

9.0 Data Management and Plan Performance/Monitoring



Managing water resources data at a watershed-wide level in a centralized and consistent manner, and providing access to this information to key stakeholders and the public at large is critical to the successful implementation of the Santa Ana Watershed Project Authority (SAWPA) One Water One Watershed (OWOW) 2.0 Plan. This chapter reports on the various methods and tools developed by SAWPA and others to monitor performance, manage data and provide new tools to support the implementation of the OWOW Plan. This includes a watershed assessment of how effectively progress is being made in achieving the OWOW 2.0 goals, objectives, and planning targets.

The results of the watershed assessment tool and reporting provides users with the status and trends in water resources, as well as the economic, ecologic and social systems that make up the watershed. This scientific, data-driven watershed assessment benefits local, regional, state and federal agencies and organizations by conveying a systematic, scientific evaluation of conditions developed for and presented to a wide-ranging audience. Integrated assessment and reporting of environmental and community conditions promote cooperative management and decision-making by increasing the public's awareness of regional conditions.

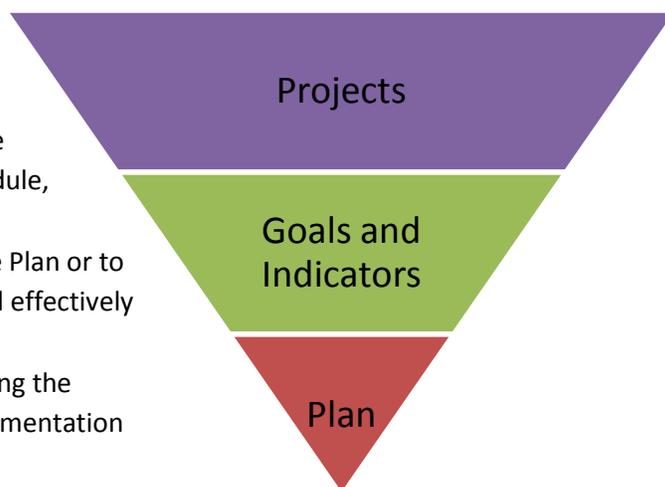
In addition, this report describes the mechanism for future plan evaluation and implementation and is designed to meet the Integrated Regional Water Management (IRWM) requirements for Plan Performance and Monitoring while also providing OWOW 2.0 with a mechanism for celebrating successes, drawing resources to challenges, and improving the health of the Santa Ana River Watershed (SARW). Properly managed data helps SAWPA, other agencies and stakeholders in the watershed

identify water quantity and quality issues, assess and develop potential solutions, quantify the anticipated impacts of these solutions, and measure the extent to which anticipated impacts materialize. In addition, having a single depository of data with a consistent format allows the sharing of information among stakeholders, and the integration of watershed data with other databases at the State level.

OWOW Plan Performance and Monitoring

Through OWOW 2.0, SAWPA has developed a process to evaluate and implement the OWOW 2.0 Plan. The intent of which is to:

- Ensure progress is being made toward meeting the objectives of the Plan
- Ensure specific projects identified in the Plan are being implemented as planned in terms of schedule, budget, and technical specifications
- Identify potential necessary modifications to the Plan or to specific projects, in order to more efficiently and effectively accomplish the goals and objectives of the Plan
- Provide transparency and accountability regarding the disbursement and use of funds for project implementation



This process includes performance measures (indicators) and monitoring to document progress toward meeting the OWOW 2.0 Plan goals. Monitoring will take place at two levels, the plan and individual implementation project. Linking the two are a set goals, each made up of a number of specific indicators.

It is anticipated that plan performance will be evaluated every three to five years. This is based upon a number of limiting factors including:

- The scale and complexity of the Santa Ana River Watershed
- Availability of data updates
- Window of time required to complete projects

Results of this, as well as future evaluations will be published by SAWPA in the OWOW Webpage, and will include the use of visual tools (i.e. dashboards) to show progress to date in achieving the plan goals.

Project Monitoring

The evaluation (rating and ranking) of projects, detailed in **Chapter 6 Project/Program Review, Evaluation and Prioritization**, is conducted through a multi-step process under the direction of the OWOW governance structure. Through this process projects of high value in achieving OWOW goals are identified to move forward for implementation and monitoring. The frequency of which this process for updating project ratings and rankings is conducted is based upon the availability of funding for projects. Projects implemented through OWOW are monitored through a Data Management System (DMS) maintained by SAWPA. This DMS is designed to ensure “lessons learned” from project-specific monitoring efforts will be used to improve SAWPA’s ability to implement future projects in the OWOW Plan. SAWPA has established a “datamart” with the State to link directly to the California Environmental Data Exchange Network (CEDEN) database to download data available for the SARW on a regular basis, and intends to expand this capability of other State databases as the opportunity becomes available. Additional tools to support the SAWPA DMS are described in detail in the Data Management section of this chapter.

SAWPA provides oversight on projects that are implemented through the Department of Water Resources (DWR) funding programs and require that project performance monitoring be developed and results reported as part of project implementation. The project’s proponents are responsible for data that is collected and provided to SAWPA and DWR as part of the regular reporting process. The project monitoring plans developed by the project proponents must include information on the following information.

- Parameter or constituent being monitored
- Measures to remedy or react to problems encountered during monitoring
- Location of monitoring
- Monitoring frequency
- Monitoring protocols and methodologies and responsible parties
- Data management process for tracking what is monitored
- Procedures to ensure monitoring schedule and processes can be maintained

Data Management Approach

The Santa Ana River Watershed (SARW) includes over a hundred municipalities and public agencies, and each municipality and agency is responsible for monitoring a wide range of parameters for many varied programs. SAWPA has directed each of these agencies to submit data to state agencies where appropriate and project performance data to SAWPA. The SARW Region has, therefore, determined that the focus should be on collecting the data already being provided by project proponents funded through the IRWM Program (and therefore already meeting DWR data requirements) and use of that data for the purposes of determining Plan Performance as described previously. Projects funded through the IRWM implementation funding programs are required to provide data from approved project performance monitoring programs in formats already consistent with the list of state agency databases

called out in DWR guidance. Therefore, the Region can ensure that the data provided can be effectively shared and used by the State and the Region's stakeholders.

SAWPA recognizes that a great deal of valuable data is collected from studies and projects not funded through the IRWM Program but which could benefit the Region and the State if made accessible. Therefore, SAWPA is working to expand the capabilities of a number of in-house tools to assist Regional stakeholders and agencies who wish to provide datasets to the Region through the IRWM Program, these datasets will be uploaded to the SAWPA database, but SAWPA would not be responsible for determining if these datasets meet DWR requirements nor for including the data into the Plan Performance assessment process. The region may, in the future, pursue additional funding to further enhance and grow the Region's DMS to fully include datasets from projects and programs not funded through the IRWM program.

Stakeholders contribute data through the projects funded by the IRWMP and are directed to input data into the appropriate state database. Additionally, stakeholders also contribute data through task force efforts such as the Lake Elsinore and Canyon Lake Nutrient Total Maximum Daily Load (TMDL) Task Force and the Middle Santa Ana River Pathogen TMDL Task Force.

Data that were not required to be submitted to state database but are deemed important are placed in SAWPA database and are made accessible through web tools, maps and tables. This database is reviewed by SAWPA staff and routinely backed up. Data quality is corrected through the use of spatial queries and then displayed through maps and tables. Anomalies are easily spotted and corrected by data submitters and SAWPA staff. Outside consultants, often added for their expertise on a particular project, add another set of eyes to the data.

The data that are submitted to the State through databases such as CEDEN as well as the SAWPA database, are available through web tools and data requests. These web tools combine tabular data with spatial data and allow the user to view the information on a map of the watershed. Many of the tools provide a quick method of analysis by providing a map with features that may be colored by a value or a chart on top of the map showing a value over time. Data that has been uploaded to the State per contract is available through a number of tools that use a weekly connection to CEDEN database which provides a very up-to-date view of the data. Data compatibility with State databases is exceptionally high due the feedback loop caused by using web based tools displayed near real time submitted data.

OWOW Plan Monitoring

There are a number of ongoing monitoring programs that are collecting data in the Region to support the OWOW Program. Current pertinent monitoring activities in the Region are described briefly below.

Lake Elsinore and Canyon lake Nutrient TMDL

The Lake Elsinore and Canyon Lake Nutrient TMDL Task Force is comprised of local stakeholders seeking to address the nutrient TMDLs defined by the Regional Board for two impaired water bodies in the San Jacinto River Watershed – Canyon Lake and Lake Elsinore. This Task Force was organized and formed by

SAWPA and LESJWA to address water quality targets in a cost effective manner among over 20 agencies and coalitions, including Federal, State, and local agencies. The Task Force meets monthly and includes representatives from local cities, Riverside County, agriculture and dairy, environmental groups, as well as the regulatory community. At the request of the Regional Board, SAWPA served as a neutral facilitator for the early TMDL development process for Lake Elsinore and Canyon Lake.

Middle Santa Ana River Pathogen TMDL

The Middle SAR Pathogen TMDL Task Force is a collaborative effort of public and private sector agencies and interests focused on the development of pathogen TMDLs for SAR Reach 3, its tributaries, and other water bodies in the Chino Basin area. Formed in 2007, the Task Force has been working on several pathogen-related activities and studies for the Chino Basin. The objectives of this Task Force are to implement a number of tasks identified by the Regional Water Quality Control Board (RWQCB) in their 2005 Amendment to the Basin Plan. These include the implementation of a watershed-wide monitoring program to assess compliance with REC-1 beneficial use water quality objectives for fecal coliform, evaluate numeric targets established for *E. coli*, and identify and implement measures to control sources of impairment. The Task Force works with the Regional Board in the formulation of pathogen TMDL allocation and implementation strategies. SAWPA serves as the neutral facilitator and administrator of the Task Force.

Urban Water Management Plans

The Urban Water Management Planning Act (UWMP Act) requires that planning projections be evaluated over at least a 20 year period. Most of the agencies within the watershed projected their demands for a 25 year period ending in 2030. This report provides the actual water demands for 2005 along with the water demand projections through 2030. Water demands within the watershed are met through a combination of both local and imported water supplies. Local resources include precipitation in the form of snow pack, surface flow and groundwater. Imported resources for the Watershed are primarily from the Colorado River Aqueduct (CRA) and the State Water Project (SWP). UWMP's evaluate scenarios that help prepare for water supply reliability the Watershed assuming a multi-year drought.

Technical Analysis

In addition, there a vast amount of data utilized in the creation of the OWOW 2.0 Plan, which are not directly reported to the State. This data and technical information is used to develop the water management needs in the OWOW 2.0 Plan. The data collected is considered adequate for the needs of developing the OWOW plan in representing current conditions, the scope of historical highs and lows and future forecasts and projections. **Table 9.1** identifies the studies, models and other data sets used to create tables, charts and graphics throughout the OWOW Plan.

Table 9-1 Source Material Used for OWOW 2.0 Technical Analyses

Data or Study	Analysis Method	Results	Use in IRWM Plan	Source
Tribal Communities	Spatial Analysis	Percent of Tribal Communities in the Watershed	Map of Tribal Communities	Southern California Association of Governments (SCAG)
Disadvantaged Communities	Spatial Analysis	Percent of Disadvantaged Communities in the Watershed	Map of Disadvantaged Communities	SCAG
Groundwater Management Zones	Groundwater Supply/Quality/Storage	GW Management Zone, Water Quality and available storage mapping	Map of GW management zones	RWQCB, Santa Ana Basin Plan
Watershed Land Use	Spatial Analysis/Land Use Trends	Spatial representation of available regions for groundwater recharge	Map of land use in the SARW	SCAG
Critical Habitat	Habitat/Spatial Analysis	Spatial representation of critical habitat	Map of critical habitat in the SARW	Various Agencies
Population	Population Projections	Projected Populations for the watershed until 2035	Map of population density in the SARW	SCAG
Flood Control Facilities	Spatial/Stormwater Capture Analysis	Stormwater Capture mapping	Map of flood control infrastructure in the SARW	Various Agencies
Groundwater Recharge Facilities	Recharge Opportunities/Spatial Analysis	GW recharge mapping	Map of GW recharge facilities and opportunities in the SARW	Various Agencies
Constructed Wetlands	Habitat/Stormwater Recharge Analysis	Habitat Area/Stormwater	Map of Constructed	Various Agencies

Data or Study	Analysis Method	Results	Use in IRWM Plan	Source
		Recharge Opportunities	Wetlands in the SARW	
Recycled Water Facilities	Spatial/Water Quality/Water Supply Analysis	Locations and dischargers along the SAR	Map of recycled water facilities in the SARW	Various Agencies
Agency Service Area	Spatial Analysis/Population Projections	Mapping of Agency Service Areas and Boundaries	Map of Agency Service Areas in the SARW and surrounding areas	UWMP/Retail Agencies
Watershed Delineations	Spatial Analysis	Sub-Watershed delineations within the SAR	Used in evaluation of more focused planning	Various Agencies
Desalination Plants	Spatial Analysis/Desalination Capacities/Quality	Mapping of Desalination Plants	Map of Desalination Plants in the SARW	Various Agencies
Regional Infrastructure	Spatial Analysis/Water Supply Analysis	Mapping of Regional Water Infrastructure and Supply Opportunities	Map of Regional Infrastructure and the outlets in the SARW	Member Agencies
Surface Water	Water Quality/Spatial Analysis	Mapping of Surface Water	Mapping of surface water sources in the SARW	RWQCB, Santa Ana Basin Plan
Imported Water Infrastructure	Spatial Analysis/Economic Impacts	Mapping of Metropolitan Water District (MWDSC) Imported Water Infrastructure	Mapping of MWDSC Imported Water Infrastructure in the SARW	MWDSC Regional Plans
Fault Lines	Spatial Analysis/Infrastructure Risk Analysis	Mapping of fault lines with water infrastructure	Mapping of fault lines and water infrastructure	US Geological Survey (USGS)
Delta Smelt Impacts	Water Supply Projections	Projections of water supply affected by the	Water import projections for Chapter 5.4	MWDSC

Data or Study	Analysis Method	Results	Use in IRWM Plan	Source
		Delta Smelt impacts		
Impaired Water Bodies (303-D List)	Water Quality Analysis	Mapping of impaired water bodies in the SARW	Mapping the impaired water bodies in the SARW	303-D List
TMDL Projects	Water Quality Analysis	Mapping of TMDL projects in the SARW	Map of TMDL Projects in the SARW	Various Agencies
Invasive Species	Habitat/Spatial Analysis	Mapping of areas affected by Invasive Species	Map and analysis of the effects of invasive species	Santa Ana Watershed Association (SAWA)
Water Quality Objectives	Water Quality Analysis	Mapping of water quality objectives in the SARW	Map and analysis of water quality objectives.	RWQCB, Santa Ana Basin Plan
Seawater Intrusion Zones	Water Quality/Spatial/Water Supply /Projections	Mapping of basins in danger of Saltwater Intrusion and the effects on supply	Map and analysis of potential seawater intrusion zones	Orange County Water District (OCWD)
Dam Locations	Spatial Analysis	Mapping of dams and weirs	Maps and sediment loading potential regarding dams	Various Agencies
Santa Ana River Trail	Habitat/Recreational Spatial Analysis	Mapping of recreation opportunities along the SAR	Map of the Santa Ana River Trail	Various Agencies
Temperature	Climate Analysis	Mapping of temperature zones throughout the SARW	Map and analysis of temperature data throughout the SARW	U.S. Bureau of Reclamation (Reclamation)
Groundwater Plume Maps	Spatial Analysis/Water Quality Analysis	Mapping of contaminated GW due contamination plumes	Map and analysis of contaminated groundwater basins/plumes	Various Agencies

Plan Performance and Project Support Tools

SAWPA has developed a number of tools to facilitate the evaluation, dissemination and integration of data to track plan performance as well as new tools to support project proponents in collaboration and evaluating multiple resources necessary to develop new regional projects. The emphasis of tool development is to support the achievement of the OWOW plan objectives at both the plan and project implementation levels. Most of these tools were developed in-house by SAWPA staff. However, several tools also reflect the collaborative work of SAWPA and others. The watershed assessment tool was developed by SAWPA working closely with the Council for Watershed Health and Dr. Fraser Shilling, UC Davis. New project support tools to support climate change adaptation and mitigation were developed by the Reclamation, based on a funding partnership with SAWPA for the OWOW 2.0 Plan. The Reclamation tools were designed such that project proponents as well as the general public could evaluate the projected climate change impacts in the Santa Ana River Watershed as well as adaptation and mitigation measures to deal these changing conditions. It is anticipated that these tools can be effectively adapted to other IRWM regions and users across the State.

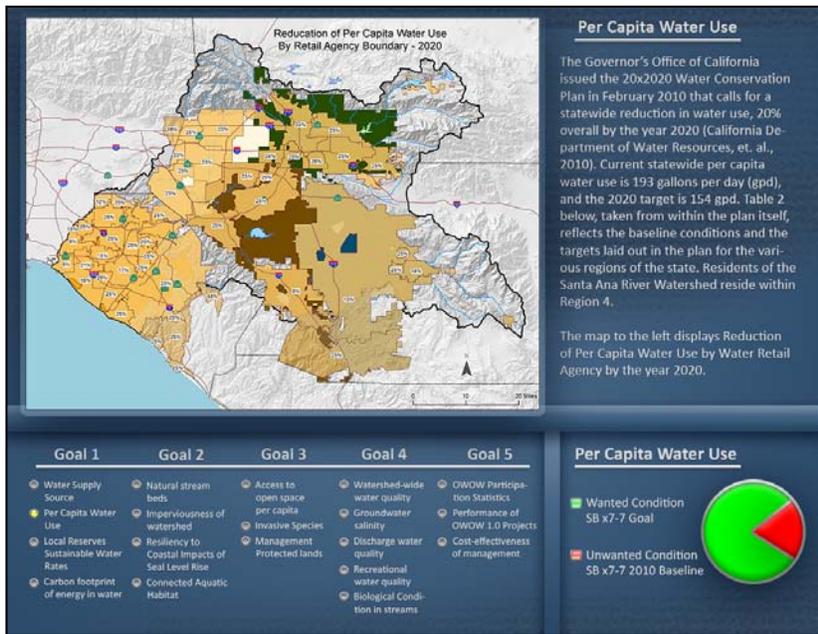
Many of the tools were designed to provide the user access to forms or data through graphical user interface (GUI) supported by Graphical information System (GIS) map layers and rely on the use of electronic reporting linked to a sequel database. It is intended that these tools will be further enhanced and expanded in the context of the OWOW Plan, as more and better data becomes available. With this information, SAWPA will be able to track the watershed's progress in meeting OWOW 2.0 goals, as well as, be responsive to opportunities to expand regional planning.

Watershed Assessment Framework and Tool

With the implementation of integrated projects and programs seeking to achieve a sustainable watershed, SAWPA early in the OWOW 2.0 planning scoping recognized the need for a common method of measuring progress on meeting the goals and objectives as well as the health of the Santa Ana River Watershed. SAWPA engaged the services of the Council for Watershed Health, a nonprofit organization, and Dr. Fraser Shilling of UC Davis to develop a watershed assessment framework for the Santa Ana River Watershed. Based on their experience with developing methodology for a Watershed Assessment Framework (WAF) using the Arroyo Seco watershed in the Los Angeles County and their work on developing a similar project for the State on the California Water Plan 2013 Update, the Council and Dr. Shilling were able to work with the Pillar workgroups to update the watershed management goals, establish planning targets or wanted conditions for the watershed and utilize data indicators or metrics from existing datasets or data collection efforts to track progress. With the input of SAWPA staff, a new tracking computer tool was created incorporating this work that will allow managers to evaluate and assess progress and assure actionable results for implementation.

SAWPA, working with their stakeholders, developed an interface to display the goals, indicators and results for SAWPA's OWOW 2.0 watershed assessment tool.

Figure 9-1 Watershed Assessment Tool



This interface provides the user a menu of watershed management goals and related indicators established for SAWPA’s OWOW 2.0 watershed assessment. The user can select from this menu indicators that were used in the watershed assessment. When an indicator is selected, the screen updates to provide an in depth evaluation of the indicator, data employed and watershed score.

The tool includes the following features:

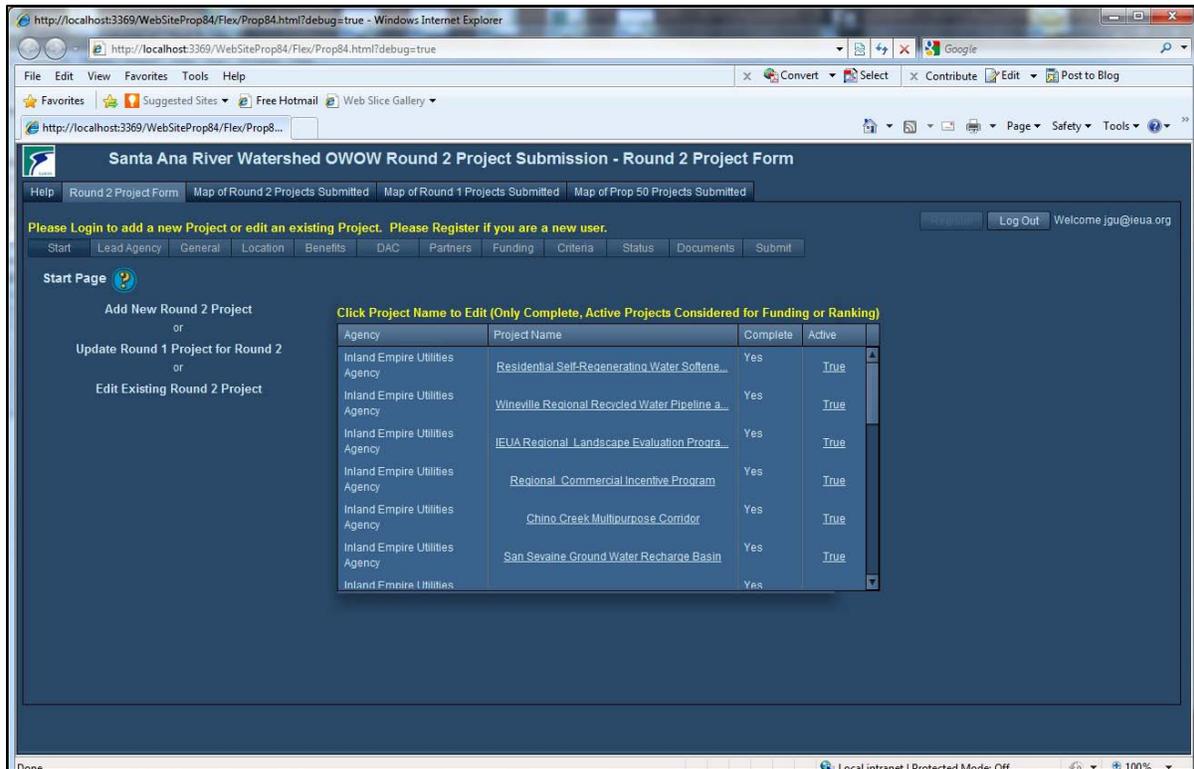
- Indicator narrative describing: What is it, Why it is important, Target or desired condition, Stress condition, Basis of calculation and use, What did we find out/How are we doing, How sure are we about our findings, Technical Information and Analysts
- Thematic map displaying the available spatial data
- Watershed assessment score

Using this assessment tool, SAWPA now has an effective, efficient and responsive ongoing monitoring program for the watershed. A report synopsis of the indicators selected for each goal, and what the analysis told us about the watershed is included in the **Appendix A**.

OWOW 2.0 Project Application Form

OWOW 2.0 Project Application Form was developed by SAWPA staff to provide stakeholders an on-line form for the submittal of project proposals for Proposition 84 Round 2 funding.

Figure 9-2 Project Application Form



The OWOW 2.0 Project Application Form includes key information required to address the goals of SAWPA’s OWOW 2.0 IRWM Program, as well as DWR’s Proposition 84 Round 2 grant program. Access to the form requires the user to register and the account is password protected.

Key information included in the form includes:

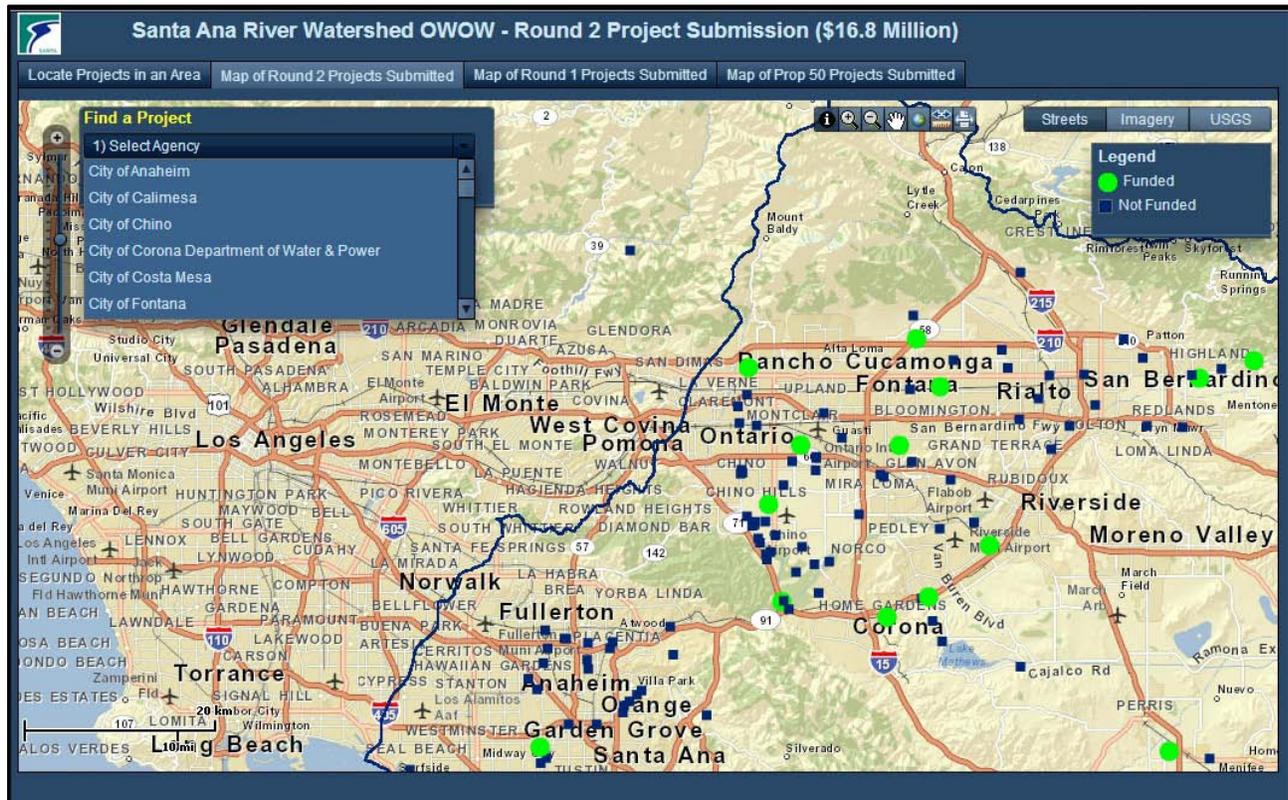
- Lead Agency Contact Information
- Project Location
- Project Benefits
- Disadvantaged Community and Tribal Support
- Project Funding
- Project Partners
- Project Status
- Attachments

Additionally, this on-line form provides the user the ability to import information from earlier proposal submissions.

OWOW 2.0 Submitted Project Map

OWOW 2.0 Submitted Project Map was developed by SAWPA staff to provide stakeholders a tool to identify and review other project proposals submitted for Proposition 84 Round 2 funding. In addition, the tool serves as a tool to assist project proponents with a tool identify potential project partners.

Figure 9-3 Submitted Project Map

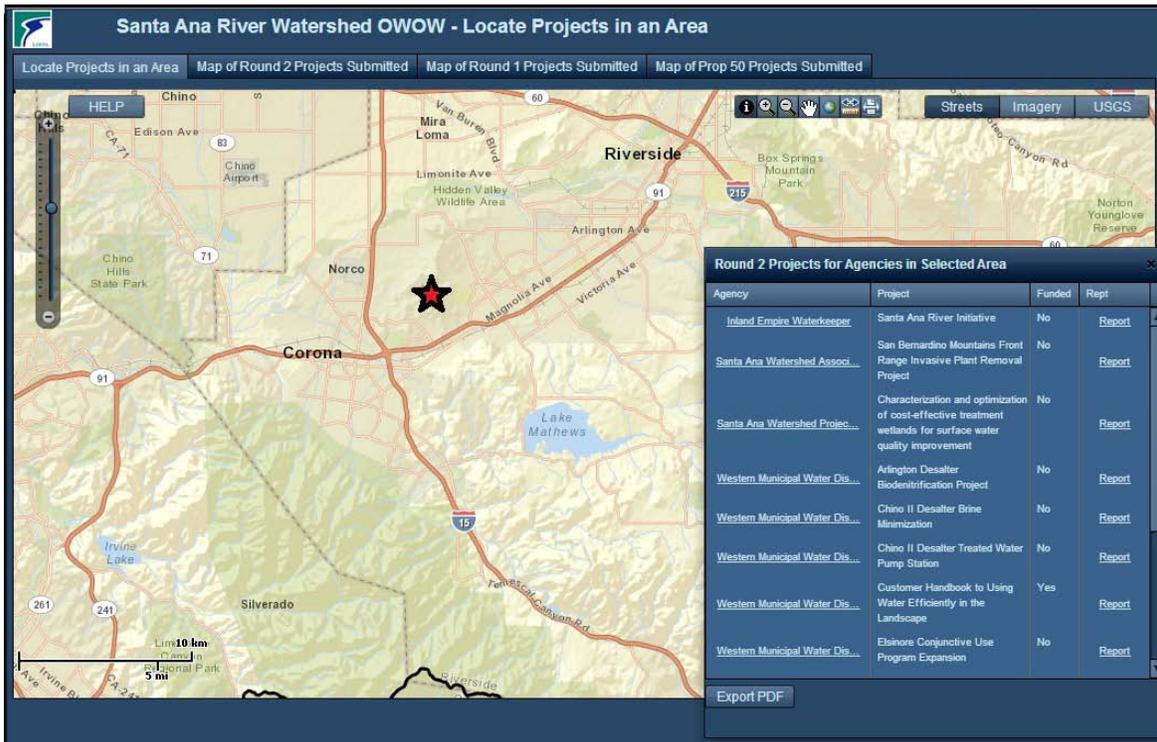


The Project Map identifies the location of each project submitted for Proposition 84 Round 2 funding. The user simply clicks on a project marker and a pop-up window is activated displaying a PDF copy of the completed OWOW 2.0 Project Application Form. Additionally, by hovering over a project marker, the user will be able to view the name of the project applicant.

OWOW 2.0 Project Partner Locator

OWOW 2.0 Project Partner Locator was developed by SAWPA staff to provide stakeholders a tool to identify potential project partners for the development of regional integrated watershed projects.

Figure 9-4 Project Partner Locator



The user simply clicks on the map and a pop-up window is activated displaying agencies whose service area overlaps the proposed project area.

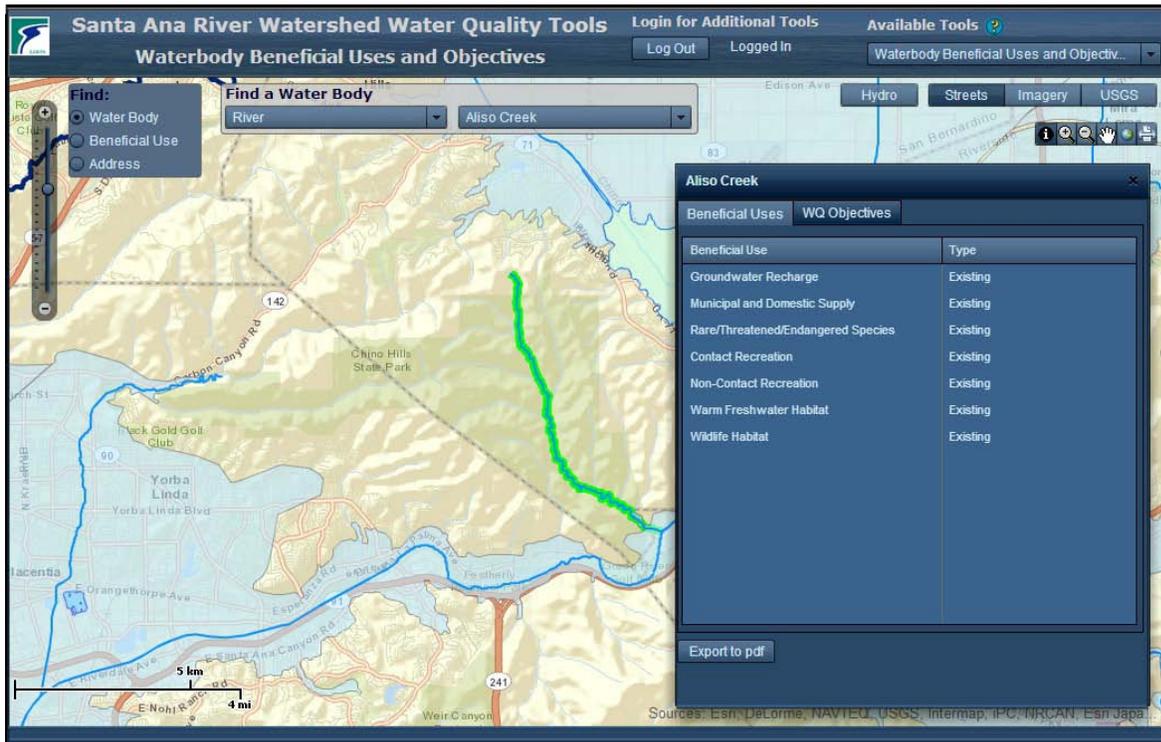
Santa Ana River Watershed Water Quality Tools

SAWPA partnering with the Santa Ana RWQCB and local stakeholders have developed a suite of tools to provide water planners and the public access to Basin Plan information relating to designated beneficial uses, water quality objectives and water quality data for waterbodies within the Santa Ana Watershed.

Waterbody Beneficial Uses and Water Quality Objectives

SAWPA partnering with the Santa Ana RWQCB has developed an interactive web application to explore hydrologic features and regulatory criteria established for waterbodies within the Santa Ana Watershed Basin Plan.

Figure 9-5 Waterbody Beneficial Uses and Objectives



This tool provides the user the ability to search a map of the Santa Ana River Watershed to identify a particular hydrologic feature, waterbody beneficial use or street address through a series of searchable menus or by simply clicking on a particular map feature.

Searching by waterbody type activates a set of pull-down menus. The first pull-down menu lists waterbody types including: bays, lakes, rivers, wetlands and groundwater management zones. The second includes a list of each named waterbody of that type identified in the Santa Ana River Watershed Basin Plan. When the user selects a waterbody, a pop-up window is activated displaying applicable beneficial uses and water quality objectives.

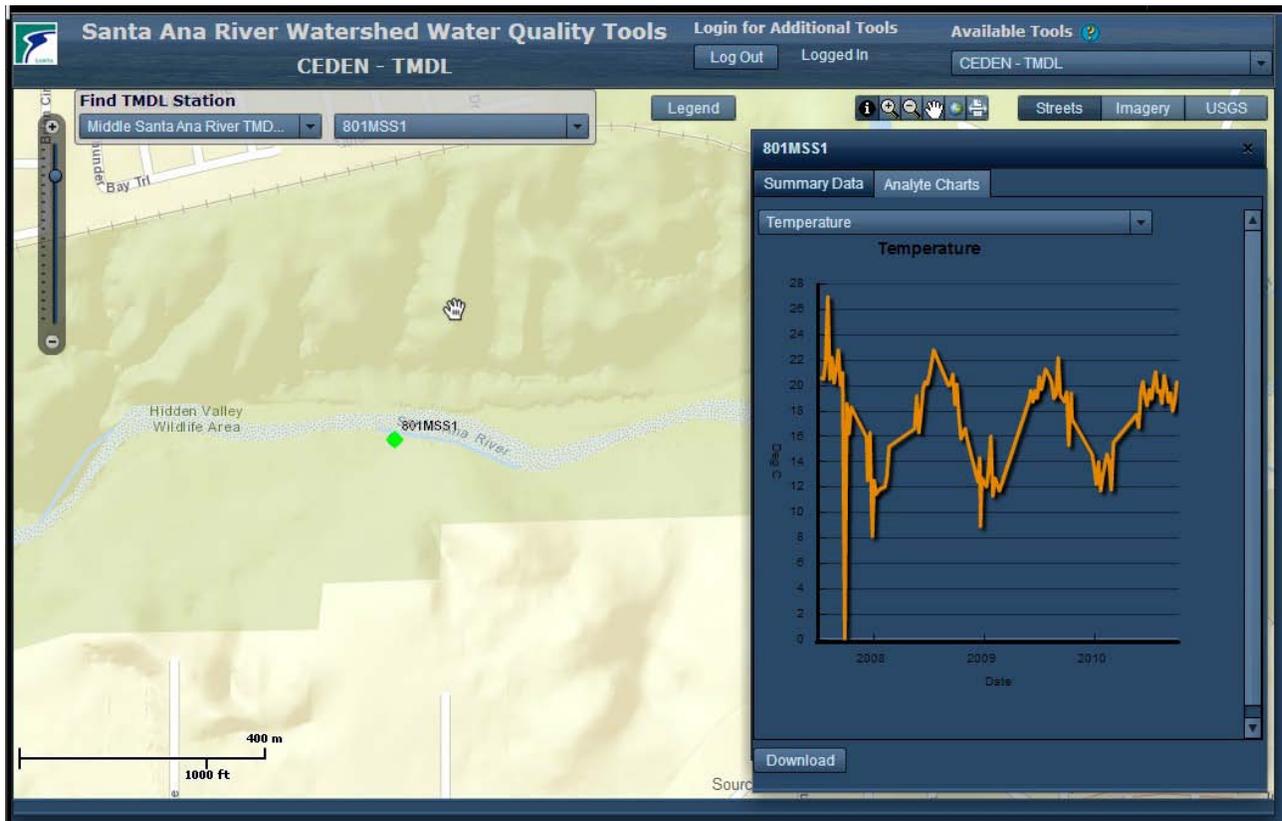
Searching by beneficial use activates a of pull-down menu of beneficial uses types identified in the Santa Ana River Watershed Basin Plan. When the user selects a beneficial use, each waterbody with that particular beneficial use is activated throughout the watershed. Selecting a waterbody activates a pop-up window displaying applicable beneficial uses and water quality objectives.

Additional features of this application include the ability to turn on/off waterbody features, export waterbody data to a PDF file, capture information from the screen and print to a PDF file, and multiple map backgrounds including: street map, satellite imagery and USGS quad.

Water Quality Monitoring Data Tool

SAWPA partnering with the Santa Ana Regional Water Quality Control Board has developed an interactive web application to examine surface water quality data for TMDL monitoring locations within the Santa Ana Watershed Basin Plan.

Figure 9-6 Watershed Water Quality Tools



This tool provides the user the ability to search monitoring locations by regulatory program through a series of searchable menus or by simply clicking on a particular monitoring location within the Santa Ana River Watershed. Current data available includes watershed-wide monitoring data collected through the Lake Elsinore and Canyon Lake nutrient and the Middle Santa Ana River pathogen TMDL programs. Data available in this application is updated on a weekly basis and served through a datamart connection established with CEDEN, managed by the California State Water Resources Control Board (SWRCB).

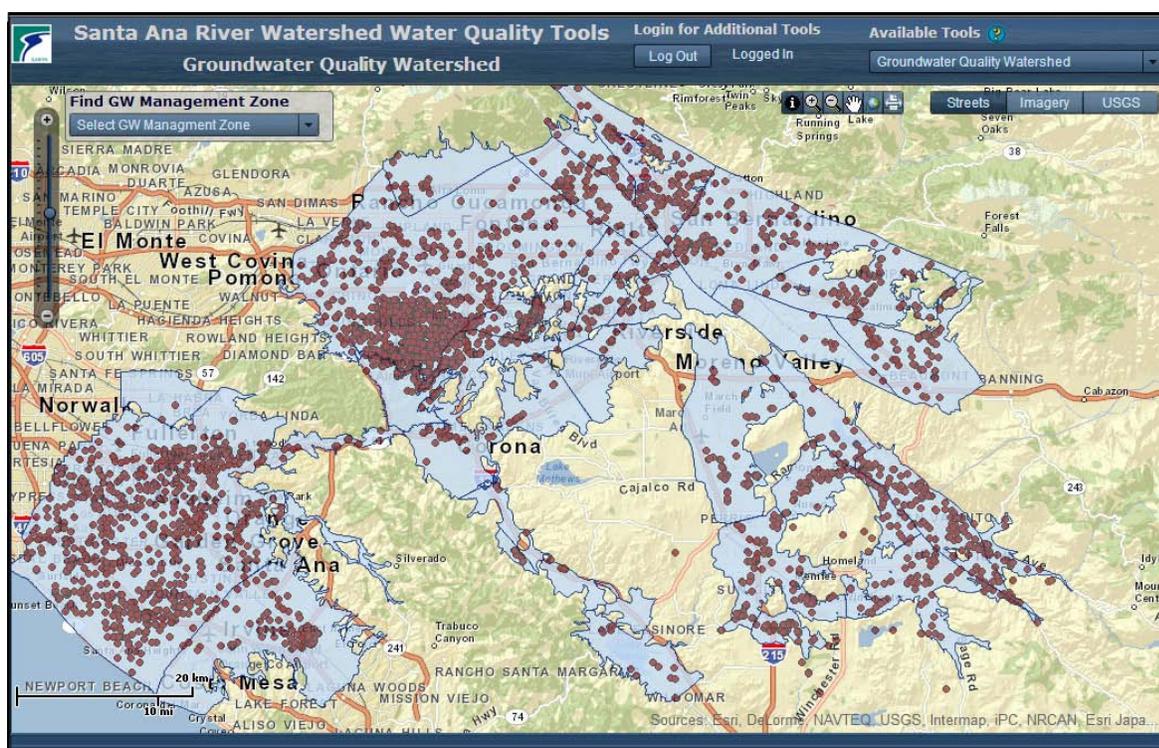
Searching by project activates a of pull-down menu listing regularly monitored stations. Selecting a particular monitoring station zooms the map to the selected location and activates a pop-up window with a series of tabs. The first tab includes a summary of available data collected at that monitoring location including: list of analytes, average result, unit of measure, number of samples and date range. A second tab includes a chart tool, which provides the user the ability to select an analyte from a pull-down menu to view available time series data graphically.

Additional features of this application include the ability to turn export waterbody data to a PDF file, capture information from the screen and print to a PDF file, and multiple map backgrounds including: street map, satellite imagery and USGS quad.

Ambient Groundwater Quality Tool

SAWPA partnering with the Santa Ana RWQCB has developed an interactive web application to examine summary groundwater quality data by groundwater management zones within the Santa Ana Watershed Basin Plan.

Figure 9-7 Groundwater Quality



This tool provides the user the ability to view groundwater quality data summarized by groundwater management zone as reported in the Recomputation of Ambient Water Quality in the Santa Ana River Watershed for TDS and NO₃-N for the past 20 year well data collection period. The user can examine summary groundwater management zone data through a searchable menu or by simply clicking on a particular Santa Ana River Watershed groundwater management zone. Selecting a particular groundwater management zone “zooms” the map to the selected location and activates a pop-up window with a series of tabs.

The first tab includes a summary of available data collected at that monitoring location including: list of analytes, average result, unit of measure, number of samples and date range. A second tab includes a graph of available TDS time series data plotted against its water quality objective. A third tab includes a

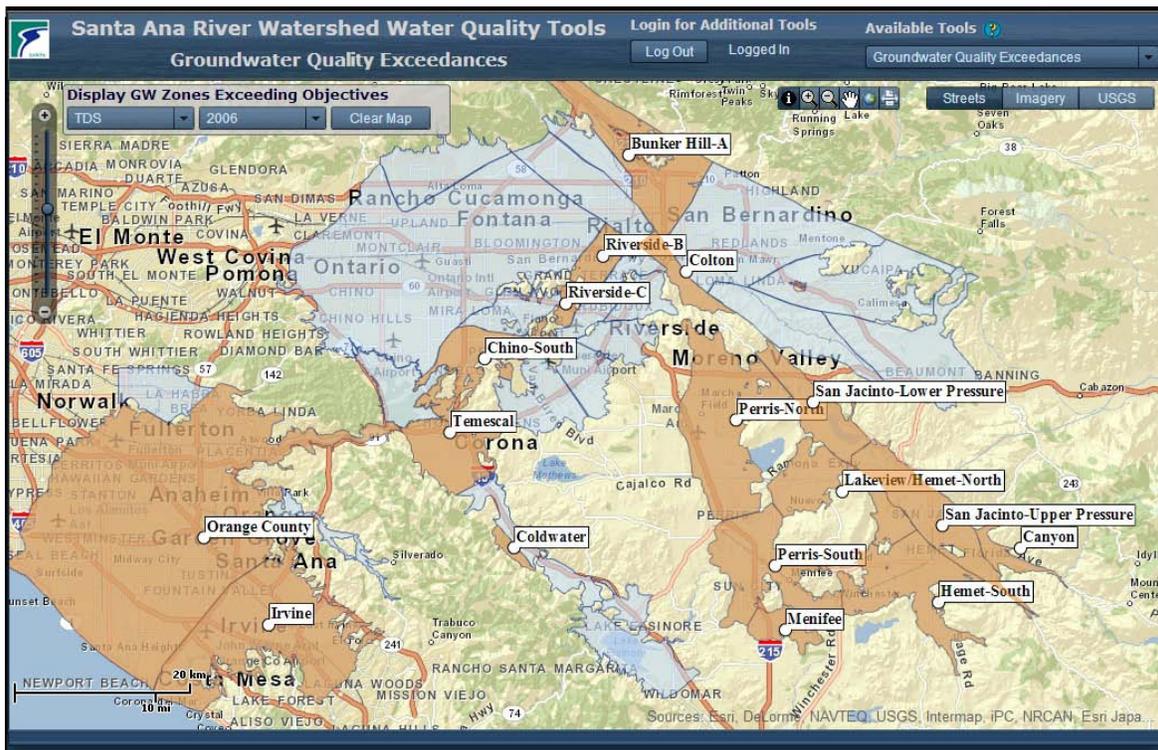
graph of available NO₃-N time series data plotted against its water quality objective. A fourth tab includes a chart tool, which provides the user the ability to select an analyte from a pull-down menu to view available time series data graphically.

Additional features of this application include the ability to turn export waterbody data to a PDF file, capture information from the screen and print to a PDF file, and multiple map backgrounds including: street map, satellite imagery and USGS quad.

Groundwater Basins Water Quality Modeling Tool

SAWPA partnering with the SWRCB has developed an interactive web application to examine exceedences to groundwater quality objectives for TDS and NO₃-N by groundwater management zone within the Santa Ana Watershed Basin Plan.

Figure 9-8 Groundwater Quality Exceedences



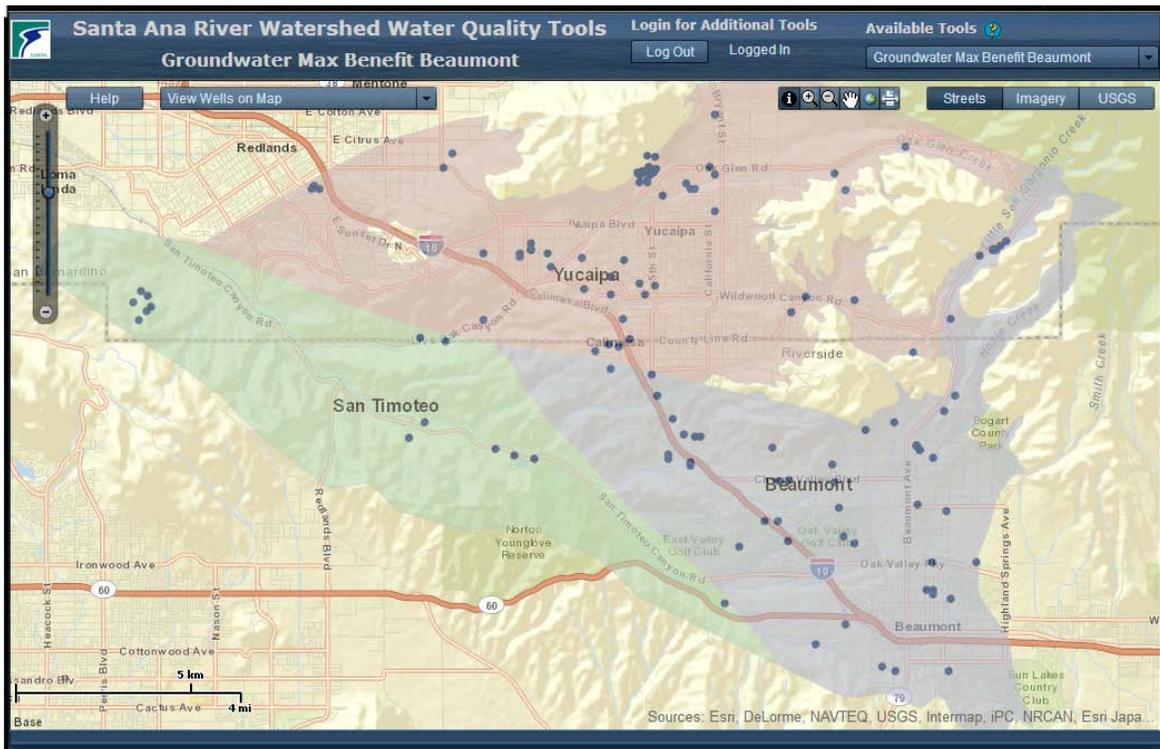
This tool provides the user the ability to view exceedences to groundwater quality objectives for TDS and NO₃-N as reported by the Triennial Recomputation of Ambient Water Quality in the Santa Ana Watershed Reports. The user can identify groundwater management zones exceeding groundwater quality objectives for TDS and NO₃-N through a series of pull-down menus by selecting between TDS and NO₃-N and then selecting a year. After the selections are made, the map refreshes highlighting and naming the groundwater management zones with exceeding the selected groundwater quality objective for the selected year.

Additional features of this application include the ability to turn export waterbody data to a PDF file, capture information from the screen and print to a PDF file, and multiple map backgrounds including: street map, satellite imagery and USGS quad.

Groundwater Basins Maximum Benefit Water Quality Modeling Tool (DRAFT)

SAWPA partnering with the Santa Ana RWQCB is working to develop an interactive web application to examine exceedences to the max benefit groundwater quality objectives for TDS and NO₃-N in the Beaumont groundwater management zone within the Santa Ana River Watershed.

Figure 9-9 Groundwater Maximum Benefit



This tool provides the user the ability to examine water quality relating to max benefit groundwater quality objectives for TDS and NO₃-N for the Beaumont groundwater management zone as reported in the 2011, Recomputation of Ambient Water Quality in the Santa Ana Watershed for the Period 1990 to 2009. A pull-down menu provides the user the following options to evaluate well data in the Beaumont groundwater management zone.

NO₃-N Exceeding BU Objective – highlights wells exceeding the max benefit groundwater quality objective NO₃-N in the Beaumont groundwater management zone

NO₃-N Concentration Range – view provides a color ramp of NO₃-N water quality for all wells

TDS Exceeding BU Objective – highlights wells exceeding the max benefit groundwater quality objective TDS in the Beaumont groundwater management zone

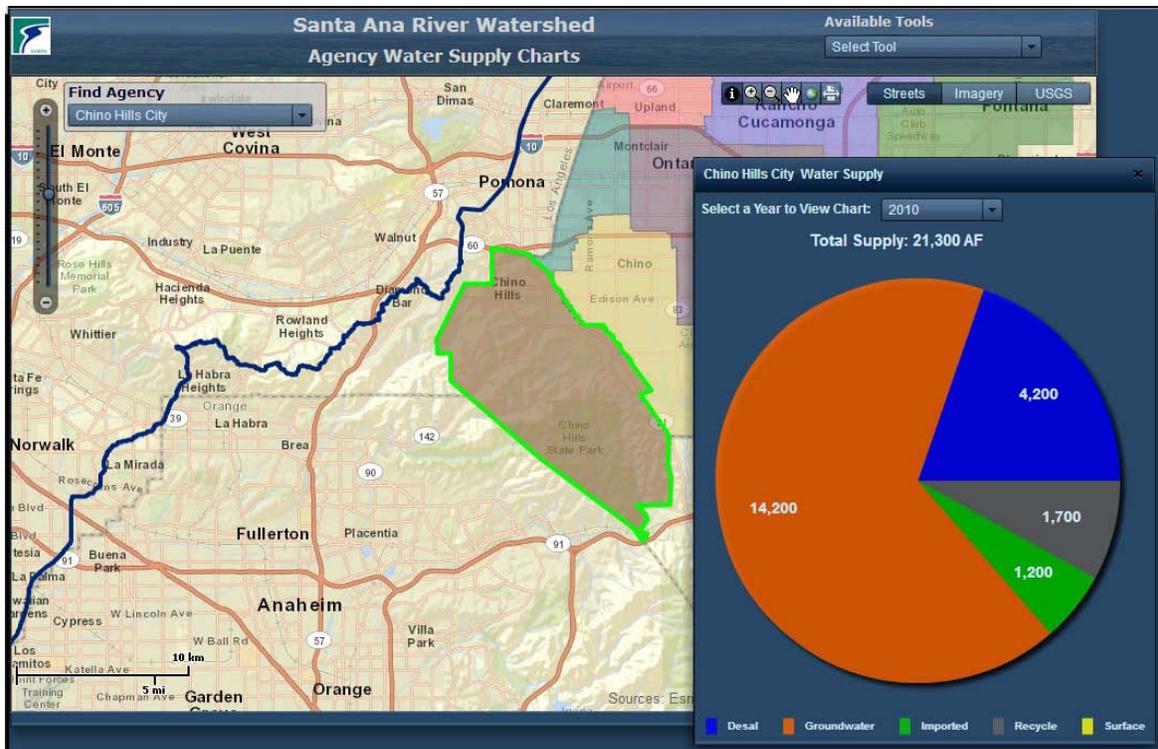
From any of these views, the user can select a highlighted well. This zooms the map to the selected location and activates a pop-up window displaying a summary of TDS and NO3-N water quality data.

Additional features of this application include the ability to turn export waterbody data to a PDF file, capture information from the screen and print to a PDF file, and multiple map backgrounds including: street map, satellite imagery and USGS quad.

Pilot - Water Resource Management Tool

SAWPA partnering with DWR and Esri is working to develop an interactive web application to review and analyze water resources data for water purveyors operating in the Santa Ana River Watershed.

Figure 9-10 Agency Water Supply Charts



This tool will provide water planners a tool to assess data related to various sources of water supply, and water use, as well as, a number of other related water resource information for the Santa Ana River Watershed. This includes the ability to display, explore and analyze water resources data at a number of levels (agency, basin, watershed) and management scenarios projected over a 20-year planning horizon. The tool is anticipated to be on-line in 2014.

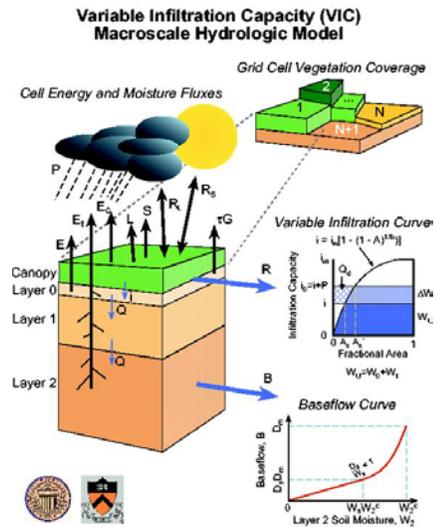
The completed tool will consider the following components:

- Water Retailers and Wholesalers

- Imported Water
- Groundwater withdrawals and recharge
- Water recycling
- Wastewater flows
- Conservation
- Surface withdrawals
- Water Use
- Planned Water Resource projects

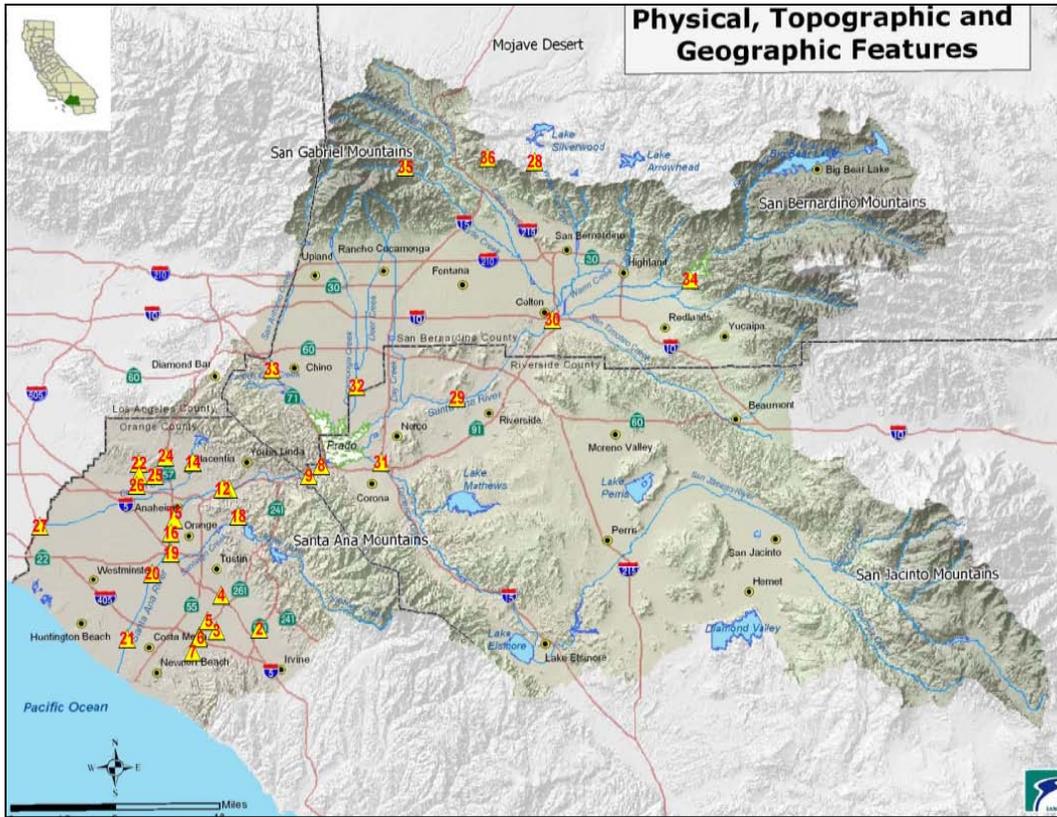
Climate Change Model

A partnership between SAWPA and Reclamation has produced an interactive climate change modeling tool to provide water planners with information on potential impacts of climate change within the Santa Ana River Watershed. The main objective of this particular tool is to develop a simplified modeling framework for evaluating climate change impacts on surface flows, temperature, snow melt, storm flow and groundwater levels and to apply this framework to evaluate potential impacts of climate change as well as mitigation/adaptation alternatives. The Climate Change tool enables the user to explore, identify and download custom climate change data for various scenarios modeled for the Santa Ana River Watershed. Recognizing the importance of potential impacts of climate change in the future, the tool will allow planners to foresee possible issues avoiding misallocation of resources and funds.



While this tool proves to be very useful to agencies within the Santa Ana River Watershed there are still some steps that Reclamation and SAWPA are taking in order to make it even more effective. This includes data refinement, model refinement, cross validation, and sea level rise information. All of these steps target any future issue or potential impact that climate change might have within the Santa Ana River Watershed.

Figure 9-11 Physical, Topographic and Geographic Features within the SARW



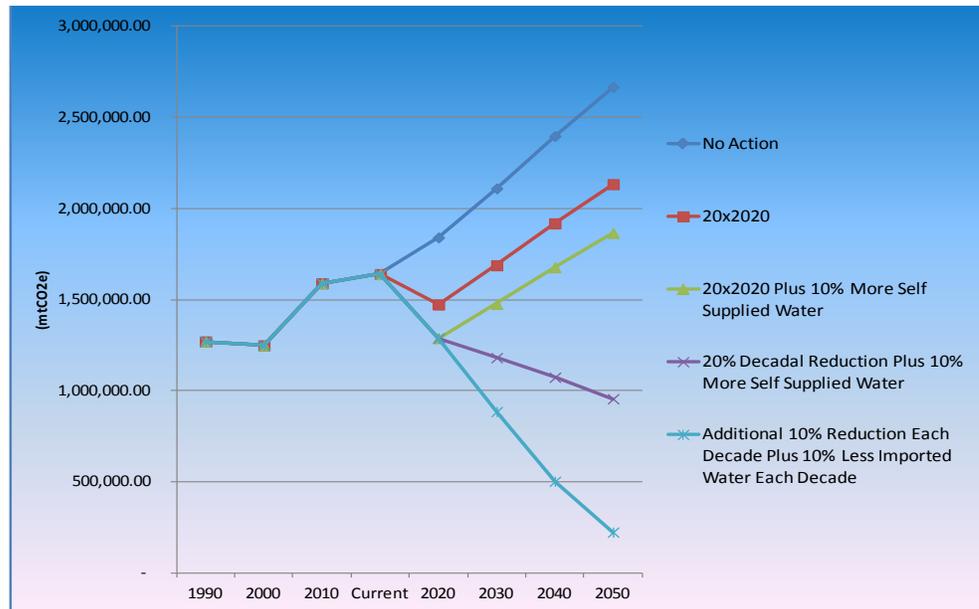
Green House Gas Modeling Tool

Reclamation, working with SAWPA, developed an interactive green house gas emissions modeling tool to provide water planners and the public information about the impacts of green house gases on water resources within the Santa Ana Watershed. This tool enables the user to explore, identify and download custom green house gas data for a suite of water technologies modeled for the Santa Ana River Watershed. It will also exhibit energy consumption in the delivery and treatment process with relation to water. In accordance with AB – 32 (Assembly Bill) which requires regions within California to reduce their overall GHG emission, the tool also evaluates both the supply and demand of water in the Santa Ana River Watershed. This tool will prove to be very useful within the watershed because it allows agencies and SAWPA alike to use the calculator for different types of scenarios which can be used to compare each outcome and result. Further, the tool can be adapted to individual projects and is anticipated for use in future GHG emissions calculations by project proponents

Figure 9-12 GHG Emissions Scenario Comparison

Groundwater Basins Water Quality Modeling Tool

In partnership with SAWPA and Reclamation, an interactive groundwater modeling tool was developed to allow planner and other entities to identify potential impacts of climate change on groundwater



resources within the Santa Ana River Watershed. The tool will enable the user to explore, identify and download groundwater data for various climate change scenarios modeled for the Santa Ana River Watershed. This data includes but is not limited to groundwater elevation, basin-average precipitation and potential ET, stream flows, M&I demand, agricultural demand, and augmented supplies. Utilization of this tool provides many different types benefits, the user is able to apply information the project might need in order to account for any future climate change scenarios. This is an important part of the project process, since an agency/public is able to identify problematic situations now they will be able to avoid or deal with them in the future. This tool at this time reflects four general groundwater management regions as defined by DWR for the watershed and is currently still under development.

OWOW Watershed Outreach Tools

SAWPA's technical approach for public outreach required a broad application of current technologies due to the difference in skill sets of the watershed audience. The demographics of this audience ranged from users who relied on the telephone (land line) for information to mobile users comfortable with Twitter. The middle ground in regards to user's technology comfort zone was the web itself. SAWPA's approach relied on three distinct technologies, the Web, Email, and Telephony, to best meet the user's abilities to receive information.

The Web provided SAWPA with several avenues of outreach. The first avenue being SAWPA's own website and SAWPA's ability to quickly modify and create pages dedicated to the OWOW process. Even the home page provided immediate announcements and directions for further information. The second avenue was a Water Blog linked to the SAWPA home page that provided additional information on a wide range of water topics, often supporting current issues or related projects. The third avenue was allowing users access through the web to project forms, project reports, and interactive GIS Tools. This

provided users with additional information on all projects and water issues thru these reports and the use of the GIS Tools. The fourth avenue was providing profile sites for users to locate SAWPA and the OWOW planning process on Facebook and LinkedIn.

Telephony provided watershed users with the ability to dial in and provide input to many of the OWOW meetings that occurred at SAWPA. The use of a free audio bridge along with web enabled presentation tool allowed users to call in anywhere in the watershed and participate in the planning process. On the mobile side, the use of Twitter provided users with quick announcements and links to recently published documents, invitations to events, and current projects in the watershed.

These methods of outreach provided the multifaceted audience with up-to-date information while using technology they were comfortable with. Technology use and its methods are constantly being reviewed during the OWOW process and will be updated to further increase the watershed audience.

SAWPA's social media tool kit could include:

- Home base (Water Blog)
- Social conversation site (Twitter)
- Social profile site (Facebook) (B2C)
- Business profile (LinkedIn) (B2B)
- Search Tools (i.e., Google Blogs search or Technorati)

As efforts in a particular area grow, additional tools may need to be added (i.e., listening, social bookmarking, and photo sharing tools).

Other Social Outreach Tools

Watershed-Wide Master Calendar

The Watershed-wide master calendar was launched on January 15, 2012. Information about the watershed-wide calendar was sent out to the entire OWOW Constant Contacts data base announcing the new watershed-wide calendar and inviting outside agencies to post their agency's events onto this interactive master regional calendar. Participants may obtain passwords to input their events by contacting the IT Department.

As further refinements are made, the calendar will contain links to the respective agencies' websites (i.e., download registration information etc.) thus creating a helpful resource tool to all stakeholders. It is intended that the calendar will be a "go-to" place to check out watershed-wide events. Event postings will be promoted through in Linked In, Twitter, and Facebook posts every time an announcement or significant event is added.

In the early stages of development and implementation, most likely SAWPA staff will need to add and monitor the events on this calendar until outside interest and momentum are deemed acceptable and the calendar becomes self-sufficient. If this step is overlooked, the calendar's possible fate could be jeopardized immediately after launching. It is important to designate a staff member to monitor and remove outdated events that outside event planners do not remove. This staff member should monitor on a weekly basis posted events and remove any outdated events.

This tool will be in addition to the normal SAWPA in-house events/meetings calendar already posted on the SAWPA website.

Mass Emails

Mass emails are authorized by the General Manager prior to release. Every time a mass email is sent, Constant Contact provides an opportunity to send out that same message as a social media message concurrently to Linked In, Twitter and Facebook by utilizing Constant Contact's "Simple Task" option. This additional option should be incorporated as "normal" procedure when sending out future mass emails. By sending social media messages when sending out mass emails, SAWPA's social media presence could be further enhanced.