Indio Water Authority

Your Water. Our Responsibility.

2010 Urban Water Management Plan

September 2011

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LIST OF APPENDICES

LIST OF ACRONYMS

ACP	Aggressive Conservation Program
AF	Acre-feet
AFY	Acre-feet per year
CDPH	California Department of Public Health
CG	Coverage Goal
CII	Commercial, Industrial and Institutional
CMP	Urban Efficiency and Conservation Master Plan
CRW	Colorado River Water
CUWCC	California Urban Water Conservation Council
CVAG	Coachella Valley Association of Governments
CVSC	Coachella Valley Stormwater Channel
CVWD	Coachella Valley Water District
DPH	California Department of Public Health
DMM	Demand Management Measures
DU	Dwelling Unit
DWA	Desert Water Agency
DWR	Department of Water Resources
EIS	Environmental Impact Study
HECW	High Efficiency Clothes Washing Machine
HOA	Homeowners Association
IC	Industrial and Commercial
IID	Imperial Irrigation District
IRWMP	Integrated Regional Water Management Plan
IWA	Indio Water Authority
MCL	Maximum Contaminant Level
MCP	Moderate Conservation Program
MGD	Million gallons per day
MOU	Memorandum of Understanding
MSWD	Mission Springs Water District
MWD	Metropolitan Water District
MWDSC	Metropolitan District of Southern California
NPDES	National Pollutant Discharge Elimination System
NRW	Non-Revenue Waters
PPR	Present Perfected Rights
SBX7-7	Senate Bill 7
SMCL	Secondary Maximum Contaminant Level
SWP	State Water Project
TDS	Total Dissolved Solids
ULFT	Ultra Low Flush Toilets
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey

UWMP	Urban Water Management Plan
VSD	Valley Sanitary District
WRDP	Water Resources Development Plan
WRF	Water Reclamation Facility
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

CHAPTER 1 – INTRODUCTION

1.1 Overview

This report presents the Urban Water Management Plan 2010 (Plan) for the Indio Water Authority (IWA) service area. This chapter describes the general purpose of the Plan, discusses Plan implementation, and provides general information about IWA and service area characteristics.

1.2 Purpose

An Urban Water Management Plan (UWMP) is a planning tool that generally guides the actions of water management agencies to support long-term resources planning and ensure adequate water supplies are available to meet existing and future water demands. While the conservation and efficient use of urban water supplies are statewide and global concerns, developing and implementing plans for efficient use can best be accomplished at the local level. Thus, an UWMP provides both managers and the public with a broad perspective of the water supply issues that may affect their service area.

Furthermore, while a UWMP may specify a strategic agenda for reliable water supplies, it is not to be substituted for project-specific planning documents. For example, as mandated by the State Legislature, a plan shall "describe the opportunities for exchanges or transfers of water on a short-term or long-term basis" (California Urban Water Management Planning Act 2010, Article 2, Section 10631(d)). The identification of such opportunities within a UWMP is non-binding such that it neither commits a water management agency to pursue a particular water exchange/transfer opportunity, nor precludes a water management agency from exploring exchange/transfer opportunities that were not identified in the plan. Additionally, should a project be approved for implementation within a service area, the appropriate detailed project plans and analyses must be prepared separate from the UWMP.

In short, this UWMP is a planning tool, providing a framework for action, but not requiring specific project development or action. Water resources management in California is not a matter of certainty and planning projections may change in response to a number of factors. Thus, it is important that this Plan be viewed as a long-term, general planning document, rather than as an exact blueprint for supply and demand management. Development of this Plan is an effort to generally answer a series of planning questions including:

- What are the potential sources of water supply and what are their probable yields?
- What is the probable demand, given a reasonable set of assumptions about growth and implementation of good water management practices?
- How comparable are the supply and demand figures, assuming that the various probable supplies will be pursued by the implementing agency?

The IWA will address these questions by identifying feasible and cost-effective opportunities to meet existing and future demands. IWA will explore enhancements to supplies from traditional sources such as groundwater as well as other options, including water exchanges, water recycling, utilizing Colorado River water from the Coachella Canal, desalination, and water banking/conjunctive use. Each opportunity that is identified as a feasible option within the service area will further undergo specific, detailed evaluations to determine how each option would fit into the overall supply/demand framework, how each option would impact the environment, and how each option would affect customers. The objective of these more detailed evaluations is to find the optimum combination of conservation and supply programs that ensure that the needs of the customers are met.

The California Urban Water Management Planning Act (UWMP Act) requires preparation of a plan that:

- Accomplishes water supply planning over a 20-year period in five-year increments.
- Identifies and quantifies adequate water supplies, including recycled water, for existing and future demands, in normal, single-dry, and multiple-dry years.
- Implements conservation and efficient use of urban water supplies.

In 2009, an amendment to the UWMP Act was passed (Senate Bill 7, aka SBX7-7). This amendment requires a 20 percent reduction in per capita water use statewide by year 2020. SBX7-7 provides water conservation targets by region and requires each urban water supplier to develop interim (2015) and 2020 urban water use targets consistent with the requirements of the bill. IWA's urban water use targets are presented in Section 2 of this Plan.

Additional recent changes and amendments to the UWMP Act which impact urban water suppliers include:

- Provide water use projections for single-family and multifamily residential housing needed for lower income households.
- A 60-day notification period for the public hearing to all cities and counties within which the supplier provides water.
- Linkage of Demand Management Measures (DMMs) to State-funded grants or loans.

A checklist to ensure compliance of this Plan with the Act and recent amendments is provided in Appendix A.

In summary, the Plan answers the question: *Will there be enough water for the IWA in future years, and what combination of programs should be explored for making this water available?*

It is the stated goal of IWA to deliver a reliable and high quality water supply to their customers, even during dry periods. Based on conservative water supply and demand assumptions over the next 20 years in combination with conservation of non-essential demand during certain dry years, the Plan successfully achieves this goal.

1.3 Implementation of the Plan

This subsection describes the cooperative framework within which the Plan will be implemented including agency coordination, public outreach, and optimization of resources.

1.3.1 Joint Preparation of the Plan

Participation in local and regional planning is integral to the management of IWA's water resources.. Other agencies within the Coachella Valley (Valley) that have been contacted to either coordinate or assist in the preparation of this document or provide comments on the draft are listed in Table 1-1. An example letter that was sent to agencies soliciting comments on the draft UWMP is provided in Appendix B.

Table 1-1: Coordination with Appropriate Agencies (DWR Table 1)

Agency	Participated in Developing the UWMP	Commented on the Draft	Attended Public Meetings	Was Contacted for Assistance	Was Sent a Copy of the Draft UWMP	Was Sent a Notice of Intention to Adopt	Not Involved / No Information
Coachella Valley Water District		x			x	x	
Desert Water Agency					x	x	
City of Coachella					x	x	
Valley Sanitation District					x	x	
Mission Springs Water District		x			x	x	
City of Indio					x	x	
City of La Quinta					x	x	
Riverside County Department of Health					x	x	
Riverside County Flood Control District					x	x	
Coachella Valley Association of Governments					x	x	
Building Industry Association					x	x	
Myoma Dunes Mutual Water Company					x	x	
Coachella Valley Unified School District					x	x	
Desert Sands Unified School District					x	x	
Department of Water Resources					x	x	

1.3.2 Public Outreach

IWA has implemented a public outreach program to promote the efficient use of its water supply within its service communities. IWA utilizes several forms of communication with its customers including brochures, media events, service announcements, workshops, as well as other means.

The notifications sent to the public regarding the scheduled meeting to adopt this Plan are available in Appendix C, along with the actual adoption resolution.

1.3.3 Resource Maximization

Due to the already strained groundwater resources and water availability in California, it is important that IWA diversifies its water supply portfolio to meet growing needs. Receiving water supplies from a variety of resources will allow IWA to establish a sustainable water supply that will foster development without further depleting the resources available. This diversification includes not only developing new resources or reusing existing resources, but also conserving available resources. IWA's multi-faceted approach to future water management include: regional cooperation, source substitution, groundwater recharge, and water efficiency measures.

Regional cooperation and development of partnerships are crucial for ensuring the sustainable management of water resources in the Valley. Appropriate source substitution, such as groundwater of seawater desalination, will continue to diversify IWA's water supply source portfolio. Groundwater recharge, using State Water Project and Colorado River water, provides safe storage and natural treatment for the future use of these supplies. Lastly, water efficiency measures, whether through voluntary practices or mandatory regulations, will ensure that a limited supply will meet the most pressing demands and increase public awareness of the value of water.

The following seven alternatives have been identified through a Water Resources Development Plan (WRDP) (IWA, 2008b) as having a high priority for implementation in order to diversify water supply options and reduce reliance on groundwater:

- Agricultural conservation
- Urban water conservation
- Use recycled water from Valley Sanitary District's wastewater treatment plant
- Use recycled water from remote recycling plants
- Treatment of Coachella Canal water for urban use
- Agricultural use of Coachella Canal water in-lieu of groundwater
- Groundwater recharge via spreading basins

1.4 Water Agencies of the Coachella Valley

There are predominantly five water supply agencies in the Coachella Valley. These include:

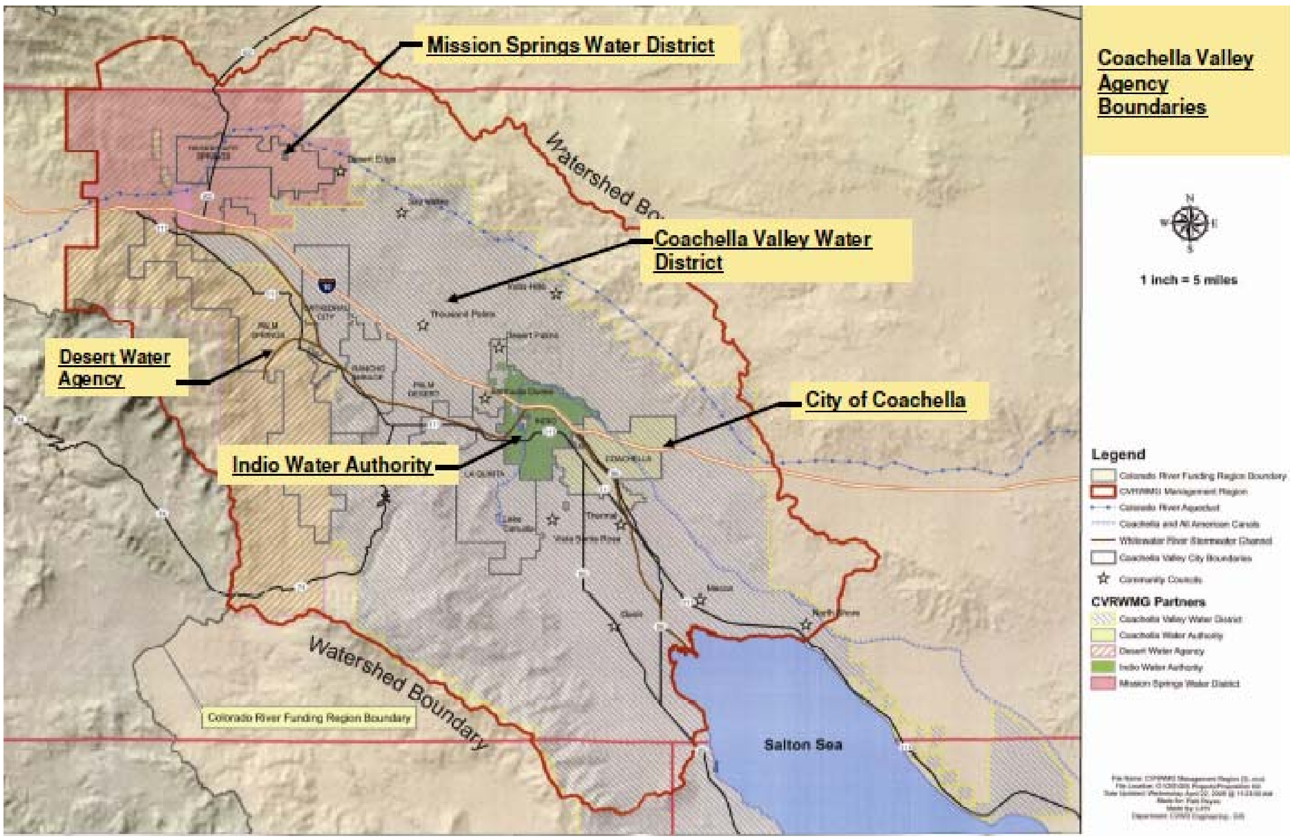
- Indio Water Authority (IWA)
- Coachella Valley Water District (CVWD)
- Desert Water Agency (DWA)
- Mission Springs Water District (MSWD)

- City of Coachella

In addition to providing background information on IWA, this section also presents background information on the other agencies in the Valley, as all of the agencies are working together towards the development of a regional water management plan. These issues are further discussed in subsequent chapters.

Figure 1-1 illustrates the location of the water supply agencies in the Coachella Valley.

Figure 1-1: Coachella Valley Agency Boundaries



1.4.1 Indio Water Authority

Incorporated in 1930, the City of Indio (City) was the first city in the Coachella Valley. The City encompasses approximately 38 square miles with a sphere of influence that adds approximately 21.5 square miles north of Interstate 10. The existing land uses include commercial, limited industrial, and residential. The majority of land use can be classified as residential, varying in density from equestrian and country estates to high-density multi-family dwellings. The proposed future land uses within the sphere of influence include open space, residential, resource recovery, specific plans (assumed mixed use), business park, and a small amount of community commercial.

The Indio Water Authority (IWA) was formed as a Joint Powers Authority in 2000, wholly owned by the City and Indio Redevelopment Agency, to be the legislative and policy entity responsible for delivering water to residents of the City for all municipal water programs and services. The five elected members of the Commission appoint four members of the community to serve on the Board. The IWA mission is to:

> "Provide the highest quality most reliable source of water, in an effective and fiscally responsible manner while promoting the highest standard to our customers, and maintaining excellent customer service through highly motivated customer oriented employees. To achieve this mission, the Indio Water Authority will provide leadership in managing and developing water resources in the Coachella Valley region."

Since the establishment of the IWA, service connections have increased from approximately 12,100 to 20,575 active meter accounts in 2009, with the majority of the new growth occurring north of Interstate 10. In 2009, the IWA supplied 7,576 million gallons (23,251 AF) of water to approximately 75,000 businesses and residents. As one of the fastest growing municipal utilities in the Coachella Valley, the IWA is committed to maintaining a sustainable water supply for its residential and commercial customers.

IWA extracts groundwater to meet the needs of its current customer population. The groundwater is drawn from the Whitewater River Subbasin and is delivered to the service area via a pressurized distribution system supplied by 21 wells and 6 pumping plants. The IWA also has emergency intertie connections with Coachella Valley Water District (CVWD) and the City of Coachella.

Since 2005, IWA has established active water conservation, water reuse, and groundwater recharge planning efforts to ensure adequate water availability and system capacity to meet the growing needs of the City. These planning efforts include: residential and commercial landscape rebate and irrigation programs, water misuse program, and a Memorandum of Understanding between IWA and Valley Sanitation District (VSD) to collaborate in the construction of capital improvement projects that support water reuse and groundwater recharge efforts.

The City is a co-permitee with Riverside County Flood Control and Water Conservation District, the County of Riverside, Coachella Valley Water District, and the cities of Banning, Cathedral City, Coachella, Desert Hot Springs, Indian Wells, La Quinta, Palm Desert, Palm Springs, and Rancho Mirage for implementing the National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharge.

1.4.2 Coachella Valley Water District

The Coachella Valley Water District (CVWD) was formed in 1918 under the County Water District Act provisions of the California Water Code. In 1937, CVWD absorbed the responsibilities of the Coachella Valley Stormwater District which had formed in 1915. CVWD now encompasses approximately 640,000 acres, mostly within Riverside County, but also extending into northern Imperial and northern San Diego counties. CVWD's service area is shown on Figure 1-1. CVWD is governed by a board of five directors, elected at-large to four-year terms representing five divisions.

CVWD is a Colorado River water importer and a California State Water Project contractor. The water-related services provided by CVWD include irrigation water delivery and agricultural drainage, domestic water delivery, wastewater reclamation and recycling, stormwater protection, and groundwater recharge.

Irrigation Water Delivery and Agricultural Drainage

CVWD's irrigation system provides approximately 300,000 acre-feet per year (AFY) of Colorado River water to over 1,100 customers covering 78,530 acres via the 123-mile, concrete-lined, Coachella branch of the All American Canal. The irrigation distribution system consists of 485 miles of buried pipe, 19 pumping plants, and 1,300 acre-feet (AF) of storage. In addition to agricultural customers, the system also provides irrigation to golf courses, fish farms, duck clubs, and a few municipal irrigators. As agricultural lands are converted to residential uses, Colorado River water will also be treated for municipal use and the irrigation system will supply non-potable Colorado River water for outdoor irrigation needs within the service area.

Due to a high perched groundwater table and concentration of salts in irrigated soils within CVWD's service area, an agricultural drainage system is necessary. CVWD operates and maintains an agricultural drainage system consisting of 166 miles of buried pipe ranging in size from 18 inches to 72 inches in diameter and 21 miles of open channels to serve as a drainage network for irrigated lands. The system receives water from on-farm drainage lines. In most areas, the drainage system flows to the Coachella Valley/Whitewater River Stormwater Channel; however, in areas near the Salton Sea, a number of open channels convey flows directly to the sea.

Domestic Water Delivery

CVWD's domestic water system provides approximately 132,000 acre-feet of water per year to over 280,000 residents through 106,000 active meters. The pressurized pipeline distribution system has 30 pressure zones and consists of approximately 115 deep wells, 2,000 miles of pipe, and 120 million gallons of storage in 59 enclosed reservoirs.

Wastewater Reclamation and Recycling

CVWD's wastewater reclamation system collects and treats approximately 18.3 million gallons per day (MGD) from approximately 98,000 user accounts. The system consists of approximately 1,100 miles of collection piping and six water reclamation plants. In addition, 3 of the water reclamation plants recycle an average of about 8 MGD for golf course and Homeowners Association irrigation. The recycled water distribution system serves a total of 16 customer accounts via 15 miles of pressurized distribution pipelines. Some areas within the CVWD service areas remain on septic systems.

CVWD just completed Phase 1 of the Mid-Valley Pipeline Project, a $75 million non-potable pipeline distribution system that will expand its existing recycled water distribution system to serve approximately 50 golf courses that currently use groundwater for irrigation purposes. The Mid-Valley Pipeline will deliver Coachella Canal water to the expanded recycled water system as a secondary source of supply. This project will help maximize the use of recycled water and reduce groundwater pumping by as much as 50,000 AFY.

Stormwater Protection

CVWD provides regional flood protection for its stormwater unit within the Coachella Valley. CVWD's stormwater unit extends from the Whitewater River Spreading area to Salton City, encompassing approximately 378,000 acres. CVWD's regional flood control system consists of a series of debris basins, levees, and stormwater channels that divert floodwaters from the canyons and alluvial fans surrounding the Coachella Valley to the 49-mile Whitewater River/Coachella Valley Stormwater Channel (CVSC) that flows to the Salton Sea (shown on Figure 1-1).

Groundwater Recharge

CVWD operates and maintains groundwater recharge facilities at 3 locations in the Coachella Valley: the Whitewater River Spreading area, the Thomas E. Levy Groundwater Replenishment Facility, and Martinez Canyon Pilot Recharge Facility. Also, CVWD and the Desert Water Agency (DWA) have jointly operated and maintained the Mission Creek Recharge Facility to replenish the aquifer underneath the western Valley since 2003. CVWD has operated and maintained recharge facilities at the Whitewater River Spreading area since 1919, first with local surface runoff and, since 1973, with imported State Water Project water. The Whitewater River Spreading area facilities cover 700 acres and consist of two diversion dikes and a series of 19 ponds adjacent to the Whitewater River. Local runoff and State Water Project water deliveries are transported to the ponds via the Whitewater River, and then diverted into the recharge ponds at two locations by diversion dikes. Since its introduction in 1919, over two million acre-feet of water have been recharged at this facility.

In addition, CVWD also operates the Tom E. Levy Recharge Facility and the Martinez Canyon Pilot Recharge Facility. The Tom E. Levy Recharge Facility has been operational since June 2009 and is a full scale 40,000 AFY facility. The Martinez Canyon Pilot Recharge Facility is a 3,000 AFY recharge project to replenish the lower Valley's aquifer. The source of recharge water for both the Thomas E. Levy Replenishment Facility and Martinez Canyon Pilot Recharge Facility is Colorado River water delivered by CVWD's irrigation system.

1.4.3 Desert Water Agency

Desert Water Agency (DWA) serves an area of about 325 square miles, including outlying county areas, part of Cathedral City, and most of Palm Springs. The DWA was formed in 1961 to import water from the State Water Project in an effort to provide a reliable local water supply for its customers. DWA is a public agency of the State of California. In 1968, the DWA entered the retail water business by purchasing the Cathedral City and Palm Springs water companies. The DWA is governed by a five-person Board of Directors, elected by citizens within DWA boundaries. Additionally, the DWA produces and sells electrical power produced by two hydroelectric generating plants and, in 2005, it began using solar power for the DWA Operation Center.

The DWA employs an extensive system network, including: a domestic water delivery system, an irrigation water delivery system, wastewater collection system, and water reuse and groundwater recharge systems.

Domestic Water System

Approximately 95 percent of domestic water supplied by DWA is pumped from the Upper Whitewater River aquifer from deep wells located throughout the service area. The remaining 5 percent of domestic water is supplied by mountain streams, specifically Chino Creek, Snow Creek, and Falls Creek. DWA pumps water using 25 active wells into the domestic water system with six pressure zones – which includes approximately 22,000 active services throughout 369 miles of pipeline and serves approximately 71,000 people. The DWA utilizes 28 reservoirs with a combined capacity to store 59 million gallons. Average annual production for DWA is about 43,000 AF. DWA receives approximately 3 million gallons per day from mountain stream supply and approximately 78 million gallons per day in well capacity.

Irrigation Water System

In 2008, DWA purchased a controlling interest in Whitewater Mutual Water Company, an irrigation water supplier in Palm Springs. Whitewater Mutual Water Company was formed in the 1920s to transport water from Whitewater Canyon to Palm Springs, and holds water rights to 7,240 AF of water per year as established by the Whitewater Decree in 1928. DWA plans to dissolve the company and incorporate its operations to DWA service.

Wastewater Collection

DWA operates a wastewater collection system which is treated by the City of Palm Springs and Coachella Valley Water District. The wastewater system includes 23.21 miles of pipeline with mains ranging from 6 inches to 18 inches in diameter size. Two lift stations create a 4 million gallon per day capacity.

Water Recycling and Groundwater Replenishing

DWA began its recycled water program with the opening of a 5 MGD water reclamation plant in 1988. The plant's capacity was expanded to 10 MGD in 1995. Wastewater is initially treated at the Palm Springs' wastewater treatment plant before arriving at the DWA water recycling facility. This recycling facility allows the DWA to treat the influent to a water quality that is suitable to serve irrigation needs. Annual production for the water recycling plant was 4,622 AF during the 2007/2008 fiscal year. Through the water recycling program, DWA provides irrigation water to golf courses, parks, medians, and Palm Springs High School. The use of recycled water in landscaping saves millions of gallons per day of potable drinking water.

In addition to conservation initiatives and water recycling, DWA also replenishes groundwater at the Mission Creek Recharge Facility in cooperation with CVWD. Groundwater basins are replenished at this site with water imported from the State Water Project. Because no pipeline exists between the State Water Project and Palm Springs, DWA has established an agreement with the Metropolitan Water District of Southern California (MWDSC) to exchange water for the use of the Colorado River Aqueduct. DWA uses the water it receives to fill recharge basins, located at Whitewater River Spreading area and Mission Creek Recharge Facility. From 1973 to 2008, DWA and CVWD have replenished groundwater basins with more than 2.1 million acre-feet of water at these two locations.

1.4.4 Mission Springs Water District

The Mission Springs Water District (MSWD) began as a mutual water company in the late 1940s. By 1953, it had evolved into an incorporated entity, the Desert Hot Springs County Water District. That name was changed to Mission Springs Water District in 1987. MSWD's service area consists of 135 square miles, including the City of Desert Hot Springs, 10 smaller communities in Riverside County, and communities in the City of Palm Springs. MSWD is governed by a five-member board, elected from at-large representation to four-year terms.

MSWD provides water services to residential and commercial customers through three independent distribution systems. The systems include 14 active wells that produced approximately 10,500 AF of water in the 2008 fiscal year. The water was distributed to approximately 12,500 connections through 239 miles of pipeline. The 26 reservoirs in the MSWD system provide a combined storage capacity of 23 million gallons. MSWD systems serve no agricultural customers.

MSWD collects its water supply from three water sources. The majority of MSWD's water supply comes from groundwater. In addition, an emergency source of water available to MSWD comes from the two inter-connections with the CVWD system, which are capable of providing limited amounts of water to the MSWD main system. A third source is water recharged to the Mission Creek Subbasin by DWA. This water is obtained through an agreement between DWA and MWD to exchange Colorado River water for SWP water.

Approximately 50 percent of the MSWD's customer base is connected to the MSWD wastewater system. The MSWD operates two wastewater treatment plants, whose combined capacity is approximately 2.7 MGD. Wastewater service is concentrated in Desert Hot Springs and two mobile home parks. Since 2001, MSWD has focused on a septic-to-sewer conversion project. Of about 8,600 targeted parcels, about 6,200 remain to be connected. Included in those 6,200 parcels are 3,400 active septic systems that will need abatement.

Wastewater is treated to secondary levels, with a plan to install tertiary treatment capability with the next expansions of the wastewater treatment plants. Designs for those expansions have recently been completed. The secondary effluent from the plant is currently recharged on site into the groundwater basin.

1.4.5 City of Coachella

The City of Coachella was incorporated in 1946 and encompasses approximately 32 square miles in the eastern Coachella Valley. The City of Coachella's sphere of influence encompasses 53 square miles as shown in Figure 1-1. The water-related services provided by the City of Coachella include domestic water delivery, wastewater collection and reclamation, and local drainage control. The City of Coachella's water demand has more than doubled in the last 5 years due to rapid pace of development within the city limits.

The City of Coachella's domestic water system provides approximately 8,400 AFY of potable groundwater to over 40,000 residents. The pressurized pipeline distribution system has 2 pressure zones and consists of 8 deep wells and 10.1 million gallons of combined storage in 3 enclosed, welded-steel reservoirs.

The City of Coachella also manages the Coachella Sanitary District which includes a 2.4 MGD secondary-treatment wastewater facility. There are also plans to develop a recycled water system in the future.

The City of Coachella provides local drainage control via a system of storm drains, retention basins, and dry wells, some of which discharge to CVWD's regional flood control system.

1.5 Climate

The climate of the Coachella Valley is arid characterized by low annual rainfall, low humidity, high summer temperatures, abundant sunshine, and relatively mild winters. The average summer high temperature in Indio is 107 degrees Fahrenheit (F); the average winter low temperature is 55 degrees F. Precipitation typically occurs during the winter months with an annual mean rainfall of approximately 3.2 inches (in.).

Table 1-2 and Figure 1-2 summarize average temperature and precipitation data for the City of Indio.

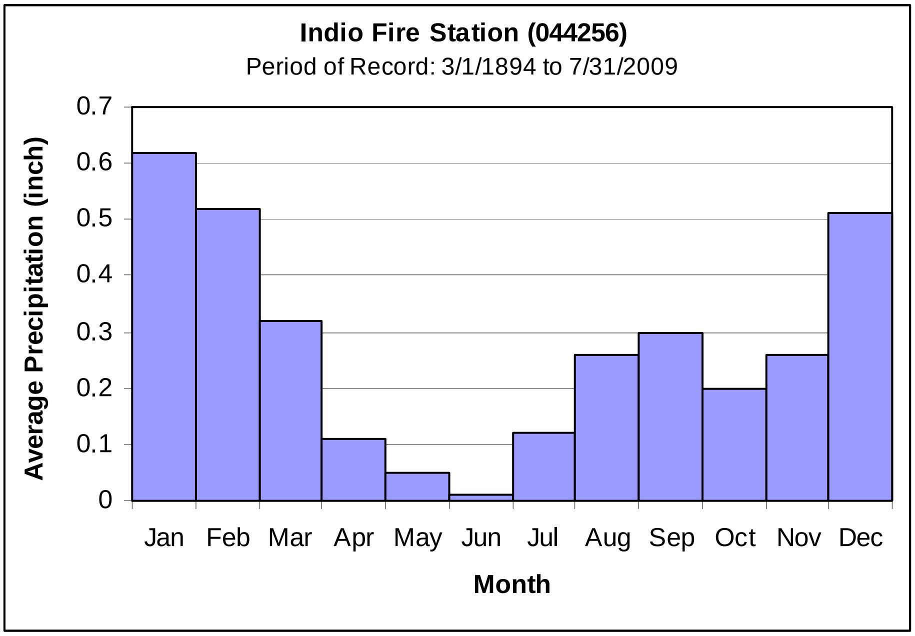
Table 1-2: Monthly Average Climate Data for Indio

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	71	75	80	87	94	102	107	106	101	92	80	72	89
Average Min. Temperature (F)	39	44	50	57	64	72	78	77	70	59	47	39	58
Average Total Precipitation (in)	0.62	0.52	0.32	0.11	0.05	0.01	0.12	0.26	0.30	0.20	0.26	0.51	3.27
Evapotranspiration Eto (in)	2.44	3.31	5.25	6.85	8.67	9.57	9.64	8.67	6.85	5.00	2.95	2.20	71.40

Western Regional Climate Center. www.wrcc.dri.edu

California Irrigation Management Information System. www.cimis.water.ca.gov

Figure 1-2: Monthly Average Total Precipitation



1.6 Potential Effects of Climate Change

Climate plays a central role in the operation, planning, and management of water resource systems for water supply, flood management, and environmental stewardship. Expectations of the timing and form of precipitation; the timing, magnitude, and distribution of runoff; and, the availability of water for beneficial use are based on our understanding of the climate system and experience with historic meteorological and hydrological events.

The potential impacts of climate change on water resources may be felt through changes in temperature, precipitation and runoff, and sea level rise (California Department of Water Resources [DWR], 2009). A summary of some of the DWR predicted climatic changes is provided below.

- Mean annual temperature increases from 2 to 6 degrees by 2100.
- An anticipated increase in extreme wet and dry conditions. It is unknown how annual precipitations totals may be impacted. More precipitation is predicted to fall as rain rather than snow in the middle elevations of the mountains.
- Decreased seasonal snowpack accumulation with earlier snowmelt particularly in the Northern Sierra Nevada Mountains (reduction by as much as 90% by 2100). By 2050, scientists project a loss of at least 25 percent of the Sierra snowpack.
- Less mountain block recharge from snowpack expected with possible implications for long-term support of regional aquifers.

- Annual runoff concentrated more in winter months with more variability and greater extremes.
- Sea level rise of up to 55 in. with the potential for higher rises if ice sheets collapse.
- Ecosystem challenges, such as forest fires, increased due to exacerbation of existing threats from above changes.

The implications of climate change regionally and nationally may adversely impact the following Valley water resources:

State Water Project (SWP) "Table A" entitlements – Reductions to the Sierra snowpack would reduce the availability of water during late spring and early summer and may make it more difficult to fill reservoirs, while increased sea levels would increase salinity intrusion, which could degrade available freshwater supplies. This would require the State to further reduce SWP "Table A" entitlements, including allocations to the Valley.

Coachella Valley Colorado River water supplies are protected from impacts of climate change and corresponding shortages by 1) California's first priority for Colorado River supplies in the lower Colorado River basin, and 2) Coachella's high priority for Colorado River supplies among California users of Colorado River water. Climate change impacts were evaluated in the Environmental Impact Study (EIS) on the "Colorado River Interim Guidelines for East Basin Shortages and Coordinated Operations for Lakes Powell and Mead", (USBR, 2007) These shortage sharing guidelines are crafted to include operational elements that would respond if potential impacts of climate change and increased hydrologic variability occur. The guidelines include coordinated operation elements that allow for adjustment of Lake Powell releases to respond to low average storage conditions in Lake Powell or Lake Mead. In addition, the guidelines enhance conservation opportunities in the lower Colorado River basin and retention of water in Lake Mead. While impacts from climate change cannot be quantified at this time, the interim guidelines provide additional protection against impacts of shortage sharing.

Computer models have been developed to show water planners how California water management might be affected by climate change. The Department of Water Resources (DWR) has committed to continue to update and refine these models based on ongoing scientific data collection and to incorporate this information into future California Water Plans. In the future IWA should update their water management plan to be in-step with DWR updates on SWP delivery reliability and water demands..

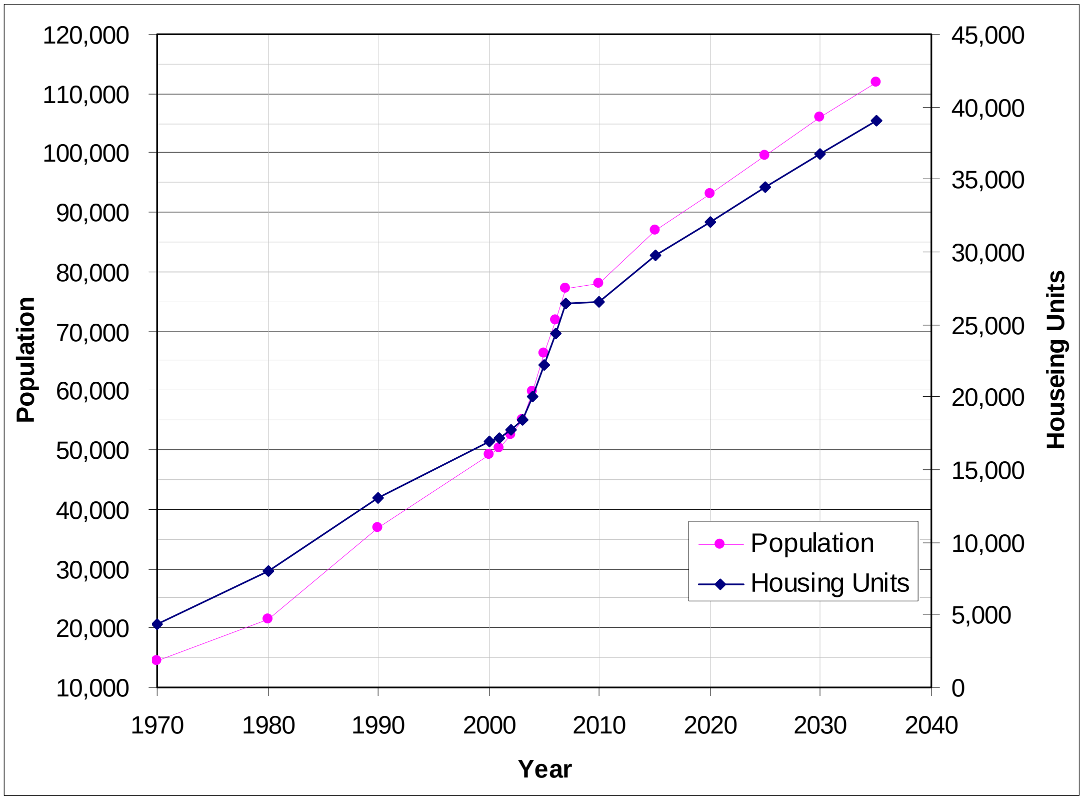
1.7 Demographic Features

Like much of Southern California, the City of Indio experienced rapid growth in recent years until the economy slowed in 2008. Current and projected populations for the IWA service area are listed in Table 1-3. Figure 1-3 presents historical and projected populations as developed by Riverside County's Center for Demographic Research (2008). Projections for housing units within Indio's current city boundaries are also presented along the right axis.

Table 1-3: Population Current and Projected (DWR Table 2)

	2005	2010	2015	2020	2025	2030
Service Area Population	66,284	76,036	86,889	93,115	99,476	105,873

Figure 1-3: Population and Housing Projections for the City of Indio (Riverside County, 2008)



The Riverside County Study (2008) has also provided projections for employment/jobs within the City boundary. These are presented in Table 1-4.

Table 1-4: Employment/Job Projections (DWR Table 2)

	2015	2020	2025	2030
Employment/Jobs	25,275	27,896	30,501	33,153

Additional demographic statistics of the Riverside County study (2008) are presented below.

- Median Age (2007) = 29
- Median Household Income (2007) = $43,001

- Racial and Ethnic Populations (2007)
  - White = 18.2%
  - Hispanic = 77.1%
  - African American = 1.7%
  - Asian/Pacific Islander = 1.7%
  - All Other Races = 1.3%
- Housing Types (2008)
  - Single Detached = 65.9%
  - Single Attached = 3.2%
  - Multi-family: 2 to 4 = 5.6%
  - Multi-family: 5 plus = 13.7%
  - Mobile Homes = 11.7%
- Housing Occupancy Rates (2008)
  - Persons per occupied = 3.54
  - Percent of units occupied = 82.0%
  - Percent of units vacant = 18.0%
- Median Home Price (2008) = $272,500
- Housing Tenure (2007)
  - Owner Occupied = 61%
  - Renter Occupied = 39%

CHAPTER 2 – WATER USE

2.1 Overview

This chapter describes historic and current water usage and presents projected future demands within IWA's service area. Water usage is presented by customer class such as residential, industrial, institutional, landscape, agricultural, and other purposes.

Demand projections contain an inherent level of uncertainty and are intended to provide a general sense as to water supply requirements for the future. Demand projections are dynamic, often changing as a result of economic, political, and environmental pressures. Several factors can affect demand projections, including:

- Land use revisions
- New regulations
- Consumer choice
- Economic conditions
- Transportation needs
- Highway construction
- Environmental factors
- Conservation programs
- Plumbing codes

These factors can impact not only the amount of water needed, but also the timing and location of when and where it is needed. Past experience in the Coachella Valley has indicated that population growth is the most influential factor in determining water demand projections. During the current economic recession, there has been a major downturn in development and new construction, thus reducing projected demands for water.

The projections presented in this Plan do not attempt to forecast extreme economic or climatic changes. Likewise, no speculation was made regarding future plumbing codes or other regulatory changes. The projections do account for IWA's current water conservation efforts, which are projected to reduce overall water demand by 20 percent by 2020.

2.2 Background

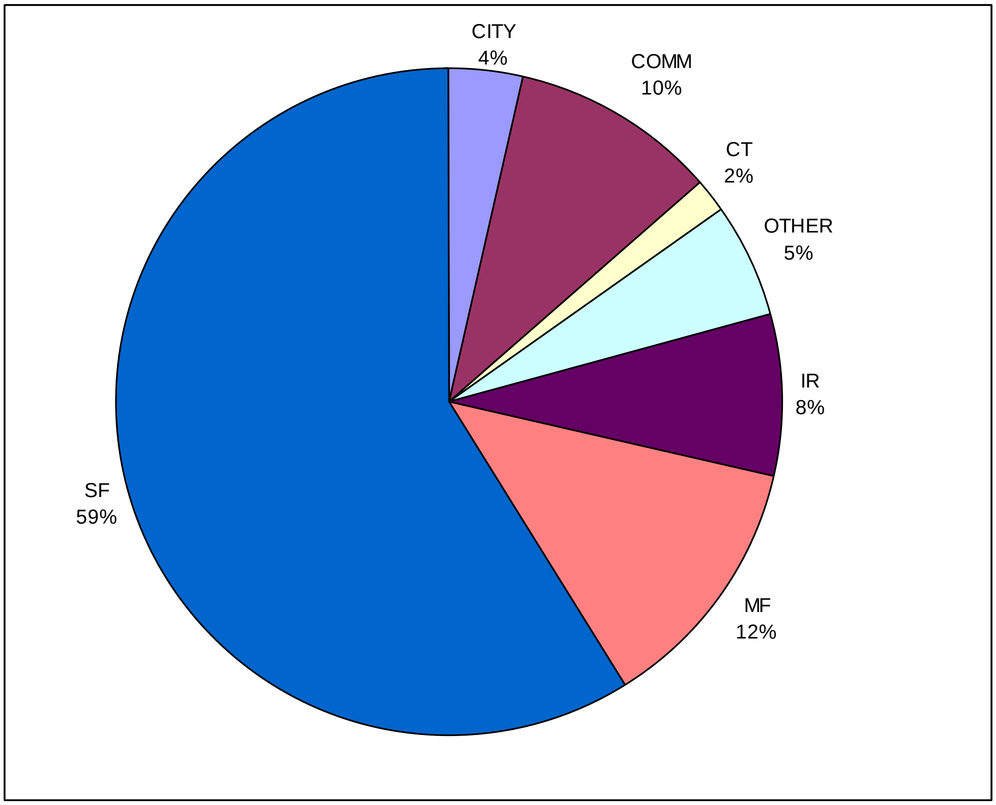
Since the early 1900s, the Coachella Valley (Valley) has been dependent on groundwater as the primary source of drinking water. Groundwater from the Coachella Valley Basin, and predominantly its Whitewater River Subbasin, has also been used to supply irrigation for crops, fish farms and duck clubs, golf courses, greenhouses, industrial uses, and municipalities throughout the Valley. Historically, 100 percent of water supplies for the City of Indio have come from the underlying groundwater aquifer, which also serves the other water purveyors throughout the Valley. It is well documented that the groundwater basin has been in a state of "overdraft" in varying degrees for several years (BV, 2008a).

In addition to groundwater, supplemental water supplies for the Valley have historically included Colorado River Water imported via the Coachella/All American Canal; imported water exchanged for the State Water Project (SWP) entitlement water; minimal surface waters from local streams; agricultural drains, which are surface waters of the State identified separately from local streams; and, recycled water from wastewater treatment plants and fish farms.

2.3 Historic Water Use

As the City of Indio has grown and developed, so has its demand for water. In 2002, consumption was approximately 16,900 AFY. By 2009, consumption was over 21,000 AFY, all of which was supplied by groundwater. Nearly 60 percent of those supplies are for demands within the single-family residential customer class. The State Water Resources Control Board (SWRCB, 2009) for the region indicates that approximately 70 percent of single-family residential water demands are for outdoor uses. Figure 2-1 presents water consumption by customer class.

Figure 2-1: Average Annual Water Consumption by Customer Class Based on 2006-2009 Data



Water use varies by season as a result of increasing irrigation demands with warmer temperatures. Figure 2-2 illustrates average monthly demands within IWA's service area as a percent of annual total demands (BV, 2009).

Figure 2-2: Average Monthly Water Use (BV, 2009)

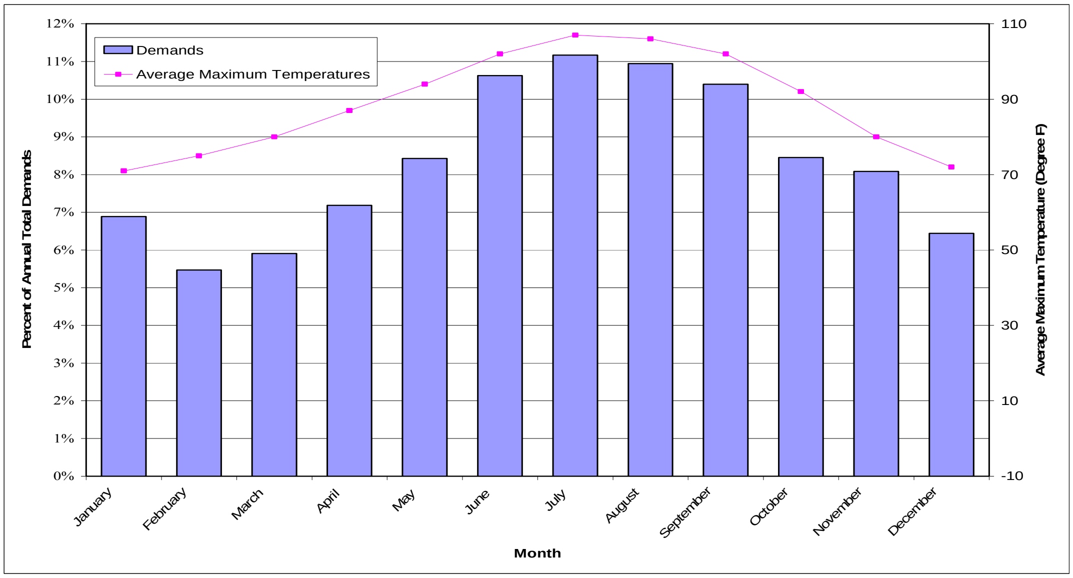


Table 2- presents IWA's household water usage based on residential (single- and multi-family) water consumption. Estimates for the average numbers of persons living within each housing unit are also presented. Occupancy estimates were calculated directly from the population and housing unit values presented in Riverside County's 2009 Progress Report (Riverside County, 2009).

Table 2-1: Daily Household Water Usage (gallons per household per day) for IWA's Service Area

Gallons per Household per Day	2002	2003	2004	2005	2006	2007	2008	2009	2010*	Average
Household Usage Rate[1]	569	603	574	542	579	557	510	497	497	562
Average # Persons per Household[1]	3.01	2.98	2.99	2.98	2.96	2.91	2.92	2.95	2.95	2.95

[1] Riverside County, 2009. Housing Units

*Values for 2010 are assumed to be equivalent to 2009 values as billing data was not available at the time of report preparation.

2.4 Unaccounted for Water

In all distribution systems, differences exist between the amounts of water produced (pumped) or treated and the amount actually consumed, which is based on metered/billing records. These differences may be referred to as "non-revenue waters" (NRW) or as "system water losses." Some revenue losses may be attributed to leaks in the distribution system (real losses), but more often they are a result of apparent losses which include un-metered connections, meter inaccuracies, maintenance operations, storage overflows, street cleanings and/or fire flows. Previous studies estimated IWA's NRW to be 4.7 to 7.5 percent (Metcalf & Eddy, 2006, and Dudek, 2008, respectively), while more recently, unaccounted for water has ranged between 7.5 and 10 percent. IWA has initiated a program to replace old meters in order to reduce any discrepancies which may result from worn water meters. The meter replacement program is intended to assist IWA in reducing NRW and thus a value of 7.5 percent has been utilized for projecting future unaccounted for water losses.

Table 2-2: Unaccounted for Water Losses in AFY

	2005	2010	2015	2020	2025	2030
Unaccounted for System Losses[2]	[1] 940	1,561	1,998	2,287	2,428	2,671

[1] Metcalf & Eddy, 2006.
[2] All values except 2005 assume 7.5% unaccounted for water loss.

2.5 Water Wholesales

IWA is not a water wholesaler and does not supply or sell water to other agencies.

2.6 Baseline and Target Water Use

Under section 10608.20 of the Water Conservation Act of 2009 (SBX7-7), urban retail water suppliers are required to report a baseline daily per capita water use, an urban water use target, an interim urban water use target, and a compliance daily per capita water use in their 2010 UWMP. Supporting data and bases for the estimates are also required.

2.6.1 Baseline Water Use

To calculate the baseline water use, the supplier must first define the base period. This is either a 10-year period if recycled water use in 2008 was less than 10 percent of the total water delivered or a 15-year period if recycled water use in 2008 was greater than 10 percent. IWA did not supply any recycled water in 2008 and therefore their baseline water use is based on a 10-year base period. In addition to the 10-year base period, DWR also requires than an evaluation be performed over a 5-year continuous period, ending no earlier than December 31, 2007 and no later than December 31, 2010. Table 2-3 presents the IWA base periods.

Table 2-3: Base Period Ranges (DWR Table 13)

Base	Parameter	Value	Units
10 to 15 Year Base Period	2008 Total Water Deliveries	7,221	MG
	2008 Total Volume of Delivered Recycled Water	0	AF
	2008 Recycled Water as a Percent of Total Deliveries	0	%
	Number of Years in Base Period Range	10	Years
	Year Beginning Base Period Range	2001	
	Year Ending Base Period Range	2010	
5 Year Base Period	Number of Years in Base Period	5	Years
	Year Beginning Base Period Range	2003	
	Year Ending Base Period Range	2007	

The Gross Water Use for each of the years in the baseline period is rather straightforward for IWA as their sole water source during the period has been groundwater. There have been no imports, exports, changes in system storage, indirect recycled water use, or agricultural deliveries. Base water use for each year in the base period is calculated as:

$$\textit{Daily per Capita Water Use (gpcd)} = \frac{Gross\_Water\_Use}{Population}$$

Table 2-4 presents the Gross Water Use and Daily per Capita Water Use for each of the 10 years in the base period. Table 2-5 presents the baseline per capita water use for the 5-year base period.

Table 2-4: Base Daily per Capita Water Use – 10-Year Range (DWR Table 14)

Base Years	Service Area Population*	Gross Water Use (gal. per day)	Daily Per Capita Water Use (3) ÷ (2)
2001	50,435	18,660,129	370
2002	52,463	17,349,581	331
2003	55,078	16,596,998	301
2004	60,035	18,680,662	311
2005	66,358	18,584,246	280
2006	71,949	21,283,903	296
2007	77,046	22,207,000	288
2008	80,962	22,081,123	273
2009	82,230	20,757,184	252
2010	76,036	19,276,122	254
		Total of Column:	2956
		Divide Total by Number of Base Years(10):	296
*2001 through 2009 CA DOF; 2010 US Census			

Table 2-5: Base Daily per Capita Water Use – 5 Year Range (DWR Table 15)

Base Years	Service Area Population*	Gross Water Use (gal. per day)	Daily Per Capita Water Use (3) ÷ (2)
2003	55,078	16,596,998	301
2004	60,035	18,680,662	311
2005	66,358	18,584,246	280
2006	71,949	21,283,903	296
2007	77,046	22,207,000	288
		Total of Column:	1477
		Divide Total by 5:	295
*2001 through 2009 CA DOF; 2010 US Census			

2.6.2 Target Water Use

An urban retail water supplier must set a 2020 water use target and a 2015 interim target using one of four methods.

- Method 1: Eighty percent of the water supplier's baseline per capita water use
- Method 2: Per capita daily water use estimated using the sum of performance standards applied to indoor residential use; landscaped area water use; and Commercial, Industrial and Institutional (CII) uses
- Method 3: Ninety-five percent of the applicable state hydrologic region target as shown in Figure D-3 of the DWR 2010 UWMP Guidebook.
- Method 4: Baseline per capita water use minus savings from achieving water conservation measures in three water sectors (CII, Residential Indoor, and Landscape water use along with losses).

In accordance with Water Code Section 10608.22, the 2020 urban water use target also must be less than the Minimum Water Use Reduction Requirement, which is calculated as 95% of the 5-year base daily per capita water use. For Indio, this is 281 gpcd. Thus, the 2020 Water Use Target cannot exceed 281 gpcd. Table 2-6 presents potential 2020 Water Use Targets for IWA.

Table 2-6: Potential Urban Water Use Targets for 2020

Approach/Method	Description	Target (gpcd)
	Baseline per capita daily use (10-year)	296
	Baseline per capita daily use (5-year)	295
1	80% of water supplier's baseline per capita water use for the 10-year period.	236
2	Per capita daily water use estimated using the sum of performance standards applied to indoor residential, landscaped area water use; and CII uses	Not Calculated
3	95% of the applicable state hydrologic region target	200
4	Baseline per capita water use less savings from achieving water conservation measures in three water sectors (CII, Residential Indoor, and Landscape water use along with losses).	Not Calculated
Minimum Reduction Requirement	95% of Baseline per capita daily use for the 5-year period.	281

The interim 2015 urban water use target is calculated as the average of the 10-year base per capita water use and the 2020 urban water use target. Table 2-7 presents IWA's 2015 and 2020 Water Use Targets.

Table 2-7: Urban Water Use Targets

Base Daily Per Capita Water Use (gpcd)	296
2015 Interim Urban Water Use Target (gpcd)	266
2020 Urban Water Use Target (gpcd)*	236
*80 percent of the Base Daily Per Capita Water Use per Method 1	

2.7 Projected Water Use

Projected water demands through 2030 for all customer classes were developed in the Urban Water Efficiency and Conservation Master Plan (CMP) (BV, 2009) and summarized in the following pages. Projected demands are estimated as: the number of projected accounts for each customer class as presented in the 2005 UWMP Addendum (BV, 2008) multiplied by the water use rates for each customer class which are based on 2008 consumption data. Table 2-8 presents past, current and projected water deliveries for each customer class as well as the number of accounts through 2030. All accounts in the IWA service area are metered.

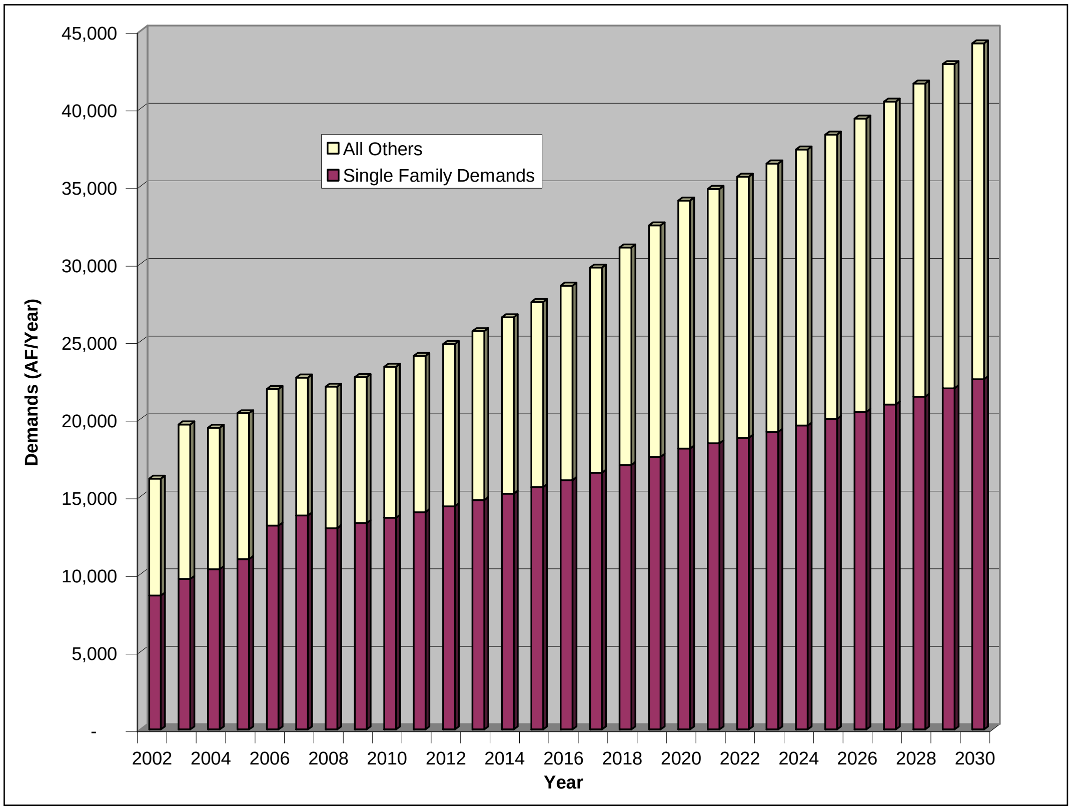
Table 2-8: Past, Current and Projected Water Deliveries (BV, 2009). (DWR Tables 3 through 7)

Customer class	2005		2010*		2015	
	# of Accounts	Deliveries (AFY)	# of Accounts	Deliveries (AFY)	# of Accounts	Deliveries (AFY)
Single-Family	13,708	10,885	18,484	11,121	21,597	15,611
Multi-Family	387	2,817	407	2,473	457	3,558
Commercial	786	2,173	884	1,615	1,330	2,589
Institutional/Gov	195	2,262	260	2,946	316	3,078
Industrial/Construction	44	288	44	211	45	425
Irrigation	226	1,381	386	1,664	444	2,332
Other	1	71	1	1	1	1
Total	15,347	19,877	20,466	20,031	24,190	27,594
Customer class	**2020**		**2025**		**2030**	
	# of Accounts	**Deliveries (AFY)**	**# of Accounts**	**Deliveries (AFY)**	**# of Accounts**	**Deliveries (AFY)**
Single-Family	24,710	18,094	28,169	19,996	31,627	22,553
Multi-Family	507	4,267	560	4,702	612	5,322
Commercial	1,376	3,580	1,583	4,107	1,789	4,839
Institutional/Gov	372	5,093	409	6,242	446	7,898
Industrial/Construction	45	425	45	425	45	425
Irrigation	502	2,680	557	2,921	612	3,116
Other	1	1	1	1	1	1
Total	27,513	34,141	31,323	38,394	35,132	44,154

*Deliveries by customer class for 2010 were not available at the time of report production. However total water production was available. Deliveries by customer class for 2010 were estimated as being proportionate to customer class deliveries in 2009.

According to the CMP (BV, 2009), demands are projected to reach approximately 44,000 AFY by 2030 at current use rates. The projections correspond well to estimates presented in the 2007 Water Master Plan Update (Dudek, 2008) for projected demands at build-out, which were 43,700 AFY (39.0 MGD). Figure 2-3 presents annual projected demands through 2030 for the reference or baseline scenario, which is without implementing future conservation beyond that already implemented in 2008. The water demands for the single-family customer class are shown for comparison with all other customer classes.

Figure 2-3: Project Demands Through 2030 (BV, 2009)



The CMP also presents adjusted demand projections, which consider the impacts of future water conservation programs and demand management measures. Under a moderate conservation program (MCP), demands were estimated to reach approximately 33,000 AFY by 2030. This is a savings of 11,000 AFY, which equates to an approximately 25 percent reduction in demand. Under a more aggressive conservation program (ACP), water demands were estimated to reach approximately 30,000 AFY by 2030, which is a savings of 14,000 AFY. Potential water savings under the MCP and ACP are presented in Table 2-9.

Table 2-9: Projected Water Savings (AFY) from Conservation Programs

Conservation Program	2005	2010	2015	2020	2025	2030
MCP	0	445	2,855	5,832	8,300	11,100
ACP	0	520	3,220	6,330	9,270	12,600

See Figure 2-4 and Figure 2-5 for demand projections under the moderate and aggressive Conservation Programs, respectively.

Figure 2-4: Projected Demands Through 2030 with a Moderate Conservation Program (MCP) (BV, 2009)

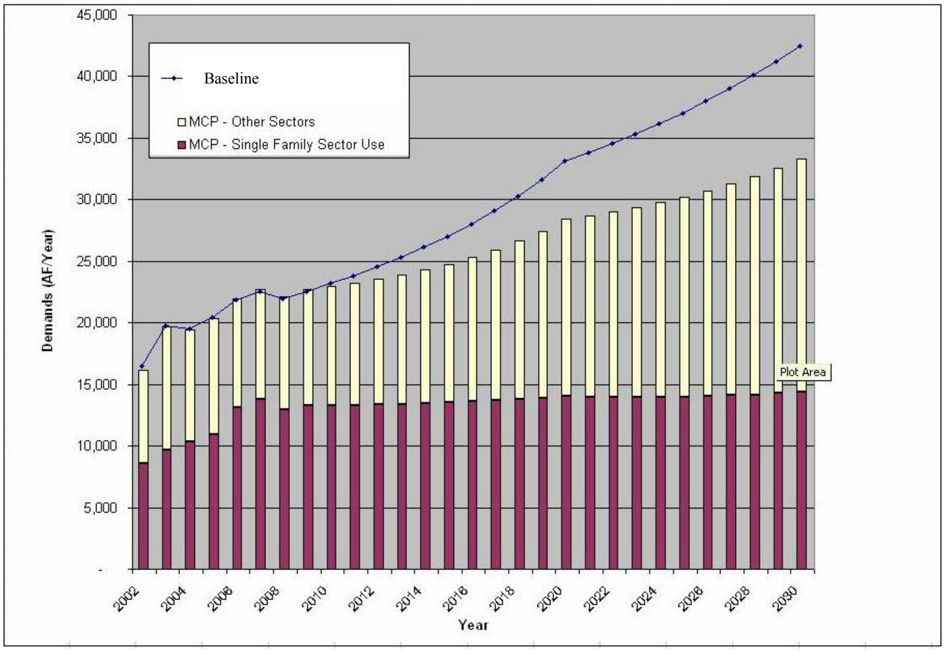
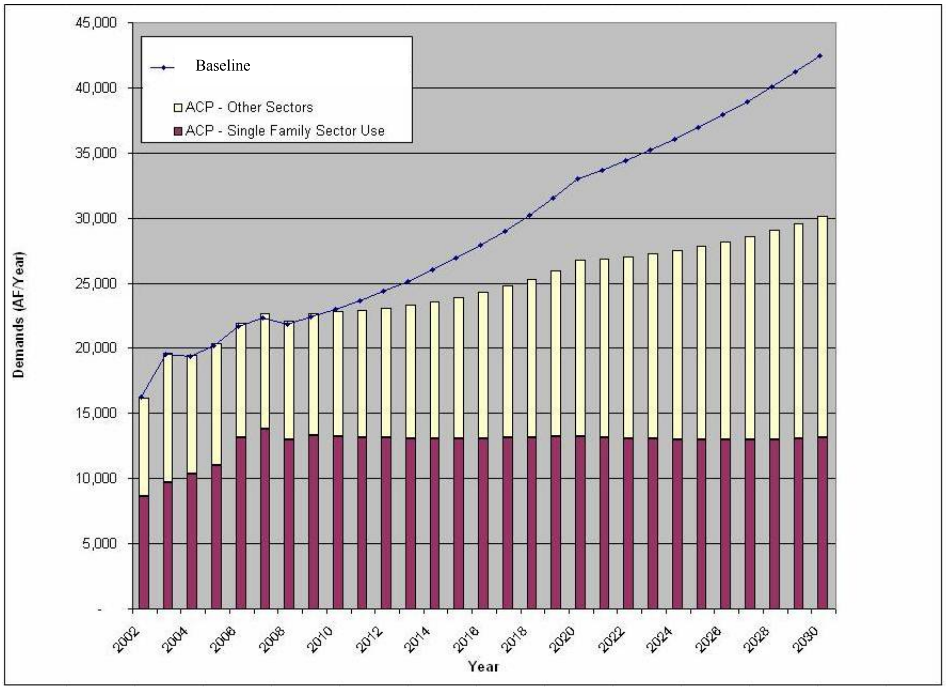


Figure 2-5: Projected Demands Through 2030 with an Aggressive Conservation Program (ACP) (BV, 2009)



Additional water savings may materialize as a result of reduced system losses. Generally, unaccounted for system losses are proportional to the amount of water produced. If less water is produced as a result of conservation, we would also expect to see a reduction in unaccounted for system losses. Unaccounted for losses for the base/reference year under a moderate conservation program and under a more aggressive conservation program are presented in Table 2-10.

Table 2-10: Unaccounted for Losses (AFY) under Each of the Conservation Programs (7.5% of Production)

Program	2005	2010[2]	2015	2020	2025	2030
Reference[1]		1,561	2,236	2,763	3,098	3,572
MCP	940	1,561	1,998	2,287	2,428	2,671
ACP	940	1,561	1,940	2,168	2,257	2,443

[1]7.5% loss based projected demands without implementation of any conservation programs
[2] Estimated as 7.5% of production

IWA is focusing its efforts on implementing a moderate conservation program at this time. A more aggressive program may be considered once the program's components (demand management measures, residential and municipal re-landscaping programs, SMART irrigation meters, etc.) can be evaluated. Any further discussions in this UWMP regarding water savings from a conservation program will be referring to the MCP.

2.8 Projected Demands Summary

Demand projections were previously presented in Table 2-8. Additional water uses and losses are presented in Table 2-11.

Table 2-11: Additional Water Uses and Losses - AFY (DWR Table 10)

	2005	2010	2015	2020	2025	2030
Unaccounted for Losses[1]	940	1,561	1,998	2,287	2,428	2,671
Conservation	-		(2,900)	(5,800)	(8,400)	(11,100)
Total	940	1,561	(902)	(3,513)	(5,972)	(8,429)
[1]Based on Moderate Conservation Program implementation						

Total water use, which is presented in Table 2-12, includes:

- Potable water demands
- Unaccounted for water losses
- Water savings resulting from demand management and conservation programs

Table 2-12: Total Water Use - AFY (DWR Table 11)

	2005	2010	2015	2020	2025	2030
Total Water Use	20,817	21,592	26,692	30,628	32,422	35,725
Totals of DWR Tables 3-7 and 10.						

2.9 Lower Income Housing Water Use Projections

California Water Code 10631.1 requires retail urban water suppliers to provide water use projections for future single-family and multifamily residential housing needed for lower income households. These water use projections are to assist a supplier in complying with state code which grants priority of the provision of service to housing units that is affordable to lower income households.

The *2006-2014 Growth Needs of the City of Indio's Housing Element* (2009) lists 1,662 low and very low income housing units that meet the definition of the Southern California Association of Governments Regional Housing Needs Assessment Plan. This is just over 5 percent of all new housing units projected for 2015 (Riverside County Center for Demographic Research). A similar proportion of future lower income housing units are estimated for years 2020 through 2030.

The estimated residential per unit water demand is 0.56 AFY/unit (497 gallons/unit/day in 2009, see Table 2-1). Thus, 903 AFY are needed in 2015 to supply the projected lower income housing units.

Table 2-13 presents projected water demands for lower income housing units through 2030. Water demands for these units are included in future water demand projections for single family and multi -family homes which were presented in Table 2-8 (DWR Tables 5-7).

Table 2-13: Low Income Housing Projected Water Demands (DWR Table 8).

	2015	2020	2025	2030
Low Income Housing Water Demands (AFY)	903	973	1,043	1,113

CHAPTER 3 – WATER RESOURCES

3.1 Overview

This section describes the water resources currently available to IWA and those planned for the 20-year period covered by the 2010 UWMP. Throughout the Valley, the only direct water source employed for potable urban water uses is local groundwater. Although both CVWD and DWA have (SWP) and Colorado River water rights, these waters are currently used only to either replenish the groundwater basin via recharge or for agricultural irrigation and other non-urban purposes. Colorado River water is delivered to the Coachella Valley via the Coachella Canal, while SWP is exchanged for Colorado River water.

Currently, groundwater is the sole supply source for IWA. The 2005 and 2010 reported values for total water supply are the volumes of water that were actually pumped from groundwater basins to meet IWA needs. Water supply totals for 2015-2030 are projected demands including the savings projected from implementing a moderate conservation program (IWA, 2008 IWA is actively pursuing several agreements that would enable it to exchange purchased water for Colorado River Water. IWA plans to invest in infrastructure that would enable it to treat and serve Colorado River Water from the Coachella Canal to its urban water customers, while any excess water would be sent to recharge basins for aquifer recharge.

Assumptions to develop the projected water supply values include:

- Delivery of surface water supplies will begin in 2013 at 5,000 AFY up to a maximum of 20,000 AFY.
- Potable supply from a 10 MGD Surface Water Treatment Plant (SWTP) for Colorado River Water from the Coachella Canal is online by 2015, with an expanded capacity of 14 MGD by the year 2030 (BV, 2010)
- Surface water will be treated at the SWTP for potable use with any excess water utilized for aquifer recharge through spreading basins.
- Supplies from recycled water are available by 2015.
- Any recycled water that is not reused or treated canal water that is not required to meet direct use demands will be used for aquifer recharge.

Both currently available and planned water supplies sources are summarized in Table 3-1.

Table 3-1: Current and Planned Water Supplies – AFY (DWR Table 16)

Water Supply Sources	2005	2010	2015	2020	2025	2030
Surface Water[1]	0	0	5,000	10,000	20,000	20,000
Wholesale Water	0	0	0	0	0	0
Supplier Produced Groundwater	20,800	21,600	20,000	20,000	20,000	20,000
Transfers In or Out	0	0	0	0	0	0
Recycled Water (Projected Use)	0	0	1,700	5,800	6,500	6,500
Total	20,800	21,600	26,700	35,800	46,500	46,500

[1] Unspecified water deals totaling up to 20,000 AFY

The term "dry" is used throughout this chapter, and in subsequent chapters concerning water resources and reliability, as a measure of supply availability. As used in this Plan, dry years are those years when supplies are the lowest, which occurs primarily when precipitation is lower than the long-term average precipitation. The impact of low precipitation in a given year on a particular supply may differ based on how low the precipitation is, or whether the year follows a high-precipitation year or another low-precipitation year. For the SWP, a low-precipitation year may or may not affect supplies, depending on how much water is in SWP storage at the beginning of the year. Also, dry conditions can differ geographically. For example, a dry year can be local to the Valley area (thereby affecting local groundwater replenishment and production), local to northern California (thereby affecting SWP water deliveries), or statewide (thereby affecting both local groundwater and the SWP). When the term "dry" is used in this Plan, statewide drought conditions are assumed, affecting both local groundwater and SWP supplies at the same time.

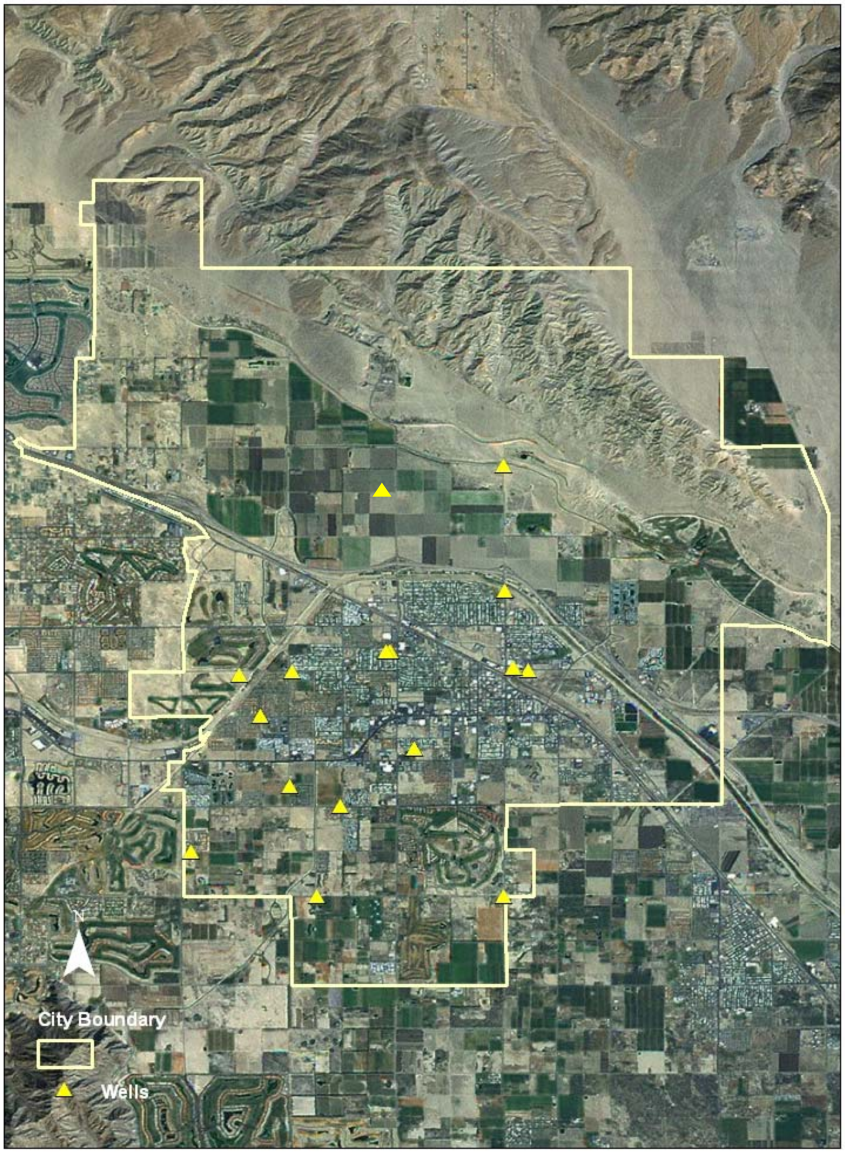
3.2 Groundwater

The primary source of water supply in the Valley is groundwater. The most prominent groundwater basin in the Valley is the un-adjudicated Whitewater River Basin. Much of the groundwater in the Whitewater River Basin originated from deep percolation of rainfall and stream runoff from the adjacent mountains. This basin is composed of two primary subbasins, the Upper and Lower Whitewater River Subbasins.

The Upper and Lower Whitewater River Subbasins extend from the northwest edge of the Upper Valley near Whitewater to the Salton Sea in the Lower Valley (DWR, 2003b). The two subbasins are estimated to have a combined storage capacity of approximately 30 million acre-feet (DWR, 1964).

Groundwater has historically been the sole source of supply for IWA. Supplies for the City of Indio are primarily from the lower aquifer in the Lower Whitewater River Subbasin. IWA currently has 20 operational supply wells. Pumping capacities for these wells range from 1,200 gpm to 3,200 gpm, with a total pumping capacity of 72 MGD. Supply wells are located throughout the City. Figure 3-1 illustrates IWA's supply well locations.

Figure 3-1: Well Locations



IWA water production accounts for approximately 4 to 6 percent of the total volume of water pumped in the Valley (BV, 2008a). Since the Whitewater River Basin is an un-adjudicated aquifer, IWA does not hold specific water rights, but rather pumps supplies from the aquifer as needed to meet demands within its service area. Table 3-2 lists the historical records of groundwater pumped from the Whitewater River Basin by IWA. Similarly, the amount of groundwater projected to be pumped in 2015-2030 is presented in Table 3-3. These projections include projected demand requirements and 7.5 percent of unaccounted for losses.

Table 3-2: Amount of Groundwater Pumped – AFY (DWR Table 18)

Year	2005	2006	2007	2008	2009	2010
Whitewater River Basin	20,817	23,841	24,875	24,734	23,251	21,592
% of Total Water Supply	100%	100%	100%	100%	100%	100%

Table 3-3: Amount of Groundwater Projected to be Pumped – AFY (DWR Table 19)

Year	2015	2020	2025	2030
Whitewater River Basin	20,000	20,000	20,000	20,000
% of Total Water Supply	75%	56%	43%	43%

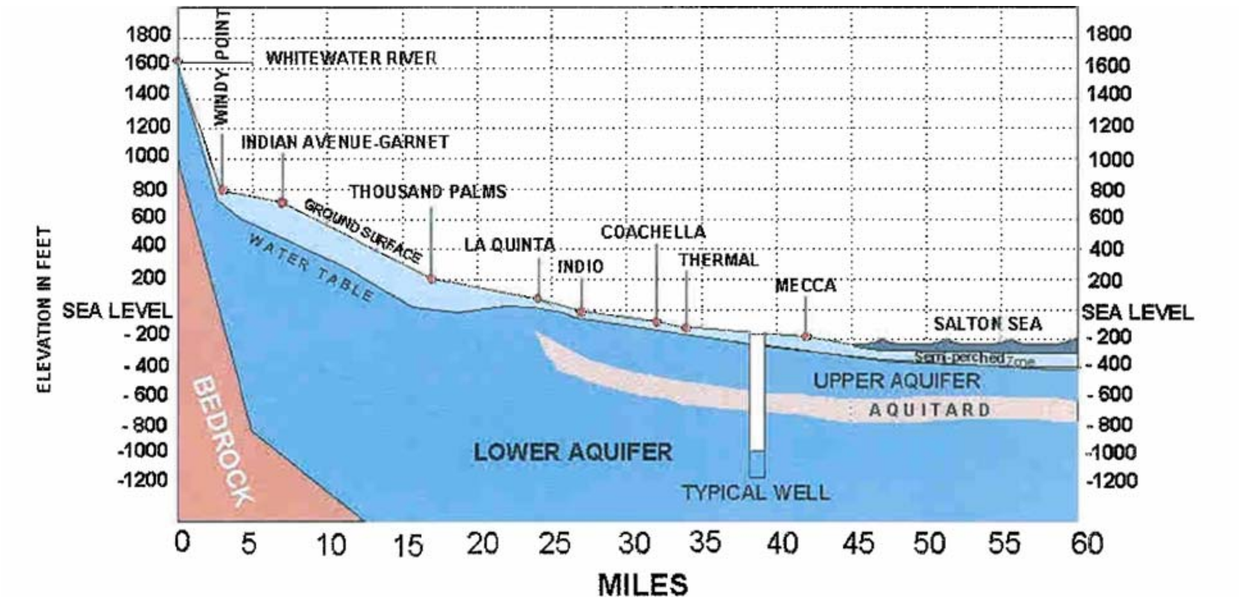
Groundwater quality varies throughout the Valley and is difficult to characterize (see Chapter 5—Water Quality). Most groundwater extracted for potable municipal supply in the Valley has total dissolved solids (TDS) concentrations of less than 300 mg/L (CVWD, 2002). IWA's groundwater from local wells has had average TDS concentrations of 200 mg/l.

3.2.1 Whitewater River Basin Description

In the upper portion of the Coachella Valley, underlying sediments profiles consist of coarse sand and gravel with minor amounts of clay. The aquifer in this area is unconfined, allowing water that rests on the ground surface to percolate directly into the underlying aquifer system, making recharge simple and efficient (CVWD, 2002). Figure 3-2 illustrates the hydrogeologic profile of the Upper and Lower Whitewater River Subbasins.

As illustrated, a confining layer, or aquitard, begins near La Quinta and continues south to the Salton Sea, conceptually dividing the Lower Valley into four main hydrogeologic units: the semi-perched aquifer, the upper aquifer, the aquitard or confining layer, and the lower aquifer. The 100 to 200 foot-thick aquitard restricts groundwater flow between the upper and lower aquifers (CVWD, 2002) in the Lower Whitewater Subbasin, and generally slows the deep percolation of surface runoff and applied irrigation water.

Figure 3-2: Hydrogeologic Profile of the Upper and Lower Whitewater River Subbasins



Source: CVWD, 2002

According to CVWD's assessment in 2002 and based upon historical data, the average natural recharge is approximately 49,000 AFY, with a range of 10,000 AFY to 187,000 AFY depending on annual precipitation values, while demands in recent years have exceeded 465,000 AFY. The relatively low natural recharge rate compared to annual demands has yielded the current overdraft condition. Groundwater levels in the basin have been steadily declining as a result of pumping since 1936, with a small period of recovery in the early 1950s due to the commencement of canal water deliveries. However, groundwater pumping again increased in the 1980s, followed by a period of rapid urban development which exacerbated water levels and groundwater storage in the Lower Valley declined, resulting in a deficit of more than 50,000 AFY in the 1990s. Based on the water balance performed for the CVWD Final Water Management Plan (2002), through 1999, the presumed 30 million acre-foot capacity of the Upper and Lower Whitewater River Subbasins was estimated to be in an overdraft condition with 1.7 million acre-feet of total stored water lost and 4.7 million acre-feet of freshwater storage lost. Of this, over 3.7 million acre-feet was withdrawn from the Lower Whitewater River Subbasin (CVWD, 2002). Freshwater storage excludes return flows from poor water quality sources, such as agricultural drainage and golf courses that do not meet potable water standards.

In the Lower Valley, regional water levels have been declining since the early 1950s. Groundwater level data indicate that, since 1952, water levels have declined at a rate of 0.5 to 1.5 feet per year and, in some portions of the subbasin, groundwater levels have decreased by more than 60 feet to date. In the Upper Valley, storage generally declined until SWP exchange water was delivered in 1973. Since that time, the change in storage has largely been dependent upon SWP deliveries (BV, 2008a).

CVWD and DWA are involved in efforts to recharge the aquifers of the Upper and Lower Whitewater River Subbasins. Due to the hydrogeology of the area, recharge in the Upper Subbasin is relatively simple and recharge efforts have had some success, especially in the vicinity of the spreading facility near Palm Springs. According CVWD's UWMP (2005a), water surface elevations in the Palm Springs area from 1980 to 2005 either remained relatively stable or increased. However, recharge efforts in the Upper Subbasin have not directly translated into increased groundwater surface elevations in the Lower Subbasin. In the lower Valley, groundwater recharge had been limited due to the depth of the aquifer and the presence of the confining layer. The Thomas E. Levy Replenishment Facility and the Martinez Canyon Pilot Recharge Facility, both located in the lower Valley, have recharged more than 60,000 AF since 1997.

A secondary issue, which has resulted from the overdraft and declining water levels, is land subsidence. Land subsidence can disrupt surface drainage, cause earth fissures, damage wells and other infrastructure, and can ultimately reduce the overall storage capacity of the aquifer due to soil compaction in the absence of water. The U.S. Geological Survey (USGS) has been investigating subsidence in the Coachella Valley since 1996 and has recently released a report on their findings (Sneed and Brandt, 2007). Their findings suggest that, in the southern Coachella Valley, land surface elevations have had a net decline of 22 millimeters (1 inch) to 333 (13 inches) (±58 millimeters, ±2 inches). The USGS suggests that the subsidence may be due to aquifer compaction and could be permanent.

3.2.2 Groundwater Management Plan

The amount of water pumped in the Valley has annually exceeded the natural and artificial recharge rate resulting in an overdraft condition in Whitewater River Groundwater Basin. Currently, IWA does not have a Basin Management Plan. The largest water purveyor in the Valley, CVWD, considers the 2002 Coachella Valley Final Water Management Plan (CVWD, 2002) and the 2010 Water Management Plan Update to be a Basin Management Plan. However, it is anticipated that the development of the Integrated Regional Water Management Plan will complement and enhance the CVWD Water Management Plan with input from all of the water purveyors in the Valley, and will most likely include increasing imported water supplies, conservation, recharge, and source substitution, to eliminate overdraft.

3.2.3 Groundwater Supply Inconsistencies/Reliability

The Whitewater River Groundwater Basin is un-adjudicated and has sufficient storage to meet projected needs for the 20 year planning period. Thus, issues related to reliability of supply & vulnerability to seasonal and climatic changes do not significantly affect the reliability of the Coachella Valley Groundwater Basin. Currently, 100 percent of water delivered by IWA comes from this source. Additional discussions regarding the reliability of groundwater supplies are presented in Chapter 6 – Reliability Planning.

3.3 Surface Water Supplies to IWA

In dry years, IWA intends to purchase Colorado River Water from CVWD to be treated at the future Surface Water Treatment Plant. The delivery agreement will be developed in accordance with the June 30, 2009 CVWD-City of Indio Settlement Agreement Section 2.d. (2): "In order to facilitate new projects implemented by Indio that make reasonable and beneficial use of water, CVWD will agree to sell Colorado River water for use as groundwater recharge in such projects at a rate equal to the rate that is charged to any CVWD recharge project." The amount of surface water purchased will be based on the Surface Water Treatment Plant capacity and desire to achieve IWA's goal of not exceeding 20,000 AFY of groundwater production.

Colorado River Apportionment

Since the 1940s, Colorado River water has served as a source of supply for the Valley. Water from the Colorado River is delivered to Southern California via the All American Canal and to the Coachella Valley via the Coachella Canal, which is a branch of the All American Canal. CVWD is the sole shareholder of Colorado River water rights in the Coachella Valley. Under the Quantification Settlement Agreement, CVWD has a base allotment of 330,000 AFY. Also under the Quantification Settlement Agreement, CVWD's allocation will increase to 459,000 AFY by 2026 as a result of transfer agreements with Imperial Irrigation District (IID) and MWD.

CVWD has also entered into transfer agreements with IID and MWD to receive additional Colorado River water supplies. When all water transfers have been completed by 2033, CVWD will have a total diversion of 459,000 AFY at Imperial Dam as shown in Table 3-4. After deducting conveyance losses, about 444,000 AFY will be available for use in the Valley (CVWD, 2005a).

Table 3-4: CVWD Priority 3(a) Deliveries under Quantification Settlement Agreement and MWD SWP Exchange Agreement

Component	Amount (AFY)
Base Allotment	330,000
1988 MWD/IID Approval Agreement	20,000
Coachella Canal Lining (to SDCWA and SLR[1])	-26,000
To Miscellaneous/Indian Present Perfected Rights (PPRs)	-3,000
IID/CVWD First Transfer (Phase 1)	50,000
IID/CVWD Second Transfer (Phase 2)	53,000
Metropolitan SWP Transfer	35,000
Total Diversion at Imperial Dam	459,000
Less Conveyance Losses[2]	-15,000
Total Deliveries to CVWD	444,000

1 San Luis Rey Indian Water Rights Settlement Parties
2 Assumed conveyance losses after completion of Coachella Canal Lining.
Source: CVWD, 2005a

As part of the Quantification Settlement Agreement, CVWD entered into an agreement with IID to allow IID to store a portion of its Colorado River water in the Coachella Valley's Upper and Lower Whitewater River Subbasins. CVWD will return the stored water minus losses by reducing its consumptive use of Colorado River water by an amount requested by IID not exceeding the amount previously put into storage.

3.4 Transfers, Exchanges, and Groundwater Banking Programs

3.4.1 Valley-wide Program – State Water Project

Both CVWD and DWA are among the 29 State Water Contractors holding contracts for State Water Project (SWP) Table A water. Through various agreements and purchases, both CVWD and DWA have been able to increase their total allocations of Table A SWP water. Their original allocations were 23,100 AFY and 38,100 AFY, respectively. Today, CVWD's total allocation of Table A water is 138,350 AFY and DWA's allocation is 55,750 AFY for a total of 194,100 AFY to the Valley. However, the amount of water that they are actually allocated in any give year is based on the amount of SWP hydrologically available in that year. For example, in 2010, the allocation was only 50 percent of the total amount contracted.

Neither agency has a direct physical connection to the SWP by which they can receive SWP water. Rather, their SWP water is delivered to Metropolitan Water District of Southern California (MWD) and in exchange, MWD transfers an equal amount of water to the Coachella Valley via its Colorado River Aqueduct, which traverses the Valley near Whitewater.

Since 1973, SWP Exchange water has been used to recharge the Upper Whitewater River Subbasin at the Whitewater Recharge Facility. Under the Advance Delivery Agreement, MWD can pre-deliver up to 800,000 AF of Colorado River water into the Valley. This agreement gives MWD the flexibility to deliver CVWD SWP allocations either from their Colorado River Aqueduct or from water previously stored in the basin.

3.4.2 IWA Program

IWA would like to acquire as much as 20,000 AFY of new surface water supplies. Specific details of a water acquisition deal are not available, but it is desirous that deliveries from any deal would commence in 2013. This new supply would reach IWA via existing SWP and Colorado River water exchange agreements coordinated by CVWD and Metropolitan Water District. For the purpose of this Plan, it is assumed that deliveries of a new surface water supply would commence in 2013 at 5,000 AFY, with 10,000 AFY by 2020 and 20,000 AFY by 2030.

The surface water supply will be treated and served in-lieu of pumping groundwater to meet local domestic, industrial, and commercial demands. Excesses in this supply could be recharged and/or reserved for future storage and recovery program negotiations (i.e., providing a water source to outside agencies in exchange for developing a local storage account and financing capital facilities). This supply source would increase IWA's flexibility in serving its clients and, as a result, would help to reduce the groundwater overdraft in the area. The Coachella Canal is readily accessible to IWA, making this a potentially feasible option.

The selection of an efficient and capable water treatment process train will ultimately provide a water supply that is compatible with the existing system water supplies and minimize corrosion issues associated with blending two source waters. IWA is currently developing a feasibility report to evaluate the construction of a 10 MGD water treatment plant that could be expanded in the future. One of the concerns with the Canal water is total dissolved solids (TDS) levels. TDS levels in the Coachella Canal range from 650-800 mg/L. However, groundwater TDS levels are approximately 200 mg/L and IWA intends to blend the two supplies to meet target water quality objectives.

A summary of the transfer/exchange opportunity to IWA is presented in Table 3-5.

Table 3-5: Transfer and Exchange Opportunities – AFY (DWR Table 20)

Transfer Agency	Transfer or Exchange	Short Term	Proposed Quantities	Long Term	Proposed Quantities
IWA Transfers & Exchanges					
MWD/CVWD – SWP/CRW	Transfer/ Exchange	N/A	N/A	X	20,000

3.4.3 Groundwater Banking Programs

Groundwater banking opportunities have been provided to MWD by CVWD and DWA through an advanced delivery agreement. CVWD and DWA entered into the Advanced Delivery Agreement in 1984, wherein Colorado River supplies are percolated into the Whitewater aquifer during periods of surplus water availability, with the understanding that MWD will utilize the banked supplies during periods of future water shortages in Southern California. As of 1999, MWD had stored 290,300 AF of Colorado River water in the groundwater basin (CVWD, 2002). The storage amount varies significantly from year to year and was at approximately 44,000 AF at the close of 2009. Under the terms of the Advanced Delivery Agreement, MWD's balance cannot fall below zero. (CVWD, 2010 comment on IWA draft UWMP)

3.5 IWA Planned Water Supply Projects and Programs

IWA has initiated planning processes to develop a more reliable water supply for the City of Indio while reducing the groundwater overdraft. Viable water management alternatives were identified and screened. A Water Resources Development Plan was developed, identifying preferred alternatives to be given a high priority for implementation. These preferred alternatives will help to diversify IWA's supply and reduce groundwater production. These projects include:

- Urban Conservation Program
  - Public outreach
  - Implementation of California Urban Water Conservation Council (CUWCC) DMMs
  - Water use ordinances
  - Savings of 9,500 to 17,300 AFY

- Recycled Water
  - Develop Reuse Master Plan
  - Upgrade local WWTP to tertiary treatment
  - Identify potential uses
  - Use excess flows for groundwater recharge
  - Potential 6,600 to 18,000 AFY
- Coachella Canal Water WTP
  - Develop Feasibility Study
  - Requires agreement with CVWD for canal water
  - Site, design, and construct a new water treatment plant
  - Estimated plant capacity of 11,300 to 15,700 AFY (10 to 14 MGD, respectively)
- Groundwater Recharge
  - Develop Feasibility Study
  - Potential sources include tertiary treated recycled water and/or canal water
  - Site and construct recharge basins and/or ASR facilities
  - Estimated amount available is a range from 5,200 to 14,100 AFY

For the purposes of projecting savings and supply due to these projects, the 'normal' year data are based on ultimate build-out (2035) demand projections and volumes of wastewater available.

All future water supply projects are considered 100 percent reliable for meeting IWA demands with groundwater recharge occurring only during normal years. These potential projects are listed in Table 3-6.

Table 3-6: Future Water Supply Projects (DWR Table 26)

Project Name	Projected Start Date	Projected Completion Date	Potential Project Constraints	Normal-Year [AF]	Single-Dry [AF]	Multiple-Dry Year 1 [AF]	Multiple-Dry Year 2 [AF]	Multiple-Dry Year 3 [AF]
Urban Conservation Program (savings)	2007	On-going	Adequate Funding	11,100	11,100	11,100	11,100	11,100
Recycled Water[1]	2015	2025	Infrastructure	6,500	6,500	6,500	6,500	6,500
Coachella Canal Water WTP	2015	2030	Regional Cooperation; Insufficient Surface Water Supplies	15,700	15,700	15,700	15,700	15,700
Groundwater Recharge	2011	2015	Insufficient Surface Water Supplies	4,300				
Total				37,600	33,300	33,300	33,300	33,300

[1] See Chapter 4 for details on recycled water supplies

3.5.1 Cost-Benefit of Future Water Supply Projects

Estimates for unit costs of water for each of the proposed supply projects were prepared in the Water Resources Development Plan (BV, 2008b). Unit costs for the Urban Conservation Program were further refined under the Urban Efficiency and Conservation Management Plan (CMP) (BV, 2009). Costs presented in the CMP have been extrapolated to consider the unit cost over a 20-year program in order to be comparable to life costs for the other programs. Unit cost estimates are presented in Table 3-7. An estimate for the unit cost for DMMs that have not yet been implemented is also presented. This estimate assumes that approximately 15 percent of the water savings in the CMP result from DMM implementation.

Table 3-7: Unit Cost of Water Resulting from Non-Implemented/Non-scheduled DMMs and Planned Water Supply Projects

Non-implemented & Not Scheduled DMMs / Planned Water Supply Projects	Cost per AF
[1] Urban Conservation Program (savings)	$117
[2] Recycled Water	$330[3]
[2] Coachella Canal Water WTP	$200-400[4]
[2] Groundwater Recharge	$242[5]
[1] Non-implemented DMMs	$784

[1] Conservation Master Plan, BV, 2009, Table 8-4 extrapolated out to 2030.
[2] Water Resources Development Plan, BV, 2008b
[3] Conceptual Design Report under development - cost does not include distribution/advanced treatment
[4] Cost variation dependent upon final treated water capacity with blending
[5] Cost does not include advance treatment if required

3.6 Development of Desalination

Desalination is a water treatment process for the removal of salt from water for beneficial use. Desalination is used on brackish water (water with moderate salinity) as well as seawater. The California UWMP Act requires a discussion of potential opportunities for use of desalinated water (Water Code Section 10631[i]). IWA has explored such opportunities and they are described in the following section, including opportunities for desalination of brackish surface water, brackish groundwater, and seawater. Although these are further discussed, none of these opportunities are currently economically feasible for IWA.

Table 3-8: Opportunities for Desalinated Water

Source of Water	Yes	No
Ocean Water		X
*Brackish Surface Water		X
*Brackish Groundwater		X

* These waters exist in the Coachella Valley, however, use of desalination technology is not cost effective at this time.

3.6.1 Opportunities for Brackish Water and/or Groundwater Desalination

Another source substitution alternative for the City of Indio is to identify other groundwater basins that could provide water for supply, thus reducing the amount of water to be pumped from the Lower Whitewater Groundwater Subbasin. One such subbasin is the Desert Hot Springs Subbasin, which has an estimated capacity for storing 4.1 million acre-feet of groundwater (DWR, 2003a). This basin is proximal to the City of Indio and especially to those developments north of Interstate-10. However, very little groundwater has been produced from this subbasin due to its poor water quality.

The Desert Hot Springs Subbasin is subdivided into three areas: Miracle Hill, Sky Valley and Fargo Canyon. The capacity of the Fargo Canyon subarea is estimated at 2.3 million acre-feet (CVAG, 2004). Water quality in the Fargo Canyon Subarea is characterized by high concentrations of TDS (800 to over 1000 milligrams per liter (mg/L)), chloride (100-150 mg/L), and sulfate (200 to over 500 mg/L). Fluoride and other minerals, as well as high water temperatures, can also be an issue in the area.

Treatment of this water would be required. The process train and cost of treatment would depend on the water quality of the pumped water. It is understood that the groundwater temperatures in this subbasin are thermal (DWR, 2003a). The thermal characteristics of the groundwater could potentially be harnessed to provide energy to any treatment facility.

3.6.2 Opportunities for Seawater Desalination

Along the California coastline, from the San Francisco Bay to San Diego, numerous studies are currently underway investigating the feasibility of desalting seawater. One water management alternative under consideration is the possibility of IWA investing in a desalination plant, planned by other municipalities such as MWD and San Diego County, in exchange for receiving a portion of their Colorado River water deliveries.

Recent technological advances in various desalination processes have significantly reduced the cost of desalinated water to levels that are comparable and, in some instances, competitive with other alternatives for acquiring new water supplies. Desalination technologies are becoming more efficient, less energy demanding, and less expensive; however, they are still considered energy intensive relative to other treatment technologies.

A review of planning level costs for desalinated seawater including capital and O&M costs indicates a range from $1,200/AF to $1,800/AF (B&V, 2008). These prices amortize costs over the life of the plant, 25 years. The range of cost provided is influenced by the size of facility, type of intake and outfall selected, pretreatment requirements, degree of reliability, energy cost, and water quality goals. Significant cost savings can be achieved for desalination plants with capacities in excess of 25 MGD due to economies of scale.

If a desalination plant is ever permitted along the California coastline, and IWA is indeed able to invest, IWA would also have to make arrangements for acquiring or exchanging the water. This may require a turnout on the Colorado Aqueduct in order to exchange for Colorado River water with MWD. Additional costs may be associated with such an agreement.

CHAPTER 4 – RECYCLED WATER

4.1 Overview

This section of the Plan describes the existing and future recycled water opportunities available to IWA's service area. Recycled water currently plays a limited role in the water supply throughout the Coachella Valley.

4.2 Recycled Water Master Plan

Wastewater treatment services for the City of Indio are predominantly provided by Valley Sanitary District (VSD). IWA and VSD are working together to develop recycled water program to augment the local water supply and will be releasing an Environmental Impact Report in anticipation of new facilities. The IWA is also in the process of developing a Recycle Water Master Plan.

4.3 Potential Sources of Recycled Wastewater

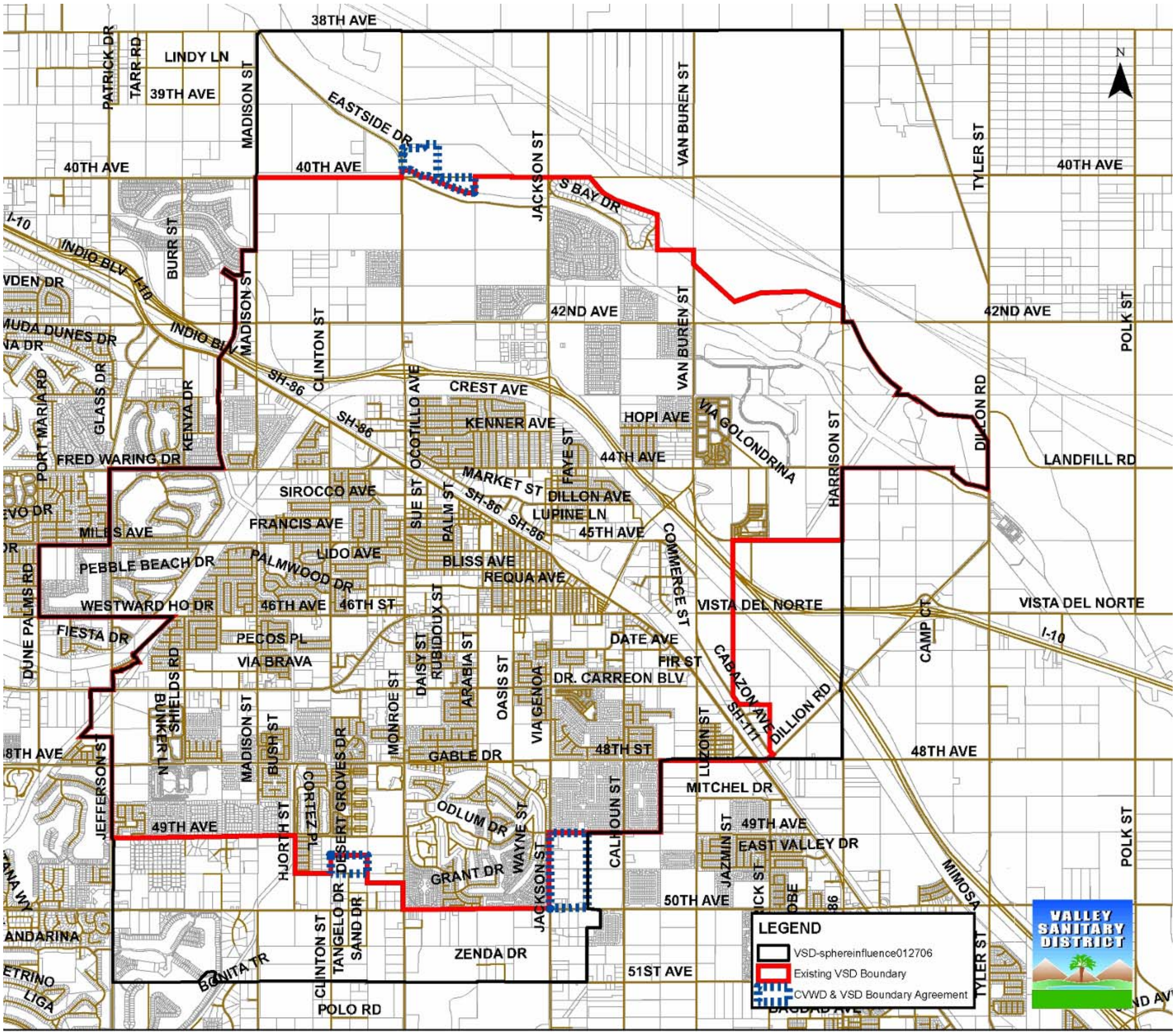
4.3.1 Existing Wastewater Treatment Facilities

The City of Indio is served by two wastewater treatment plants (WWTPs): one is owned by VSD and the other by CVWD. The CVWD WWTP treats a small percentage of the City's wastewater. The plant is located at Avenue 38 and Madison Street (WRP-7) in the City of Indio. The CVWD WWTP is a tertiary treatment facility and the effluent produced is recycled for non-potable uses for CVWD customers.

The VSD WWTP is located on Van Buren Street in the City of Indio and provides services to 98 percent of the City's population. Currently, the majority of the effluent from the VSD WWTP is discharged to the Coachella Valley Stormwater Channel (CVSC) while a small percentage is sent to tribal lands for irrigation.

While the current capacity of VSD's WWTP is approximately 11.0 MGD, the facility will ultimately expand to accommodate a capacity of 17.0 MGD (Dudek, 2003) by 2020. Average wastewater flows at the VSD WWTP in 2009 were 6.3 MGD (7,050 AFY) (Black & Veatch, 2009). Figure 4-1 was provided by VSD and illustrates their service boundary, sphere of influence (SOI), and sewer network. The figure also delineates the areas shared with CVWD. Furthermore, current and projected volumes of wastewater collected and treated at VSD WWTP are listed in Table 4-1.

Figure 4-1: VSD's Sewer Network and Service Boundary



The VSD WWTP operates three parallel treatment processes: an activated sludge treatment process; an oxidation pond treatment process; and a constructed wetlands treatment process. In 2009, VSD delivered 272 AF of secondary effluent for irrigation use. Any effluent that is not reused is discharged to the CVSC which flows directly to the Salton Sea.

The Wetlands Treatment Project was developed to expand the VSD wastewater treatment process. This site has become a home for the Coachella Valley Wild Bird Center and provides a migratory and resident waterfowl and shorebird habitat as well as community education and recreational benefits. The 15-acre natural system treats up to 1 MGD of primary effluent (VSD, 2003). Flows from the wetland discharge into the CVSC.

Table 4-1: Wastewater Collection & Treatment by VSD – AFY (DWR Table 21)

Type of Wastewater	2005	2010	2015	2020	2025	2030
Wastewater collected & treated in service area [1]	7,150	8,170	13,600	19,040	19,040	19,040
Volume that meets recycled water standard	0	0	1,700	5,800	6,500	6,500
[1] Values developed via linear interpolation based on recent flows to VSD and estimated flow at build-out (Dudek, 2003).						

At the present time, approximately 96 percent of the plant effluent is sent to the CVSC, and the remaining effluent is provided to adjacent tribal lands for irrigation (spray). Of the effluent sent to the CVSC, 1.0 MGD comes from the Wetland Treatment Project just south of the WWTP (BV, 2008b).

NPDES permit limits for discharge to the CVSC include: CBOD < 25 mg/L, TSS < 30 mg/L, 6.0 < pH < 9.0, fecal coliform < 200 MPN/100ml, and Cl < 0.01 mg/L.

Sludge build up in the ponds is dewatered and sludge disposed as fertilizer, soil conditioner or compost and hauled to farming operations in the Coachella Valley.

Table 4-2: Disposal of Wastewater (non-recycled) - AFY (DWR Table 22)

Method of Disposal	Treatment Level	2005	2010	2015	2020	2025	2030
Wetlands	Primary	1,120	1,120	1,120	1,120	1,120	1,120
CVSC	Secondary	5,193	6,778	10,508	11,848	11,148	11,148
	Total	6,313	7,898	11,628	12,968	12,268	12,268

See subsequent sections for the amount to be used in a recycled water system.

4.3.2 Planned Improvements and Expansions

Existing VSD WWTP facilities consist of primary and secondary treatment facilities which discharge to the CVSC and neighboring wetlands and tribal lands. Development of a new recycled water supply would require the addition of tertiary treatment facilities, and potentially advanced treatment, depending on the ultimate use of the recycled water.

It is anticipated that the primary uses of recycled water by IWA would be for direct non-potable reuse. Direct non-potable reuse includes irrigation at golf courses and landscaping on roadway medians and new home and commercial developments. A secondary use of recycled water would be groundwater recharge.

IWA is currently planning a 4 MGD, first-phase recycled water project. This project would include required treatment facilities and core infrastructure, such as construction of a new recycled water pump station and major conveyance pipeline(s). This initial phase is expected to be online by 2015 with a potential future expansion in 2025 to 8 MGD, depending on future recycled demands and/or recharge requirements. Preparation of a water recycling plan will require coordination with other agencies. Table 4-2 presents agencies that will or have participated in the preparation of a Water Recycling Plan.

Table 4-3: Agency Involvement in Preparation of Recycling Plan

Type	Participated
Water Agencies	
IWA	Yes
Wastewater Agencies	
VSD	Yes

4.4 Opportunities for Reuse

4.4.1 Potential Recycled Water Users

Viable opportunities for water reuse are often associated with irrigation of golf courses, public parks, and landscaping for public buildings. Some potential water reuse customers have been identified and their water requirements have been estimated. One of the larger potential users for reuse water would be IWA itself, in order to supply landscape and irrigation demands. Table 4-4 presents historical and projected annual water quantities delivered by IWA for landscape and irrigation based on current water use rates and assuming that 80 percent of water delivered to City accounts is for outdoor water use including landscaping and parks.

Table 4-4: IWA Demand Projections for Landscaping & Irrigation

Year	Demands (AFY)
2005	460
2010	900
2015	1,400
2020	2,460
2025	2,940
2030	3,550

Table 4-5 quantifies potential opportunities for the application of recycled water.

Table 4-5: Potential Recycled Water Users

Recycled Water Users	2010 Demand (AFY)	2030 Demand (AFY)	Notes
Golf Courses	4,660	4,660	2007 value
Homeowners' Association (HOA)	210	210	2007 value
City of Indio – Landscape & Irrigation	900	3,550	2010 and 2030 Projections
Adjacent Tribal Lands	272	272	2009 value
TOTALS	6,042	8,692	

If we assume a constant annual rate of increase in flows to the WWTP, such that by 2020 average flows are 17 MGD, then in 2010, the average projected flows would be 7.3 MGD (8,167 AFY). Table 4-6 compares the potential amount of recycled water available to the demands by proposed end users.

Table 4-6: Projected Availability of Wastewater to Supply Irrigation Demands to Proposed Users

	2010 (AFY)	2030 (AFY)	Notes
WW flows to VSD	8,167	19,080	7.3 MGD (2010) and 17.0 MGD (2030)
Amount available from VSD	7,047	17,920	WW flows to VSD less 1 MGD to Wetlands
Opportunities for Reuse*	5,200	8,692	See Table 4-5**:**
% Reused	77%	49%	
Remaining	**1,005**	**9,228**	**0.9 MGD (2010) and 8.2 MGD (2030)**

*Opportunities for Reuse in 2010 (5,200 AFY) differ from value presented in Table 4-6 (6,042 AFY) to account for limitations on recycled water use resulting from seasonal differences between supply and demand.

In the short-term, 86-percent of the recycled effluent from VSD's WWTP could be utilized for reuse irrigating golf courses, HOA community lands, lands associated with public buildings, and public parks. In the future, surplus recycled water, particularly during lower demand periods, could be available and used to recharge the groundwater basin.

4.4.2 Potential Recycled Water Demands

IWA plans to have a recycled water program in effect by 2015. Recycled water will primarily be used for landscape irrigation with any excess volumes being utilized for groundwater recharge. Currently, approximately 1,392 AFY of secondary treated effluent are provided for wetlands/wildlife habitat and for agricultural purposes. Deliveries of secondary treated effluent for agricultural irrigation were nearly 1,300 AF in 2002, however by 2009; deliveries were down to 272 AF. It is assumed that in the future VSD will continue to provide 272 AFY for agricultural irrigation purposes and that these flows will continue to be supplied at current treatment levels. These uses are included in projected recycled water uses presented in Table 4-7.

Table 4-7: Recycled Water Uses - Actual and Potential, AFY (DWR Table 23)

User type	Treatment Level	2005	2010	2015	2020	2025	2030
Agriculture	Secondary	837	272	272	272	272	272
Landscape	Tertiary	0	0	700	4,300	4,500	4,500
Wildlife Habitat	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wetlands	Secondary	1,120	1,120	1,120	1,120	1,120	1,120
Industrial	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Groundwater Recharge	Tertiary	0	0	1,000	1,500	2,000	2,000
	Total	1,957	1,392	3,092	7,192	7,892	7,892

Table 4-8: Projected Future Use of Recycled Water in IWA Service Area – AFY

	2015	2020	2025	2030
Projected Use of Recycled Water	1,700	5,800	6,500	6,500

4.5 Recycled Water Comparison

Table 4-9: Recycled Water Uses 2005 Projection Compared with 2010 Actual – AFY (DWR Table 24)

	2005 Projection for 2010	2010 Actual Use
Agriculture	1,260	272
Landscape	0	0
Wildlife Habitat	N/A	N/A
Wetlands	1,120	1,120
Industrial	N/A	N/A
Groundwater Recharge	0	0
Total	2,380	1,392

4.6 Methods to Encourage Recycled Water Use

There are a few methods that have been considered to provide an incentive to recycled water users. One method is to issue a monthly rebate directly to each recycled water user. The other is utilizing a two-fold approach to encourage recycled water use. The two-fold approach relies on making recycled water available at a reduced rate and to adopt a Recycled Water Ordinance, mandating recycled use for certain applications. It is unknown at this time how the combination of incentives and requirements will impact projected recycled water use.

4.7 Optimization Plan

Production from the WRP is not anticipated to be adequate to meet the total demands of the system. However, as potable water demands increase and, consequently, recycled water production increases, the water available to meet system demands would also increase. Phasing of the recycled water use will also help with budgeting for the project, developing systems for operation and maintenance and building the recycled water market.

CHAPTER 5 – WATER QUALITY

5.1 Overview

The quality of any naturally occurring water source is dynamic in nature. This is true for the local groundwater of the Whitewater River Basin, and SWP and Colorado River Water deliveries. During periods of intense rainfall or snowmelt, routes of surface water movement change; new constituents are mobilized and enter the water source while other constituents are diluted or eliminated. The quality of water changes over the course of a year. These same basic principles apply to groundwater. Depending on water depth, groundwater will pass through different layers of rock and sediment and leach different materials from those strata. Water depth is a function of local rainfall and snowmelt. During periods of drought, the mineral content of groundwater often increases. Water quality is not a static feature of water, and these dynamic variables must be recognized.

Regulations on water quality are also ever changing as a result of the discovery of new contaminants, changes in the understanding of the health impacts of contaminants, development of new analytical technologies, and the introduction of new treatment technologies. In the State of California, water purveyors are subject to drinking water standards set by the Federal Environmental Protection Agency (EPA) and the California Department of Health Services (DHS).

This section describes the water quality characteristics of IWA's groundwater supply, future canal water supply and the potential effects water quality may have on supply reliability.

5.2 Groundwater Quality

Generally in the Valley, the quality of groundwater is more variable than that which is produced for municipal supply. Water quality at a given well depends upon well depth (or the screened interval of the water supply well), proximity to faults, presence of surface contaminants, proximity to recharge basins, and other hydrogeologic and cultural features.

Between 1996 and 2004, various water samples taken from wells throughout Coachella Valley failed to reach primary and secondary drinking water standards for total dissolved solids (TDS), nitrate, sulfate, chloride, fluoride, and arsenic concentrations. Arsenic is currently the only water quality issue that may potentially affect groundwater reliability; however, three arsenic-removal facilities have been constructed to effectively eliminate arsenic as a concern for the contaminated wells—none of which supply water to IWA.

IWA's wells have consistently met all drinking water standards. Water quality values for various constituents from IWA's supply wells are as follows:

- TDS ranged from 160 to 432 ppm,
- Nitrate ranged between 1.7 and 22 ppm,
- Sulfate ranged between 18 and 100 ppm,

- Chloride ranged between 5.5 and 36 ppm,
- Fluoride ranged between 0.42 and 1.0 ppm, and
- Arsenic ranged between ND and 1.8 ppb.

All contaminants present in IWA's groundwater are below the maximum contaminant levels (MCLs) and secondary maximum contaminant levels (SMCLs), and therefore do not impact the reliability of the supply at present. Groundwater supplied by IWA's existing wells is a high quality drinking water source characterized by low turbidity, moderate alkalinity, and low dissolved solids content. This water supply presents no special treatment challenges and is amenable to disinfection with free chlorine. IWA's 2008 Annual Water Quality Report is included as Appendix E.

Yet, the risk remains that if pumping continues at an increasing rate, water quality may begin to deteriorate. Although this is a possibility, adverse changes in water quality to IWA's supplies have not materialized in recent years and reductions to supply due to water quality issues are not projected for the next 20 years.

5.3 Coachella Canal Water Quality

Colorado River Water supplied by the Coachella Canal may be characterized as a relatively consistent water source with low turbidity, moderate alkalinity, moderate total organic carbon (TOC), and high dissolved inorganic content. No data on regulated microbial contaminants was available from the sources reviewed here, but experience from utilities that use the Colorado River as a drinking water source indicates that this supply would likely be classified in Long Term 2 Enhanced Surface Water Treatment Rule Bin 1. Regulated organic micro-pollutants have been detected in the Lower Colorado River, typically at concentrations well below regulatory standards. Nuisance metals iron and manganese are typically present in the Lower Colorado River at concentrations less than their respective SMCLs. Information on objectionable tastes and odors was largely absent from the data evaluated here; however, experience has shown that, with the exception of storage for long periods in off-line reservoirs, Lower Colorado River water typically meets the SMCL for threshold odor number. Sulfate and TDS concentrations are consistently above USEPA and DPH non-enforceable SMCLs. Other regulated inorganic micro-contaminants are typically present in Lower Colorado River water at concentrations below their respective MCLs.

CHAPTER 6 – RELIABILITY PLANNING

6.1 Overview

The California Urban Water Management Planning Act (Act) requires urban water suppliers to assess water supply reliability that compares total projected water use with the expected water supply over the next twenty years in five-year increments. The Act also requires an assessment for a single dry year and multiple dry years. This chapter presents the reliability assessment for IWA's service area.

It is the stated goal of IWA to deliver a reliable and high quality water supply for their customers, even during dry periods. IWA's goal includes reducing groundwater pumping from the current level to annual pumping of 20,000 AFY. IWA has adopted a Conservation Master Plan which establishes interim and final urban water use targets that will achieve a 20 percent reduction in water use by 2020. A copy of this plan is included in the Appendix E. The projected conservation values are shown in the following tables as a reduction in the overall demand. Based on conservative water supply and demand assumptions over the next 20 years in combination with conservation of non-essential demand during certain dry years, the Plan successfully achieves this goal.

6.2 Reliability of Water Supplies

The Coachella valley groundwater basin is un-adjudicated and has sufficient storage to meet the projected pumping conditions on the basin for the next 20 years, and beyond. Thus, issues related to reliability of supply and vulnerability to seasonal and climatic changes do not significantly affect the reliability of the Coachella Valley Groundwater Basin. Currently and historically 100 percent of water consumed by IWA comes from this source.

Since water supplies have not been vulnerable to seasonal or climatic conditions, the supplies are limited only by available IWA pumping capacity and it is this pumping capacity that is used to define the supplies historically available to IWA. Table 6-1 presents the pumping capacity of IWA supply wells.

Table 6-1: Historical Supply Reliability/Pumping Capacity – AFY (DWR Table 28)

Average / Normal Water Year	Single Dry Water Year	Multiple Dry Water Years		
		Year 1	Year 2	Year 3
56,500	56,500	56,500	56,500	56,500
% of Normal	100%	100%	100%	100%
Pumping capacity is estimated by assuming 75 percent reliability with one of the largest wells off-line.				

Although historically 100% reliable, the groundwater basin is showing signs of overdraft, which could impact reliability in the very long term. Alternative supply sources as well as a groundwater recharge program are being considered and/or developed by IWA to assist in mitigating the current overdraft condition of the basin during average and normal water years. IWA is also developing an Urban Water Use Efficiency and Conservation Program to implement Demand Management Measures (DMMs) and other conservation programs to decrease the annual volume consumed.

The future alternative supply programs propose to utilize purchased surface water supplies that will be exchanged for Colorado River water to reduce reliance on groundwater supplies. Due to the priorities, associated water rights, and exchange agreements, the surface water supplies have historically been very reliable. However, the Valley-wide and IWA transfer and exchange programs are potentially vulnerable to shortages resulting from climatic, environmental and/or legal conditions. State Water Project supplies have been dramatically cut in recent years due to the on-going drought condition as well as due to a legal decision to reduce exports from the Delta to mitigate further negative impacts on the Delta Smelt population. Colorado River water supplies may also be vulnerable to legal and climatic issues.

Table 6-2 summarizes the vulnerability of Valley supplies to various factors.

Table 6-2: Factors Resulting in Inconsistency of Supply (DWR Table 29)

Name of Supply	Legal	Environmental	Water Quality	Climatic
Groundwater		X	X	
State Water Project	X	X		X
Colorado River Water	X		X	X

Water year data used to form projected future demand and single-dry and multiple-dry year demand for reliability scenarios were as follows.

6.3 Normal, Single-Dry, and Multiple-Dry Year Planning

Considering the above discussed factors impacting supply, groundwater available to IWA is assumed to be 100% reliable and future surface water is assumed to be highly reliable, but could potentially be limited due to either physical availability of water or due to exchange limitations in extreme dry years. When considering future surface water supply reliability it is assumed that exchanges may be the limiting factor and therefore critical drought years for SWP supplies, as summarized in Table 6-3, are assumed in the following analyses.

Table 6-3: Basis of Water Year Data (DWR Table 27)

Water Year Type	Base Years
Normal Water Year	2004
Single-Dry Water Year	1977
Multiple-Dry Water Years	1990-1992

6.4 Supply and Demand Comparisons

The available water supplies and demands for IWA's service area were analyzed to access the region's ability to satisfy demands during three scenarios: a normal water year, single-dry year, and multiple-dry years. The tables in this section present the supplies and demands for the various drought scenarios for the projected planning period of 2010-2030 in five-year increments.

6.4.1 Normal Water Year

In a normal water year, IWA will limit their groundwater production to the target 20,000 AFY and utilize surface water and recycled water to supplement that supply to meet demands as shown in Table 6-4.

Table 6-4: Projected Normal Water Supply – AFY

Supply Sources	2015	2020	2025	2030
Groundwater	20,000	20,000	20,000	20,000
Surface Water	5,000	10,000	20,000	20,000
Recycled Water	1,700	5,800	6,500	6,500
Total Supply	26,700	35,800	46,500	46,500

Table 6-5: Projected Normal Water Demand – AFY

Projected Demand	2015	2020	2025	2030
Demand	29,600	36,400	40,800	46,800
Conservation	(2,900)	(5,800)	(8,400)	(11,100)
Total Demand	26,700	30,600	32,400	35,700
% of year 2004	128%	146%	155%	171%

Table 6-6: Projected Supply and Demand Comparison – AFY (DWR Table 32)

	2015	2020	2025	2030
Supply totals	26,700	35,800	46,500	46,500
Demand totals	26,700	30,600	32,400	35,700
Difference	0	5,200	14,100	10,800
Difference as % of Supply	0%	15%	30%	23%
Difference as % of Demand	0%	17%	44%	30%

As show in Table 6-1, IWA's actual ability to pump groundwater is approximately 56,500 AFY, which is significantly more than the 20,000 AFY assumed to be used in the normal year.

Therefore, the difference as a percent of supply values shown in the above table are conservative and additional groundwater supplies could be produced if required.

6.4.2 Single-Dry Year

Reliability during a single-dry year scenario was assumed to be similar to that experienced during the 1977 drought conditions. The amount of surface water purchased will be based on availability during this dry year. IWA will supplement this supply with recycled water supplies and any additional supply needed will be pumped from the un-adjudicated groundwater basin. Table 6-7 summarized the anticipated use/availability of supplies during a single-dry year. The normal year values serving as a basis for comparison of the percentages in Table 6-7 and 6-8 are the normal year supply values reported in Tables 6-4 and 6-5.

Table 6-7: Projected Single-Dry Year Water Supply – AFY

Supply Sources	2015	2020	2025	2030
Groundwater	20,000	20,000	20,000	20,000
Surface Water	5,000	4,800	5,900	9,200
Recycled Water	1,700	5,800	6,500	6,500
Total Supply	26,700	30,600	32,400	35,700
% of Normal Year	100%	85%	70%	77%

Table 6-8: Projected Single-Dry Year Water Demand – AFY

	2015	2020	2025	2030
Demand	29,600	36,400	40,800	46,800
Conservation	(2,900)	(5,800)	(8,400)	(11,100)
Demand	26,700	30,600	32,400	35,700
% of projected normal	100%	100%	100%	100%

Table 6-9: Projected Single-Dry Year Supply and Demand Comparison – AFY (DWR Table 33)

	2015	2020	2025	2030
Supply totals	26,700	30,600	32,400	35,700
Demand totals	26,700	30,600	32,400	35,700
Difference	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%

Similar to the normal year condition, the actual IWA ability to pump groundwater is greater than the amount shown above. Therefore, the difference as a percent of supply values shown in the above table are conservative and additional groundwater supplies could be produced if required.

6.4.3 Multiple-Dry Year

Reliability during a multiple-dry year scenario was assumed to be similar to that experienced during the 1990-1992 drought conditions. Similar to the single-year drought conditions, groundwater and recycled water supplies are assumed to be 100% reliable, while surface water supplies could be reduced somewhat. It is assumed that the surface water supplies will be completely available (full 20,000 AFY) in the years surrounding the 3 year drought condition. During the 3 year drought scenario, IWA will purchase enough Colorado River Water from CVWD to utilize the capacity of the future SWTP; however, additional purchases to recharge the groundwater basin will be suspended.

The normal year values serving as a basis of comparison for the percentages in the subsequent Projected Supply and Projected Demand tables are the normal year supply values reported in Tables 6-4 and 6-5. Supply and demand for each year is based on linear interpolation of projected demands for each 5-year period as shown in Tables 6-10 through 6-21.Similar to the normal year and single-dry year conditions, the actual IWA ability to pump groundwater is greater than the amounts shown. Therefore, the difference as a percent of supply values shown in the following tables are conservative and additional groundwater supplies could be produced if required.

Table 6-10: Projected Supply - Multiple Dry Year Period Ending in 2015 – AFY (DWR Table 31)

Supply Source	2011	2012	2013	2014	2015
Groundwater	22,300	23,400	20,000	20,600	20,000
Surface Water	-	-	4,500	5000	5,000
Recycled Water	-	-	-	-	1,700
Total Supply	22,300	23,400	24,500	25,600	26,700
% of projected normal	92%	94%	96%	98%	100%

Table 6-11: Projected Demand - Multiple Dry Year Period Ending in 2015 - AFY

	2011	2012	2013	2014	2015
Demand	23,200	24,800	26,400	28,000	29,600
Conservation	(900)	(1,400)	(1,900)	(2,400)	(2,900)
Total Demand	22,300	23,400	24,500	25,600	26,700
% of projected normal	100%	100%	100%	100%	100%

Table 6-12: Projected Supply and Demand Comparison – Multiple Dry Year Period Ending in 2015 - AFY (DWR Table 34)

	2011	2012	2013	2014	2015
Supply totals	22,300	23,400	24,500	25,600	26,700
Demand totals	22,300	23,400	24,500	25,600	26,700
Difference	0	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%	0%

Table 6-13: Projected Supply - Multiple Dry Year Period Ending in 2020 – AFY

Supply Sources	2016	2017	2018	2019	2020
Groundwater	20,000	20,000	20,000	20,000	20,000
Surface Water	5,000	4,920	4,880	4,840	10,000
Recycled Water	2,520	3,340	4,160	4,980	5,800
Total Supply	27,520	28,260	29,040	29,820	35,800
% of projected normal	96%	93%	90%	88%	100%

Table 6-14: Projected Demand - Multiple Dry Year Period Ending in 2020 - AFY

	2016	2017	2018	2019	2020
Demand	30,960	32,320	33,680	35,040	36,400
Conservation	(3,480)	(4,060)	(4,640)	(5,220)	(5,800)
Total Demand	27,480	28,260	29,040	29,820	30,600
% of projected normal	100%	100%	100%	100%	100%

Table 6-15: Projected Supply and Demand Comparison - Multiple Dry Year Period Ending in 2020 - AFY (DWR Table 34)

	2016	2017	2018	2019	2020
Supply totals	27,520	28,260	29,040	29,820	35,800
Demand totals	27,480	28,260	29,040	29,820	30,600
Difference	40	0	0	0	5,200
Difference as % of Supply	0%	0%	0%	0%	15%
Difference as % of Demand	0%	0%	0%	0%	17%

Table 6-16: Projected Supply - Multiple Dry Year Period Ending in 2025 - AFY

Supply Sources	2021	2022	2023	2024	2025
Groundwater	20,000	20,000	20,000	20,000	20,000
Surface Water	10,000	5,240	5,460	5,790	20,000
Recycled Water	5,940	6,080	6,220	6,360	6,500
Total Supply	35,940	31,320	31,680	32,150	46,500
% of projected normal	100%	67%	68%	70%	100%

Table 6-17: Projected Demand - Multiple Dry Year Period Ending in 2025 - AFY

	2021	2022	2023	2024	2025
Demand	37,280	38,160	39,040	39,920	40,800
Conservation	(6,320)	(6,840)	(7,360)	(7,880)	(8,400)
Total Demand	30,960	31,320	31,680	32,150	32,510
% of projected normal	100%	100%	100%	100%	100%

Table 6-18: Projected Supply and Demand Comparison - Multiple Dry Year Period Ending in 2025 - AFY (DWR Table 34)

	2021	2022	2023	2024	2025
Supply totals	35,940	31,320	31,680	32,150	46,500
Demand totals	30,960	31,320	31,680	32,150	32,510
Difference	4,980	0	0	0	13,990
Difference as % of Supply	14%	0%	0%	0%	30%
Difference as % of Demand	16%	0%	0%	0%	43%

Table 6-19: Projected Supply - Multiple Dry Year Period Ending in 2030 - AFY

	2026	2027	2028	2029	2030
Groundwater	20,000	20,000	20,000	20,000	20,000
Surface Water	20,000	7,220	7,880	8,540	20,000
Recycled Water	6,500	6,500	6,500	6,500	6,500
Total Supply	46,500	33,720	34,380	35,040	46,500
% of projected normal	100%	73%	74%	75%	100%

Table 6-20: Projected Demand - Multiple Dry Year Period Ending in 2030 - AFY

	2026	2027	2028	2029	2030
Demand	42,000	43,200	44,400	45,600	46,800
Conservation	(8,940)	(9,480)	(10,020)	(10,560)	(11,100)
Total Demand	33,060	33,720	34,380	35,040	35,700
% of projected normal	100%	100%	100%	100%	100%

Table 6-21: Projected Supply and Demand Comparison - Multiple Dry Year Period Ending in 2030 - AFY (DWR Table 34)

	2026	2027	2028	2029	2030
Supply totals	46,500	33,720	34,380	35,040	46,500
Demand totals	33,060	33,720	34,380	35,040	35,700
Difference	13,440	0	0	0	10,800
Difference as % of Supply	29%	0%	0%	0%	23%
Difference as % of Demand	41%	0%	0%	0%	30%

6.4.4 Summary of Comparisons

As shown in the analyses above, IWA has adequate supplies to meet demands during normal, single-dry, and multiple-dry years throughout the 20-year planning period. This results from the fact that the groundwater basin is un-adjudicated and will serve as a backup source to other potential sources, such as recycled water and surface water, once they are developed.

CHAPTER 7 – DEMAND MANAGEMENT MEASURES

7.1 Overview

Establishing goals and choosing water conservation measures is a continuing planning process. Goals are developed, adopted, and then evaluated periodically. Specific conservation measures are phased in and then evaluated for their effectiveness, achievement of desired results, and customer satisfaction. Water conservation can achieve a number of goals such as:

- Reducing groundwater overdraft
- Reducing average annual potable water demands
- Reducing urban runoff
- Reducing demands during peak seasons
- Meeting drought restrictions

Fourteen water Demand Management Measures (DMMs) are specified in the California Urban Water Management Planning Act (Act). The Act was revised in 2000 to relate the DMMs to the 14 Best Management Practices (BMPs) of the California Urban Water Conservation Council (CUWCC).

The CUWCC was formed in 1991 through the "Memorandum of Understanding Regarding Urban Water Conservation in California" (MOU). The urban water conservation BMPs included in the MOU are intended to reduce California's long-term urban water demands. The BMPs are currently implemented by the signatories to the MOU on a voluntary basis.

IWA signed the MOU in 2009, thus meeting one of the recommendations of the 2000 UWMP. IWA's BMP reports from the CUWCC website are provided in Appendix F.

7.2 Water Demand Management Measures

Recent changes to CUWCC guidelines have reorganized the Council's 14 BMPs into five categories, classified either as "Foundational BMPs" or "Programmatic BMPs." Foundational BMPs are considered to be essential water conservation activities, and if adopted for implementation, should be ongoing activities with no time limit. In contrast, Programmatic BMPs represent a range of activities that will improve conservation once implemented.

Foundational BMPs are divided into the Education and Utility Operations Categories. Programmatic BMPs are divided into the Residential, Commercial, Industrial and Institutional (CII), and Landscape categories.

Compliance with the BMP water savings goals can be accomplished by implementing the specific measures laid out in each BMP, by accomplishing a set of measures that achieves equal or greater water savings (in the CUWCC MOU as the Flex Track Menu), or simply by accomplishing set water savings goals as measured in gallons per capita per day (gpcd) consumption. IWA is compliant with the water savings goals by accomplishing the set gpcd targets, but will continue to explore Programmatic BMPs to promote further conservation within the service territory.

7.2.1 Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers & Residential Retrofits

Programmatic: Residential

A water survey program for residential customers is a key component of IWA's conservation plan. Through the survey program, residents can request that IWA staff visit their homes and identify opportunities outside the residence or business to reduce consumption, such as landscaping conversions or the installation of more efficient irrigation heads. IWA has been performing outside surveys for residents and businesses since 2008. Over 100 landscape conversions have been performed.

The cost per residential survey is estimated as $110, which accounts for IWA labor in performing surveys and tracking progress. This value is based on presented costs by other utilities for residential surveys (Alan Plummer Associates, Inc. [APAI], 2005).

Table 7-1 presents the CUWCC's assumptions for water savings as a result of a water survey program.

Table 7-1: CUWCC Water Savings Assumptions for a Residential Water Survey Program

Source of Water Savings	Pre-1980 Construction	Post-1980 Construction
Low-flow showerhead retrofit	7.2 gpcd	2.9 gpcd
Toilet retrofit	1.3 gpcd	0.0 gpcd
Leak Repair	0.5 gpcd	0.5 gpcd
Landscape Survey (Outdoor Use Reduction)	10%	10%

IWA may be able to expand this program to include indoor surveys as well. IWA may consider requiring in-home surveys for any residents interested in participating in its Smart Controller and/or Re-landscape Rebate programs.

This part of the program is still in the planning phase and has not yet been implemented. The IWA is continually working to improve and expand conservation plans through partnerships and additional funding opportunities. In 2011 IWA signed an MOU with the Coachella Valley Water District (CVWD) to provide Indio residents who are served by CVWD equal opportunities to receive smart controller rebates or convert lawns to desert landscape.

A residential plumbing retrofit program can also contribute to the overall reduction in indoor water use in the residential customer class. This program targets residences constructed prior to

1992. IWA should market this program to the North Indio and Central zones of the City, where pre-1992 construction accounts for 97 percent and 77 percent of residences, respectively.

Table 7-2 presents the CUWCC's assumptions for water savings as a result of a residential plumbing retrofit program.

Table 7-2: CUWCC Water Savings Assumptions for a Residential Plumbing Retrofit Program

Source of Water Savings	Pre-1980 Construction	Post-1980 Construction
Low-flow showerhead retrofit	7.2 gpcd	2.9 gpcd
Toilet retrofit	1.3 gpcd	0.0 gpcd

Other utilities implement residential plumbing retrofit programs through the actual distribution of retrofit kits to their residential customers, at no cost to the customers. The kit should include a minimum of one new showerhead and two aerators (one kitchen and one bathroom). The estimated cost of such a kit is $10. The Gas Company distributes these kits and in partnership with the Gas Company, IWA helps promote the program to Indio residents. The IWA promotes the program through the website and supplying information during residential audits.

The IWA may expand this program and possibly add toilet retrofit kits dependent on future funding.

7.2.2 System Water Audits, Leak Detection, and Repair

Foundational: Utility Operations – Water Loss Control

IWA has already achieved the CUWCC's goal of less than 10 percent unaccounted-for water losses in its system. The Water Management Plan (WMP) (Dudek, 2008) estimates IWA's unaccounted water loss to be approximately 7.5 percent; IWA would like to further reduce this to between 3 and 5 percent. Such a reduction could result in water savings of approximately 800 to 1,200 AFY by 2020.

As a signatory to the CUWCC's MOU, the program will be further expanded. Unaccounted-for water will be determined by reviewing monthly and annual water consumption and production data, which is currently being tracked. Expansion of this program will enhance IWA's knowledge and awareness of its system, which will allow for more accurate targeting of problem areas for future maintenance or replacement. Areas of expansion currently in effect are:

- Changing the way IWA performs fire flows, utilizing hydraulic modeling software to predict the available fire flow without using any water.
- IWA has had its own inspector since mid-2007 to monitor water use at construction sites and ensure all flows are being monitored.

- IWA acquired an electronic leak-detection device in 2008, which was the first step in implementing its leak detection/prevention program.

The IWA is currently in the process of hiring a consultant to perform leak detection functions on the system. Part of the deliverables will be the AWWA leak detection sheets that can be submitted to CUWCC to fulfill this foundational DMM.

Table 7-3: Actual Water Savings from Water System Audits

Actual	2006	2007	2008	2009	2010
% of Unaccounted Water	5.7%	7.5%	7.5%	7.5%	7.5%
Miles of Mains Surveyed	N/A	N/A	N/A	N/A	N/A
Miles of Lines Repaired	N/A	N/A	N/A	N/A	N/A
Actual Expenditures - $	N/A	N/A	N/A	N/A	N/A
Actual Water Savings - AFY	N/A	N/A	N/A	N/A	N/A

Table 7-4: Planned Water Savings from Water System Audits

Planned	2011	2012	2013	2014	2015
% of Unaccounted Water	7.5%	6.6%	5.8%	4.9%	4%
Miles of Mains Surveyed	N/A	N/A	N/A	N/A	N/A
Miles of Lines Repaired	N/A	N/A	N/A	N/A	N/A
Projected Expenditures - $	N/A	N/A	N/A	N/A	N/A
Projected Water Savings - AFY	N/A	N/A	N/A	N/A	N/A

7.2.3 Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections

Foundational: Utility Operations – Metering

Currently, 100 percent of IWA's customers are metered for water use and meters are required for any new service connections. This DMM enables IWA to meter and bill customers based on their actual volume of use. The CUWCC estimates that metered accounts along with volumetric rates can result in a 20 percent reduction in demand. IWA has likely already realized the savings associated with metering all accounts. A tiered rate structure would be necessary to reduce further usage under this DMM.

IWA is actively maintaining and upgrading its meter system with its meter replacement program which began in 2006. In this program, IWA is replacing all existing direct-read meters with a wireless automated meter reading system, giving replacement priority to the more failure-prone older meters. IWA has estimated an annual cost of $550,000 for this program in 2010 for replacing 3,000 meters. Once the meter change-out is fully implemented, the program will continue to address ongoing problems associated with meter failure and slowing. Program costs should be significantly reduced at this point.

Table 7-5: Projected Water Savings from Metering

Actual	2006	2007	2008	2009	2010
# of Un-Metered Accounts[1]	0	0	0	0	0
# of Retrofit Meters Installed	1000	1978	2230	2282	1607
# of Accounts w/o Commodity Rates	0	0	0	0	0
Actual Expenditures - $	$180,000	$180,000	$275,000*	$325,000*	$450,000
Actual Water Savings - AFY	N/A	N/A	N/A	N/A	N/A

[1] System is 100% metered.
*Expenditures for 2008 and 2009 appear lower because developers made partial contributions

Table 7-6: Projected Water Savings from Metering

Planned	2011	2012	2013	2014	2015
# of Un-Metered Accounts[1]	0	0	0	0	0
# of Retrofit Meters Installed	1602	1605	1605	1605	1605
# of Accounts w/o Commodity Rates	0	0	0	0	0
Projected Expenditures - $	$450,000	$450,000	$450,000	$450,000	$450,000
Projected Water Savings - AFY	N/A	N/A	N/A	N/A	N/A

[1] System is 100% metered.

7.2.4 Large Landscape Conservation Programs and Incentives

Programmatic: Landscape

A large landscape water conservation program with incentives for IWA's CII and irrigation customers could be an important component of its long-term conservation plan. IWA should strive to provide educational opportunities to these clients about the benefits and opportunities for reducing their outdoor water usage. An important aspect of this program will be surveys and water audits of landscaping water usage.

The cost for each CII survey has been estimated as twice that of a residential survey or $220/survey, which accounts for the time spent by IWA staff to perform surveys and track program implementation.

This program is still in the planning phase and has not yet been implemented. Implementation goals through 2015 were estimated in the conservation master plan. The IWA continues to seek partnerships and additional funding to implement and expand conservation programs including this DMM.

7.2.5 High-Efficiency Clothes Washing Machine Financial Incentive Programs

Programmatic: Residential

A high-efficiency clothes washing machine (HECW) financial incentive program will contribute to the overall reduction in indoor water use by the residential customer class. CUWCC developed a Coverage Goal (CG) system to more easily determine coverage progress and allow agencies to obtain credit for promoting ultra high efficiency machines. The annual CG is calculated as:

$$CG = TotalDwellingUnits \times 0.0768$$

Total dwelling units (DUs) are estimated to be approximately 25,860 at implementation. The calculated coverage goal would be 1,986 HECWs installed over the 2.5 year program, or 794 units per year. IWA may want to consider developing a tiered incentives program with the largest incentives for washing machines with a water factor equal to or less than 6.0. Each replaced machine could save approximately 120,000 gallons of water over the life of the machine (estimated as 14 years).

The HECW Machine Financial Incentives Programs can be implemented by supplying rebates to customers for the purchase of approved HECW machines. A rebate of $100/HECW is suggested at this time.

This program is still in the planning phase and has not yet been implemented. The IWA continues to form partnerships and additional funding to expand conservation programs.

7.2.6 Public Information Programs

Foundational: Education – Public Information Programs

A public information program for IWA's customers is a critical aspect of the conservation plan. IWA has been proactive and implemented a public information program years before signing on to the CUWCC's MOU. Through the program, IWA can assist customers in identifying opportunities for conservation via brochures, media events, service announcements, workshops, and other means. The CUWCC does not have a quantifiable value for water savings associated with this DMM. However, savings could be significant if the program targets residential outdoor use, including demonstration gardens for re-landscaping away from turf.

Tables 7-7 and 7-8 show the estimated annual costs for the program through 2030. Costs for 2006-2010 are assumed equivalent to actual expenditures for 2008 as indicated in the BMP report submitted to the CUWCC (see Appendix E), while costs beyond 2010 are consistent with estimates that were previously presented in IWA's 2005 UWMP-Addendum (B&V, 2005c).

Table 7-7: Actual Expenditures for the Public Information Program

Actual	2005	2006	2007	2008	2009
a) Paid advertising	0	0	0	0	0
b) Public Service Announcements	0	$2,200	$2,200	$2,200	$2,200
c) Bill inserts/Newsletters/ Brochures	$425	$1,200	$1,200	$1,200	$1,200
d) Bill showing water usage in comparison to previous year's usage	No extra cost, included in standard bill print.	No extra cost, included in standard bill print.	No extra cost, included in standard bill print.	No extra cost, included in standard bill print.	No extra cost, included in standard bill print.
e) Demonstration Gardens	0				
f) Special Events, Media Events	$2,500	$4,400	$4,400	$4,400	$4,400
g) Speakers Bureau	0	$2,200	$2,200	$2,200	$2,200
h) Program to coordinate with other government agencies industry and public interest groups and media	0	0	0	0	0
Actual Expenditures - $	$2,925	$10,000	$10,000	$10,000	$10,000

Table 7-8: Projected Expenditures for the Public Information Program

Planned	2010	2015	2020	2025	2030
a) Paid advertising	0	$5,000	$5,000	$5,000	$5,000
b) Public Service Announcements	$2,200	0	0	0	0
c) Bill inserts/Newsletters/ Brochures	$1,200	$3,000	$3,000	$3,000	$3,000
d) Bill showing water usage in comparison to previous year's usage	No extra cost, included in standard bill print.	No extra cost, included in standard bill print.	No extra cost, included in standard bill print.	No extra cost, included in standard bill print.	No extra cost, included in standard bill print.
e) Demonstration Gardens	0	0	0	0	0
f) Special Events, Media Events	$4,400	$10,000	$20,000	$20,000	$20,000
g) Speakers Bureau	$2,200	0	0	0	0
h) Program to coordinate with other government agencies industry and public interest groups and media	0	$5,000	$10,000	$10,000	$10,000
Projected Expenditures - $	$10,000	$18,000	$33,000	$33,000	$33,000

7.2.7 School Education Programs

Foundational: Education – School Education Programs

A school education program contributes to the long-term reduction in water use as a result of actual changes to water use behaviors in City of Indio's youth. However, the CUWCC has not established any quantifiable goals or targets for the implementation of this program. IWA has presented to 3 classes in the Desert Sands Unified School District as well as provided calendars promoting efficient water use to several elementary schools. Each year the IWA offers school presentations free of charge to any interested school or class. Presentations include information about water conservation, water quality and information about where the water comes from.

The CUWCC does not have a quantifiable value for water savings associated with this DMM.

Costs for this program have been estimated as $10 per year per student reached.

7.2.8 Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts

Programmatic: Commercial, Industrial, and Institutional

Conservation programs for IWA's CII customers could play a significant role in its long-term conservation plan. Under this BMP, IWA will need to identify and rank CII customers by their water use, develop an Ultra Low-Flow Toilet (ULFT) program, and either implement a CII water use survey and incentives program or establish and meet CII conservation performance targets.

If IWA chooses to pursue a CII Survey and Customer Incentives Program, then it should work to supply surveys to 10 percent of its CII customers within 10 years. However, if IWA pursues a CII Conservation Program, then that program should achieve a 10 percent reduction in the CII baseline water use within 10 years. Some utilities have achieved this by supplying one-time grants to CII customers for both indoor and outdoor water conserving measures. This program is still in the planning phase and has not yet been implemented. The IWA continues to seek new partnerships and additional funding to expand conservation programs.

7.2.9 Wholesale Agency Assistance Programs

Foundational: Utility Operations – Operations

IWA does not receive or provide wholesale water. This BMP is not applicable to IWA's service area.

7.2.10 Retail Conservation Pricing

Foundational: Utility Operations – Pricing

Retail conservation pricing provides economic incentives to customers to use water efficiently. The goal of this BMP is to recover the maximum amount of water sales revenue from volumetric rates that is consistent with utility costs, financial stability, revenue sufficiency, and customer equality. IWA's Board has approved a new allocation-based rate structure to be implemented in October 2012. The new rate structure alone will change customer behaviors, resulting in conservation. The revenue for the rate structure will also off-set the costs of the conservation program.

7.2.11 Conservation Coordinator

Foundational: Utility Operations – Operations

A Conservation Coordinator provides oversight of conservation programs and BMP implementation, as well as communicating and promoting water conservation issues. IWA has been proactive and in 2006 hired an Environmental Programs Coordinator to facilitate its conservation efforts. The Coordinator oversees not only water conservation, but also other environmental programs within the City of Indio. Including the Environmental Programs Coordinator, IWA currently employs has four staffers that oversee conservation efforts.

The annual budget for the Environmental Programs Coordinator program was estimated to be $463,300 in 2010 (B&V, 2005c). The 2015 budget is estimated as $539,610.

Table 7-9: Actual Expenditures for a Water Conservation Coordinator

Actual	2006	2007	2008	2009	2010
# of Full-time Positions	4	4	4	4	4
# of Part-time Positions	0	0	0	0	0
Actual Program Budget - $	$37,500	$42,500	$44,500	$46,500	$48,500
Actual Staff Budget - $	$240,452	$358,281	$360,222	$362,162	$364,103
Actual Expenditures - $	$277,952	$400,781	$404,722	$408,662	$412,603

Table 7-10: Projected Expenditures for a Water Conservation Coordinator

Planned	2011	2012	2013	2014	2015
# of Full-time Positions	4	4	5	5	5
# of Part-time Positions	0	0	0	0	0
Projected Program Budget - $	$ 48,500	$ 48,500	$ 48,500	$ 48,500	$ 48,500
Projected Staff Budget - $	$ 383,266	$ 383,266	$ 472,040	$ 481,481	$ 491,110
Projected Expenditures - $	$ 431,766	$ 431,766	$ 520,540	$ 529,981	$ 539,610

7.2.12 Water Waste Prohibition

Foundational: Utility Operations – Operations

A Water Waste Prohibition is an important component for any conservation plan and refers to enactment and enforcement measures that prohibit gutter flooding, single pass cooling system in new connections, non-recirculation system in all new conveyer car washes and commercial laundry systems, and non-recycling decorative water fountains.

The City of Indio has already passed an ordinance (1528) prohibiting water wasting which results in flows onto roadways, adjacent property, or non-irrigated property. In addition, the City has also passed ordinance 257, which states: "Chapter 54.050 It shall be unlawful for any person to willfully or neglectfully waste in any manner, any person having knowledge of any conditions whereby water is being wasted, shall immediately notify the Water Department of that fact."

IWA enforces local ordinances regarding sprinklers which could include a temporary shut-off of water service upon receipt of a complaint of a broken sprinkler head. IWA is addressing nuisance water through this ordinance. However, IWA has addressed nuisance water more specifically in its landscaping ordinance (54.054).

IWA has developed a "Water Waster Notice" to notify the property owner of the violation and corrective actions to be taken when over-irrigation or water wasting is reported on the property. IWA has developed a form for calculating the amount of water being wasted and can inform the property owner. With documentation of wasted water, specifically by photos of the violation and "Water Waster Notice", IWA can enforce its regulations and educate the public. A copy of both the "Water Waster Notice" and the sheet for calculating nuisance water flows can be found in Appendix G.

The effectiveness of this DMM is currently determined by how many revisits are made to a site and by tracking the number of total complaint calls received in the database.

7.2.13 Residential Ultra Low Flush Toilet Replacement Programs

Programmatic: Residential

A residential ULFT replacement program seeks to replace high consuming toilets (≥3 gpf) with the more efficient ULFTs that use 1.6 gallons or less per flush in both single-family and multi-family residences. At a minimum, the program should replace as many toilets as would be replaced under a City ordinance that required ULFT retrofits on resale for all homes older than 1992. The program may achieve these water savings through financial incentives or rebates. Under the residential ULFT replacement program, some agencies provide rebates for the purchase of ULFT toilets while others actually supply and install the toilets themselves. IWA can consider either approach for implementation of this program. An estimated cost of $150 per ULFT replaced is assumed for this DMM.

This program is still in the planning phase and has not yet been implemented. IWA continues to seek partnerships and additional funding to expand conservation programs.

7.2.14 Implementation and Investment in DMMs

IWA's Conservation Program was initiated in 2008. In developing its water Conservation Program, IWA utilized many of the CUWCC's DMMs as guidelines. The IWA is actively participating in the CUWCC foundational BMPs. According to the GPCD method, the IWA is "on track" and with CUWCC and 20 by 2020 goals. Still, IWA continues to seek new partnerships and addition funding to expand conservation programs and include more and more programmatic BMPs. The DMMs proposed by the CUWCC are presented in Table 7-11. Their implementation status by IWA as well as new BMP categorization by CUWCC is also indicated.

Table 7-11: CUWCC DMMs and Implementation Status

No.	DMM	Status
1	Residential Surveys *(Programmatic: Residential)*	Implemented
2	Residential Retrofits *(Programmatic: Residential)*	Upgrades to irrigation systems implemented. Internal plumbing fixtures under evaluation.
3	System Water Audits *(Foundational: Utility Operations – Water Loss Control)*	IWA's System Water Audit Program was started in 2001. The goal is to maintain < 2% water loss in the distribution system.
4	Metering *(Foundational: Utility Operations – Metering)*	Implemented - 100% of IWA's customers are metered, and any new water users will require metering on their service connections. IWA will require separate meters for irrigation on all commercial, industrial, and apartment building properties by January 1, 2013.
5	Landscape *(Programmatic: Landscape)*	Implemented - Since 2008, IWA has taken several steps: ▸ Landscape and Water Conservation Ordinance ▸ Smart Controller Program ▸ Water Smart Landscape Rebate Program ▸ Irrigation Upgrade Rebate Program
6	Clothes Washers *(Programmatic: Residential)*	Under Evaluation
7	Public Information *(Foundational: Education – Public Information Programs)*	Implemented - IWA's Water Smart Education and Outreach Program was started in 2006 and has since expanded to include: ▸ Cooperative efforts with the Coachella Valley Association of Governments (CVAG) ▸ Memorandum of Understanding (MOU) with Valley water agencies ▸ Active membership in Water Agencies of the Desert Region (WADR)
8	School Education *(Foundational: Education – School Education Programs)*	Implemented as part of the Public Information Program.
9	Commercial, Industrial, and Institutional (CII) *(Programmatic: Commercial, Industrial, and Institutional)*	Under Evaluation
10	Wholesale Incentives *(Foundational: Utility Operations – Operations)*	Not Applicable
11	Rates *(Foundational: Utility Operations – Pricing)*	To be implemented in October 2012.
12	Conservation Coordinator *(Foundational: Utility Operations – Operations)*	Implemented - IWA hired an Environmental Programs Coordinator hired in 2006 to facilitate conservation efforts and conservation programs.
13	Waste Prohibitions *(Foundational: Utility Operations – Operations)*	Implemented
14	Residential Ultra-low Flow Toilet (ULFT) Replacement Programs *(Programmatic: Residential)*	Under Evaluation

7.3 Summary of Conservation

The proposed conservation plan for IWA incorporates not only the programs under the CUWCC's DMMs, but also components from its current conservation program and a few new components and/or measures. This section further addresses any proposed new measures and those components from the current conservation program that should be incorporated into IWA's CMP.

Programs within the CMP focus heavily on reducing demands for residential outdoor water use. The single-family residential customer class alone accounts for nearly 60 percent of IWA's total annual demands, while approximately 70 percent of single-family residential water usage is outdoors. IWA previously targeted this customer class for water conservation through its ordinances with the goal of reducing excess water usage and the wasting of water. Under the public outreach and residential survey programs (DMMs 1, 7 and 8), IWA will have the opportunity to discuss and recommend water efficient landscaping to residential customers. However, to achieve significant water savings, IWA will need to go farther and develop a comprehensive residential outdoor water conservation program. The Residential Outdoor Conservation Program could include a combination of:

- demonstration gardens
- rebates for turf replacement
- public outreach and education
- landscape templates and resource guides
- water use efficiency tags for plants and irrigation devices at local nurseries
- training and workshops for certifying landscape designers
- rebates for Water Smart Irrigation Controllers, and
- ordinances.

Through the implementation of the CUWCC's DMMs and the passage of ordinances, IWA should also be able to realize a significant reduction in residential demands for indoor water use. In addition, City plumbing codes should be reviewed and updated to ensure that they do not impede the efforts of water conservation initiatives.

The following measures are specifically recommended as part of IWA's CMP.

- New ordinances
- Re-landscaping of municipally owned lands, including medians
- Rebates for residential turf replacement
- Smart Controller Rebate Program

7.4 Conservation Master Plan Programs and Measures

The conservation programs suggested by the CMP have been designed to achieve at least a 20 percent reduction in current per capita potable water usage for all demand classes by 2020. This goal is actually mandated by the Governor and the State Water Resources Control Board for all public utilities in the State of California.

Based on production data, IWA's current average per capita water usage rate for all customer classes is approximately 296 gpcd. To achieve state mandates, this usage rate should reduce to 236 gpcd by 2020. At this time the IWA is currently "on track" to meet this goal as calculated by the CUWCC gpcd method.

The proposed conservation plan relies heavily on the successful implementation of a residential re-landscaping program that would promote the replacement of sod with drought tolerant plants, also known as xeriscape landscaping. City ordinances would also be necessary for this component of the program to ensure that xeriscape landscaping is installed at all new residential developments. Another important component is the re-landscaping of municipal lands with xeriscape landscapes. This program should be given the highest priority as it will provide residents with demonstration gardens and will show residents that the City is indeed serious about water conservation. New Ordinances

Local ordinances that promote water conservation and prohibit water wasting can yield high volume, cost-effective water savings. The City of Indio may want to consider ordinances that target not only the residential customer class but also the CII water customer classes. Ordinances targeting outdoor water use will yield the greatest water savings and should thus be given the highest priority. Ordinances promoting water efficient fixtures indoors also should be considered as they will yield cumulative water savings and assist IWA in fulfilling obligations as a signatory to CUWCC's MOU. The sooner that new ordinances can be approved, the greater their impact will be.

Water Efficient Landscaping in Residential New Construction Ordinance

The implementation of proactive ordinances for new construction can have a profound impact on water conservation and the ability of IWA to cost-effectively meet its water conservation goals. An ordinance requiring water efficient landscaping for all new residential construction should be considered. The proposed moderate conservation program (MCP) achieves xeriscape landscaping at 40 percent of all City of Indio homes and apartments building by 2020 and 80 percent by 2030. Based on new account projections for the two customer classes, the City could attain water efficient landscaping at 26 percent of all single-family homes and 20 percent of multi-family accounts by 2020 solely through such an ordinance. Further savings could be realized if the ordinance was broad sweeping for all new construction developments including commercial and industrial.

Residential ULFT Retrofit Ordinances

Another ordinance to be considered is one prohibiting the sale and installation of non-ULFTs (rated to greater than 1.6 gpf). The State of California is currently considering such legislation (CUWCC, 2007). The City of Indio could also consider a local ordinance requiring the installation of ULFTs upon resale. Such an ordinance would enable IWA to achieve its retrofit goals under the CUWCC's MOU and realize water savings that exceed those of the MCP (4 percent per year = natural replacement rate), yielding an additional 2.9 percent in the rate of retrofits compared to natural replacement only. The CUWCC natural replacement rate for toilets assumes that the toilets replaced have had a life of 30 years.

IWA may also want to consider an ordinance requiring high efficiency plumbing products on all new developments and on all retrofits that go beyond 1991 plumbing code requirements. The City could also enact an ordinance that requires the installation of low flush toilets (≤ 1.6 gpf) on all resale homes, for those built prior to 1992.

Ordinance Water Savings

Potential water savings from the proposed ordinances were developed and are presented in Table 7-13.

Table 7-13: Potential Water Savings from Proposed Ordinances (BV, 2009)

Ordinance	Water Savings (AFY)	
	2015	2020
1. New residential construction desert landscaping	900	2,000
2. Prohibition of sale/installation of non-ULFTs	Up to 50	Up to 100
3. ULFT retrofit upon resale	Up to 18	Up to 35

7.4.1 Municipal Re-landscaping

A very important component of the residential re-landscaping program is the re-landscaping of municipal lands with water efficient desert landscapes. This program was recommended as a high priority as it will provide residents and community leaders with demonstration gardens illustrating the types of plants to be planted, the water savings from conversion from sod, and the potential diversity and beauty of desert landscapes. The demonstration gardens will be essential for the public outreach and education components of IWA's Residential Landscaping Conservation Program. This program could target municipal properties currently in sod and also all medians. Potential water savings resulting from this program implementation are presented in Table 7-14.

Table 7-14: Potential Water Savings from a Municipal Re-Landscaping Program (BV, 2009)

Program	Water Savings (AFY)	
	2015	2020
Re-landscaping of Municipal properties and medians	400	1,000

Landscape design is a planning approach that should integrate elements that will reduce water use. Landscaping for water conservation can include one or more of the following to reduce water use: plant type (native, low water use), minimizing narrow paths or steep areas that produce inefficient irrigation, plant groups with similar irrigation requirements, regular maintenance of irrigation equipment, fertilizer, aeration, mulch, and reduced irrigation areas in new developments. To encourage retrofit of turf with low water demand landscaping, utilities have implemented rebate programs to encourage turf removal. Rebate programs have been successful in facilitating conservation efforts in other cities.

7.4.2 Smart Controller Program

The Smart Controller Program, which offers rebates to customers for replacing standard landscape controllers with new smart controllers, is already a component of IWA's current conservation program. The new controllers are able to calculate irrigation needs as a function of the type of landscaping and changes in weather and soil conditions. Each controller installed through the program could reduce irrigation demands by 30 percent. IWA should continue to market this program to area residents and CII customers, but also focus on HOA boards and multi-family accounts.

7.4.3 Water Smart Landscape Rebate Program

IWA also currently has a Water Smart Landscaping Rebate Program. This program assists residents, business owners, and developers in replacing water intensive landscaping with low water usage plants and desert landscapes. The program offers rebates of $1.00 per square foot of turf removed, up to $750 per residence and $3500 per commercial property. It is recommended that IWA continue to market this program to area residents, CII customers, and HOA boards and to ensure that City ordinances do not conflict with the goals of this program.

IWA could provide certification workshops to local landscape designers to ensure that designers are aware of and utilize water efficient practices and plants. A list of certified landscape designers could be provided to residents, developers, and business owners.

The Water Smart Landscape Rebate Program is the centerpiece of IWA's conservation program due to the potential savings that could result. Potential water savings in the residential customer class resulting from this program are presented in Table 7-15.

Table 7-15: Potential Water Savings from the Water Smart Landscape Rebate Program (BV, 2009)

Program	Water Savings (AFY)	
	2015	2020
Water Smart Landscape Rebate Program	1,550	2,750

These savings assume that a water efficient landscaping ordinance for new construction is passed in 2010 and that any new residences after 2010 would be built to new water efficiency standards.

Under its 5-year plan, IWA's target is to replace turf with water efficient landscaping at approximately 1,350 existing single-family homes and at 44 existing multi-family residential accounts by 2015. These are 6.4 and 10.0 percent of the 2015 total projected homes and accounts, respectively. On an annual basis, this amounts to 270 single family homes and 9 multi-family accounts that convert sod landscapes to water efficient desert landscapes annually.

Table 7-16: Estimated Annual Water Savings from Programs under the Conservation Plan (BV, 2009)

Program	2010	2015	2020	2025	2030
Municipal Re-Landscaping	51	382	1,008	1,203	1,453
Residential Re-landscaping	389	2,438	4,754	7,001	9,531
Residential Indoor conservation: toilet replacement	6	36	70	102	135
Recycled Water (4 MGD)	-	896	4,481	4,481	4,481
PROGRAM SAVINGS	445	3,751	10,312	12,787	15,599

Estimated cumulative water savings resulting from each of the components of the Conservation Plan through 2030 are presented in Table 7-17.

Table 7-17: Estimated Cumulative Water Savings from Programs under the Conservation Plan through 2030 (BV, 2009)

Program	Cumulative Water Savings (AF) through 2030
Municipal Re-Landscaping	17,200
Residential Re-landscaping	100,300
Residential Indoor conservation: Toilet replacement	1,500
Recycled Water (4 MGD)	62,700
PROGRAM SAVINGS	181,600

7.5 IRWMP Conservation Grant

Under CA Proposition 84 (The Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006), the state approved more than $5.3 billion to fund a myriad of water-related improvements, of which $4 million was awarded to the Coachella Valley for conservation measures commensurate with the Coachella Valley Integrated Regional Water Management Plan (IRWMP). The IWA will receive $200,000 of this funding to supplement the $50,000 it has already budgeted toward reducing per capita consumption within its service territory as part of the Urban Water Use Efficiency Program

This program is in the earliest stages of implementation, and will evolve in scope and method as the IWA continues with trial-and-error approaches to consumption reduction programs and as well, gathering information from other city-specific water providers with successful conservation incentive programs.

Initially the funding will be directed toward the Water Smart Landscape Rebate Program detailed in Section 7.4.3, with the intention of converting several high-visibility businesses to drought-tolerant landscaping, and presenting their reduced water bills and attractive new landscaping as a marketing tool to expand participation. As the IWA gathers more information and evaluates the success of pilot projects, it will likely diversify the program to include smart controllers, municipal re-landscaping, and any other techniques and learned lessons that can best be incorporated into a local conservation plan.

CHAPTER 8 – WATER SHORTAGE CONTINGENCY PLANNING

8.1 Overview

Water supplies may be interrupted or reduced significantly in a number of ways, such as a drought which limits supplies, an earthquake which damages water delivery or storage facilities, a regional power outage, or a toxic spill that affects water quality. This chapter of the Plan describes how IWA intends to respond to such emergencies so that emergency needs are met promptly and equitably.

The 1987 - 1992 drought, as well as other regulatory and institutional changes that occurred before it, resulted in greater uncertainties in the imported water supplies to Southern California. In 1991, widespread water rationing was imposed for the first time. MWD realized that a heightened level of coordination was required in order to minimize the risk of this happening in the future. As a result, the Integrated Resources Plan was adopted by MWDSC, which calls for a coordinated regional approach to secure reliable water supplies for Southern California in the long-term.

The City of Indio enjoys a high level of reliability for its water supply from the Coachella Valley Groundwater Basin. Even during the driest three-year historic sequence, the City's supplies were not impacted due to the groundwater basins reliability. Table 8-1 presents the estimated three-year minimum water supply for 2011 through 2013 assuming these are drought years.

Table 8-1: Three-year Estimated Minimum Water Supply (AFY)

Source	Year 1	Year 2	Year 3	Normal
Groundwater	26,160	27,020	27,880	24,900
Total	26,160	27,020	27,880	24,900

In the summer of 2005, IWA implemented a water-emergency ordinance to address potential reduced supplies and impose conservation. The ordinance itself was specific to the summer conservation period of 2005; however, this ordinance is the template for future ordinances to be issued should climatic or supply conditions warrant such action. The 2005 ordinance called for voluntary and some mandatory provisions to reduce water use and prohibit wasteful practices. A copy of the 2005 Emergency Water Shortage Ordinance is provided in Appendix H.

8.2 Stages of Action

The City Manager, after consultation with the IWA Commissioners, is authorized and directed to determine when the water supply conditions prevailing in the City meet Stage I, II or III as detailed in Table 8-2. A Stage IV Water Emergency may be declared at the City Manager's sole discretion.

The following sections detail the measures to be taken under each stage of action.

Table 8-2: Stages of Action (DWR Table 35)

Stage	Condition	System Status/Trigger	Rationing Type
I	Normal Condition	The City will meet water demands.	Voluntary
II	Water Alert	Probability that the City will not meet all water demands.	Mandatory
III	Water Warning	The City is not able to meet all water demands.	Mandatory
IV	Water Emergency	Major deficiency of any supply or failure of a distribution facility	Mandatory

8.3 Consumption Reduction Methods

As the City experiences increasing stages of action, IWA customers must adjust their water use behaviors accordingly to reduce strain on limited supplies. Table 8-3 lists consumption reduction methods associated with each of the expected percent demand reductions for each of the stages of action. Impacts on consumption from each the methods are also presented. Penalties or fines for unauthorized water usage will be effective once the respective stage has been declared.

Table 8-3: Consumption Reduction Methods (DWR Table 37)

Stage	Condition	Consumption Reduction Methods	Projected Reduction (%)
I	Normal	1. Customers are requested to use water wisely and to practice water conservation measures so that water is not wasted.	0.00%
		2. Customers are to avoid use of water in a manner that creates runoff or drainage onto adjacent properties or onto public or private roadways.	0.00%
II	Water Alert	1. Parks, school grounds, and golf courses are to be watered at night only.	0.00%
		2. Lawns and landscaping are to be watered after 6:00 p.m. and before 6:00 a.m.	0.00%
		3. Driveways, parking lots, and other paved surfaces are not to be washed with water.	0.25%
		4. Private vehicles are to be washed with a bucket; hoses must have positive shut off nozzles.	0.25%
		5. Commercial car washes must recycle water.	9.00%
		6. Restaurant customers are to receive water only upon request.	0.10%
		7. Water service through construction meters for grading or other construction purposes is to be used after 5:00 p.m. and before 10:00 a.m.	4.00%
		8. Commercial nurseries are to use water between 6:00 p.m. and 6:00 a.m.	0.00%
		9. Livestock or animals may be watered at any time.	0.00%
		10. Decorative ponds, golf course water hazards which are not an integral part of the permanent irrigation or fire protection system, fountains, and other waterscape features are not to be filled or replenished. Fountain pumps should remain off to minimize evaporation.	1.40%

Stage	Condition	Consumption Reduction Methods	Projected Reduction (%)
III	Water Warning	1. Parks are to be watered at night no more than two times per week.	0.50%
		2. School grounds are to be watered at night no more than two times per week.	0.25%
		3. Golf course greens and tees are too watered at night. Fairways may be watered on alternate days at night.	5.00%
		4. Lawns and landscaping are to be watered no more than two times per week after 6:00 p.m. and before 6:00 a.m.	1.00%
		5. Restaurant customers are to receive water only upon request using disposable cups.	0.50%
		6. Driveways, parking lots, or other paved surfaces are not to be washed with water.	0.00%
		7. Swimming pools are not to be filled.	0.00%
		8. Commercial car washes must recycle water.	0.15%
		9. New construction meters will not be issued by the City.	4.00%
		10. Water service through construction meters for grading or other construction purposes is to be used after 5:00 p.m. and before 10:00 a.m.	0.10%
		11. Agricultural customers are to use water on alternate days only.	1.00%
		12. Commercial nurseries are to use water only on alternate days between 6:00 p.m. and 6:00 a.m.	2.50%
		13. Livestock or animals may be watered at any time.	0.00%
IV	Water Emergency	1. Lawns and landscaping are not to be watered.	3.50%
		2. Parks, school grounds, and golf course fairways are to be watered with recycled water, if available, or not at all. Golf course greens and tees may be watered no more than two times per week.	3.50%
		3. Driveways, parking lots, or other paved surfaces are not to be washed with water.	0.00%
		4. Commercial car washes using recycled water are to be used for washing vehicles. Consumption of City water for this use must be reduced to 50% of average consumption during the prior year.	3.00%
		5. Restaurant customers are to receive water only upon request, using disposable cups.	0.00%
		6. Swimming pools are not to be refilled.	0.00%
		7. New construction meters will not be issued by the City.	0.00%
		8. Water service through construction meters will not be available by the City.	0.00%
		9. Permanent orchard crop irrigation is to be limited to no more than two times per week. In the event of a temporary service outage, agricultural irrigation is to be discontinued.	4.00%
		10. Other agricultural and commercial nursery irrigation is to be discontinued.	6.00%
		11. Livestock or animals may be watered at any time.	0.00%

Table 8-4 represents the overall demand reductions expected under each of the stages of action resulting from the consumption reduction methods presented in Table 8-3.

Table 8-4: Expected Demand Reductions during Water Action Stages

Stage	Condition	Percent Reduction	Volumetric Reduction (Based on 2010 Demands = 18.3 MGD)
I	Normal	0	0
II	Water Alert	15%	2.75 MGD
III	Water Warning	15% (30% Total)	2.75 MGD (5.5 MGD total)
IV	Water Emergency	20% (50% Total)	3.7 MGD (9.2 MGD total)

8.4 Water Shortage Contingency Plan Implementation and Enforcement

In the event of a water shortage, the City Manager will direct City personnel to provide public education and notices to all water users within the City's service area, advising them of the water supply conditions and required actions. The City Manager is also authorized to monitor compliance among users, including a review of customer usage records and field observation or any other steps deemed necessary to enforce mandatory water conservation.

Initial noncompliance will be addressed via written warning. Second and third violations will result in surcharges of 25% and 50%, respectively. If water wasting continues, water service may be shut off and misdemeanor charges filed, at the discretion of the City Manager.

Impacts of the various stages of action will be monitored by tracking monthly consumption throughout the duration of the emergency declaration and comparing water usage to historic usage as shown in Table 8-5.

Table 8-5: Water Use Monitoring Mechanisms

Mechanisms for Determining Actual Reductions	Type of Data Expected
Meter readings as compared to historical flows	AF/account
Total consumption	AFY

8.5 Catastrophic Water Shortages

Due to the significant amount of groundwater in storage, both natural and imported, IWA does not anticipate any significant short term, drought or emergency water supply deficiencies. In the event of a major catastrophe, the availability of groundwater will not be affected. IWA has a number of generators that can be used to operate wells and booster stations in case of widespread power failure.

The system is planned to convert to system storage over the next 10 years which will provide storage reservoirs located at higher elevations; this will help to supply water at lower energy costs and also in the event of power failure. Portable pumps and temporary above-ground pipe are available to provide water service should earthquakes damage portions of the system. IWA remotely monitors the status of all key facilities at IWA headquarters, which enables it to detect areas affected by disasters. Also, most of IWA's employees live within a short driving distance of IWA facilities; therefore, IWA is capable of addressing any emergency in a quick and efficient manner.

8.6 Analysis of Revenue Impacts on Reduced Sales During Shortages

A reduction in the amount of water consumed will lead to a reduction in revenue and expenses for IWA. These reductions will have an impact on IWA's ability to finance its operations during periods of water shortages.

Revenues would decrease as a result of reduced water sales to IWA customers. Table 8-7 presents a summary of projected revenue reductions by stage.

Table 8-6: Reduced Revenues Due to Water Shortage

Stage	Anticipated Revenue Reduction
II	15%
III	30%
IV	50%

In addition, expenditures by IWA are also expected to decrease in the event of a water shortage. Reductions are expected in source supply and pumping expenses. Table 8-7 presents a summary of projected expenditure reductions by stage.

Table 8-7: Reduction to Expenditures Due to Water Shortage

Stage	Anticipated Expenditure Reduction
II	15%
III	29%
IV	53%

Several measures could be taken to generate additional funds to absorb the negative financial impact on IWA operations from a severe water shortage. Examples of such measures, possible financial benefits, and possible consequences are listed in Table 8-8.

Table 8-8: Proposed Measures to Overcome Revenue and Expenditure Impacts

Proposed Measure	Summary of Impacts
Rate Adjustment	Increased savings to General Fund
	In normal years, CVWD would receive more money than required for normal operations (increased profit)
	Water customers resistance
Use of Accumulated Reserves	Increased savings to General Fund during non-events
	Decreased availability for O&M or Capital Fund
Decrease Capital Expenditure	Increased savings to General Fund
	Delay of system rehabilitation
	Decrease in quality of future system facilities
Decrease of O&M Expenditure	Increased savings to General Fund
	Less staff available to respond to emergencies
	Reduced maintenance frequency of system facilities

8.7 Water Quality Emergency Measures

The City has filed a Water Quality Emergency Notification Plan with the DPH. This plan details the actions that will be taken in the event of any violation of standards, maximum contaminant levels, variance, and exemptions. Actions include qualifying the "Degree of Hazard" and notification of area residents, schools, and businesses. Details of this plan are included in Appendix I.

CHAPTER 9 – REFERENCES

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APPENDIX A

UWMP CHECKLIST

APPENDIX B

EXAMPLE LETTER TO APPROPRIATE AGENCIES

APPENDIX C

PUBLIC NOTICE ADVERTISEMENT AND ADOPTION RESOLUTION

APPENDIX D

2008 ANNUAL WATER QUALITY REPORT

APPENDIX E

CONSERVATION MASTER PLAN

APPENDIX F

BMP REPORTS TO CUWCC

APPENDIX G

WATER WASTER NOTICE AND CALCULATION SHEET

APPENDIX H

EMERGENCY WATER SHORTAGE ORDINANCE

APPENDIX I

WATER QUALITY EMERGENCY NOTIFICATION PLAN