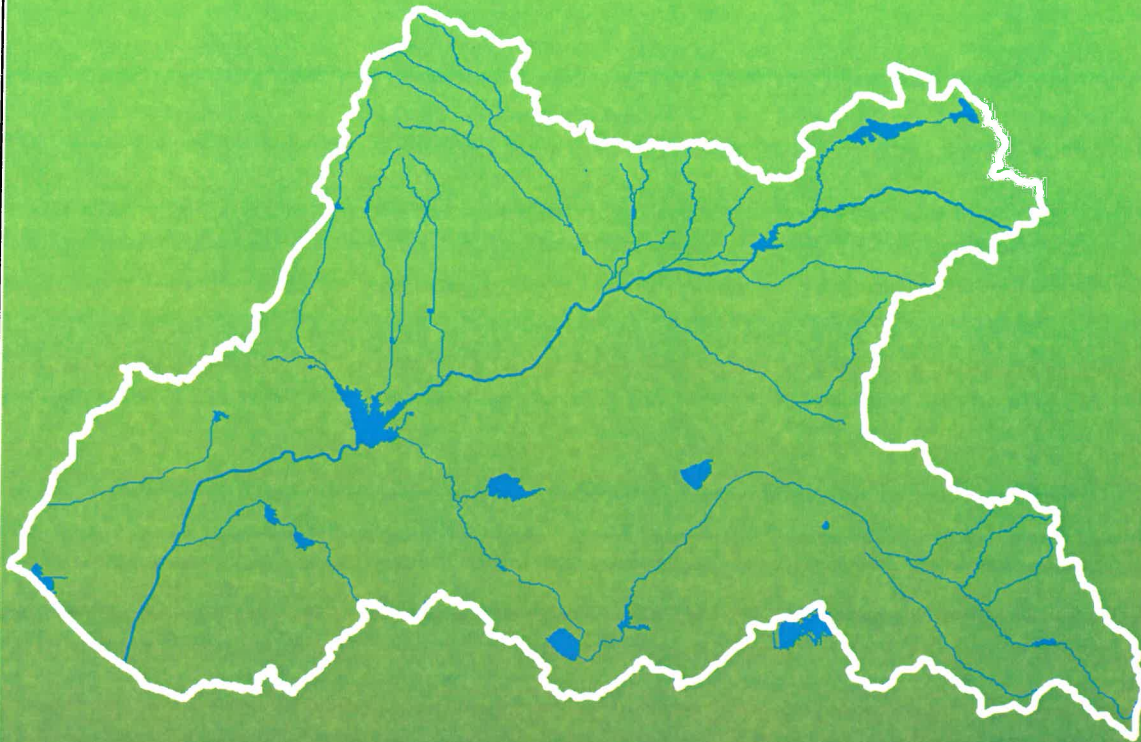


SANTA ANA WATERSHED PROJECT AUTHORITY



Santa Ana Basin

BASIN STUDY UPDATE
PROPOSAL

A SUBMITTAL TO THE BUREAU OF
RECLAMATION

11615 Sterling Avenue Riverside, California 92503

Santa Ana Basin Study Update Proposal

Santa Ana Basin Study Update Proposal

Project Title

Santa Ana Basin Study Update

Non-Federal Lead Agency

Santa Ana Watershed Project Authority (SAWPA)

SAWPA Staff Lead

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Senior Watershed Manager

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Location of Study

Santa Ana River Watershed (referred to as the "Santa Ana Basin" by the Bureau of Reclamation).



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About Non-Federal Lead Agency

SAWPA is a joint-powers-authority (JPA) located in the Santa Ana River Watershed with five major water resource member agencies: Eastern Municipal Water District, Inland Empire Utilities Agency, Orange County Water District, San Bernardino Valley Municipal Water District and Western Municipal Water District. SAWPA envisions a sustainable and resilient Santa Ana River Watershed that provides water for a high quality of life for all, while maintaining healthy ecosystems and open space opportunities. SAWPA strives to make the Santa Ana Watershed sustainable through fact-based planning and informed decision-making; regional and multi-jurisdictional coordination; and the innovative development of policies, programs, and projects.

SAWPA is the planning lead for the California Integrated Regional Water Management (IRWM) Program in the Santa Ana River Watershed. Designated as the Regional Water Management Group (RWMG) through the California Department of Water Resources (DWR) 2009 IRWM Regional Acceptance Process, SAWPA coordinates with watershed stakeholders to develop plans, projects and programs that implement IRWM program goals. SAWPA developed and administers the Santa Ana River Watershed IRWM governance body, the One Water One Watershed (OWOW) Steering Committee. The OWOW Steering Committee is comprised of eleven members from the three counties in the Santa Ana River Watershed (Orange County, Riverside County and San Bernardino County).

About Previous Watershed Planning Efforts

Beginning in 2011, SAWPA and the Bureau of Reclamation (Reclamation) collaborated on the Santa Ana Basin Plan, which was completed in 2013 and incorporated as part of the 2014 One Water One Watershed 2.0 Plan. The OWOW 2.0 Plan is the Santa Ana River Watershed IRWM Plan, following the guidelines promulgated by the State of California. SAWPA now proposes a Basin Plan Study Update in partnership with Reclamation to, 1) update and spatially analyze the projected impacts of climate change modeled in the original 2013 Santa Ana Basin Plan, 2) present the data from the Basin Study and the Basin Study Update to the stakeholders in the 2,800 square mile basin, and 3) support updates to the OWOW 2.0 plan required by changes in California law.

The 2013 Basin Study was unique because the Santa Ana River Watershed was the first urban setting in which Reclamation conducted its climate change analysis. Since completing the Basin Plan, changes in California state policy, as well as the economy and development patterns of the watershed encourage the need for the proposed update.

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SAWPA and the Santa Ana Watershed have a strong legacy of integrated watershed planning, with the first Santa Ana River *Water Resources Plan* in 1998. In November 2010, the OWOW 1.0 Plan was approved by the SAWPA Commission and the subsequent OWOW 2.0 Plan conducted between 2011 and 2013 continued integrated watershed planning for the watershed.

If successful in receiving Reclamation support in updating the OWOW 2.0 plan, the proposed Basin Plan Update will ensure the watershed's future plan incorporates the latest science and data and is compliant with the State of California Proposition 1 Integrated Regional Water Management (IRWM) requirements. Proposition 1 was passed by the California electorate in November 2014 and the DWR released draft planning guidelines in January 2016 that described the new information and analyses that IRWM Plans have to incorporate.

Total Basin Study Update Costs

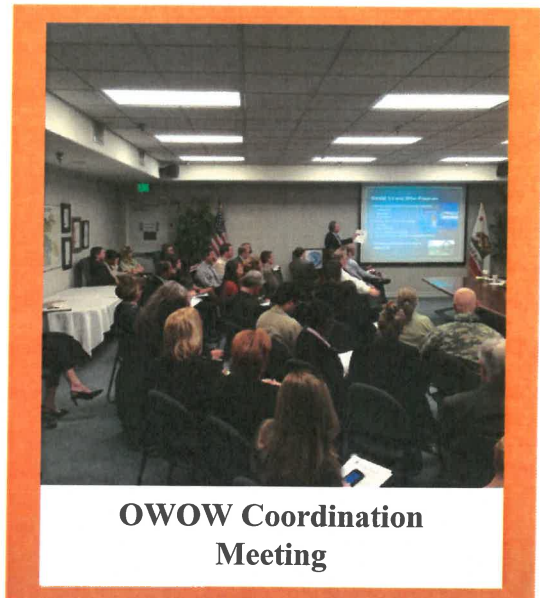
Through this proposal, \$399,000 will be provided by SAWPA and \$399,000 would be provided by Reclamation. See the budget on page 19 for further information.

Cost-Share Partners

SAWPA will serve as the 50 percent cost share partner to Reclamation. In kind support services will also be provided by retail water agencies, groundwater management agencies, cities, counties, flood control agencies, recreational and environmental stakeholders throughout the watershed in updating the Plan.

Reclamation Regional Contact

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2013 Basin Study Background

If awarded, the proposed Basin Study Update will build on the Basin Study begun with Reclamation in 2011 and completed in 2013. Through the 2013 Basin Study, Reclamation and SAWPA completed the following tasks and analyses:

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- The *Basin Study Summary Report* helped watershed stakeholders identify data gaps, conduct tradeoff analyses, address the effects of climate change, and develop effective adaptation strategies. It suggested implementation actions for stakeholders that can help reduce energy consumption and ensure California Global Warming Solutions Act of 2006 (Assembly Bill 32) compliance, listed vulnerabilities, identified adaptation strategies, utilized a ‘no regrets strategy’ analysis that assessed proposed projects and specific adaptation strategies and defined the cost and benefits in terms of productivity, mitigation potential, resilience, and sustainability.
- The *Climate Change Analysis for the Santa Ana River Watershed* (Technical Memorandum No. 1) explained the methods used to develop an analysis of potential implications of the changing climate, and how those implications might affect issues of importance to the Santa Ana River Watershed. It included the development of climate projections, hydrology models using projections for water supply and demand in the Santa Ana River Watershed. Global climate models (GCMs) used in the analysis were downscaled to 12-kilometer grids to make them relevant for regional analysis.
 - The Greenhouse Gas (GHG) Emissions Calculator (Technical Memorandum No. 2) was developed as a tool to support the *Climate Change Analysis for the Santa Ana River Watershed* and to evaluate mitigation strategies. It is a decision-making tool that can be used to explore the links between water resources, energy, and GHG emissions. It can be used to determine water supply and energy demands for the study area, in addition to GHG emissions from 1990 to 2050.
- The *Inland Empire Interceptor Appraisal Analysis* (Technical Memorandum No. 3) assessed rerouting all Inland Empire Brine Line system flows for discharge to the Salton Sea. The appraisal analysis was conducted as an aid in selecting the most economical plan by comparing alternative features. The report analyzed historical Brine Line flow data and forecasting of future flows. It also addressed analysis of available historical data for water quality constituents of the Brine Line flows and forecasting of those constituents in future flows.
- The *Overview of Disadvantaged Communities and Native American Tribes in the Santa Ana River Watershed* provided a brief description of Disadvantaged Communities (DACs) and Native American Indian Tribes located in or near the watershed, and a summary of water and related resource opportunities and challenges facing these entities. The conclusion of the report summarized this information to offer water resources planners a means to examine future opportunities, and follow-up on considerations as they update the OWOW 2.0 Plan and provide recommendations to engage DACs and Tribes in proposed projects.

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Basin Study Update Abstract

SAWPA proposes a Basin Plan Study Update in partnership with Reclamation to 1) spatially analyze the projected impacts modeled in the original 2013 Santa Ana Basin Plan, and 2) present the data from the Basin Study and the Basin Study Update to the stakeholders in the 2,800 square mile watershed. Per the DWR IRWM draft guidelines, future IRWM Plans need to include vulnerability assessments by RWMGs and examine vulnerabilities through an IRWM decision-making process in order to 1) prioritize them, and 2) determine the feasibility to address them. The 2013 Basin Study has already analyzed four “key vulnerabilities.” These include:

Water Supply

- Insufficient local water supply
- Increased dependence on imported supply
- Inability to meet water demand during droughts
- Shortage in long-term operational water storage capacity

Water Quality

- Poor water quality
- Increased water treatment needs

Flooding

- Increased flash flooding and inland flooding damage
- Increased coastal flooding and inundation of coastal community storm drains
- Damage to coastal community sewer systems from sea level rise

Ecosystem and Habitat

- Damage to coastal ecosystems and habitats
- Adverse impacts to threatened and sensitive species from reduced terrestrial flows and sea level rise

The OWOW 2.0 Plan analysis by OWOW stakeholders and the Reclamation’s analysis through the 2013 Basin Study concluded that the Santa Ana River Watershed “is potentially highly sensitive to climate change, with a particular vulnerability to changes in its precipitation, temperature, evapotranspiration, snow water equivalent, and streamflow” (*Basin Study Summary Report*, September 2013).

Reclamation's expertise in the modeling used for the 2013 Basin Study will be of particular value in evaluating vulnerabilities in a spatial context. Understanding how different geographies and both human and non-human populations will be impacted in

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different ways by the potential impacts is an important step in planning mitigation and adaptation efforts.

The needs of disadvantaged communities, as defined by the State of California, are a focus of multiple programs in the state and the watershed. In particular, as a component of the IRWM program, the upcoming Disadvantaged Community Involvement Program, will complete a “Strengths and Needs Assessment” in the watershed. This state-funded effort will benefit from the spatial vulnerability assessment requested in this proposal. By understanding how particular climate impacts will provide challenges to particular communities of need, planners and other stakeholders can begin to marshal resources and programs to provide adaptation and mitigation.

Receiving Reclamation assistance to develop a finer spatial resolution on associated vulnerabilities is fundamental to this proposal. Understanding the impacts to different anthropogenic and biological communities from projected changes in climate involves a unique analysis of each community type because these communities are each affected by streamflow, precipitation and air temperature differently. These community-based analyses and the communities’ unique impacts from projected changes in climate, can include, but are not limited to:

Water Supply

- **Urban Areas:** With municipal water demand affected predominately by water rates, water conservation messaging and water conservation participation programs, it is difficult to link demand to future changes in streamflow, precipitation and air temperature because the current trends for those three conditions is not strongly correlated to municipal demand. In order to correlate municipal water demand to climate trends, the analysis would likely first link observed municipal supply to observed climate, and then correlate observed supply levels to observed water rates. Since there was an observed increase in water rates primarily due to the onset of the State Water Resources Control Board’s emergency drought regulations in 2015, this analysis would likely be done by analyzing observed municipal demand data in response to supply shortages from the drought.

Water Quality

- **Total Dissolved Solids in the Watershed:** With the projected salt imbalance discussed in the OWOW 2.0 Plan, a relationship of total dissolved solids levels in

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the watershed and various factors should be isolated. This analysis was discussed in the OWOW 2.0 Plan and will need to be updated for such variables such as irrigation return flows, recycled water and streambed infiltration. The climate projections from the Basin Study would be included in the updated analysis.

Ecosystem and Habitat

- **Prado Basin:** With hundreds of acres of wetlands, subtle change in hydrology due to changes in climate can alter wetlands, resulting in a different biotic feedback, contributing methane and carbon dioxide to the atmosphere (Burkett and Kusler, 2007). With observed hydrology data showing water levels in the Prado Basin and likely data for observed atmospheric reading through satellite imagery, an estimation for methane and carbon dioxide emissions could be made using the correlation between the observed hydrology and observed atmospheric data.



View of the Prado Basin from Prado Dam
Prado Basin was modified by a major flood control project in the 1940s, Prado Dam. Today it is an ecosystem of hundreds of acres of wetlands and riparian vegetation.

- **Santa Ana Sucker Fish Habitat:** The Santa Ana sucker fish has been often observed in the Santa Ana River within the City of Colton in San Bernardino County from the Riverside Avenue crossing of the river upstream to the Rialto Channel river confluence. Understanding the air temperature projections from the Basin Study and correlating that to water temperature projections will highlight the understanding of the future impacts to the Santa Ana sucker. With new fish population data being provided by the Upper Santa Ana River Habitat Conservation Plan, there will be an opportunity to correlate the current relationship between sucker fish presence to observed water temperature, and then estimate future population levels using air temperature projections from the 2013 Basin Study.

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The Basin Study Update scope of work would begin with SAWPA and Reclamation working together to identify data sets that are available for these types of community-specific analyses. Once data is gathered, SAWPA and Reclamation would focus on each of the four key vulnerability categories. This would establish a framework for further climate change impacts.

SAWPA will also identify its internal scope of work to augment the Reclamation scope of work. SAWPA will focus on filling the planning and data gaps in the OWOW 2.0 plan created by new State laws, including Stormwater Resources Plans and Groundwater Sustainability Plans (GSPs). Since the OWOW 2.0 Plan was adopted, the Governor has signed Senate Bill 985 that requires storm water resource plans be incorporated into IRWM Plans, and a collection of bills that produced the Sustainable Groundwater Management Act (SGMA). SGMA allows local agencies to customize GSPs to their regional economic and environmental needs. For an OWOW 2.0 update, a local GSP covering a sub-basin of the Santa Ana River Watershed may set extraction limits. Per the DWR's IRWM draft guidelines, the update to the OWOW 2.0 Plan should be consistent with those limits. The OWOW 2.0 update will also have to identify groundwater basins in the Santa Ana River Watershed with or without GSPs and develop a watershed approach for coordinating with those GSPs or lack of GSPs.

Lastly, SAWPA will ensure that the updated OWOW 2.0 Plan reflects the latest water supply and demand projections and recent sub-regional resource plans such as the 2016 Inland Empire Utilities Agency Integrated Resources Plan, 2015 San Bernardino Valley Municipal Water District Upper Santa Ana River Watershed IRWM Plan, and 2014 Orange County Water District Long Term Facilities Plan. Since the OWOW 2.0 Plan covers a large planning area, SAWPA will coordinate the timing of other water and land development plan update cycles with OWOW 2.0 planning updates and incorporate the necessary locations, impacts, existing and future actions to address various water quality contaminants in the watershed in accordance with Assembly Bill 1249. Like Senate Bill 985 which requires that the IRWM Plans address a specific water resources issue, the focus for Assembly Bill 1249 is identifying nitrate, arsenic, perchlorate and/or hexavalent chromium contamination in an IRWM planning area such as the Santa Ana River Watershed.

The Importance of Updating the Basin Study

The Basin Study Update will address water imbalances by serving as a screening tool for projects proposed for funding through the OWOW process. The Basin Study Update is important because it supports the Santa Ana River Watershed meeting new IRWM guidelines that require a framework for regional decision making bodies to address vulnerabilities. The IRWM guidelines discuss using the RWMG decision making

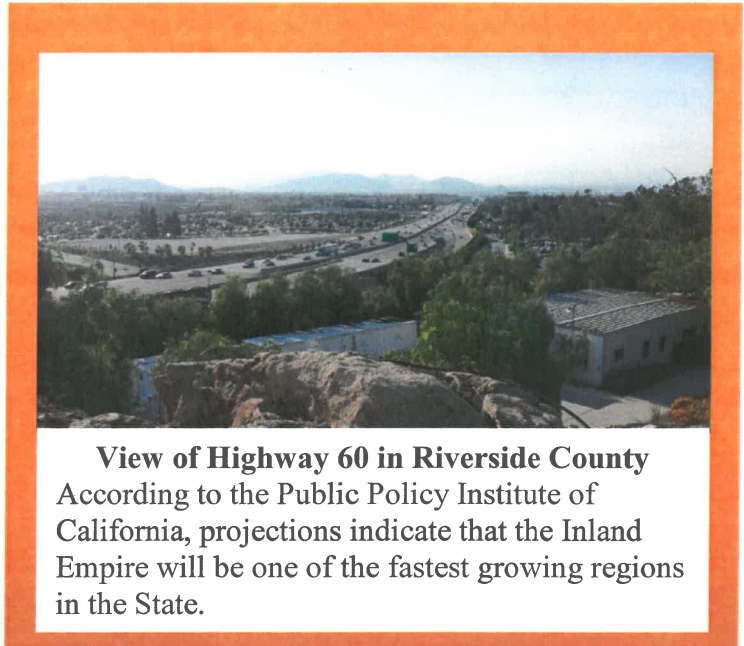
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process, which would be the OWOW Steering Committee and the SAWPA Commission, to prioritize vulnerabilities and determine the feasibility of addressing them. Once vulnerabilities are prioritized, the RWMG can incorporate strategies to eliminate or minimize vulnerabilities. Project and programs would then likely be proposed to the OWOW Steering Committee and SAWPA Commission from the stakeholders and an analysis by SAWPA staff would subsequently be done to see which projects and programs eliminate or minimize the identified vulnerabilities.

The community-based spatial analysis in the proposed Basin Study Update would also serve as a useful resource for planners in other sectors (urban planning, transportation, open space management, etc.) who are developing projects and programs. Planners and decision makers can use data sets produced as part of the Basin Study and the Basin Study Update and build upon them using data from their sector. This Study would directly help, for example, managers in the Prado Wetlands, but would also create an analysis framework for a wetland manager in another part of the watershed to scope a study for the wetlands they manage.

The Extent and Consequences of Existing or Anticipated Imbalances in Water Supply and Demand

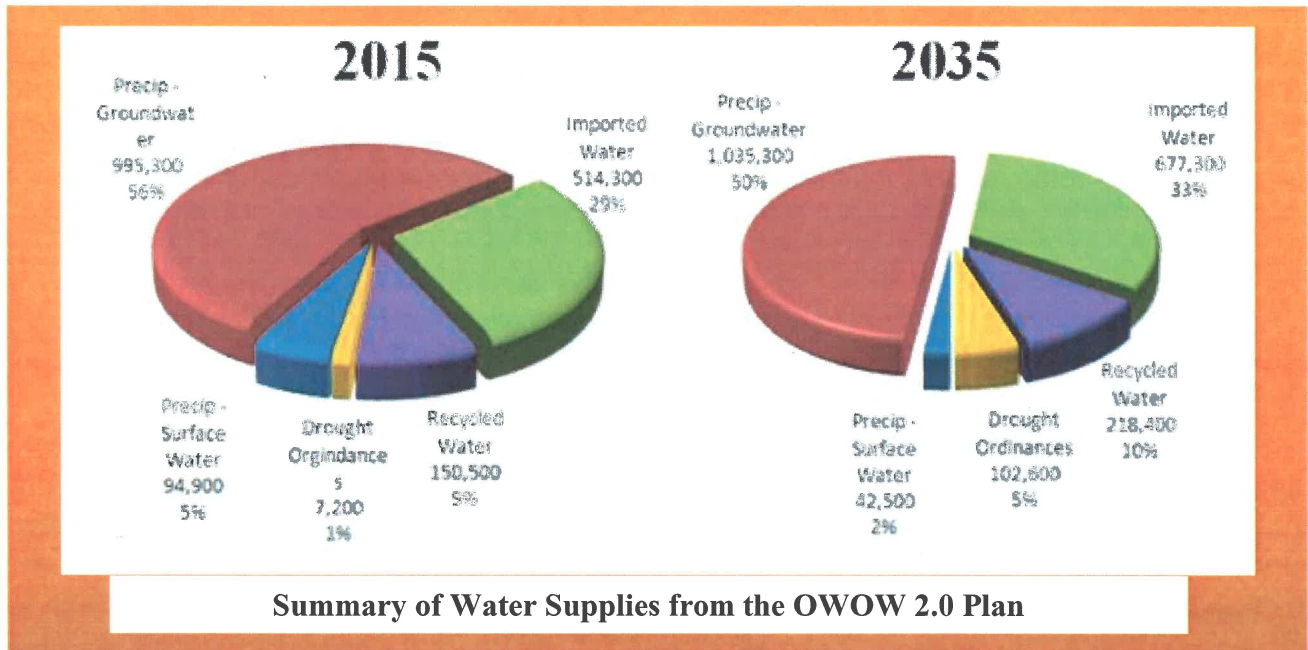
Based on the OWOW 2.0 Plan analysis by OWOW stakeholders and Reclamation's analysis through the 2013 Basin Study, it was concluded that the Santa Ana River Watershed "is potentially highly sensitive to climate change, with a particular vulnerability to changes in its precipitation, temperature, evapotranspiration, snow water equivalent, and streamflow." Under the integrated water resource planning approach, evaluations have been conducted in ten major water resource management areas covering the following areas: 1) water supply reliability, 2) water recycling, 3) water quality improvement, 4) water use efficiency, 5) water and land use, 6) flood risk management, 7) environment and habitat enhancement, 8) parks, recreation and open space, 9) climate change, and 10) environmental justice. The current conditions were considered; threats, weaknesses, strengths, and opportunities were examined, and strategies were defined to improve



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resources. From these evaluations, the imbalances in several arenas, including water supply and water quality, became readily apparent.

Existing supplies in the watershed are provided by groundwater, surface water, imported water, recycled water and local precipitation. The 2015 supply portfolio for



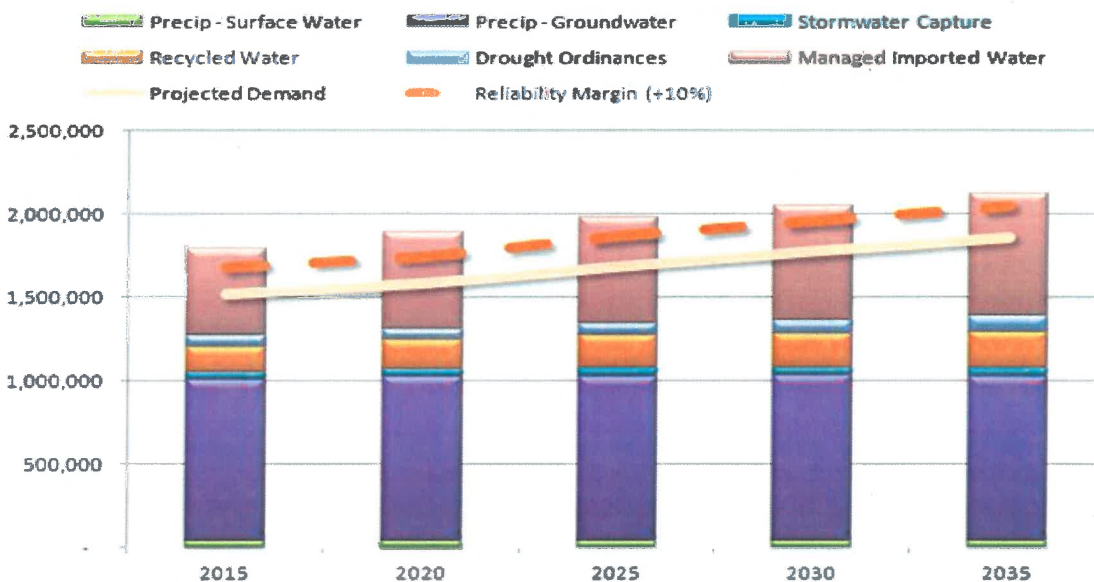
the entire Santa Ana River Watershed is shown in the pie chart above. Projected supplies for 2035 were also included in the Plan. Both sets of data were developed by aggregating the 2010 California Urban Water Management Plan data and other subregional water planning from the approximately 70 retail water agencies in the watershed. Local precipitation presently meets about 60 percent of the demand and, due to increasing demand over time, is projected to meet about 50 percent of the demand in 2035. Overall recycled water currently represents the third largest water supply source to the watershed, accounting for approximately 20 percent of total water demands.

Existing supply and demand has largely been in balance across the Santa Ana River Watershed due to the management of groundwater basins, management of imported water, implementation of conservation programs and investments in recycled water. The reduction in imported water from the State Water Project has led to drawing down on reserves in groundwater in some places in the watershed. The State Water Project's allocation to its water users (known as "water contractors") was 20 percent of the contractors' request for 2015, 5 percent of the contractors' request for 2014, and 35 percent of contractors' request for 2013.

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For projecting future imbalances, the 2013 Basin Study utilized a supply and demand analysis for the Santa Ana River Watershed. The VIC routing model was used to develop routed streamflow at the 36 gage locations throughout the Santa Ana River Watershed. Using information from watershed stakeholders, water demand was estimated using population projections and per capita water use. The analysis found that by 2035 water demand was to increase by approximately 460 thousand acre feet per year from 2013 levels, an increase of about 26 percent. By integrating the climate, hydrology and population data, the OWOW 2.0 Plan projected that supply will meet demand through a single year drought with a reliability margin of 11 percent in 2035. Although the watershed as a whole will be able to make it through single year droughts, there are some agencies that are projected to experience shortfalls. One water agency was projected to have a shortage of 27 thousand acre feet in a single year of drought.

Projected Supplies and Demands - Single Year Drought



Given the changes projected in precipitation and temperature, according to the Basin Study a water shortage worse than the 1977 drought could occur one out of every six to eight years by the middle of the 21st century and one out of every two to four years by the end of 21st century. Additionally, the State is currently requiring a three-year drought planning framework, to which most agencies are providing a response by June 2016. With 2015 Urban Water Management Plans becoming available, and per-agency assessments of supply through the next three years, a wealth of new data is available

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for strengthening the supply and demand forecast. With the continuing Colorado River drought, recent declines in the State Water Project allocations and the onset of new drought requirements from the State, it is imperative for the watershed to focus on balances between water supply and demand that take into account the entire watershed's supply portfolio.

The Extent to Which the Proposal Describes and Provides Support for the Study Proponent's Ability to Address the Following Elements of a Basin Study Update within the Timeframe Required

The work done under the following four elements that were a part of the 2013 Basin Study will serve as a foundation for the Basin Study Update:

- Projections of water supply and demand within the basin, including an assessment of risks to the water supply relating to climate change as defined in section 9503(b)(2) of the SECURE Water Act.
- Analysis of how existing water and power infrastructure and operations will perform in the face of changing water realities, such as population increases and climate change, as well as other impacts identified within section 9503(b)(3) of the SECURE Water Act as appropriate.
- Development of appropriate adaptation and mitigation strategies to meet future water demands.
- A trade-off analysis of the strategies identified and findings as appropriate, including an analysis of all proposed alternatives in terms of their relative cost, environmental impact, risk (probability of not accomplishing the desired/expected outcome), stakeholder response, or other attributes common to the alternatives.

As described in the above section, water supply and demand through 2035 has been projected through the previous Basin Study and the OWOW 2.0 Plan. As shown in the bar graph in the previous section, the assessment of the risk that water demand will outpace supply at the watershed level is 11 percent in 2035, though some agencies are projected to individually see imbalances between demand and supply.

An analysis of existing water and power operations was included in the 2013 Basin Study that examined demand management and possible adaptive strategies. The Basin Study determined that in order to reach the GHG emissions target set by Assembly Bill 32 for 2020, a reduction of GHG emissions by approximately 30 percent is required from a "no action" scenario. Reclamation developed the GHG Emissions Calculator to evaluate mitigation strategies. The 2013 Basin Study also included a trade-off analysis to assess the various climate change adaptation strategies noted in the OWOW 2.0 Plan.

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Nine adaptation strategies were cross-referenced with the four key vulnerabilities to determine the number and type of climate change vulnerabilities that can be addressed. As a follow up to that analysis, a “no-regrets” strategy analysis was conducted whereby identifying actions that would provide benefits in the present while also reducing vulnerability to future climate change impacts.

The four elements will be built upon in the Basin Study Update by focusing on the specific issues related to these four key vulnerabilities. For the 2013 Basin Study, the watershed has looked at the cost associated with implementation of the strategies and the relative risk associated with such implementation through the “no-regrets” strategy.

The Strength of Any Nexus between the Basin Study Update and a Reclamation Project or Activity

This southern California watershed relies on water imported from another basin through Metropolitan Water District of Southern California’s Colorado River Aqueduct (CRA). Reclamation and seven basin states manage the Colorado River (CR) system under the authority of the Secretary of the Interior and for the benefit of seven “basin states.” Approximately 30 percent of the Santa Ana River Watershed relies on imported water, which is provided by the CR Supply as well as the State Water Project which is managed by the DWR.

There are also multiple major groundwater basins within Metropolitan Water District of Southern California service area and the Santa Ana River Watershed. Coordination and cooperation are vital with Reclamation as both parties explore groundwater recharge and reuse opportunities. Additionally, SAWPA has worked closely with Reclamation on several major regional studies over the past decade.

As a funding partner, SAWPA has entered into several agreements with Reclamation in these past studies:

- *Southern California Comprehensive Water Reclamation and Reuse Study*, Prepared by CH2M Hill for US Bureau of Reclamation and 8 regional partners, including SAWPA, July 2002
- *Southern California Water Recycling Initiative*, Prepared by CH2M Hill for US Bureau of Reclamation and 12 regional partners, including SAWPA, July 2006
- *Southern California Regional Brine Concentrate Management Study*, Prepared by CH2M Hill for Reclamation and 15 regional partners, including SAWPA, October 2009
- *Santa Ana River Watershed LiDAR/Infrared Imagery Landscape Mapping Demonstration Project Final Report* prepared by SAWPA, October 2015

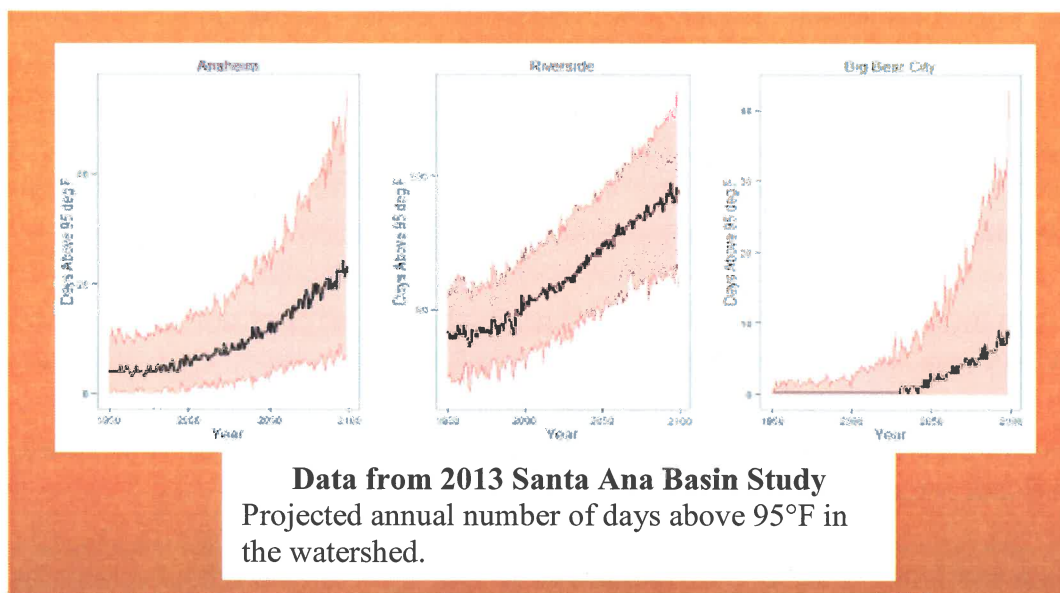
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Multiple Federal projects funded through the Reclamation's Title XVI Program and American Recovery and Reinvestment Act of 2009 funding are also located in the Santa Ana River Watershed and within the SAWPA member agencies' service areas. For example, Reclamation's Title XVI Program funding combined with IRWM funding through SAWPA provided sufficient revenue for the construction of the largest water recycling project west of the Mississippi River - the Orange County Water District Groundwater Replenishment System.

The Availability and Quality of Existing Data and Models Applicable to the Proposed Basin Study Update

The following data and models will be used for the study:

- SAWPA's water demand and supply analysis contained in Chapter 5.4 of the OWOW 2.0 Plan and the 2013 Basin Study.



- Surface water hydrology and air temperature projections developed by Reclamation in its *Climate Change Analysis for the Santa Ana River Watershed* using the VIC model.
- Future water supply analyzed using the downscaled GCMs.
- Data available for the community-based analyses such as atmospheric data from remote sensing, municipal water use data from retail water agencies, fish population data from water agencies, etc.
- The qualitative data assembled by Reclamation in the 2013 Basin Study for examining demand management and possible adaptive strategies to climate change.

High-quality data and effective water demand and supply projection modeling are contained in the following reports, which served as the basis for past analyses. The

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potential effects on water supply and demand due to climate change and variability also were analyzed with evaluation of localized climate change impacts in the watershed, working with the Rand Corporation and State experts. The results of these analyses are referenced as follows:

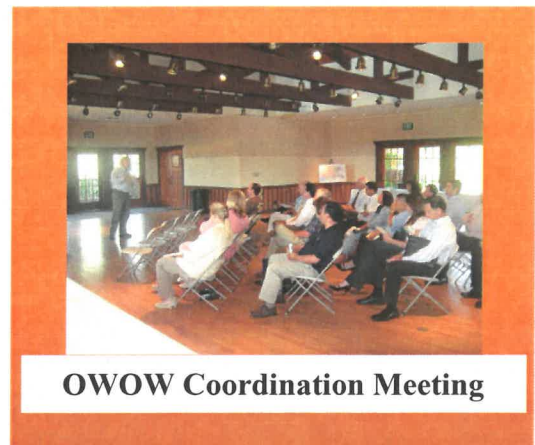
- *Presenting Uncertainty About Climate Change to Water Resource Managers, A Summary of Workshops with the Inland Empire Utilities Agency, Rand Corporation 2008*
- *Presentation of Uncertainty About Climate Change Modeling to SAWPA area, Presentation, Rand Corporation 2008*
- *Water Resources Plan, SAWPA Planning Department, June 1998, Chapter 6.9-Climate Change*

New models will not need to be developed; instead, an analysis that isolates the relationship between two parameters, such as air temperature levels (that were projected in the 2013 Basin Study) and fish population levels, will need to be implemented. The scope will include finding a relationship between two sets of observed data, such as air temperature and fish population. Using the forecasted air temperature levels from the 2013 study and the relationship between observed air temperature and observed fish population levels, the Basin Study Update will be able to forecast future fish population levels.

The Level of Support for the Basin Study Update and Diversity of Stakeholder that Will Be Involved

The OWOW process, at its core, is driven by the watershed approach, and the strong engagement of stakeholders. This truth is revealed in the “bottom-up” approach of the OWOW 2.0 planning effort and the 2013 Basin Study. By encouraging participation from different groups of people and those holding varying viewpoints from throughout the watershed, the capacity to reach larger numbers of stakeholders also grew. This process will continue with the Basin Study Update. SAWPA

staff has begun extensive outreach on the proposal to some of the water agencies in the watershed such as the flood control districts and wholesale water agencies. The upcoming Disadvantaged Community Involvement Program will extend the process to communities previously disengaged from watershed planning. The stakeholder engagement will continue throughout the process as the main goal of the Study is to produce an analysis that can be used by agencies and organizations throughout the watershed such as those interested in water quality, water supply, flood control,



OWOW Coordination Meeting

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greenhouse gas emissions, ecosystem health, tribal water rights, urban communities, rural communities, etc.

The Extent to Which the Proposed Basin Study Update Will Employ an Integrated Watershed Planning and Management Approach

The Basin Study Update will employ an integrated watershed approach by considering the relationship between different elements such as flood control and ecosystems as they are impacted by changes in climate that have been projected in the 2013 Basin Study. When implementing each of the analyses for the four key vulnerabilities, such as ecosystem health, the Basin Study Update will consider how the observed data have driven changes in the other parts of the watershed, such as water quality, flood control and urban water demand. Many relationships will be driven by hydrology, as water flows from the upper watershed to the lower watershed. A new awareness of relationships between water and land use agencies, and the role of transportation infrastructure on water resources must be brought inside watershed planning efforts, and the OWOW 2.0 plan update will be supported in this effort by the Basin Study Update. The integrated approach used during the 2013 Basin Study will support these new inclusions through the Basin Study Update process.

Basin Study Update Outline

The Basin Study Update outline is provided below by task. Each task will have a set of deliverables.

Task 1: Data Gathering and Collaborative Stakeholder Engagement

Sub-Task 1a: Review and update 2013 Basin Study data sources and data analyses as needed.

Sub-Task 1b: Collaborate with stakeholders to identify which community-based analyses would be most beneficial to their individual planning processes.

Sub-Task 1c: Work with stakeholders to identify data sets available for the community-based analyses while striving for at least one community per each of the four key vulnerabilities from climate change. Once identified create finalized plan of study.

Sub-Task 1d: Finalize MOU with Reclamation with plan of study.

Task 1 Deliverables: Finalized Plan of Study, MOU between Reclamation and SAWPA.

Task 2: Modeling and Analysis

Sub-Task 2a: Find the relationship between observed climate data, such as temperature, and observed data of interest for the community based analyses.

Sub-Task 2b: Use climate projections from the 2013 Basin Study, such as temperature, to project the values for the data of interest for the community based analyses. Use the

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observed data relationship that was extracted as part of Sub-Task 2a to project data values.

Sub-Task 2c: Perform an integrated watershed analysis of the outcomes projected from the community based analyses by finding interconnections due to hydrology, infrastructure, climate, etc.

Sub-Task 2d: Perform a spatial analysis of impacts projected under the 2013 Basin Study and the Basin Study Update to understand where in the watershed specific vulnerabilities should be addressed in planning and project implementation.

Sub-Task 2e: Perform an analysis where the four key vulnerabilities are ranked to the best extent possible by highlighting the magnitude of the projected impacts and the amount of stakeholders in the watershed that are affected such as urban communities, rural communities, tribal entities, water agencies, flood control agencies, etc.

Task 2 Deliverables: Modeling results and data summaries for the community based analyses, integrated watershed analysis of the projected impacts, ranking of the key vulnerabilities from 2013 Basin Study using the information generated as part of the Basin Study Update.

Task 3: Coordinate Planning on a Watershed Scale

Sub-Task 3a: Conduct an integrated gap analysis for the watershed to support stormwater resources planning and groundwater sustainability planning.

Sub-Task 3b: Develop a watershed approach for coordinating with the sub-basins that are not implementing stormwater resources plans and/or groundwater sustainability plans.

Sub-Task 3c: Coordinate the timing of other water and land use plan update cycles with OWOW 2.0 planning updates.

Sub-Task 3d: Incorporate the necessary locations, impacts, existing and future actions to address various water quality contaminants of nitrate, arsenic, perchlorate and/or hexavalent chromium contamination in the watershed in accordance with Assembly Bill 1249.

Sub-Task 3e: Ensure the updated OWOW 2.0 Plan reflects the latest water supply and demand projections and recent sub-regional resource plans such as the 2016 Inland Empire Utilities Agency Integrated Resources Plan, 2015 San Bernardino Valley Municipal Water District Upper Santa Ana River Watershed IRWM Plan, etc.

Task 3 Deliverables: Gap analysis for stormwater resources and groundwater sustainability planning, watershed coordination framework for implementing stormwater resource plans and/or groundwater sustainability plans, framework for supporting related planning cycles in the watershed, water quality analysis, updates to water supply and demand projections.

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Task 4: Stakeholder Engagement (Outreach)

Sub-Task 4a: Create an engagement plan and/or tools so the process and results of the Basin Study Update are accessible to diverse stakeholders across the watershed.

Sub-Task 4b: Share the OWOW 2.0 plan update and the Basin Study Update with diverse stakeholders and entities across the watershed.

Task 4 Deliverables: Engagement plan and/or tools, sign-in sheets and/or agendas for engagement events.

Basin Study Update Costs and Task Leads

The budget is provided below. Also shown is which agency will be the lead and provide the funding for each task (by percentage).

Basin Study Update Budget

Task	Task Description	Cost	SAWPA Share	Reclamation Share
<u>1</u>	<u>Data Gathering and Collaborative Outreach</u>	\$ 58,000	<u>60%</u>	<u>40%</u>
1a	Review and update	\$ 20,000	40%	60%
1b	Collaborate with stakeholders	\$ 15,000	100%	0%
1c	Identify data sets available	\$ 20,000	50%	50%
1d	Finalize MOU	\$ 3,000	50%	50%
<u>2</u>	<u>Modeling and Analysis</u>	\$ 548,000	<u>59%</u>	<u>41%</u>
2a	Find the relationship between data	\$ 250,000	5%	95%
2b	Use climate projections from Basin Study	\$ 135,000	5%	95%
2c	Perform an integrated watershed analysis	\$ 18,000	95%	5%
2d	Perform vulnerabilities analysis	\$ 130,000	95%	5%
2e	Rank vulnerabilities	\$ 15,000	95%	5%
<u>3</u>	<u>Coordinate Planning on a Watershed Scale</u>	\$ 157,000	<u>100%</u>	<u>0%</u>
3a	Conduct an integrated gap analysis	\$ 80,000	100%	0%
3b	Develop a watershed approach	\$ 50,000	100%	0%
3c	Coordinate planning cycles	\$ 10,000	100%	0%
3d	Coordinate water quality analysis	\$ 5,000	100%	0%
3e	Coordinate water supply/demand analysis	\$ 12,000	100%	0%
<u>4</u>	<u>Stakeholder Engagement (Outreach)</u>	\$ 35,000	<u>95%</u>	<u>5%</u>
4a	Create Outreach Plan	\$ 5,000	95%	5%
4b	Share Basin Study Update results	\$ 30,000	95%	5%
Total		\$ 798,000	n/a	n/a
	SAWPA Share	\$ 399,000		
	Reclamation Share	\$ 399,000		

Santa Ana Basin Study Update Proposal

Basin Study Update Schedule

The Basin Study Update schedule is provided below by task.

Task		Basin Study Update Schedule							
		2017				2018			
Task Description		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
<u>1</u>	<u>Data Gathering and Collaborative Outreach</u>								
1a	Review and update	█	█						
1b	Collaborate with stakeholders	█	█						
1c	Identify data sets available	█	█						
1d	Finalize MOU	█	█						
<u>2</u>	<u>Modeling and Analysis</u>								
2a	Find the relationship between data			█	█	█			
2b	Use climate projections from Basin Study			█	█	█			
2c	Perform an integrated watershed analysis						█	█	
2d	Perform vulnerabilities analysis						█	█	
2e	Rank vulnerabilities						█	█	
<u>3</u>	<u>Coordinate Planning on a Watershed Scale</u>								
3a	Conduct an integrated gap analysis	█	█	█					
3b	Develop a watershed approach	█	█	█					
3c	Coordinate planning cycles	█	█	█	█	█	█	█	█
3d	Coordinate water quality analysis	█	█	█	█	█			
3e	Coordinate water supply/demand analysis	█	█	█	█	█			
<u>4</u>	<u>Stakeholder Engagement (Outreach)</u>								
4a	Create Outreach Plan						█	█	█
4b	Share Basin Study Update results								█
Total		█	█	█	█	█	█	█	█

