



AGENDA

SPECIAL JOINT WORKSHOP OF THE INLAND EMPIRE UTILITIES AGENCY BOARD OF DIRECTORS AND THE REGIONAL POLICY COMMITTEE

**WEDNESDAY, AUGUST 5, 2015
10:00 A.M.**

**INLAND EMPIRE UTILITIES AGENCY*
AGENCY HEADQUARTERS
6075 KIMBALL AVENUE, BUILDING A
CHINO, CALIFORNIA 91708**

CALL TO ORDER OF THE JOINT INLAND EMPIRE UTILITIES AGENCY BOARD OF DIRECTORS AND REGIONAL POLICY COMMITTEE MEETING

FLAG SALUTE

PUBLIC COMMENT

Members of the public may address the Board on any item that is within the jurisdiction of the Board; however, no action may be taken on any item not appearing on the agenda unless the action is otherwise authorized by Subdivision (b) of Section 54954.2 of the Government Code. Those persons wishing to address the Board on any matter, whether or not it appears on the agenda, are requested to complete and submit to the Board Secretary a "Request to Speak" form which are available on the table in the Board Room. Comments will be limited to five minutes per speaker. Thank you.

ADDITIONS TO THE AGENDA

In accordance with Section 54954.2 of the Government Code (Brown Act), additions to the agenda require two-thirds vote of the legislative body, or, if less than two-thirds of the members are present, a unanimous vote of those members present, that there is a need to take immediate action and that the need for action came to the attention of the local agency subsequent to the agenda being posted.

1. WORKSHOP

A. INTEGRATED WATER RESOURCES PLAN (IRP)

2. **ADJOURN**

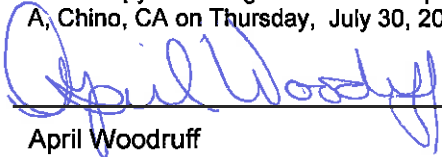
*A Municipal Water District

In compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting, please contact the Board Secretary (909) 993-1736, 48 hours prior to the scheduled meeting so that the Agency can make reasonable arrangements.

Declaration of Posting

Proofed by: _____

I, April Woodruff, Board Secretary of the Inland Empire Utilities Agency*, A Municipal Water District, hereby certify that a copy of this agenda has been posted by 5:30 p.m. at the Agency's main office, 6075 Kimball Avenue, Building A, Chino, CA on Thursday, July 30, 2015.

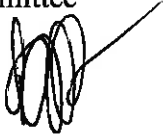



April Woodruff




Date: August 5, 2015

To: The Honorable Board of Directors and
Regional Policy Committee

From: P. Joseph Grindstaff 
General Manager

Submitted by: Chris Berch 
Executive Manager of Engineering/Assistant General Manager

Sylvie Lee 
Manager of Planning and Environmental Resources

Subject: Integrated Water Resources Plan

RECOMMENDATION

This is an information item on the Integrated Water Resources Plan (IRP), which is used for regional water resources planning.

BACKGROUND

The intent is to finalize the following overarching IRP goals:

Resilience: Provide regional water management flexibility to adapt to climate change, economic growth and any changes that limit, reduce or make water supplies unavailable.

Water Efficiency: Meet or exceed rules and regulations for reasonable water use.

Sustainability: Provide environmental benefits, including energy efficiency, reduced greenhouse gas emissions and improved water quality.

Cost-Effective: Supply regional water in a cost effective manner by maximizing outside funding.

PRIOR BOARD ACTION

None.

IMPACT ON BUDGET

None.

Integrated Water Resources Plan

"Thinking in terms of tomorrow"



Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Integrated Water Resources Plan Update

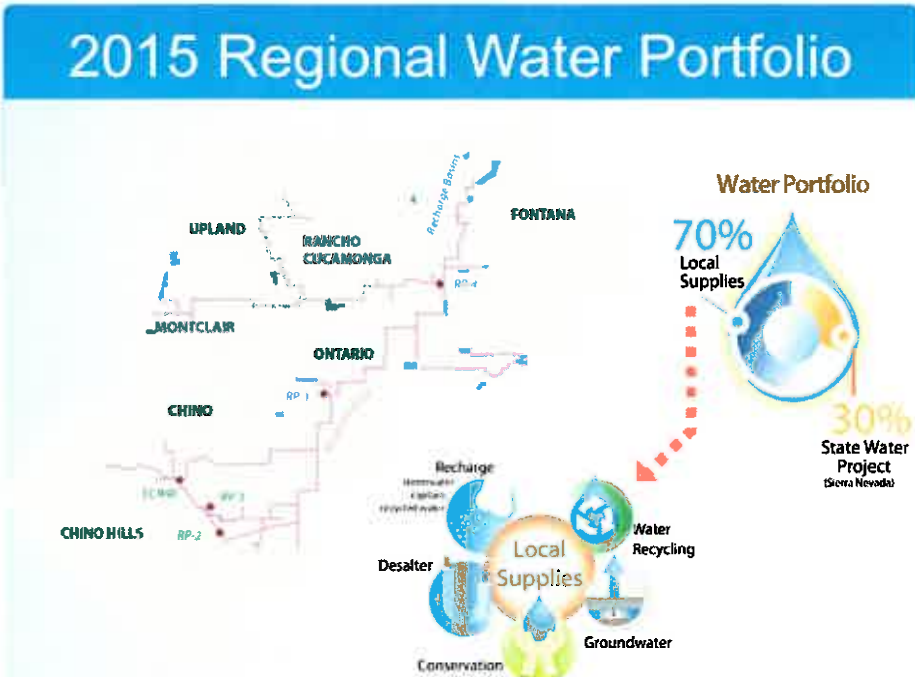
"Thinking in terms of tomorrow"



 **Inland Empire Utilities Agency**
A MUNICIPAL WATER DISTRICT

August 5, 2015

2015 Regional Water Portfolio



Water Portfolio

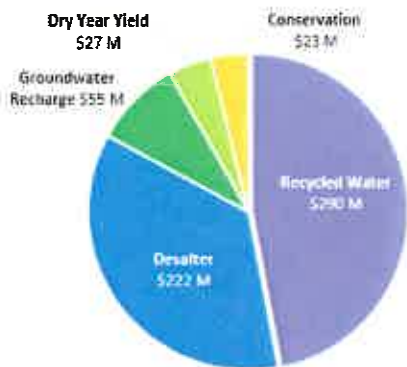
- 70% Local Supplies
- 30% State Water Project (Sierra Nevada)

Local Supplies components:

- Recharge: Hemet and various recycled water
- Water Recycling
- Groundwater
- Conservation Programs
- Desalter

Map locations: UPLAND, RANCHO CUCAMONGA, FONTANA, MONTCLAIR, ONTARIO, CHINO, CHINO HILLS, RP-1, RP-2, RP-3, RP-4, Recharge Basin.

Regional Accomplishments in the Chino Basin since 2000



Regional investment: \$617 M
Grants received: \$258 M
Increased local water by 80,000 acre-feet per year (AFY)
Reduced dependence on water from Bay-Delta

What are the Challenges the Region is Facing?

Governor's Executive Order

Issued: April 1, 2015

Exceptional Drought Covers 44.3%

Abnormally Dry
Moderate Drought
Severe Drought
Extreme Drought
Exceptional Drought

Water Resources Control Agency
A MEMORIAL TO STATE CREATIVITY

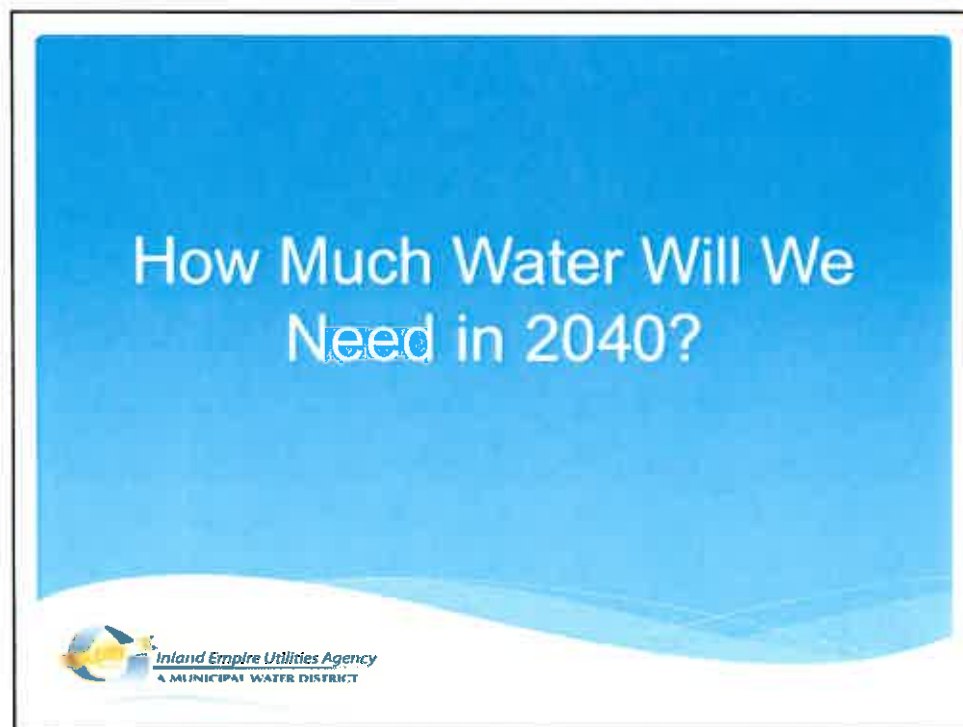
... we are standing on dry grass where there should be five feet of snow. This historic drought demands unprecedented action."

Following the lowest snowpack ever recorded and with no end to the drought in sight, Governor Brown issued an Executive Order mandating substantial water reductions across the state of California.

Snow Survey Results

March 2014

Water Resources Control Agency
A MEMORIAL TO STATE CREATIVITY







Shrinking Indoor Usage

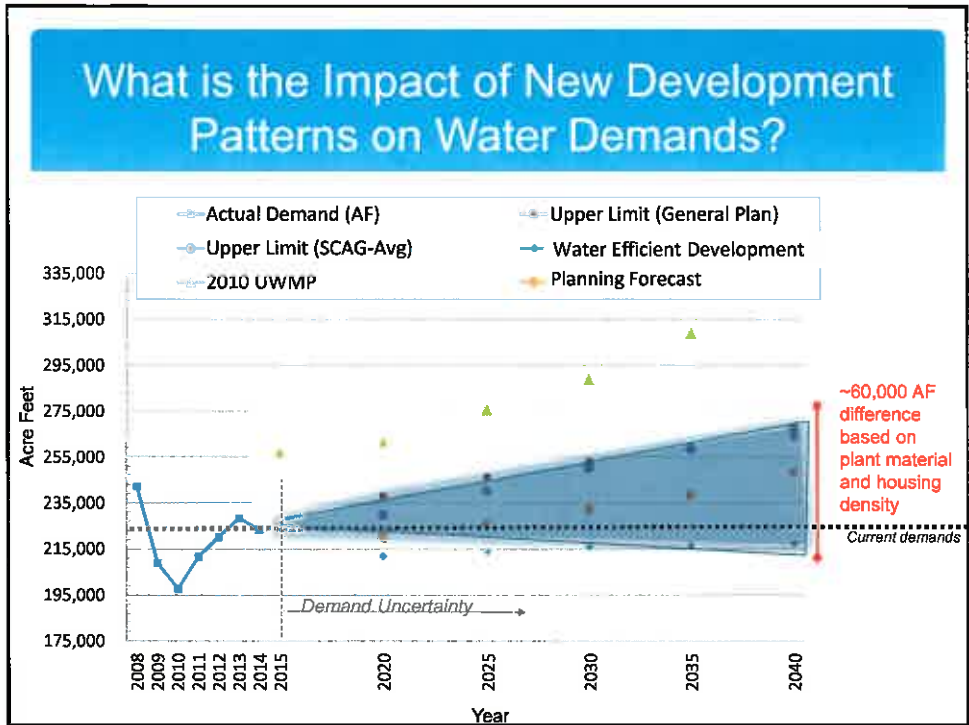
<p>Historical: 70 gpcd indoor</p> <p>3 ½ Gallons</p> 	<p>Current: 55 gpcd indoor</p> <p>128 GALLONS PER FLUSH</p> 	<p>Future: 20-35 gpcd indoor</p> <p>< 1 Gallon</p> 
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 Inland Empire Utilities Agency
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Shrinking Outdoor Usage

<p>Historical: High water use plants (100% plant factor)</p> 	<p>Current: Moderate water use plants (80- 70% plant factor)</p> 	<p>Future: Low water use plants (50% or less plant factor)</p> 
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How to Meet Future Demands?

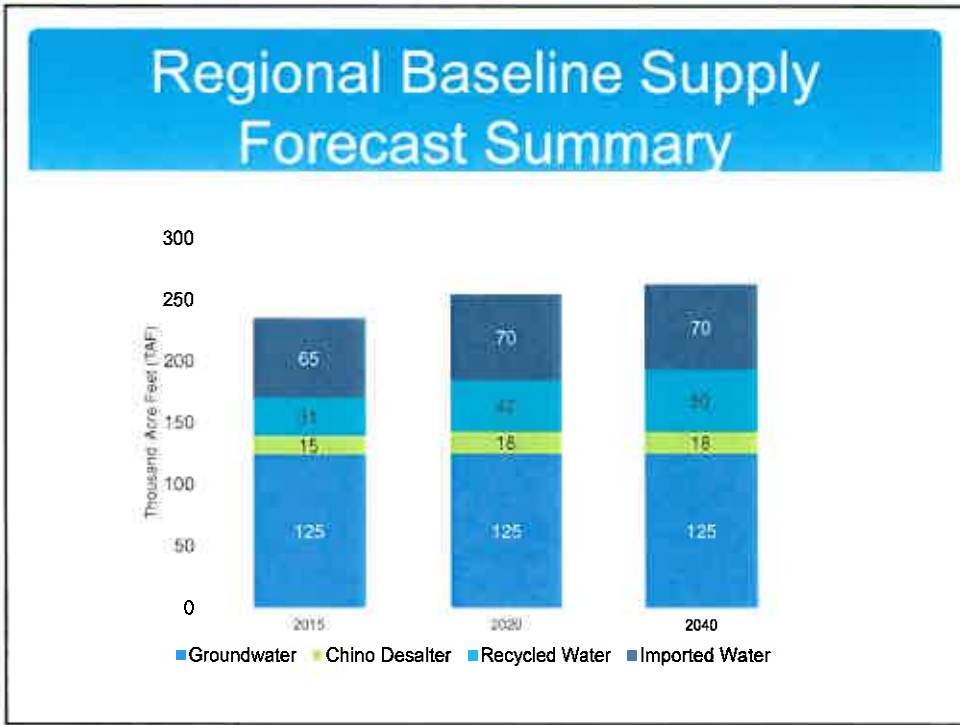
New Supplies

- Conjunctive use
- Recycled water & surface water
- Imported water supplies
- Interties
- Water transfers
- Injection and water banking

Maximize Current Supplies

- Demand management:
 - sustainable water use allocations
 - technology based information systems
- Increased conservation programming:
 - pressure regulation devices
 - leak detection
 - efficient landscape programs

Sanjour Group
 a subsidiary of the MWH Group



How Can We Build on Past Investments to Prepare for the Future?

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Integrated Water Resources Plan

Purpose:

To evaluate the resiliency of the IEUA service area's water supply over the next 25 years and evaluate different options for ensuring successful sustainable management and reliability of the region's water resources.

Deliverable:

Recommended regional strategy and identification of conceptual level priority projects to be implemented in 5 year increments.



Overarching IRP Goals

Resilience. Water Efficiency. Sustainability. Cost Effectiveness.

Resilience

- Provide regional water management flexibility to adapt to climate change, economic growth, and any changes that limit, reduce, or make water supplies unavailable.



Overarching IRP Goals

Resilience. Water Efficiency. Sustainability. Cost Effectiveness.

Water Efficiency

- Meet or exceed rules and regulations for reasonable water use.



Overarching IRP Goals

Resilience. Water Efficiency. Sustainability. Cost Effectiveness.

Sustainability:

- Provide environmental benefits, including energy efficiency, reduced green house gas emissions and water quality improvements.

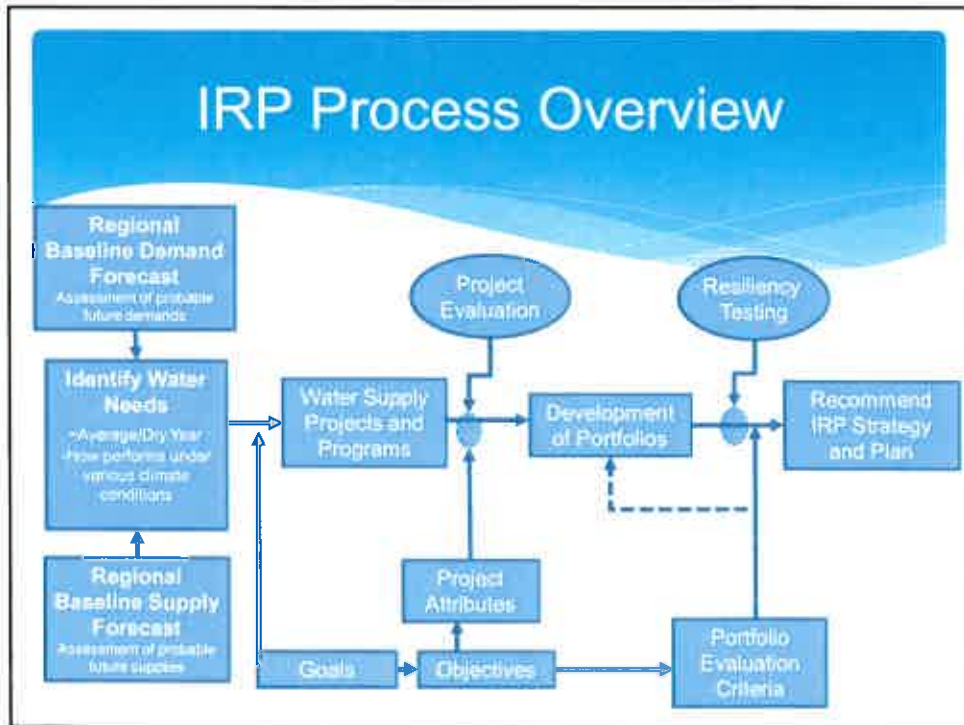


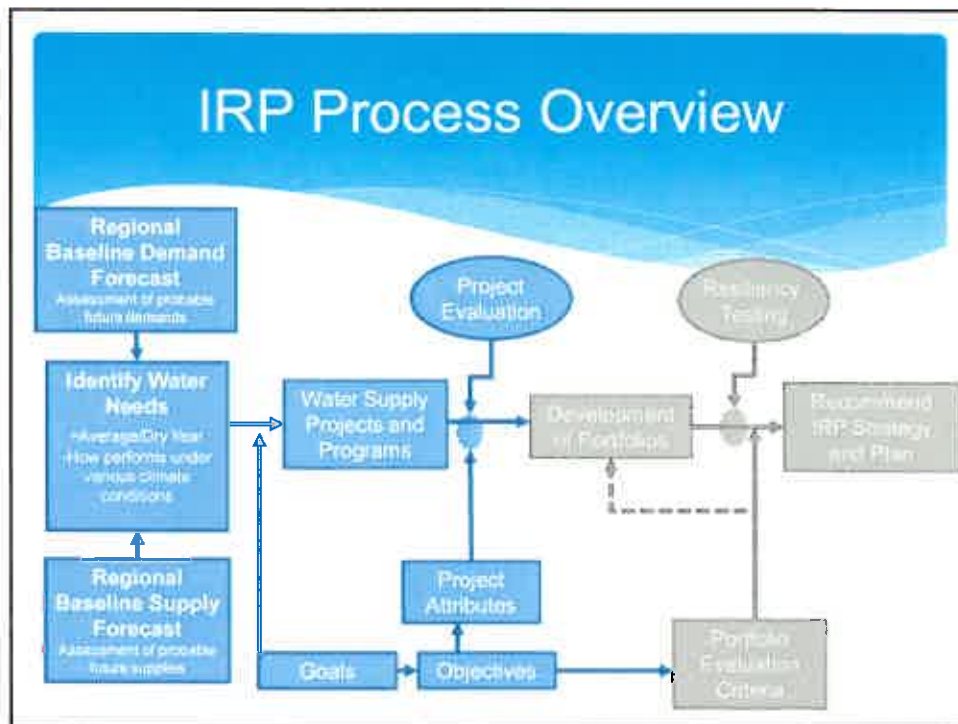
Overarching IRP Goals

Resilience. Water Efficiency. Sustainability. Cost Effectiveness.

Cost-Effectiveness:

- Supply regional water in a cost effective manner by maximizing outside funding.



Timeline

June	July-August	September-November
<ul style="list-style-type: none"> ✓ Demand forecast ✓ Baseline supplies ✓ Establish overarching IRP goals ✓ Identify key objectives and ranking criteria 	<ul style="list-style-type: none"> ✓ Identify supply projects ✓ Projects screened against ranking criteria □ Each member agency will develop a regional project portfolio □ RAND Corporation will conduct stress testing of climate change impacts on baseline supplies 	<ul style="list-style-type: none"> □ RAND will perform stress testing of regional portfolios □ Analyze regional portfolios to identify key tradeoffs among the portfolios □ Identify projects and management strategies to 2040 in five year increments □ Identify adaptive management/project triggers □ Present draft IRP

Overarching IRP Goals

Resilience:

- Regional water management flexibility to adapt to climate change and economic growth, and any changes that limit, reduce, or make water supplies unavailable.

Water Efficiency:

- Meet or exceed rules and regulations for reasonable water use.

Sustainability:

- Provide environmental benefits, including energy efficiency, reduced green house gas emissions, and water quality improvements.

Cost-Effectiveness:

- Supply regional water in a cost effective manner by maximizing outside funding.



Discussion



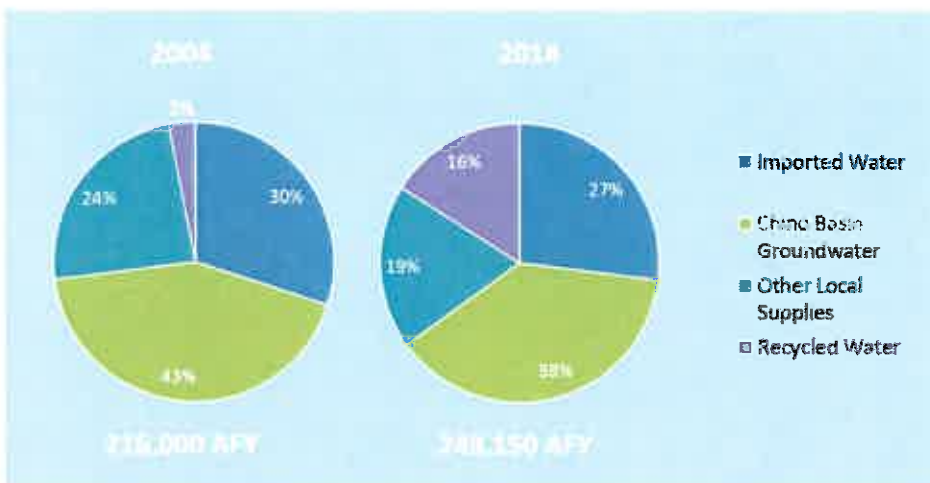
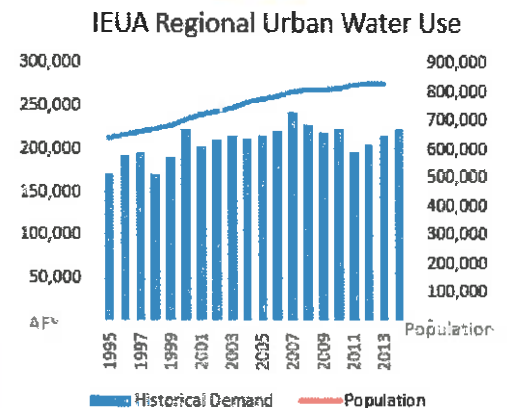
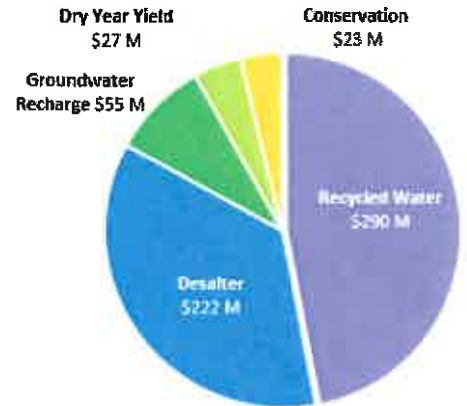
INTEGRATED WATER RESOURCES PLAN FACT SHEET



Inland Empire Utilities Agency (IEUA) is committed to investing in our regional water supply for today and tomorrow through fiscal responsibility, efficient business practices, water supply management, and environmental stewardship.

Regional Accomplishments in the Chino Basin since 2000:

- Regional investments of over \$617 million in recycled water, groundwater recharge, brackish groundwater desalination, conservation, and dry year yield/conjunctive use programs, with over \$258 million funded through grants.
- This funding has enabled the region to develop a resilient water supply, be better prepared for drought conditions, and support economic growth without increasing reliance on uncertain imported water sources, including the Bay-Delta.
- Increased local sources of water by over 80,000 acre-feet per year (AFY)*.
- Regional water use efficiency and conservation programs have kept the demands flat as the population has increased.



*An acre-foot can serve the water needs of two average-sized families for one year.

As we move forward, it is important to continue to manage the water portfolio regionally to provide resilient, efficient and sustainable local water supplies that are cost effective.

The IRP will serve as the program document used to complete environmental documents and serve as a basis for grant proposals.

Future Water Supplies

Water supply management challenges include the availability of Bay-Delta water supplies, meeting reasonable use goals and the uncertainties of climate change. The **Integrated Water Resources Plan (IRP)** is a strategic roadmap to meet regional needs for the next quarter of a century. **The goals of the IRP are:**

Resilience: Provide regional water management flexibility to adapt to climate change, economic growth and any changes that limit, reduce or make water supplies unavailable.

Water Efficiency: Meet and exceed rules and regulations for reasonable water use.

Sustainability: Provide environmental benefits, including energy efficiency, reduced greenhouse gas emissions and improved water quality.

Cost-Effectiveness: Supply regional water in a cost effective manner by maximizing outside funding.

A **major benefit of the IRP** is that it will position the region to secure grants and low-interest loans, including **hundreds of millions** in funding from Proposition 1. IRP projects will complement member agency projects, including water storage, stormwater capture and additional recycled water use.

The **recommended regional strategy** will result in an adaptive IRP that:

1. Recognizes uncertain future risks and opportunities for the region.
2. Identifies conditions that indicate when additional investments are needed.
3. Defines investments that can be deferred and implemented if

June	July—August	September—November
<ul style="list-style-type: none"> ✓ Demand forecast 	<ul style="list-style-type: none"> ✓ Identify supply projects 	<ul style="list-style-type: none"> <input type="checkbox"/> RAND will perform stress testing of regional portfolios
<ul style="list-style-type: none"> ✓ Baseline supplies 	<ul style="list-style-type: none"> ✓ Projects screened against ranking criteria 	<ul style="list-style-type: none"> <input type="checkbox"/> Analyze regional portfolios to identify key tradeoffs among the portfolios
<ul style="list-style-type: none"> ✓ Establish overarching IRP goals 	<ul style="list-style-type: none"> <input type="checkbox"/> Each member agency will develop a regional project portfolio 	<ul style="list-style-type: none"> <input type="checkbox"/> Identify projects and management strategies in five year increments to 2040
<ul style="list-style-type: none"> ✓ Identify key objectives and ranking criteria 	<ul style="list-style-type: none"> <input type="checkbox"/> RAND Corporation will conduct stress testing of climate change impacts on baseline supplies 	<ul style="list-style-type: none"> <input type="checkbox"/> Identify adaptive management/ project triggers <input type="checkbox"/> Present draft IRP

2015 Integrated Resources Plan (IRP)

Urban Water Demand Forecast Model

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Introduction

With so much concern about current shortfalls in supply, and predictions of long-term drought, it is imperative to develop and craft a comprehensive water resource plan. The Agency's Integrated Resources Plan (IRP) is our Region's blueprint for ensuring reliable, cost-effective, and environmentally responsible water supply for the next twenty-five years. It takes into consideration available and alternative supplies, demand forecasts, climate change and conservation.

The primary purpose of the IRP is to identify and recommend solutions to Regional urban water needs. The guiding principle of this IRP is to plan for a deeply uncertain future and develop a robust strategy that can adapt and respond to a wide range of possible futures. Past water resource investments and current planning efforts will be integrated in a focused, holistic manner to develop an implementation strategy that will secure short and long-term water supplies for the Region. The IRP will integrate projects from the Recycled Water Program Strategy, Wastewater Facilities Master Plan (WWFMP), Recharge Master Plan Update and the Water Use Efficiency Business Plan.

IRP Components

The IRP is based on two key components: 1) demand projections, and 2) supply options to meet demands. This memo describes how regional demand projections were developed. Once the demand projections have been characterized, current supplies and future supply options will be examined and tested under a wide range of future scenarios.

Executive Summary

The future of water demand has at least as much uncertainty as the future of water supply. Regional planning cannot predict a single, stationary future; therefore we must embrace an anticipatory approach to demand planning and management. Recognizing that land use data has the largest influence in urban demand, it is desirable to accommodate current trends for future needs, but we must also consider recent development shifts to "Smart Growth" communities that tend to have higher density units and lower overall water use. Acknowledging and planning for this potential change will allow the Region to implement only the improvements needed to accommodate growth and have a "No Regrets" approach to water resource management.

Therefore, the recommendation for the 2015 IRP is to select a range, or envelope, of demand projections that fall between the City General Plans and the Southern California Association of Governments Regional Transportation Plan land use data. Based upon this recommendation, the urban water demand forecast for the 2015 IRP out to the year 2040 is presented in Table 1. Further validation will be needed to determine if the recommended urban water demand forecast presented below can be refined to narrow in on the forecast envelope. The Agency will be seeking feedback from the Region to determine the outlook on changes in land use from the currently adopted City General Plans. Further discussion on this topic will be conducted at the June 9th IRP Technical Workshop meeting.

Table 1: 2015 IRP Urban Water Demand Forecast in Acre-Foot per Year

Planning Year	2020	2025	2030	2035	2040
Demand (Lower Limit – High Shift to "Smart Growth" Development)	212,000	214,000	216,000	217,000	218,000
Demand (Upper Limit – Traditional Lot Layouts)	230,000	245,000	250,000	260,000	267,000
2010 Urban Water Management Plan	262,000	275,000	289,000	310,000	332,000

Demand Forecast Model

Retail municipal and industrial (M&I) demands represent the full spectrum of urban water use within the service area, including residential, commercial, institutional and industrial uses. Within the water industry, there are numerous approaches for projecting M&I water demands. These include per capita methods, trend extrapolation and econometric models. Each of these approaches has benefits and limitations.

Methodology

The foundation of the demand forecast is an econometric model that normalizes the demand to account for individual, each factor that has a potential to influence water demand. A complete list of variables included in the demand forecast model is provided in Appendix A. The basic framework of the demand model is similar in nature to the model used by the Metropolitan Water District of Southern California. This memorandum summarizes the various demand influences and the corresponding factors incorporated into the 2015 IRP demand projections. The econometric model was selected due to its ability to capture and present water demand variability caused by shifts in development patterns, climate change and socioeconomics, such as:

- Larger or smaller lots, or a shift in more sustainable building footprints, such as higher density units and reduces landscape areas
- Mild or severe climate change, and
- Fast or slow growth of socioeconomics and influences of strong and weak economies

The model aggregates water demand from the Agency's entire service area into a regional demand forecast. The regional demand number is then disaggregated by the following sectors: Single-Family, Multi-Family, Non-Residential and Other. The model does not have the ability at this time to disaggregate demands by City. This will be evaluated and further explored at a later time.

Planning Period

The IRP has a planning horizon out to the year 2040. The demand forecast model will provide a twenty-five year urban water demand projection for the Region. The model will encompass a range of Regional demand forecast scenarios, governed by criteria incorporated from Regional growth projections and City General Plan land use data. Five-year incremental planning periods were established at 2020, 2025, 2030, 2035, and 2040 to allow for the planning and prioritization of new water resources projects and programs.

Study Area and Boundaries

The Agency's 242 square mile service area in western San Bernardino County was used as the urban water demand area boundary. The Agency's service area includes the cities of Chino, Chino Hills, Fontana, Montclair, Ontario, Rancho Cucamonga, and Upland, as well as some unincorporated portions of San Bernardino County.

Historical Water Use

The majority of the water demand within the Agency's service area since the 1990's has been for urban uses. The remaining water has been used for agricultural purposes. The 2010 Urban Water Management Plan (UWMP), which was prepared by the Agency and based on projected water supply demands by their member agencies, showed approximately 90 percent of the water demand for urban

use and 10 percent for agriculture. The 2010 UWMP estimated approximately 255,000 Acre-Foot per Year (AFY) in total urban demand by the year 2015. However, actual demands have grown more slowly, increasing by 19,000 AF over the past four years from approximately 200,000 AFY in FY2009-10 to 219,000 AFY in FY13/14. This is due in part due to delayed growth as a result of the economic recession, as well as plumbing code changes, water use efficiency programs, and responses to current water supply challenges such as the drought that California has been experiencing since 2012.

The Agency's recent 2014 WWFMP flow monitoring confirmed that urban usage patterns have shifted as a result of more efficient devices such as low flow toilets and plumbing code improvements. The WWFMP flow monitoring showed a regional indoor flow average of 55 gallons per capita per day (GPCD) indoor, with new developments in the region dropping as low as 37 GPCD. This structural change in water use means that future development will not be as water intensive as in the past, potentially reducing the overall regional need for additional water supply. This shift also has significant implications for future wastewater and recycled water planning. Regional treatment plants may not need to be expanded for hydraulic capacity as quickly as previously thought (saving regional capital), but future available recycled water supplies will be lower than projected.

Outdoor water use has the largest potential for additional water savings in the Region. As part of the demand projection, A&N Technical Services conducted a study to estimate the amount of indoor versus outdoor usage in the Agency's service area. Its study, which was based on the city of Ontario, found that outdoor irrigation accounts for approximately 60 percent of total urban demand.

Socioeconomics

These factors are those related to human behavior and culture. This includes size and age of families, income, and cultural factors, such as quality of life and housing preferences such as size, lot size, density and location. Socioeconomics is defined as economic activity that affects and shapes how societies progress, stagnate, or regress because of their local or regional economy. This is a critical component to water demand forecasting to allow planning agencies the ability to predict and better adapt to changing conditions.

To understand the future of water demand, it is necessary to understand current and past demand and the factors affecting them. With a focus on revenue projections, infrastructure capacity planning, and how demand can be quickly reduced during drought and over the long term, a demand model needs the ability to bring these into a common framework. Below is a summary of the socioeconomic factors incorporated into the water demand forecast model. These will be used to adjust the water use factors applied to the growth projections.

- Marginal Water Price
- Median Household Income
- Household size in persons per household
- Housing density for single and multi-family units

The following section describes the various socioeconomic factors incorporated into the 2015 IRP demand forecast model.

Economic Cycle

The economy is also susceptible to change and it is likely to continue to change between strong and weak market conditions. During weak market conditions, family budgets may be reduced, lower

production of goods produced by industry and less discretionary spending leads to reduced water use. During the calibration process, for the purpose of quantifying trends in historical water use, we were able to determine and isolate the impact of the economy on demand. During the period of 2003 through 2014, the effect of the economy had the potential to change water use by 7 percent either direction, pending market conditions. For the purpose of the 2015 IRP demand forecast model, it is assumed that the market conditions remain normal and no adjustment will be made to the demand forecast model. Only under sensitivity evaluation will weak and strong market conditions be evaluated.

Household Size

Average household size remained relatively stable during the 1990s, but began increasing rapidly in the late 1990s according to Department of Finance statistics. Based on the Southern California Association of Governments (SCAG) growth projections, average household size is projected to decline about one percent, from 2015 to 2040. Table 2 summarizes household size in persons per unit for both single and multifamily residential included in the 2015 IRP demand forecast model.

Table 2: Household Size

Year	Household Size in Persons per Household			
	2015	2020	2030	2040
Single Family	3.58	3.52	3.55	3.54
Multifamily	2.87	2.80	2.82	2.81

Land Development and Communities

In the last decade, a relatively new type of housing development has emerged with higher housing densities. This is a national as well as a regional trend. These “Smart Growth” or “New Urbanist” developments feature medium to large single family homes, usually built to the limit on small lots. Also known as “zero-lot-line” housing, landscape irrigation use in these types of homes is limited by available space compared with more traditional lot layouts. It is reasonable to assume that the higher density caused by these trends will lead to lower water use per housing unit because of the reduced and limited space made available for landscaping.

For comparison purposes and to help anticipate a range of uncertain futures, Tables 3 and 4 summarizes the following sources of land use data and ranges of housing density incorporated into the demand forecast model. Land use data was sourced from the City General Plans, Metropolitan Water District 2010 MAIN model (MWD-MAIN) and Regional growth plans such as SCAG’s 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (2012 RTP/SCS).

Table 3: Single family housing density variability

Data Source	Low (Units per Acre)	Average (Units per Acre)	High (Units per Acre)
General Plans	1.2	2.7	4.2
2012 RTP/SCS	2.3	3.7	5.4
2010 MWD_MAIN	3.2	3.2	3.2

Table 4: Multi-family housing density variability

Data Source	Low (Units per Acre)	Average (Units per Acre)	High (Units per Acre)
General Plans	9.7	13.5	17.3
2012 RTP/SCS	8.4	13.5	17.0
2010 MWD_MAIN	10.9	10.9	10.9

Land use data was found to be the variable that will have the largest influence on future demand projections. When comparing the results of the 2015 IRP demand forecast, utilizing the City General Plan data, to the forecast presented in the 2010 Urban Water Management Plan, there is a difference in total urban demand in the year 2040 by approximately 65,000 Acre-Foot (AF). This is only exacerbated when compared to the higher housing density values submitted in recent General Plan EIR amendments received by the Agency and SCAG’s 2012 Sustainable Communities Strategy. For example, when compared to the High density presented in Table 3 and 4, there is a difference in total urban demand in the year 2040 by approximately 110,000 AF.

Weather and Climate Change

Weather has a large impact on the amount of water that customers need. Under hotter and drier conditions, water use increases at the same time that supplies may be constrained. With climate change, this trend is likely to be exacerbated in the near future. In fact, climatologists have changed the way they view drought in years past, as a temporary setback, and now recognize ongoing higher temperatures and longer drought conditions may be the “new normal” for California.

A study conducted by scientists at Stanford University entitled “Anthropogenic Warming Has Increased Drought Risk in California” has linked climate change with “more frequent occurrences of high temperatures and low precipitation that will lead to increased severe drought conditions.” In addition, over the past two decades, droughts have occurred more frequently than in the previous century, with 14 droughts occurring between 1896 and 1994, and six occurring between 1995 and 2014.

To account for weather-induced change, the model was expanded in two ways. First, the demand forecast model included an adjustment for long term climate change based on the NOAA Technical Report NESDIS 142-5: Regional Climate Trends and Scenarios for U.S. National Climate Assessment. The report stated that increased atmospheric emissions have the potential to increase water use by as much as 4.3 percent, and second, the model also included an adjustment to account for changes in demand due to temperature and precipitation. During the period between 2003 and 2014, weather had the potential to increase urban demand up to 6.0 percent during dry conditions.

As a result of these outlooks on future climate conditions and recent weather trends, it is recommended that the 2015 IRP demand forecast model include water demand adjustments to account for hotter and drier weather that potentially lead to increased and prolonged drought conditions. Table 5 and 6 summarizes the climate and weather factors incorporated into the demand forecast projections shown in Figure A and presented in Table 1 above.

Table 5: Climate effect on Water Demand

By Year	Increase in Temp. (F)	Effect on Water Demand	Probability
2040	3.6 degrees	+4.3%	80 th percentile

Table 6: Weather effect on Water Demand

Weather Condition	Effect on Water Demand
Multiple Dry Year	+5.98%

Customer Response and Water Use Behavior

Since 2012, Southern California has been challenged by prolonged drought conditions; this has led to increased public water awareness that has created a change in water use behavior, ultimately leading to greater water stewardship practices. Change in behavior was quantified during model calibration and was directly linked to a reduction in urban water demand, thus, resulting in a further decline of approximately 4.6 percent beyond traditional demand reduction events, such as drought, recession, and conservation. For this reason, embedded behavioral lifestyle changes can be recognized as attributing to the establishment of a “new norm” resulting from changes in actual water use.

As a result of these findings, it is recommended that the demand forecast model include factors that account for changes in water use behavior. For the purpose of the 2015 IRP demand forecast model, it is assumed that change in water use behavior will continue into the future and will reduce demand by 4.6 percent through the year 2040.

Conservation and Water Use Efficiency

Conservation and water use efficiency (WUE) includes both passive and active savings. Passive conservation generates a reduction in demand resulting from natural replacement of devices by consumers as a result of building plumbing codes and ordinances. Active conservation includes reductions in demand directly related from Agency administered programs that stimulate consumer participation through rebates. This includes direct installation programs that contract services for turf removal and the installation of high efficiency indoor and outdoor water conservation devices. Table 7 summarizes the current level of active and passive savings already achieved by the service area.

Table 7: Estimated level of conservation and water use efficiency achieved

Savings Type	Savings (Acre-Foot per Year)
Active	5,700
Passive	<u>1,650</u>
Total Water Savings	7,350

The water savings realized through conservation and WUE will be considered as an offset to future demands. Therefore, similar to the supply options, each additional measure above what the Region is able to currently achieve has an expense associated with the implementation of that activity and must be evaluated in a similar fashion. For the purpose of the demand forecast model, it is assumed that the current level of savings achieved through conservation and WUE programs already in-place will extend and continue to augment future demands through the year 2040. The current projected level of baseline conservation and WUE is 7,350 AFY and has been incorporated into the 2015 IRP demand forecast model.

Demographics and Growth Projections

In the single family and multifamily sectors, water use per unit factors are combined with the forecasts of the number of households to yield projections of the retail water demand. Similarly, in the commercial, institutional and industrial (CII) sectors, water use per employee is combined with projections of employment to yield projections of retail CII water demand. The socioeconomic variables were derived from both local and regional planning agencies such as City General Plans, MWD-MAIN and SCAG growth projections. Table 8 depicts the key relationships between the demand sector and the corresponding variables, or demand influencing factors.

Table 8: Demand Drivers and Socioeconomics

Demand Sector	Growth Forecast Variable	Socioeconomic and Other Demand Influencing Factors
Single Family Residential	Number of Single Family Households	Climate Household Size Income Price Conservation Housing Density
Multifamily Residential Number of Multifamily Households	Number of Multi Family Households	Climate Household Size Income Price Conservation Housing Density
Commercial, Industrial, Institutional (CII)	Total Urban Employment	Climate Price Conservation Industrial /Service Emp. Share

Regional and Local Growth Forecasts

City General Plans and SCAG’s regional growth forecasts are the key variables underlying the 2015 IRP demand forecast model. Projected totals of single family households, multifamily households, and employment are critical “driver” variables because they represent the overall level of regional growth. Household size, density, and other socioeconomic parameters affect the water use factors that are applied to the driver variable to determine variability in long term demand forecasting.

SCAG’s 2012 RTP/SCS was adopted in April 2012; the plan underwent an extensive local review and incorporated zoning information from City and County General Plans. The 2012 RTP/SCS was used to extend the demographic projections to the year 2040 for the Agency’s service area. Demographic projections referenced from the 2012 RTP/SCS for the Agency’s Service Area include:

- Population
- Occupied single and multi-family housing units, and
- Employment by Sector

Regional growth forecasts for the demographics listed above are summarized in Table 9 below.

Table 9: Regional Growth Forecasts

	2015	2020	2030	2040
Population	856,168	896,533	1,009,349	1,125,203
Occupied Single Family	166,570	175,119	192,225	212,993
Occupied Multi Family	80,214	87,775	103,320	116,795
Total Employment	350,461	375,653	462,518	527,521

Regional Urban Water Demand Forecast

The future of water demand has at least as much uncertainty as the future of water supply. Regional planning cannot predict a single, stationary future; therefore we must embrace an anticipatory approach to demand planning and management to accommodate for a deeply uncertain future. By embracing an anticipatory approach to demand planning, the Region will have the ability to evaluate and identify monitoring criteria used to trigger when an adaptive strategy is needed to accommodate for changed conditions. Recognizing that land use data has the largest influence in urban demand, it is desirable to accommodate current trends for future needs, but also only implement those improvements needed to have a “No Regrets” approach to water resource management.

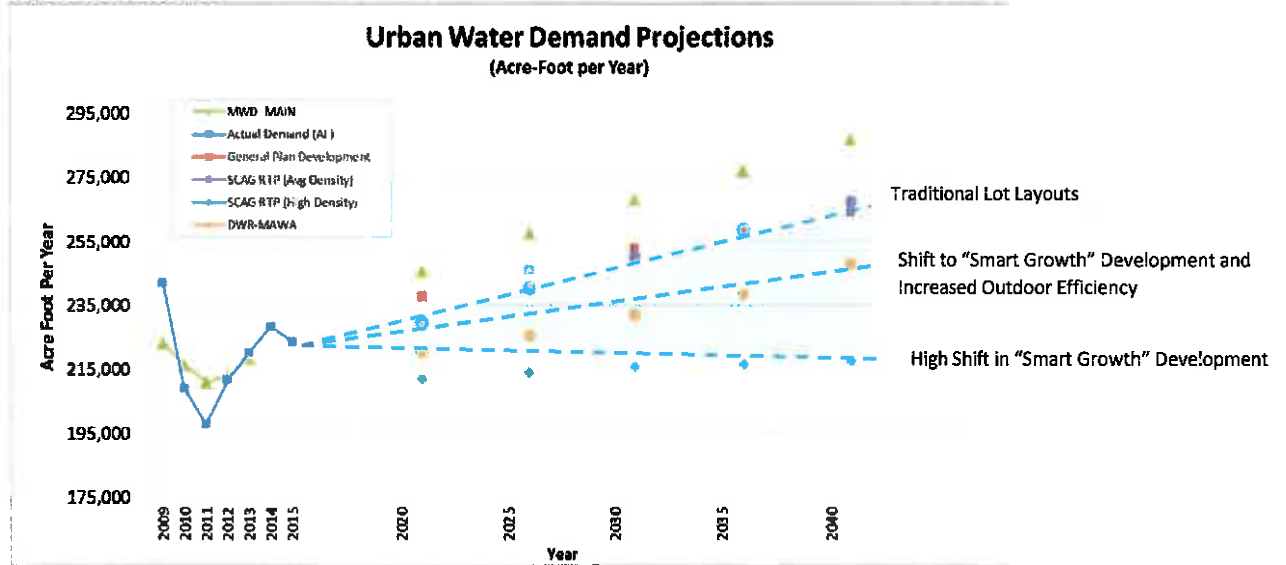
The recommendation for the 2015 IRP is to select a range, or envelope, of demand projections that fall between the current City General Plans and the High housing density projections included in the SCAG 2012 RTP/SCS. Figure A presents the urban water demand forecast envelope, in blue highlight, recommended for the Region’s 2015 IRP.

Further validation will be needed to determine if the recommended urban water demand forecast presented below can be refined to narrow in on the forecast envelope. The Agency will be seeking feedback from the Region to determine the outlook on changes in land use data from the currently adopted City General Plans. Further discussion on this topic will be presented at the June 9th IRP Technical Workshop meeting.

For example, Agency staff cross referenced the recommended future demand envelope and compared it to the Department of Water Resources State Model Water Efficiency Landscape Ordinance, depicted in the orange forecast called DWR_MAWA, presented in Figure A. Efficient and reasonable use factors included in this check were as follows. These factors are considered within range of the potential changes for increasing water efficiency standards pursuant to the Governor’s Executive Order B-29-15.

- Existing outdoor use limited to 70 percent of relative evapotranspiration (ET_o),
- Future outdoor use limited to 60 percent of ET_o, and
- Indoor use reduced from 55 GPCD in 2015 to 35 GPCD by year 2040 for new development

Figure A: Regional Urban Water Demand Forecast



References

Source: "Anthropogenic warming has increased drought risk in California" Noah S. Diffenbaugh, Daniel L. Swain, and Danielle Touma. Proceedings of the National Academy of Sciences of the United States of America. Vol 112 no. 13, 3931-3936. Published online March 2, 2015.

Source: "Planning for Demand Uncertainty in Integrated Water Resources Management" Ray Quay. American Water Works Association. Vol 102:2. Published February 2015.

Source: "Integrated Water Resources Plan, 2010 Update". Report No. 1373. Metropolitan Water District of Southern California. October 2010.

Source: "Inferring Indoor and Outdoor water end use in the IEUA Service Area". David Pekelney and Thomas Chesnutt. A&N Technical Services, Inc. January 21, 2014.

Source: "Statistical Analysis of Short Term IEUA Demand: Empirical Estimates of Demand Trends". David Pekelney and Thomas Chesnutt. A&N Technical Services, Inc. January 8, 2014.

Source: "Review of Metropolitan's Current Retail M&I Demand Model". David Pekelney and Thomas Chesnutt. A&N Technical Services, Inc. October 7, 2013.

Source: "Wastewater Flow Projections for Inland Empire Utilities Agency - Technical Memorandum" Alison Hill, RMC Water and Environment. December 31, 2013.

Source: "2013: Regional Climate Trends and Scenarios for the U.S. National Climate Assessment. Part 5. Climate of the Southwest U.S" . Kunkel, K.E, L.E. Stevens, S.E. Stevens, L. Sun, E. Janssen, D. Wuebbles, K.T. Redmond, and J.G. Dobson, , NOAA Technical Report NESDIS 142-5, 79 pp.

Source: "Regional Transportation Plan (RTP) Sustainable Communities Strategy" Southern California Association of Governments. Adopted April 2012.

Appendix A – Forecast Demand Model Variables

Variable	Reference
Population (total population, household population, single family, multi-family residential)	Southern California Association of Governments 2012 Regional Transportation Plan, Cal State Fullerton Center for Demographic Research
Household size (single family, multi-family residential)	MWD-MAIN model (2010)
Housing density (single family, multi-family residential)	MWD-MAIN model (2010); Southern California Association of Governments 2012 Regional Transportation Plan; General Plans from the Cities of Chino, Chino Hills, Upland, Fontana, Montclair, Rancho Cucamonga, and Ontario
Median household income	MWD-MAIN model (2010)
Employment by Sector	Southern California Association of Governments 2012 Regional Transportation Plan, Cal State Fullerton Center for Demographic Research
Marginal water price	MWD-MAIN model (2010)
Active and passive conservation	AWE Model
Drought persistence	Historical Data (FY03 through FY14) per short term TM v11
Economic Cycle	Historical Data (FY03 through FY14) per short term TM v11
Short-term weather	Historical Data (FY03 through FY14) per short term TM v11
Sustainable communities mix	Southern California Association of Governments 2012 Regional Transportation Plan—Sustainable Communities Strategy Report
Housing density	Southern California Association of Governments 2012 Regional Transportation Plan; General Plans from the Cities of Chino, Chino Hills, Upland, Fontana, Montclair, Rancho Cucamonga, and Ontario
Median household income	MWD-MAIN model (2010)
Long-term climate change	NOAA National Climate Assessment of Southwest, Part5v10
Budget based rates	IEUA AWE Model
Water use efficiency (demand management and conservation)	Water Use Efficiency Business Plan 2015 Update and AWE Model

Baseline Demand Influences

Table 1 summarizes the demand influences that were incorporated into the corresponding baseline demand forecast. The following sections define each level of influence, or adjustment that was applied to the normalized demand forecast.

Table 1: Baseline demand influences incorporated within each demand forecast

	Baseline Demand Influences					
	Economic Cycle	Household Income	Housing Density	Weather	Climate Change	Customer Response
Upper Forecast	Baseline	Baseline	City General Plan	Multiple Dry	High	Permanent
Lower Forecast	Baseline	Baseline	SCAG	Dry	Baseline	Permanent
Planning Forecast	NA	NA	DWR	NA	NA	NA

Notes: NA = Not Applicable

Economic Cycle

Ability to specify how strong and weak market conditions impact demand. The effect from market conditions was defined from historical demand data through the normalizing process.

- **Weak** – implies weak market conditions and demand is reduced by 6.55%.
- **Baseline** – implies that demand will not change and market conditions will remain normal/average.
- **Strong** – implies strong market conditions and demand will increase by 6.55%

Median Household Income

Ability to incorporate potential changes in demand related to household income. The following alternatives were based on the following assumptions.

- **Low** – median household income growth is below the baseline rate and reduces over time at minus 1% percent per year. Implies that demand will potentially be reduced.
- **Baseline**— median household income trends at the predicted rate per the 2012 SCAG RTP/SCS. Implies that demand will not change and will remain normal/average.
- **High** – median household income growth increases faster than the baseline rate and increases at plus 1% percent per year. Implies that demand will potentially be increased.

Housing Density

Ability to adjust the water use factor applied to each occupied housing unit based upon the expected density of future development. The density values below are aggregated regional values for the Agency's service area. In general, higher housing densification tends to have lower water use per unit caused by reduced landscape areas and more stringent water use efficiency standards.

- **City General Plan** – incorporates housing density reflective of the 2014 City General Plans.
 - Single family residential density range 1.2 – 4.2 units per acre
 - Multi-family residential density range 9.7 – 17.3 units per acre
- **Baseline** – implies that future residential development resembles past/traditional dwelling units per land area.
- **SCAG** - incorporates housing density reflective of the 2012 S. California Association of Governments Regional Transportation Plan/Sustainable Communities Strategy (2012 SCAG RTP/SCS).
 - Single family residential density range 2.3 – 5.4 units per acre
 - Multi-family residential density range 8.4 – 17.0 units per acre
- **DWR** – does not incorporate housing density, assumed a modified version of the current DWR State Model Water Efficient Landscape Ordinance. Assumed the following efficiency standards:
 - 70% relative evapotranspiration (Eto) for existing landscapes
 - 60% relative Eto for new landscapes
 - Indoor water use for future development of 55 gallons per capita day (GPCD) in 2015 to 35 GPCD by 2040.
 - Number of occupied housing units per SCAG RTP/SCS
 - Assumed 62% of total demand for residential use

Weather

Ability to specify how weather conditions impact demand from below and above average/normal conditions. The effect of weather variation was defined from historical demand data through the normalizing process.

- **Wet** – implies that demand will be decreased by 3.74% due to below normal temperature and increased wet periods.
- **Baseline** - implies that demand will not change and weather will remain normal/average conditions.
- **Dry** – implies that demand will increase by 3.74% due to above normal temperature and reduced wet periods.
- **Multiple Dry** – implies that demand will increase by 5.98% due to extended periods of above normal temperature and reduced wet periods.

Climate Change

Long term climate change is modeled by using recent Global Climate Change model predictions of potential increases in temperature and corresponding impact to demands. The Regional Climate Trends and Scenarios from the Southwest U.S. were referenced from the National Oceanic and Atmospheric Administration (NOAA) Technical Report NESDIS 142-5. (<http://scenarios.globalchange.gov/report/regional-climate-trends-and-scenarios-us-nationalclimate-assessment-part-5-climate-southwest>)

- **Baseline** - implies that demand will not change and climate will remain at normal/average conditions.
- **Median** (50th percentile) – implies that expected temperature will increase by 2.7 degree Fahrenheit due to climate change. This would increase demands by 3.2% by 2040.
- **High** (80th percentile) – implies that expected temperature will increase by 3.6 degree Fahrenheit due to climate change. This would increase demands by 4.3% by 2040.

Customer Response and Water Use Behavior

Defines how much of recent demand reductions will persist into the future that is permanent. The effect from recent customer response and water use behavior was defined from historical demand data through the normalizing process.

- **Baseline** – implies that demand will not change and everything will return to the normal, or bounce back to normal/average conditions.
- **Permanent** – implies that the 4.6% recent reduction is a permanent lifestyle change and continues to 2040.

Baseline Demand Comparison: Normalized vs. Adjusted

Figure A presents the Upper, Lower and Planning Forecasts under Baseline assumptions, therefore all demand influences are assumed to be normal or under average conditions, except for housing density. Housing density remained as indicated in Table 1. Figure B presents the same demand forecasts with the demand influences indicated in Table 1. As shown, there is a slight difference in the forecast envelope when you compare Figure A to B. The common attribute between the two Figures is housing density; therefore as shown, the other demand influences did not have as much impact to the demand forecasts as housing density did. To note, each demand influence adjusts the normalized water use factors that are applied regional growth projections for number of households and employees per sector.

Figure A: Baseline demand forecasts under normal or average conditions.

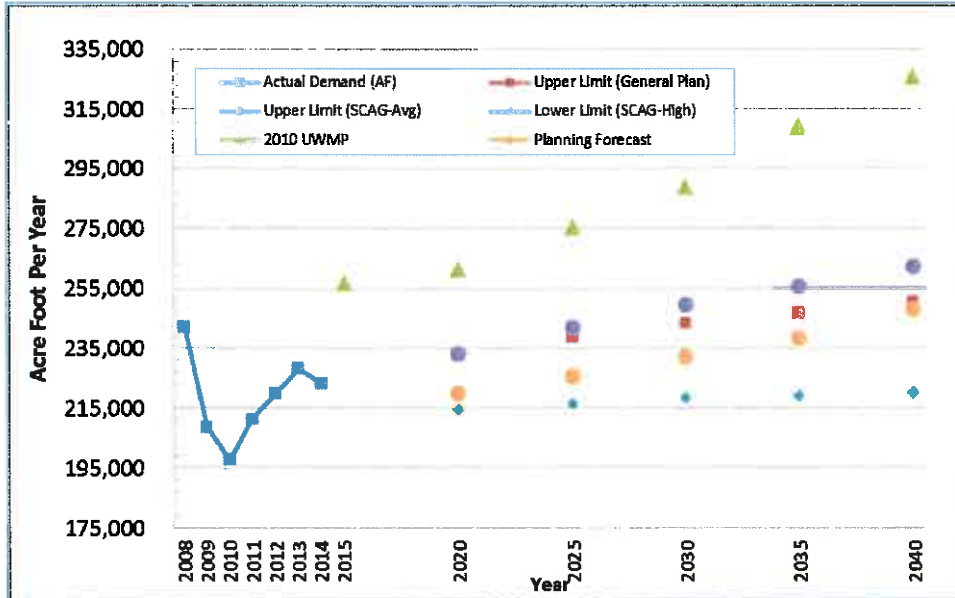
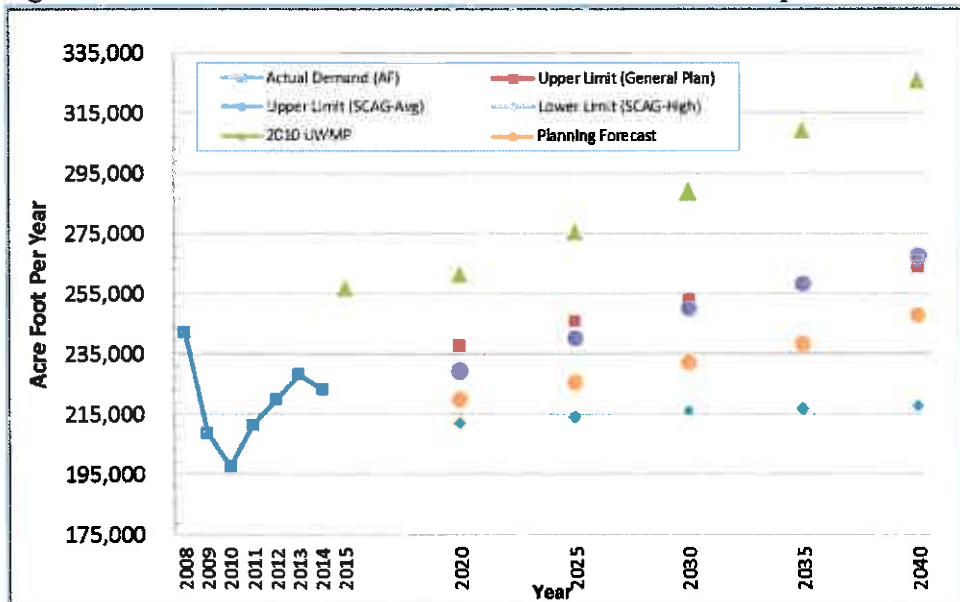


Figure B: Baseline demand forecasts under demand influences per Table 1.



Commercial, Industrial and Institutional (CII) Demands

Below is a summary of how demands were established for the CII sector.

Total CII demand is calculated after subtracting the following demand sectors: single-family, multi-family and other (percent of total demand) from historical regional demand data. After identifying total CII demand, a normalized water use factor per employee was determined during the model calibration process, refer to Table 1. The unit of measure for the water use factor is gallons per employee per day (gallons/employee-day). Multiplying the water use factor per employee by the total number of employees, results in total CII demand for the region. Note that future CII demand forecasts are driven by growth projections for total employment, or number of employees.

The latest forecast for total urban employment by sector was obtained from the S. California Association of Governments 2012 Regional Transportation Plan (SCAG RTP) out to 2040. The employment sectors consist of: Construction, Manufacturing, Utilities, Trade, Retail Trade, Real Estate, Science and Government. To determine the corresponding ratio of total CII demand by employment sector, employment productivity factors (output per hour) were used. Productivity factors were obtained from the Metropolitan Water District's demand model (MWD_MAIN).

Table 1: Water Use Factor per Employee

	2015	2020	2030	2040
Water Use Factor (gallons/employee-day)	162	160	142	128

Baseline Supply Assumptions and Forecast to 2040

Chino Basin Groundwater: Amount of water that can be produced without the need to take from member agency storage accounts or require supplemental recharge.

- Near Term (2015 to 2020) = 90,550 AFY
 - 5-yr average from FY09/10 to FY13/14
- Mid Term (2020 to 2030) and Long Term (2030 to 2040) = 91,260 AFY
 - Operating Safe Yield (OSY) = 135,000 AFY
 - Includes baseline stormwater recharge
 - Stormwater capture from the 2013 Recharge Master Plan Update (RMPU) will be considered and coordinated with the Chino Basin Watermaster and Wildermuth Environmental. The Agency still needs to determine how much stormwater can be counted in addition to Chino Basin Groundwater.
 - Excludes Recycled Water recharge
 - Agriculture and Non-Ag = 8,000 AF
 - Operating Safe Yield Available to Appropriators = 127,000 AF
 - IEUA Member Agency Share of OSY = 71.9%

Member Agency	Share of Safe Yield (%)
Chino	7.356
Chino Hills	3.851
Ontario	20.742
Upland	5.202
Cucamonga Valley Water District	6.601
Monte Vista Water District and Irrigation District	10.031
Fontana Water Company	0.002
Fontana Union Water Company	11.657
San Antonio Water Company	2.748
West End Consolidated Water Company	1.728
Golden State Water Company	0.750
Marygold Mutual Water Company	1.195
Total IEUA Share	71.9%

Per Chino Basin Watermaster 35th annual report – Appropriative Rights (as of 06/30/2012)

Recycled Water: Amount of recycled water delivered and used by Member Agencies.

- **Direct Use:**
 - **Near Term (2015 to 2020) = 25,000 AFY by 2020**
 - Direct use forecast per 2015 Recycled Water Program Strategy
 - **Mid Term (2020 to 2030) and Long Term (2030 to 2040) = 31,300 AFY by 2025**
 - Direct use forecast to 2025 per the 2015 Recycled Water Program Strategy
 - Post 2025 direct use evaluated by the Integrated Resources Plan (IRP)
- **Groundwater Recharge:**
 - **Near Term (2015 to 2020) = 16,900 AFY by 2020**
 - Recharge forecast per 2015 Recycled Water Program Strategy (RWPS) and the Agency's Ten Year Capital Improvement Plan (TYCIP)
 - **Mid Term (2020 to 2030) and Long Term (2030 to 2040) = 18,700 AFY by 2025**
 - Recharge forecast to 2025 per the 2015 RWPS and TYCIP
 - Post 2025 RW recharge evaluated by the IRP

Chino Desalter: Amount of water produced and distributed by the Chino Desalter Authority to a Member Agency.

- **Near Term (2015 to 2020) = 17,733 AFY**
 - Assumes completion of Phase III Expansion to 35,200 AF with IEUA Member Agency Share approximately 50.4%
- **Mid Term (2020 to 2030) and Long Term (2030 to 2040) = 17,733 AFY**
 - Assumes completion of Phase III Expansion to 35,200 AF with IEUA Member Agency Share approximately 50.4%

Non Chino Basin Groundwater: Amount of water produced by a Member Agency from outside the Chino basin.

- **Near Term (2015 to 2020) = 22,000 AFY**
 - 5-yr average from FY09/10 to FY13/14
- **Mid Term (2020 to 2030) and Long Term (2030 to 2040) = 22,000 AFY**
 - 5-yr average from FY09/10 to FY13/14

Local Surface Water: Amount of creek water treated and distributed for urban demand.

- Near Term (2015 to 2020) = 11,700 AFY
 - 5-yr average from FY09/10 to FY13/14
- Mid Term (2020 to 2030) and Long Term (2030 to 2040) = 11,700 AFY
 - 5-yr average from FY09/10 to FY13/14

Imported Water: Amount of water purchased by Member Agencies from the Metropolitan Water District of Southern California.

- Near Term (2015 to 2020) = 69,752 AFY
 - Assumes 65,000 AF purchased in FY14/15
 - Member Agency Tier 1 purchase limit per Resolution 2014-12-1
- Mid Term (2020 to 2030) and Long Term (2030 to 2040) = 69,752 AFY
 - Member Agency Tier 1 purchase limit per Resolution 2014-12-1

Conservation and Water Use Efficiency: Amount of water savings considered to offset demand. Assuming current annual savings from active programs and future code based savings will continue through 2040. Savings below are in addition to the savings already achieved from current programming.

- Near Term (2015 to 2020) = 1,000 AFY
 - Active savings forecast per the 2015 Water Use Efficiency Business Plan
- Mid Term (2020 to 2030) and Long Term (2030 to 2040) = 1,000 AFY
 - Assuming savings achieved from 2015 WUEBP continue to 2040
 - Additional savings post 2020 to be evaluated by the IRP

Baseline Supply Forecast

FY End	Total Regional Supply	Total Urban Supply	Imported-MWD	GW-Chino	GW-Other	Local Surface	Acre-Foot per Year (AFY)		StormWater	RW-Direct	RW-GWR	Desaltest-CDA	RW-SAR Obligation	Supp. Recharge
							Total RW-Direct	RW-Direct Ag						
09-10	226,290.0	209,290.0	38,243.9	105,594.8	17,286.6	13,109.9	17,312.8	9,026.9	8,285.9	7,208.0	14,623.6	17,000.0		
11	212,744.8	195,744.8	88,366.5	88,366.5	14,459.1	18,761.3	16,655.9	7,673.5	8,982.4	8,028.0	14,440.8	17,000.0		
12	222,230.9	205,230.9	52,876.1	85,345.8	19,507.2	16,744.3	20,605.5	10,260.8	10,344.8	8,634.0	13,961.0	17,000.0		
13	233,004.3	216,004.3	59,013.0	95,955.5	21,145.4	5,980.2	21,840.0	9,215.4	12,624.6	10,479.0	13,671.4	17,000.0		
14	240,435.2	223,435.2	67,055.4	77,429.9	38,092.2	3,658.3	24,657.2	10,058.9	14,598.3	13,593.0	14,735.4	17,000.0		
15	242,000.0	225,000.0	65,000.0	90,538.5	22,098.1	11,650.8	24,600.0	8,550.0	16,050.0	14,500.0	15,000.0	17,000.0		
16	261,910.8	244,910.8	69,752.0	90,538.5	22,098.1	11,650.8	25,426.0	7,267.5	18,158.5	14,980.0	17,733.0	17,000.0		
17	264,306.9	247,306.9	69,752.0	90,538.5	22,098.1	11,650.8	26,252.0	6,177.4	20,074.6	15,460.0	17,733.0	17,000.0		
18	266,539.6	249,539.6	69,752.0	90,538.5	22,098.1	11,650.8	27,078.0	5,250.8	21,827.2	15,940.0	17,733.0	17,000.0		
19	268,633.2	251,633.2	69,752.0	90,538.5	22,098.1	11,650.8	27,904.0	4,463.2	23,440.8	16,420.0	17,733.0	17,000.0		
20	271,336.2	254,336.2	69,752.0	91,266.0	22,098.1	11,650.8	28,730.0	3,793.7	24,936.3	16,900.0	17,733.0	17,000.0		
21	273,115.9	256,115.9	69,752.0	91,266.0	22,098.1	11,650.8	29,580.7	3,224.6	26,356.0	17,260.0	17,733.0	17,000.0		
22	274,810.2	257,810.2	69,752.0	91,266.0	22,098.1	11,650.8	30,431.3	2,740.9	27,690.4	17,620.0	17,733.0	17,000.0		
23	276,432.0	259,432.0	69,752.0	91,266.0	22,098.1	11,650.8	31,282.0	2,329.8	28,952.2	17,890.0	17,733.0	17,000.0		
24	277,992.2	260,992.2	69,752.0	91,266.0	22,098.1	11,650.8	32,132.6	1,980.3	30,152.3	18,340.0	17,733.0	17,000.0		
25	279,499.9	262,499.9	69,752.0	91,266.0	22,098.1	11,650.8	32,983.3	1,683.3	31,500.0	18,700.0	17,733.0	17,000.0		
26	279,499.9	262,499.9	69,752.0	91,266.0	22,098.1	11,650.8	32,983.3	1,683.3	31,500.0	18,700.0	17,733.0	17,000.0		
27	279,499.9	262,499.9	69,752.0	91,266.0	22,098.1	11,650.8	32,983.3	1,683.3	31,500.0	18,700.0	17,733.0	17,000.0		
28	279,499.9	262,499.9	69,752.0	91,266.0	22,098.1	11,650.8	32,983.3	1,683.3	31,500.0	18,700.0	17,733.0	17,000.0		
29	279,499.9	262,499.9	69,752.0	91,266.0	22,098.1	11,650.8	32,983.3	1,683.3	31,500.0	18,700.0	17,733.0	17,000.0		
30	279,499.9	262,499.9	69,752.0	91,266.0	22,098.1	11,650.8	32,983.3	1,683.3	31,500.0	18,700.0	17,733.0	17,000.0		
31	279,499.9	262,499.9	69,752.0	91,266.0	22,098.1	11,650.8	32,983.3	1,683.3	31,500.0	18,700.0	17,733.0	17,000.0		
32	279,499.9	262,499.9	69,752.0	91,266.0	22,098.1	11,650.8	32,983.3	1,683.3	31,500.0	18,700.0	17,733.0	17,000.0		
33	279,499.9	262,499.9	69,752.0	91,266.0	22,098.1	11,650.8	32,983.3	1,683.3	31,500.0	18,700.0	17,733.0	17,000.0		
34	279,499.9	262,499.9	69,752.0	91,266.0	22,098.1	11,650.8	32,983.3	1,683.3	31,500.0	18,700.0	17,733.0	17,000.0		
35	279,499.9	262,499.9	69,752.0	91,266.0	22,098.1	11,650.8	32,983.3	1,683.3	31,500.0	18,700.0	17,733.0	17,000.0		
36	279,499.9	262,499.9	69,752.0	91,266.0	22,098.1	11,650.8	32,983.3	1,683.3	31,500.0	18,700.0	17,733.0	17,000.0		
37	279,499.9	262,499.9	69,752.0	91,266.0	22,098.1	11,650.8	32,983.3	1,683.3	31,500.0	18,700.0	17,733.0	17,000.0		
38	279,499.9	262,499.9	69,752.0	91,266.0	22,098.1	11,650.8	32,983.3	1,683.3	31,500.0	18,700.0	17,733.0	17,000.0		
39	279,499.9	262,499.9	69,752.0	91,266.0	22,098.1	11,650.8	32,983.3	1,683.3	31,500.0	18,700.0	17,733.0	17,000.0		
40	279,499.9	262,499.9	69,752.0	91,266.0	22,098.1	11,650.8	32,983.3	1,683.3	31,500.0	18,700.0	17,733.0	17,000.0		

		Project Attribute Tags	Project Attributes	
Attributes Derived From IRP Goals	A	Increased regional infiltration into aquifers?	<input checked="" type="radio"/> Increases groundwater in storage	<input checked="" type="radio"/> No change <input type="radio"/> Decreases groundwater in storage
	B	Increases water level in critical GW management zones?	<input checked="" type="radio"/> Located in critical zone	<input checked="" type="radio"/> Not located in a priority zone <input type="radio"/> N/A
	C	Increased stormwater capture/recharge?	<input checked="" type="radio"/> Increases stormwater capture/recharge	<input checked="" type="radio"/> No effect on stormwater capture/recharge <input type="radio"/> Increases stormwater runoff or decreases stormwater capture/recharge
	D	Increased permeability or natural infiltration for stormwater?	<input checked="" type="radio"/> Increases natural infiltration or permeability for stormwater	<input checked="" type="radio"/> No effect on natural infiltration or permeability <input type="radio"/> Decreases natural infiltration or permeability for stormwater
	E	Provide additional recycled water?	<input checked="" type="radio"/> Increases recycled water supply availability	<input checked="" type="radio"/> Does not increase recycled water availability <input type="radio"/> Reduces recycled water availability
	F	Reduce Dependence on imported water from MWD during dry years?	<input checked="" type="radio"/> Decreases dependence on imported water in dry years	<input checked="" type="radio"/> No effect or dependence on imported water needs in dry years <input type="radio"/> Increases dependence on imported water during dry years
	G	Increase local water supplies?	<input checked="" type="radio"/> Enhances or creates new local water supplies	<input checked="" type="radio"/> No effect on local water supply creation <input type="radio"/> Decreases local water supplies
	H	Emergency local supply redundancy?	<input checked="" type="radio"/> Increases local supply redundancy	<input checked="" type="radio"/> No effect on local supply redundancy <input type="radio"/> Decreases local supply redundancy
	I	Decrease reliance on local surface water during dry years?	<input checked="" type="radio"/> Decreases dependence on local surface water in dry years	<input checked="" type="radio"/> No effect or dependence on local surface water in dry years <input type="radio"/> Increases dependence on local surface water during dry years
	J	Requires conservation in existing development?	<input checked="" type="radio"/> Requires or provides conservation in existing development	<input checked="" type="radio"/> No impact on conservation in existing development <input type="radio"/> Encourages increased water use in existing development
	K	Requires demand management in new development?	<input checked="" type="radio"/> Requires or provides management in new development	<input checked="" type="radio"/> No impact on demand management in new development <input type="radio"/> Encourages increased water use in new development
	L	Reduce TDS and/or nitrates in GW?	<input checked="" type="radio"/> Reduces TDS/nitrates	<input checked="" type="radio"/> N/A <input type="radio"/> Increases TDS/nitrates in GW
	M	Decrease net energy consumption?	<input checked="" type="radio"/> Decreases energy consumption compared to AF SWP water	<input checked="" type="radio"/> N/A <input type="radio"/> Increases energy consumption compared to AF SWP water
Other Project Attributes	N	Increase capacity of wet year water ("big gulp" concept)	<input checked="" type="radio"/> Increased amount of water available for wet year purchases or capture only	<input checked="" type="radio"/> Water available year round, not dependent on weather <input type="radio"/> N/A
	O	Eligible for grant funding?	<input checked="" type="radio"/> Eligible for known grant funding	<input checked="" type="radio"/> May be eligible for future grant funding <input type="radio"/> Agreement. Not eligible for grant funding
	P	Technical Feasibility/ease of implementation	<input checked="" type="radio"/> Technically feasible/easy to implement	<input checked="" type="radio"/> Difficult/ multiple party negotiations necessary <input type="radio"/> Infeasible

Integrated Resources Plan Process Diagram

