading Practice Rating at the Collaboration level.

In contrast, Regional-Scale Actions in watersheds and groundwater basins throughout the Local Region of Interest generally lag, in that adequate funding streams do not appear to have been secured, though projects are being implemented and many Advanced Plans addressing source water quality exist.

⁴ A full assessment of the Stress Level metrics was not possible due to lack of available data; this is an estimate.

⁵ Assessment of this metric was not possible, due to lack of readily-available data for the Local Region of Interest. For the purpose of this pilot assessment, we have assumed that the result is "Moderate," equivalent to one reading of raw or untreated surface water sources relied on by Public Water Systems in the last five years that exceeded primary Maximum Contaminant Levels (MCLs).

 **IEUA Operations**
Leading Practice (partial)

- Both through its recycled water program and its participation in the CDA, IEUA is heavily engaged in water quality management, indirectly addressing source water quality protection and enhancement, particularly with regard to addressing salinity in the Chino groundwater basin.
- IEUA, working with the CBWM and through the creation and operation of the CDA, has been working to reduce contributions from low-quality groundwater in part of the Chino Basin that have been a source of water quality degradation in the Lower SAR. This effort has recently limited that contribution by successfully exerting hydraulic control through groundwater pumping.

 **IEUA Collaboration**
Leading Practice

- IEUA collaborates intensively with other agencies working on source water quality, including the CBWM, SAWPA, and the Santa Ana Regional Water Quality Control Board, as well as MWD.
- IEUA helped spearhead an initiative to address, and is committed to cleaning up, a trichloroethylene (TCE) contaminant plume within the Chino groundwater basin that poses a significant threat to drinking water, as called for in a settlement agreement and order issued in September, 2016 by the Santa Ana Regional Water Quality Control Board.

 **Regional-Scale Actions**
Advanced Progress (partial)

- The Regional Water Quality Control Plans (Basin Plans) are the primary source water quality protection plans. Integrated Benefit-Cost Assessment for the Basin Plans is lacking and progress towards achieving goals has been slower than needed to reach sustainable levels within the timeframe of a planning horizon.
- Through the requirements of the Sustainable Groundwater Management Act (SGMA) and the California Recycled Water Policy, improved planning and implementation for groundwater source water quality protection is anticipated in the future.

Recommendations

To reduce Stress Levels and improve the SWM Rating for this Stressor, IEUA should do the following:

- Invest broadly in the protection and enhancement of stormwater quality, through public education and engagement with cities to promote the use of green infrastructure and multi-benefit solutions.
- Work with MWD and other water purveyors to collaboratively identify ways to give Basin Plans greater support for implementation, with enhanced funding and application of broad, long-term benefit-cost analysis to prioritize identified management actions to achieve Basin Plan water quality goals, including reduced salinity and nitrate levels, as well as other toxic contaminants.
- Actively support MWD and the US Bureau of Reclamation in Reclamation's Colorado River Salinity Control Program to reduce the salinity of the Colorado River water to MWD's target level.

Supply

Scale: Local Region of Interest



Groundwater Supply

Stress Level: Moderate

Metric assessment findings:

- Declining water table:** Most CASGEM-designated Medium and High Priority groundwater basins in the Local Region of Interest, the limited scope of this assessment, are managed to a target elevation that is met as a long-term average. While this management approach appears to have been generally successful in stabilizing water levels over the last couple of decades in many basins within the Local Region of Interest, the continuing drought in California has broadly led to significant declines in water levels. Some basins have reached record lows, including basins within the Local Region of Interest. Thus, there is some potential that average annual extraction in excess of recharge is occurring, yielding the Moderate Stress score.

Management Response Levels

IEUA has done an exemplary job of engaging on groundwater supply management, particularly in the Chino Basin. While outside the realm of its direct responsibilities with regard to water supply, IEUA has collaborated broadly on this issue, investing significantly in supporting groundwater stores within the groundwater basins relied upon by its customers. Regional-Scale Actions have yielded some Advanced Plans for the Local Region of Interest, but not enough to achieve partial completion of the Advanced Progress criteria.



IEUA Operations

N/A⁶

IEUA Collaboration

Leading Practice

- IEUA is an exemplary regional player in terms of groundwater supply, helping to secure funding for and participating in multiple recharge and recycling efforts in the SAR watershed, as well as leading the recharge program within the Chino Basin, which underlies their service area. In a noteworthy achievement, the Chino Basin groundwater storage was maintained from 2013-2016 during a period of drought.
- IEUA is tremendously engaged as an active collaborator, extending its purview beyond its direct realm of responsibility, including its active role in the CDA, SAWPA, and the CBWM.

⁶ The SWM Profile addresses IEUA operations only with respect to activities related to their water supply functions. IEUA's water sales do not rely on groundwater as a source, and therefore the IEUA Operations evaluated do not include management of groundwater supply.

 **Regional-Scale Actions****Moderate Progress**

- Sustainable operation of groundwater basins is of paramount importance to the entire Local Region of Interest as a reliable, climate-resilient source of water supply, and recharge efforts and basin management is extremely well-developed in most of the area, especially as many basins are adjudicated. Despite regional investment in groundwater recovery projects and recycled water recharge, local groundwater production has decreased due to water quality constraints on production.
- While many groundwater supply planning documents have been developed within the Local Region of Interest, they do not include most groundwater basins providing the majority of the groundwater supply, and many do not include quantitative sustainability targets against which progress can be measured.
- A significant regional-scale action known as the SARCCUP is in the process of being implemented by the five SAWPA member agencies (IEUA, Orange County Water District, San Bernardino Valley Municipal Water District, Western Municipal Water District, and Eastern Municipal Water District) with SAWPA's assistance. SARCCUP is a large conjunctive use project, which in its first phase will develop interconnections and 180,000 AF of groundwater storage in the Santa Ana River Watershed within four different groundwater basins.

Recommendations

To reduce Stress Levels and improve the SWM Rating for this Stressor, IEUA should do the following:

- Given reduced availability of imported water supplies for recharge, continue to prioritize increased investment in stormwater capture and water recycling for recharge and other potable offsets to maintain groundwater storage levels.
- Actively support protection of recharge areas through identification and acquisition and/or land use controls as a means to support groundwater supply sustainability.
- Develop sustainability goals for adjudicated groundwater basins and then manage towards their attainment, as is being required for non-adjudicated basins under the Sustainable Groundwater Management Act (SGMA).
- Continue to encourage support for implementation of SARCCUP as a means to support maintenance of groundwater storage levels in the affected groundwater basins.

Demand

Scale: Local Region of Interest



Urban Demand

Stress Level: High

Metrics assessment findings:

- **Residential indoor water use:** For the Local Region of Interest, residential indoor water use in the 2015-2016 water years, during which conservation was mandated, was just below the 55 gallons-per-capita threshold for the High Stress Level, resulting in a Moderate Stress Level.
- **Outdoor water use:** Prior to recent mandatory reductions, outdoor water use in the Local Region of Interest was about 50% of total demand, and was greater than 60% in the IEUA service area, resulting in a High Stress Level.
- **Future water demand:** Water demand in 20 years is expected to increase more than 20% in both the IEUA Service Area and the Local Region of Interest based upon projections in IRPs and Urban Water Management Plans (UWMPs), resulting in a High Stress Level. Recent data indicates that increase may be overstated, but still could be greater than the 10% threshold indicating a High Stress Level.

Management Response Levels

Leading Practice ratings for both Operations and Collaboration reflect leadership by IEUA and its member agencies in support of long-term water use efficiency within and beyond their service areas, as well as IEUA's commitment to integrate demand management in planning for long-term supply resiliency and sustainability.

At the broader Regional-Scale Actions level, MWD works with its member agencies to incentivize increased water use efficiency and to integrate demand management into its supply portfolio. Regional-Scale Actions received only a partially-completed Advanced Practice rating because MWD's demand management plans and forecasts had not yet incorporated climate change impacts; changes in landscape and building standards, development patterns, and water use; and benefit-cost analysis of the demand management programs.



IEUA Operations

Leading Practice (partial)

- IEUA has assumed planning and financial responsibility for water use efficiency and conservation programs to incentivize and leverage the actions by its member agencies and their customers. IEUA and its member agencies have committed to exceed legislatively required per capita water use goals.

- With IEUA support, member agencies are able to meet mandates to reduce total water use, are reducing demand below IRP projections, and are on track to exceed the 2009 legislative requirements (SB X7-7) to reduce per capita water use (20% by 2020).



IEUA Collaboration

Leading Practice

- In addition to its Regional Water Use Efficiency Plan and IRP, IEUA actively engages and supports regional demand management planning and implementation efforts beyond its service area, particularly in the Santa Ana River watershed through SAWPA's OWOW and the greater Southern California region through MWD.
- IEUA is collaborating with SAWPA and its member agencies to develop tools and promote water budget-based use targets and conservation rate structures.
- In 2006, IEUA with its regional partners developed the Inland Empire Landscape Alliance (IELA) to help retailers and cities develop implementable landscape ordinances consistent with California's Model Water Efficient Landscape Ordinance (MWELO) and promote landscape water use efficiency.



Regional-Scale Actions

Advanced Progress (partial)

- SAWPA and the California Data Collaborative provide foundational data and analytical support for developing water budget-based rate structures in the SAR watershed.
- MWD has assumed the responsibility and authority to develop and assist in the implementation of region-wide demand management programs. MWD's SoCal Water\$mart provides rebates to its member agency customers; member agencies benefit from MWD paying for the majority of the incentive dollars as well as its administration.
- MWD's 2015 IRP update includes conservation targets as an essential part of the actions needed to achieve regional reliability goals. However, it does not use climate change scenarios in the demand forecasts or incorporate an Integrated Benefit-Cost assessment.

Recommendations

To reduce Stress Levels and improve the SWM Rating for this Stressor, IEUA should do the following:

- Continue providing data and technological support for development of budget-based rate structures that incentivize reduced water use and improved water efficiency while providing revenue stability for retail agencies.
- Undertake Integrated Benefit-Cost Assessments of demand management measures identified in IEUA's IRP and Water Use Efficiency Business Plan, building upon the existing cost-effectiveness analysis.
- Invigorate existing partnerships such as the IEUA Landscape Alliance, and develop new ones with cities, land use entities, water quality regulators, the development community, and non-profits, to effectively implement a wider range of multi-benefit demand management programs.
- Increase the engagement with land use entities and other non-water supply entities to further assist retail agencies in the SAR watershed to implement programs and achieve their water demand targets.
- Continue working with MWD to update its demand forecasts to take into account recent changes in standards, water use targets, and demand by member agencies as well as supporting use of Integrated Benefit-Cost Assessments to help prioritize and build support for multi-benefit actions that address demand management goals.

Demand



Agricultural Demand

The agricultural demand in the Local Region of Interest and in the IEUA service area was not evaluated for the purpose of the IEUA pilot application of the SWM Profile since it was below the evaluation threshold of 10% of the total demand in the Local Region of Interest.

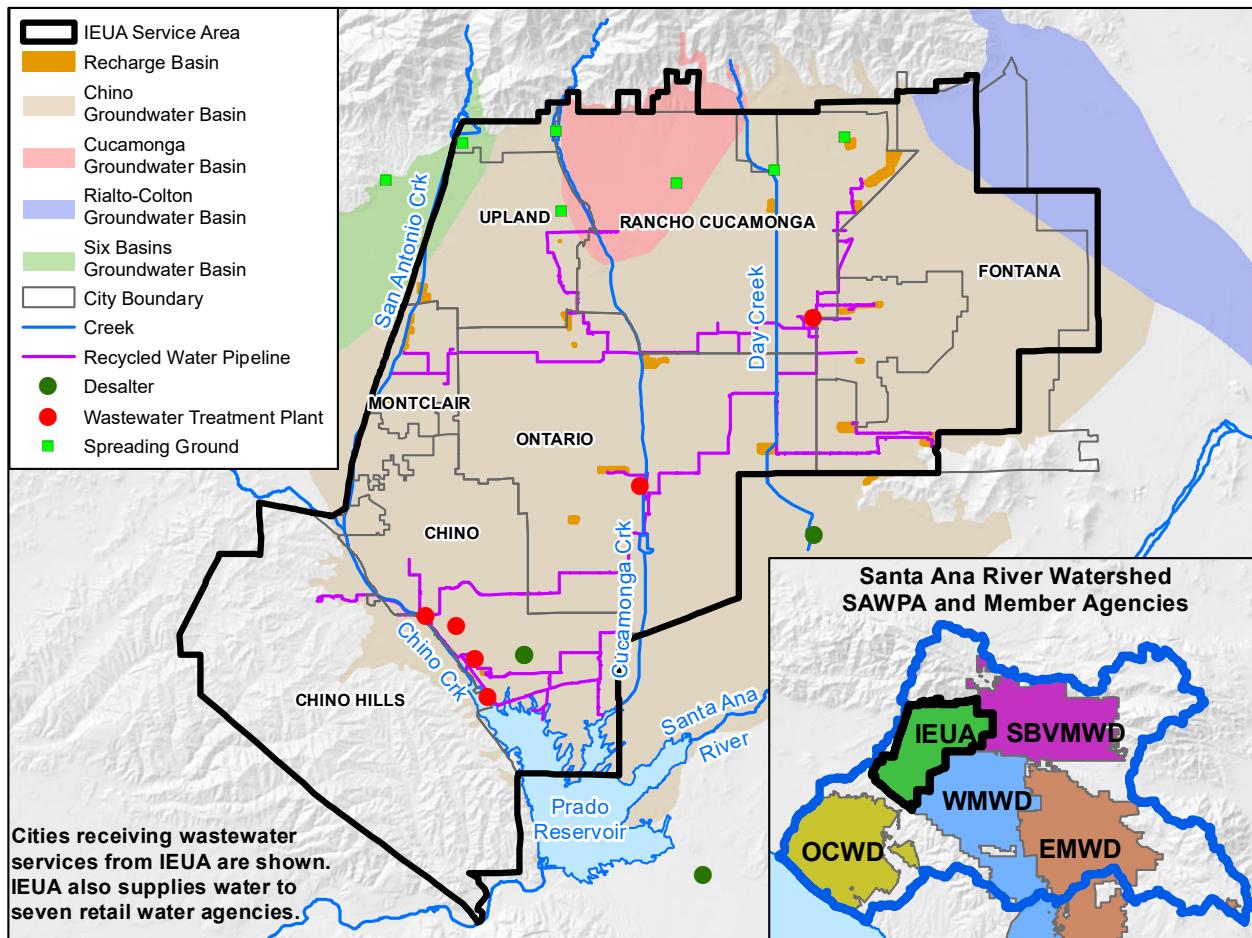
Finance Theme

Stressor:

- Finance and Investment

Applicable Scale for these Stressors: IEUA

The IEUA scale extends only to the jurisdictional limits of IEUA.



Source: Figure 3.



Finance and Investment

Stress Level: Low⁷

Metrics assessment findings:

- **Days of Working Capital:** IEUA's working capital balance over the last five years has averaged just shy of nine months, indicating that IEUA is well-positioned financially to absorb unexpected declines in revenue or increases in cost over the near term, resulting in a Stress Level of Low.
- **Debt Coverage Ratio:** IEUA's debt coverage ratio has averaged 2.04 over the last 10 years, well above the criteria established by rating agencies for water and sewer enterprises to assess creditworthiness, resulting in a Stress Level of Low.
- **System Renewal/Replacement Rate:** IEUA's renewal/reinvestment rate on its facilities and pump stations is better than the industry median, while the rate on its distribution pipe networks is below the median, resulting in a Stress Level of Low. The recycled water distribution pipe network is very new, with an average age of four years, which explains the relatively low rate of renewal/reinvestment.

Management Response Level

IEUA's commendable Leading Practice rating on Finance and Investment for both its Operations and Collaboration is driven by its strong commitment to communicating financial information to management and staff, board members, member agencies, investors, and the public through a series of regularly updated reports, including the Annual Budget, Long-Range Plan of Finance, Ten Year Capital Improvement Plan, Asset Management Plan, and Facilities Master Plan. IEUA regularly holds workshops with Board of Directors, member agencies, and its regional partners, providing an opportunity for stakeholder input throughout the rate and budget development process.

⁷ This stressor evaluates only IEUA activities and its engagement and collaboration with entities outside of its service area. The stress level assessment is based only upon financial data obtained from IEUA. The data for the metrics developed for this Stressor is not readily available from other entities in the region and/or would be time and cost-prohibitive to obtain.

**IEUA Operations****Leading Practice**

- IEUA has in place robust financial policies and asset management practices that guide its operations and capital programs and ensure fiscal transparency.
- IEUA's Ten-Year Capital Improvement Plan and Asset Management Plan employ lifecycle cost analysis of assets and strive to optimize infrastructure rehabilitation and replacement in order to maintain system reliability and cost control.

**IEUA Collaboration****Leading Practice**

- IEUA engages others in the region to develop regional funding strategies for the implementation of integrated regional water projects such as SARCCUP, a project of the SAWPA member agencies. It has in place several Joint Power Authority (JPA) agreements to manage regional assets, including the CDA.
- IEUA acts as a grant and loan hub for the region and supports regional projects and partners through grant and loan contract management. Between 2000 and 2015, IEUA helped the region secure over \$250 million in federal and state grants and loans to support development of water supply infrastructure.

**Regional-Scale Actions****N/A⁸****Recommendations**

To reduce Stress Levels and improve the SWM Rating for this Stressor, IEUA should do the following:

- Continue providing leadership in securing regional funding and promoting financial transparency.

⁸ This Stressor includes only IEUA activities, as this data is sensitive, not generally available, and is time- and cost-prohibitive to obtain.

Recommended Sustainability Strategies

IEUA has demonstrated leadership and support for the planning, implementation and collaboration required to build a sustainable water management future—for their member agencies, partners, and the people who share dependence on common water supplies. Their efforts to provide recycled water and promulgate water use efficiency measures have been essential to stabilize and increase local groundwater supplies and meet water quality objectives. Beyond the SAR watershed, through engagement with MWD and others, IEUA collaborates to share responsibility and accountability for regional supply reliability and watershed health and resilience. These ongoing efforts need to expand across the Region of Interest to confront vulnerabilities to water supply caused by population growth, climate change, decreased reliability of imports, and drought, and to reverse ongoing harm to water-dependent species and habitats. Therefore, IEUA and its regional partners need to expand their network of influence to achieve sustainable water management.

In addition to Stressor-specific recommendations to IEUA provided on the preceding pages, below are broader recommendations to IEUA and other regional actors drawn from the SWM Profile assessment. These strategies provide pathways to lower stress, and move IEUA and its Region of Interest closer to sustainable water management.

Broaden Collaborations

Building on the many collaborative activities in the Local Region of Interest, we recommend deeper sharing of responsibility for sustainable water management. In particular, participation by land-use authorities and stormwater managers can make water supply and watershed collaboratives more effective, a lesson being learned through both voluntary and regulated partnerships in the SAR watershed, such as the MS4 permitting process in Orange, Riverside, and San Bernardino counties. Pooling resources and developing shared knowledge and consistent policies among land use authorities, stormwater agencies, state and federal agencies, developers, and other private interests will drive greater integration and therefore opportunities to leverage multi-benefit solutions. IEUA and its partners should actively support programs, incentives, and requirements for new and existing development (e.g., low impact development, “green infrastructure”), to protect and enhance surface watersheds and groundwater storage.

Align Authorities and Funding

By broadening participation as encouraged above, collaboratives can access more diverse authorities and funding, bringing to bear a complete set of policy, regulatory, and financial tools to meet water challenges. In particular, developing financial models to support capture and use of stormwater, in partnership throughout the Local Region of Interest, can provide new funding opportunities.

Fragmented authority and funding impedes progress toward sustainable water management. Multiple entities with similar mandates should consider combining into associations, if not into fewer entities.

State and federal agencies, along with public and private land conservancies, who operate from mandates related to fisheries, forests, water quality, stream flows, and species recovery, need to more actively assert their authorities and deploy available funding so that local actions related to land use, water supply, and demand are aligned with their mandates to restore species and watersheds.

Assess Benefits and Costs Comprehensively

Although many existing plans analyze cost-effectiveness, they do not assess comprehensive benefit-cost tradeoffs that could support greater investment in sustainable water management. IEUA should pursue its intent to conduct integrated benefit-cost assessments that examine outcomes beyond the marginal costs of water supply: energy, water quality, recreation, health, and local economy analyses. IEUA can then promote these types of assessments for other entities to emulate, in order to build public support, stimulate collaborative programs and projects, and provide access to additional funding.

Improve Information Sharing and Reporting

Developing best practices for sharing and managing public data, and greater investment in data clearinghouse initiatives such as the California Data Collaborative (supported by IEUA, SAWPA, and MWD) are needed to address continuing challenges with coordination, integration, analysis, and reporting of quality-controlled water management data with State agencies, regional collaborators, member agencies, and self-supplied users. These efforts will provide more useful information that will improve decision making and streamline sustainability assessments.

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Sustainable Water Management Profile

The Water Foundation is a non-profit philanthropy that strives to improve the long-term availability of clean, safe water for cities, farms and the environment. As an advocate for better water policies and management, the Water Foundation invests in a sustainable, resilient future for the American West.

The Sustainable Water Management Profile is a tool for advancing long-term water supply resilience and water resource stewardship at a regional scale. The Profile provides standards for assessing water supply vulnerability to key stressors, and for evaluating the responses of water supply agencies to those stressors.



<http://waterfdn.org>