# Project Summaries

| Table 4 – 2015 IRWM Grant Solicitation Project Summary Table | | | | |
|---|---|---|---|---|
| IRWM Project Element | | Newhope-Placentia Trunk Sewer Replacement 2-72 | 2015 Integrated Watershed Protection Program | Santa Ana River Conservation and Conjunctive Use Program |
| IR.1 | Water supply reliability, water conservation, and water use efficiency | Yes | Yes | Yes |
| IR.2 | Stormwater capture, storage, clean-up, treatment, and management | Not applicable | Yes | Yes |
| IR.3 | Removal of invasive non-native species, the creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands | Not applicable | Yes | Yes |
| IR.4 | Non-point source pollution reduction, management, and monitoring | Not applicable | Yes | Yes |
| IR.5 | Groundwater recharge and management projects | Yes | Yes | Yes |
| IR.6 | Contaminant and salt removal through reclamation, desalting, and other treatment technologies and conveyance of reclaimed water for distribution to users | Yes | Not applicable | Not applicable |
| IR.7 | Water banking, exchange, reclamation, and improvement of water quality | Yes | Not applicable | Yes |
| IR.8 | Planning and implementation of multipurpose flood management programs | Not applicable | Yes | Not applicable |
| IR.9 | Watershed protection and management | Not applicable | Yes | Yes |
| IR.10 | Drinking water treatment and distribution | Not applicable | Not applicable | Not applicable |
| IR.11 | Ecosystem and fisheries restoration and protection | Not applicable | Not applicable | Yes |

## Brief Descriptions:

Newhope Placentia Trunk Sewer Replacement 2-72 Project: The project will divert 8 MGD of wastewater that are currently not reclaimable and increase GWRS's water production by 6,300 AFY for groundwater recharge.

2015 Integrated Watershed Protection Program: The program will actively develop watershed-wide stormwater management plans that integrate water quality facilities and water recharge facilities with the flood control facilities.

Santa Ana River Conservation and Conjunctive Use Program: The multi-agency, watershed-wide program will develop dry-year supply by banking wet-year water and integrate water conservation measures and habitat enhancements efforts.

# Project Descriptions

## Newhope-Placentia Trunk Sewer (NHP) Replacement Project 2-72

Implementing Agency: Orange County Sanitation District (OCSD)

The proposed project will increase purified recycled water production by approximately 6,300 acre-feet per year (AFY) for recharging the Orange County Groundwater Basin, which is a major supply source for the Santa Ana River Watershed.

Total water demands in Orange County are expected to increase from 480,000 AFY in 2015 to 558,000 AFY by 2035 (Orange County Water District's Long Term Facilities Plan). The population of the service area is projected to grow 9% in the next two decades (2.4 to 2.6 million). Most of this population increase should be from local residents, rather than immigration. Water demands will increase with rising municipal and industrial uses to support the growing service area. Water supplies in this area include groundwater, imported water, and recycled water. Groundwater is a major source of water supply. Adverse impacts like increased seawater intrusion and subsidence can be caused by over drafting from the basin. For this reason in order to sustain production from the basin, water must be replenished using projects like the Groundwater Replenishment System (GWRS); a 100 million gallons per day (MGD) facility that is jointly funded by OCSD and Orange County Water District. Operational since 2008, the GWRS takes highly treated wastewater that would have previously been discharged into the Pacific Ocean at OCSD's Plant No. 2 in Huntington Beach, and purifies it. The purification process uses a three-step advanced treatment consisting of microfiltration, reverse osmosis and ultraviolet light with hydrogen peroxide. This process produces high-quality water that exceeds all state and federal drinking water standards.

The Project will take municipal wastewater flows currently routed into the Santa Ana River Interceptor (SARI) due to the insufficient existing capacity of the existing NHP trunk sewer, and redirect them into OCSD's Reclamation Plant No. 1 in Fountain Valley for water recycling at GWRS. Existing wastewater flows in the Project area are currently sent to the SARI, which conveys non-reclaimable brines to OCSD's Treatment Plant No. 2 in Huntington Beach for treatment and ocean disposal. Once combined with the SARI's brine, these flows are prohibited from being recycled at GWRS. The Project will segregate approximately 8 MGD of municipal wastewater that is currently non-reclaimable, enabling them to be reclaimed at Plant No. 1 and GWRS. This will increase purified recycled water production for groundwater recharge by 6,300 AFY.

The outcome of the Project will be an increase in GWRS's purified recycled water production by approximately 6,300 AFY, which will be used for recharging the Orange County Groundwater Basin. This new local water supply directly offsets the need to import water from the State Water Project and the Colorado River.

The Project will also reduce the salinity of the Orange County Groundwater Basin by replenishing it with more high quality purified recycled water, as compared with imported water. The low salinity of the purified recycled water (approximately 43 milligrams per liter (mg/L) total dissolved solids) will improve the water quality of the local groundwater. In comparison, imported water salinity is significantly higher (approximately 500 mg/L TDS). For 6,300 AFY (approximately 6 MGD), the salt reduction amounts to 4,170 tons/year as a result of the Project.

An outcome of the Project is that it will create additional capacity in the SARI for additional salt removal to support desalting in the upper Santa Ana River Watershed, which discharges into the brine conveyance pipeline, and improve water quality in both the upper and lower portions of the watershed. The lower watershed's smart development needs would also be met. After the Project is complete and the Yorba Linda Pump Station (which pumps the existing NHP trunk sewer flows to the SARI) becomes obsolete, the property will become available to California State University at Fullerton for future development.

## 2015 Integrated Watershed Protection Program

Implementing Agency: Riverside County Flood Control and Water Conservation District (RCFCWCD)

Solving Riverside County's flood risk and water supply shortages in the Santa Ana River Watershed already require a regional approach, one that often involves local, state and federal partners. New needs have arisen that caused us to expand this approach to include other water-related issues that challenge Riverside County's economic prosperity, quality of life and environment. The three projects are a part of the RCFCWCD's 5-year capital improvement plan: San Jacinto River, Stage 4, Phase 1; Bautista Optimization Pond; and Beaumont MDP-Line 16. Each will be constructed by the District in collaboration with local partners including the City of San Jacinto, Lake Hemet Municipal Water District, and Beaumont-Cherry Valley Water District.

To complete the collaboration on these three projects and future regional projects, the RCFCWCD is establishing a Watershed and Water Conservation Planning Section. It will be led by an Engineering Project Manager and staffed with two civil engineers; a third engineer is planned to be added in 2016. The Section's first step is to actively develop watershed-wide storm water management plans that integrate water quality facilities and water recharge facilities with the flood control facilities that have been in our typical master plans in the past. Opportunities for stream restoration, wildlife corridor and species habitat enhancement, as they relate to storm water management, will be identified as well. These opportunities are best evaluated from a watershed-wide perspective and would be coordinated with the County's habitat conservation plans.

San Jacinto River, Stage 4, Phase 1:

The installation of a river levee in western Riverside County through the Project will provide all-weather access into and out of the San Jacinto Valley in western Riverside County by removing 967 acres and 445 structures from the San Jacinto River 100-year floodplain, to increase hydraulic capacity under the existing State Street Bridge, and to protect the State Street Bridge from damage during high flow events. The existing San Jacinto River channel and levees do not provide 100-year flood protection in the project reach. Recurring breaches of the existing levees have resulted in damaged agricultural lands and resort facilities, flooded roads, displaced local residents, and large inundated areas adjacent to the river. Floodwaters that come into contact with dairy wastes can contaminate local surface waters as well as impair water bodies as far away as Canyon Lake and Lake Elsinore during a large storm event. Also, without the project, the City of San Jacinto General Plan cannot be fully implemented, and the River would remain a constrained linkage between sensitive biological areas. In addition the culturally significant Soboba Band of Luiseno Indian's cottonwood grove would not be protected.

Bautista Optimization Pond:

The Project will expand upon the existing recharge facilities by constructing five new basins together with inlet and outlet facilities within a 16-acre site. The purpose of the Project is to improve water supply reliability, enhance water conservation, improve groundwater quality, and stabilize local water rates. The Project is located in an area that provides a considerable overdraft with excellent percolation rates, more than 200 feet of natural filtration, and resides with significant disadvantaged communities. The Project also responds to the legal requirements of the Soboba Legal Settlement Agreement between the tribe and the Metropolitan Water District of Southern California. Currently storm water runoff from Bautista Creek flows from the upper watershed to the San Jacinto River and into Mystic Lake. According to the Western Riverside County Agriculture Coalition, all flows that enter Mystic Lake completely evaporate: providing little to no recharge benefits to the San Jacinto Watershed.

Beaumont MDP-Line 16:

The installation of a reinforced concrete water conveyance pipeline through the Project will provide multiple benefits to the community by serving as a watershed protection project, and a water conservation project. It will help offset dependency on imported water for the community of Cherry Valley, City of Beaumont and portions of the City of Calimesa, all areas with limited local water resources. Surface flow from the watershed, currently from a tributary to Marshall Creek, will be captured and conveyed to a groundwater recharge facility where the water will replenish the Beaumont Groundwater Basin – a major water supply source for the region.

## Santa Ana River Conservation and Conjunctive Use Program (SARCCUP)

Implementing Agency: The Santa Ana Watershed Project Authority, a joint-powers authority, and its five regional member agencies which provide wholesale water to most of the Santa Ana River Watershed:

- Eastern Municipal Water District
- Inland Empire Utilities Agency
- Orange County Water District
- San Bernardino Valley Municipal Water District
- Western Municipal Water District

SARCCUP Phase 1 establishes a multi-agency conjunctive use program that includes the construction and integration of new recharge, extraction and conveyance infrastructure with existing facilities. This will create a 180,000 acre foot (AF) groundwater bank for State Water Project (SWP) water through joint-agency agreements in the Santa Ana River Watershed. The constructed facilities will have the capacity to store up to 60,000 AFY during three wet years within a decade, and extraction facilities can draw up to 60,000 AFY during three dry years within a decade. This estimation is based upon a typical hydrologic cycle for California of three wet years over a ten year period.

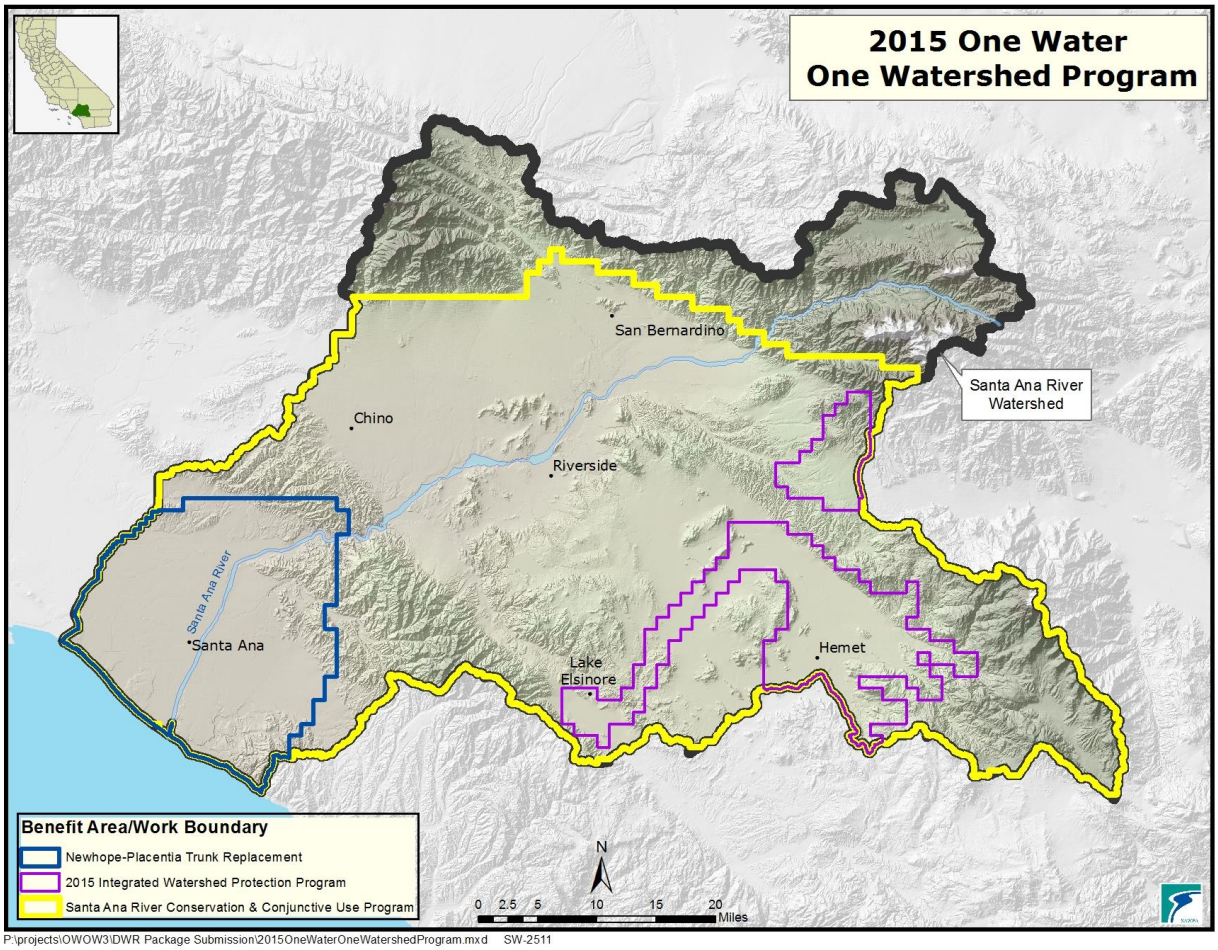
SARCCUP will additionally restore 3.5 miles of stream habitat and 40.5 acres of riparian habitat for a federally listed native freshwater fish species, the Santa Ana Sucker (*Catostomus santaanae*), to mitigate incidental "take" under the Endangered Species Act and acquire the necessary permits from federal and state resource agencies for water supply projects throughout the Santa Ana River Watershed. Creating Santa Ana Sucker habitat is essential to the ability of a coalition of local water agencies, which have begun planning a regional multi-species Endangered Species Act Section 10 habitat conservation plan, to build local supply reliability projects. Habitat and water supplies will also be sustained through the removal and native replantings of 640 acres infested with the invasive Arundo Donax plant species.

SARCCUP will also implement a regional water use efficiency element to obtain additional water conservation in the watershed by supporting retail water agencies in adopting conservation-based rates (also known as budget-based rates) and landscape transformations as drought tolerant landscapes replace ornamental turf grass. There is a need for adoption of conservation-based water rates and drought tolerant landscape maintenance as stated in this region's Integrated Regional Water Management Plan, the One Water One Watershed 2.0 Plan. The plan specifies that a supply approach must be coupled with a demand management approach to effectively solve the water resource issues faced by a watershed in a semi-arid climate.

The supply element of SARCCUP Phase 1 will create the 180,000 AFY water bank for a region that, according to the One Water One Watershed 2.0 Plan, is currently dependent on imported water for approximately one third of the region's water supply. The region is fortunate enough to have two sources of imported water, including both the SWP and the Metropolitan Water District of Southern California's Colorado River Aqueduct. Currently the SWP's allocation to its contractors has been curtailed because of the ongoing drought, as well as species and salinity control issues in the Bay-Delta. There have been no recent curtailments on the Colorado River system, but the basin is in the midst of a fifteen year drought. These supplies are projected to still be available in the future, but the timing of their availability will be an unprecedented constraint for the approximately 70 retail water agencies in the Santa Ana River Watershed. SARCCUP will address this need by installing the required infrastructure, constructing recharge basins and stipulating the necessary inter-agency agreements to take advantage of the time periods when water is available from the SWP.

As additional, water supplies will be needed to sustain a region that is projected to experience some of the greatest population growth in the State. Future phases of SARCCUP may include banking other sources of supply beyond those available from the SWP.

# Regional Map

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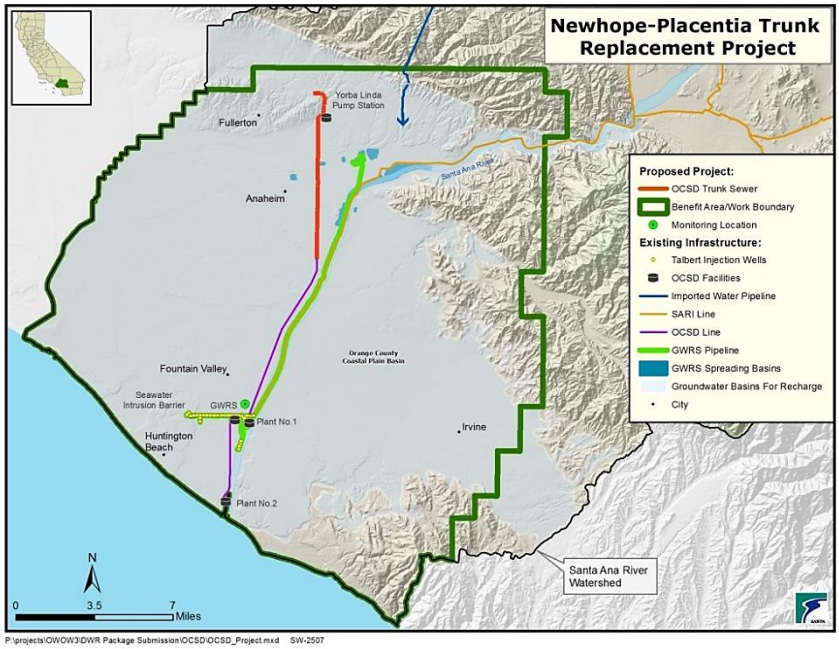
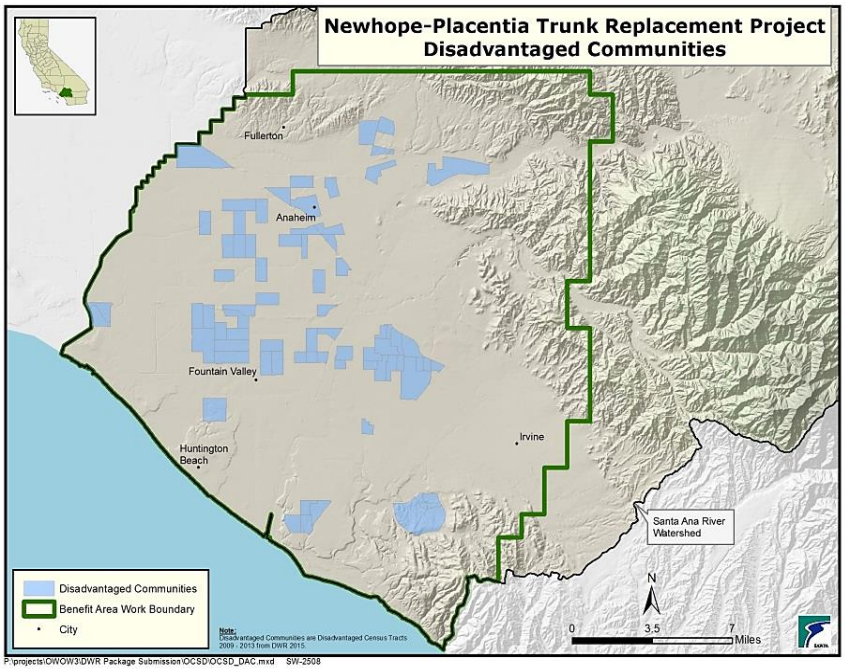
# Project Maps

## Newhope-Placentia Trunk Sewer (NHP) Replacement Project 2-72

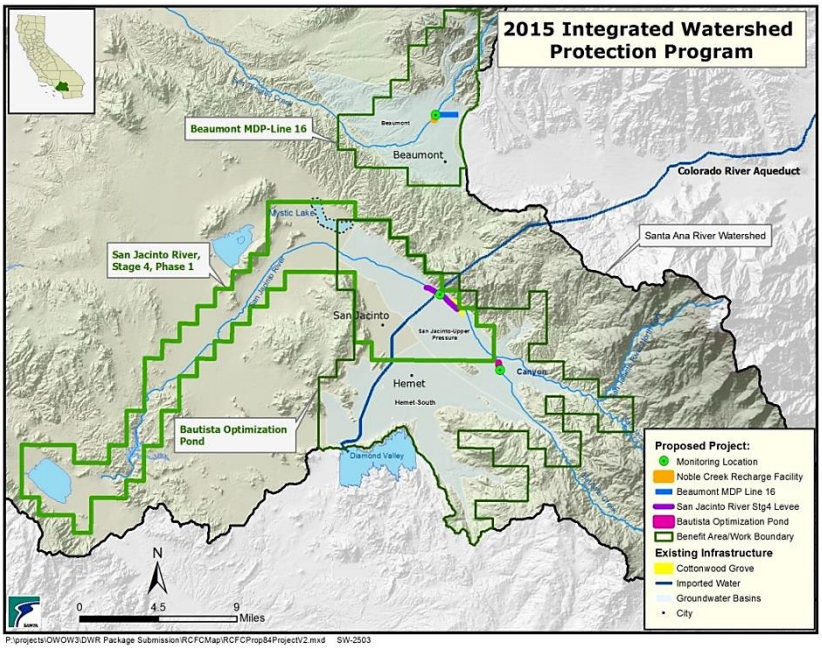
Implementing Agency: Orange County Sanitation District (OCSD)

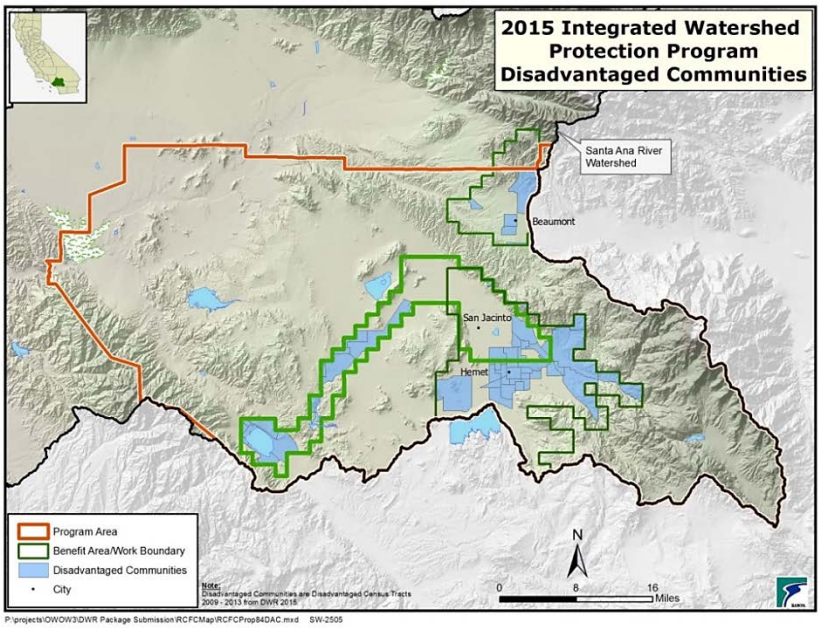


## 2015 Integrated Watershed Protection Program

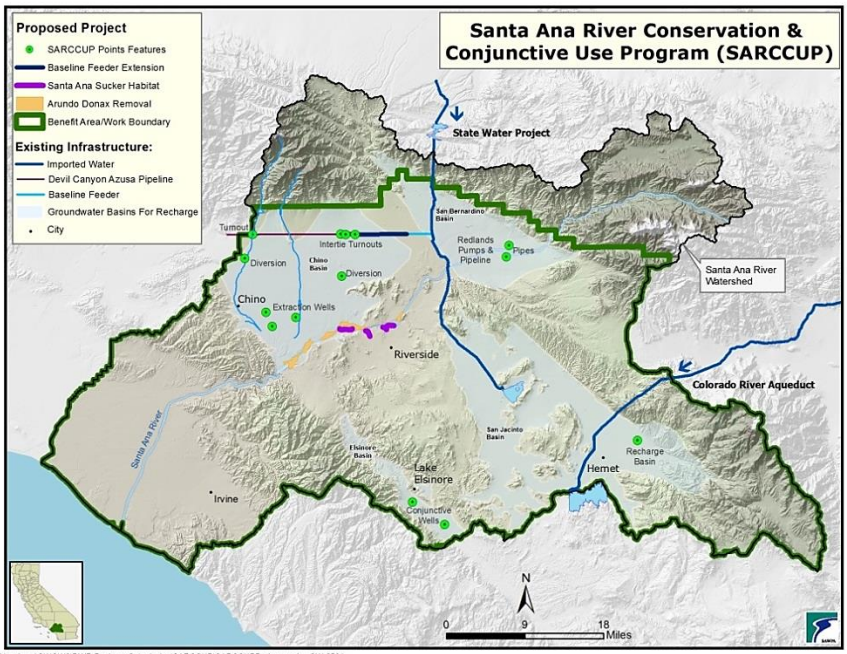
Implementing Agency: Riverside County Flood Control and Water Conservation District (RCFCWCD)

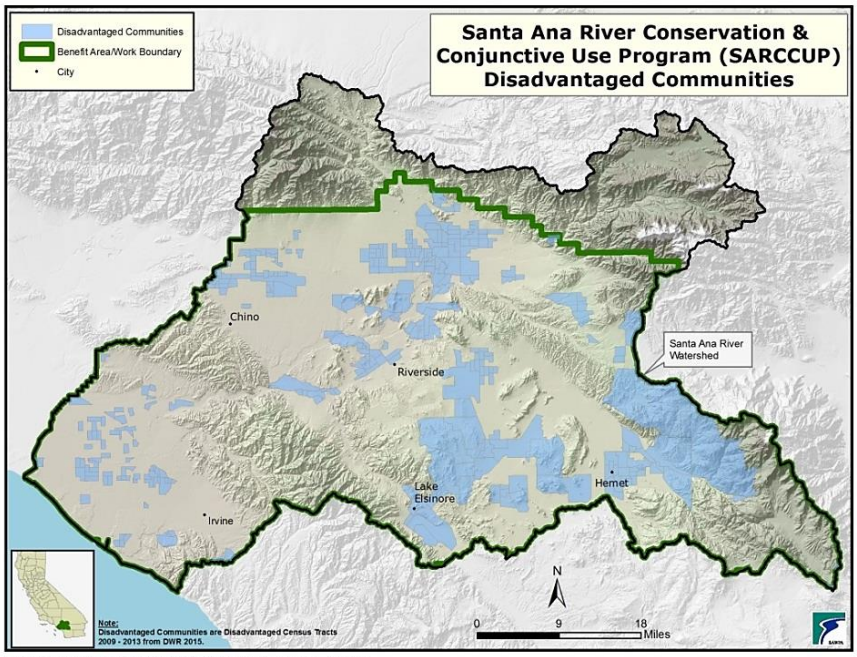


## Santa Ana River Conservation and Conjunctive Use Program (SARCCUP)

Implementing Agency: The Santa Ana Watershed Project Authority and its five regional member agencies, which provide wholesale water to most of the Santa Ana River Watershed.



# Project Physical Benefits

## Newhope-Placentia Trunk Sewer (NHP) Replacement Project 2-72

| Table 5 – Annual Project Physical Benefits | | | |
|---|---|---|---|
| Project Name: Newhope-Placentia Trunk Sewer (NHP) Replacement Project 2-72 | | | |
| Primary Benefit | | | |
| Type of Benefit Claimed: Water supply produced, saved, or recycled<br>Units of the Benefit Claimed : Acre feet per year (AFY)<br>Anticipated Useful Life of Project (years) 50 | | | |
| (a) | (b) | (c) | (d) |
| | Physical Benefits | | |
| Year | Without Project | With Project | Change Resulting from Project (c) – (b) |
| 2015 | 0 | 0 | 0 |
| 2016 | 0 | 0 | 0 |
| 2017 | 0 | 0 | 0 |
| 2018 | 0 | 0 | 0 |
| 2019 | 0 | 0 | 0 |
| 2020 | 0 | 0 | 0 |
| 2021 - 2064 | 0 | 6,300 | 6,300 |
| **Comments:** Assumes Project begins operation in October 2020. No marginal benefits as benefits will not accrue until project is 100% completed. | | | |

| Project Name: Newhope-Placentia Trunk Sewer (NHP) Replacement Project 2-72 | | | |
|---|---|---|---|
| Secondary Benefit | | | |
| Type of Benefit Claimed: Water quality (Total Dissolved Solids (TDS) reduction)<br>Units of the Benefit Claimed : Milligrams per liter (mg/L)<br>Anticipated Useful Life of Project (years) 50 | | | |
| (a) | (b) | (c) | (d) |
| | Physical Benefits | | |
| Year | Without Project | With Project | Change Resulting from Project (c) – (b) |
| 2015 | 500 | 500 | 0 |
| 2016 | 500 | 500 | 0 |
| 2017 | 500 | 500 | 0 |
| 2018 | 500 | 500 | 0 |
| 2019 | 500 | 500 | 0 |
| 2020 | 500 | 500 | 0 |
| 2021-2064 | 500 | 43 | -457 |
| **Comments:** Aquifer TDS reduction is based on recharging 6 MGD (500 mg/L - 43 mg/L) x 8.34 = 22,868 lbs/day = 4,170 tons/yr. Imported water TDS (without project) = 500 mg/L. GWRS purified recycled water TDS (with project) = 43 mg/L. Assumes Project begins operation in October 2020. No marginal benefits as benefits will not accrue until the project is 100% completed. | | | |

## 2015 Integrated Watershed Protection Program

| Table 5 – Annual Project Physical Benefits | | | |
|---|---|---|---|
| Project Name: 2015 Integrated Watershed Protection Program | | | |
| Primary Benefit | | | |
| Type of Benefit Claimed: Floodplain Plain Reduction<br>Units of the Benefit Claimed : Acres<br>Anticipated Useful Life of Project (years) 50 | | | |
| (a) | (b) | (c) | (d) |
| | Physical Benefits | | |
| Year | Without Project | With Project | Change Resulting from Project (c) – (b) |
| **2015** | 0 | 0 | 0 |
| **2016** | 0 | 0 | 0 |
| **2017** | 0 | 0 | 0 |
| **2018** | 0 | 0 | 0 |
| **2019** | 0 | 0 | 0 |
| **2020-2070** | 0 | 900 | 900 |
| **Etc. through Last Year of Project Life** | 0 | 900 | 900 |
| **Total** | 0 | 900 | 900 |
| **Comments:** The San Jacinto River, Stage 4, Phase 1 project is to construct the ultimate levee system between the existing Corps of Engineers levee 9,500 feet upstream of State Street, and a point about 3,500 feet downstream of State Street, a distance of about 2.5 miles. The primary construction element is a setback levee along the 2.5-mile reach that would widen the existing river corridor to over 1,100 feet. The levee would remove 967 acres and 445 existing structures from the San Jacinto River floodplain. Besides the new southern setback levee, the construction phase of the Project includes a floodwall and grade control structure over Metropolitan's aqueduct pipelines. Enhancements to the existing northern levee including a new floodwall along Golden Era's frontage, excavation under the State Street Bridge, removal of portions of the existing southern levee and the construction of a low flow diverter to return water to the existing levee section downstream. There are no physical benefits from 2015-2019 because construction of the project won't be completed until 2020. Life of project is 50 years. During the span of a 30-year mortgage, a home in the 100-year floodplain has a 26-percent chance of being flooded at least once during those 30 years! The value of 26 percent is based on probability theory that accounts for each of the 30 years having a 1-percent chance of flooding. | | | |

**Project Name: 2015 Integrated Watershed Protection Program**

**Secondary Benefit**

**Type of Benefit Claimed: Stormwater Capture/Groundwater Recharge**
**Units of the Benefit Claimed : AFY**
**Anticipated Useful Life of Project (years): 20**

| (a) | (b) | (c) | (d) |
|---|---|---|---|
| | Physical Benefits | | |
| Year | Without Project | With Project | Change Resulting from Project (c) – (b) |
| **2015** | 0 | 0 | 0 |
| **2016** | 0 | 0 | 0 |
| **2017** | 0 | 0 | 0 |
| **2018** | 0 | 0 | 0 |
| **2019-2035** | 300 | 1,500 | 1,200 |
| **Total** | 300 | 1,500 | 1,200 |

**Comments:** The Bautista Ponds Drainage Tributary Area is 32,000 acres, with an average rainfall of 13.1 inches and a loss rate of 45%. The loss rate is conservatively estimated for the San Jacinto basin since the information is not published; however, based on the Chino Basin Watermaster 2010 Recharge Master Plan, loss rates are estimated at 43% for the Chino Basin. Using this data, it was determined that there is a total of 19,213 acre-feet of storm water runoff that will flow down the Bautista Creek annually. The Bautista Pond Optimization Project increases the existing storage capacity by 60 acre-feet. Historically, there are multiple rainfall events per year in this drainage tributary. In conjunction with irrigation drain water released into the Bautista Creek, it is assumed that enough water will be conveyed through the Bautista Creek to fill the proposed Bautista Ponds 20 times annually. Using this information, the annual recharge is calculated at 1,200 acre-feet.

## Santa Ana River Conservation and Conjunctive Use Program (SARCCUP)

| Table 5 – Annual Project Physical Benefits | | | |
|---|---|---|---|
| **Project Name: Santa Ana River Conservation and Conjunctive Use Program** | | | |
| **Primary Benefit** | | | |
| **Type of Benefit Claimed: Water Supply Created**<br>**Units of the Benefit Claimed : AF**<br>**Anticipated Useful Life of Project (years): 30** | | | |
| **(a)** | **(b)** | **(c)** | **(d)** |
| | **Physical Benefits** | | |
| **Year** | **Without Project** | **With Project** | **Change Resulting from Project (c) – (b)** |
| **2015** | 0 | 0 | 0 |
| **2016-2026** | 0 | 180,000 | 180,000 |
| **2026-2036** | 0 | 360,000 | 360,000 |
| **2036-2046** | 0 | 540,000 | 540,000 |
| **Comments:** It's anticipated there are 3 wet years every decade, effectively water banking and producing an average of 180,000 AFY of water supply in a 10 year period (or 540,000 AFY over a 30 year project life). While this program is anticipated to have an indefinite life cycle, a 30 year life is presented herein as a typical useful life for infrastructure. It's anticipated that infrastructure would continuously be maintained into the future. | | | |

| | | | |
|---|---|---|---|
| **Project Name: Santa Ana River Conservation and Conjunctive Use Program** | | | |
| **Secondary Benefit** | | | |
| **Type of Benefit Claimed: Habitat Improved** | | | |
| **Units of the Benefit Claimed : Acres of Habitat Restored**<br>**Anticipated Useful Life of Project (years): 5** | | | |
| **(a)** | **(b)** | **(c)** | **(d)** |
| | **Physical Benefits** | | |
| **Year** | **Without Project** | **With Project** | **Change Resulting from Project (c) – (b)** |
| **2015** | 0 | 0 | 0 |
| **2016** | 0 | 106.5 | 106.5 |
| **2017** | 0 | 640 | 640 |
| **2018** | 0 | 653.5 | 653.5 |
| **2019** | 0 | 667 | 667 |
| **2020** | 0 | 680.5 | 680.5 |
| **Comments:** 106.5 acres of Arundo Donax will be removed in 2016 with the remainder (533.5 acres) in 2017, after which continued maintenance will control regrowth. Riparian habitat for the benefit of the Santa Ana sucker fish will be restored starting in 2018 with one third (13.5 acres) restored every year in 2018, 2019 and 2020 for a total restored riparian habitat of 40.5 acres. | | | |

# Technical Analysis of Physical Benefits Claimed

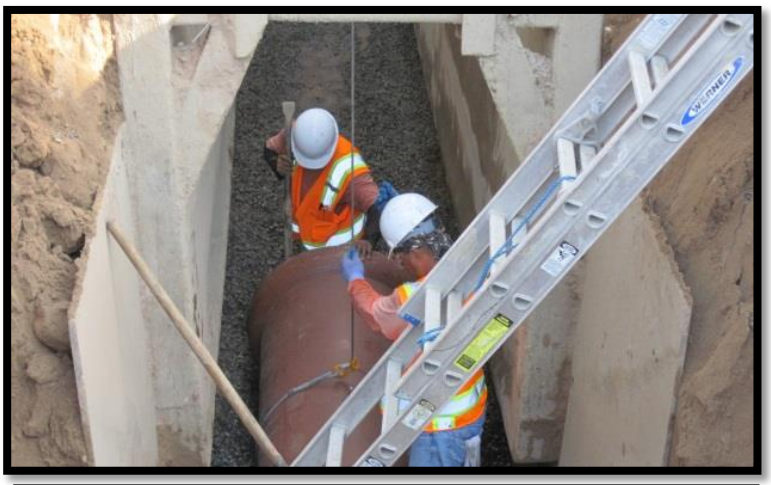
## Newhope-Placentia Trunk Sewer (NHP) Replacement Project 2-72

Implementing Agency: Orange County Sanitation District (OCSD)

The Newhope-Placentia Trunk Sewer (NHP) Replacement Project 2-72 will: (1) increase water recycling to create a new, local water supply of 6,300 AFY to recharge the Orange County Groundwater Basin, and (2) improve water quality by recharging low salinity purified recycled water that will result in a salt reduction of 4,170 tons/year.

**Explanation for the Need for Project**

The Project will modify OCSD's collection system by redirecting municipal wastewater flows to (1) satisfy current and future flows, (2) eliminate pumping and allow abandonment of the Yorba Linda Pump Station (OCSD uses 251,300 kwh/year to run the pump station which totals to $37,000/year in electricity bills), and (3) add flexibility to the collections system to divert reclaimable wastewater flows to Plant No. 1 in Fountain Valley where they can be treated sent to the expanded Groundwater Replenishment System (GWRS) as feedwater to produce more purified recycled water.



OCSD Field Crew Installing a Trunk Sewer Line

The Project will redirect municipal wastewater flows away from the Santa Ana River Interceptor (SARI) to OCSD's Reclamation Plant No. 1 for water recycling. Existing wastewater flows in the Project area are currently sent to the SARI, which conveys non-reclaimable brines to OCSD's Treatment Plant No. 2 for treatment and ocean disposal. Once combined with the SARI brines, these flows are prohibited from being recycled at GWRS. The Project will segregate the municipal wastewater , enabling it to be reclaimed, producing a drought-resilient "raw water source" and increasing Orange County's recycled water supply by approximately 6 million gallons per day (MGD), or 6,300 acre-feet per year (AFY). Recharging with the low salinity purified recycled water in lieu of imported water will reduce groundwater salinity by approximately 4,170 tons/year.

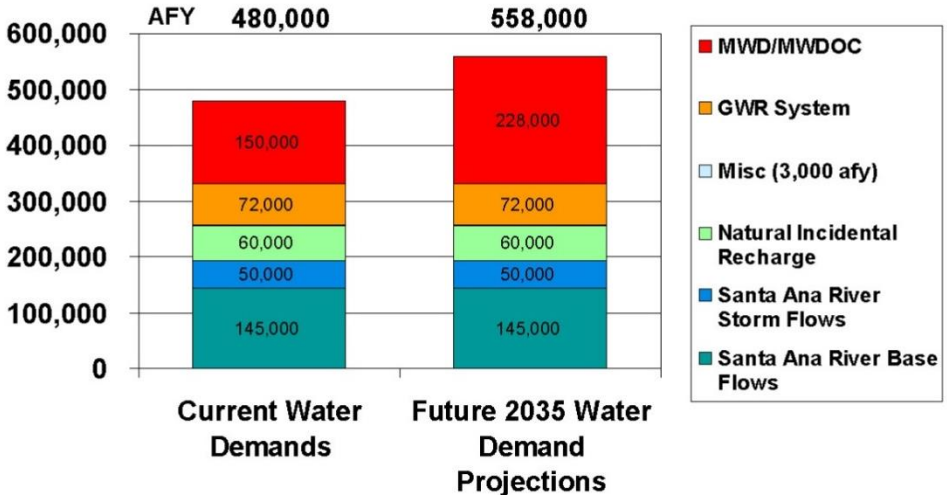
The combination of long-term drought, environmental restrictions, and population increases means that Orange County's limited water supplies need to be stretched and utilized as efficiently as possible. With local population projected to keep increasing, the Santa Ana River Watershed is facing future water supply shortages as current supplies are swindling. The ongoing drought, salinity control measures and environmental restrictions in the Bay-Delta have reduced imported water availability. In 2015, available water from the State Water Project (SWP) is just 20% of what most SWP contractors requested. In 2014, it was 5% for most contractors. More ways to increase local water resources like water reclamation need to be implemented to utilize more treated wastewater to offset and reduce imported water demands.

Total water demands are expected to increase from approximately 480,000 AFY to 558,000 AFY by 2035 (see the figure below from Orange County Water District's (OCWD) Long-Term Facilities Plan that evaluated water supply issues and trends in Orange County). The demands are divided up based on the various water supply sources available within the OCSD service area, which is effectively the same as that served by OCWD. Water needs in this area are met primarily with a combination of groundwater, imported water, and recycled water. This report shows

that the volume of imported water demanded from Metropolitan Water District of Southern California (MWD) and Municipal Water District of Orange County (MWDOC) is projected to increase significantly, a source of supply that is often volatile due to the drought and recent trend in SWP allocations.

Groundwater pumping from the Orange County Groundwater Basin has been a major source of supply for the Santa Ana River Watershed, in addition to MWD/MWDOC imported water, natural incidental recharge and Santa Ana River flows. In order to sustain production from the Basin, without overdrafting and causing adverse impacts such as increased seawater intrusion or subsidence, water must be replenished using projects like GWRS. As a co-sponsor and co-financier of GWRS, OCSD's goal is to utilize the remainder of its secondary effluent as source water for GWRS expansion plus other recycled water opportunities that will increase local water supplies and offset imported water demands. Besides supplying GWRS, OCSD also furnishes secondary effluent for Green Acres Project (GAP), which provides recycled water for non-potable uses, reducing potable water demands and imported water needs.

**Current and Future Water Demands Within the OCSD Service Area**




GWRS is already a proven source of water supply for Orange County. GWRS is a water supply project jointly sponsored by OCSD and OCWD that supplements existing water supplies by providing a new, reliable, high-quality source of water to recharge the Orange County Groundwater Basin, to protect it from degradation due to seawater intrusion, and to provide a water source for industrial uses. Operational since January 2008, GWRS produced up to 70 MGD (72,000 AFY) of purified recycled water to recharge the Orange County Groundwater Basin and help prevent seawater intrusion. Completed in 2015, the GWRS Initial Expansion increased the purified recycled water production capacity up to 100 MGD (103,000 AFY). GWRS takes OCSD's treated wastewater that otherwise would be sent to the Pacific Ocean and purifies it using a three-step advanced process consisting of microfiltration (MF), reverse osmosis (RO), and ultraviolet disinfection/advanced oxidation (UV/AOP). GWRS is planned for an ultimate production capacity of 130 MGD (134,000 AFY).

Source water for GWRS is treated wastewater (secondary effluent) from OCSD's Plant No. 1 in Fountain Valley. Allowing for process recovery factors, GWRS will require approximately 173 MGD of secondary effluent to produce 130 MGD of purified recycled water.

At present, GWRS production capacity is limited to about 100 MGD because the volume of source water (secondary effluent) from OCSD's Plant No. 1 is fully utilized/recycled. To make the region resilient to drought and seawater intrusion, OCSD needs to construct improvements to its collection system to divert more wastewater to its Plant No. 1, and in turn produce more feedwater for GWRS. As stated, approximately 8 MGD of existing municipal wastewater flows are currently being diverted into the SARI instead of being routed to the Newhope-

Placentia Trunk Sewer due to its insufficient existing capacity. Once in the SARI, this wastewater is conveyed to Plant No. 2, as noted above, and discharged to the Pacific Ocean. The Project will divert this wastewater, increasing flows to Plant No. 1 and GWRS.

Currently, OCSD recycles about half of its treated wastewater and discharges the remainder to the Pacific Ocean at Plant No. 2 in Huntington Beach on the coast. OCSD's objective is 100% water reuse. In order to achieve this objective, the Project will support the GWRS expansion. Without more reclaimable wastewater from OCSD Plant No. 1, the GWRS expansion purified recycled water production will be restricted because of an inadequate source of feedwater. The Project will help alleviate this shortfall and enable OCSD to recycle more of its effluent.

Without GWRS, imported water would need to be purchased to recharge the groundwater basin. While Santa Ana River water that flows from the upper Santa Ana River Watershed is captured instream and recharged in the Anaheim area as well, the drought has severely limited the volume of stormwater available. Even with the gains in regional conservation programs, more water is needed to replenish Basin and protect it from degradation due to seawater intrusion. Without GWRS and the Talbert Barrier, seawater could migrate inland and degrade the groundwater quality of this major municipal water supply.

A related issue associated with recharging the Basin with imported water is the build-up of salinity. Imported water salinity averages about 500 milligrams per liter (mg/L) total dissolved solids (TDS) because deliveries to Orange County are typically a blend of State Water Project (SWP) water (TDS = 250 mg/L +/-) and Colorado River water (700 mg/L +/-). In comparison, some areas of the Orange County Groundwater Basin produce groundwater having TDS levels around 200-300 mg/L. Injection and recharge of imported water would gradually increase salts in the Basin, degrading its water quality. Yet, the alternative of not injecting water at the Talbert Barrier would result in a significant degradation of the groundwater quality due to seawater intrusion. Maintenance of the Talbert Barrier is paramount to protecting Orange County Groundwater Basin.

Injection at Talbert Barrier and replenishment of the Basin with low TDS water will help maintain water quality and sustain the Basin to provide drinking water for 2.4 million Orange County residents. The Project will gradually reduce the salinity of the Orange County Groundwater Basin by replenishing it with more high quality purified recycled water as compared with imported water. The low salinity of the purified recycled water (approximately 43 mg/L TDS) will improve the water quality of the local groundwater. This will be equivalent to a 457 mg/L TDS reduction as compared with imported water (500 mg/L – 43 mg/L TDS). For a recharge volume of 6,300 AFY (approximately 6 MGD), this salt reduction amounts to 4,170 tons/year as a result of the Project.

In conclusion, the Project is needed to divert wastewater to Plant No. 1 that is currently non-reclaimable, where it can be treated and delivered to GWRS, increasing production of high quality purified recycled water by 6,300 AFY to recharge the Orange County Groundwater Basin.

**Estimates of Without-Project Conditions**

The existing Newhope-Placentia Trunk Sewer was constructed in 1959, and the Rolling Hills Sub-Trunk Sewer was constructed in 1966. Without the modification to the sanitation system, water supplies for recharge of the Orange County Groundwater Basin would be reduced by 6,300 AFY, which is enough water to supply nearly 13,000 families. Population is expected to increase in Orange County, not entirely based on immigration, but rather primarily due to growth from local residents. In order to serve the area's need, water agencies would need to purchase an equivalent volume (6,300 AFY) of imported water. During drought conditions, imported water from the SWP and/or Colorado River would be likely be restricted and costly. The Colorado River Basin is in the midst of a 15 year drought, and according to a report by the U.S. Bureau of Reclamation, by comparing the median of water supply projections against the median of the water demand projections, the long-term projected imbalance in future Colorado River supply and demand in the Basin is about 3.2 million acre-feet by 2060. If unavailable, increased water conservation and perhaps rationing would be required because the area's water supplies would be limited. Water rationing and restrictions would impact daily life, the local economy, and the quality of life in the

Santa Ana River Watershed. While overdrafting the groundwater basin might be a short-term solution, replenishment of the Basin would be required to sustain this local resource. Injection at the Talbert Barrier is essential to prevent seawater intrusion that would contaminate Orange County's groundwater.

Without the Project, groundwater quality would suffer increased salinity with use of imported water. The TDS of imported SWP and Colorado River water is approximately 500 mg/L. Recharging the Basin with imported water would add about 4,170 tons/year of salts to the groundwater as compared with the better quality purified recycled water from the Project.

Without the Project, the capacity of GWRS would be limited to its current 100 MGD (103,000 AFY) of purified recycled water. The region needs more high quality water to sustain the groundwater basin, which provides 60-70% of the area's demands. More treated wastewater is needed as source water for the expansion of GWRS to its ultimate planned capacity of 130 MGD (134,000 AFY). The Project will supply a significant portion of the source water needed to expand GWRS.

**Methods Used to Estimate Physical Benefits**

Two methods will be used to measure the physical benefits of the Project: (1) flow and (2) TDS.

The increased volume of purified recycled water produced by GWRS will be determined by comparing the daily flow rates before and after the Project is completed. The difference between the before and after daily production flow rates will represent the volume of new water supply attributable to the Project. The estimated physical benefit due to the Project is 6,300 AFY of purified recycled water for recharge. This 6,300 AFY (approximately 6 MGD) volume of new water is based on GWRS' overall recovery rate of approximately 75%. In other words, by OCSD diverting 8 MGD more wastewater to treatment at Plant No. 1and delivering 8 MGD more feedwater to GWRS, the resulting purified recycled water production is approximately 6 MGD. The GWRS Advanced Water Purification Facility (AWPF) pumping stations in Fountain Valley have flow meters that measure purified recycled water production. Increases in purified recycled water production that may be attributable to other factors/projects, if any, will be taken into account such that the benefit of the Project may be determined. The annual volume of purified recycled water generated by the Project will be reported to document this benefit.

The salt reduction benefit will be calculated based on the difference between the average TDS of the alternative imported water supply and that of the purified recycled water. The actual salt reduction will be based on the volume of purified recycled water attributable to the Project, calculated in tons/year. The estimated physical benefit due to the Project is 4,170 tons/year based on production of 6 MGD (6,300 AFY) of purified recycled water for recharge with the difference between the TDS of imported water (500 mg/L) and TDS of purified recycled water (43 mg/L). The calculation is: (6 MGD) x (500 mg/L TDS – 43 mg/L TDS) x 8.34 = 22,868 lbs/day = 4,170 tons/year of salt.

**New Facilities, Policies, and Actions Required to Obtain the Physical Benefits.**

This Project will increase the size of the existing Newhope-Placentia Trunk Sewer (approx. 34,800-feet of pipe) on State College Boulevard from the Yorba Linda Pump Station (Yorba Linda Blvd and State College Blvd in the City of Fullerton, CA.) to Orangewood Ave (Orangewood Ave and State College Blvd in the City of Anaheim, CA; South of Los Angeles Angels of Anaheim Baseball Stadium), and Rolling Hills Sub-trunk Sewer (approx. 3,500-feet of pipe) located north of the Yorba Linda Pump Station, to provide the required capacity for current and future sewer flows. The Project also includes a segment of the Rolling Hills Sub-trunk Sewer located north of the Yorba Linda Pump Station in the City of Fullerton.

The Project is identified in OCSD's 1999 and 2006 Strategic Plan Updates as well as the 2009 Facilities Master Plan. Funding for the Project has already been secured and is included in the OCSD FY 2014-2015 budget and FY 2015-2016 draft budget. Policies are in place for implementation of the Project. On May 5, 2010, OCSD and OCWD

entered into the "Amended Joint Exercise of Powers Agreement for the Development, Operation and Maintenance of the Groundwater Replenishment System and the Green Acres Project" that sets forth terms for operation of GWRS and associated Plant No. 1 deliveries of source water to GWRS.

**Mitigating Any Potentially Adverse Impacts**

Potential adverse physical effects anticipated due to the project include temporary construction impacts, such as dust, noise, and traffic. Mitigation measures include requiring the contractor to implement dust control, noise reduction, and traffic control during construction of the Project.

OCSD has completed environmental documentation for compliance with California Environmental Quality Act (CEQA) for this Project in "Program Environmental Impact Report, Collection System Improvement Plan" (PEIR) (SCH# 2006101018), dated March 2007 in its final version. The Project was identified as Project 2-65 under the PEIR.

State College and 91-Freeway on-ramp in the City of Anaheim

The Mitigation Monitoring and Reporting Plan in the PEIR include the following mitigation measures for adverse impacts associated with the Project:

> Impact: Construction activities would produce fugitive dust emissions resulting in a short-term impact to air quality. Less than Significant With Mitigation.
> Mitigation**:** Contractors will reduce fugitive dust emissions through implementation of the following dust control measures.
>
> - Cover all trucks hauling soil, sand, or other loose materials
> - Apply water as necessary on all unpaved access roads, parking areas, and staging areas at construction sites
> - Sweep all paved access roads, parking areas, and staging areas at construction sites with sweepers
> - Water or apply nontoxic soil stabilizers to exposed soil stockpiles or areas disturbed by construction activities which produce dust
> - Limit traffic speeds on unpaved roads to 15 mph
>
> Impact: Construction activities could result in short-term noise disruptions to surrounding areas. Significant Unavoidable.

Mitigation: To minimize noise disruption during construction, construction activities will generally be scheduled to occur during times allowed by applicable codes, noise ordinances or permits. Additionally, the following mitigations could be implemented as required:

- Noise reduction measures such as sound blankets or temporary sound walls could be used to reduce noise generation from stationary noise generating equipment during construction.
- Stationary noise generating equipment such as generators could be placed within the jacking pits where possible to reduce noise during construction.
- Pile driving activities or other particularly disruptive construction could be limited to specific times agreed to with agencies of jurisdiction or adjacent property owners prior to construction.
- Where appropriate, noise monitoring at the closest sensitive receptors could be conducted and reports submitted to the city of jurisdiction.

Impact: Construction activities will occur within city streets and would impact traffic.
Less than Significant with Mitigation.
Mitigation: Traffic control plans will be prepared by a qualified professional engineer as required prior to the construction phase of each sewer line project.
Mitigation: Traffic control plans will consider the ability of alternative routes to carry additional traffic and will identify the least disruptive hours of construction, site truck access routes, and the type and location of warning signs, lights, and other traffic control devices. Consideration will be given to maintaining access to commercial parking lots, private driveways, sidewalks, bikeways, and equestrian trails to the greatest extent feasible.
Mitigation: Encroachment permits for all work within or adjacent to public rights-of-way will be obtained from each appropriate agency prior to commencement of any construction. Agencies could include California Department of Transportation (Caltrans), RDMD and the various city agencies where work will occur. The Sanitation District will comply with traffic control requirements, as identified by Caltrans and the affected local jurisdictions.
Mitigation: Traffic control plans will comply with the Work Area Traffic Control Handbook and/or the Manual on Uniform Traffic Control Devices, as determined by each affected local agency, to minimize any traffic and pedestrian hazards that exist during project construction.
Mitigation: Public roadways will be restored to their existing condition after project construction is completed.
Mitigation: The Sanitation District will attempt to schedule construction of relief facilities to occur jointly with other public works projects already planned in the affected locations, through careful coordination with all local agencies involved.
Mitigation: Emergency service purveyors will be contacted and consulted to preclude the creation of unnecessary traffic bottlenecks that will seriously impede response times. Additionally, measures to provide an adequate level of access to private properties will be maintained to allow delivery of emergency services.
Mitigation: Orange County Transportation Authority (OCTA) will be contacted when construction affects roadways that are part of the OCTA bus transit network. Adequate procedures will be implemented to keep bus routes and station accessible to users.
Mitigation: Construction traffic, mainly trucks, will be routed in a way to minimize impacts to sensitive neighborhoods. In addition, storage and staging of materials and equipment will be done after obtaining a Temporary Use Permit, when needed.
Mitigation: An effort will be made to solicit input from residents in the neighborhoods of the proposed improvements. These inputs will be considered in the planning phase through construction to mitigate the residents' concerns.
Mitigation: For sewer improvements that occur within railroad rights-of-way, the Sanitation District will follow the Southern California Regional Rail Authority (SCRRA) procedures for right-of-way encroachment – SCRRA Form No. 36. The procedures for temporary encroachment calls for: (1) the submittal of a written statement of the reason and location of the encroachment; (2) a completed and executed SCRRA Form No. 6, Right-of-Entry Agreement; (3) plan check, inspection, and flagging fees; and (4) insurance

certificates, as described in the Right-of-Entry Agreement. Per SCRRA Form No. 6, the Sanitation District must comply with the rules and regulations of this agreement at all times when working on SCRRA property, including those outlines in the "Rules and Requirements for Construction at Railway Property, SCRRA Form No. 37" and "General Safety Regulations for Construction/Maintenance Activity on Railway Property".

**Addressing Long-Term Drought Preparedness**

The Newhope-Placentia Trunk Sewer (NHP) Replacement Project 2-72 fully addresses long-term drought preparedness as described in the Statewide Priority (Table 1) of the 2015 IRWM Grant Program Guidelines. The Project will contribute to sustainable water supply and reliability during water shortages by increasing GWRS' purified recycled water production by approximately 6,300 AFY to recharge the Orange County Groundwater Basin. Groundwater supplies 60-70% of the municipal water demands for 2.4 million people in the OCSD service area. This new local water supply directly offsets the need to import water, which benefits the region and entire State of California.

Approximately 8 MGD of existing municipal wastewater flows are currently being diverted into the SARI instead of being routed to the Newhope-Placentia Trunk Sewer due to its insufficient existing capacity. Wastewater flows diverted into the SARI are non-reclaimable and treated at OCSD's Plant No. 2, which discharges treated wastewater to the Pacific Ocean. SARI wastewater may not be used as source water for GWRS according to its existing permit. Without the Project, approximately 8 MGD of municipal wastewater will continue to be non-reclaimable to GWRS System, treated at OCSD's Plant No. 2 and discharged to the Pacific Ocean, which is a loss of this valuable water resource. With the Project, this wastewater can be recycled by GWRS to produce approximately 6,300 AFY of purified recycled water for groundwater recharge. Replenishing the Orange County Groundwater Basin sustains its use as a major water supply. Injecting purified recycled water at the Talbert Barrier protects the Basin from seawater intrusion. Together, these benefits demonstrate that the Project will:

- Promote water reuse and recycling;
- Support more groundwater recharge and conjunctive use;
- Achieve a long-term reduction of water use by making beneficial use of treated wastewater that is currently discharged to the ocean and by replacing/offsetting imported water demands with purified recycled water;
- Continue and expand OCSD-OCWD's joint partnership in GWRS for efficient management of the Orange County Groundwater Basin; and
- Continue and establish water system interties by expanding GWRS to recharge the groundwater basin in areas that need more water.

Currently, OCSD recycles about half of its treated wastewater and discharges the remainder to the Pacific Ocean. OCSD's objective is 100% water reuse. In order to achieve this objective, the Project will support the planned GWRS expansion. Without more reclaimable wastewater from OCSD Plant No. 1, GWRS' purified recycled water production will be restricted because of an inadequate source of feedwater. The Project will help alleviate this shortfall and enable OCSD to recycle more of its treated wastewater. The Project will help Orange County prepare for and withstand future droughts and continue to effectively manage its local water resources in a manner that benefits the region.

## 2015 Integrated Watershed Protection Program

Implementing Agency: Riverside County Flood Control and Water Conservation District (RCFCWCD)

**Explanation for the Need for Project, Infrastructure to be Installed and Without Project Conditions**

Solving Riverside County's flood risk and water supply shortages in the Santa Ana River Watershed already require a regional approach; one that often involves local, state and federal partners. New needs have arisen that cause the region to expand this approach to include other water-related issues that challenge Riverside County's economic prosperity, quality of life and environment. The three projects: San Jacinto River, Stage 4, Phase 1; Bautista Optimization Pond; and Beaumont MDP-Line 16 are a part of the RCFCWCD's 5-year capital improvement plan. Each will be constructed by the RCFCWCD in collaboration with local partners including the City of San Jacinto, Lake Hemet Municipal Water District (LHMWD), and Beaumont-Cherry Valley Water District (BCVWD).

San Jacinto River, Stage 4, Phase 1:

The existing channel and levees near the proposed project do not provide 100-year flood protection. Recurring breaches of the existing levees have resulted in damage to agricultural lands and resort facilities, flooded roads, displaced local residents, and large inundated areas adjacent to the river. The unimproved levees downstream of State Street in the City of San Jacinto could fail, resulting in the flooding of farmland and dairies.

San Jacinto River near State Street

The purpose of the project is to construct the ultimate levee system between the existing Corps of Engineers levee, 9,500 feet upstream of State Street in the City of San Jacinto, and a point about 3,500 feet downstream of State Street; a distance of about 2.5 miles. The primary construction element is a setback levee along the 2.5-mile reach that would widen the existing river corridor to over 1,100 feet. The levee would remove 967 acres and 445 existing structures from the San Jacinto River floodplain. Physical benefits were estimated using a manual count of parcel information in the benefit area and aerial photography. In addition to the new southern setback levee, the construction phase of the Project includes a floodwall and grade control structure over Metropolitan's aqueduct pipelines, enhancements to the existing northern levee including a new floodwall along Golden Era's frontage, excavation under the State Street Bridge, removal of portions of the existing southern levee, and the construction of a low flow diverter to return water to the existing levee section downstream.

Bautista Optimization Pond:

LHMWD is dependent on groundwater and costly imported water supplies to meet existing demand. Approximately 62% of demand is met by groundwater and 7% of demand is met by import water. The Project creates new groundwater yield through stormwater capture and recharge, and recharge using surplus irrigation drain water. Recharged stormwater and surplus irrigation drain water will increase groundwater supplies and address overdraft in the Hemet-San Jacinto groundwater basin. The Hemet-San Jacinto groundwater basin experiences approximately 10,000 acre-feet per year in overdraft. Because of the combination of existing overdraft

with climate change, and continued reduction of imported water supply reliability, enhanced water conservation projects are vital. Based on available records, it is possible to capture a greater surplus of irrigation storm water with the project site. The project is needed to increase the capacity for available irrigation water and to recharge a portion of the 19,000 AF of storm water available annually. The existing routine basin maintenance program will be expanded to cover the proposed basins and to ensure vegetation and sediment buildup is adequately managed to allow for uninterrupted recharge efforts.

The Bautista Pond's Drainage Area is 32,000 acres, with an average rainfall of 13.1 inches and a loss rate of 45%. The loss rate is conservatively estimated for the San Jacinto basin since the information is not published. However, based on the Chino Basin Watermaster 2010 Recharge Master Plan, loss rates are estimated at 43% for the adjacent Chino Basin, with similar climates. Using this data, it was determined that there are a total of 19,000 acre-feet of storm water runoff that will enter the Bautista Creek annually. The Bautista Pond Optimization Project increases the existing storage capacity by 60 acre-feet. Historically there are multiple rainfall events annually in this drainage tributary. In conjunction with irrigation drain water released into the Bautista Creek (which currently uses 50% of the available water) it can be assumed that enough water will be conveyed through the Bautista Creek to fill the proposed Bautista Ponds 20 times annually. Using this information, the annual recharge is calculated. The Project will capture and recharge 1,200 acre-feet of stormwater and surplus irrigation drain water during an average rainfall year.

New facilities to be installed include an inlet and outlet facilities on a 16-acre site. The proposed basins range in depth from 4 feet to 6 feet, with volumes ranging from 8 acre-feet to 16 acre-feet. A new inlet structure will be constructed from the existing basins into the proposed basins; so that all basins function in a series. The existing emergency spillway will be removed and a new emergency spillway will be constructed at the northern end of the project site to allow excess water to drain back into the Bautista Creek Channel. Additionally, an 18" waterline will be installed; connecting to an existing State Water Project raw water pipeline in Cedar Avenue and runs south 5,000 linear-feet along the west edge of the basins.

Beaumont MDP-Line 16:

BCVWD has observed that even small amounts of rainfall produce significant quantities of runoff from the area tributary to Beaumont MDP-Line 16 drainage area. The runoff is relatively clear and can easily be captured and percolated in BCVWD's recharge facility by a gravity interceptor storm drain. Capturing the runoff will reduce the flooding potential downstream. The water that is captured and percolated will reduce the BCVWD's demand for imported water purchased from the San Gorgonio Pass Water Agency and save the customers in the BCVWD service area over $173,400 annually.

Without the project, BCVWD would have to purchase 547 AFY of imported water from the San Gorgonio Pass Water Agency.

Noble Creek in the Project Benefit Area

The new facilities include a storm drain pipe along Grand Avenue and a public right-of-way in Cherry Valley with strategically located storm water inlets to convey the collected storm water to the existing BCVWD groundwater recharge facility. Specifically, 1,330 linear feet of 30-inch reinforced concrete pipeline (RCP), 1,330 linear feet of 48-inch RCP, 425 linear feet of 54-inch RCP, 870 linear feet of 60-inch RCP and 2,900 linear feet of 66-inch RCP within Grand Avenue from BCVWD's Noble Creek Recharge Facility to Bellflower Avenue. A series of spillways will

need to be constructed between the existing recharge basins to convey excess storm water that cannot be captured. This water will be returned to Noble Creek. A new inlet to Noble Creek will be needed.

Adverse effects could include periods of very high flows, i.e., and rare storm events where flow will increase greatly in the short reach Noble Creek between the BCVWD recharge area and the confluence with Marshall Creek. However, the timing of the flood hydrograph peaks is such that the impact is insignificant.

In order to estimate physical benefits, BCVWD plans to install a flow meter on the storm water pipeline at the recharge site to measure all of the water that is intercepted and percolated. This information is needed by the Beaumont Basin Watermaster to maintain BCVWD's groundwater storage account. BCVWD has an 80,000 AF capacity storage account in the Beaumont Basin to store imported water, recycled water and captured stormwater.

**Addressing Long-Term Drought Preparedness**

San Jacinto River, Stage 4, Phase 1:
The project will achieve:

- Long-term reduction of water use. This project will reduce water use by converting 30 acres of farmland to natural uses.
- Establishment of system interties. Construction of the entire San Jacinto River, Stage 4 project will provide a linkage between sensitive biological areas.

Bautista Optimization Pond:
The project will achieve:

- Promotion of water conservation, conjunctive use, reuse and recycling. The project will promote conjunctive use by allowing recharge of imported water supplies during wet years for extraction during dry years, better balancing supply and demand.
- Efficient groundwater basin management. The project was identified in the Hemet-San Jacinto Water Management Plan and works to better manage the groundwater basin by reducing overdraft.
- Establishment of system interties. The project is expanding upon an existing basin system which utilizes existing vacant land owned by the flood control District, creates a partnership between multiple agencies, utilizes existing State Water Project facilities for conjunctive use, and makes use of runoff water that is lost to the region.

Beaumont MDP-Line 16:
The project captures stormwater that otherwise would not be available to BCVWD and uses it to supply water to customers. The high quality of this water allows the City of Beaumont recycled water to be used without desalination as discussed above. Stormwater during wet years would be captured for use during dry years as part of a conjunctive use project.

The project will achieve:

- Promotion of water conservation, conjunctive use, reuse and recycling. The stormwater that is captured and percolated, as part of this project, will reduce the BCVWD's demand for imported water. Capturing the runoff will also reduce the flooding potential downstream.
- Efficient groundwater basin management. The stormwater that is captured and percolated as part of this project will reduce the BCVWD's demand for an equivalent amount of imported water.

## Santa Ana River Conservation and Conjunctive Use Program (SARCCUP)

Implementing Agency: The Santa Ana Watershed Project Authority, a joint-powers authority, and its five regional member agencies which provide wholesale water to most of the Santa Ana River Watershed:

- Eastern Municipal Water District
- Inland Empire Utilities Agency
- Orange County Water District
- San Bernardino Valley Municipal Water District
- Western Municipal Water District

**Explanation for the Need for Project**

The purpose of SARCCUP is to implement a collaborative program that improves the Santa Ana River Watershed's water supply resiliency through development of additional dry-year yield (DYY), reduce water use, and improve habitat for a native threatened species population in supporting implementation of the One Water One Watershed 2.0 IRWM Plan Goals. This provides a balance to enhance the natural and built environment.

Reduction of imported supplies due to natural or manmade interruptions has the potential to severely impact the human right to water and increase the risk of not meeting existing demands. Snowpack and storage levels are at historic lows, and SARCCUP is needed to increase DYY in anticipation of future reductions of water supply whether driven by climate change, natural or regulatory supply cutbacks. For example, for this year, available water from the State Water Project (SWP) is just 20% of what most SWP contractors requested. In 2014 it was 5% for most contractors. In addition to increasing DYY, facilitation of water use efficiency is needed to alter the regions' use of this precious resource. SARCCUP's conjunctive use element will develop 180,000 AF of the watershed's storage potential by providing for management and facilities to provide capacity to store 60,000 AFY during three wet years in a decade, and extraction facilities to draw 60,000 AFY during dry years.

SARCCUP's water use efficiency element will facilitate maintenance of drought tolerant landscapes and water conservation through implementation of conservation-based rates (also known as budget-based rates) for up to five retail agencies in the watershed. There is a need for adoption of conservation-based water rates and drought tolerant landscape maintenance as stated in this region's Integrated Regional Water Management Plan, the One Water One Watershed 2.0 Plan. This plan specifies that a supply approach must be coupled with a demand management approach to effectively solve the water resource issues faced by a watershed in a semi-arid climate.

For a resilient water supply and use in the watershed, a balance is also needed to improve the native species' population and their habitat in the Santa Ana River. Invasive plants such as Arundo Donax use significantly more water than native plant species and have aggressively altered the habitat for endemic fish species, such as the Santa Ana Sucker, by choking out conditions for spawning, foraging and refugia. Through SARCCUP's habitat improvements element, the Santa Ana Sucker's habitat will more than double and the remaining Arundo Donax in the Santa Ana River will be removed.

A coalition of local water agencies have begun planning a regional multi-species Endangered Species Act Section 10 habitat conservation plan, which makes it essential to create Santa Ana Sucker habitat. Its completion and implementation will also be necessary to build groundwater recharge infrastructure throughout the watershed. Without additional Santa Ana Sucker habitat it will be very difficult, if not impossible, to build new groundwater recharge facilities due to the need to obtain federal permits that meet the Endangered Species Act requirements. Sustaining fish habitat is critical watershed planning for the following reasons:

- In order to obtain federal permits to build large infrastructure projects for groundwater recharge the Endangered Species Act requires "incidental take" coverage for Santa Ana Sucker which was listed as threatened by the U.S. Fish and Wildlife Service in April 2000.

- In order to obtain incidental take coverage for this species the current condition of the Santa Ana Sucker population in the Santa Ana River must be improved prior to the U.S. Fish and Wildlife Service writing a Biological Opinion under the Endangered Species Act for the required permits.
- In order to improve the current Santa Ana River population of the species, local entities must provide additional spawning and refugia habitat along the main-stem of the River. Based on current conditions, the only viable method is to create and restore tributary habitat and increase the number of stream miles sucker can use to spawn.

**Estimates of Without-Project Conditions**

SARCCUP is a large scale, water supply solution because it includes co-management of a groundwater bank on a watershed-wide basis. It takes advantage of the existing regional pipelines as well as a natural network of tributaries that connect to the Santa Ana River. The only other known large water supply projects being planned in the Santa Ana River Watershed is the ocean desalination project in the City of Huntington Beach. However, this ocean desalination project would only benefit the lower watershed as it is not cost effective or feasible at this time to pump desalinated ocean water from the Orange County coast and over the Chino Hills into the middle or upper basins of the Santa Ana River Watershed. In addition, ocean desalination is estimated to be on the order of double the cost of SARCCUP water which includes the cost of extraordinary water purchase from the SWP, capital cost of the required infrastructure, and operational and maintenance (O&M) costs. The estimated cost for the potable water to be produced from the Carlsbad Ocean Desalination plant currently nearing completion in San Diego County is $2,014/AF to $2,257/AF; source: http://www.sdcwa.org/seawater-desalination.

SARCCUP Conjunctive Use element cost summary:

| | |
|---|---|
| Capital Cost | $84,376,244 |
| Amortized Capital Cost (30 yrs, 5%) | $5,488,800 |
| Yield (180,000 AF over 10 yrs) | 18,000 AFY average |
| Unit Capital Cost | $305/AF |
| Unit O&M Cost | $250/AF |
| SWP supply Unit Cost | $600/AF |
| Total Unit Cost | $1,155/AF |
| Unit Cost with Grant | $983/AF |

**Basis for Estimation of Benefits**

SARCCUP is the collaboration of the five regional water supply agencies: Eastern Municipal Water District (EMWD), Inland Empire Utilities Agency (IEUA), Orange County Water District (OCWD), San Bernardino Valley Municipal Water District (SBVMWD) and Western Municipa Water District (WMWD) that mostly wholesale (WMWD and EMWD have some retail water customers) water to the approximately 70 retail water agencies in the Santa Ana River Watershed to maximize the development and use of local and imported water supplies. The five regional agencies have also collaborated with the local water retailers by planning water supply projects that are mutually beneficial to the retailers and wholesalers. Furthermore, SARCCUP will conjunctively manage these local water supplies such that the aggregate yield and water supply reliability generated is greater than the independent management of these resources. By way of a five way agreement between the five agencies, the conjunctive use program will take advantage of economies of scale, watershed-wide groundwater storage opportunities and regional transmission and distribution systems to establish a dry-year yield supply. Additionally, in the upper watershed, wholesale and retail water agencies, as well as the county flood control district have collaborated on the creation of Santa Ana Sucker habitat through the planning of an Endangered Species Act Section 10 habitat conservation plan.

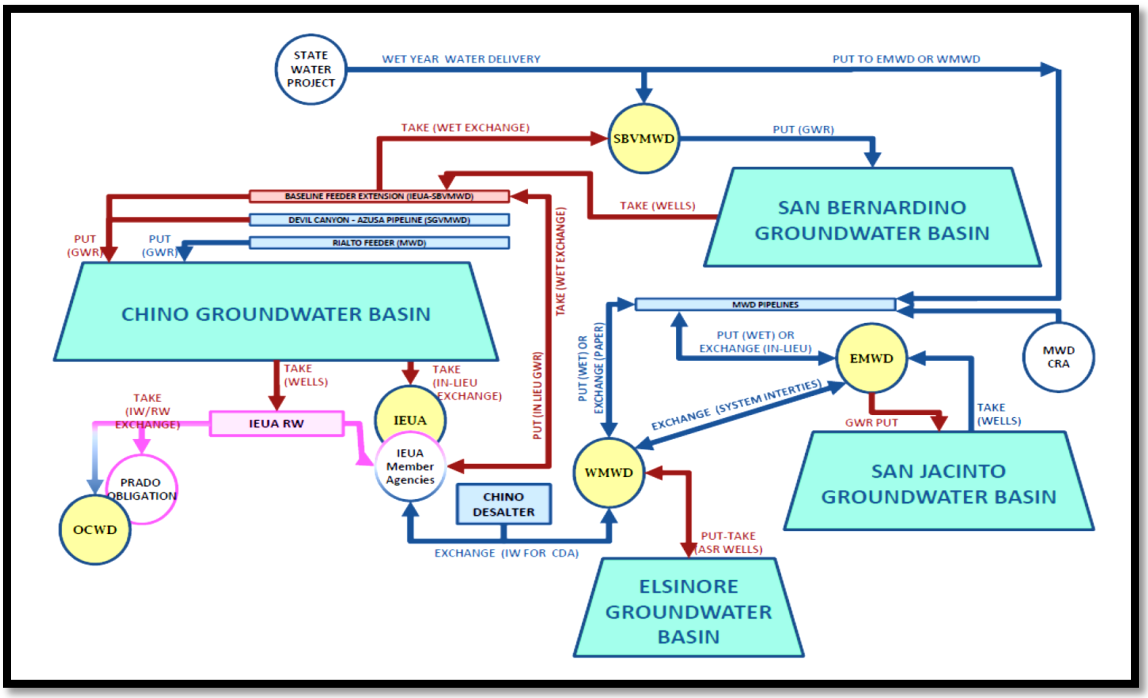
***Conjunctive Use Element***

The benefits of the SARCCUP conjunctive use element are estimated based on the unused, groundwater storage capacity in the Santa Ana River Watershed. This unused storage capacity will be filled with extraordinary imported water supply during an assumed three wet years in a 10-year cycle. This water will be stored and then be available to augment supplies during three dry years within the 10-year cycle.

The total unused storage space in the watershed is about 1,000,000 AF and is distributed as follows:

- Chino Basin–500,000 AF
- Elsinore and Riverside Basins–60,000 AF
- Orange County Basin–100,000 AF
- San Bernardino Basin Area (SSBA)–60,000 AF
- San Jacinto Basin–300,000 AF

SARCCUP Phase 1 defined herein, which would be funded by the 2015 Integrated Regional Water Management Proposition 84 Grant and the five regional water agencies, will develop 180,000 AF of this storage potential by providing for management and facilities to provide capacity to store 60,000 AFY during three wet years in a decade, and extraction facilities to draw 60,000 AFY during dry years. Dry years, or "take years" are defined as the periods when supply from the SWP and Colorado River, as well as local sources, are reduced due to drought or other natural or manmade supply reductions for the Santa Ana River Watershed. It is anticipated that future phases will expand this first phase to further develop additional, available storage capacity in the groundwater basins and add stormwater typically lost to the ocean as an extra water supply source.




SARCCUP operational schematic illustrating the proposed methods to move water to and from the proposed groundwater bank to the five regional agencies

***Habitat Improvements Element***

As part of the habitat improvements element of SARCCUP, 640 acres of Arundo Donax, estimated through field surveys conducted by OCWD and its partners, will be removed and maintained. Studies have concluded that

removal of one acre of Arundo Donax results in the net water savings of 3.75 AFY in comparison to native vegetation. (Iverson, P.E., Mark. 1994, "Effects of Arundo Donax on Water Resources." City of Riverside, Water Reclamation Plant; Zembal, Richard. 2007, "Chipping away at Arundo." Orange County Water District. Southwest Hydrology). SARCCUP will remove 640 acres and replace it with native vegetation that uses less water, resulting in a water savings of 2,400 AFY. Native vegetation will include planting riparian habitat such as coastal sage scrub.

Habitat restoration for the threatened Santa Ana sucker is based on field surveys and studies related to the Endangered Species Action Section 10 habitat conservation plan for the region establishing the location, type and extent of necessary improvements. The benefit area of 3.5 stream miles has been based on field investigation of appropriate location, topography and conditions to create the habitat on the watercourse.

***Water Use Efficiency Element***

For the Water Use Efficiency element of SARCCUP, technical support for conservation-based water rates will be provided by SAWPA and the five regional water agencies. Support will target local retail water agencies in the Santa Ana River Watershed that have uniform rates, flat rates, inclining or declining block rates, or other non-efficiency based rates.

Public outreach and support for California drought tolerant landscape designs that encourage utilizing non-turf grass options and proper maintenance and care of these landscapes will be implemented with assistance by Orange County Coastkeeper and Inland Empire Waterkeeper on an as needed-basis when requested by the regional water agencies.

The estimation of water conservation benefits is based on a recent analysis by the University of California at Riverside that shows that the implementation of conservation-based rate structures have resulted in sustained demand reduction on the order of 17% from pre-adopted levels (*University of California, Riverside/Baerenklau et al. study "Residential Water Demand Effect of Increasing Block Rate Water Budgets", specific page #1*).

The proposed program includes educating policy makers from the approximately seventy retail water agencies in the Santa Ana River Watershed on conservation-based rates and directly supporting up to five interested agencies on their adoption of conservation-based rates through individual funding contracts (average 14,500 connections/agency @ 180 gallons per capita per day x 3.3 persons/connection = 7,236 AFY: *http://www.sawpa.org/wp-content/uploads/2014/01/8-Per-Capita-Water-Use.pdf*, page 1, Section 1.2.1). A 15% reduction in water use for five targeted retail water agencies results in 7,236 AF/year savings in three years.

**New Facilities, Policies, and Actions Required to Obtain the Physical Benefits**

***Conjunctive Use Element***

A joint memorandum of understanding has been executed by each of the five regional water agencies that are receiving funding under the proposed program to establish a basis of collaboration based on equitable sharing of benefits. Upon implementation, additional agreements will be further developed for the execution of SARCCUP. In addition, agreements with Metropolitan Water District of Southern California (MWDSC) will be pursued to facilitate the program. These agreements will create the foundation for an operational program procedure that facilitates the opportunistic acquisition of surplus water supply, the recharge and storage of water, and the extraction and conveyance of the stored water as dry-year yield throughout the watershed. Together, these agreements facilitate the collaboration of the five agencies by establishing procedures, monitoring and accounting of the water bank program. Agreement(s) with MWDSC are anticipated to provide facilitation of acquisition of water, conveyance of water and economic incentives to be forward thinking and establishing a resilient program. A Master Plan Report will be implemented and will take into consideration the watershed's hydrology, as well as groundwater put and take scenarios in order to inform the construction phase of the conjunctive use project.

For each of the individual groundwater basin components, the following facilities will be constructed or modified to transfer, recharge, store and extract surplus imported water:

**Chino Basin Conjunctive Use Storage Program**

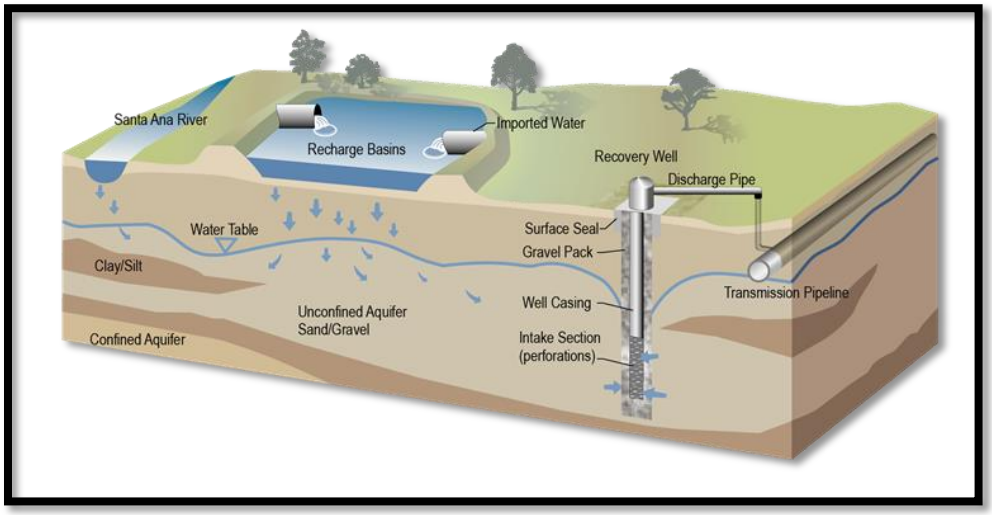
IEUA which overlies the Chino Basin in the middle watershed would arrange with the individual retail water agencies within its service area and the Chino Basin Watermaster to recharge SWP wet-year water and in-lieu recharge. Distribution of this Dry Year Yield supply would be by exchange through the MWDSC/SBVMWD regional pipeline system, Baseline Feeder pipeline that connects the IEUA service area to the SBVMWD service in the upper watershed, exchange or recycled water or groundwater pumping and conveyance to OCWD in the lower watershed via the Santa Ana River, and interconnections to WMWD which is also in the middle watershed. The projects below enable 96,000 AF of extraordinary water supply to be stored over 3 wet years, and a dry-year yield extraction capacity of 32,000 AFY.

*Baseline Feeder Extension*

The Baseline Feeder underground pipeline would be extended westward from its current alignment from Cactus Avenue and Baseline in the City of Rancho Cucamonga by laying approximately 6.5 miles of 48" pipe to San Sevaine Creek, a tributary to the Santa Ana River. San Sevaine Creek would allow the Baseline Feeder to connect to the Chino Basin in IEUA's service area for delivery of SBVMWD imported water during take scenarios.

*Municipal Interties on Baseline Feeder Extension*

Allow Cucamonga Valley Water District (CVWD) and Fontana Water Company (FWC) to take potable water from the Baseline Feeder Extension from SBVMWD by installing two municipal interties to the Baseline Feeder Extension pipeline.




Example of the proposed SARCCUP groundwater bank program elements to recharge water into storage which would be extracted during dry years

*Turnout on Baseline Feeder to San Sevaine Creek*

Create a turnout on the Baseline Feeder to allow discharges to San Sevaine Creek in IEUA's service area for diversion from SBVMWD service area to IEUA's service area and to the lower watershed in OCWD's service area.

*Diversion on San Sevaine Creek to Recharge Basin*

Allow increased rate of diversion of imported water to Jurupa Basin for pumping and recharge. A new 4-foot sluice gate and piping will be cut into flood control channel wall. A rubber dam may also be required. Diversion can be of State Water Project water from existing pipeline turnout CB18, which has a 30 cubic feet per second capacity, or SBVMWD water from the planned Baseline Feeder extension. The CB18 turnout will likely be used for a period of recharge with 25 CFS from the diversion for 180 days.

*Turnout on Devil Canyon-Azusa Pipeline into San Antonio Creek*

Build a dual-purpose turnout on the Devil Canyon-Azusa Pipeline in the City of Rancho Cucamonga which would allow for the delivery of imported water to recharge in Chino or Orange County basins. The turnout will also allow for delivery, treatment, and use as in-lieu recharge in Chino Basin through the existing Water Facilities Authority (a joint powers authority of Cities of Chino, Chino Hills, Ontario, Upland and Monte Vista Water District) facilities. As other sources of water will be distributed through the Devil Canyon-Azusa Pipeline, IEUA will monitor through a network of gauges and flow monitors so that there is no double counting of the banked water.

*Extraction Wells in Southerly portion of Chino Basin*

Three groundwater production wells within the IEUA's South Zone near the City of Chino in the southerly portion of the basin will pump water with high concentrations of nitrates and will be tied into the agency's existing recycled water pipeline. The three wells will be used in dry year take scenarios and benefit the retail water agency customers in the service areas of IEUA and OCWD. Under SARCCUP, a future agreement between the five regional water agencies in the Santa Ana River Watershed would stipulate that OCWD in the lower watershed would be sent a proportional value of recycled water through Chino Creek and the Santa Ana River.

**San Jacinto Recharge Project**

The facilities below for the San Jacinto Basin, located in EMWD's service area, will expand the San Jacinto water bank by 19,500 AF with recharge and extraction capacity of 6,500 AFY over the ten year lifecycle of the proposed project. In order to take advantage of the unused capacity of the San Jacinto Basin and transfer water under take scenarios, a recharge basin will be developed and three new extraction wells will be installed

*Basin Development and associated hiking trails, educational exhibits*

Develop a 39-acre recharge basin, Mountain Avenue West near the City of San Jacinto, by removing 10 feet of topsoil to allow for efficient groundwater recharge. Along the basin, hiking trails and educational exhibits will be installed.

*Extraction Wells and Associated Pipelines*

Construct three new groundwater extraction wells that will have the ability to pump 6,500 AFY of groundwater in take years and an associated connecting distribution pipeline.

**San Bernardino Basin Area (SBBA)**

Construct the facilities necessary to remove groundwater stored under SARCCUP from the SBBA and deliver it to other four regional water agencies across the Santa Ana River Watershed either directly, by in-lieu transfers or possibly through the MWDSC's system through an existing intertie. Existing analysis indicates that there are sufficient recharge ponds existing and proposed for construction so no new recharge ponds are included in the first phase of SARCCUP. The construction will include extraction wells, transmission pipelines and an expanded pump station to increase extraction and conveyance by 20,000 AFY to access 60,000 AF banked storage in SBBA. Future phases of SARCCUP could include 20,000 AFY more recharge and extraction and 60,000 AF more storage in the SBBA.

*Production Wells and Transmission Pipelines*

Construct five wells and transmission pipelines from the new wells to SBVMWD's regional distribution network, which is intertied with the East Branch of the State Water Project and the MWDSC Inland Feeder Pipeline.

*Expand Redlands Pump Station*

In the City of Redlands, add three additional 20 CFS pumps to an existing pump station to enable the 20,000 acre-foot per year design capacity.

**Elsinore Basin**

The proposed project will involve the construction two dual-purpose wells each with a 1,500 AFY capacity needed to expand the conjunctive use program by 4,500 AF in the Elsinore Basin within WMWD's service area. Storage for

the expansion of the Elsinore Basin is planned to be three years recharge 1,500 AFY x 3 = 4,500 AF. Minor conveyance and distribution pipelines that would be connected to Elsinore Valley Municipal Water District's distribution system, the nearby retail water agency, may also have to be constructed as part of this expansion.

***Habitat Improvement Element***

This element of SARCCUP is intended to provide habitat for a threatened freshwater fish species, the Santa Ana sucker fish, to mitigate "take" for water resource projects throughout the watershed and decrease water supply lost to evapotranspiration by removing Arundo Donax.

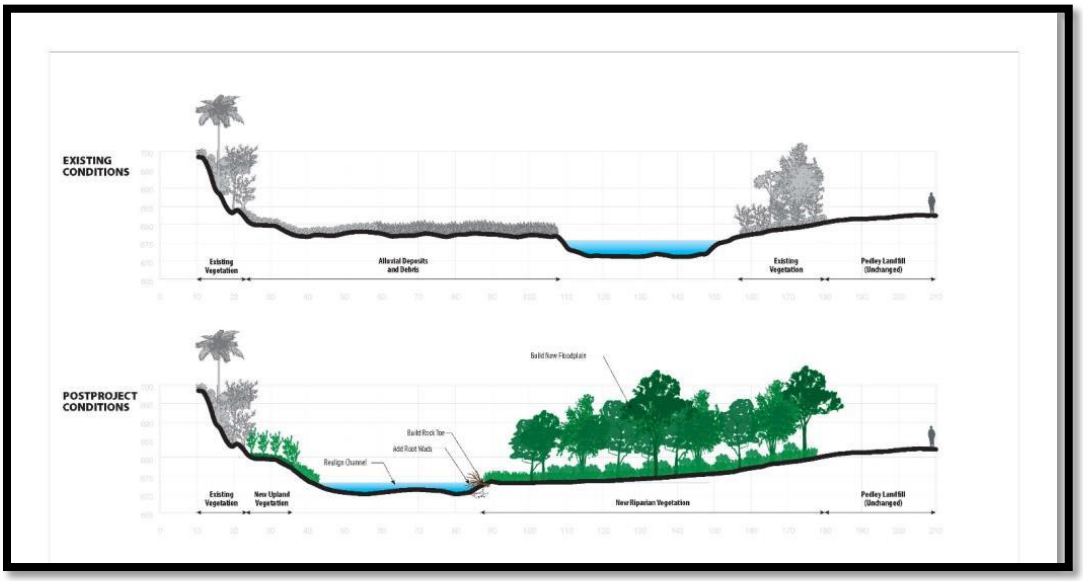
3.5 miles of new stream habitat will be created off the Santa Ana River in Riverside and San Bernardino Counties for the Santa Ana Sucker for spawning, foraging and refugia. Hydrologic connectivity between the streams and the Santa Ana River will be restored by re-contouring the streams and providing additional flows where possible through groundwater pumping. By creating appropriate hydrology, restoration to maintain the species' preferred substrate habitat conditions of exposed gravel and /cobble will be maintained. 40.5 acres of riparian habitat will be restored along streams by removing non-native vegetation and reshaping streambeds to create pools for protection against non-native fish predators. The 40.5 acres of riparian habitat will include bank slope re-plantings and hydroseeding of native vegetation. Additionally, 640 acres of Arundo Donax will be removed and replaced with native vegetation.

**Arundo Donax Removal**

The Arundo Donax removal component consists of 640 acres of Arundo Donax along the Santa Ana River just upstream of Prado Basin in Riverside County by utilizing heavy machinery and herbicide, and conducting pedestrian and vehicle maintenance sweeps by OCWD and its partners.

**Anza Drain – Santa Ana Sucker Habitat**

The Anza Drain component consists of site preparation (non-native tree removal, clearing and grubbing, hazardous soil removal), completion of a Stormwater Pollution Prevention Plan (SWPPP), water diversion during construction, earth work, infrastructure, seeding, planting, irrigation system installation, signage and fencing within this connected tributary to the Santa Ana River in the City of Riverside. The project also includes five years of plant establishment maintenance and performance monitoring.




Example of habitat restoration, changing hydrology, flow regime, removal of non-native plants and replacements with native plants to create improved habitat for the Santa Ana Sucker for spawning, foraging and refugia.

**Old Farm Road – Santa Ana Sucker Habitat**

The Old Farm Road component consists of site preparation (non-native tree removal, clearing and grubbing, hazardous soil removal), SWPPP and water diversion during construction, earth work (channel excavation, gravel placement, liner, erosion control, instream woody material), infrastructure, seeding, planting, irrigation system installation, signage and fencing within this connected tributary to the Santa Ana River in the city of Riverside. The project also includes five years of plant establishment maintenance and performance monitoring.

**Lower Hole Creek – Santa Ana Sucker Habitat**

The Lower Hole Creek component consists of site preparation (non-native tree removal, clearing and grubbing, hazardous soil removal), SWPPP and water diversion during construction, earth work (channel enhancement, gravel, instream woody material, sediment excavation at mouth, bank stabilization and construction, spur dikes, channel realignment, erosion control), infrastructure, seeding, planting, irrigation system installation, signage and fencing within this connected tributary to the Santa Ana River in the City of Riverside. The project also includes five years of plant establishment maintenance and performance monitoring.

**Hidden Valley Wetlands – Santa Ana Sucker Habitat**

The Hidden Valley Wetlands component consists of site preparation (non-native tree removal, clearing and grubbing, hazardous soil removal), SWPPP and water diversion during construction, earth work, infrastructure, seeding, planting, irrigation system installation, signage and fencing within this connected tributary to the Santa Ana River in the City of Riverside. The project also includes five years of plant establishment maintenance and performance monitoring.

***Water Use Efficiency Element***

SAWPA will oversee the implementation of conservation-based water rates by interested retail water agencies in the Santa Ana River Watershed to increase water conservation. A collaborative body, such as a SAWPA Project Committee, that includes membership from each of the five regional water agencies and was formed for the 2014 IRWM Grant funded Interregional Landscape Water Demand Reduction Program, will likely be created to administer overall project implementation including the conservation-based water rates component. The Smartscape Program will be implemented with assistance by Orange County Coastkeeper/Inland Empire Waterkeeper to provide, on an as-needed basis requested by the five regional water agencies, support for landscaping design and installation. The activities to acquire the water conservation benefits include:

Conservation-Based Water Rates:

- Outreach to Retail Water Agencies – Up to five retail water agencies will be targeted based on interest expressed at the initial workshops conducted by the SAWPA Project Committee or other communication from SAWPA and the five regional water agencies. The workshops and communication will demonstrate the costs and benefits of implementing conservation-based water rates. The benefits can include the avoided cost of purchased water, lower capital improvement program expenditures, and increased watershed quality due to lower urban runoff as less excess water is applied to outdoor landscapes when customers use water within their budgeted amount.
- Adoption by Retail Water Agencies – Conservation-based water rates will be implemented and adopted by up to five retail water agencies. Funding will be provided to the up to five agencies for items needed to adopt conservation-based rate structures such as a rate study, billing support needs, acquisition of weather data, Proposition 218 notices, etc. A policy will be developed that states the reimbursement process to the up to five agencies. The policy will include stipulations on water conservation reporting. Tools may be developed to assist the up to five retail water agencies to adopt conservation-based water rates. These tools may include information to determine outdoor budgets and local weather data.

Smartscape Program - The Smartscape program picks up where current websites and video resources end by providing guidance and training that is not readily available from existing programs on maintaining drought

tolerant landscapes. The assistance will be available at any stage in the landscape transformation process and will involve identifying landscape transformation design options. Smartscape program participants will have the advantage of personal assistance via email or a phone help-line, workshops at drought tolerant gardens, and onsite personal assistances. This program will be provided as-needed by the five regional agencies and will increase water conservation across the approximately 2,800 square mile Santa Ana River Watershed. These measures reflect Governor Edmund G. Brown's April 1, 2015 executive order that calls for the State's retail water agencies to respond to the drought by implementing conservation-based rate tools and removing heavy water-using ornamental turf grass.

**Mitigating Any Potentially Adverse Impacts**

There will be no adverse physical effects from each of the components of SARCCUP. The conjunctive use program will be predicated on a "Put" then "Take" model, whereas only water that was first recharged into the basin will be able to be withdrawn. Therefore, the net impact will be a positive impact providing for increased groundwater levels and water in storage. Arundo Donax removal, habitat creation and conservation based rate development will result in positive impacts, with only typical, temporary adverse impacts during construction which will be mitigated with best management practices.

**Addressing Long-Term Drought Preparedness**

SARCCUP's conjunctive use element will improve long-term drought preparedness as it is a resilient program that provides ongoing benefits over the project's lifecycle, also assisting in creating an overall resilient watershed better prepared to weather droughts. By planning ahead and storing extraordinary water supply during wet years, new water supply is essentially created that will be used to offset the reliance on the State Water Project, which conveys water through the Bay-Delta, and local water supply sources during periods of local drought.

Water will be budgeted based on efficiency targets through the adoption of conservation-based water rates by up to five retail water agencies. The provision of rate tools to retail water agencies by the project proponents reflects Governor Edmund G. Brown's April 1, 2015 executive order that calls for the State's retail water agencies to respond to the drought by implementing conservation-based rate tools.

Water that was consumed by the non-native vegetation Arundo Donax will now be available to urban users once the plant has been removed. This will result in additional flows which can be captured and recharged in the Orange County Basin.

**Promote Water Conservation, Conjunctive Use, Reuse and Recycling**

SARCCUP promotes water conservation with conservation-based rates implementation, removal of Arundo Donax (high, non-native vegetation water user), and a robust conjunctive use program. This core element of this project is establishing a watershed-scale conjunctive use program, promoting and facilitating collaboration of the five regional water agencies. Conservation-based rate structures have resulted in sustained demand reduction on the order of 17% (University of California, Riverside/Baerenklau et al., study "Residential Water Demand Effect of Increasing Block Rate Water Budgets", page 1).

Removal of one acre of Arundo Donax results in the net water savings of 3.75 AFY in comparison to water used by one acre of native vegetation. (Iverson, P.E., Mark. 1994, "Effects of Arundo Donax on Water Resources." City of Riverside, Water Reclamation Plant; Zembal, Richard. 2007, "Chipping away at Arundo." Orange County Water District. Southwest Hydrology). SARCCUP will remove 640 acres and replace it with native vegetation that uses less water, resulting in a water savings of 2,400 AFY.

**Improve Landscape and Agricultural Irrigation Efficiencies**

The Smartscape program picks up where current websites and video resources end on improving outdoor landscapes; providing answers to questions, guidance and training that is not readily available from existing programs on maintaining drought tolerant landscapes. This assistance is available at any stage in the landscape transformation process; from identifying landscape transformation design options and incentives to the critical ongoing maintenance stage. Smartscape program participants will have the advantage of personal assistance via email or a phone help-line, workshops at drought tolerant gardens, and onsite personal assistance for tough problems. This program will be provided as-needed by the five regional agencies and will increase water conservation across the approximately 2,800 square mile Santa Ana River Watershed.

**Achieve Long-term Reduction of Water Use**

SARCCUP reduces long-term reduction of water use with conservation-based rates implementation, removal of Arundo Donax (non-native vegetation water user). Conservation-based rates will sustainably alter water user's behavior of water use, providing long term reduction, as opposed to short-term reduction of water use. SARCCUP's Arundo Donax removal element is part of the final phases of eradicating Arundo Donax from the watershed. A maintenance program exists to keep the Arundo Donax from returning, therefore providing a long term reduction of its water use.

**Efficient Groundwater Basin Management**

The conjunctive use element provides for increased groundwater basin management coordination throughout the watershed by instituting collaboration between the regional agencies. The groundwater bank developed by SARCCUP increases the utilization of local groundwater storage space. Groundwater management will be improved by implementing a watershed-scale approach which will not only increase storage of water in the groundwater basins but will also result in additional monitoring of groundwater conditions.

**Establish System Interties**

The regional pipeline network of MWDSC and the five regional agencies will provide the ability to move water throughout the watershed. In addition, the extension of the Baseline Feeder will provide conveyed new direct connection between SBVMWD to IEUA. Exchange agreements will be established amongst the parties to facilitate direct and in-lieu water exchanges.

**Solutions that Yield a New Water Supply Such as Seawater Desalination**

Because SARCCUP will be purchasing water that would otherwise flow to the ocean via the Bay-Delta, it is in essence creating a "new" water supply, capturing and storing the water before going to the ocean, avoiding the need to then perform seawater desalination. Presently, this water supply is not available to water agencies. SARCCUP will create the facilities and the administrative structure to capture and store this water supply for use by the five regional water agencies.

# Direct Water-Related Benefit to a DAC

## Newhope-Placentia Trunk Sewer (NHP) Replacement Project 2-72

Implementing Agency: Orange County Sanitation District (OCSD)

Not applicable to the proposed project as the benefit area does not include a population or geographical area of at least 25% for disadvantaged community coverage.

## 2015 Integrated Watershed Protection Program

Implementing Agency: Riverside County Flood Control and Water Conservation District (RCFCWCD)

Most of the 2015 Integrated Watershed Protection Program's provide a direct weather-related benefit to a DAC.

San Jacinto River, Stage 4, Phase 1:

This project will provide flood risk management for City of San Jacinto, which is **58%** within a DAC, and will improve water quality in the watershed inhabited by the Native American Tribal Council (NATC). This project will also protect a NATC culturally significant cottonwood grove. As part of the Environmental Impact Report development, 24 tribes were contacted via writing and phone. Joseph Ontiveros, Cultural Resources Director for the Soboba Band of Luiseño Indians, and William Pink, a Native American consultant of Luiseño heritage, offered valuable information during the earlier studies for this Project, especially regarding the cottonwood grove.

Bautista Optimization Pond

The retail water district that would assist in implementation, Lake Hemet Municipal Water District (LHMWD) has a service area that is predominantly a DAC. **72%** of the 35,000 acre project benefit area is within a DWR identified DAC. Further, the project has a direct benefit to over 35,000 acres of DAC's in the Hemet-San Jacinto Watershed area. The Soboba Band of Luiseno Indians, as groundwater producers, will benefit from the increased recharge efforts of the project. Approximately 2,000 acres (or 26%) of Soboba tribal lands are included in the project area. The increased groundwater water supply will reduce reliance on costly imported water supplies and reduce overall water cost benefiting the DAC's served by LHMWD.

Beaumont MDP-Line 16:

This project, whose benefit area is geographically **30%** within a DAC, benefits the Disadvantaged Community in Cherry Valley by allowing the Beaumont-Cherry Valley Water District to maintain reliable and resilient water supplies and reduce dependency on imported water. Today, DACs face critical water and economic resources challenges such as isolation, language barriers, flood risk, and lack of funding and or resources. It is important that the water districts recognize proposed DAC water project needs, and engage these communities early in the process. Construction of this project will allow for effective outreach for both the disadvantaged community and the water district.

## Santa Ana River Conservation and Conjunctive Use Program (SARCCUP)

Implementing Agency: The Santa Ana Watershed Project Authority, a joint-powers authority, and its five regional member agencies which provide wholesale water to most of the Santa Ana River Watershed:

- Eastern Municipal Water District
- Inland Empire Utilities Agency
- Orange County Water District
- San Bernardino Valley Municipal Water District
- Western Municipal Water District

Inadequate water supply to communities is a public health risk. The public water systems in DACs are sometimes not able to provide the same level of service as neighboring, more affluent areas. This is largely due to the economic challenges of generating funds for capital improvements as well as operations and maintenance.

Long-term planning can also be a concern for DACs. If a DAC is struggling to provide robust water service and achieve compliance with regulatory requirements, it may not be performing the advanced planning needed to anticipate the effect of long-term drought, disruption in imported water, or the possible effects of climate change.

In addition, DACs may not be as aware of potential grant opportunities or have the financial ability to have grant writing on staff or hire them as consultants.

By approaching SARCCUP as a watershed-scale program to develop additional dry-year yield, water conservation and habitat improvement, specific economically disadvantaged areas can be “bridged into” rather than bypassed and receive benefits from the project. The planning, financial and project implementation prowess of these five regional agencies will equally benefit the DAC communities. Under the project, **27%** of the Benefit Area geographically, or 494,080 acres, will benefit DACs. SARCCUP will regionally increase water supply, water conservation, and environmental improvement equally. This includes DAC areas, since the five Regional Agencies represent DACs in their service area.

# Project Performance Monitoring Plan

## Newhope-Placentia Trunk Sewer (NHP) Replacement Project 2-72

Implementing Agency: Orange County Sanitation District (OCSD)

| Table 6 – Project Performance Monitoring Plan | | |
|---|---|---|
| **Project: Newhope-Placentia Trunk Sewer (NHP) Replacement Project 2-72** | | |
| **Proposed Physical Benefits** | **Targets** | **Measurement tools and methods** |
| Increase water recycling to create a new, local water supply to recharge the Orange County Groundwater Basin | 6,300 AFY purified recycled water for recharge | Flow meters measuring the purified recycled water production will be monitored before and after the Project on approximately an annual basis, based on online continuous readings. Flow rates can vary and are measured and recorded continuously. Flow meters are located at the Groundwater Replenishment System (GWRS) Barrier and Product Water Pump Stations which are located at the Advanced Water Purification Facility in Fountain Valley. Base flows of purified recycled water discharged from these GWRS pump stations will be recorded during the year prior to the start-up of the Project. These values will then be compared with the increased flows of purified recycled water discharged from these pump stations after the completion of the Project. The flow meters take continuous online readings, which are recorded and averaged to yield average daily flow rates of purified recycled water produced and discharged to the Talbert Barrier in Fountain Valley, as well as the spreading basins in Anaheim.<br>There are no interim targets because benefits cannot yet be realized until project is 100% complete. |
| Improve groundwater quality by recharging low salinity purified recycled water | 4,170 tons/year salt (TDS) reduction | Based on water quality data, calculate the difference between the average TDS of the alternative imported water supply and the average TDS of the purified recycled water using the volume of purified recycled water produced as a result of the Project.<br><br>Imported water quality data from Metropolitan Water District of Southern California and will be verified on an annual (average) basis. Purified recycled water quality data will be gathered from Orange County Water District. The calculation is: (Average daily flow in MGD) x (TDS of imported water in mg/L - TDS of purified recycled water in mg/L) x 8.34 x 365 days/yr) / 2000 lbs/ton = TDS reduction in tons/yr.<br>There are no interim targets as benefits cannot be realized until project is 100% complete. |

**Tools Used to Monitor Performance**

Tools that will be used to monitor the Project's performance include: (1) flow meters, and (2) TDS results from laboratory water quality analyses.

The Project will divert wastewater to OCSD's Reclamation Plant No. 1 where it will be treated and delivered to the GWRS as source water. As a result of the increased source water, GWRS will produce an estimated 6,300 AFY of additional purified recycled water to recharge the Orange County Groundwater Basin.

The increased volume of purified recycled water produced by GWRS will be determined by comparing the daily flow rates before and after the Newhope-Placentia Trunk Sewer Replacement Project is completed. The difference between the before and after daily production flow rates will represent the volume of new water supply attributable to the Project. Daily flows will help track the progress towards the annual target. The estimated physical benefit due to the Project is 6,300 AFY of purified recycled water for recharge. The GWRS Advanced Water Purification Facility (AWPF) pumping stations in Fountain Valley have flow meters that measure purified recycled water production on a continuous, instantaneous basis. Daily, monthly, and annually averages are determined based on these online flow readings, which are recorded in the GWRS process control system (aka SCADA) records. Increases in purified recycled water production that may be attributable to other factors/projects, if any, will be taken into account such that the benefit of the Project may be determined. The baseline flow condition will be the volume of purified recycled water prior to operation of the Project (i.e. pre-Project conditions). The annual volume of purified recycled water generated by the Project will be reported to document this benefit.

The salt reduction benefit will be calculated based on the difference between the average TDS of the alternative imported water supply and that of the purified recycled water. The TDS of the imported water will be based on treated water quality analyses from Metropolitan Water District of Southern California which is available and published annually. The TDS of the purified recycled water will be based on the Orange County Water District (OCWD) Advanced Water Quality Laboratory results. Sampling and water quality analyses will be taken at least quarterly. The actual salt reduction will be based on the volume of purified recycled water attributable to the Project (as determined above, with the TDS reduction calculated in tons/year. The estimated physical benefit due to the Project is 4,170 tons/year based on production of 6 MGD (6,300 AFY) of purified recycled water for recharge with the difference between the TDS of imported water (500 mg/L) and TDS of purified recycled water (43 mg/L). The calculation is: (6 MGD) x (500 mg/L TDS – 43 mg/L TDS) x 8.34 = 22,868 lbs/day = 4,170 tons/year of salt. Actual values for flow and TDS will be input in the equation to track the salt reduction on a quarterly basis to determine the Project's performance.

**Type of Analysis Used**

Purified recycled water flow data will be collected at the GWRS AWPF Barrier and Product Water Pump Stations which is in Fountain Valley. The baseline flow data will be based on GWRS flow records. Purified recycled water flow is metered continuously and recorded by the AWPF process control system (aka SCADA). How was the baseline collected? An analysis of before project flow will be compared to after project flow on an annual basis.

Water quality data will be collected from State-certified laboratories:

- Imported water from Metropolitan Water District of Southern California
- Purified recycled water from OCWD's Advanced Water Quality Laboratory in Fountain Valley

An analysis of pre and post project TDS will be done at least quarterly.

**How the Monitoring Tools and Targets are Appropriate**

The above monitoring tools and targets are appropriate for use because the monitoring points are well established and the baselines are based on thorough data. Based on OCSD flow records, it is estimated that 8 MGD of raw wastewater from the Fullerton-Anaheim area will be diverted. The typical historic average recovery rate at GWRS is approximately 75%, whereby about ¾ of the source water GWRS receives from Plant No. 1 actually becomes purified recycled water. The balance is discharged as backwash waste, cleaning waste, and reverse osmosis concentrate. Thus, of the 8 MGD, approximately 6 MGD (6,300 AFY) of purified recycled water will be produced by GWRS as a direct result of the Project.

Laboratory water quality results, measuring TDS, are appropriate for determining the salt reduction in the groundwater because the OCWD Advanced Water Quality Laboratory is a California state-certified laboratory. The actual reduction is the difference in TDS between the alternative imported water and the purified recycled water produced as a result of the Project. The salt reduction will be based on the mass (tons/yr) and calculated using the purified recycled water flow rate.

**Monitoring Targets**

The monitoring targets are (1) flow of purified recycled water, and (2) TDS of purified recycled water and imported water, with the difference between these TDS readings representing the salt reduction.

The Project will divert wastewater to OCSD's Reclamation Plant No. 1 where it will be treated and delivered to the GWRS as source water. As a result of the increased source water, GWRS will produce an estimated 6,300 AFY more of purified recycled water to recharge the Orange County Groundwater Basin. Flow metering will monitor progress towards achieving this Project benefit.

The flow will be used to calculate the salt reduction based on the TDS difference between imported water and GWRS purified recycle water.

**Monitoring Data Used to Measure Performance**

As noted above, the monitoring data will be used to measure how much purified recycled water is produced and how much TDS reduction is attributable to the Project by comparing before and after Project data.

The increased volume of purified recycled water produced by GWRS will be determined by comparing the daily flow rates before and after the Project is completed. The difference between the before and after daily production flow rates will represent the volume of new water supply attributable to the Project. Daily flows will help track the progress towards the annual target. The estimated physical benefit due to the Project is 6,300 AFY of purified recycled water for recharge. The GWRS Advanced Water Purification Facility (AWPF) pumping stations have flow meters that measure purified recycled water production. Increases in purified recycled water production that may be attributable to other factors/projects, if any, will be taken into account such that the benefit of the Project may be determined. The baseline flow condition will be the volume of purified recycled water prior to operation of the Project (i.e. pre-Project conditions). The annual volume of purified recycled water generated by the Project will be reported to document this benefit.

The salt reduction benefit will be calculated based on the difference between the average TDS of the alternative imported water supply and that of the purified recycled water. The TDS of the imported water will be based on treated water quality analyses from Metropolitan Water District of Southern California. The TDS of the purified recycled water will be based on the Orange County Water District (OCWD) Advanced Water Quality Laboratory results. Sampling and water quality analyses will be taken at least quarterly. The actual salt reduction will be based on the volume of purified recycled water attributable to the Project (as determined above, with the TDS reduction calculated in tons/year. The estimated physical benefit due to the Project is 4,170 tons/year based on production of 6 MGD (6,300 AFY) of purified recycled water for recharge with the difference between the TDS of imported water (500 mg/L) and TDS of purified recycled water (43 mg/L). The calculation is: (6 MGD) x (500 mg/L TDS – 43 mg/L TDS) x 8.34 = 22,868 lbs/day = 4,170 tons/year of salt. Actual values for flow and TDS will be input in the equation to track the salt reduction on a quarterly basis to determine the Project's performance.

## 2015 Integrated Watershed Protection Program

Implementing Agency: Riverside County Flood Control and Water Conservation District (RCFCWCD)

| Table 6 – Project Performance Monitoring Plan | | |
|---|---|---|
| **Project: 2015 Integrated Watershed Protection Program** | | |
| **Proposed Physical Benefits** | **Targets** | **Measurement tools and methods** |
| Flood Plain Reduction | 967 Acres | Acres protected by the San Jacinto River, Stage 4, Phase 1 Project. The tool that will be used to monitor project performance includes the FEMA approval process. Prior to project approval a Conditional Letter of Map Revision (CLOMR) will be submitted to FEMA for design concept approval. The CLOMR package that is submitted to Federal Emergency Management Agency (FEMA) must be approved by FEMA before the project is constructed. |
| Stormwater Capture/Groundwater Recharge | 1,200 AFY | Acre-feet/year provided by the Bautista Optimization Pond Project. Lake Hemet Municipal Water District (LHMWD) monitors recharge activities at the existing Bautista Ponds with a flow meter on the existing inlet diversion structure from the Bautista Creek into the existing ponds. Solar powered telemetry equipment transmits the data to LHMWD's Supervisory Control and Data Acquisition (SCADA) system where is it totalized and recorded daily, monthly, and annually. |

**Tools Used to Monitor Performance**

San Jacinto River, Stage 4, Phase 1:
When the levee project is completed, 967 acres and 445 existing structures will be removed from the San Jacinto River floodplain. The tool that will be used to monitor project performance includes the FEMA approval process. Prior to project approval a Conditional Letter of Map Revision (CLOMR) will be submitted to FEMA for design concept approval. The CLOMR package that is submitted to FEMA must be approved by FEMA before the project is constructed. The interim target includes the letter from FEMA approving the CLOMR submitted by the lead agency. In order for FEMA to revise the floodplain mapping, after the project is constructed, a Letter of Mapped Revision (LOMR) must be submitted along with as-built plans. The letter from FEMA approving the LOMR will also be used to monitor project performance and will provide the final monitoring target showing the Floodplain reduction benefits claimed in the above table. The monitoring tools are most appropriate because it uses a federal oversight process, through FEMA, to quantify acreage protected.

Bautista Optimization Pond:
When the recharge project is complete, 1,200 AFY will be conveyed to the ponds. LHMWD monitors recharge activities at the existing Bautista Ponds with a flow meter on the existing inlet diversion structure from the Bautista Creek into the existing ponds. Solar powered telemetry equipment transmits the data to LHMWD's SCADA system where is it totalized and recorded daily. This monitoring method is most appropriated because the data can be retrieved any time to prepare a performance analysis and the flow meter is located as close as possible to the receiving basin. LHMWD will continue to use the existing flow meter to monitor and record all flows that enters the proposed pond system and percolates.

**Monitoring Data Used to Measure Performance**

The monitoring data provides the accounting of groundwater recharge and floodplain reduction. The measurement of performance is to demonstrate the quantification of physical benefits claimed as a part of this application

**Type of Analysis Used**

San Jacinto River, Stage 4, Phase 1:
Flood level models will be completed as part of the CLOMR and LOMR submittal to FEMA.

Bautista Optimization Pond:
Historic data will be used as a baseline to compare the measured increase in recharge. Additionally, the connection to Eastern Municipal Water District's Reach 5 Raw Water Pipeline on the north end of the project will be metered at the connection point to track recharge of imported water supplies.

**How the Monitoring Tools and Targets are Appropriate**

San Jacinto River, Stage 4, Phase 1:
Floodplain reduction cannot be approved until the levee construction is completed. Appropriate measuring tools for progress of the floodplain reduction are required by FEMA to revise the flood plain. A copy of the CLOMR and LOMR application submitted to FEMA will be submitted to show progress.

Bautista Optimization Pond:
LHMWD monitors recharge activities at the existing Bautista Ponds with a flow meter on the existing inlet diversion structure from the Bautista Creek into the existing ponds. Solar powered telemetry equipment transmits the data to LHMWD's SCADA system where is it totalized and recorded daily. This monitoring method is most appropriated because the data can be retrieved any time to prepare a performance analysis and the flow meter is located as close as possible to the receiving basin. LHMWD will continue to use the existing flow meter to monitor and record all flows that enters the proposed pond system and percolates. Historic data will be used as a baseline to measure the increased recharge amounts against

During extreme rainfall events, the ponds may not percolate all diverted stormwater and the accumulated water will flow back into the Bautista Creek through an outlet structure on the lowest pond. However, these high flow storm events are not anticipated to regularly occur and should not affect overall long-term monitoring analysis.

**Monitoring Targets**

San Jacinto River, Stage 4, Phase 1:
The monitoring target is the project's target of 967 acres and 445 existing structures being removed from the San Jacinto River floodplain.

Bautista Optimization Pond:
The target is for the proposed project to the additional 1,200 AFY of storm water recharged to the basins.

## Santa Ana River Conservation and Conjunctive Use Program (SARCCUP)

Implementing Agency: The Santa Ana Watershed Project Authority, a joint-powers authority, and its five regional member agencies which provide wholesale water to most of the Santa Ana River Watershed:

- Eastern Municipal Water District
- Inland Empire Utilities Agency
- Orange County Water District
- San Bernardino Valley Municipal Water District
- Western Municipal Water District

| Table 6 – Project Performance Monitoring Plan | | |
|---|---|---|
| **Project: Santa Ana River Conservation and Conjunctive Use Program (SARCCUP)** | | |
| **Proposed Physical Benefits** | **Targets** | **Measurement tools and methods** |
| Water Supply Created | 180,000 AF in each 10 year Period | Water bank accounting of water purchased, recharged, stored and extracted for use as dry-year yield (DYY). Surplus water delivered will be metered at imported water pipeline turnouts. Groundwater levels will be monitored. Extraction wells will be metered to account for water withdrawn from groundwater basins. |
| Habitat Improved | 680.5 Acres | Verification and documentation of improved habitat acreage. Geographical Information System (GIS) personnel will coordinate with field personnel to document actual improvements made using handheld global position satellite (GPS) locating devices. |

**Tools Used to Monitor Performance**

The monitoring plan will use the following tools to monitor and tract the program's performance:

- Planning, Design and Construction Monitoring – Implementation and progress of the individual project elements and tasks will be tracked using scheduling software, such as Microsoft "Project". Interim targets for completion of project elements will be established to expedite the project execution.
- Periodic Status Reporting – Project status reporting will be formatted and on a frequency complimentary to other regulatory reporting requirements so as to minimize the administrative costs for SARCCUP.
- Conjunctive Use Water Bank Inventory and Accounting – In conjunction with and complimentary to any required documentation of water stored in adjudicated basins, all "deposits" and "withdraws" from the Water Bank will be accounted for, documented and reported. Benefits can begin to accrue as individual project elements are implemented.
- Arundo Donax removal will be accomplished within the first year, immediately obtaining the water savings associated with their removal. The remainder of the 4 ½ year project is maintenance related to spraying and keeping it from re-establishing.

**Type of Analysis Used**

A collaborative body, such as a SAWPA Project Committee, that includes membership from each of the five regional water agencies and was formed for the 2014 IRWM Grant funded Inter-regional Landscape Water Demand Reduction Program, will be created to administer project implementation and the continued operation throughout the project lifetime. During the planning, design and construction phase of the conjunctive use

element, progress will be reported on a "percent completed" basis and tracked with the project schedule. During the ongoing operation phase of the conjunctive use program, the management of the program will provide transparency and facilitation of the following information:

- Water purchases by the five project proponents (wholesale water agencies) from the State Water Project and Metropolitan Water District of Southern California will be monitored and documented from metered water supply connections
- The amount of imported wet year water stored in the SARCCUP groundwater basins will be accounted for in a system complimentary to existing water master reporting, and
- The amount of water extracted from the SARCCUP groundwater basins will be monitored and documented from extraction well meters.

The accounting will be done by a central entity such as a SAWPA Project Committee and be made available to the local retail water agencies in the Santa Ana River Watershed that will be purchasing the SARCCUP water.

For the Habitat Improvement and Arundo Donax removal element of SARCCUP, GIS specialists will coordinate with field personnel to document completed areas with use of devices such as GPS locators to locate the actual work performed and transfer this data to GIS mapping for monitoring and documentation.

**How the Monitoring Tools and Targets are Appropriate**

The monitoring tools and targets were established based on objective and verifiable tasks. Therefore, the tools are monitoring and reporting on tasks without the need for subjective judgment, rather based on completed items. Furthermore, the accounting of the operation of the water bank will be similar to typical bank account whereas deposits, withdraws and balances are documented transparently. Water meters at water transmission main turnouts and extraction wells are industry standard means of accounting for water purchased, stored and extracted.

For the Habitat Improvement/Arundo Donax elements, GIS mapping is a state of the art tool for documenting and monitoring actual conditions in the field. Data can be presented graphically providing for easy tracking and monitoring.

**Monitoring Targets**

The monitoring targets will be the amount of water recharged and stored in the groundwater basin over a ten year period and available for use during dry years. The secondary monitoring target will be the actual habitat improvement accomplished. Because these are objective deliverables, as to subjective quantifications, they will serve as a sound approach to monitoring progress.

**Monitoring Data Used to Measure Performance**

The monitoring plan will be established to provide transparency in determining the completion of tasks as well as the accounting of water supply created and habitat improved. The measurement of performance is to demonstrate the quantification of physical benefits claimed as a part of this application. The monitoring plan will therefore focus on tracking the two major benefits claimed: AF of Water Supply created and acres of Habitat Improved. These two major benefits are directly connected to the performance of the installation of groundwater banking and extraction facilities and the removal or Arundo Donax.

# Cost Effective Analysis

## Newhope-Placentia Trunk Sewer (NHP) Replacement Project 2-72

Implementing Agency: Orange County Sanitation District (OCSD)

| Table 7 – Cost Effective Analysis<br>Project name: Newhope-Placentia Trunk Sewer (NHP) Replacement Project 2-72 | |
|---|---|
| Question 1 | *Types of benefits provided as shown in Table 5*<br><br>1. Water supply produced, saved, or recycled - 6,300 AFY<br>2. Water quality (TDS reduction) - 4,170 tons/year salt |
| Question 2 | *Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?* Yes. |
| | *If no, why?* |
| | *If yes, list the methods (including the proposed project) and estimated costs.*<br><br>Alternative 1 - Proposed Project<br>Estimated project capital cost is $104,890,000.<br>Over the 50-year life of the project, and at 6,300 AFY purified recycled water produced annually, a total of 315,000 AFY of water will be produced. On a unit cost basis, the estimated Project cost is $332.98/AF.<br>The proposed project would also reduce salinity in the groundwater basin by 4,170 tons per year. The estimated TDS reduction (43 mg/L - 500 mg/L = -457 mg/L). Using the unit value of $ 0.413 per mg/L per AF of water from the Final Report of "Salinity Management Study" conducted by Metropolitan Water District of Southern California and U.S. Bureau of Reclamation (June 1999) and updating it by 3% per year to reflect 2015 dollars, yields a update factor of 1.60. Applying this factor yields a 2015 unit value of $0.661 per mg/L per AF of water. Therefore, for 6,300 AF and a TDS reduction of 457 mg/L, the value of the improved water quality is estimated at $1,903,000/yr. Over 50 years, the value of the reduce salinity is estimated at $95,154,000 (not allowing for inflation). Roughly, the cost of the project ($104,890,000) is offset by the value of the salinity reduction ($95,154,000).<br>Net cost of alternative 1 = $9,736,000 = $31/AF over 50 years (not including inflation).<br><br>Alternative 2 - Purchase Imported Water<br>The estimated cost of purchasing 6,300 AFY of treated imported water for groundwater recharge based on the 2015 cost of $923.50/AF is $5,818,050/yr. For a 50-year period, the estimated cost of purchasing imported water would be $290,902,000 (not including inflation).<br>The TDS of the imported water would be approximately 500 mg/L and result in no water quality improvement.<br>Net cost of alternative 2 = $290,902,000 = $923.50/AF over 50 years (not including inflation). |
| Question 3 | *If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.*<br><br>The proposed Project is the preferred, least cost alternative. The Project will provide a new, reliable, local water supply and offset the need to purchase imported water (6,300 AFY). The Project will reduce salts in the groundwater basin (4,170 tons/yr) by diverting wastewater to provide more source water for water recycling for GWRS to recharge more low TDS (43 mg/L) purified recycled water. The alternative is buying imported water (6,300 AFY) with a higher TDS (500 mg/L). The alternative will increase salts in the groundwater basin. |

## 2015 Integrated Watershed Protection Program

Implementing Agency: Riverside County Flood Control and Water Conservation District (RCFCWCD)

| Table 7 – Cost Effective Analysis<br>Project name: 2015 Integrated Watershed Protection Program | |
|---|---|
| Question 1 | *Types of benefits provided as shown in Table 5*<br><br>1. Flood Plain Reduced (acres) for the San Jacinto River, Stage 4, Phase 1<br>2. Stormwater Capture/Groundwater Recharge (acre/feet per year) for the Bautista Optimization Pond |
| Question 2 | *Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?* |
| | *If no, why?* |
| | *If yes, list the methods (including the proposed project) and estimated costs.*<br><br>San Jacinto River, Stage 4, Phase 1<br>Yes. An alternative alignment in each Reach of the levee was developed that would result in either less conversion of Farmland and/or reduce construction noise impacts to nearby residents. A cost estimate was not prepared for the alternative alignment. The alignment analysis was completed to determine which project alignment will provide less physical impacts to the area.<br><br>Bautista Optimization Pond<br>Yes. The Alternative B design mostly follows the same design as proposed project except for a few modifications to the step basins to account for the interception of an existing 78" RCP storm drain. This is alternative was not selected because it requires additional structures, deeper excavations, and would require additional operation and maintenance. Construction of Alternative B is $660,000 more expensive than the selected alternative. |
| Question 3 | *If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.*<br><br>San Jacinto River, Stage 4, Phase 1: The proposed project would accomplish all five of the Project Objectives where the other alternative only met one or two of the objectives:<br>• To provide all weather access into and out of the San Jacinto Valley by removing State Street from the San Jacinto River 100-year floodplain;<br>• Reduce the amount of dairy and agricultural lands affected by flooding that may limit day-to-day operations of the facilities and cause pollutants from these facilities to affect downstream receiving waters;<br>• Increase hydraulic capacity to protect the existing State Street Bridge from damage from high flows and increase the flow capacity under the bridge to accommodate a 100-year event;<br>• Provide 100-year flood protection from the San Jacinto River between the existing USACE levee (upstream) to a point 2000 feet west of State Street Bridge (downstream); and<br>• Provide protection of the Metropolitan Water District of Southern California underground pipelines that cross under the San Jacinto River.<br><br>Bautista Optimization Pond: The proposed project is the least cost alternative as the Alternative B design was $660,000 more expensive than the selected alternative. |

## Santa Ana River Conservation and Conjunctive Use Program (SARCCUP)

Implementing Agency: The Santa Ana Watershed Project Authority, a joint-powers authority, and its five regional member agencies which provide wholesale water to most of the Santa Ana River Watershed.

| Table 7 – Cost Effective Analysis<br>Project name: Santa Ana River Conservation and Conjunctive Use Project | |
|---|---|
| Question 1 | *Types of benefits provided as shown in Table 5:*<br><br>1. Water Supply Produced in acre feet per year<br>2. Habitat Restored in acres |
| Question 2 | *Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?* |
| | *If no, why?* |
| | For the stream restoration for the Santa Ana sucker (habitat restored in acres), there is no alternative due to the absence of other tributaries with adequate flows for fish survival in the Santa Ana River. The sucker's habitat has been greatly reduced due to urbanization. This habitat restoration project is unique to significantly expand the dwindling Sucker habitat. There is no other comparable project. |
| | *If yes, list the methods (including the proposed project) and estimated costs.*<br><br>For the conjunctive use element (water supply produced) alternatives to develop a new and significant water supply in the Santa Ana River Watershed include the Huntington Beach Ocean Desalination project (approximately $2,000/AF). SARCCUP is a large scale, water supply solution because it includes co-management of a groundwater bank on a watershed-wide basis. It takes advantage of the existing regional gravity fed pipelines as well as a natural network of tributaries connecting to the Santa Ana River. The only other known large water supply projects being planned in the Santa Ana River Watershed is the ocean desalination project in the City of Huntington Beach. However, this ocean desalination project would only benefit the lower watershed as it is not cost effective or technically feasible at this time to pump desalinated ocean water from the coast beyond Orange County and over the Chino Hills into the middle or upper basins of the Santa Ana River Watershed. In addition, ocean desalination is estimated to be on the order of double the cost of SARCCUP, which includes the cost of extraordinary water supply purchase, capital cost of required infrastructure and operational and maintenance (O&M) costs. (Recent Carlsbad Ocean Desalination plant cost is $2,014/AF to $2,257/AF; source: http://www.sdcwa.org/seawater-desalination).<br><br>SARCCUP conjunctive use element cost summary:<br>• Capital Cost $84,376,244<br>• Amortized Capital Cost (30 years, 5%) $ 5,488,800<br>• Yield (180,000 AF over 10 years) 18,000 AFY average<br>• Unit Capital Cost $305/AF<br>• Unit O&M Cost $250/AF<br>• Source water supply Unit Cost $600/AF<br>Total Unit Cost $1,155/AF<br>Unit Cost with Grant $983/AF |
| Question 3 | *If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.*<br><br>SARCCUP is the least cost alternative for a large-scale development of DYY water supply. |