OJAI BASIN GROUNDWATER MANAGEMENT AGENCY GROUNDWATER MANAGEMENT PLAN – 2017 UPDATE

Administrative Information

Introduction to Administrative Information

In September, 2014, Governor Jerry Brown signed into law a package of three bills (AB 1739, SB 1168, and SB 1319) known as the Sustainable Groundwater Management Act ("SGMA"). The SGMA provides a framework for sustainable management of groundwater supplies by local authorities, with a limited role for state intervention only if necessary to protect the resource.

The act requires the formation of local groundwater sustainability agencies that must assess conditions in their local water basins and adopt locally-based management plans. The SGMA provides local agencies with the tools and authority to require registration of groundwater wells, measure and manage extractions, require reports and assess fees, and request revisions of basin boundaries, including establishing new subbasins.

High- and medium-priority basins, as defined by the State of California Department of Water Resources ("DWR"), must adopt groundwater sustainability plans within five to seven years, depending on whether the basin is in critical overdraft. Statewide groundwater basins are prioritized based on eight criteria: (1) overlying population, (2) projected growth of overlying population, (3) public supply wells, (4) total water wells, (5) overlying irrigated acreage, (6) reliance on groundwater as the primary source of water (7) impacts on the groundwater, including overdraft, subsidence, saline intrusion, and other water quality degradation, and (8) any other information determined to be relevant by the DWR.

The Ojai Basin Groundwater Management Agency ("OBGMA" or "Agency") has worked to preserve the quantity and quality of groundwater in the Ojai Valley Groundwater Basin ("Ojai Basin") for sustainable long-term use since the agency's establishment in 1991. Enabling Legislature is referred to herein as the "OBGMA Act." Since the OBGMA already performs many of the tasks required by the SGMA, and has demonstrated sustainable conditions for a 10-year period, the Ojai Basin is well suited to meet SGMA requirements by providing a Alternative Groundwater Sustainability Plan ("AGSP") under Section 10733.2. To comply with this statute, the OBGMA issued it's "Report Supporting Alternative Demonstration of Groundwater Sustainability Made Pursuant to Water Code Section 10733.6(b)" in December 2016.

Per OBGMA Resolution No. 2014-4, adopted by its Board of Directors on December 4, 2014 (copy included as Appendix A), the OBGMA is designated as the Groundwater Sustainability Agency ("GSA") for the Ojai Groundwater Basin.

AGSPs must contain a physical description of the basin, including groundwater levels, groundwater quality, land subsidence, information on groundwater-surface water interaction, data on historical and projected water demands and supplies, monitoring and management provisions, as well as a description of how the plan will affect other plans, including city and county general plans. AGSPs will be evaluated every five years.

General Information

Management Plan Executive Summary

This GMP provides a plan to maintain operation of the Ojai Basin in a sustainable fashion with no undesirable results observed over the long term basin management period. In keeping with the SGMA requirements, the ten year period of 2006 to 2016 is presented as a key metric in demonstrating sustainable operations, though monitoring for the better part of the past century is recognized as valuable information as well. The driving force behind groundwater conditions in the Ojai Basin is precipitation as rainfall; groundwater levels, amount of groundwater in storage, surface water flow, well production, etc. are all tied to the unifying precipitation input component. A long term average safe yield of about 5,000 acre-feet per year is typically more than extracted via pumping over recent years.

OBGMA's 2017 GMP update is intended to serve as the third edition of a document originally issued in1993 and updated in 2007. By implementing key objectives in both previous editions, the OBGMA has established a cost efficient management structure and monitored the basin conditions accordingly.

Within the current GMP version, OBGMA uses its data sets and improved basin understanding, in a frame of reference reflective of watershed focus and statewide regulation, to continue on its five main management objectives that provide the structure to the OBGMA's management efforts:

1) Understanding the Basin
2) Controlling Exports; Protecting and Managing the Basin
3) Encouraging Supporting Activities
4) Effective Communication
5) Efficient Administration

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Agency Information

Agency Background

The OBGMA Board of Directors ("Board") consists of five members and their alternates. The five seats comprise representatives of each of the following entities: Ojai Water Conservation District, City of Ojai, Golden State Water Company, Casitas Municipal Water District, and the mutual water companies (Gridley Road Water Group, Hermitage Mutual Water Company, Senior Canyon Mutual Water Company, and Siete Robles Mutual Water Company). Regular attendance at each of the Board meetings is required to form a quorum and attend to Board activities. Figure 1 presents a map of the OBGMA area of purview with the various water agency boundaries.

Based upon the studies conducted by and for the OBGMA, and due to a relatively wet period from the mid-1990s through 2010, the water supplies and demands in the basin are largely in balance and capable of meeting the annual demands of overlying landowners and in-basin water users. However, after a series of dry years such as from 2011 to the present, water levels in some wells in the basin may decline to the point where an alternative water source must be used. In part, that is why water users presently import some 3680 acre-feet (1985 to 2012 average) of Lake Casitas water from the Casitas Municipal Water District ("CMWD") into the basin annually, or about half of the total irrigation demand.

If Lake Casitas water was not available or not used in a series of dry years, considering the present understanding of the hydrology of the basin and the existing water uses, a number of negative consequences are possible. These include shallower and peripheral wells would probably not produce water, pumping lift costs to pump groundwater would be excessive, some wells would produce excessive amounts of sand, water quality of pumped groundwater would likely be compromised, and other detrimental effects associated with a reduced storage in the Ojai Basin.

Through the agency's efforts, many stakeholders better understand these conditions, and the importance of conjunctive use in action, whereby groundwater is used when available and Lake

Casitas water is relied upon when basin storage is minimized. This practice has a somewhat self-regulating effect on the Ojai Basin, as the charges for purveyor water encourage conservation and good stewardship of the groundwater resource.

Therefore, the focus of the Agency's efforts is on protecting and preserving the basin groundwater resource for in-basin use, and guarding against export of water from the basin.

Two critical facts underline the importance of the OBGMA and this groundwater sustainability plan.

> **Chronic drought is a climatic reality**. Over the last 100 years there were several serious droughts, and climate change may bring an increase in the frequency and intensity of years with below the historic average rainfall. Local precipitation, the only source of water in the Ventura River watershed, is predicted by several models to decrease in annual averages. Extended periods of drought are likely.
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> **The Ventura River watershed is depended upon by numerous competing interests**. Most water allocated to the various water purveyors in the watershed is already claimed. It has been predicted that the Lake Casitas could go dry in a long-term drought. Existing wells already in the Ojai Basin are producing groundwater at a rate that is considered to be at or near the safe yield of the basin, and it is predicted (with historical precedence) that in a long term drought a significant number of the existing wells will go dry. Stakeholders in the Ojai Basin can depend on no economically reasonable new source of water.

The OBGMA has been given the responsibility for managing groundwater in the Ojai Basin and for conserving that groundwater in conjunction with its constituents, the well operators in the basin. The intent of this plan is to avoid or minimize adverse economic and social impacts while maximizing the long-term sustainable use of our valuable but limited water supply.

OBGMA Mission Statement

It is the mission of the Ojai Basin Groundwater Management Agency to preserve the quantity and quality of groundwater in the Ojai Basin in order to protect and maintain the long-term water supply for the common benefit of the water users in the Basin.

The mission of the OBGMA is derived from its enabling legislation, The Ojai Basin Groundwater Management Agency Act, which became law in 1991. The act was approved as a response to the needs and concerns of local water agencies, water users, and well owners of the Ojai Basin. The Agency was established in the fifth year of a drought, amidst concerns for potential Ojai Basin overdraft.

The mission is in keeping with the history of the Ojai Basin and the circumstances existing when the Agency was formed. Since that time, although there have been some good water years and the Ojai Basin has continued to provide sufficient water for its well owners, competition for scarce water resources in Southern California and Ventura County is ever expanding, water resource planning is intensifying, and the importance of the OBGMA mission is even greater today.

Figure 1. OBGMA and Local Water Agencies Location Map.

GROUNDWATER MANAGEMENT PLAN OBJECTIVES, MANAGEMENT ACTIVITIES, AND MONITORING PROTOCOLS

The OBGMA is required by law to have a Sustainable Groundwater Management Plan ("SGMP") to guide its operations. The initial SGMP was prepared and published in 1995. An update in 2007 provided additional information based on studies performed for the OBGMA by contracted hydrogeologists and engineers, on input from well owners and water users, and on recommendations made by the Agency's advisory committee and by the DWR, which led to a better understanding of the basin's hydrogeology, demands, and hydrologic fluctuations that affect the stakeholders.

The SGMP consists of five broad goals, each with a number of action elements, that provide the structure to the OBGMA's management efforts and will be adopted for management objectives within this GSP. Detailed action elements evolve as these efforts continue to progress. Approved elements will be implemented in the form of rules, regulations, or ordinances. Prior to implementation, additional criteria to guide these actions will be developed in a public process by the Board and added to this sustainability plan. Some elements, where noted, require more study and public review before specific implementation actions are approved.

Management Plan Objective 1: Understand the Basin Hydrology

The OBGMA must have a comprehensive understanding of the hydrology of the basin under its jurisdiction in order to carry out its mission for the sustainable long-term beneficial use of groundwater. To improve this understanding the Agency implements the following elements:

Monitoring.

The OBGMA has at its disposal several studies of the basin hydrology, including conceptual models. These models must be tested and updated regularly under a continuing monitoring program to serve as a basis for informed decision-making. Monitoring will also be conducted to identify changing conditions and implement management programs when needed. Monitoring includes:

1. Surface water entering the basin
2. Recharge of the basin from rainfall
3. Stream flow seepage
4. Evapotranspiration
5. Discharge from the basin as surface flow at San Antonio Creek and subsurface flow
6. Extractions from the basin via public and private wells

Monitoring results are shared annually by the Agency with owners, water users and the public.

Data Collection.

Previous studies identified significant gaps in the current monitoring activities in the basin. Specific areas identified for increased data collection are basin water level and water quality monitoring in stratified aquifers known to be present in the Ojai Basin based on aquifer testing and geophysical log correlations. In cooperation with the OBGMA, the Ventura County Watershed Protection District ("VCWPD") may measure key wells routinely for water levels and water quality. Permission from the well owners is obtained by the OBGMA prior to monitoring if not already being conducted by Ventura County. Additional data collection actions, including surface water discharged from San Antonio Creek and surface water inflow into the Basin, has been assessed and will be considered in greater detail in the future. These data are analyzed and reported annually by the OBGMA. All results from each well measurement are shared with the respective well owner via either direct communication and/or provision of any Agency publication that contains such data.

Well Permitting and Registration.

The OBGMA adopted Ordinance No. 94-01 to require all wells in the Ojai Basin to be registered with the Agency. All new extraction facilities constructed within the OBGMA boundary must be registered with the Agency and must obtain a no-fee permit from the Agency prior to the issuance of a Well Permit by the VCWPD. Operators of extraction facilities shall register all wells by completing and returning the OBGMA Registration Form to the Agency within thirty calendar days following completion of construction and prior to any groundwater extraction. No extraction facility may be operated or otherwise utilized so as to extract groundwater within the boundaries of the Agency unless that facility is registered with the Agency, metered and permitted and all extractions reported to the Agency as required.

As of 2014, there are 182 active wells in the Ojai Valley Groundwater Basin, 64 of which have been drilled since 2000. The OBGMA will continue to seek to have all wells in the basin registered, under a formal agreement with Ventura County to ensure that their well records are made available to the Agency and that any new well permits are registered with the Agency. The OBGMA is also planning to obtain delegated authority from the State Water Resources Control Board, Water Rights Division to handle groundwater recordation within OBGMA area of jurisdiction.

Extraction Measurement.

The OBGMA is mandated by its enabling act to monitor groundwater extractions. Operators extracting groundwater from the Ojai Basin must file a quarterly extraction report in January, April, July, and October of each year (based on the October 1 to September 30 water year) that accurately states the amount of water extracted during the prior quarter, in addition to all other relevant information requested on the OBGMA Groundwater Extraction Form, signed under penalty of perjury by the operator. A measurement of the amount of water extracted from the Ojai Basin is important, along with precipitation, groundwater recharge, and water level monitoring, to understand its hydrology and to implement effective management, such as to maintain a balance between water use and replenishment of supply. The OBGMA is also committed to implementing an effective, reliable method of monitoring well extractions. Currently, most well operators are required to report their water extractions, as precisely as possible, using waterflow measuring meters.

The OBGMA charges a $5 fee per quarterly reporting period for the recordation of groundwater extraction. Any person who intentionally violates the Agency ordinances is guilty of an infraction and may be required to pay a fine not to exceed $500. Any person who negligently or intentionally violates this Ordinance may also be liable civilly to the Agency for a sum not to exceed $1000 per day for each violation, in addition to any other penalties that may be prescribed by law.

Computer Modeling.

The OBGMA contracted Daniel B. Stephens & Associates, Inc. ("DBS&A") to perform predictive model simulations to assess anticipated groundwater elevations following drought conditions in water years 2012 through 2014. The Ojai Basin model advances basin understanding and is used by the OBGMA in groundwater management planning. The model was developed by DBS&A for OBGMA, with funding from a DWR Local Groundwater Assistance grant and cost sharing by the OBGMA. The Ojai Basin model was developed using the MODFLOW-SURFACT computer code, which is an upgraded and proprietary version of the widely used U.S. Geological Survey ("USGS") MODFLOW code. The Ojai Model is known as a Distributed Parameter Watershed Model ("DPWM"), which is an analytical watershed model developed by DBS&A used to estimate the transient distribution and magnitude of groundwater recharge. Most recently, the model calibration was updated to run from April 1, 1970 through December 31, 2013.

Management Plan Objective 2: Protect and Manage the Basin

In order to preserve the groundwater in the Ojai Basin, the OBGMA will take direct management actions based upon a factual knowledge of the basin and the needs and concerns of water users and well owners in the basin. The Agency implements the following elements:

Water Exports from the Basin.

The OBGMA's enabling legislation mandates that no groundwater shall be exported from the Ojai Basin except under permit issued by the Agency in full compliance with the policy and intent of the law. The law mandates the preservation of the groundwater for the common benefit of water users within the basin. Based upon present hydrologic facts and circumstances, the OBGMA finds that there is no surplus water available for export. Under natural conditions, when surplus water is present in the basin, water flows under artesian pressure from wells and from exposed aquifers into San Antonio Creek along gaining reaches of the stream. Because this surplus has value to downstream stakeholders, and the surplus conditions are ephemeral (occurring only during years of heavy rainfall such as 1993, 1995, 1998, and 2005) and can change rapidly to conditions of deficiency, it is likely that surplus conditions will not exist in the foreseeable future.

Nevertheless, the Agency will review the existence of surplus from time to time, as dictated by the receipt and review of its annual report or as new, reliable information becomes available. The OBGMA will establish the conditions and criteria under which it would contemplate granting a permit for export, should a surplus be determined to exist. These conditions and criteria will include at least the following:

i. The applicant for a permit will bear the full financial and regulatory and legal burden of demonstrating that a surplus of water exists which, if exported, would not cause harm to any existing groundwater user in the basin, now or in the future.
ii. The export permit will be suspended in the event of a declared water shortage, basin storage threshold level, or upon other pre-established conditions.
iii. All export permits will contain conditions and criteria that will otherwise protect the in-basin users to the fullest extent allowable under the law.

Conjunctive Water Use Management.

Conjunctive water management involves the coordinated use of ground and surface water supplies to use the overall water supply more efficiently for improved use and protection. The purposes of conjunctive management are to coordinate water resource use in ways that reduce exposure to drought, to maximize water availability, to protect water quality, and to sustain ecological needs and aesthetic and recreational values. Other potential benefits are improved security of water supplies, reduced reliance on costly and environmentally disruptive surface water impoundment and distribution systems, and enhanced protection of aquatic life and habitat.

The CMWD is the primary water supplier in the Ventura River Watershed, providing water to both water resale agencies and retail customers. The City of Ventura is Casitas' largest customer, and Lake Casitas water serves as one of the main sources of water for the City of Ventura. One of CMWD's important functions is to serve as the "backup" water supply for a number of customers, including water suppliers and farmers, when groundwater supplies become depleted. The high-quality lake water is blended with poorer quality groundwater by some water purveyors to improve water quality and extend supplies. The annual variability of rainfall in the Ventura River Watershed affects both the total amount of water used each year as well as the relative amounts of surface water versus groundwater used. In very wet years, groundwater use goes up and demand on Lake Casitas goes down; in very dry years the reverse happens. Water demand in the watershed also varies seasonally. Demand is greater in the drier months of summer and fall, and lesser in the wetter months of winter and spring.

Lake Casitas was constructed in 1959 by the United States Bureau of Reclamation and designed to hold 254,000 acre-feet of water. The long-term average annual demand on Lake Casitas is about 17,500 acre-feet, of which about 3680 acre-feet (or 21%) is typically imported to the Ojai Basin. Water from the Ventura River comprises a little less than half of the inflow into Lake Casitas; drainage from the reservoir's surrounding watersheds comprises the rest. A significant amount of water is lost to evaporation from the surface area of Lake Casitas. CMWD takes daily evaporation pan measurements. Between 1959 and 2010, an average of nearly 8000 acre-feet per year evaporated from the lake.

Develop Conjunctive Use Policy for coordination with CMWD

The OBGMA will develop a conjunctive use policy with CMWD and the operators of the City water purveyor system to ensure scientific applicability to extractions and imports to the basin.

Establishment of Thresholds and Triggers.

Groundwater within the Ojai Basin is considered largely in balance, despite groundwater levels and storage volumes that can fluctuate dramatically from one year to the next. Water levels in the basin fluctuate considerably in response to groundwater extraction and recharge from seasonal rainfall. Review of precipitation, accumulative departure curves, and water level responses over time indicate that the basin has the hydrologic characteristics of quick discharge and quick recharge, when precipitation occurs. Typically, conditions in the watershed cycle between very wet years, which bring more water than drainage networks can hold, and multi-year dry periods, which strain available water supplies. This variability in supply poses significant challenges to long-term water supply management.

There is a great variation in location and depth of the wells in the basin, and their relative access to groundwater at low points in the hydrologic cycle. There is also variation in water quality in different parts of the basin. Based on aquifer testing, there is a significant amount of overlap of cones of depression created in the potentiometric surface by pumping wells. These features must be considered when establishing action levels of groundwater elevations or stream flow.

The OBGMA will establish multi-tiered basin storage thresholds that trigger special action by the Agency to assure protection of groundwater supplies in the basin. Storage thresholds will take into account the needs of the water users, overlying landowners and well operators in the basin, as well as the existing conjunctive relationship between groundwater from within the basin and Lake Casitas water imported into the basin. When groundwater levels or quality are low, the Agency will notify users to rely more heavily upon Lake Casitas water. This creates a somewhat self-regulating effect on the Ojai Basin, as the charges for purveyor water encourage conservation and good stewardship of the groundwater resource.

Special actions will also include mandatory conservation measures that must be implemented at those points. The Agency will develop the procedures and pass the ordinances needed to put the conservation measures into effect. This will be done with full communication with, and the involvement and understanding of, the basin well operators. Additional special actions may be triggered on a well-by-well basis in response to high extraction rates. To do so, the Agency will establish a database that contains the typical use for each registered well. Principal monitoring thresholds will include:

Water levels at key wells during springtime-high (proxy for basin wide storage)

OBGMA will establish the basin peak annual storage and report at its June meeting. This information will be based on logger data recorded at 90-minute intervals in key wells.

Water quality (elevated chloride, sulfate, and odor issues).

OBGMA will observe reported quality data and evaluate with respect to basin conditions.

Well performance (sanding, scaling, aeration, cavitation, and dry issues)

State Well #04N/22W-05L08S is a key well monitored for water levels by Ventura County, with data available beginning in 1949. The historic low in basin storage (about 50% of maximum capacity) was in 1951 during a significant drought and before the current practice of conjunctive use, including CMWD water imports, was commonplace. This nadir is a significant threshold because the confined aquifer skeleton would have been maximally compacted at that time. Static water levels below that depth would increase compaction and potentially cause inelastic land subsidence and irrecoverable storage capacity in the Ojai Basin. To date, no surface or subsurface evidence of land subsidence has been observed in the Ojai Basin.

Peak water level known and reported by June meeting each year: ensuing actions

The OBGMA will measure the springtime-high water level (typically between March and June) at the key well annually. A percentage of groundwater storage in the basin will be estimated based on this water level. Based on the estimated volume of storage in the basin, the OBGMA will calculate a recommended extraction at each well from the typical usage records. This recommendation will be delivered to water users on June 30 each year. For example, if the basin is estimated to be at 80% of its maximum storage capacity, the OBGMA will limit users to 80% of the typical average extraction.

Soft Allocation

On a per-parcel and per-well basis, OBGMA will establish and suggest the following based on each year's precipitation and storage conditions:

Establish springtime high storage

Recommend total extraction by well

Recommend extraction totals per parcel

These are referred to as "soft allocations" as there has yet to be a penalty or fine associated with exceedance, through a base-rate and tiered fee structure of costs and allocation may be established by the Board.

Management Plan Objective 3: Encourage Supporting Activities

With its limited resources, the OBGMA must strive to achieve its goals in cooperation with and through the supporting activities of other agencies, and through the encouragement of supportive actions by water users. The Agency implements the following elements:

Data Collection and Storage.

Ventura County already routinely collects information on water levels and quality from wells in the Ojai Basin. In cooperation with the OBGMA, this effort is planned to continue to meet the monitoring needs of the basin. The OBGMA currently has dedicated data loggers that continually measure water levels and temperature at six key wells. This network will be expanded in the near future to include four additional loggers that will measure chloride concentrations in addition to temperature and water levels.

Additional data loggers

In addition to the six exsitng logger locations, a near-discharge area logger is considered. This has not been conducted previously as water levels remained very consistent through many years as manually measured.

Water Conservation.

The OBGMA encourages water conservation practices by both agricultural users and urban users. Market forces as well as good management practices are moving most agricultural users in the basin toward implementation of water conservation measures. Likewise, the Golden State

Water Company ("GSWC"), the largest municipal supplier in the basin, has initiated a conservation plan approved by the Public Utilities Commission and supported by the City of Ojai. The OBGMA will encourage the development, publication and sharing of information with these users that will encourage the optimum use of water resources in the basin. Further, the Agency will seek the assistance of various local, state, federal, and private organizations to provide water conservation services and education programs for in-basin water users, including the pursuit of grant funds as available. The Agency will encourage in-basin water users to incorporate conservation practices and will consider development of a conservation plan in anticipation of drought conditions.

Abandoned Wells.

Ventura County has a program to address abandoned wells as part of the water well ordinance. The OBGMA encourages a special program by the County to implement that program in the Ojai Basin to identify all abandoned wells, such as to determine if they pose any hazard to the quantity or quality of groundwater in the basin, and to identify the actions needed and help obtain the resources to rectify any problems. The Agency supports evaluation of abandoned or idle wells to determine whether they can be converted to monitoring wells, rehabilitated, or properly destroyed in accordance with Ventura County standards.

Abandoned Well Inspection program

OBGMA will establish a review process for abandoned well disposition; some may be well suited for conversion to monitoring wells.

Artificial Recharge.

The artificial recharge of the basin from San Antonio Creek by the OWCD is strongly endorsed by the OBGMA. The Ojai Water Conservation District ("OWCD") was involved in a program for enhanced percolation of stream flow at San Antonio Creek until 1985. This involved the diversion of surface flows into a series of percolation basins and was highly successful. The program was discontinued after the emergency construction of a debris basin on San Antonio Creek by Ventura County using Federal Emergency Management Agency funds, following the major "Wheeler Fire" in the watershed. The result of that debris basin was the destruction of most of the percolation basins.

To rehabilitate these spreading grounds, the OBGMA supports the San Antonio Creek Spreading Grounds Rehabilitation Project ("SACSGRP"), one of the key projects of the Watersheds Coalition of Ventura County suite of applications. The SACSGRP is intended to increase groundwater storage and recharge in the Ojai Basin by rebuilding the abandoned diversion works, rehabilitating the existing spreading ground basins, and constructing aquifer recharge wells adjacent to San Antonio Creek, just southwest of the confluence of the Gridley and Senior Canyons. The project site is located on an 11.4 acre parcel of land owned by the VCWPD adjacent to San Antonio Creek, within the unincorporated portion of Ventura County, approximately 0.9 miles northeast of the City of Ojai. The project received $1,315,000 in grant funding from the State Water Resources Control Board through the Proposition 50 Integrated Regional Water Management Grant, which was awarded to the Watershed Coalition of Ventura County, and approximately $200,000 in local match contributions from the stakeholders. The stakeholder group is composed of the OBGMA, the OWCD, the GSWC, the CMWD and the VCWPD and was formed in January 2008 to collaborate on the implementation and maintenance of the project. The primary purpose of the project is to capture 25 cubic feet per second (cfs) of surface flow (when available) from San Antonio Creek to recharge groundwater in the Ojai Basin. This will result in greater groundwater storage and production from local water supply wells and less reliance on already-limited surface water supplies. A depth-discrete monitoring well ("SACSGRP DDMW") was installed near the spreading grounds to monitor the effectiveness of this important groundwater project and obtain a better hydrogeologic understanding of the basin. The SACSGRP DDMW consists of a nested series of five 2-inch-diameter PVC casings to discretely screen the intervals from 40 to 90 feet, 100 to 110 feet, 140 to 150 feet, 190 to 210 feet, and 255 to 295 feet below ground surface.

Watershed Management.

The OBGMA will work with other stakeholders in the Ventura River Watershed to effectively understand and manage the drainage area that includes Ojai. Such a project is also included in the suite of tasks applied for by the Watersheds Coalition of Ventura County, under the Ventura River Watershed Management Plan ("VRWMP"). The OBGMA supports this endeavor and the understanding of the Ojai Basin will be ameliorated with additional monitoring wells provided under the project.

Stakeholder collaboration

Ojai Valley Land Conservancy

Ojai Valley Green Coalition

Partner agency collaboration

Department of Water Resources

State Water Resources Control Board

Upper Ventura River Groundwater Basin Sustainability Agency

Co-operation Agreement (Inter-basin) with UVRBGSA

Management Plan Objective 4: Communicate Effectively

The effectiveness of the OBGMA depends upon its ability, within its limited means, to meet the needs of the water users and well owners of the Basin. This is dependent upon effective, two-way communication between the OBGMA and the users it serves. The Agency implements the following elements:

Advisory Committees

. Ad hoc advisory committees with representatives of the well owners and water users in the basin have been periodically created by the OBGMA Board and have been a means of developing a dialogue between users and the Agency. Advisory committees will be used by the Board as a nucleus of interested and affected users to consider and develop the details of actions proposed under this Plan.

Annual Report

The OGBMA will prepare an annual report as required by law which it will publish itself at minimum expense. Technical contractors will only be used if required to perform technical analysis of data collected during the year. Information learned about the basin and water use in the basin will be shared by the Agency with all well owners directly and with water users in the basin through the general news media and the publications of local water purveyors. Actions or items of special interest will be shared with well owners by direct mailing newsletters, which will also include notice of OBGMA meetings and agendas. Board members will be available to meet with basin water users to address issues of concern and the ongoing management activities of the Agency.

Website

Mailers

Monthly Meetings

Newspaper outreach

Presentations at stakeholder meetings

Ojai Day participation

Office, staff, and consultant access

Management Plan Objective 5: Administrate Efficiently

The resources available to the OBGMA to carry out its mission and serve the water users of the basin are limited. Therefore cost containment measures are essential. The Agency implements the following elements:

Funding.

The OBGMA is funded by extraction charges levied onto pumpers in the Ojai Basin to initiate, carry on, and complete the powers, purposes and groundwater management activities of the Agency. The present legislative ceiling on extraction charges is $25 per acre-foot (Resolution #2013-2). The approved budget for the 2014/2015 fiscal year is $60,000 based on 4000 acre-feet of extractions. The OBGMA operates from a one room office, with one part time office assistant who also acts in the capacity of secretary and treasurer. The agency must have one professional, technically qualified staff person as a manager at least part time. These expenses, along with regular audits, legal services, and required insurance consume the majority of the funding. The agency is also a participant in funding projects that are within its purview, such as groundwater basin models, the SACSGRP, and grant applications.

Link Budget with extraction fees

Develop fixed cost fee

SGMA Authorities and OBGMA Act

Resolution of findings by the BOD that outlines reliance on SGMA authorities made a necessity because the authorizing legislation is silent.

Minimum Requirements.

The OBGMA's enabling legislation requires a minimum amount of extraction to be established, below which the requirements of the act will not be applied. The Agency will establish these criteria (likely 2 acre-feet/yr).

Board Composition

Seat vacancy

Figure 2. Ojai Basin Aerial Map, with Streams and 2014 Active Well Locations

DESCRIPTION OF OJAI BASIN AND EXISTING CONDITIONS

The Ojai Valley Groundwater Basin (DWR Bulletin 118 Groundwater Basin Number 4-2) stretches over 10.1 square miles (6471 acres) in mountains north of the Pacific Ocean. The basin one of the most important basins in the Ventura River Watershed in terms of serving a large number of people and agricultural acres. As of 2014, there are 182 active wells in the basin that supply water to tree crops (mostly citrus and avocados), residents, and businesses in the City of Ojai and surrounding areas (Figure 2). Some water from the basin is also naturally discharged to San Antonio Creek, providing critical base flow and supporting its riparian habitat, as well as downstream water users. San Antonio Creek has been designated as critical habitat for the endangered southern California steelhead.

The Ojai Basin a relatively deep, bowl-shaped basin, which is bounded on the west and east by non-water-bearing Tertiary aged rocks, on the south by the Santa Ana Fault and Black Mountain, and on the north by the Topatopa Mountains. Major surface drainages that contribute influx or recharge to the basin include San Antonio Creek and the various tributary streams that drain the East End of the Ojai Valley and flow into San Antonio Creek. Steep slopes in these creek, especially those flowing out of Senior Canyon and Thacher Creek, are responsible for forming extensive alluvial fan deposits as the fast-moving, debris-laden water coming out of the mountains slows, spreads out, and deposits suspended sediment. These deposits of sand and gravel, thickest closest to the mountains in the northeastern portion of the basin, are largely responsible for filling the Ojai Basin over time and forming the water-bearing aquifers of the basin. The basin is deepest in the center and southern areas where sediments have built up against the boundary defined by the Santa Ana Fault. The thickness of the water-bearing alluvium is as much as 715 feet. The primary storage areas are approximately four sand and gravel units that are each on the order of up to 100 feet thick.

The basin has areas of confined, semi-confined, and unconfined groundwater. Unconfined conditions exist in the northern and eastern portions of the basin, in the areas of the alluvial fan heads. Groundwater in the rest of the aquifer system is, depending on the amount of water in storage and groundwater level position, mostly confined to semi-confined in the central, southern, and western portions of the basin. Groundwater generally flows in a southwesterly direction; however, it also flows towards the municipal wells in the central portion of the basin. Depth to water can be on the order of 300 feet in the eastern and northern alluvial fan-head portions of the basin (with seasonal variations between 50 and 90 feet). In the southern and western portions of the basin, depth to water is typically less than 50 feet (with seasonal variations on the order of 15 feet). During wet periods, artesian conditions or springs can occur in the southwestern part of Ojai Basin when the elevation to which groundwater will naturally rise exceeds the ground surface elevation.

The Ojai Basin has the largest capacity of the Ventura River Watershed's four groundwater basins. It has a maximum capacity of approximately 85,000 acre-feet, with a safe annual year of approximately 5026 acre-feet. A "maximum capacity" does not reflect the amount of usable or recoverable fresh water, only that the basin has the capacity to hold this gross volume. Not all of the storage capacity contains economically recoverable water or water that is of acceptable quality for use.

Figure 3. Ojai Basin Geologic Map.

Ojai Basin Geology

The Ojai Basin is part of the Transverse Ranges geomorphic province. Rocks in this region have been folded into a series of predominantly east-west-trending anticlines and synclines associated with thrust and reverse faults. Late Eocene to Miocene sedimentary rocks of dominantly marine origin are deformed in a series of folds and faults to form the Ojai Basin and its surrounding mountains (Figure 3). Exposed bedrock units within the basin are non-water-bearing, Late Eocene to Miocene sedimentary rocks of mostly marine origin. From oldest to youngest, these units include the Juncal Formation, Matilija Sandstone, Cozy Dell Shale, Coldwater Sandstone, Sespe Formation, Rincon Shale, and Monterey Shale. Minor groundwater production is yielded from the consolidated bedrock formations, as the groundwater is stored only in fractures.

The primary water-bearing units are Quaternary surficial sediments that unconformably overlie the older sedimentary rocks along valley floors and stream channels. These include historical, Pleistocene-aged dissected gravel terraces and active, Holocene-aged deposits. Active sedimentation occurs as stream channel deposits of gravel and sand, such as at San Antonio Creek, alluvial fan deposits of gravel, and floodplain alluvium of clay, silt, sand and gravel. The alluvial deposits may reach several hundred feet of thickness, with typical well yields that range from 100 to 600 gallons per minute (GPM).

Coarse grained sand and gravel aquifer units appear to be thickest near the north and east portions of the basin (the alluvial fan heads) and thinnest to the south and west where fine grained lacustrine and floodplain deposits predominate as confining layers, separating the water-bearing zones into as many as a half-dozen correlative aquifer units. Groundwater in the alluvial sediments may be unconfined or confined, depending on water levels and the presence of clay-rich confining units. With the exception of higher elevation areas associated with the alluvial fan heads, the aquifer system is capable of being under confined conditions in most of the basin, but may be confined or unconfined at different times depending on the degree of saturation and the thicknesses of aquifer and aquitard units.

Regional deformation was caused by north-south compression, which may have began during the late Pliocene or as late as 700,000 years ago and continues today. Regional crustal shortening due to this compression is largely taken up locally by faults and associated folds. Major faults are the San Cayetano, Santa Ana, Santa Ynez, Lion, Big Canyon, and Sisar. The importance of structural geology is relevant from a hydrogeologic standpoint for several reasons. During pumping, faults and bedrock folds provide no-flow boundaries. Faults can also provide zones of fracture in consolidated rocks from which groundwater can be extracted at wells. Where not cutting the overlying alluvium, faults can cause deeper formation groundwater to rise and subcrop into the overlying alluvial formations.

Ojai Basin Groundwater Recharge

In the Ventura River Watershed, no significant water is imported for human uses including agricultural, irrigation, or municipal supplies. Virtually all water to the Ojai Valley Groundwater Basin derives from the hydrologic cycle as precipitation within the mountainous area surrounding the basin and precipitation on the valley floor itself. The majority of recharge to the basin is from infiltration of precipitation on the valley floor and percolation of surface waters through alluvial channels. Some additional recharge is provided by excess irrigation flow (with a little more than half typically sourced from Lake Casitas) and a minor amount of subsurface flow. The OBGMA's monitoring of the basal alluvial aquifer at the SACSGRP DDMW indicate a favorable component of "recharge without rainfall," as discharges from adjacent bedrock aquifers contribute spring flow and subterranean contributions to the alluvial aquifers.

The Ojai Basin is located within a Mediterranean-type climatic zone characterized by long, dry summers and short, mild winters. The vast majority of precipitation occurs in the winter months. Precipitation rates within the Basin are variable, and cyclic patterns occur, sometimes with deficient rainfall over several consecutive winters (droughts). Recharge from precipitation within the basin is considered to also be variable and to follow similar trends.

Groundwater levels within the basin have been observed to exhibit relatively large fluctuations that correlate with wet and dry periods. The drainage area for the Ojai Basin is relatively large (36 square miles) compared to the alluvial surface area of about 10 square miles, and as such the amount of groundwater in storage responds quickly to heavy precipitation. Most of this recharge occurs where Horn Canyon (Thacher Creek), Gridley Canyon and Senior Canyon (San Antonio Creek), and Reeves Creek enter the basin at alluvial fan heads. Each of these intermittent streams merge as they flow southwest across the basin and exit as San Antonio Creek, the second largest tributary to the Ventura River after Matilija Creek. The headwaters of San Antonio Creek and its tributaries originate in the Topatopa Mountains north of the basin. San Antonio Creek has nearly perennial flow as it leaves the basin, sourced by effluent groundwater from the Ojai Basin. Lion Canyon Creek drains the Upper Ojai Valley and also contributes a significant amount of flow to San Antonio after it exits the Ojai Valley. Surface water in San Antonio Creek then joins the Ventura River system and flows south before discharging into the Pacific Ocean.

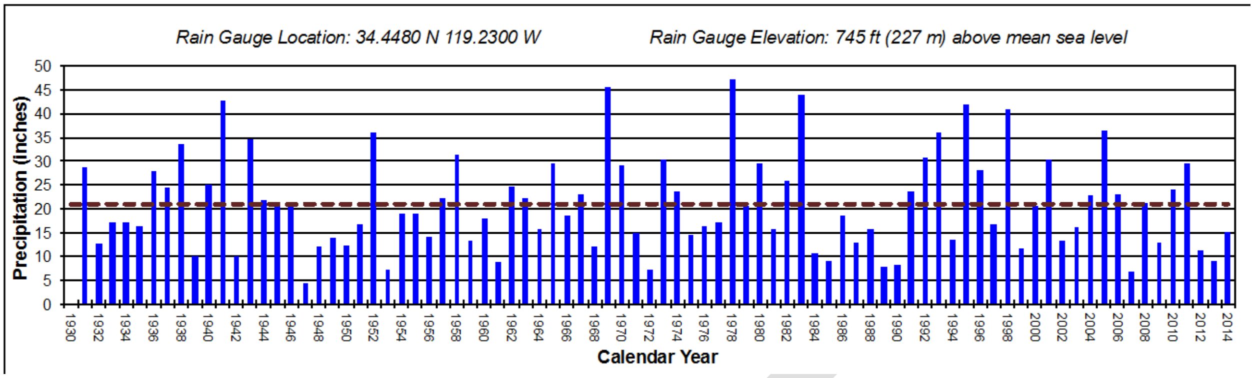

Figure 4. Precipitation at the Ojai Valley Floor.

The average annual precipitation within Ojai Basin is about 21 inches. In addition to the precipitation bar chart presented above (Figure 4), the accumulative departure from average annual precipitation (Figure 5) is an indicator of drought periods versus periods of "normal" or "wet" periods. As the curve declines to the right, a period of drought is realized. Locally, it appears that a drought period began after the end of the 2011 calendar year, but it follows an approximately 15 year period of relatively wet conditions.

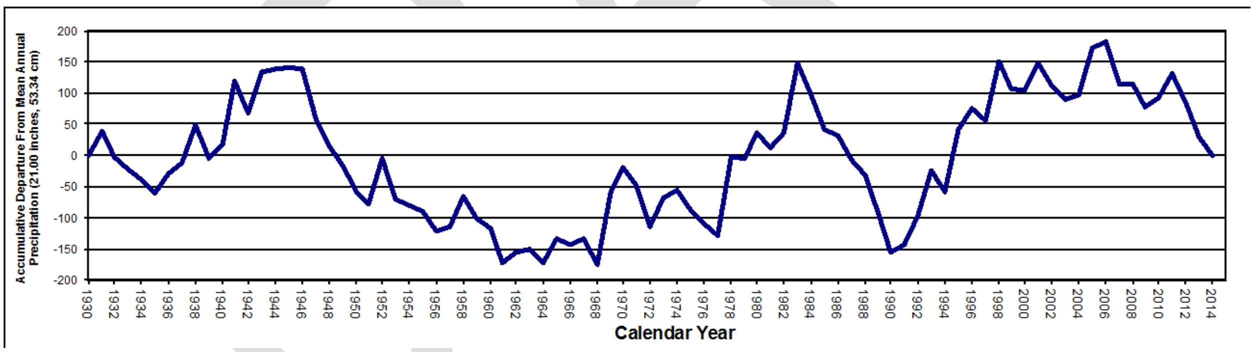

Figure 5. Accumulative Departure Curve from the 1931-2014 Average Annual Precipitation.

Based on the amount of precipitation measured within the watershed, and modeled recharge estimates, the OBGMA estimates that the 21 inches of annual average precipitation accounts for about 6000 acre-feet of groundwater recharge (Figure 6). During the 2011 calendar year, 29.31 inches of rain fell on the valley floor and upwards of 10,000 acre-feet of water recharged to the basin. During the following three calendar years of drought conditions, where 11.35, 9.07, and 15.12 inches of rain fell on the valley floor, respectively, a maximum of around 6700 acre-feet of total recharge was added to the basin storage, assuming no evapotranspiration.

Recharge is primarily focused in the area of alluvial fan heads on the northern and eastern boundaries of the basin and within stream channels, including alluvial channels that extend into the bedrock areas to the north and east (Figure 7). Modeled and observed phenomena indicate that any precipitation less than 11 inches on the valley floor is taken up by evapotranspiration and soil storage, among other factors, and that significant recharge is limited to subsurface flow or excess irrigation flow during these drier years.

The model mass balance indicates that the vast majority of water inflow into the basin is from recharge and the primary outflows are groundwater extraction in wells and groundwater discharge to surface streams. Over the model calibration period, a significant amount of the total mass of water within the system was released from and entered into storage due to fluctuations in hydraulic head, and these respective amounts were approximately equal. This indicates that although the amount of groundwater in storage fluctuated widely during the calibration period, the average amount of groundwater in storage was almost unchanged from the beginning to the end of the model run.

The lateral groundwater model extent was assigned to cover the geographic and vertical extent of alluvial deposits in the Basin. Vertically, the model extends to the estimated depth of the alluvial deposits, and vertical model discretization is based on analysis of geophysical logs from 24 wells located within the Basin. Ten model layers were used to represent discrete aquifer and semiconfining units. The model is discretized into time periods, termed "stress periods," that correspond to 3-month water year quarters. Model boundary conditions were established to represent surrounding features that may provide inflow to or outflow from the model domain. Boundary conditions included recharge from precipitation, irrigation, septic systems and historical spreading grounds, evapotranspiration by riparian vegetation, groundwater discharge to stream channels, groundwater exchange between bedrock and alluvial aquifers, groundwater extraction (i.e., pumping) in wells, and downgradient alluvial outflow. Model parameters associated with the boundary conditions were established based on basin-specific data, where available. The DPWM was used to estimate the distribution of recharge from precipitation based on site-specific climatological, geologic, soils, and vegetation factors.

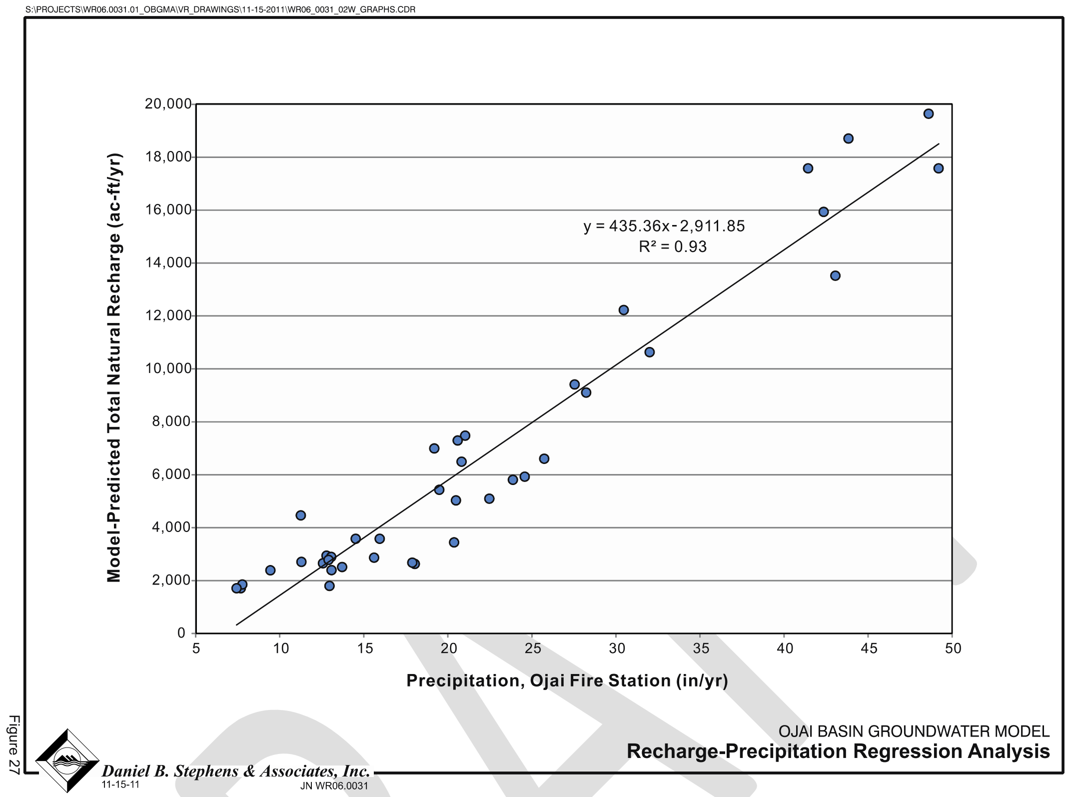

Figure 6. Model-Predicted Relationship between Precipitation and Recharge.

Figure 7. Model-Predicted Average Recharge by Precipitation and Irrigation Return Flow.

Ojai Basin Groundwater Storage and Key Water Levels

Monitoring of water levels by the County and OBGMA in several key wells provide a direct insight into basin storage and the effects of drought on portions of the basin. Generally, peripheral northern and eastern areas appear to be less affected by the droughts as they store the bedrock-derived recharge first as compared to central and southern portions of the basin.

Additional storage capacity and extraction from the central portions of the basin compared to the peripheral areas also contribute to this phenomenon of discrepancy in water levels.

Figure 8 presents the historic and predicted groundwater levels at the key observation well, one of four observation wells used in the DPWM. The objective of the predictive model simulations is to evaluate anticipated groundwater elevations in the Ojai Basin through water year 2020 (until September 30, 2020) by assuming three future scenarios: median precipitation conditions, continued dry conditions, and wet conditions. At Observation Well #1, the observed December 2013 groundwater levels at this location were as low as they have been since 1965. For the median-precipitation predictive simulation, groundwater levels are modeled to rise approximately 40 to 50 feet following hypothetical wet years (assumed 2015, 2018), decline following hypothetical dry years, and are similar to 2013 levels at the end of the model simulation period. For the wet-weather simulation, groundwater levels rise significantly in the hypothetical extremely wet year (assumed 2018, 48.6 inches precipitation) and are similar to 2012 levels at the end of the simulation period, still relatively low compared to the longer historical record. For the dry-weather simulation, groundwater levels are lower at the end of the simulation period than observed groundwater levels since 1961.

As expected, groundwater levels fluctuate based on precipitation increases during hypothetical wet years (2015, 2018), and decline during hypothetical dry years (2016, 2019, 2020). The predicted total precipitation from 2015 to 2020 ranges from around 111 inches in the dry conditions simulation, 132 inches in median conditions, and 146 inches in wet conditions.

Median precipitation condition scenarios predict (1) an overall net decline over the simulation period for the central portion of the basin near the Ojai City municipal well field and in the southern portion of the basin, (2) a net groundwater level rise in the northwestern portion of the basin, and (3) no significant net change in the eastern-central portion of the basin. In all cases, wet-weather scenario simulations result in a predicted net increase in groundwater levels; however groundwater levels are predicted to continue to be generally lower than those observed over the last forty years. Dry-weather simulations result in a predicted continued net decline in groundwater elevations.

Figure 8. Historic and Predicted Groundwater Levels at Key Observation Well

Based on hydrographic data, the OBGMA estimates that the amount of groundwater in storage in the Ojai Basin at the spring high point is as follows (red font where estimated without published record):

Calendar Year	Estimated Total Storage (AF)	Percent Basin Storage	Springtime-High Water Level at Key Well (ft BGS)	Precipitation at Ojai Fire Station (inches)
1975	77264	91%	100	14.57
1976	78031	92%	125	16.32
1977	70018	82%	137	17.05
1978	79792	94%	38	47.3
1979	76651	90%	69	20.74
1980	78851	93%	46	29.51
1981	74314	87%	95	15.99
1982	78128	92%	110	26.13
1983	83785	99%	50	44.07
1984	73978	87%	86	10.62
1985	72294	85%	114	9.23
1986	76753	90%	85	18.64
1987	78509	92%	115	12.94
1988	72077	85%	120	15.97
1989	70991	84%	130	7.82
1990	69046	81%	147	8.17
1991	72899	86%	115	23.85
1992	69720	82%	73	30.66
1993	79000	93%	49	36.25
1994	75000	88%	106	13.71
1995	79000	93%	44	41.79
1996	74000	87%	96	28.28
1997	73000	86%	109	16.92
1998	79000	93%	57	40.97
1999	73500	86%	102	11.57
2000	72000	85%	119	20.62
2001	74000	87%	74	30.41
2002	62567	74%	129	13.29
2003	57087	67%	142	16.03
2004	55094	65%	160	22.92
2005	80000	94%	44	36.43
2006	62810	74%	75	23.05
2007	49750	59%	130	6.94
2008	59000	69%	103	21.16
2009	50000	59%	135	12.93
2010	54627	64%	118	24.07
2011	63944	75%	94	29.31
2012	62402	73%	98	11.35
2013	48000	56%	176	9.07
2014	45000	53%	226	15.12
2015	45000	53%	226	-

These calculations were prepared for the OBGMA by the VCWPD using groundwater levels at the key well. The historic low in basin storage was in 1951 during a significant drought and before the current practice of conjunctive use, including CMWD water imports, was commonplace. Water levels in the key well fell to their lowest point of 580 ft AMSL in September 1951. An estimated 43,741 acre-feet of groundwater was in storage in the basin at that time. The springtime-high water level that year was 652 ft AMSL. This nadir is a significant threshold because the confined aquifer skeleton would have been maximally compacted at that time. Static water levels below that depth would increase compaction and potentially cause subsidence and irrecoverable storage capacity in the Ojai Basin. In 2014, static water levels fell to about 665 ft AMSL, the lowest levels since 1965. Figure 9 presents the relationship between estimated groundwater storage in the basin and the springtime-high water level at the key observation well.

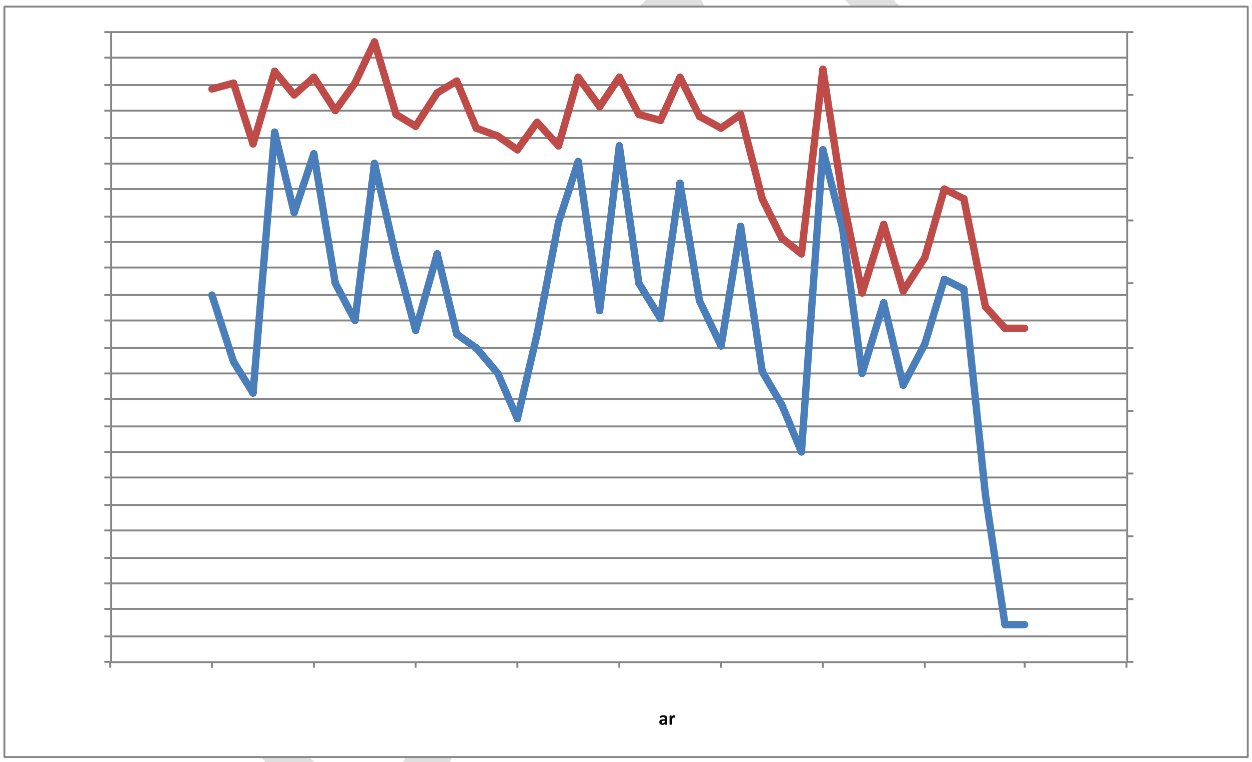

Figure 9. Relationship between Basin Storage and Springtime-High Water Level at Key Well.

Ojai Basin Groundwater Extractions

The primary discharge mechanism for the basin is groundwater pumping. The OBGMA has kept a record of the reported groundwater extractions in the basin since 1993. These data are divided into two columns: extractions by the GSWC for residences and businesses in the City of Ojai, primarily for domestic use (column E), and extractions from private wells, primarily for irrigation use (column D). These are added together to show total groundwater extractions (column F). Importations from Lake Casitas are reported to OBGMA and shown in column C. Since 1993, water imported from Lake Casitas and water extracted from private well have been added together to show the "Estimated Irrigation Demand" (column B). Prior to 1993, an estimate of irrigation demand based on land use, crop water requirements, evapotranspiration, and rainfall was made, then the Lake Casitas importations were subtracted, to come up with an estimate of private well extractions in the basin. All units in the table are in acre-feet.

Groundwater Extractions, Demands, and Imports

Calendar Year	Estimated Irrigation Demand	Casitas Importation	Estimated Groundwater Extraction (Private Wells)	Groundwater Extraction (GSWC)	Estimated Total Groundwater Extractions
A	*B* *B = C + D*	*C*	*D*	*E*	*F* *F = D +E*
1985	7200	4181	3019	1638	4657
1986	7500	3633	3867	1663	5530
1987	7800	4473	3327	1744	5071
1988	7796	4635	3161	1839	5000
1989	7093	5169	1924	1766	3690
1990	9804	4961	4843	1804	6647
1991	7631	3377	4254	1819	6073
1992	8769	2744	6052	1645	7697
1993	6829	2800	4029	2070	6099
1994	7072	3433	3639	1946	5585
1995	6117	3530	2587	1846	4433
1996	6801	4468	2333	1569	3902
1997	8017	5272	2745	1583	4328
1998	5071	3115	1956	1913	3869
1999	6185	3922	2263	2181	4444
2000	7054	4044	3010	2080	5090
2001	7204	3195	4009	2258	6267
2002	7021	4249	2772	2220	4992
2003	6450	3428	3022	2066	5088
2004	7058	4185	2873	1824	4697
2005	5462	2768	2694	1955	4649
2006	5462	2796	2666	1818	4484
2007	6877	3770	3107	1963	5070
2008	6492	3176	3316	1736	5052
2009	7054	3411	3643	1751	5394
2010	5633	2404	3229	1742	4971
2011	5867	2990	3191	1934	5125
2012	6292	2986	3664	1646	5310
2013			4093	1376	5469
2014*			2460	1085	3546

***through 9/14/2014**

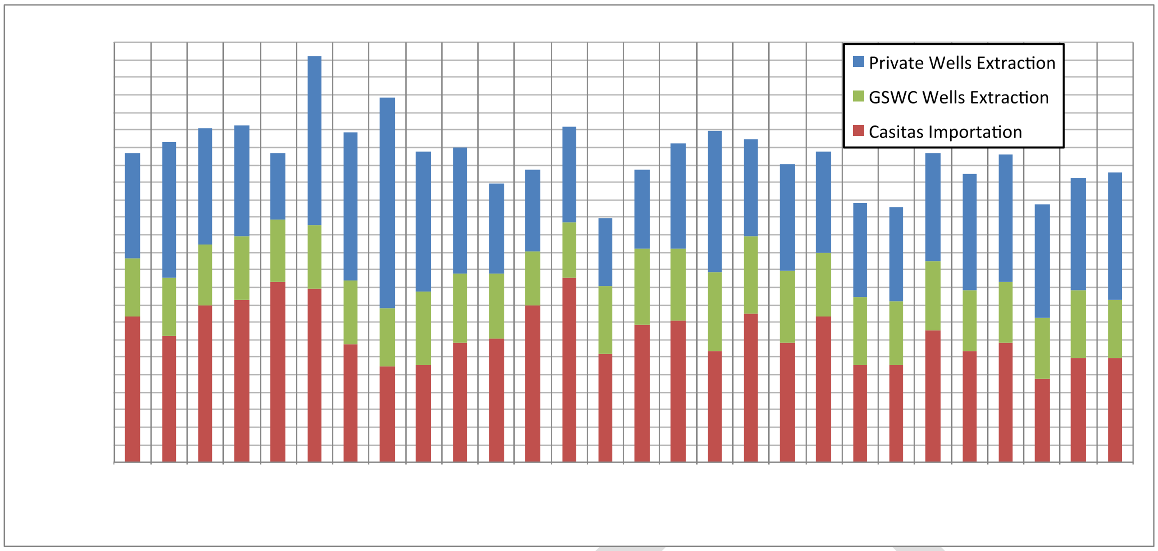

Figure 10. Estimated Total Basin Demand, 1985 to 2012.

Groundwater use in the Ojai Basin between 1985 and 2012 averaged approximately 5100 acre-feet annually, of which some 1850 acre-feet (or 36%) was pumped by the GSWC for municipal and domestic supply. In addition to GSWC, the mutual water companies and active private wells supply both agricultural and domestic water in the basin. During the 1985 to 2013 period, the highest production was 7697 acre-feet (1992, with 1645 AF from GSWC and 6052 AF from private wells) and the lowest was 3690 acre-feet (1989, with 1766 AF from GSWC and 1924 AF from private wells). Figure 10, above, presents the estimated total annual basin water demand. Total basin demand is the calculated as the sum of groundwater extraction (by both GSWC and private wells) and surface water importation from Lake Casitas.

Ojai Basin Groundwater Natural Discharge

Because of the basin's relatively limited storage capacity, the basin may be depleted rapidly during drought periods by groundwater pumping and groundwater outflow to San Antonio Creek at the basin's natural discharge points.

Groundwater rising above the level of a stream bottom results in what is called a "gaining stream," where groundwater seeps out of the surface and flows downstream, thus depleting the aquifer. For much of the year, including almost all of the dry-season, all of the water in the Ventura River and its tributaries is from groundwater and springs (excluding the lower stretch of the river that is fed by treated wastewater). Only during storms, and for a relatively short period of time afterwards, do surface runoff and flows from soil water add to the base flow.

Modeled discharge to surface streams is reported to average about 2280 acre-feet per year. Smaller components of discharge are to evapotranspiration (about 260 acre-feet/yr) and outflow to downgradient bedrock and alluvium (about 130 acre-feet/yr). In the 2010-2011 water year, a total of nearly 10,600 acre-feet are calculated to have discharged at San Antonio Creek beneath the Casitas Springs bridge at Highway 33. This compares to about 900 acre-feet at the same point for water year ending 2012. The Ojai Basin comprises approximately 70% of the surface water tributary area to this gauge and is one of the only groundwater basins that provides perennial discharge to the creek system. Although no active gauge is present to date near the discharge point from the Ojai Basin, monitoring of the San Antonio Creek at Creek Road is within the purview of the OBGMA and a planned activity.

Instream flow studies and "requirements"

Separation of deep well production aquifers from shallow stream-flow contributing aquifers

Latitude-Longitude Daylight And Infiltration (L^2DAI)

Ojai Basin Groundwater Quality

Groundwater supplies a significant percentage of the water used for drinking and irrigation in the watershed, and is the principal source of streamflow for most of the year except in very wet years. The quality of groundwater is important for drinking, irrigation, aquatic ecosystem health, and other uses. Groundwater in the watershed is generally of good enough quality for drinking and irrigating, though a few parameters must be regularly monitored, and water from some wells must be blended with water from other sources to meet drinking water quality standards. Average concentration of total dissolved solids (TDS) is 812 mg/L and ranges from 671 to 1090 mg/L in county-sampled and reported wells.

The quality of the watershed's groundwater is greatly influenced by the quality and quantity of surface water runoff that recharges the groundwater basins, and by the natural interaction of groundwater with sediments in the surrounding geologic formations. Other factors that can influence groundwater quality include impacts from land uses overlying groundwater basins, use and density of septic systems, well depth, and age of groundwater.

Regional groundwater has been analyzed less frequently and at fewer locations than surface water. Public supply wells in California are required by law to be sampled for inorganic, organic, radiological, and microbiological constituents on a routine basis. These data are submitted to the SWRCB and integrated into the State's GeoTracker GAMA (Groundwater Ambient Monitoring & Assessment Program) database. In addition, water suppliers are required to prepare for their customers annual water quality consumer confidence reports, which contain information on the quality of their water supply sources. The VCWPD performs annual water quality monitoring at seven to eight wells within the Ojai Basin. Groundwater quality monitoring is also required of property owners subject to violation-related cleanup requirements; this monitoring is overseen by the Regional Water Quality Control Board or the Ventura County Environmental Health Division.

Figure 11 presents the Piper diagrams of selected inorganic constituent from sampled well in the basin. Groundwater chemistry in the Ojai Basin is quite variable. Constiuents include TDS, sodium (Na^{+}), potassium (K^{+}), calcium (Ca^{2+}), magnesium (Mg^{2+}), chloride (Cl^{-}), bicarbonate (HCO^{3-}), carbonate (CO_3^{2-}) and sulfate (SO_4^{2-}) for the wells sampled by the County of Ventura in the Ojai Basin in 2014.

Water samples from three wells were analyzed for inorganic chemicals (Title 22 metals) in previous years. No inorganic chemical was above the primary maximum contaminant level ("MCL") for drinking water. Two wells had iron (Fe) concentrations above the MCL for drinking water. Depth-discrete information indicates a higher chloride concentration in deep aquifers in the central and southwestern portion of the basin. Nitrate is the main groundwater quality concern for most of the Ventura River Watershed.

San Antonio Creek drains the Ventura River Watershed's largest urban area, the City of Ojai, as well as the most intensively farmed area in the watershed, the Ojai Valley's East End. San Antonio Creek is on the Clean Water Act's Section 303(d) list of impaired waterbodies for bacteria, nitrogen, low dissolved oxygen, and total dissolved solids. High concentrations of chlorides and total dissolved solids are commonly seen during dry conditions when groundwater, high in dissolved salts, is the main source of flow. San Antonio Creek is also one of the tributaries that has been designated as critical habitat for the endangered southern California steelhead.

Figure 11. Sampled Well Location Map with Piper Diagrams of Selected Inorganic Constituents. (from VCWPD 2015).