Final Groundwater Sustainability Plan

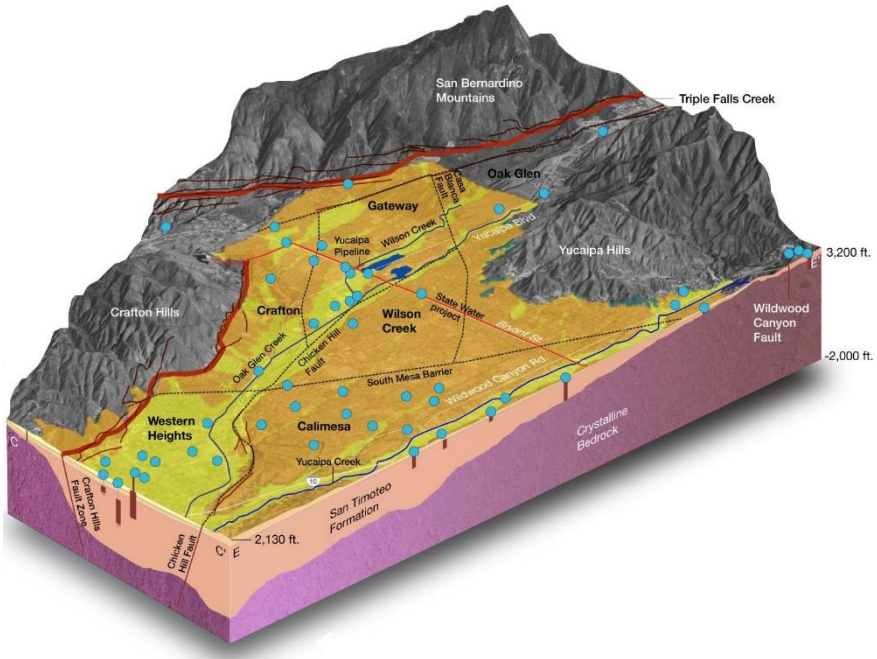
for the

Yucaipa Groundwater Subbasin: Appendices

January 2022

Prepared for:

Yucaipa Groundwater Sustainability Agency
c/o San Bernardino Valley Municipal Water District



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Appendix 1-A

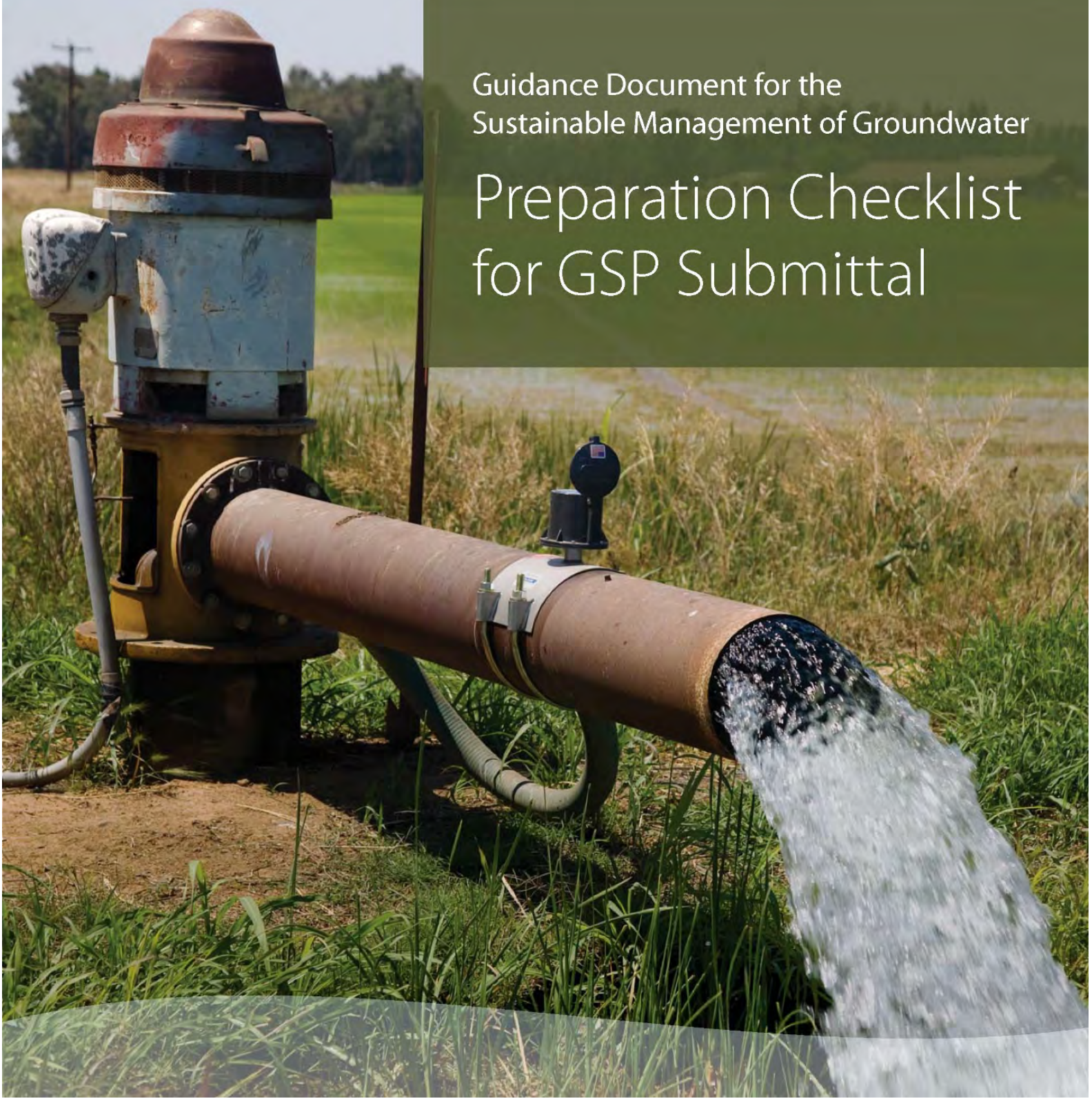
Preparation Checklist for GSP Submittal

California Department of Water Resources
Sustainable Groundwater Management Program

December 2016

Guidance Document for the
Sustainable Management of Groundwater

Preparation Checklist for GSP Submittal



Guidance Document for the Sustainable Management of Groundwater

Preparation Checklist for GSP Submittal

December 2016

The objective of this Guidance Document is to provide Groundwater Sustainability Agencies (GSAs) and other interested stakeholders a checklist of Groundwater Sustainability Plan (GSP) content requirements for the purpose of verifying a GSP is complete and is ready for submission to DWR. Please note that if multiple GSAs develop multiple GSPs for a basin, the coordinated submission of those GSPs shall not occur until the entire basin is covered by GSPs.

The Preparation Checklist for GSP Submittal is only intended to provide a guide to GSAs and other stakeholders. This guidance is optional, since the content of this Guidance Document does not create any new requirements or obligations for the GSA or other stakeholders.

Guidance documents are not a substitute for the GSP Emergency Regulations (GSP Regulations) or the Sustainable Groundwater Management Act (SGMA). Those GSAs submitting a GSP are strongly encouraged to read the GSP Regulations and SGMA. In addition, using this Guidance Document to develop a GSP using does not equate to an approval determination by DWR.

Context with GSP Regulations

The Preparation Checklist for GSP Submittal can be used by GSAs in conjunction with the GSP Annotated Outline Guidance Document as a method to develop a GSP consistent with the requirements of the GSP Regulations and SGMA. The detailed requirements of a GSP may be found in the GSP Regulations, primarily in Article 5 – Plan Contents, and in SGMA, primarily in Chapter 6 beginning with California Water Code (CWC) Section 10727. The checklist includes references to applicable GSP Regulations sections and CWC sections, as well as a brief description of the required GSP information. The checklist also contains a column for GSAs to record the page number, or section of the GSP, where the information for that particular requirement is found. The preparation checklist may also be included in the GSP.

Table 1 contains the **Preparation Checklist for GSP Submittal**.

California Department of Water Resources
Sustainable Groundwater Management Program
1416 Ninth Street
P.O. Box 942836
Sacramento, CA 94236-0001
www.water.ca.gov/groundwater

Table 1. Preparation Checklist for GSP Submittal

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
Article 3. Technical and Reporting Standards				
352.2		Monitoring Protocols	• Monitoring protocols adopted by the GSA for data collection and management • Monitoring protocols that are designed to detect changes in groundwater levels, groundwater quality, inelastic surface subsidence for basins for which subsidence has been identified as a potential problem, and flow and quality of surface water that directly affect groundwater levels or quality or are caused by groundwater extraction in the basin	Section 3.6.4
Article 5. Plan Contents, Subarticle 1. Administrative Information				
354.4		General Information	• Executive Summary • List of references and technical studies	Section ES
354.6		Agency Information	• GSA mailing address • Organization and management structure • Contact information of Plan Manager • Legal authority of GSA • Estimate of implementation costs	Section 1.2
354.8(a)	10727.2(a)(4)	Map(s)	• Area covered by GSP • Adjudicated areas, other agencies within the basin, and areas covered by an Alternative • Jurisdictional boundaries of federal or State land • Existing land use designations • Density of wells per square mile	Section 1.3

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
Article 5. Plan Contents, Subarticle 1. Administrative Information (Continued)				
354.8(b)		Description of the Plan Area	• Summary of jurisdictional areas and other features	Section 1.3
354.8(c) 354.8(d) 354.8(e)	10727.2(g)	Water Resource Monitoring and Management Programs	• Description of water resources monitoring and management programs • Description of how the monitoring networks of those plans will be incorporated into the GSP • Description of how those plans may limit operational flexibility in the basin • Description of conjunctive use programs	Section 1.5
354.8(f)	10727.2(g)	Land Use Elements or Topic Categories of Applicable General Plans	• Summary of general plans and other land use plans • Description of how implementation of the GSP may change water demands or affect achievement of sustainability and how the GSP addresses those effects • Description of how implementation of the GSP may affect the water supply assumptions of relevant land use plans • Summary of the process for permitting new or replacement wells in the basin • Information regarding the implementation of land use plans outside the basin that could affect the ability of the Agency to achieve sustainable groundwater management	Section 1.6

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
Article 5. Plan Contents, Subarticle 1. Administrative Information (Continued)				
354.8(g)	10727.4	Additional GSP Contents	**Description of Actions related to:** • Control of saline water intrusion • Wellhead protection • Migration of contaminated groundwater • Well abandonment and well destruction program • Replenishment of groundwater extractions • Conjunctive use and underground storage • Well construction policies • Addressing groundwater contamination cleanup, recharge, diversions to storage, conservation, water recycling, conveyance, and extraction projects • Efficient water management practices • Relationships with State and federal regulatory agencies • Review of land use plans and efforts to coordinate with land use planning agencies to assess activities that potentially create risks to groundwater quality or quantity • Impacts on groundwater dependent ecosystems	Sections 1.5, 1.6, 2.7, 2.7.8.1, and 4.2.2.
354.10		Notice and Communication	• Description of beneficial uses and users • List of public meetings • GSP comments and responses • Decision-making process • Public engagement • Encouraging active involvement • Informing the public on GSP implementation progress	Sections 1.7, 1.8 and 1.9

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
Article 5. Plan Contents, Subarticle 2. Basin Setting				
354.14		Hydrogeologic Conceptual Model	• Description of the Hydrogeologic Conceptual Model • Two scaled cross-sections • Map(s) of physical characteristics: topographic information, surficial geology, soil characteristics, surface water bodies, source and point of delivery for imported water supplies	Section 2.6
354.14(c)(4)	10727.2(a)(5)	Map of Recharge Areas	• Map delineating existing recharge areas that substantially contribute to the replenishment of the basin, potential recharge areas, and discharge areas	Section 2.3
	10727.2(d)(4)	Recharge Areas	• Description of how recharge areas identified in the plan substantially contribute to the replenishment of the basin	Section 2.5.4
354.16	10727.2(a)(1) 10727.2(a)(2)	Current and Historical Groundwater Conditions	• Groundwater elevation data • Estimate of groundwater storage • Seawater intrusion conditions • Groundwater quality issues • Land subsidence conditions • Identification of interconnected surface water systems • Identification of groundwater-dependent ecosystems	Section 2.7
354.18	10727.2(a)(3)	Water Budget Information	• Description of inflows, outflows, and change in storage • Quantification of overdraft • Estimate of sustainable yield • Quantification of current, historical, and projected water budgets	Section 2.8
	10727.2(d)(5)	Surface Water Supply	• Description of surface water supply used or available for use for groundwater recharge or in-lieu use	Section 2.8.2.5

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
Article 5. Plan Contents, Subarticle 2. Basin Setting (Continued)				
354.20		Management Areas	• Reason for creation of each management area • Minimum thresholds and measurable objectives for each management area • Level of monitoring and analysis • Explanation of how management of management areas will not cause undesirable results outside the management area • Description of management areas	Sections 2.9, 3.4, and 3.5.
Article 5. Plan Contents, Subarticle 3. Sustainable Management Criteria				
354.24		Sustainability Goal	• Description of the sustainability goal	Section 3.2
354.26		Undesirable Results	• Description of undesirable results • Cause of groundwater conditions that would lead to undesirable results • Criteria used to define undesirable results for each sustainability indicator • Potential effects of undesirable results on beneficial uses and users of groundwater	Section 3.3
354.28	10727.2(d)(1) 10727.2(d)(2)	Minimum Thresholds	• Description of each minimum threshold and how they were established for each sustainability indicator • Relationship for each sustainability indicator • Description of how selection of the minimum threshold may affect beneficial uses and users of groundwater • Standards related to sustainability indicators • How each minimum threshold will be quantitatively measured	Section 3.4

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
Article 5. Plan Contents, Subarticle 3. Sustainable Management Criteria (Continued)				
354.30	10727.2(b)(1) 10727.2(b)(2) 10727.2(d)(1) 10727.2(d)(2)	Measureable Objectives	• Description of establishment of the measureable objectives for each sustainability indicator • Description of how a reasonable margin of safety was established for each measureable objective • Description of a reasonable path to achieve and maintain the sustainability goal, including a description of interim milestones	Sections 3.5 and 4.2
Article 5. Plan Contents, Subarticle 4. Monitoring Networks				
354.34	10727.2(d)(1) 10727.2(d)(2) 10727.2(e) 10727.2(f)	Monitoring Networks	• Description of monitoring network • Description of monitoring network objectives • Description of how the monitoring network is designed to: demonstrate groundwater occurrence, flow directions, and hydraulic gradients between principal aquifers and surface water features; estimate the change in annual groundwater in storage; monitor seawater intrusion; determine groundwater quality trends; identify the rate and extent of land subsidence; and calculate depletions of surface water caused by groundwater extractions • Description of how the monitoring network provides adequate coverage of Sustainability Indicators • Density of monitoring sites and frequency of measurements required to demonstrate short-term, seasonal, and long-term trends • Scientific rational (or reason) for site selection • Consistency with data and reporting standards • Corresponding sustainability indicator, minimum threshold, measureable objective, and interim milestone	Section 3.6

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
			(Monitoring Networks Continued) • Location and type of each monitoring site within the basin displayed on a map, and reported in tabular format, including information regarding the monitoring site type, frequency of measurement, and the purposes for which the monitoring site is being used • Description of technical standards, data collection methods, and other procedures or protocols to ensure comparable data and methodologies	
354.36		Representative Monitoring	• Description of representative sites • Demonstration of adequacy of using groundwater elevations as proxy for other sustainability indicators • Adequate evidence demonstrating site reflects general conditions in the area	Section 3.6.5.
354.38		Assessment and Improvement of Monitoring Network	• Review and evaluation of the monitoring network • Identification and description of data gaps • Description of steps to fill data gaps • Description of monitoring frequency and density of sites	Section 3.6.6.

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
Article 5. Plan Contents, Subarticle 5. Projects and Management Actions				
354.44		Projects and Management Actions	• Description of projects and management actions that will help achieve the basin's sustainability goal • Measureable objective that is expected to benefit from each project and management action • Circumstances for implementation • Public noticing • Permitting and regulatory process • Time-table for initiation and completion, and the accrual of expected benefits • Expected benefits and how they will be evaluated • How the project or management action will be accomplished. If the projects or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included. • Legal authority required • Estimated costs and plans to meet those costs • Management of groundwater extractions and recharge	Sections 4.2 and 4.3.
354.44(b)(2)	10727.2(d)(3)		• Overdraft mitigation projects and management actions	Section 4.2.2.

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
Article 8. Interagency Agreements				
357.4	10727.6	Coordination Agreements - Shall be submitted to the Department together with the GSPs for the basin and, if approved, shall become part of the GSP for each participating Agency.	**Coordination Agreements shall describe the following:** • A point of contact • Responsibilities of each Agency • Procedures for the timely exchange of information between Agencies • Procedures for resolving conflicts between Agencies • How the Agencies have used the same data and methodologies to coordinate GSPs • How the GSPs implemented together satisfy the requirements of SGMA • Process for submitting all Plans, Plan amendments, supporting information, all monitoring data and other pertinent information, along with annual reports and periodic evaluations • A coordinated data management system for the basin • Coordination agreements shall identify adjudicated areas within the basin, and any local agencies that have adopted an Alternative that has been accepted by the Department	NA

Appendix 1-B

Yucaipa GSA Governance Documents

MEMORANDUM OF AGREEMENT TO FORM A GROUNDWATER SUSTAINABILITY AGENCY FOR THE YUCAIPA SUB-BASIN (Sub-basin No. 8-02.07)

This 2017 Memorandum of Agreement ("MOA") is entered into by and among: South Mesa Water Company ("SOUTH MESA"), South Mountain Water Company ("SOUTH MOUNTAIN"), Western Heights Water Company ("WESTERN HEIGHTS") and Yucaipa Valley Water District ("YVWD"), herein collectively referred to as the "WATER PURVEYORS"; and, the City of Calimesa ("CALIMESA"), the City of Redlands ("REDLANDS") and the City of Yucaipa ("YUCAIPA"), herein collectively referred to as the "MUNICIPALITIES"; and, the San Bernardino Valley Municipal Water District ("SAN BERNARDINO VALLEY MUNICIPAL") and the San Gorgonio Pass Water Agency ("SAN GORGONIO"), herein collectively referred to as the "REGIONALS." The MUNICIPALITIES are sometimes herein collectively referred to as the "LAND USE AGENCIES." Each of the above-described entities is individually referred to as a "Party" and are collectively referred to as the "Parties". For purposes of this MOA, SOUTH MESA, SOUTH MOUNTAIN and WESTERN HEIGHTS are collectively referred to as the "MUTUALS"; and, the Parties other than the MUTUALS are collectively referred to as the "LOCAL AGENCIES."

Pursuant to the Sustainable Groundwater Management Act ("SGMA") and as further set forth herein, the purpose of this MOA is to form a Groundwater Sustainability Agency ("GSA") for the entire Yucaipa Sub-basin (Basin or Sub-Basin No. 8-02.07), in order to preserve local management and control of the Basin as set forth under SGMA.

The County of Riverside ("RIVERSIDE") and the County of San Bernardino ("SAN BERNARDINO"), collectively "COUNTIES," shall be considered "Stakeholders" but not Parties to this MOA.

Recitals

WHEREAS, on September 16, 2014, Governor Jerry Brown signed into law Senate Bills 1168 and 1319, and Assembly Bill 1739, collectively known as the Sustainable Groundwater Management Act ("SGMA"), codified in certain provisions of the California Government Code, including commencing with Section 65350.5, and codified in Part 2.74 of Division 6 of the California *Water Code*, commencing with Section 10720, and amending other provisions of the California *Government Code* and California *Water Code*; and

WHEREAS, SGMA went into effect on January 1, 2015; and,

WHEREAS, various clarifying amendments to SGMA were signed into law in 2015, including Senate Bills 13 and 226, and Assembly Bills 617 and 939, which were codified in part in California *Water Code* Section 10723.6(a), authorizing a combination of local agencies to form a GSA pursuant to a joint powers agreement, a memorandum of agreement, or other legal agreement; and, California *Water Code* Section 10723.6(b), authorizing water corporations regulated by the California Public Utilities Commission and mutual water companies to participate in a GSA through a memorandum of agreement or other legal agreement; and

WHEREAS, the legislative intent and effect of SGMA, as set forth in California *Water Code* Section 10720.1, includes the following: (1) to provide for the sustainable management of groundwater basins; (2) to enhance local management of groundwater consistent with rights to use or store groundwater and Section 2 of Article X of the California Constitution, and to preserve the security of water rights in the state to the greatest extent possible consistent with the sustainable management of groundwater; (3) to establish minimum standards for sustainable groundwater management; (4) to provide local groundwater agencies with the authority and the technical and financial assistance necessary to sustainably manage groundwater; (5) to avoid or minimize subsidence; (6) to improve data collection and understanding about groundwater; (7) to increase groundwater storage and remove impediments to recharge; (8) to manage groundwater basins through the actions of local governmental agencies to the greatest extent feasible, while minimizing state intervention to only when necessary to ensure that local agencies manage groundwater in a sustainable manner; and (9) to provide a more efficient and cost-effective groundwater adjudication process that protects water rights, ensures due process, prevents unnecessary delay, and furthers the objectives of SGMA; and,

WHEREAS, SGMA affords GSAs specific powers to manage groundwater in addition to existing legal authorities, which powers may be used to provide the maximum degree of local control and flexibility consistent with the sustainability goals of SGMA; and,

WHEREAS, SGMA includes several un-codified findings by the California Legislature, including the determination that the people of the state have a primary interest in the protection, management, and reasonable beneficial use of the water resources of the state, both surface and underground, and that the integrated management of the state's water resources is essential to meeting its water management goals; and,

WHEREAS, the Basin, as depicted in **Exhibit A** to this MOA, is identified by the California Department of Water Resources Bulletin 118 as Sub-basin No. 8-02.07 of the Upper Santa Ana Valley Groundwater Basin, and is designated by DWR as medium-priority; and,

WHEREAS, California *Water Code* Section 10720.7 requires the Basin, as a medium-priority basin that is not designated by DWR as being subject to critical conditions of overdraft, to be managed by a Groundwater Sustainability Plan ("GSP") or coordinated GSPs by January 31, 2022; and,

WHEREAS, in order to avoid designation as a probationary basin and become subject to direct intervention and management by the State Water Board, California *Water Code* Section 10735.2 requires that, by June 30, 2017 a collection of local agencies must form a GSA or prepare agreements to develop one or more GSPs that will collectively serve as a GSP for the entire Basin, in the event that a local agency has not decided to become a GSA that intends to develop a GSP for the entire Basin; and,

WHEREAS, the LOCAL AGENCIES have water supply, water management, and/or land use responsibilities for their respective jurisdictional areas overlying the Basin and are local agencies as defined by SGMA in California *Water Code* Section 10721(n), and thus each is authorized by SGMA to become or form a GSA; and,

WHEREAS, the LOCAL AGENCIES' individually have jurisdictional and/or service areas within and their collective jurisdictional areas and/or service areas cover the entirety of the Basin, with no gaps in coverage; and,

WHEREAS, the WATER PURVEYORS, including the MUTUALS, produce groundwater and provide water service within the Basin, and it is the Parties' shared intent to provide for management-level participation by the MUTUALS in the GSA to the maximum extent allowed by law without limiting any powers afforded to a GSA under SGMA; and,

WHEREAS, the REGIONALS are State Water Contractors, and have the rights and duties of such, including for the delivery of State Water Project Water within the Basin; and,

WHEREAS, in accordance with the terms of this MOA, and in furtherance of the shared intent of the Parties to maximize funding opportunities for the Basin and avoid potential intervention in the Basin by the State Water Board, the Parties agree that the YUCAIPA-GSA formed by this MOA will cover the entire Basin; and,

WHEREAS, the Parties mutually desire and intend to work with local stakeholders and interested parties in the Basin that are not Parties to this MOA, to carry out the policy, purposes, and requirements of SGMA in the Basin.

Agreement

NOW, THEREFORE, in consideration of the promises, terms, conditions, and covenants contained herein, it is mutually understood and agreed as follows:

I. **Incorporation of Recitals.** The Recitals stated above are incorporated herein by reference.

II. **Purposes.** The purposes of this MOA is to form the YUCAIPA-GSA for the Basin as specified herein pursuant to applicable provisions and requirements of SGMA, including but not limited to California *Water Code* Sections 10723 and 10723.6.

III. **Approval of MOA and Formation of the YUCAIPA-GSA.** Approval of this MOA and formation of the YUCAIPA-GSA shall be accomplished by the LOCAL AGENCIES each holding its own noticed public hearing pursuant to California *Water Code* Section 10723(b) and California *Government Code* Section 6066 and at such hearing will consider approval of a Resolution by its governing board to enter this MOA and jointly form the YUCAIPA-GSA as specified in this MOA. Approval of this MOA by the MUTUALS shall be accomplished through their respective governing boards' duly authorized procedures.

IV. **Definitions.** The following terms, whether used in the singular or plural, and when used with initial capitalization, shall have the meanings specified herein. The Parties agree that any definitions set forth herein are intended to be consistent with SGMA, and in the event of any discrepancy between a defined term in this MOA and a defined term in SGMA, the terms of SGMA shall control.

A. "Basin" refers to the Yucaipa Sub-basin, designated by the California Department of Water Resources Bulletin 118 as Sub-basin No. 8-02.07, as depicted in **Exhibit A** to this MOA.

B. "DWR" means the California Department of Water Resources.

C. "GSA" means a Groundwater Sustainability Agency, as defined by SGMA.

D. "GSP" means a Groundwater Sustainability Plan, as defined by SGMA.

E. "Memorandum of Agreement" or "MOA" refers to this Memorandum of Agreement.

F. "SGMA" refers to the Sustainable Groundwater Management Act, of 2014, as amended.

G. "State Water Board" means the California State Water Resources Control Board.

H. "YUCAIPA-GSA" refers to the Yucaipa Sub-basin GSA formed under this MOA.

V. Coordination and Cooperation

A. Continued Cooperation. The Parties to this MOA will continue to meet, confer, coordinate, and collaborate to discuss and develop technical, managerial, financial, and other criteria and procedures for the preparation, governance, and implementation of a GSP or coordinated GSPs in the Basin and to carry out the policy, purposes, and requirements of SGMA in the Basin.

B. Points of Contact. Each Party shall designate a principal contact person for that Party, who may be changed from time to time at the sole discretion of the designating Party. The principal contact person for each Party shall be responsible for coordinating with the principal contact persons for the other Parties in scheduling meetings and other activities under this MOA.

C. Voting Methodology. The voting structure for matters pertaining to the establishment and implementation of the administrative components of the YUCAIPA-GSA shall be by simple majority (51%) of the voting Parties, wherein each WATER PURVEYOR, MUNICIPALITY and REGIONAL holds a single vote.

VI. Roles and Responsibilities

A. The YUCAIPA-GSA shall be controlled by a Governing Board comprised of one representative of each of the Parties to this MOA.

B. The Parties agree to jointly establish their specific roles and responsibilities for implementing this MOA, including through the adoption of organizational documents, management policies, rules and procedures.

C. The Parties agree to jointly develop and implement a GSP or coordinated GSPs for the Basin in accordance with SGMA.

D. The Parties agree to work in good faith and coordinate all activities to carry out the purposes of this MOA in implementing the policy, purposes, and requirements of SGMA in the Basin, including continuing to meet, confer, coordinate, and collaborate to discuss and develop governance, management, technical, financial, and other matters, including respective roles and responsibilities for activities such as, but not limited to, the following: modeling;

metering; monitoring; hiring consultants; developing and maintaining list of interested persons under California *Water Code* Section 10723.4; budgeting; and other initial tasks as determined by the Parties.

E. The LOCAL AGENCIES shall coordinate with each other to cause all applicable noticing and submission of required information to DWR regarding formation of the YUCAIPA-GSA.

VII. Funding and Budgeting. The Parties shall work together to identify the costs, funding needs and funding sources for the administration of the YUCAIPA-GSA and the development and implementation of the GSP. To the extent not otherwise funded in accordance with or inconsistent with SGMA's provisions regarding GSA funding, the PURVEYORS shall collectively bear seventy-five percent (75%) and the MUNICIPALITIES and REGIONALS shall collectively bear twenty-five percent (25%) of the cost of the creation and administration of the YUCAIPA-GSA; and within each group, the Parties shall equally share in the costs of the creation and administration of the YUCAIPA-GSA. Nothing in this provision shall obligate any party to bear any portion of the attorneys' fees and legal costs of another Party.

VIII. Stakeholders. The initially designated stakeholders are the COUNTIES. The Parties agree to work together in ensuring public outreach and involvement of the public and other interested stakeholders throughout the SGMA process, including but not limited to all beneficial uses and users of groundwater as provided in SGMA Section 10723.2. Stakeholders have no voting rights under Section V.C. and no cost sharing obligations under Section VII of this MOA.

IX. Term, Termination, and Withdrawal.

A. Term. This MOA shall continue and remain in effect unless and until terminated by the unanimous written consent of the Parties, or as otherwise provided in this MOA or as authorized by law.

B. Withdrawal. After the YUCAIPA-GSA is officially established as the GSA for the Basin, any Party may decide, in its sole discretion, to withdraw from this MOA by providing ninety (90) days written notice to the other Parties. A Party that withdraws from this MOA shall remain obligated to pay its share of costs and expenses incurred or accrued under this MOA and any related cost-sharing agreement or arrangement up to the date the Party provides its notice of withdrawal as provided herein. Withdrawal by a Party shall not cause or require the termination of this MOA or the existence of the YUCAIPA-GSA with respect to the non-withdrawing Parties. In the event of withdrawal by one of the LOCAL AGENCIES, the Parties shall meet and confer during the 90-day notice period regarding: (i) whether the withdrawing Party wishes to seek GSA status for a portion of the Basin underlying the jurisdictional area or service area of the withdrawing Party; (ii) whether, as a result of the withdrawal, a co-GSA management or other arrangement with the withdrawing Party is necessary to satisfy the requirements of SGMA; and (iii) any other issues and steps that are necessary to avoid triggering probationary status of the Basin and State Water Board intervention. Any resolution of issues pertaining to withdrawal and any

other GSA issues shall be undertaken in a manner that satisfies all requirements of SGMA and DWR, including any requirement to file new GSA notices.

X. Notice Provisions

All notices required by this MOA shall be made in writing and delivered to the respective representatives of the Parties at their respective addresses as follows:

PARTIES:

PURVEYORS:

South Mesa Water Company
391 West Avenue L
Calimesa, California 92320
Attn: Dave Armstrong, General Manager
Email: smwc@verizon.net

South Mountain Water Company
35 Cajon Street
Redlands, California 92373
Attn: Cecilia Griego, Water Resources Specialist
Email: cgriego@cityofredlands.org

Western Heights Water Company
32352 Avenue D
Yucaipa, California 92399
Attn: William Brown, General Manager
Email: w.brown@westernheightswater.org

Yucaipa Valley Water District
12770 Second Street
Yucaipa, California 92399
Attn: Joseph, Zoba, General Manager
Email: jzoba@yvwd.dst.ca.us

MUNICIPALS:

City of Calimesa
908 Park Avenue
Calimesa, California 92399
Attn: Bonnie Johnson, City Manager
Email: bjohnson@cityofcalimesa.net

City of Redlands
35 Cajon Street
Redlands, California 92373
Attn: Chris Diggs, Municipal Utilities and Engineering Director
Email: cdiggs@cityofredlands.org

City of Yucaipa
34272 Yucaipa Boulevard
Yucaipa, California 92399
Attn: Ray Casey, City Manager
Email: rcasey@yucaipa.org

REGIONALS:

San Bernardino Valley Municipal Water District
380 E. Vanderbilt Way
San Bernardino, CA 92408
Attn: Douglas Headrick, General Manager & Chief Engineer
Email: douglash@sbvmwd.com

San Gorgonio Pass Water Agency
1210 Beaumont Avenue
Beaumont, CA 92223
Attn: Jeff Davis, General Manager and Chief Engineer
Email: jdavis@sgpwa.com

STAKEHOLDERS:

COUNTIES:

County of Riverside
4080 Lemon Street
Riverside, CA 92501
Attn: Steve Horn, Senior Management Analyst, Executive Office
Email: shorn@rceo.org

County of San Bernardino
385 N. Arrowhead Avenue
San Bernardino, CA 92415-0120
Attn: Bob Page, Principal Management Analyst, Special Projects
Email: bpage@sbcounty.gov

Any Party or Stakeholder may change the address to which notices are to be given under this MOA by providing all other Parties with written notice of such change at least fifteen (15) calendar days prior to the effective date of the change. All notices shall be effective upon receipt and shall be deemed received upon confirmed personal service, confirmed facsimile delivery, confirmed courier service, or on the fifth (5^{th}) calendar day following deposit of the notice in registered first class mail.

XI. General Terms

A. Amendments. Amendments to this MOA require the unanimous written consent of all Parties and approval by the Parties' respective governing boards.

B. Successors and Assigns. The terms of this MOA shall be binding upon and inure to the benefit of the successors-in-interest and assigns of each Party; provided, however, that no transfer or assignment shall be effective until approved by the

Parties in accordance with the provisions of Section V.C. of this MOA. Once succession and/or assignment has been approved, a former Party shall have no further rights or obligations under this MOA.

C. Waiver. No waiver of any provision of this MOA by any Party shall be construed as a further or continuing waiver of such provision or any other provision of this MOA by the waiving Party or any other Party.

D. Authorized Representatives. Each person executing this MOA on behalf of a Party hereto affirmatively represents that such person has the requisite authority to sign this MOA on behalf of the respective Party.

E. Exemption from CEQA. The Parties recognize and agree that, pursuant to SGMA Section 10728.6, neither this MOA nor the preparation or adoption of a GSP constitute a "project" or approval of a project under the California Environmental Quality Act (CEQA) or the State CEQA Guidelines, and therefore this MOA is expressly exempt from CEQA review.

F. Governing Law and Venue. This MOA shall be governed by and construed in accordance with the laws of the State of California. Any suit, action, or proceeding brought under the scope of this MOA shall be brought and maintained to the extent allowed by law in the County of San Bernardino, California.

G. Attorney's Fees, Costs, and Expenses. In the event of a dispute among any or all of the Parties arising under this MOA, each Party shall assume and be responsible for its own attorney's fees, costs, and expenses.

H. Entire Agreement/Integration. This MOA constitutes the entire agreement among the Parties regarding the specific provisions of this MOA, and the Parties hereto have made no agreements, representations or warranties relating to the specific provisions of this MOA that are not set forth herein.

I. Construction and Interpretation. The Parties agree and acknowledge that this MOA has been developed through a negotiated process among the Parties, and that each Party has had a full and fair opportunity to review the terms of this MOA with the advice of its own legal counsel and to revise the terms of this MOA, such that each Party constitutes a drafting Party to this MOA. Consequently, the Parties understand and agree that no rule of construction shall be applied to resolve any ambiguities against any particular Party as the drafting Party in construing or interpreting this MOA.

J. Force Majeure. No Party shall be liable for the consequences of any unforeseeable force majeure event that (1) is beyond its reasonable control, (2) is not caused by the fault or negligence of such Party, (3) causes such Party to be unable to perform its obligations under this MOA, and (4) cannot be overcome by the exercise of due diligence. In the event of the occurrence of a force majeure event, the Party unable to perform shall promptly notify the other Parties in writing to the extent practicable. It shall further pursue its best efforts to resume its obligations under this MOA as quickly as possible and shall suspend performance only for such period of time as is necessary as a result of the force majeure event.

K. Execution in Counterparts. This MOA may be executed in counterparts, each of which shall be deemed an original and all of which when taken together shall constitute one and the same instrument.

L. No Third Party Beneficiaries. This MOA is not intended, and will not be construed, to confer a benefit or create any right on a third party or the power or right of any third party to bring an action to enforce any of the terms of this MOA.

M. Timing and Captions. Any provision of this MOA referencing a time, number of days, or period for performance shall be measured in calendar days. The captions of the various articles, sections, and paragraphs of this MOA are for convenience and ease of reference only, and do not define, limit, augment, or describe the scope, content, terms, or intent of this MOA.

IN WITNESS WHEREOF, the Parties hereto have approved and executed this MOA as of the respective dates specified in the adopting Resolution of each Party as provided above in Article III of this MOA.

[Signature Pages Follow]

COUNTY OF RIVERSIDE
EXECUTIVE OFFICE

GEORGE A. JOHNSON
COUNTY EXECUTIVE OFFICER

ROB FIELD
ASSISTANT COUNTY EXECUTIVE OFFICER
ECONOMIC DEVELOPMENT AGENCY

MICHAEL T. STOCK
ASSISTANT COUNTY EXECUTIVE OFFICER
HUMAN RESOURCES

ZAREH SARRAFIAN
ASSISTANT COUNTY EXECUTIVE OFFICER
HEALTH SYSTEMS

PAUL McDONNELL
ASSISTANT COUNTY EXECUTIVE OFFICER
COUNTY FINANCE DIRECTOR

June 22, 2017

Mr. Douglas Headrick
General Manager and Chief Engineer
San Bernardino Valley Municipal Water
District 380 E. Vanderbilt Way
San Bernardino, CA 92408

re: Support for Yucaipa Sub-Basin GSA

Mr. Headrick:

The County of Riverside appreciates the commitment of the cities of Calimesa, Redlands and Yucaipa; San Bernardino Valley Municipal Water District; San Gorgonio Pass Water Agency; Yucaipa Valley Water District; South Mesa Water Company; South Mountain Water Company; and Western Heights Water Company to maintain local control of the Yucaipa Sub-Basin and to work together through a Memorandum of Agreement to sustainably manage the basin's groundwater resources in a way that considers the interests of all beneficial uses and users.

As the County is also eligible to serve as the Groundwater Sustainability Agency for the Yucaipa Sub-Basin, the County wishes to assure you that it does not intend to adopt a competing Groundwater Sustainability Agency formation resolution and notification of the California Department of Water Resources.

If you should have any questions, please contact me at 951-955-1110 or by email at agann@rivco.org.

Sincerely,

Alex Gann
Deputy County Executive Officer

ec: Steve Van Stockum, Director, Riverside County Department of Environmental Health
Jeff Johnson, Deputy Director, Riverside County Department of Environmental Health
Jason Uhley, General Manager-Chief Engineer, Riverside County Flood Control
And Water Conservation District

385 N. Arrowhead Avenue, 5th Floor, San Bernardino, CA 92415 | Phone: 909.387.4830 Fax: 909.387.3029
www.SBCounty.gov

SAN BERNARDINO COUNTY

Board of Supervisors

May 23, 2017

Mr. Douglas Headrick
General Manager and Chief Engineer
San Bernardino Valley Municipal Water District
380 E. Vanderbilt Way
San Bernardino, CA 92408

Re: Support for Yucaipa Sub-Basin Groundwater Sustainability Agency

Mr. Headrick:

On May 23, 2017, the County of San Bernardino Board of Supervisors voted to communicate the County's support of the cooperative efforts of the Yucaipa Sub-Basin Groundwater Sustainability Agency to manage groundwater in the Yucaipa Sub-Basin (No. 8-2.07) in compliance with the California Sustainable Groundwater Management Act.

The County appreciates the commitment of the cities of Calimesa, Redlands and Yucaipa; San Bernardino Valley Municipal Water District; San Gorgonio Pass Water Agency; Yucaipa Valley Water District; South Mesa Water Company; South Mountain Water Company; and Western Heights Water Company to maintain local control of the Yucaipa Sub-Basin and to work together through a Memorandum of Agreement to sustainably manage the basin's groundwater resources in a way that considers the interests of all beneficial uses and users.

As the County is also eligible to serve as the Groundwater Sustainability Agency for the Yucaipa Sub-Basin, the County wishes to assure you that the County does not intend to adopt a competing Groundwater Sustainability Agency formation resolution and notification of the California Department of Water Resources. To that end, on March 7, 2017, the Board of Supervisors adopted a resolution that the County would not be the Groundwater Sustainability Agency for 11 groundwater basins and sub-basins in the county, including Yucaipa Sub-Basin. A copy of this resolution is attached.

If you should have any questions, please contact Bob Page, Principal Management Analyst, at (909) 387-4384 or by email at bpage@cao.sbcounty.gov. Thank you.

Sincerely,

Robert A. Lovingood
Chairman and First District Supervisor
Board of Supervisors
County of San Bernardino

REPORT/RECOMMENDATION TO THE BOARD OF SUPERVISORS OF SAN BERNARDINO COUNTY, CALIFORNIA AND RECORD OF ACTION

May 23, 2017

FROM: **DENA M. SMITH, Interim Chief Executive Officer**
County Administrative Office

SUBJECT: **SUPPORT FOR BEAR VALLEY BASIN AND YUCAIPA BASIN GROUNDWATER SUSTAINABILITY AGENCIES**

RECOMMENDATION(S)

1. Approve and authorize submission of letters of support for the cooperative efforts of cities, water districts and water companies to manage groundwater in compliance with the California Sustainable Groundwater Management Act in the following groundwater basins:
   a. Bear Valley Basin (No. 8-9)
   b. Yucaipa Sub-Basin (No. 8-2.07)
2. Authorize the Chairman of the Board of Supervisors or the Chief Executive Officer to execute similar letters of support, subject to review by County Counsel, for local agency efforts to manage other groundwater basins in San Bernardino County that must comply with the California Sustainable Groundwater Management Act for which the County has previously notified the California Department of Water Resources that the County will not serve as the Groundwater Sustainability Agency.

(Presenter: Bob Page, Principal Management Analyst, 387-5425)

COUNTY AND CHIEF EXECUTIVE OFFICER GOALS AND OBJECTIVES

Ensure Development of a Well-Planned, Balanced, and Sustainable County.
Pursue County Goals and Objectives by Working with Other Agencies.

FINANCIAL IMPACT

Providing letters of support to local agencies forming Groundwater Sustainability Agencies (GSAs) will not result in the use of additional Discretionary General Funding (Net County Cost).

BACKGROUND INFORMATION

Effective January 1, 2015, the California Sustainable Groundwater Management Act (SGMA) requires local water and land use agencies to sustainably manage 127 groundwater basins and sub-basins (basins) that have been designated by the California Department of Water Resources (DWR) as medium or high priority. SGMA mandates that one eligible local agency or multiple eligible local agencies form a GSA for each of these basins by June 30, 2017 with the responsibility of developing and implementing a Groundwater Sustainability Plan (GSP).

cc: CAO-Smith
CAO-Page w/Letters of Support
CAO-Shea
File - Administrative Office w/copy of Letters
jr 5/24/17

ITEM 55

Record of Action of the Board of Supervisors

APPROVED (CONSENT CALENDAR)
COUNTY OF SAN BERNARDINO
Board of Supervisors

MOTION	AYE	AYE	SECOND	MOVE	AYE
	1	2	3	4	5

LAURA H. WELCH, CLERK OF THE BOARD

BY _____

DATED: May 23, 2017

Rev 7-12-16

DWR has designated Bear Valley Basin as medium priority. DWR has also defined the boundaries of the Bear Valley Basin in its Bulletin 118 and assigned it No. 8-9. The City of Big Bear Lake, the Big Bear City Community Services District and the Big Bear Municipal Water District have formed the Bear Valley Basin Groundwater Sustainability Agency (Bear Valley Basin GSA), a joint powers authority that became effective on April 26, 2017, with the purpose to become the exclusive GSA for the Bear Valley Basin.

DWR has designated Yucaipa Sub-Basin as medium priority. DWR has also defined the boundaries of the Yucaipa Sub-Basin in its Bulletin 118 and assigned it No. 8-2.07. Negotiations of a Memorandum of Agreement (MOA) regarding the formation of a GSA for the Yucaipa Sub-Basin completed in April. The MOA was circulated for approval by June from the governing bodies of the following parties to the MOA: the cities of Calimesa, Redlands and Yucaipa; San Bernardino Valley Municipal Water District; San Gorgonio Pass Water Agency; Yucaipa Valley Water District; South Mesa Water Company; South Mountain Water Company; and Western Heights Water Company.

Before either GSA can be the exclusive GSA for their respective basin, SGMA requires that they hold a noticed public hearing to adopt a resolution to become the exclusive GSA. The Bear Valley Basin GSA hearing is scheduled for May 25, 2017. The parties to Yucaipa Sub-Basin GSA MOA will hold separate public hearings on various dates before June 30, 2017. The GSAs will then have 30 days to notify DWR of their decisions, providing among other things a map of the service areas of the parties within each basin (attached) and a list of all beneficial uses and users of the groundwater and how their interests will be considered in the operation of the GSAs and the development and implementation of their GSPs.

DWR will post the notices on its SGMA Portal on its website (sgma.water.ca.gov/portal/#intro). Other eligible local agencies in each basin, including the County, will then have 90 days to file a competing GSA notice. If no competing notices are filed with DWR, the Bear Valley Basin GSA and Yucaipa Sub-Basin GSA will become the exclusive GSAs for their basins. On March 7, 2017 (Item No. 20), the Board of Supervisors (Board) adopted a resolution that the County would not be the GSA for 11 groundwater basins and sub-basins in the county, including Bear Valley Basin and Yucaipa Sub-Basin. The Board adopted a similar resolution covering five other basins on January 10, 2017 (Item No. 21).

The parties to these GSAs requested that the County support their efforts. If approved by the Board, the recommended letters will be provided to the Bear Valley Basin GSA and Yucaipa Sub-Basin GSA.

If local agencies in any of the other 14 basins covered by the Board's January 10 and March 7 resolutions request support of their GSA, approval of Recommendation No. 2 will authorize the Chairman of the Board or the Chief Executive Officer to execute similar letters of support, subject to review by County Counsel.

PROCUREMENT
N/A.

REVIEW BY OTHERS
This item has been reviewed by County Counsel (Sophie A. Akins, Deputy County Counsel, 387-5001) on May 5, 2017; Finance (Stephenie Shea, Administrative Analyst, 387-4919) on May 8, 2017; and County Finance and Administration (Katrina Turturro, Deputy Executive Officer, 387-5423) on May 8, 2017.

Exhibit A

RESOLUTION NO. 2017-18

COPY

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF YUCAIPA, CALIFORNIA, APPROVING THE MEMORANDUM OF AGREEMENT TO FORM A GROUNDWATER SUSTAINABILITY AGENCY FOR THE YUCAIPA SUB-BASIN WITH THE CITIES OF CALIMESA AND REDLANDS; THE SOUTH MESA WATER COMPANY; THE SOUTH MOUNTAIN WATER COMPANY; THE WESTERN HEIGHTS WATER COMPANY; THE YUCAIPA VALLEY WATER DISTRICT; THE SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT; AND THE SAN GORGONIO PASS WATER AGENCY

WHEREAS, on September 16, 2014, Governor Jerry Brown signed into law Senate Bills 1168 and 1319, and Assembly Bill 1739, collectively known as the Sustainable Groundwater Management Act ("SGMA"), codified in certain provisions of the California Government Code, including commencing with Section 65350.5, and codified in Part 2.74 of Division 6 of the California Water Code, commencing with Section 10720, and amending other provisions of the California Government Code and California Water Code; and

WHEREAS, various clarifying amendments to SGMA were signed into law in 2015, including Senate Bills 13 and 226, and Assembly Bills 617 and 939, which were codified in part in California Water Code Section 10723.6(a), authorizing a combination of local agencies to form a Groundwater Sustainability Agency (GSA) pursuant to a joint powers agreement, a memorandum of agreement, or other legal agreement; and, California Water Code Section 10723.6(b), authorizing water corporations regulated by the California Public Utilities Commission and mutual water companies to participate in a GSA through a memorandum of agreement or other legal agreement; and

WHEREAS, the Yucaipa Sub-Basin (Basin) is identified by the California Department of Water Resources (DWR) Bulletin 118 as Sub-Basin No. 8-02.07 of the Upper Santa Ana Valley Groundwater Basin, and is designated by DWR as a medium priority basin; and

WHEREAS, California Water Code Section 10720.7 requires the Basin, as a medium priority basin that is not designated by DWR as being subject to critical conditions of overdraft, to be managed by Groundwater Sustainability Plan by January 31, 2022; and

WHEREAS, the Cities of Yucaipa, Calimesa and Redlands; the Yucaipa Valley Water District; the South Mountain Water Company; the San Bernardino Valley Municipal Water District; and the San Gorgonio Pass Water Agency have water supply, water management, and/or land use responsibilities for their respective jurisdictional areas overlying the Basin and are local agencies as defined by SGMA, and thus each is authorized by SGMA to become or form a GSA; and

WHEREAS, the South Mesa Water Company and the Western Heights Water Company produce groundwater and provide water service within the Basin, and it is the intent to provide for management-level participation by these Water Companies in the GSA

WHEREAS, the City held a public hearing on May 22, 2017, after publication of notice pursuant to Government Code Section 6066 to consider adoption of this Resolution; and

WHEREAS, adoption of this Resolution does not constitute a "Project" under the California Environmental Quality Act (CEQA) pursuant to 15060(c)(3) and 15378(b)(5) of the State CEQA Guidelines because it is an administrative action that does not result in any direct or indirect physical change in the environment.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF YUCAIPA DOES HEREBY RESOLVE, DETERMINE AND ORDER AS FOLLOWS:

Adopt Resolution No. 2017-18 approving the Memorandum of Agreement to form a Groundwater Sustainability Agency for the Yucaipa sub-basin with the Cities of Calimesa and Redlands; the South Mesa Water Company; the South Mountain Water Company; the Western Heights Water Company; the Yucaipa Valley Water District; the San Bernardino Valley Municipal Water District; and the San Gorgonio Pass Water Agency.

PASSED, APPROVED, and ADOPTED this 22nd day of May, 2017.

DICK RIDDELL, MAYOR

ATTEST:

JENNIFER SHANKLAND, CITY CLERK

RESOLUTION 2017 - 09

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE SAN GORGONIO PASS WATER AGENCY TO APPROVE THE MEMORANDUM OF AGREEMENT TO JOINTLY FORM THE YUCAIPA GROUNDWATER SUSTAINABILITY AGENCY FOR THE YUCAIPA SUBBASIN

WHEREAS, the Sustainable Groundwater Management Act of 2014 (SGMA) was signed into law on September 16, 2014, went into effect on January 1, 2015, and has been subject to various amendments; and

WHEREAS, SGMA provides for the sustainable management of groundwater basins at the local level through the formation of Groundwater Sustainability Agencies (GSAs) and through preparation and implementation of Groundwater Sustainability Plans (GSPs); and

WHEREAS, the Yucaipa Subbasin (Basin) is identified by the California Department of Water Resources (DWR) Bulletin 118 as Subbasin No. 8-02.07 of the Upper Santa Ana Valley Groundwater Basin, and is designated by DWR as medium priority, and therefore, except as provided by SGMA, the Basin is subject to the requirements of SGMA; and

WHEREAS, the San Gorgonio Pass Water Agency (Agency) is a special act agency of the State of California, organized and operating pursuant to the San Gorgonio Pass Water Agency Law, California Water Code Appendix, Chapter 101, and accordingly the Agency constitutes a local agency for all purposes under SGMA; and

WHEREAS, SGMA authorizes a combination of local agencies as defined by SGMA to form a GSA pursuant to a joint powers agreement, a memorandum of agreement, or other legal agreement, and SGMA also authorizes a water corporation regulated by the California Public Utilities Commission or a mutual water company to participate in a GSA through a memorandum of agreement or other legal agreement; and

WHEREAS, in accordance with SGMA, the Agency, South Mesa Water Company (South Mesa), South Mountain Water Company (South Mountain), Western Heights Water Company (Western Heights), Yucaipa Valley Water District (YVWD), City of Calimesa (Calimesa), City of Redlands (Redlands), City of Yucaipa (Yucaipa), and San Bernardino Valley Municipal Water District (San Bernardino Valley Municipal) have prepared a Memorandum of Agreement (MOA), attached hereto as **Exhibit A**, to jointly form a GSA that is referred to in the MOA as the Yucaipa-GSA to cover the entire Basin, the members of which Yucaipa-GSA are the Agency, South Mesa, South Mountain, Western Heights, YVWD, Calimesa, Redlands, Yucaipa, and San Bernardino Valley Municipal; and

WHEREAS, the Agency is committed to the sustainable management of groundwater resources within the Basin in accordance with SGMA; and

WHEREAS, pursuant to the requirements of SGMA, the Agency held a public hearing on this date after publications of notice pursuant to California Government Code Section 6066 to consider adoption of this Resolution; and

WHEREAS, pursuant to SGMA Section 10728.6 and Public Resources Code Section 21065, neither this Resolution, nor the MOA, nor the preparation or adoption of a GSP constitutes a project or approval of a project under the California Environmental Quality Act (CEQA) or the State CEQA Guidelines.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE SAN GORGONIO PASS WATER AGENCY THAT:

1. The San Gorgonio Pass Water Agency hereby approves the Memorandum of Agreement to Jointly Form the Yucaipa Groundwater Sustainability Agency for the Yucaipa Subbasin (MOA), a copy of which is attached hereto as **Exhibit A**.

2. Pursuant to the MOA and as authorized by SGMA, the San Gorgonio Pass Water Agency elects to jointly form and participate as a member of the Yucaipa Groundwater Sustainability Agency (Yucaipa-GSA) for the entire Basin as further set forth and depicted in the MOA.

3. The General Manager of the San Gorgonio Pass Water Agency is hereby authorized and directed to coordinate with other members of the Yucaipa-GSA to submit a copy of this Resolution and other applicable information to the California Department of Water Resources regarding the formation of the Yucaipa-GSA.

I HEREBY CERTIFY that the foregoing is a true, full and correct copy of Resolution 2017-09 that was duly introduced, passed and adopted at a regular meeting of the Board of Directors of the San Gorgonio Pass Water Agency, at its regular meeting on June 5, 2017.

David L. Fenn, Board President
San Gorgonio Pass Water Agency

ATTEST:

Jeffrey Davis, Secretary

BYLAWS OF THE
YUCAIPA SUSTAINABLE GROUNDWATER MANAGEMENT AGENCY
(Department of Water Resources Sub-Basin No. 8-02.07)

ARTICLE I - NAME, ORGANIZATION, REPRESENTATIVES, PRINCIPAL OFFICE

Section 1.1 Name. The name of this organization is the Yucaipa Sustainable Groundwater Management Agency (hereinafter referred to as the "Yucaipa-SGMA").

Section 1.2 Organization. The Yucaipa-SGMA was formed by a Memorandum of Agreement ("MOA") in 2017 which remains in full force and effect, by and among: South Mesa Water Company, South Mountain Water Company, Western Heights Water Company and Yucaipa Valley Water District, herein collectively referred to as the "Water Purveyors"; and the City of Calimesa, the City of Redlands, and the City of Yucaipa, herein collectively referred to as the "Municipalities"; and the San Bernardino Valley Municipal Water District, and the San Gorgonio Pass Water Agency, herein collectively referred to as the "Regionals." Each of the above-described entities is individually referred to as a "Party" and collectively referred to as the "Parties".

Section 1.3 Board of Directors. Each Party shall appoint a principal representative and alternative representative, who may be changed from time to time at the sole discretion of the designating Party. The individuals appointed to the Yucaipa-SGMA shall be a senior executive management level employee of each designating Party. In the event that the appointed representative(s) is/are no longer employed by the appointing Party, the individual will be removed as a member of the Board of Directors of the Yucaipa-SGMA. Written confirmation from the governing board shall be provided to the Yucaipa-SGMA at the Principal Office following any change in representation.

Section 1.4 Principal Office. The principal office of the Corporation is hereby fixed and located at the offices of the San Bernardino Valley Municipal Water District, 380 East

Vanderbilt Way, San Bernardino, California 92408. The Parties hereby granted full power and authority to change said principal office from one location to another. Any such change shall be noted by the Secretary.

ARTICLE II - ROLES AND RESPONSIBILITIES

Section 2.1 Sustainable Groundwater Management Act. The Parties agree to jointly implement the Sustainable Groundwater Management Act ("SGMA"), codified in certain provisions of the California Government Code, including commencing with Section 65350.5, and codified in Part 2.74 of Division 6 of the California *Water Code*, commencing with Section 10720, and amending other provisions of the California *Government Code* and California *Water Code.*

Section 2.2 Groundwater Sustainability Plan. Specifically, the Parties agree to develop, implement, and maintain a Groundwater Sustainability Plan ("Plan") prepared pursuant to the Sustainable Groundwater Management Act (Part 2.74 of Division 6 of the Water Code, beginning with Section 10720) for the Yucaipa Basin (Department of Water Resources Sub-Basin No. 8-02.07) ("Basin"),

The following general principles shall guide the Parties in the implementation of a Groundwater Sustainability Plan: (a) Adopt a Plan that defines the basin setting and establishes criteria that will maintain or achieve sustainable groundwater management; (b) Monitor and report groundwater conditions to demonstrate that the Plan is achieving the sustainability goal for the basin; (c) Document the effect of the implementation of the Plan on adjacent basins; (d) Modify the Plan as needed, and report on a substantial compliance to the California Department of Water Resources; (e) Establish and report sustainable management criteria, projects, and management actions; and (f) Justify that the Plan provides a sustainably managed basin for 20 years following Plan implementation without adversely affecting the ability of an adjacent basin to achieve and maintain its sustainability goal.

Section 2.3 Powers and Duties. The Yucaipa-SGMA shall exercise the following powers:

A. To adopt rules, regulations, policies, bylaws and procedures governing the operation of the Yucaipa-SGMA.

B. To establish as-needed Ad Hoc and Standing advisory committees for making recommendations to the Board of Directors. Committees shall exist for the term specified in the action creating the committee, and the Board of Directors may dissolve a committee at any time through a majority vote of the Parties.

C. To monitor all public and private groundwater production and extractions.

D. To develop a Groundwater Sustainability Plan as described in Section 2.2.

E. To prepare an Annual Groundwater Report that reflects: all public and private groundwater extractions; natural and artificial recharge; return from use; water quality issues; contamination plumes; and other parameters deemed necessary by the Board of Directors to accurately determine the quantity and quality of the groundwater conditions in the Yucaipa Basin (Department of Water Resources Sub-Basin No. 8-02.07).

F. To determine the amount of additional artificial recharge for the Basin from imported sources as a complement to native sources, and to plan for the development and application of such additional sources of recharge.

G. By a majority vote, the Board of Directors may elect to exercise the following powers for a duration determined or modified as needed:

    a. To contract for the services of engineers, attorneys, planners, financial consultants, and separate and apart therefrom, to appoint agents and representatives to employ such other staff persons as necessary.

    b. To determine, assess, collect, account, and audit annual groundwater extraction charges to recover expenses related to groundwater recharge, administrative expenses, data collection, and report preparation as determined by the Board of Directors.

    c. To cooperate, act in conjunction, and contract with the United States, the State of California, or any agency thereof, counties, municipalities, public and private corporations of any kind (including without limitation, investor-owned utilities), and individuals, or any of them, for any and all purposes necessary or convenient for the purposes of the Yucaipa-SGMA.

d. To accumulate operating and reserve funds and invest the same as allowed by law for the purposes of the Yucaipa-SGMA.

e. As may be permitted by law, to apply for and accept grants, contributions, donations and loans, including under any federal, state or local programs for assistance in developing or implementing any of its projects or programs in connection with any project untaken by the Yucaipa-SGMA.

f. To implement a cost-sharing methodology in a manner that qualifies as a pass-through charge under the Constitutional requirements of Proposition 218 and similar revenue-raising requirements.

g. To exercise any power necessary or incidental to the foregoing powers in the manner and according to the procedures provided for under the law applicable to the Parties to this Agreement.

ARTICLE III - MEETINGS

Section 3.1 Regular Meetings. The Parties shall hold regular quarterly meetings on the fourth Wednesday in January, April, July, October for the purpose of conducting routine business matters. The Parties by resolution may fix and adjust the time, date, and place of holding such meetings.

Section 3.2 Workshops and Special Meetings. The Parties may schedule, and conduct workshops and special meetings as needed at the direction of a majority of the Board of Directors. The Parties by resolution may fix the time, date, and place of holding such meetings.

Section 3.3 Voting Methodology. The voting structure for matters pertaining to the establishment and implementation of the administrative components of the Yucaipa-SGMA shall be by simple majority (51%) of the voting Parties, wherein each Water Purveyor, Municipality and Regional holds a single vote.

Section 3.4 Fees and Compensation. Representatives from each Party shall receive no compensation or expenses from the Yucaipa-SGMA.

Section 3.5 Ralph M. Brown Act. Notwithstanding any of the provisions of these Bylaws to the contrary, all meetings shall be subject to the Ralph M. Brown Act, commencing at Section 54950 of the Government Code of the State of California.

Section 3.6 Conduct of Meetings. The President or, in the absence of the President the Vice President, or, in the absence of the Vice President the Secretary, or, in the absence of the Secretary a Chairperson chosen by a majority of the Parties present, shall preside over the meeting.

Section 3.13 Quorum. A majority of the Parties constitutes a quorum for the transaction of business.

ARTICLE IV - OFFICERS

Section 4.1 Officers. The officers of the Yucaipa-SGMA shall be a President, a Vice President, a Secretary, a Treasurer.

Section 4.2 Election. The officers shall be chosen at the first Regular Meeting held each calendar year and each shall hold office until the officer shall resign, be removed, or be otherwise disqualified to serve, or the officer's successor is elected.

Section 4.3 Removal and Resignation. Any officer may resign, or may be removed, with or without cause, at any time. Vacancies caused by death, resignation or removal of any officer may be filled by a majority vote of the Parties.

Section 4.4 President. The President shall preside at all meetings of the Parties.

Section 4.5 Vice President. In the absence of the President, the Vice President shall perform all the duties of the President.

Section 4.6 Secretary. The Secretary shall keep a book of minutes of all meetings, with the time and place of holding, the names of those present, and actions taken by the Parties.

Section 4.7 Treasurer. The Treasurer shall keep and maintain adequate and correct books of account showing the receipts and disbursements of the Yucaipa-SGMA, and an account of its cash and other assets, if any. Such books of account shall at all reasonable times be open to inspection by any Director.

The Treasurer shall deposit all moneys of the Yucaipa-SGMA with such depositories as are designated by the Parties and shall disburse the funds of the Yucaipa-SGMA as may be ordered, and shall render to the Parties, regular statements of the financial condition of the Yucaipa-SGMA.

ARTICLE V - MISCELLANEOUS

Section 5.1 Execution of Documents. The Parties may authorize any officer or officers as agent or agents, to enter into any contract or execute any instrument in the name of and on behalf of the Yucaipa-SGMA and such authority may be general or confined to specific instances; and unless so authorized, no officer, agent or other person shall have any power or authority to bind the Yucaipa-SGMA by any contract or engagement or to pledge its credit or to render it liable for any purpose or to any amount.

Section 5.2 Inspection of Bylaws. The Yucaipa-SGMA shall keep in its principal office the original or a copy of these Bylaws, as amended or otherwise altered to date, certified by the Secretary, which shall be open to inspection by members of the public at all reasonable times during office hours.

Section 5.3 Fiscal Year. The fiscal year of the Yucaipa-SGMA shall begin July 1 of each year and end on the last day of June of the succeeding year.

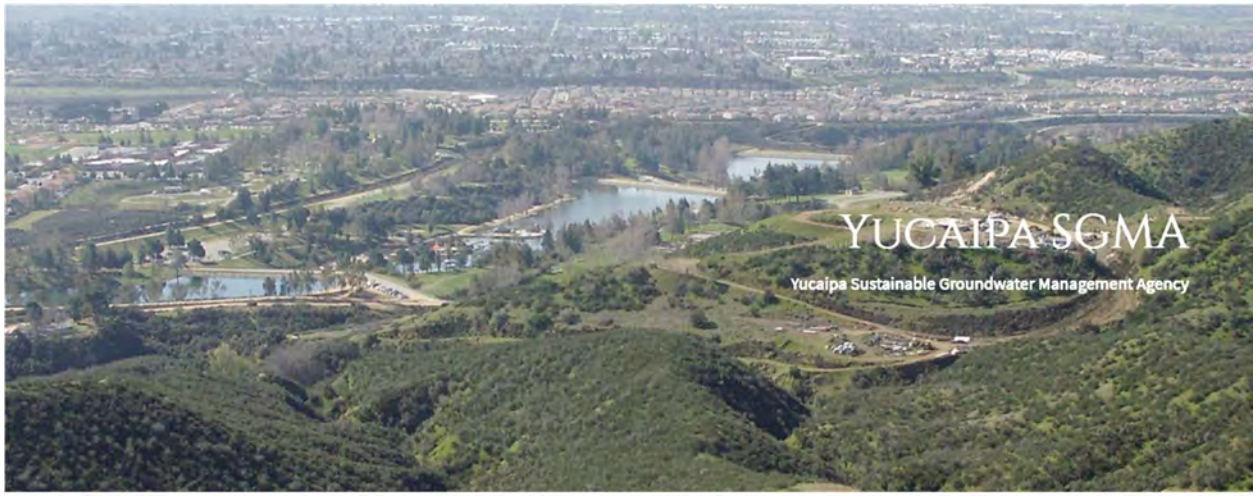
Section 5.4 Construction and Definitions. Unless the context otherwise requires, the general provisions, rules of construction and definitions contained in the Law shall govern the construction of these Bylaws. If any section, subsection, sentence, clause or phrase of these Bylaws, or the application thereof, is contrary to the Law, the provisions of the Law shall prevail. Without limiting the generality of the foregoing, the masculine gender includes the feminine and neuter, the singular number includes the plural and the plural number includes the singular, and the term "person" includes a corporation as well as a natural person.

Section 5.5 Amendments. New Bylaws may be adopted, or these Bylaws may be amended or repealed by the vote of the Parties. No amendment to these Bylaws shall be effective until approved by the Parties.

Approved unanimously on May 23, 2018.

Appendix 1-C

Public Outreach and Engagement Plan



PUBLIC OUTREACH AND ENGAGEMENT PLAN

Prepared for:

Yucaipa Sustainable Groundwater Management Agency
YucaipaSGMA.org

Prepared by:

DUDEK
605 Third Street
Encinitas, California 92024

July 2019

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FIGURES

GLOSSARY OF TERMS/ABBREVIATIONS

Acronym/Abbreviation	Definition
Yucaipa SGMA	Yucaipa Sustainable Groundwater Management Agency
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
DWR	California Department of Water Resources
TAG	Technical Advisory Group
SWRCB	State Water Resources Control Board
South Mesa	South Mesa Water Company
South Mountain	South Mountain Water Company
WHWC	Western Heights Water Company
YVWD	Yucaipa Valley Water District
SBVMWD	San Bernardino Valley Municipal Water District
SGPWA	San Gorgonio Pass Water Agency
Term	**Definition**
Aquifer	An underground layer of water-bearing permeable rock, rock fractures or unconsolidated material (gravel, sand, or silt) that yields significant amounts of groundwater to wells or springs (DWR Bulletin 118).
Yucaipa Subbasin	Upper Santa Ana Valley Groundwater Basin, Yucaipa Subbasin, identified as Groundwater Basin Number 8-2.07 in DWR Bulletin 118 – California's Groundwater
Stakeholder	An individual with interest in the Yucaipa Subbasin GSP
Engagement	Efforts made to understand and involve stakeholders and their concerns in the activities and decision-making of the Yucaipa GSA
Member Agencies	The water purveyors, municipalities and regional water agencies who are members of the Yucaipa Groundwater Sustainability Agency

1 BACKGROUND OF THE SUSTAINABLE GROUNDWATER MANAGEMENT ACT

The Sustainable Groundwater Management Act, signed into law by Governor Jerry Brown on September 16, 2014, created a new framework for groundwater management in California. The framework includes a structure and schedule to achieve sustainable groundwater management within 20 years. The California Department of Water Resources (DWR) has historically managed the state's central repository for groundwater data. Under The Sustainable Groundwater Management Act, DWR provides guidance, financial assistance, and technical support for compliance with state requirements. The State Water Resources Control Board (SWRCB) provides the regulatory backstop under The Sustainable Groundwater Management Act, taking over basin management and assessing fees if local groundwater management is not successful in complying with the requirements of The Sustainable Groundwater Management Act.

The Sustainable Groundwater Management Act established a new structure for local groundwater management through Groundwater Sustainable Agencies (GSAs). The formation of GSAs for all basins that the DWR designated as high and medium priority groundwater basins was required by July 1, 2017. Each GSA for these high and medium priority basins must then develop a Groundwater Sustainability Plan (GSP) that details how sustainable groundwater management will be achieved within 20 years of implementing the GSP. Sustainable groundwater management is defined by The Sustainable Groundwater Management Act as *the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results*. This avoidance of undesirable results is measured through six sustainability indicators:

1. Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon,
2. Significant and unreasonable reduction of groundwater storage,
3. Significant and unreasonable seawater intrusion,
4. Significant and unreasonable degradation of water quality,
5. Significant and unreasonable land subsidence, and
6. Depletion of interconnected surface water and groundwater that has significant and unreasonable adverse impacts on beneficial uses of the surface water.

The GSP is a tool used to help the GSA sustainably manage the basin. The criteria for sustainable management, including determining what is significant and unreasonable within the parameters of The Sustainable Groundwater Management Act for the

groundwater basin managed by that GSA, must be assessed, with input from stakeholders, before the GSP can be adopted.

1.1 Sustainable Groundwater Management Act Requirements for Stakeholder Engagement

Stakeholder engagement is an important component of any successful long term planning effort. Engaging members of the public in groundwater sustainability planning will improve public understanding of the technical and political considerations the GSA factors into their decision-making process. Participation by the public will also improve the GSA's understanding of the potential impacts of their decisions.

The Sustainable Groundwater Management Act recognized the importance of stakeholder engagement and laid out specific requirements for stakeholder engagement within each of the four phases of The Sustainable Groundwater Management Act:

Phase 1: GSA Formation and Coordination
The following Phase 1 requirements were completed by Yucaipa SGMA in 2017 and 2018:

- Establish and maintain a list of interested parties
- Provide public notice of the GSA formation
- Conduct a GSA formation public hearing
- Notify DWR of the GSA formation
- Provide a written statement to DWR as well as cities and counties within the GSA boundary describing how interested parties may participate in the GSP development.
- Develop GSA website for interested parties

Phase 2: GSP Preparation and Submission
The following Phase 2 requirements will be completed by Yucaipa SGMA by January 31, 2022:

- Submit initial notification.
- Prepare a GSP that considers beneficial uses and users of groundwater when describing undesirable results, minimum thresholds, projects and actions.
- The GSP must include a communication section that includes the following:
    - An explanation of the Agency's decision-making process.
    - Identification of opportunities for public engagement and a discussion of how public input and response will be used.

  - A description of how the Agency encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin.
  - The method the Agency will follow to inform the public about progress implementing the Plan, including the status of projects and actions.
- The GSA must provide public noticing and hold a public meeting before adopting or amending a GSP.

Phase 3: GSP Review and Evaluation

The following Phase 3 requirements will be completed by DWR:

- After the GSA adopts the GSP and it is submitted to DWR, the GSP will be available on the DWR website for a 60-day comment period for any person to provide comments to DWR before the DWR completes evaluation and assessment of the GSP.

Phase 4: Implementation and Reporting

The following Phase 4 requirements will be completed by Yucaipa SGMA through 2042:

- The Sustainable Groundwater Management Act requires assessments and re-evaluation of the GSP at least every 5 years. The GSA must provide public notice and hold public meetings prior to amending the GSP.
- Public notice is also required before the GSA imposes or increases fees.

There are also has general requirements that apply to all four phases of Sustainable Groundwater Management Act implementation.

2 YUCAIPA SUBBASIN AND GSA FORMATION

The Upper Santa Ana Valley Groundwater Basin, Yucaipa Subbasin lies under portions of the cities of Calimesa, Redlands, and Yucaipa, as well as unincorporated San Bernardino and Riverside Counties. The Subbasin, cataloged by the California Department of Water Resources (DWR) as groundwater basin number 8-2.07, is approximately 25,300 acres (Figure 1).

The Yucaipa Sustainable Groundwater Management Agency (Yucaipa SGMA) was formed as the GSA for the Yucaipa Subbasin in 2017 through a Memorandum of Agreement (MOA) entered into by local water purveyors, municipalities, and regional water management entities.

Yucaipa-GSA Member Agencies
Purveyors
South Mesa Water Company
South Mountain Water Company
Western Heights Water Company
Yucaipa Valley Water District
Municipalities
City of Redlands
City of Yucaipa
Regionals
San Bernardino Valley Municipal Water District
San Gorgonio Pass Water Agency

The Yucaipa SGMA completed the initial phase of stakeholder engagement (Phase 1) in June 2017 and provided the required documentation for GSA formation, which is available to the public through the DWR Sustainable Groundwater Management Act Portal (https://sgma.water.ca.gov/portal/gsa/print/349).

The City of Calimesa submitted a written Notice of Withdrawal dated November 19, 2018 and the Yucaipa SGMA subsequently acknowledged the withdrawal of the City of Calimesa from the Yucaipa SGMA at the January 23, 2019 meeting.

2.1 Yucaipa SGMA and GSA Decision Making Process

The roles and responsibilities of the Yucaipa SGMA were further clarified in the By-Laws adopted in May 2018. Each of the Member Agencies appoints one principal representative and one alternate representative to the Yucaipa SGMA Board. All Board meetings are public meetings subject to the Ralph M. Brown Act. Each Board member has one vote and a simple majority of 51% of the voting parties is required to pass an item. A majority of the Board is considered a quorum for purposes of meeting and decision-making.

3 YUCAIPA SUBBASIN GSP

The DWR has designated the Yucaipa Subbasin as a high-priority basin based on population size and growth, reliance on groundwater for public water supply, and long-term declines in groundwater levels. The Yucaipa Subbasin is not designated as critically overdrafted, therefore a GSP must be developed by January 31, 2022. This GSP will detail a pathway to sustainable groundwater management by 2042 in accordance with the Sustainable Groundwater Management Act.

Yucaipa SGMA has initiated the process of developing a GSP (Yucaipa GSP) for the Yucaipa Subbasin that will define a course of action to achieve sustainable groundwater management within 20 years of plan adoption. The Yucaipa GSP will identify local undesirable results and identify management actions to minimize undesirable results as well as milestones to ensure progress. A groundwater monitoring program will be developed and implemented to track improvement within the basins leading to sustainable management. The Yucaipa GSP will be re-evaluated and refined, as needed, and submitted to DWR every five years in accordance with the Sustainable Groundwater Management Act.

4 PURPOSE OF THE DOCUMENT

This Public Outreach and Engagement Plan (Plan) has been developed as a communication tool to help stakeholders understand the importance of participation in groundwater sustainability planning and lay the framework of how stakeholders can actively engage in the Yucaipa-GSA planning effort. In 2018, DWR released a guidance document for GSP Stakeholder Communication and Engagement that details best practices including the development of Communication and Engagement Plans to increase transparency in the GSP development process.

The Yucaipa SGMA will prepare a GSP in accordance with The Sustainable Groundwater Management Act that will guide future management decisions including the amount of ground water that can be pumped from the subbasin without causing undesirable results, and the development of new projects to enhance water resource management.

The Yucaipa SGMA discussed overarching goals for outreach and engagement at the April 24, 2019 Board Meeting. The primary goals during the GSP development process included:

1. Maintaining transparency throughout the GSP development process,
2. Developing a common understanding among stakeholders of the Yucaipa subbasin needs, and

3. Exceeding the state requirements for outreach and engagement.

This Plan is intended to be a guiding framework that will be updated as needed to maintain transparency throughout the GSP development and implementation process.

5 OPPORTUNITIES FOR PUBLIC INVOLVEMENT AND ENGAGEMENT

The Yucaipa SGMA encourages members of the public to participate in the GSP development and implementation process through attending public meetings, providing comments on the draft GSP, and communicating directly with member agency staff and Board members.

5.1 Meeting Opportunities

The Yucaipa SGMA Board holds quarterly regular meetings the fourth Wednesday in January, April, July, and October to conduct routine business matters. During the development of the GSP, the Technical Advisory Group (TAG) will meet approximately monthly as needed. All Board and TAG meetings are open to the public and each meeting agenda includes an item where members of the public can speak to the Board. All meeting agendas and minutes are posted on the Yucaipa SGMA website (https://yucaipasgma.org).

5.1.1 Public Notices

Board meetings and workshops are noticed in accordance with the Brown Act. In addition to publicly noticing meetings on the Yucaipa SGMA website, the Yucaipa SMGA maintains a list of interested parties and distributes electronic agenda information and newsletters via email. Newsletters include notices of Yucaipa SGMA Board meetings and other updates including updates on the progress of the GSP development and implementation. Interested parties can subscribe to the list that receives email notifications through the “subscribe” link at the bottom of the website home page (https://yucaipasgma.org).

5.2 Collaborative Opportunities

The Yucaipa-SMGA has taken an inclusive approach to groundwater management, making space on the Board for each of the local entities with water supply, water management, and or land use responsibility in the Yucaipa Subbasin that wanted to participate in the GSA. The Board understands that each interested party has an established relationship with their local water supplier that should continue through the development and implementation of the GSP. Each Board member is appointed by the

member agency and represents the constituents in their jurisdiction. In addition to the Yucaipa SGMA Board member agencies, representatives from the City of Calimesa, the County of Riverside and the County of San Bernardino participated in the formation of the Yucaipa SGMA and are committed to continued involvement as representatives of their stakeholder interests. Due to this uniquely inclusive Board structure, Yucaipa SGMA views each Board member and stakeholder representative as an ambassador of their own jurisdiction, representing their interests in the Yucaipa SGMA meetings.

Purveyors

5.2.1 South Mesa Water Company

The South Mesa Water Company (South Mesa) is a mutual water company, formed in 1912, with approximately 4 square miles within the service area including portions of both the City of Calimesa and the City of Yucaipa. Water supplied by South Mesa is currently 100% groundwater. The South Mesa service area is approximately 90% residential with some industrial uses, several schools, and some small parks. South Mesa engages directly with shareholders through the annual shareholder meeting and updates as needed. South Mesa engages with shareholders through their website, regular Consumer Confidence Reports, social media platforms and information available at the South Mesa office. Many shareholders also pay their bills in person and converse regularly with South Mesa staff.

5.2.2 South Mountain Water Company

The South Mountain Water Company (South Mountain) is a mutual water company with groundwater production in the Yucaipa subbasin. The City of Redlands owns majority shares and operates the two wells owned by South Mountain. The business activities of the company are conducted by Bear Valley Mutual Water Company.

5.2.3 Western Heights Water Company

The Western Heights Water Company (WHWC) serves approximately 4.53 square miles including parts of the City of Yucaipa and the City of Redlands. Approximately 90% of WHWC customer demand is domestic with approximately 10% industrial and commercial use. WHWC currently has sufficient groundwater supply for 100% of the potable water demand, but purchases 25% imported water to offset groundwater demand. WHWC shareholders engage in decision making through participation in WHWC Board meetings.

5.2.4 Yucaipa Valley Water District

The Yucaipa Valley Water District (YVWD) is a special district that was formed in 1971 and supplies local groundwater, treated imported water, and recycled water. The Yucaipa Valley Water District service area is approximately 40 square miles and includes portions of the City of Calimesa and the City of Yucaipa. Approximately 78% of the water use in the YVWD is residential with approximately 22% commercial, industrial and institutional. The YVWD engages with customers through their local office, website and consumer confidence reports. YVWD also published some notices in the local newspaper as appropriate.

Municipalities

5.2.5 City of Redlands

The City of Redlands was incorporated in 1888 and currently serves water to local businesses and more than 75,000 residents in Redlands, Mentone, parts of Crafton Hills, San Timoteo Canyon, and a small portion of San Bernardino. The City of Redlands supplies originate as surface water, groundwater and imported water. The City of Redlands provides ongoing communication with stakeholders through their website and social media. Important water-related information is distributed with consumer confidence reports and bills as appropriate.

5.2.6 City of Yucaipa

The City of Yucaipa was incorporated in 1989 and currently has over 58,000 residents. Water service in the City is provided by YVWD, South Mesa, and WHWC. South Mountain has water facilities, including water wells, within the City of Yucaipa, but does not currently provide water services in the City. The entire City of Yucaipa is within the service area of the SBVMWD. The City of Yucaipa has several commissions and committees, including the Planning Commission, Parks and Recreation Commission, and Trails and Open Space Committee, that enable citizens to participate in the governance process. The City of Yucaipa regularly holds public meetings where members of the general public can voice concerns or issues. The City also engages with stakeholders through social media, the city website and newspaper publications as appropriate.

Regionals

5.2.7 San Bernardino Valley Municipal Water District

The San Bernardino Valley Municipal Water District was formed in 1954 as a regional water agency. The San Bernardino Valley Municipal Water District is a wholesale water supplier that imports water through the State Water Project, manages groundwater stored within the District boundaries, and coordinates delivery of imported water to local water retail agencies.

5.2.8 San Gorgonio Pass Water Agency

The San Gorgonio Pass Water Agency (SGPWA) was established in 1961 and supplies State Water Project water to retail water agencies. The SGPWA engages with stakeholders through semi-monthly public Board meetings and workshops. SGPWA provides regular updates on the website and through social media.

Stakeholders

5.2.9 City of Calimesa

The City of Calimesa was incorporated in 1990 and currently has over 8,000 residents. Water service in the City is provided by South Mesa and YVWD. The entire City of Calimesa is within the San Gorgonio Pass Water Agency service area. The City has several active commissions and provides opportunities for public comment at all City Council and Commission meetings. The City also engages with stakeholders through their website and social media.

5.2.10 County of Riverside

The County of Riverside was formed in 1893 and covers nearly 7,300 square miles including 28 cities. The County provides information and updates on a centralized website as well as social media.

5.2.11 County of San Bernardino

The County of San Bernardino was formed in 1854 and covers 20,000 square miles including 24 cities. The County provides information and updates on a centralized website as well as social media.

5.3 Opportunities for Tribal Communities

According to the DWR Water Management Planning Tool, as of January 2019, there are no tribal trust lands within the Yucaipa Subbasin as shown in Figure 2. Although there are no federally recognized tribes, Indian land currently or historically held in Trust by the United States Government or smaller Reservation areas within the Yucaipa Subbasin, the Yucaipa SGMA encourages participation from all stakeholders including tribal communities within the watershed.

5.4 Disadvantaged Communities

There are several communities within the Subbasin that DWR has mapped as Disadvantaged Communities (DAC) and Severely Disadvantaged Communities (SDAC) based on median household income within community census tracts, blocks, and places as shown in Figure 3. The majority of the areas designated as DAC and SDAC are within either the City of Yucaipa or the City of Calimesa. Members of these communities are represented on the Yucaipa SGMA by both their City representative and their water supplier.

5.5 Stakeholder Email List

The Yucaipa SGMA maintains a list of stakeholders interested in the GSP process, known as the *List of Interested Parties (List)*. Electronic newsletter, meeting notices, and notices of GSP documents are sent electronically to the List. There are currently over 100 individuals subscribed to the List. The List is continuously updated with individuals that request in writing to be placed on the list of interested parties or subscribe through the Yucaipa SGMA website.

5.6 Online Resources

The Yucaipa SGMA has created a website (www.YucaipaSGMA.org) that includes general information, relevant documents, a calendar of meetings and important events, as well as the agendas and minutes for all Yucaipa SGMA meetings.

6 CONTACT US

This document serves as a tool for facilitating public engagement in the GSP development process. It is designed to be a living document that is updated as needed to reflect current mechanism of engagement. Yucaipa SGMA will continue to use the communication tools outlined in this document as necessary through the implementation phase of the GSP.

For additional information regarding the Yucaipa SGMA and the GSP, please contact:

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Phone: (909) 387-9215
Email: bobt@sbvmwd.com

Mailing Address:
San Bernardino Valley Municipal Water District
380 East Vanderbilt Way,
San Bernardino, California 92408

Website: www.YucaipaSGMA.org

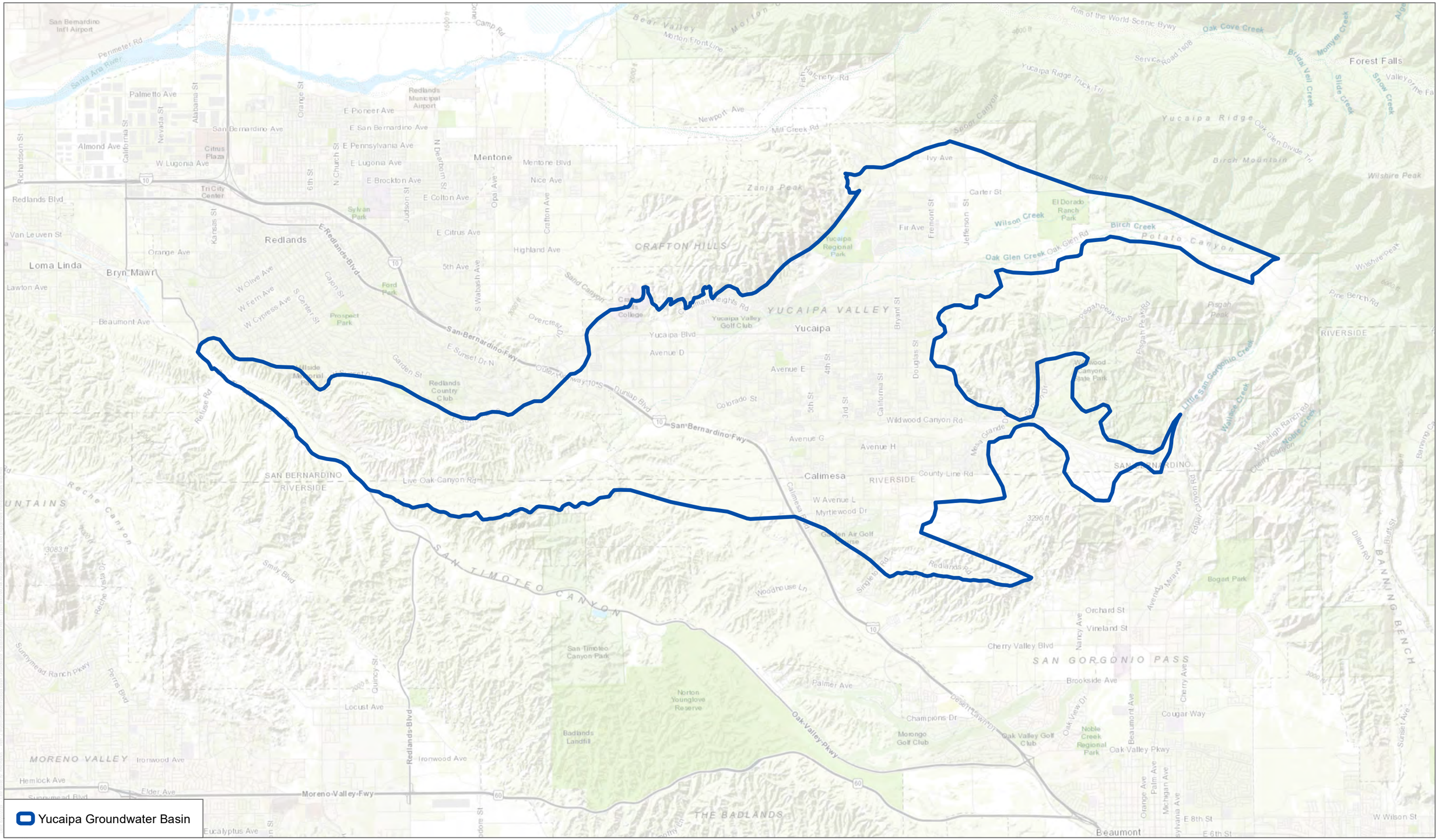

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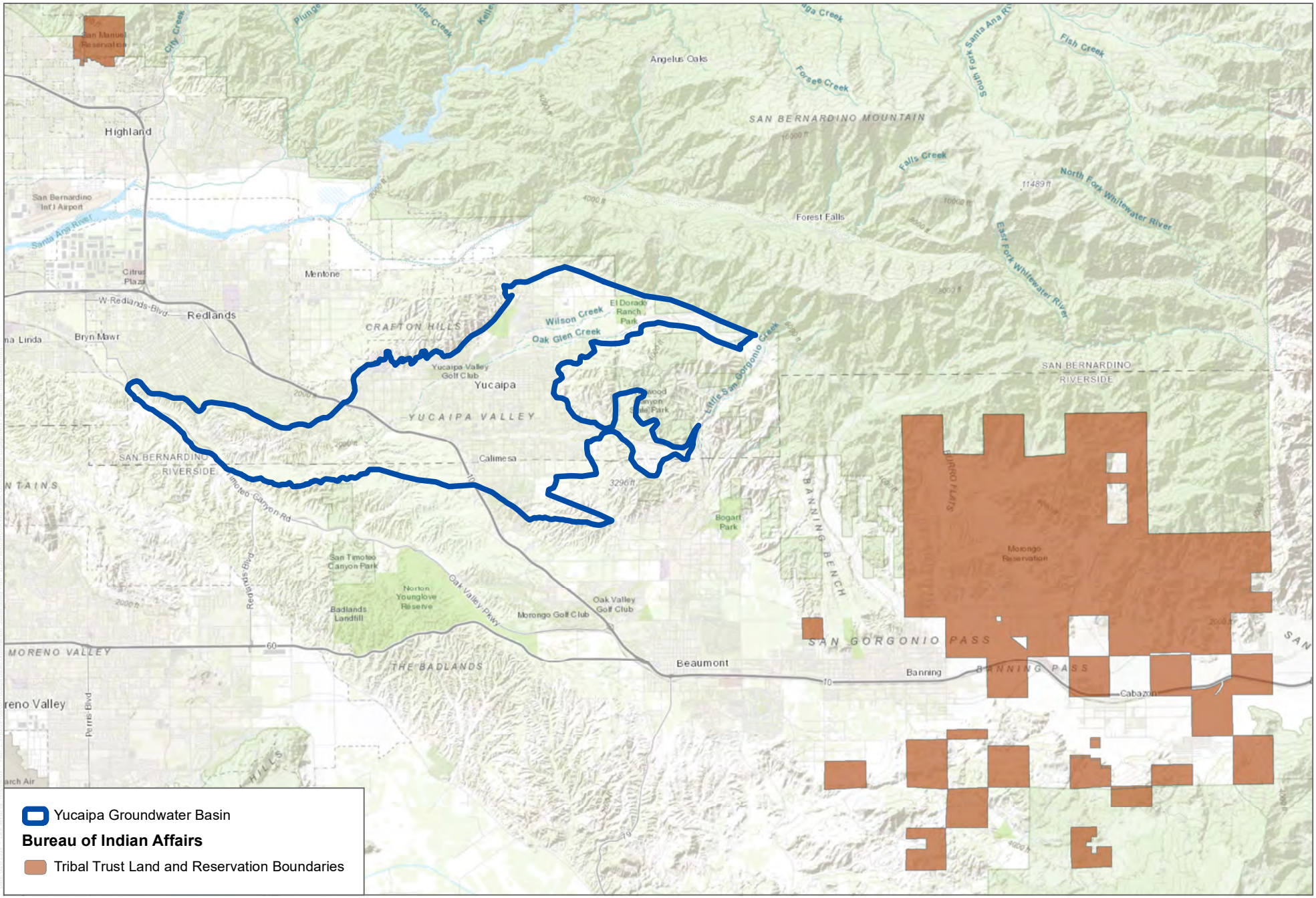
FIGURE 1

Boundary Map

Public Outreach and Engagement Plan



SOURCE: ESRI, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordanance Survey, ESRI Japan, METI, ESRI China (Hong Kong), swisstopo, OpenStreetMap contributors, and the GIS User Community; BLM; DWR

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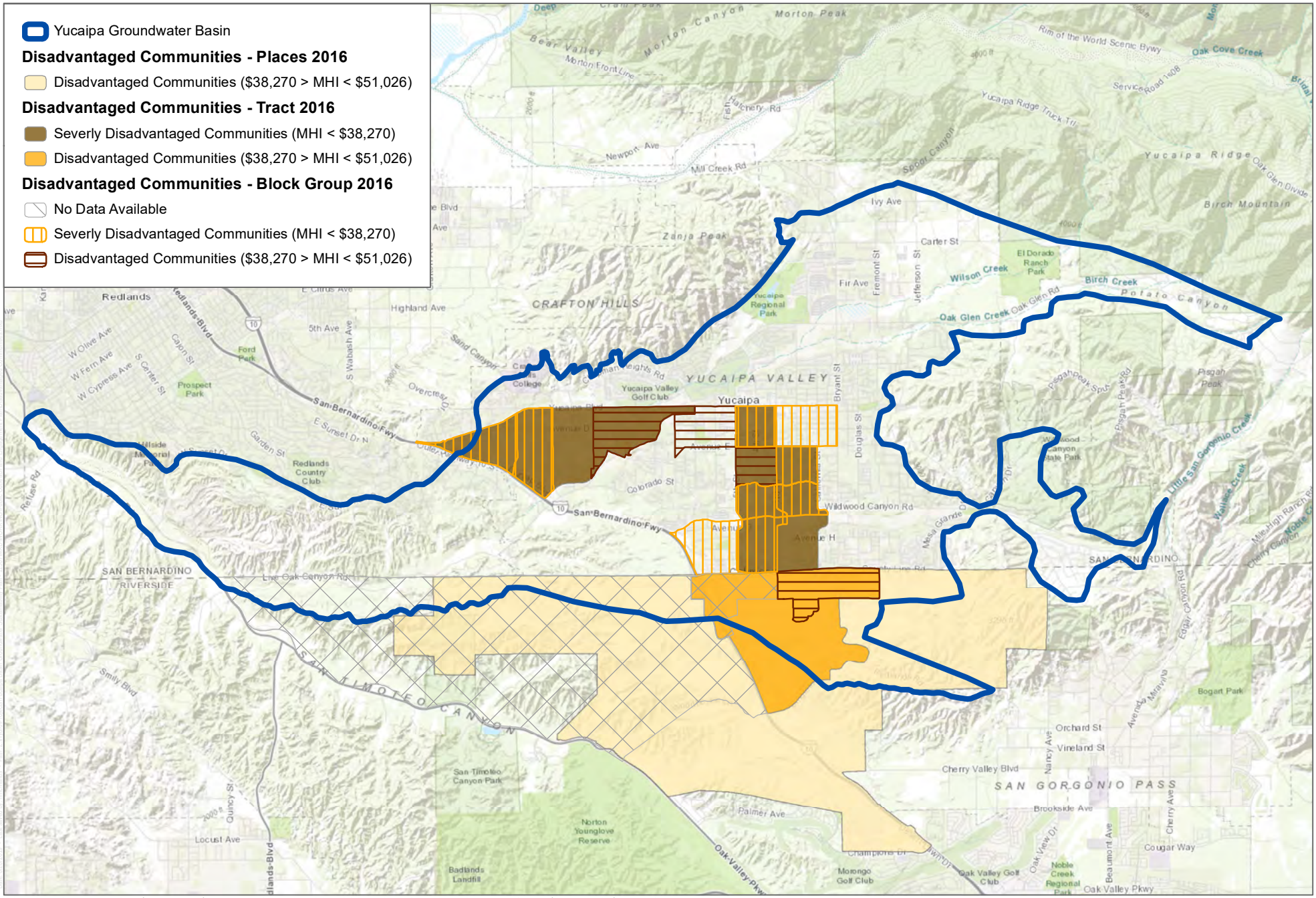
FIGURE 2

Tribal Trust Lands

Public Outreach and Engagement Plan



SOURCE: ESRI, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordanance Survey, ESRI Japan, METI, ESRI China (Hong Kong), swisstopo, OpenStreetMap contributors, and the GIS User Community; DWR 2019

Note: MHI = Mean Household Income

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FIGURE 3

Disadvantaged Communities

Public Outreach and Engagement Plan

This plan was paid for in part by a grant from the California Department of Water Resources through the Proposition 1 Sustainable Groundwater Planning Grant Program.

DUDEK

Appendix 1-D

Public Comments on Draft GSP

Comments on Draft GSP

City of Yucaipa Comments on Draft GSP

Management actions were defined to achieve sustainable management of the groundwater resources in the Plan Area should groundwater elevations decline below measurable objectives. These actions will be implemented when groundwater levels decline to the drought buffers established for the North Bench, Calimesa and Western Heights management areas. The drought buffers provide operational flexibility for the Yucaipa GSA to implement these management actions and/or other programs to prevent undesirable results.

INSERT 1

No projects were identified in this GSP to help achieve groundwater sustainability in the Plan Area. Yucaipa GSA member agencies have constructed stormwater capture basins to enhance recharge to the Subbasin. The Wilson Creek and Oak Glen Creek spreading basins are designed to capture stormwater and are used to artificially recharge the Subbasin using surplus SWP water delivered by the SWP East Branch Extension. Other existing and planned stormwater capture basins will provide additional opportunities to capture and recharge stormwater flows thereby reducing the reliance on imported water to meet the basin measurable objectives.

ES-5 Plan Implementation

Upon adoption of this GSP by the Yucaipa GSA, the primary activities associated with implementing the GSP include administrative duties by the member agencies of the Yucaipa GSA, the management of data collection, data validation, and analysis to evaluate conditions in the Subbasin, the preparation and submittal of annual reports and periodic evaluations, with associated data, to DWR, and an assessment of conditions in the Subbasin and determination if management actions need to be implemented. During the initial 5-year period after the GSP is adopted, the Yucaipa GSA will evaluate options to address data gaps, and conduct feasibility studies to evaluate the effectiveness of potential spreading basins and other programs that would maintain or achieve sustainability in the Subbasin.

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Some of the member agencies of the Yucaipa GSA have constructed storm water capture basins to enhance recharge to the Subbasin. The Wilson Creek and Oak Glen Creek basins are designed to capture storm water, but are primarily used to artificially recharge the Subbasin using surplus SWP water delivered by the SWP East Branch Extension. These basins are included in the YIHM to simulate their contributions to recharge to the Subbasin. The Wilson Creek and Oak Glen Creek basins have contributed an average 1,900 AFY and 170 AFY, respectively, since 2011. The other existing storm water capture basins are estimated to capture approximately 1,800 AFY. These projects provide additional benefits including improving water quality in surface waters by reducing stormwater runoff volumes and providing wildlife habitat.

The Yucaipa GSA identified proposed projects that have been designed, permitted, and are undergoing development or will in the near future. These include the Wilson Creek III Basins, the Pendleton Avenue Low Water Crossing, and the Upper Wildwood Creek Basin. The projects funded by the City of Yucaipa (with major funding also provided by SBVMWD for the Wilson III Basins) are designed to capture storm water flows and enhance recharge to the Subbasin. The estimated average annual recharge contribution is approximately 1,500 AF. These basins will be located in the North Bench management area. These planned basins were not included in the future water budget analyses for the North Bench management area using the YIHM, because the North Bench management area is not projected to experience undesirable results over the 50-year planning and implementation horizon. However, these planned projects will provide additional opportunities to capture and recharge stormwater flows, thereby reducing the reliance on imported water to meet the basin measurable objectives.

described in the November 2012 IRWM Proposition 84 and 1E Program Guidelines by the California Department of Water Resources. The 2015 IRWM Plan documents the IRWM Region's current IRWM program and processes that have been implemented since 2005 when the IRWM Region was created.

A Regional Water Management Group, also known as the Basin Technical Advisory Committee, was formed to implement and update the IRWM. The Basin Technical Advisory Committee consists of water agencies and other stakeholders. The Basin Technical Advisory Committee prepares an annual water management plan, which tracks certain metrics from the IRWM such as groundwater level data, groundwater storage levels, and liquefaction potential. It also provides recommended thresholds for groundwater recharge to help prevent liquefaction and migration of groundwater contamination plumes.

1.5.3 Operational Flexibility Limitations

Operational flexibility is a key consideration in integrated water resource management because it helps water purveyors adapt to known legal, operational, and environmental constraints, and plan for an uncertain future, especially as it relates to drought resiliency and the effects of climate change. Operational flexibility can be measured over a given time horizon and/or geographic scale (e.g., water district service area) as the difference between available water supply and service area demand. Operational flexibility is maximized when a water purveyor has a large variety of sources in a water supply portfolio, when it has local control over such sources, and when such sources are connected to each other (i.e., conjunctively managed). On a general statewide scale, water purveyors are increasingly looking to minimize reliance on imported water supplies by promoting stormwater recharge, maximizing wastewater recycling, and sustainably developing local sources of water.

For the Yucaipa Subbasin, water purveyors collectively draw from a combination of sources—including local surface water, groundwater, imports from the SWP, and recycled water—which differ in terms of the volume available, area served, timing of peak availability, reliability and cost. Climate and regulatory constraints (e.g., water quality standards, water rights, and minimum environmental flows) have historically had a greater impact on the availability of surface water supplies.

Groundwater sources were historically limited only by the capacity of production wells accessing the aquifer. However, declining water level trends prior to 2007 indicated an unsustainable withdrawal of groundwater from the Yucaipa Subbasin. The importation of supplemental SWP water into the subbasin led to a decrease in groundwater extractions to approximately the estimated safe yields of the minor subbasins. Consequently, the declining trends in groundwater levels ceased and water levels either stabilized or recovered to levels approaching the historical high groundwater levels observed in the Spring of 1988. With the passage of SGMA and the sustainable management criteria established in this GSP (Chapter 3), once adopted, groundwater extraction will be regulated by minimum thresholds established for each applicable sustainability indicator and an estimated sustainable yield.

The GSP complements and enhances existing projects and programs currently in place to maximize beneficial use of water resources and increase operational flexibility within the Yucaipa Subbasin. Existing water monitoring and management activities are summarized in Tables 1-3 and 1-5. To that end, individual Yucaipa GSA member agencies have implemented various policies and goals, such as enhancing recycled water use, implementing programs to conserve water usage, evaluating programs that would increase stormwater capture and artificial recharge, and policies requiring future developments to build and connect to existing water services, including recycled water, and sanitary sewer. Examples of projects that have increased operational flexibility within the Yucaipa Subbasin include YVWD's expansion and treatment upgrades at the WRWRF to increase recycled water output to serve back to its customers, and the near-future implementation of the Salinity and Groundwater Enhancement project designed to produce exceptionally pure recycled water for groundwater recharge.

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Other projects include the Wilson Creek and Oak Glen Creek basins which were designed to capture storm water, but are primarily used to artificially recharge the Subbasin using surplus SWP water delivered by the SWP East Branch Extension. These basins are included in the YIHM to simulate their contributions to recharge to the Subbasin. The Wilson Creek and Oak Glen Creek basins have contributed an average 1,900 AFY and 170 AFY, respectively, since 2011. The other existing storm water capture basins are estimated to capture approximately 1,800 AFY. These projects provide additional benefits including improving water quality in surface waters by reducing stormwater runoff volumes and providing wildlife habitat.

City of Redlands Comments on Draft GSP

Timestamp	Email	Name (First and Last)	Agency/Organization	Zip Code	Yucaipa GSP TOC and Executive Summary	Chapter 1 Administrative Information, Plan Area and Communication	Chapter 2 Basin Setting	Chapter 3 Sustainability Criteria	Chapter 4 Management Actions	Chapter 5 Plan Implementation	Appendices	General comments
2021/11/04 3:55:49 PM PDT	jharris@cityofredlands.org	John Harris	City of Redlands	92373		1.4.1.1.2 - City of Redlands is a majority shareholder in SMWC, and has historically operated and maintained their wells, but is not responsible for doing so. There is no Agreement obligating Redlands to operate and maintain SMWC wells. Also, Crafton Hills College is not located within the City of Redlands. 1.4.1.2.1 and 1.6.2.2.3 - Include similar language as above.						

South Mesa Water Company Comments on Draft GSP

South Mesa Water Company

Telephone (909)795-2401 · Fax (909)795-5299
391 West Avenue L · P.O. Box 458
Calimesa, California 92320-0458

November 30, 2021

VIA Email

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San Bernardino Valley Municipal Water District
380 E Vanderbilt Way
San Bernardino, CA 92408

Steve Stuart
sstuart@dudek.com
Dudek
605 3rd Street
Encinitas, California 92024
Steve Stuart

Re: Yucaipa GSA Revised GSP Administrative Draft and Dudek Responses
South Mesa Water Company Further Comments

Dear Mr. Howard and Mr. Stuart:

On behalf of South Mesa Water Company ("South Mesa"), we again express appreciation to Dudek and San Bernardino Valley Municipal Water District ("SBVMWD") staff for your hard work in preparing the Groundwater Sustainability Plan ("GSP") for the Yucaipa Groundwater Sustainability Agency ("Yucaipa GSA"). As you may recall, on October 12, 2021, South Mesa submitted detailed comments on the GSP Administrative Draft that was made available on September 22, 2021.

Following that date, Dudek released for Yucaipa GSA members' review: (1) a matrix summarizing Dudek's responses to comments on the GSP Administrative Draft; and (2) a revised, redline showing changes that were made to the GSP Administrative Draft based upon the comments received. We thank you for addressing many of South Mesa's comments both in the matrix and through revisions to the GSP text.

The purpose of this letter is provide comments on the revised GSP Administrative Draft and to follow up on prior South Mesa comments for which we request further

responses and clarifications. We have focused our comments on important substantive issues (rather than grammatical aspects) that need to be addressed prior to adoption of the GSP in January.

New South Mesa Comment Regarding Transferability of Pumping Credits

In Section 4.2.2., entitled, "Management Action #2 – Sustainable Yield Pumping Allocations and Groundwater Replenishment," Dudek has made a revision to the draft GSP text at the request of SBVMWD that is of significant concern to South Mesa. The revision adds a sentence expressly stating that "Pumping credits cannot be transferred or sold to another entity within a given management area or with the Subbasin."

That sentence should be deleted. The transferability of pumping credits is a significant policy matter that has not yet been specifically addressed by the Yucaipa GSA. In fact, the ability to transfer pumping credits within a management area or within the Subbasin could potentially provide an important management tool for the Subbasin and should be explored and discussed. Until that policy issue is addressed and decided, the GSP should not include language limiting or prohibiting transferability.

We request that the subject of transferability be placed on the agenda for preliminary discussion at the next Yucaipa GSA meeting, and that placeholder language be included in the GSP stating that "The Yucaipa GSA will continue to discuss transferability of pumping credits."

Follow Up on Prior South Mesa Comments on GSP Administrative Draft

Below are follow-up requests regarding South Mesa's prior (October 12, 2021) comments on the GSP Administrative Draft. For your convenience, we have replicated the relevant segments of Dudek's responses to comments matrix. Following the replications, we state our follow-up comment(s) for Dudek's further review and responses.

1.3.1. Description of Plan Area

1.3.1	13	Reference should be made to the study/report that identifies the "hydrogeological subbasins"	South Mesa	10/12/2021	Geoscience provided GIS files of the subarea boundaries to YVWD in June 2018. Will provide document references when available.

- Does Dudek have access to those GIS files, and if not, why not?
- Has Dudek requested Geoscience to identify the document references?

- When will the document references be available?

1.5.1.3. Annual Calculations of Change in Groundwater Storage in the Yucaipa Subbasin

1.5.1.3		Please provide a brief explanatory statement why 1993 was the "base year" for the SBVMWD storage monitoring program."	South Mesa	10/12/2021	Edit was made and tracked in the Admin draft.

- We appreciate the clarification made in the text, and have a few follow-up questions. This section currently reads, in relevant part: "In 2014, SBVMWD integrated the Subbasin into its existing program that calculates an annual change in groundwater storage for the San Bernardino Basin Area (SBBA) (SBVMWD, 2018). DWR first calculated the annual change in storage in the SBBA from 1934 to 1960. SBVMWD continued the work initiated by DWR and calculated the annual change in groundwater storage from 1961 to present. SBVMWD calculates a cumulative change in storage by quantifying the volume of water lost or gained compared to a base year. The base year for the Yucaipa Subbasin is 1993, which SBVMWD noted was "equivalent" to the base year of 1934 established by DWR (SBVMWD, 2018)."
- Please explain the meaning of "equivalent" as referenced in the text. We suggest revising the text to include that explanation, to avoid confusion from using "equivalent" in quotation marks.
- Please provide further clarification and confirmation that 1993 is an appropriate base year for measuring changes in groundwater storage under SGMA.

2.5.1.1. Triple Falls Creek Subarea

2.5.1.1	20	"The prior draft GSP Chapter 2 stated: 'Data obtained from YVWD indicated that production from the Triple Falls Creek subarea since the 2005 WY has averaged 190 AFY' - is this no longer accurate?"	South Mesa	10/7/2021	This sentence was deleted in the Admin Draft. YVWD did not operate their wells in this subarea after the 1994 WY.

- How, if at all, do the revised numbers stated in this section affect the GSP pumping allocations, replenishment fees, and credits that were presented at the August 2021, September 2021 and October 2021 Yucaipa GSA meetings?

2.5.1.2 Oak Glen Subarea

2.5.1.2	21	Comment on paragraph describing water produced by YVWD-25.	South Mesa	10/12/2021	This paragraph has been revised to read, "Water produced from well YVWD-25 is under the direct influence of surface water from nearby Oak Glen Creek. Water produced from YVWD-25 is treated at the OGSWFF located approximately 0.25 mile west of YVWD-25. Since the 2001 WY, YVWD-25 has delivered 192 AFY to 342 AFY of water to the OGSWFF."

- How, if at all, do the revised numbers stated in this section affect the GSP pumping allocations, replenishment fees, and credits for this Management Area that were presented at the August 2021, September 2021 and October 2021 Yucaipa GSA meetings?
- Does YVWD hold surface water diversion permits/licenses with respect to YVWD-25? The revised text removes references to diversion of surface water.

Multiple Sections – Regarding Revisions to Pumping Figures for Subareas

2.5.1.2	21	"What is the basis for the substantial revisions to the pumping figures?"	South Mesa	10/12/2021	The sentence describing pumping from the 1966 WY to 2014 WY has been revised (see response to comment 2.5.1.1.page 20). Please see the response to comment 2.8.2.3.3 regarding the changes to the groundwater production rates between the preliminary and admin drafts of the GSP.

2.5.1.5	23	"Please explain the basis for the change in the estimated pumping figures."	South Mesa	10/12/2021	Please see the response to comment 2.8.2.3.3 regarding the changes to the groundwater production rates between the preliminary and admin drafts of the GSP.

2.5.1.6	23	"Please explain the basis for the change in the estimated pumping figures."	South Mesa	10/12/2021	Please see the response to comment 2.8.2.3.3 regarding the changes to the groundwater production rates between the preliminary and admin drafts of the GSP.

2.5.1.7	24	"Please explain the basis for the change in the estimated pumping figures."	South Mesa	10/12/2021	Please see the response to comment 2.8.2.3.3 regarding the changes to the groundwater production rates between the preliminary and admin drafts of the GSP.

2.8.2.3.3	67	Please explain why the total subsurface recharge estimates in the earlier GSP Draft Chapter 2 (approx. 16,900 AFY) were revised substantially downward in the GSP Administrative Draft Chapter 2 (approx. 13,800 AFY)	South Mesa	10/12/2021	The total subsurface recharge estimates presented in the Preliminary Draft Chapter 2 reflected numerical model results from the September 2020 version of the Yucaipa Integrated Hydrologic Model (YIHM) developed by the USGS. The September 2020 version of the YIHM was updated and recalibrated based on input from Yucaipa SGMA staff and consultants and an internal review by the USGS. The updated model was provided to the Yucaipa SGMA in May 2021. The water budget values presented in the Administrative Draft Chapter 2 reflect simulation results from the May 2021 version of the YIHM. Updates to the May 2021 version of the YIHM include: (1) Corrections to an error in the PRMS component (watershed model) of the YIHM, (2) Revised characterization of the unsaturated zone, (3) Updated return flow estimates used in

					the numerical model, and (4) Revised hydraulic conductivity and aquifer storage property distributions. In addition to these revisions, the water budget results presented in the Administrative Draft Chapter 2 were developed using an updated methodology for extracting model outputs from the YIHM. Based on discussions with the USGS, the water budgets developed for the Administrative Draft Chapter 2 were generated by extracting daily volumetric flux output data, which provides higher-resolution estimates of the modeled water budgets compared to the methodology employed during development of the Preliminary Draft Chapter 2. The reduced subsurface recharge estimates presented in the Administrative Draft Chapter 2 reflect both revisions to the YIHM and updated methodologies for extracting model outputs and developing the water budgets.

For the above-listed sections, please address the following question:

- How, if at all, do the revised numbers stated in these sections affect the GSP pumping allocations, replenishment fees, and credits for Management Areas that were presented at the August 2021, September 2021 and October 2021 Yucaipa GSA meetings?

2.5.3. Groundwater Production Wells

2.5.3	27	"Please identify the Yucaipa Basin Subarea and Management Area to which YVWD-48 supplies water, the amount of that water and how it is reflected in the GSP Water Budget."	South Mesa	10/12/2021	The text was revised to indicate that YVWD-48 "supplies water to a portion of YVWD's service area within the Singleton, Calimesa and Live Oak subareas." The fraction of the volume of water from YVWD-48 that is served within the Subbasin has not been quantified. The YIHM simulates production from YVWD-48 and estimates return flows in the Subbasin based on water served in the Subbasin.

- South Mesa appreciates the initial response, but requests further clarification on this subsection regarding YVWD-48 that pumps groundwater from the Beaumont Basin for partial use within the Yucaipa Subbasin. The response indicates that the fraction of water from YVWD-48 that is served within the Subbasin has not been quantified but further states that the YIHM "simulates production from YVWD-48" and estimates return flows in the Subbasin "based on water served in the Subbasin." Will Dudek please provide further clarification regarding the assumptions (pumping, return flows, water served within the Subbasin, etc.) utilized for YVWD-48 and also for the analogous South Mesa-04 (which also produces groundwater from the Beaumont Basin, for use within the Yucaipa Subbasin).

2.8.1.1. Integrated Surface Water and Groundwater Numerical Model

2.8.1.1		"When will the USGS report documenting the YIHM development (to complete GSP Appendix 2-D) be released by USGS and available to review?"	South Mesa	10/12/2021	SBVMWD to provide response.

- Please provide an update as to when SBVMWD anticipates receiving the USGS YIHM modeling report.

2.8.2.2.3. Imported Groundwater

2.8.2.2.3	66	Comments on the groundwater pumped by South Mesa-04, YVWD-16, YVWD-48 and YVWD-61 and imported into the Subbasin.	South Mesa	10/12/2021	The text in this section refers to the YIHM and the data used to simulate pumping at South Mesa-04, YVWD-16, YVWD-48 and YVWD-61. The text has been edited to indicate the pumping rates simulated in the YIHM, and includes a reference to data obtained from South Mesa indicating that South Mesa-04 began operating in 1956. Table 2C-3 has been updated with the individual annual pumping rates at these four wells.

- A copy of Dudek's revised draft Table 2C-3 is included with this letter as **Attachment "A"**. The revised text, Table 2C-3 and Dudek response to South Mesa's October 12, 2021 comment, appear to be inconsistent with the data provided by SMWC regarding South Mesa-04. The revised text appears to indicate that Well 4 data is being applied only back to 1988 is due to YIHM model parameters only going back to 1988. Is that correct? If so, why does the YIHM include YVWD importing water beginning 1981 via YVWD-16?
- Table 2C-3 in Appendix 2C lists "0" AF imported by South Mesa-04 from 1987 and prior, and no reference is made prior to 1965. Please explain the those figures and date ranges, and how they are being applied.
- We invite Dudek to contact South Mesa to ensure that complete and accurate South Mesa-04 data is being utilized for the GSP.

4.2.2. Management Action #2 – Sustainable Yield Pumping Allocations and Groundwater Replenishment

4.2.2	15	Consider language that Pumping credits and recharge credits cannot be transferred or sold to another entity within a given management area or within the Yucaipa Subbasin	SBVMWD	10/7/2021	Added language to this effect in 4.2.2.

- Please see South Mesa's significant concerns with this revision, as stated at the beginning of this letter.

4.2.3. Management Action #3 – Surplus Supplemental Water Spreading

4.2.3	24	"The details of the management action and the applicable accounting methodology should be further described in this section, including examples."	South Mesa	10/12/2021	Surplus supplemental water, which is not associated with Management Action #2, and discharged to a spreading basin to facilitate the artificial recharge of the Subbasin will have a separate accounting by the Yucaipa-SGMA. The surplus supplemental water will be accessible to the water purveyor that purchased the water and percolated it at a spreading basin. This water will be available to help offset production exceedances above the sustainable yield pumping allocations instead of pumping credits earned via Management Action #2.

- Please provide a further detailed explanation regarding the accounting methodology for Surplus Supplemental Water. The response above indicates that Surplus Supplemental Water is not associated with Management Action #2, but indicates that that Surplus Supplemental water will nonetheless be available to offset production exceedances above sustainable yield pumping allocations (which allocations comprise an integral component of Management Action #2). We would appreciate added clarity regarding the interrelatedness and accounting methodology for Management Action #2 and Management Action #3.

We look forward to the December meeting and to working together toward adoption of a timely and effective GSP for the Yucaipa Subbasin.

Sincerely,

SOUTH MESA WATER COMPANY

Dave Armstrong, General Manager

ATTACHMENT A

Table 2C-3: Imported Groundwater to the Yucaipa Subbasin			
Water Year Ending	Imported Groundwater (AF)		
	South Mesa	YVWD	**Total**
1965	-	-	**-**
1966	-	0	**-**
1967	-	0	**-**
1968	-	0	**-**
1969	-	0	**-**
1970	-	0	**-**
1971	-	0	**-**
1972	-	0	**-**
1973	-	0	**-**
1974	-	0	**-**
1975	-	0	**-**
1976	-	0	**-**
1977	-	0	**-**
1978	-	0	**-**
1979	-	0	**-**
1980	-	0	**-**
1981	0	20	**20**
1982	0	104	**104**
1983	0	43	**43**
1984	0	18	**18**
1985	0	13	**13**
1986	0	6	**6**
1987	0	14	**14**
1988	263	19	**282**
1989	373	45	**418**
1990	469	41	**509**
1991	403	14	**417**
1992	353	2	**355**
1993	417	2	**419**
1994	488	14	**502**
1995	523	6	**529**
1996	582	7	**589**
1997	609	7	**615**
1998	504	3	**507**
1999	560	3	**563**
2000	577	25	**602**
2001	553	886	**1,439**
2002	537	1,518	**2,055**
2003	382	1,693	**2,075**
2004	474	1,657	**2,131**
2005	610	1,279	**1,890**
2006	643	1,709	**2,352**
2007	662	1,609	**2,271**
2008	509	777	**1,286**
2009	399	551	**951**
2010	422	665	**1,087**
2011	415	587	**1,002**
2012	441	694	**1,135**
2013	338	1,010	**1,349**
2014	417	1,198	**1,615**
Average	**380**	**331**	**858**

AF = acre-feet

The Nature Conservancy, Audubon California, the Local Government Commission, the Union of Concerned Scientists, and Clean Water Action / Clean Water Fund

Comments on Draft GSP

December 3, 2021

Yucaipa Groundwater Sustainability Agency
% San Bernardino Valley Municipal Water District
San Bernardino, California, 92408

Submitted via email: yucaipasgma@gmail.com

Re: Public Comment Letter for Yucaipa Subbasin Draft GSP

Dear Mark Iverson,

On behalf of the above-listed organizations, we appreciate the opportunity to comment on the Draft Groundwater Sustainability Plan (GSP) for the Yucaipa Subbasin being prepared under the Sustainable Groundwater Management Act (SGMA). Our organizations are deeply engaged in and committed to the successful implementation of SGMA because we understand that groundwater is critical for the resilience of California's water portfolio, particularly in light of changing climate. Under the requirements of SGMA, Groundwater Sustainability Agencies (GSAs) must consider the interests of all beneficial uses and users of groundwater, such as domestic well owners, environmental users, surface water users, federal government, California Native American tribes and disadvantaged communities (Water Code 10723.2).

As stakeholder representatives for beneficial users of groundwater, our GSP review focuses on how well disadvantaged communities, drinking water users, tribes, climate change, and the environment were addressed in the GSP. While we appreciate that some basins have consulted us directly via focus groups, workshops, and working groups, we are providing public comment letters to all GSAs as a means to engage in the development of 2022 GSPs across the state. Recognizing that GSPs are complicated and resource intensive to develop, the intention of this letter is to provide constructive stakeholder feedback that can improve the GSP prior to submission to the State.

Based on our review, we have significant concerns regarding the treatment of key beneficial users in the Draft GSP and consider the GSP to be **insufficient** under SGMA. We highlight the following findings:

1. Beneficial uses and users **are not sufficiently** considered in GSP development.
    a. Human Right to Water considerations **are not sufficiently** incorporated.
    b. Public trust resources **are not sufficiently** considered.
    c. Impacts of Minimum Thresholds, Measurable Objectives and Undesirable Results on beneficial uses and users **are not sufficiently** analyzed.
2. Climate change **is not sufficiently** considered.

3. Data gaps **are not sufficiently** identified and the GSP **does not have a plan** to eliminate them.
4. Projects and Management Actions **do not sufficiently consider** potential impacts or benefits to beneficial uses and users.

Our specific comments related to the deficiencies of the Yucaipa Subbasin Draft GSP along with recommendations on how to reconcile them, are provided in detail in **Attachment A.**

Please refer to the enclosed list of attachments for additional technical recommendations:

Attachment A	GSP Specific Comments
Attachment B	SGMA Tools to address DAC, drinking water, and environmental beneficial uses and users
Attachment C	Freshwater species located in the basin
Attachment D	The Nature Conservancy's "Identifying GDEs under SGMA: Best Practices for using the NC Dataset"
Attachment E	Maps of representative monitoring sites in relation to key beneficial users

Thank you for fully considering our comments as you finalize your GSP.

Best Regards,

Ngodoo Atume
Water Policy Analyst
Clean Water Action/Clean Water Fund

J. Pablo Ortiz-Partida, Ph.D.
Western States Climate and Water Scientist
Union of Concerned Scientists

Samantha Arthur
Working Lands Program Director
Audubon California

Danielle V. Dolan
Water Program Director
Local Government Commission

E.J. Remson
Senior Project Director, California Water Program
The Nature Conservancy

Melissa M. Rohde
Groundwater Scientist
The Nature Conservancy

Attachment A

Specific Comments on the Yucaipa Subbasin Draft Groundwater Sustainability Plan

1. Consideration of Beneficial Uses and Users in GSP development

Consideration of beneficial uses and users in GSP development is contingent upon adequate identification and engagement of the appropriate stakeholders. The (A) identification, (B) engagement, and (C) consideration of disadvantaged communities, drinking water users, tribes,[1] groundwater dependent ecosystems, streams, wetlands, and freshwater species are essential for ensuring the GSP integrates existing state policies on the Human Right to Water and the Public Trust Doctrine.

A. Identification of Key Beneficial Uses and Users

Disadvantaged Communities and Drinking Water Users

The identification of Disadvantaged Communities (DACs) and drinking water users is **incomplete**. The GSP provides information on DACs, including identification by name and location on a map (Appendix 1-C, Figure 3). However, the GSP fails to clearly state the population of each DAC or provide the population of DACs dependent on groundwater as their source of drinking water in the subbasin.

The plan fails to provide a density map or depth of domestic wells (such as minimum well depth, average well depth, or depth range) within the subbasin. This information is necessary to understand the distribution of shallow and vulnerable drinking water wells within the subbasin.

These missing elements are required for the GSAs to fully understand the specific interests and water demands of these beneficial users, and to support the consideration of beneficial users in the development of sustainable management criteria and selection of projects and management actions.

RECOMMENDATIONS

- Provide the population of each identified DAC. Identify the sources of drinking water for DAC members, including an estimate of how many people rely on groundwater (e.g., domestic wells, state small water systems, and public water systems).
- Include a domestic well density map and a map showing domestic well locations and average well depth across the subbasin.

Interconnected Surface Waters

The identification of Interconnected Surface Waters (ISWs) is **insufficient**, due to lack of supporting information provided for the ISW analysis. The GSP describes the use of a

[1] Our letter provides a review of the identification and consideration of federally recognized tribes (Data source: SGMA Data viewer) within the GSP from non-tribal members and NGOs. Based on the likely incomplete information available to our organizations for this review, we recommend that the GSA utilize the California Department of Water Resources' "Engagement with Tribal Governments" Guidance Document (https://water.ca.gov/Programs/Groundwater-Management/SGMA-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents) to comprehensively address these important beneficial users in their GSP.

groundwater model, the Yucaipa Integrated Hydrologic Model (YIHM), to analyze the interaction between groundwater and surface water within the subbasin. The model is briefly described in the Water Budget section of the GSP. The GSP provides a placeholder for the model documentation in Appendix 2-D, but this appendix was not provided as part of the draft GSP.

The GSP provides general statements regarding the connected nature of certain reaches in the Water Budget section of the GSP. The GSP states (p. 2-68): *"Groundwater in the Yucaipa Subbasin discharges to Oak Glen Creek, Wilson Creek, Yucaipa Creek, and San Timoteo Creek when underlying groundwater elevations are above the bottom elevation of each stream channel. Groundwater conditions that cause this are influenced by local pumping, climatic conditions, upstream stream leakage, and subsurface inflows from adjacent Subbasins, crystalline bedrock, and the San Timoteo Badlands."* However, the GSP does not provide a map of these reaches to illustrate the conclusions of the modeling analysis regarding which reaches are connected to groundwater.

RECOMMENDATIONS

- Provide a map showing all the stream reaches in the subbasin, with reaches clearly labeled as interconnected (gaining/losing) or disconnected. Consider any segments with data gaps as potential ISWs and clearly mark them as such on maps provided in the GSP.
- In the main text of the GSP, summarize the groundwater elevation data and stream flow data used in the modeling analysis. Discuss temporal (seasonal and interannual) variability of the data used to calibrate the model.
- To confirm and illustrate the results of the groundwater modeling, overlay the subbasin's stream reaches with depth-to-groundwater contour maps to illustrate groundwater depths and the groundwater gradient near the stream reaches. Show the location of groundwater wells used in the analysis.
- For the depth-to-groundwater contour maps, use the best practices presented in Attachment D. Specifically, ensure that the first step is contouring groundwater elevations, and then subtracting this layer from land surface elevations from a Digital Elevation Model (DEM) to estimate depth-to-groundwater contours across the landscape. This will provide accurate contours of depth to groundwater along streams and other land surface depressions where GDEs are commonly found.

Groundwater Dependent Ecosystems

The identification of Groundwater Dependent Ecosystems (GDEs) is **insufficient**. The GSP took initial steps to identify and map GDEs using the Natural Communities Commonly Associated with Groundwater dataset (NC dataset). However, we found that some mapped features in the NC dataset were improperly disregarded.

- NC dataset polygons were incorrectly removed if Normalized Difference Vegetation Index (NDVI) and Normalized Difference Moisture Index (NDMI) data did not correlate with groundwater level trends. This is an incorrect method, since a lack of a relationship does not preclude that groundwater is providing some of the ecosystem's water needs. If the ecosystem is tapping into shallow groundwater then the ecosystem should be categorized as a GDE. If there are no data to characterize groundwater conditions in the

shallow principal aquifer, then the GDE should be retained as a potential GDE and data gaps reconciled in the Monitoring Network section of the GSP.

- NC dataset polygons were incorrectly removed in areas where previous site investigations indicated that the habitats were sustained by surface water. However, this removal criteria is flawed since GDEs can rely on multiple water sources – including surface water *and* groundwater – simultaneously and at different temporal/spatial scales. NC dataset polygons adjacent to surface water supplies can still potentially be reliant on shallow groundwater aquifers, and therefore should not be removed solely based on their proximity to these additional water sources.

The text discusses groundwater level trends in each of the GDE units over the period 2009 to 2019, referring to specific well names. The wells are not labeled on the GDE map (Figure 2-57), however. The GSP could be improved by labeling the GDE units and labeling each well location provided on this figure, and providing the hydrographs of groundwater levels that are discussed qualitatively in the text.

The GSP presents the subbasin's common phreatophytes in Table 2-9 and describes the habitat types when discussing each GDE unit. However, the GSP does not provide a description or inventory of the subbasin's fauna or discuss endangered, threatened, or special status species.

RECOMMENDATIONS

- Re-evaluate the NC dataset polygons that were incorrectly removed based on NDVI and NDMI trends or proximity to surface water. Refer to Attachment D of this letter for best practices for using local groundwater data to verify whether polygons in the NC Dataset are supported by groundwater in an aquifer.
- Label the GDE units and label each well location provided on Figure 2-57. Provide the hydrographs of groundwater levels that are discussed qualitatively in the text.
- Provide depth-to-groundwater contour maps, noting the best practices presented in Attachment D. Specifically, ensure that the first step is contouring groundwater elevations, and then subtracting this layer from land surface elevations from a DEM to estimate depth-to-groundwater contours across the landscape.
- If insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons as "Potential GDEs" in the GSP until data gaps are reconciled in the monitoring network.
- Provide a complete inventory, map, or description of fauna (e.g., birds, fish, amphibian) and flora (e.g., plants) species in the subbasin and note any threatened or endangered species (see Attachment C in this letter for a list of freshwater species located in the Yucaipa Subbasin).

Native Vegetation and Managed Wetlands

Native vegetation and managed wetlands are water use sectors that are required to be included in the water budget.[2,3] The integration of native vegetation into the water budget is **insufficient**. The water budget did not include the current, historical, and projected demands of native vegetation. The omission of explicit water demands for native vegetation is problematic because key environmental uses of groundwater are not being accounted for as water supply decisions are made using this budget, nor will they likely be considered in project and management actions. Managed wetlands are not mentioned in the GSP, so it is not known whether or not they are present in the subbasin.

RECOMMENDATIONS

- Quantify and present all water use sector demands in the historical, current, and projected water budgets with individual line items for each water use sector, including native vegetation.
- State whether or not there are managed wetlands in the subbasin. If there are, ensure that their groundwater demands are included as separate line items in the historical, current, and projected water budgets.

B. Engaging Stakeholders

Stakeholder Engagement during GSP development

Stakeholder engagement during GSP development is **insufficient**. SGMA's requirement for public notice and engagement of stakeholders is not fully met by the description in the Public Outreach and Engagement Plan (Appendix 1-C).[4]

The GSP documents targeted outreach to DACs, including specific representation of DACs on the Yucaipa GSA by both the City representatives and water suppliers of the DACs within the subbasin. However, we note the following deficiencies with the overall stakeholder engagement process:

- The GSP documents opportunities for public involvement and engagement in very general terms. These include meeting opportunities through the SGMA Board's quarterly meetings, Technical Advisory Group meetings during GSP development, SGMA Board appointed membership, and communication and engagement through the GSP webpage.
- The plan lacks specific details of outreach and engagement targeted to environmental stakeholders. In Section 1.8.6, the GSP documents environmental users as the subbasin's GDEs. We recommend that the GSA engage with environmental stakeholders

[2] "'Water use sector' refers to categories of water demand based on the general land uses to which the water is applied, including urban, industrial, agricultural, managed wetlands, managed recharge, and native vegetation." [23 CCR §351(al)]

[3] "The water budget shall quantify the following, either through direct measurements or estimates based on data: (3) Outflows from the groundwater system by water use sector, including evapotranspiration, groundwater extraction, groundwater discharge to surface water sources, and subsurface groundwater outflow." [23 CCR §354.18]

[4] "A communication section of the Plan shall include a requirement that the GSP identify how it encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin." [23 CCR §354.10(d)(3)]

in the subbasin, which could include California Department of Fish and Wildlife or environmental non-profits.

- Section 1.7.1 of the GSP states that notification and communication will continue to take place during the implementation phase of the GSP. However, the GSP describes outreach during GSP implementation as limited to *"engagement with the public and beneficial users regarding the progress of monitoring and reporting updates on the GSP to DWR, establishment of fees, and the development and implementation of management strategies, including projects as needed."* The discussion of public notice and engagement does not include a detailed plan for continual opportunities for engagement through the implementation phase of the GSP that is specifically directed to DACs, domestic well owners, and environmental stakeholders within the subbasin.

RECOMMENDATIONS

- In the Public Outreach and Engagement Plan, describe active and targeted outreach to engage all stakeholders throughout the GSP development and implementation phases. Refer to Attachment B for specific recommendations on how to actively engage stakeholders during all phases of the GSP process.
- Engage with environmental stakeholders in the subbasin, which could include California Department of Fish and Wildlife or environmental non-profits.
- Provide documentation on how stakeholder input was incorporated into the GSP development process.
- Utilize DWR's tribal engagement guidance to comprehensively identify, involve, and address all tribes and tribal interests that may be present in the subbasin.[5]

C. Considering Beneficial Uses and Users When Establishing Sustainable Management Criteria and Analyzing Impacts on Beneficial Uses and Users

The consideration of beneficial uses and users when establishing sustainable management criteria (SMC) is **insufficient**. The consideration of potential impacts on all beneficial users of groundwater in the basin are required when defining undesirable results and establishing minimum thresholds.[6,7,8]

[5] Engagement with Tribal Governments Guidance Document. Available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Guidance-Doc-for-SGM-Engagement-with-Tribal-Govt_ay_19.pdf

[6] "The description of undesirable results shall include [...] potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results." [23 CCR §354.26(b)(3)]

[7] "The description of minimum thresholds shall include [...] how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests." [23 CCR §354.28(b)(4)]

[8] "The description of minimum thresholds shall include [...] how state, federal, or local standards relate to the relevant sustainability indicator. If the minimum threshold differs from other regulatory standards, the agency shall explain the nature of and the basis for the difference." [23 CCR §354.28(b)(5)]

Disadvantaged Communities and Drinking Water Users

To establish minimum thresholds for each of four management areas, the GSP identifies the historic low storage volume, assigns a drought buffer to further lower the storage volume, and then uses the YIHM to determine the corresponding groundwater elevations at representative monitoring points (RMPs). The GSP does not quantify the number of domestic wells that could go dry or otherwise consider or analyze the impact of minimum thresholds on domestic wells. The GSP does not sufficiently describe whether minimum thresholds will avoid significant and unreasonable loss of drinking water to domestic well users that are not protected by the minimum threshold. In addition, the GSP does not sufficiently describe or analyze direct or indirect impacts on DACs or drinking water users when defining undesirable results, nor does it describe how the groundwater levels minimum thresholds are consistent with the Human Right to Water policy.[9]

The GSP does not establish SMC for groundwater quality. The GSP states (p. 3-2): *"Degradation of groundwater quality does not apply to the Plan Area as agriculture use has declined markedly since the 1950s to approximately 7% of the total land use, and the concerted efforts by the Yucaipa GSA member agencies to convert from septic systems to sanitary sewer systems has decreased nitrate and salt contributions to the aquifer. Limited contamination at some active remediation sites and the cessation of operations at the former Yucaipa Landfill have limited contamination to shallow, perched groundwater that has not impacted water quality in the principal aquifer."* Section 2.7.4 (Groundwater Quality) discusses other COCs, both naturally occurring and those associated with industrial activities, that have exceeded regulatory standards. All COCs in the subbasin that may be impacted or exacerbated by groundwater use and/or management should have established SMC, in addition to coordinating with water quality regulatory programs.

RECOMMENDATIONS

Chronic Lowering of Groundwater Levels

- Describe direct and indirect impacts on drinking water users and DACs when describing undesirable results and defining minimum thresholds for chronic lowering of groundwater levels. Include information on the impacts during prolonged periods of below average water years.

- Consider and evaluate the impacts of selected minimum thresholds and measurable objectives on drinking water users and DACs within the subbasin. Further describe the impact of passing the minimum threshold for these users. For example, provide the number of domestic wells that would be fully or partially de-watered at the minimum threshold.

Degraded Water Quality

- Establish water quality SMC. Set minimum thresholds and measurable objectives for all water quality constituents within the subbasin that can be impacted and/or exacerbated as a result of groundwater use or groundwater management.

- Describe direct and indirect impacts on drinking water users and DACs when defining undesirable results for degraded water quality.[10] For specific guidance on how to

[9] California Water Code §106.3. Available at: https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=WAT&sectionNum=106.3

[10] "Degraded Water Quality [...] collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues." [23 CCR §354.34(c)(4)]

consider these users, refer to "Guide to Protecting Water Quality Under the Sustainable Groundwater Management Act."[11]

- Evaluate the cumulative or indirect impacts of proposed minimum thresholds for degraded water quality on drinking water users and DACs.

Groundwater Dependent Ecosystems and Interconnected Surface Waters

We commend the GSA for evaluating potential cause and effect relationships between groundwater and remote sensing (NDVI, NDMI) data when establishing sustainable management criteria for the ISW sustainability indicator. However, sustainable management criteria for chronic lowering of groundwater levels provided in the GSP do not consider potential impacts to environmental beneficial users. This is problematic because without identifying potential impacts on GDEs, minimum thresholds may compromise, or even destroy, these environmental beneficial users. Since GDEs are present in the subbasin, they must be considered when developing all relevant SMC.

For depletion of interconnected surface waters, the GSP establishes the undesirable result but does not determine minimum thresholds. The undesirable result is established as follows (p. 3-6): *"A significant and unreasonable loss of GDE habitat may occur if there is a long-term decline in groundwater levels below 30 feet bgs."* The GSP continues (p. 3-6): *"Because the potential GDEs are not located near existing or currently planned groundwater extraction wells, it is not anticipated that they will be impacted by future extractions within the Plan Area. However, in the event that future groundwater production is planned within a mile of a potential GDE, additional investigations should be performed to identify whether the potential GDE relies on groundwater, and whether the planned production may negatively impact the potential GDE. If the potential GDE is found to rely on groundwater and planned production may impact groundwater levels in the vicinity of the potential GDE, sustainability criteria related to the depletion of interconnected surface water may be established to protect against the significant and unreasonable loss of GDE habitat."* Because ISWs have been identified in the subbasin, the GSA needs to define what significant and unreasonable effects are for ISWs, and the GSA should not wait for future well development to establish SMC. Also, please note that significant and unreasonable losses of GDE habitat can occur when groundwater levels decline within 30 feet bgs, as observed in Fillmore and Piru groundwater basins[12].

While the GSP identifies terrestrial GDEs, it does not identify or mention surface water beneficial users in the subbasin. In establishing SMC for depletion of interconnected surface water, the GSP should evaluate how the proposed minimum thresholds and measurable objectives avoid significant and unreasonable effects on surface water beneficial users in the subbasin (see Attachment C for a list of environmental users in the subbasin), such as increased mortality and inability to perform key life processes (e.g., reproduction, migration).

[11] Guide to Protecting Water Quality under the Sustainable Groundwater Management Act https://d3n8a8pro7vhmx.cloudfront.net/communitywatercenter/pages/293/attachments/original/1559328858/Guide_to_Protecting_Drinking_Water_Quality_Under_the_Sustainable_Groundwater_Management_Act.pdf?1559328858.

[12] Kibler CL, Schmidt EC, Roberts DA, Stella JC, Kui L, Lambert AM, Singer MB. A brown wave of riparian woodland mortality following groundwater declines during the 2012-2019 California drought. Environmental Research Letters 16(8): 084030. https://doi.org/10.1088/1748-9326/ac1377

RECOMMENDATIONS

- When establishing SMC for the subbasin, consider that the SGMA statute [Water Code §10727.4(l)] specifically calls out that GSPs shall include "impacts on groundwater dependent ecosystems."

- Evaluate impacts on GDEs when establishing SMC for chronic lowering of groundwater levels. When defining undesirable results, provide specifics on what biological responses (e.g., extent of habitat, growth, recruitment rates) would best characterize a significant and unreasonable impact to GDEs. Undesirable results to environmental users occur when 'significant and unreasonable' effects on beneficial users are caused by one of the sustainability indicators (i.e., chronic lowering of groundwater levels, degraded water quality, or depletion of interconnected surface water). Thus, potential impacts on environmental beneficial uses and users need to be considered when defining undesirable results in the subbasin.[13] Defining undesirable results is the crucial first step before the minimum thresholds can be determined.[14]

- Establish SMC for depletion of interconnected surface water. When defining undesirable results, include a description of potential impacts on instream habitats within ISWs when minimum thresholds in the subbasin are reached.[15] The GSP should confirm that minimum thresholds for ISWs avoid adverse impacts on environmental beneficial users of interconnected surface waters as these environmental users could be left unprotected by the GSP. These recommendations apply especially to environmental beneficial users that are already protected under pre-existing state or federal law.[8,16]

2. Climate Change

The SGMA statute identifies climate change as a significant threat to groundwater resources and one that must be examined and incorporated in the GSPs. The GSP Regulations require integration of climate change into the projected water budget to ensure that projects and management actions sufficiently account for the range of potential climate futures.[17] The effects of climate change will intensify the impacts of water stress on GDEs, making available shallow groundwater resources especially critical to their survival. Condon *et al.* (2020) shows that GDEs are more likely to succumb to water stress and rely more

[13] "The description of undesirable results shall include [...] potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results". [23 CCR §354.26(b)(3)]

[14] The description of minimum thresholds shall include [...] how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests." [23 CCR §354.28(b)(4)]

[15] "The minimum threshold for depletions of interconnected surface water shall be the rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water and may lead to undesirable results." [23 CCR §354.28(c)(6)]

[16] Rohde MM, Seapy B, Rogers R, Castañeda X, editors. 2019. Critical Species LookBook: A compendium of California's threatened and endangered species for sustainable groundwater management. The Nature Conservancy, San Francisco, California. Available at: https://groundwaterresourcehub.org/public/uploads/pdfs/Critical_Species_LookBook_91819.pdf

[17] "Each Plan shall rely on the best available information and best available science to quantify the water budget for the basin in order to provide an understanding of historical and projected hydrology, water demand, water supply, land use, population, climate change, sea level rise, groundwater and surface water interaction, and subsurface groundwater flow." [23 CCR §354.18(e)]

on groundwater during times of drought.[18] When shallow groundwater is unavailable, riparian forests can die off and key life processes (e.g., migration and spawning) for aquatic organisms, such as steelhead, can be impeded.

The integration of climate change into the projected water budget is **insufficient**. The GSP does incorporate climate change into the projected water budget using DWR change factors for 2030 and 2070. However, the plan does not consider multiple climate scenarios (e.g., the 2070 extremely wet and extremely dry climate scenarios) in the projected water budget. The GSP would benefit from clearly and transparently incorporating the extremely wet and dry scenarios provided by DWR into projected water budgets or select more appropriate extreme scenarios for the subbasin. While these extreme scenarios may have a lower likelihood of occurring and their consideration is not required by DWR (only suggested), their consequences could be significant and their inclusion can help identify important vulnerabilities in the subbasin's approach to groundwater management.

The GSP integrates climate change into key inputs (e.g., changes in precipitation and evapotranspiration) of the projected water budget. However, the GSP does not adjust imported surface water supplies based on future climate change scenarios. Additionally, the sustainable yield is not calculated based on the projected water budget with climate change incorporated. If the water budgets are incomplete, including the omission of extreme climate scenarios, projected climate change effects on imported water inputs, and climate change projections in the sustainable yield calculations, then there is increased uncertainty in virtually every subsequent calculation used to plan for projects, derive measurable objectives, and set minimum thresholds. Plans that do not adequately include climate change projections may underestimate future impacts on vulnerable beneficial users of groundwater such as ecosystems, DACs, and domestic well owners.

RECOMMENDATIONS

- Integrate climate change, including extreme climate scenarios, into all elements of the projected water budget to form the basis for development of sustainable management criteria and projects and management actions.
- Integrate climate change into imported water inputs for the projected water budget.
- Calculate sustainable yield based on the projected water budget with climate change incorporated.
- Incorporate climate change scenarios into projects and management actions.

3. Data Gaps

The consideration of beneficial users when establishing monitoring networks is **insufficient**, due to lack of specific plans to increase the Representative Monitoring Points (RMPs) in the monitoring network that represent water quality conditions and shallow groundwater elevations around domestic wells, GDEs, and ISWs in the subbasin. These beneficial users may remain unprotected by the GSP without adequate

[18] Condon et al. 2020. Evapotranspiration depletes groundwater under warming over the contiguous United States. Nature Communications. Available at: https://www.nature.com/articles/s41467-020-14688-0

monitoring and identification of data gaps in the shallow aquifer. The Plan therefore fails to meet SGMA's requirements for the monitoring network.[19]

Figure 3-5 (Representative Monitoring Points) shows insufficient representation of GDEs and drinking water users for groundwater elevation monitoring and water quality monitoring. Refer to Attachment E for maps of these monitoring sites in relation to key beneficial users of groundwater.

The GSP provides discussion of data gaps for GDEs throughout the Sustainable Management Section of the GSP. For example, the GSP states (p. 3-26): *"If future extractions planned in this region are expected to exceed historical extractions in the region, additional field work may be required to characterize the impact that proposed pumping rates will have on the potential GDE in the Singleton subarea. This would include installing one or more shallow groundwater observation wells screened from the historical high groundwater level to approximately 35 feet bgs. Groundwater elevation data collected from the shallow groundwater observation well(s) will be analyzed to evaluate whether the local habitat is sustained by shallow groundwater (<30 feet bgs), and will be used to evaluate seasonal fluctuations and potential influences by nearby pumping in the principal aquifer."* The GSP does not provide specific plans, such as locations or a timeline, to fill the data gaps for GDEs. Because GDEs have been identified in the subbasin, these data gaps should be addressed now instead of waiting for groundwater extraction to increase in the future.

RECOMMENDATIONS

- Provide maps that overlay current and proposed monitoring well locations with the locations of DACs, domestic wells, and GDEs to clearly identify monitored areas.
- Increase the number of RMPs in the shallow aquifer across the subbasin as needed to map ISWs and adequately monitor all groundwater condition indicators across the subbasin and at appropriate depths for *all* beneficial users. Prioritize proximity to DACs, domestic wells, GDEs, and ISWs when identifying new RMPs.
- Ensure groundwater elevation and water quality RMPs are monitoring groundwater conditions spatially and at the correct depth for *all* beneficial users - especially DACs, domestic wells, and GDEs.
- Further describe biological monitoring that can be used to assess the potential for significant and unreasonable impacts to GDEs or ISWs due to groundwater conditions in the subbasin.

4. Addressing Beneficial Users in Projects and Management Actions

The consideration of beneficial users when developing projects and management actions is **insufficient**, due to the failure to completely identify benefits or impacts of identified projects and management actions, including water quality impacts, to key beneficial users of groundwater such as GDEs, aquatic habitats, surface water users, DACs, and drinking water users. Therefore, potential project and management

[19] "The monitoring network objectives shall be implemented to accomplish the following: [...] (2) Monitor impacts to the beneficial uses or users of groundwater." [23 CCR §354.34(b)(2)]

actions may not protect these beneficial users. Groundwater sustainability under SGMA is defined not just by sustainable yield, but by the avoidance of undesirable results for *all* beneficial users.

The GSP fails to describe the explicit benefits or impacts to beneficial users, such as GDEs and DACs, from Management Action No. 3, Surplus Supplemental Water Spreading. We also note that the plan does not include a domestic well mitigation program to avoid significant and unreasonable loss of drinking water. We strongly recommend inclusion of a drinking water well impact mitigation program to proactively monitor and protect drinking water wells through GSP implementation.

RECOMMENDATIONS

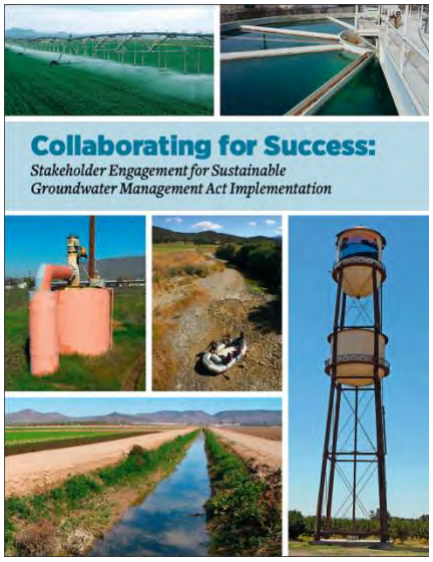
- For DACs and domestic well owners, include a drinking water well impact mitigation program to proactively monitor and protect drinking water wells through GSP implementation. Refer to Attachment B for specific recommendations on how to implement a drinking water well mitigation program.
- For DACs and domestic well owners, include a discussion of whether potential impacts to water quality from projects and management actions could occur and how the GSA plans to mitigate such impacts.
- Recharge ponds, reservoirs, and facilities for managed aquifer recharge can be designed as multiple-benefit projects to include elements that act functionally as wetlands and provide a benefit for wildlife and aquatic species. For guidance on how to integrate multi-benefit recharge projects into your GSP, refer to the "Multi-Benefit Recharge Project Methodology Guidance Document."[20]
- Develop management actions that incorporate climate and water delivery uncertainties to address future water demand and prevent future undesirable results.

[20] The Nature Conservancy. 2021. Multi-Benefit Recharge Project Methodology for Inclusion in Groundwater Sustainability Plans. Sacramento. Available at: https://groundwaterresourcehub.org/sgma-tools/multi-benefit-recharge-project-methodology-guidance/

Attachment B

SGMA Tools to address DAC, drinking water, and environmental beneficial uses and users

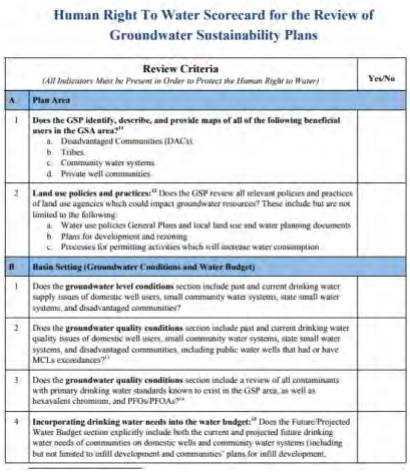
Stakeholder Engagement and Outreach



Clean Water Action, Community Water Center and Union of Concerned Scientists developed a guidance document called Collaborating for success: Stakeholder engagement for Sustainable Groundwater Management Act Implementation. It provides details on how to conduct targeted and broad outreach and engagement during Groundwater Sustainability Plan (GSP) development and implementation. Conducting a targeted outreach involves:

- Developing a robust Stakeholder Communication and Engagement plan that includes outreach at frequented locations (schools, farmers markets, religious settings, events) across the plan area to increase the involvement and participation of disadvantaged communities, drinking water users and the environmental stakeholders.
- Providing translation services during meetings and technical assistance to enable easy participation for non-English speaking stakeholders.
- GSP should adequately describe the process for requesting input from beneficial users and provide details on how input is incorporated into the GSP.

The Human Right to Water

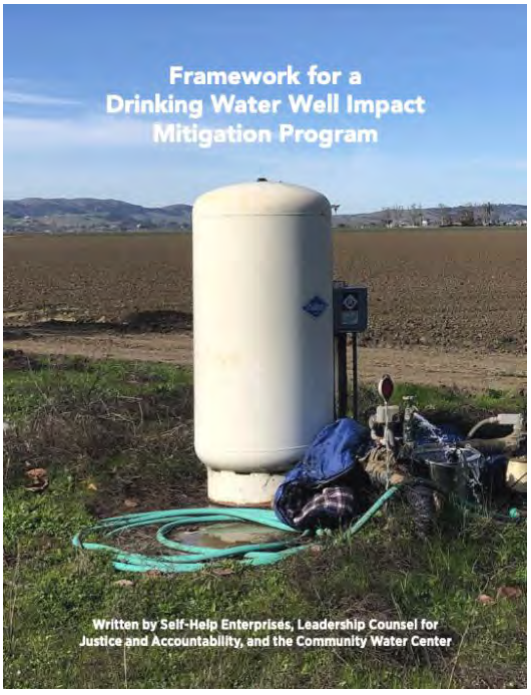


Human Right To Water Scorecard for the Review of Groundwater Sustainability Plans

	Review Criteria *(All Indicators Must be Present in Order to Protect the Human Right to Water)*	Yes/No
A	**Plan Area**	
1	**Does the GSP identify, describe, and provide maps of all of the following beneficial users in the GSA area:**[43] a. Disadvantaged Communities (DACs). b. Tribes. c. Community water systems. d. Private well communities.	
2	**Land use policies and practices:**[44] Does the GSP review all relevant policies and practices of land use agencies which could impact groundwater resources? These include but are not limited to the following: a. Water use policies General Plans and local land use and water planning documents b. Plans for development and rezoning. c. Processes for permitting activities which will increase water consumption.	
B	**Basin Setting (Groundwater Conditions and Water Budget)**	
1	Does the **groundwater level conditions** section include past and current drinking water supply issues of domestic well users, small community water systems, state small water systems, and disadvantaged communities?	
2	Does the **groundwater quality conditions** section include past and current drinking water quality issues of domestic well users, small community water systems, state small water systems, and disadvantaged communities, including public water wells that had or have MCLs exceedances?[45]	
3	Does the **groundwater quality conditions** section include a review of all contaminants with primary drinking water standards known to exist in the GSP area, as well as hexavalent chromium, and PFOs/PFOAs?[46]	
4	**Incorporating drinking water needs into the water budget:**[47] Does the Future/Projected Water Budget section explicitly include both the current and projected future drinking water needs of communities on domestic wells and community water systems (including but not limited to infill development and communities' plans for infill development,	

The Human Right to Water Scorecard was developed by Community Water Center, Leadership Counsel for Justice and Accountability and Self Help Enterprises to aid Groundwater Sustainability Agencies (GSAs) in prioritizing drinking water needs in SGMA. The scorecard identifies elements that must exist in GSPs to adequately protect the Human Right to Drinking water.

Drinking Water Well Impact Mitigation Framework



The Drinking Water Well Impact Mitigation Framework was developed by Community Water Center, Leadership Counsel for Justice and Accountability and Self Help Enterprises to aid GSAs in the development and implementation of their GSPs. The framework provides a clear roadmap for how a GSA can best structure its data gathering, monitoring network and management actions to proactively monitor and protect drinking water wells and mitigate impacts should they occur.

Groundwater Resource Hub

The Nature Conservancy has developed a suite of tools based on best available science to help GSAs, consultants, and stakeholders efficiently incorporate nature into GSPs. These tools and resources are available online at GroundwaterResourceHub.org. The Nature Conservancy's tools and resources are intended to reduce costs, shorten timelines, and increase benefits for both people and nature.

Rooting Depth Database

The Plant Rooting Depth Database provides information that can help assess whether groundwater-dependent vegetation are accessing groundwater. Actual rooting depths will depend on the plant species and site-specific conditions, such as soil type and

availability of other water sources. Site-specific knowledge of depth to groundwater combined with rooting depths will help provide an understanding of the potential groundwater levels are needed to sustain GDEs.

How to use the database

The maximum rooting depth information in the Plant Rooting Depth Database is useful when verifying whether vegetation in the Natural Communities Commonly Associated with Groundwater (NC Dataset) are connected to groundwater. A 30 ft depth-to-groundwater threshold, which is based on averaged global rooting depth data for phreatophytes[1], is relevant for most plants identified in the NC Dataset since most plants have a max rooting depth of less than 30 feet. However, it is important to note that deeper thresholds are necessary for other plants that have reported maximum root depths that exceed the averaged 30 feet threshold, such as valley oak (*Quercus lobata*), Euphrates poplar (*Populus euphratica*), salt cedar (*Tamarix spp.*), and shadescale (*Atriplex confertifolia*). The Nature Conservancy advises that the reported max rooting depth for these deeper-rooted plants be used. For example, a depth-to groundwater threshold of 80 feet should be used instead of the 30 ft threshold, when verifying whether valley oak polygons from the NC Dataset are connected to groundwater. It is important to re-emphasize that actual rooting depth data are limited and will depend on the plant species and site-specific conditions such as soil and aquifer types, and availability to other water sources.

The Plant Rooting Depth Database is an Excel workbook composed of four worksheets:

1. California phreatophyte rooting depth data (included in the NC Dataset)
2. Global phreatophyte rooting depth data
3. Metadata
4. References

How the database was compiled

The Plant Rooting Depth Database is a compilation of rooting depth information for the groundwater-dependent plant species identified in the NC Dataset. Rooting depth data were compiled from published scientific literature and expert opinion through a crowdsourcing campaign. As more information becomes available, the database of rooting depths will be updated. Please Contact Us if you have additional rooting depth data for California phreatophytes.

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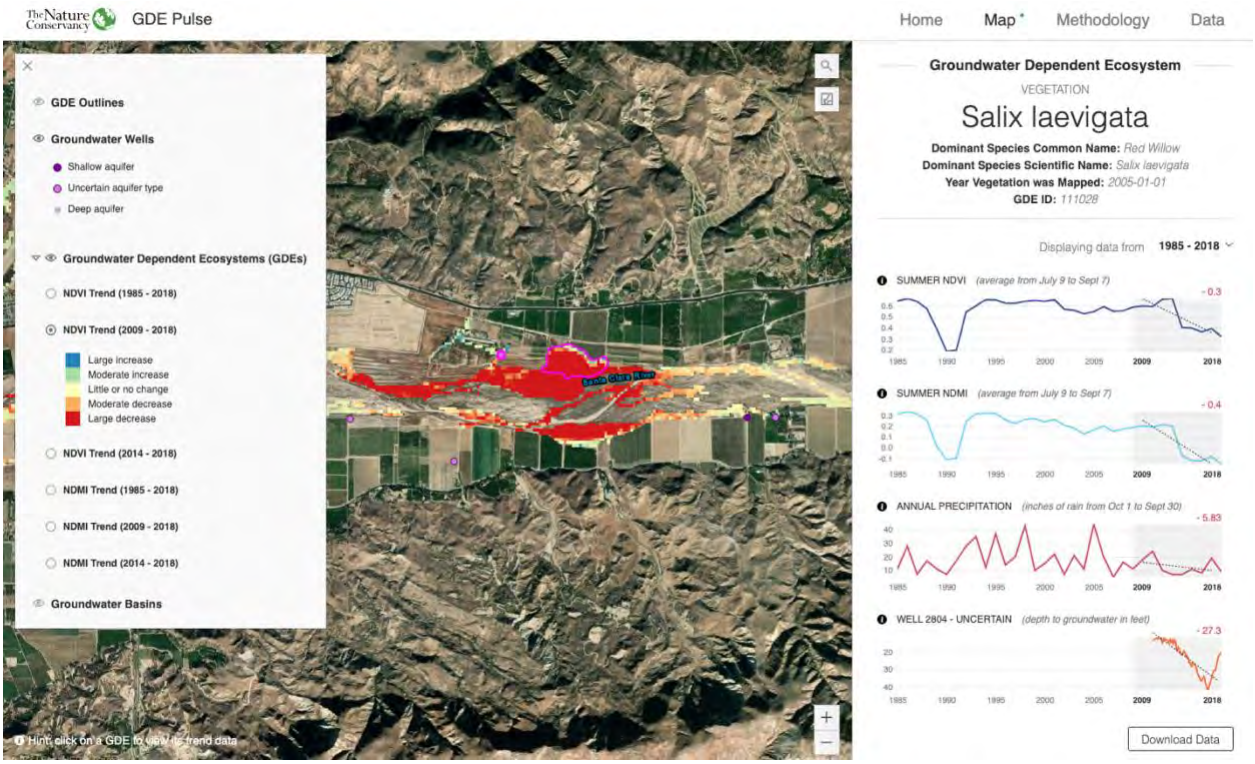
[1] Canadell, J., Jackson, R.B., Ehleringer, J.B. et al. 1996. Maximum rooting depth of vegetation types at the global scale. Oecologia 108, 583–595. https://doi.org/10.1007/BF00329030

GDE Pulse



GDE Pulse is a free online tool that allows Groundwater Sustainability Agencies to assess changes in groundwater dependent ecosystem (GDE) health using satellite, rainfall, and groundwater data. Remote sensing data from satellites has been used to monitor the health of vegetation all over the planet. GDE pulse has compiled 35 years of satellite imagery from NASA's Landsat mission for every polygon in the Natural Communities Commonly Associated with Groundwater Dataset. The following datasets are available for downloading:

Normalized Difference Vegetation Index (NDVI) is a satellite-derived index that represents the greenness of vegetation. Healthy green vegetation tends to have a higher NDVI, while dead leaves have a lower NDVI. We calculated the average NDVI during the driest part of the year (July - Sept) to estimate vegetation health when the plants are most likely dependent on groundwater.

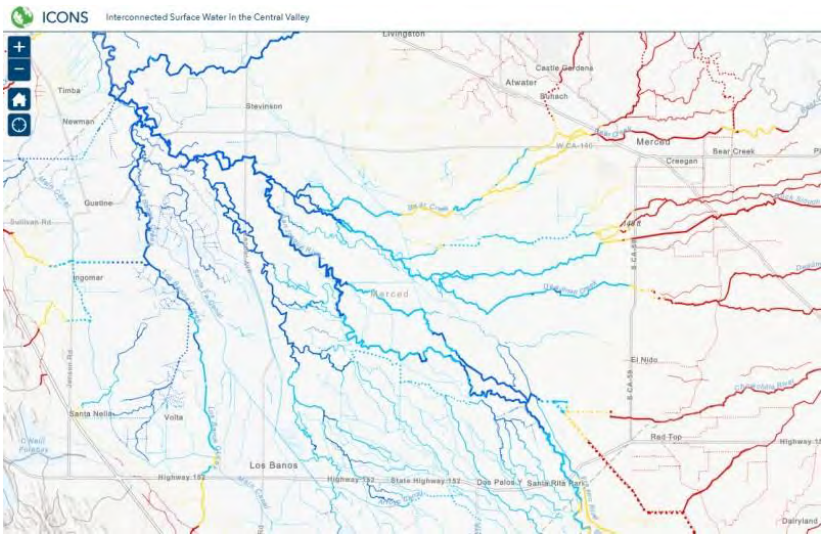
Normalized Difference Moisture Index (NDMI) is a satellite-derived index that represents water content in vegetation. NDMI is derived from the Near-Infrared (NIR) and Short-Wave Infrared (SWIR) channels. Vegetation with adequate access to water tends to have higher NDMI, while vegetation that is water stressed tends to have lower NDMI. We calculated the average NDVI during the driest part of the year (July–September) to estimate vegetation health when the plants are most likely dependent on groundwater.

Annual Precipitation is the total precipitation for the water year (October 1st – September 30th) from the PRISM dataset. The amount of local precipitation can affect vegetation with more precipitation generally leading to higher NDVI and NDMI.

Depth to Groundwater measurements provide an indication of the groundwater levels and changes over time for the surrounding area. We used groundwater well measurements from nearby (<1km) wells to estimate the depth to groundwater below the GDE based on the average elevation of the GDE (using a digital elevation model) minus the measured groundwater surface elevation.

ICONOS Mapper

Interconnected Surface Water in the Central Valley



ICONS maps the likely presence of interconnected surface water (ISW) in the Central Valley using depth to groundwater data. Using data from 2011-2018, the ISW dataset represents the likely connection between surface water and groundwater for rivers and streams in California's Central Valley. It includes information on the mean, maximum, and minimum depth to groundwater for each stream segment over the years with available data, as well as the likely presence of ISW based on the minimum depth to groundwater. The Nature Conservancy developed this database, with guidance and input from expert academics, consultants, and state agencies.

We developed this dataset using groundwater elevation data available online from the California Department of Water Resources (DWR). DWR only provides this data for the Central Valley. For GSAs outside of the valley, who have groundwater well measurements, we recommend following our methods to determine likely ISW in your region. The Nature Conservancy's ISW dataset should be used as a first step in reviewing ISW and should be supplemented with local or more recent groundwater depth data.

Attachment C

Freshwater Species Located in the Yucaipa Basin

To assist in identifying the beneficial users of surface water necessary to assess the undesirable result "depletion of interconnected surface waters", Attachment C provides a list of freshwater species located in the Yucaipa Basin. To produce the freshwater species list, we used ArcGIS to select features within the California Freshwater Species Database version 2.0.9 within the basin boundary. This database contains information on ~4,000 vertebrates, macroinvertebrates and vascular plants that depend on fresh water for at least one stage of their life cycle. The methods used to compile the California Freshwater Species Database can be found in Howard et al. 2015[1]. The spatial database contains locality observations and/or distribution information from ~400 data sources. The database is housed in the California Department of Fish and Wildlife's BIOS[2] as well as on The Nature Conservancy's science website[3].

Scientific Name	Common Name	Legal Protected Status		
		Federal	State	Other
BIRDS				
Actitis macularius	Spotted Sandpiper			
Agelaius tricolor	Tricolored Blackbird	Bird of Conservation Concern	Special Concern	BSSC - First priority
Aix sponsa	Wood Duck			
Anas acuta	Northern Pintail			
Anas americana	American Wigeon			
Anas clypeata	Northern Shoveler			
Anas crecca	Green-winged Teal			
Anas platyrhynchos	Mallard			
Anas strepera	Gadwall			
Ardea alba	Great Egret			
Ardea herodias	Great Blue Heron			
Aythya affinis	Lesser Scaup			
Aythya americana	Redhead		Special Concern	BSSC - Third priority
Aythya collaris	Ring-necked Duck			
Aythya marila	Greater Scaup			
Bucephala albeola	Bufflehead			
Bucephala clangula	Common Goldeneye			
Butorides virescens	Green Heron			
Calidris minutilla	Least Sandpiper			

[1] Howard, J.K. et al. 2015. Patterns of Freshwater Species Richness, Endemism, and Vulnerability in California. PLoSONE, 11(7). Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0130710

[2] California Department of Fish and Wildlife BIOS: https://www.wildlife.ca.gov/data/BIOS

[3] Science for Conservation: https://www.scienceforconservation.org/products/california-freshwater-species-database

Chroicocephalus philadelphia	Bonaparte's Gull			
Cistothorus palustris palustris	Marsh Wren			
Egretta thula	Snowy Egret			
Empidonax traillii	Willow Flycatcher	Bird of Conservation Concern	Endangered	
Empidonax traillii extimus	Southwestern Willow Flycatcher	Endangered	Endangered	
Fulica americana	American Coot			
Haliaeetus leucocephalus	Bald Eagle	Bird of Conservation Concern	Endangered	
Icteria virens	Yellow-breasted Chat		Special Concern	BSSC - Third priority
Lophodytes cucullatus	Hooded Merganser			
Megaceryle alcyon	Belted Kingfisher			
Mergus merganser	Common Merganser			
Nycticorax nycticorax	Black-crowned Night-Heron			
Oxyura jamaicensis	Ruddy Duck			
Pelecanus erythrorhynchos	American White Pelican		Special Concern	BSSC - First priority
Phalacrocorax auritus	Double-crested Cormorant			
Piranga rubra	Summer Tanager		Special Concern	BSSC - First priority
Podilymbus podiceps	Pied-billed Grebe			
Porzana carolina	Sora			
Setophaga petechia	Yellow Warbler			BSSC - Second priority
Setophaga petechia brewsteri	A Yellow Warbler	Bird of Conservation Concern	Special Concern	
Tachycineta bicolor	Tree Swallow			
Tringa melanoleuca	Greater Yellowlegs			
Vireo bellii	Bell's Vireo			
Vireo bellii pusillus	Least Bell's Vireo	Endangered	Endangered	
CRUSTACEANS				
Hyalella spp.	Hyalella spp.			
HERPS				
Actinemys marmorata marmorata	Western Pond Turtle		Special Concern	ARSSC
Anaxyrus boreas boreas	Boreal Toad			
Anaxyrus californicus	Arroyo Toad	Endangered	Special Concern	ARSSC
Pseudacris cadaverina	California Treefrog			ARSSC

Rana draytonii	California Red-legged Frog	Threatened	Special Concern	ARSSC
Rana muscosa	Southern Mountain Yellow-legged Frog	Endangered	Candidate Endangered	ARSSC
Spea hammondii	Western Spadefoot	Under Review in the Candidate or Petition Process	Special Concern	ARSSC
Thamnophis hammondii hammondii	Two-striped Gartersnake		Special Concern	ARSSC
Thamnophis sirtalis sirtalis	Common Gartersnake			
INSECTS & OTHER INVERTS				
Apedilum spp.	Apedilum spp.			
Argia spp.	Argia spp.			
Baetidae fam.	Baetidae fam.			
Baetis adonis	A Mayfly			
Baetis spp.	Baetis spp.			
Baetis tricaudatus	A Mayfly			
Belostomatidae fam.	Belostomatidae fam.			
Chironomidae fam.	Chironomidae fam.			
Chironomus spp.	Chironomus spp.			
Cricotopus spp.	Cricotopus spp.			
Cricotopus trifascia				Not on any status lists
Cryptochironomus spp.	Cryptochironomus spp.			
Ephydridae fam.	Ephydridae fam.			
Eukiefferiella spp.	Eukiefferiella spp.			
Fallceon quilleri	A Mayfly			
Hydropsyche spp.	Hydropsyche spp.			
Hydropsychidae fam.	Hydropsychidae fam.			
Hydroptila spp.	Hydroptila spp.			
Hydroptilidae fam.	Hydroptilidae fam.			
Laccobius spp.	Laccobius spp.			
Laccophilus spp.	Laccophilus spp.			
Limnophyes spp.	Limnophyes spp.			
Micropsectra spp.	Micropsectra spp.			
Narpus spp.	Narpus spp.			
Parametriocnemus spp.	Parametriocnemus spp.			
Paraphaenocladius spp.	Paraphaenocladius spp.			
Pentaneura spp.	Pentaneura spp.			
Polypedilum spp.	Polypedilum spp.			
Pseudosmittia spp.	Pseudosmittia spp.			
Psychodidae fam.	Psychodidae fam.			
Rheotanytarsus spp.	Rheotanytarsus spp.			

Simuliidae fam.	Simuliidae fam.			
Simulium spp.	Simulium spp.			
Sperchon spp.	Sperchon spp.			
Tanytarsus spp.	Tanytarsus spp.			
Tipulidae fam.	Tipulidae fam.			
Zaitzevia spp.	Zaitzevia spp.			
MOLLUSKS				
Physa spp.	Physa spp.			
Pyrgulopsis californiensis	Laguna Mountain Springsnail			V
PLANTS				
Alnus rhombifolia	White Alder			
Arundo donax	NA			
Eleocharis coloradoensis				Not on any status lists
Juncus dubius	Mariposa Rush			
Juncus rugulosus	Wrinkled Rush			
Juncus xiphioides	Iris-leaf Rush			
Myriophyllum aquaticum	NA			
Myriophyllum sibiricum	Common Water-milfoil			
Persicaria lapathifolia				Not on any status lists
Phacelia distans	NA			
Rumex violascens	Violet Dock			

Attachment D

The Nature Conservancy

July 2019

IDENTIFYING GDEs UNDER SGMA
Best Practices for using the NC Dataset

The Sustainable Groundwater Management Act (SGMA) requires that groundwater dependent ecosystems (GDEs) be identified in Groundwater Sustainability Plans (GSPs). As a starting point, the Department of Water Resources (DWR) is providing the Natural Communities Commonly Associated with Groundwater Dataset (NC Dataset) online[1] to help Groundwater Sustainability Agencies (GSAs), consultants, and stakeholders identify GDEs within individual groundwater basins. To apply information from the NC Dataset to local areas, GSAs should combine it with the best available science on local hydrology, geology, and groundwater levels to verify whether polygons in the NC dataset are likely supported by groundwater in an aquifer (Figure 1)[2]. This document highlights six best practices for using local groundwater data to confirm whether mapped features in the NC dataset are supported by groundwater.

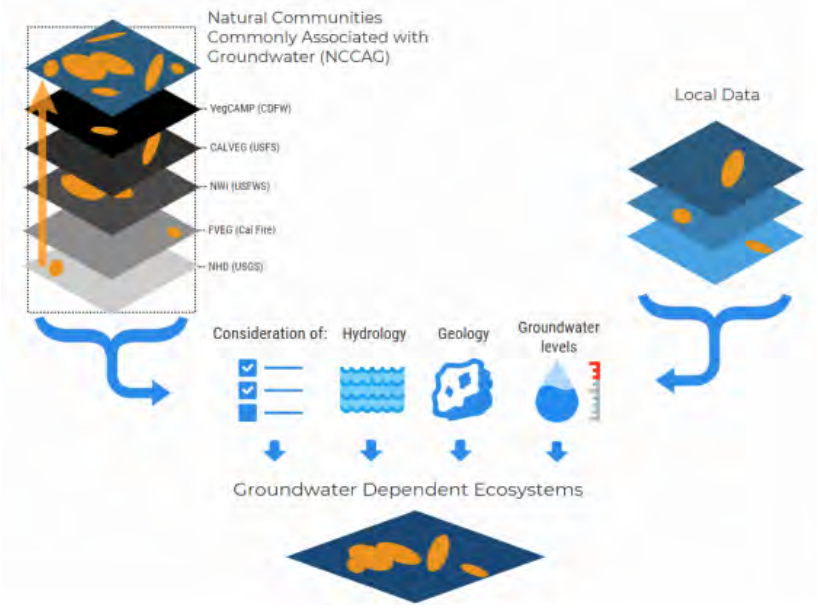


Figure 1. Considerations for GDE identification.
Source: DWR[2]

[1] NC Dataset Online Viewer: https://gis.water.ca.gov/app/NCDatasetViewer/
[2] California Department of Water Resources (DWR). 2018. Summary of the "Natural Communities Commonly Associated with Groundwater" Dataset and Online Web Viewer. Available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Data-and-Tools/Files/Statewide-Reports/Natural-Communities-Dataset-Summary-Document.pdf

The NC Dataset identifies vegetation and wetland features that are good indicators of a GDE. The dataset is comprised of 48 publicly available state and federal datasets that map vegetation, wetlands, springs, and seeps commonly associated with groundwater in California[3]. It was developed through a collaboration between DWR, the Department of Fish and Wildlife, and The Nature Conservancy (TNC). TNC has also provided detailed guidance on identifying GDEs from the NC dataset[4] on the Groundwater Resource Hub[5], a website dedicated to GDEs.

BEST PRACTICE #1. Establishing a Connection to Groundwater

Groundwater basins can be comprised of one continuous aquifer (Figure 2a) or multiple aquifers stacked on top of each other (Figure 2b). In unconfined aquifers (Figure 2a), using the depth-to-groundwater and the rooting depth of the vegetation is a reasonable method to infer groundwater dependence for GDEs. If groundwater is well below the rooting (and capillary) zone of the plants and any wetland features, the ecosystem is considered disconnected and groundwater management is not likely to affect the ecosystem (Figure 2d). However, it is important to consider local conditions (e.g., soil type, groundwater flow gradients, and aquifer parameters) and to review groundwater depth data from multiple seasons and water year types (wet and dry) because intermittent periods of high groundwater levels can replenish perched clay lenses that serve as the water source for GDEs (Figure 2c). Maintaining these natural groundwater fluctuations are important to sustaining GDE health.

Basins with a stacked series of aquifers (Figure 2b) may have varying levels of pumping across aquifers in the basin, depending on the production capacity or water quality associated with each aquifer. If pumping is concentrated in deeper aquifers, SGMA still requires GSAs to sustainably manage groundwater resources in shallow aquifers, such as perched aquifers, that support springs, surface water, domestic wells, and GDEs (Figure 2). This is because vertical groundwater gradients across aquifers may result in pumping from deeper aquifers to cause adverse impacts onto beneficial users reliant on shallow aquifers or interconnected surface water. The goal of SGMA is to sustainably manage groundwater resources for current and future social, economic, and environmental benefits. While groundwater pumping may not be currently occurring in a shallower aquifer, use of this water may become more appealing and economically viable in future years as pumping restrictions are placed on the deeper production aquifers in the basin to meet the sustainable yield and criteria. Thus, identifying GDEs in the basin should done irrespective to the amount of current pumping occurring in a particular aquifer, so that future impacts on GDEs due to new production can be avoided. A good rule of thumb to follow is: *if groundwater can be pumped from a well - it's an aquifer*.

[3] For more details on the mapping methods, refer to: Klausmeyer, K., J. Howard, T. Keeler-Wolf, K. Davis-Fadtke, R. Hull, A. Lyons. 2018. Mapping Indicators of Groundwater Dependent Ecosystems in California: Methods Report. San Francisco, California. Available at: https://groundwaterresourcehub.org/public/uploads/pdfs/iGDE_data_paper_20180423.pdf
[4] "Groundwater Dependent Ecosystems under the Sustainable Groundwater Management Act: Guidance for Preparing Groundwater Sustainability Plans" is available at: https://groundwaterresourcehub.org/gde-tools/gsp-guidance-document/
[5] The Groundwater Resource Hub: www.GroundwaterResourceHub.org

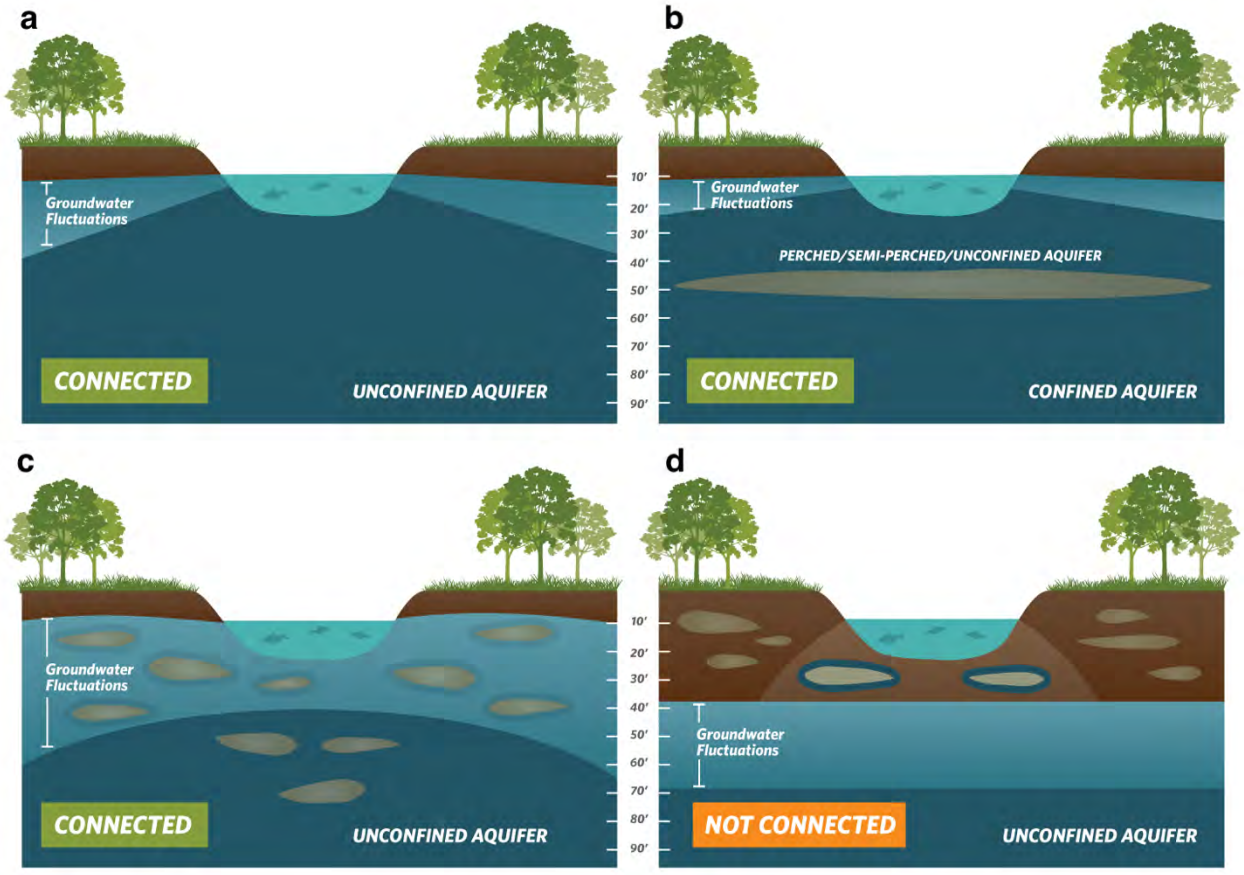


Figure 2. Confirming whether an ecosystem is connected to groundwater. Top: (a) Under the ecosystem is an unconfined aquifer with depth-to-groundwater fluctuating seasonally and interannually within 30 feet from land surface. (b) Depth-to-groundwater in the shallow aquifer is connected to overlying ecosystem. Pumping predominately occurs in the confined aquifer, but pumping is possible in the shallow aquifer. Bottom: (c) Depth-to-groundwater fluctuations are seasonally and interannually large, however, clay layers in the near surface prolong the ecosystem's connection to groundwater. (d) Groundwater is disconnected from surface water, and any water in the vadose (unsaturated) zone is due to direct recharge from precipitation and indirect recharge under the surface water feature. These areas are not connected to groundwater and typically support species that do not require access to groundwater to survive.

BEST PRACTICE #2. Characterize Seasonal and Interannual Groundwater Conditions

SGMA requires GSAs to describe current and historical groundwater conditions when identifying GDEs [23 CCR §354.16(g)]. Relying solely on the SGMA benchmark date (January 1, 2015) or any other single point in time to characterize groundwater conditions (e.g., depth-to-groundwater) is inadequate because managing groundwater conditions with data from one time point fails to capture the seasonal and interannual variability typical of California's climate. DWR's Best Management Practices document on water budgets[6] recommends using 10 years of water supply and water budget information to describe how historical conditions have impacted the operation of the basin within sustainable yield, implying that a baseline[7] could be determined based on data between 2005 and 2015. Using this or a similar time period, depending on data availability, is recommended for determining the depth-to-groundwater.

GDEs depend on groundwater levels being close enough to the land surface to interconnect with surface water systems or plant rooting networks. The most practical approach[8] for a GSA to assess whether polygons in the NC dataset are connected to groundwater is to rely on groundwater elevation data. As detailed in TNC's GDE guidance document[4], one of the key factors to consider when mapping GDEs is to contour depth-to-groundwater in the aquifer that is supporting the ecosystem (see Best Practice #5).

Groundwater levels fluctuate over time and space due to California's Mediterranean climate (dry summers and wet winters), climate change (flood and drought years), and subsurface heterogeneity in the subsurface (Figure 3). Many of California's GDEs have adapted to dealing with intermittent periods of water stress, however if these groundwater conditions are prolonged, adverse impacts to GDEs can result. While depth-to-groundwater levels within 30 feet[4] of the land surface are generally accepted as being a proxy for confirming that polygons in the NC dataset are supported by groundwater, it is highly advised that fluctuations in the groundwater regime be characterized to understand the seasonal and interannual groundwater variability in GDEs. Utilizing groundwater data from one point in time can misrepresent groundwater levels required by GDEs, and inadvertently result in adverse impacts to the GDEs. Time series data on groundwater elevations and depths are available on the SGMA Data Viewer[9]. However, if insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons in the GSP until data gaps are reconciled in the monitoring network (see Best Practice #6).

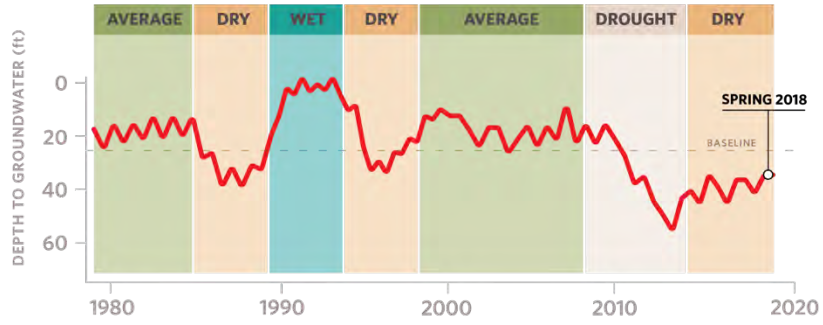


Figure 3. Example seasonality and interannual variability in depth-to-groundwater over time. Selecting one point in time, such as Spring 2018, to characterize groundwater conditions in GDEs fails to capture what groundwater conditions are necessary to maintain the ecosystem status into the future so adverse impacts are avoided.

[6] DWR. 2016. Water Budget Best Management Practice. Available at: https://water.ca.gov/LegacyFiles/groundwater/sgm/pdfs/BMP_Water_Budget_Final_2016-12-23.pdf

[7] Baseline is defined under the GSP regulations as "historic information used to project future conditions for hydrology, water demand, and availability of surface water and to evaluate potential sustainable management practices of a basin." [23 CCR §351(e)]

[8] Groundwater reliance can also be confirmed via stable isotope analysis and geophysical surveys. For more information see The GDE Assessment Toolbox (Appendix IV, GDE Guidance Document for GSPs[4]).

[9] SGMA Data Viewer: https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer

BEST PRACTICE #3. Ecosystems Often Rely on Both Groundwater and Surface Water

GDEs are plants and animals that rely on groundwater for all or some of its water needs, and thus can be supported by multiple water sources. The presence of non-groundwater sources (e.g., surface water, soil moisture in the vadose zone, applied water, treated wastewater effluent, urban stormwater, irrigated return flow) within and around a GDE does not preclude the possibility that it is supported by groundwater, too. SGMA defines GDEs as "ecological communities and species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface" [23 CCR §351(m)]. Hence, depth-to-groundwater data should be used to identify whether NC polygons are supported by groundwater and should be considered GDEs. In addition, SGMA requires that significant and undesirable adverse impacts to beneficial users of surface water be avoided. Beneficial users of surface water include environmental users such as plants or animals[10], which therefore must be considered when developing minimum thresholds for depletions of interconnected surface water.

GSAs are only responsible for impacts to GDEs resulting from groundwater conditions in the basin, so if adverse impacts to GDEs result from the diversion of applied water, treated wastewater, or irrigation return flow away from the GDE, then those impacts will be evaluated by other permitting requirements (e.g., CEQA) and may not be the responsibility of the GSA. However, if adverse impacts occur to the GDE due to changing groundwater conditions resulting from pumping or groundwater management activities, then the GSA would be responsible (Figure 4).

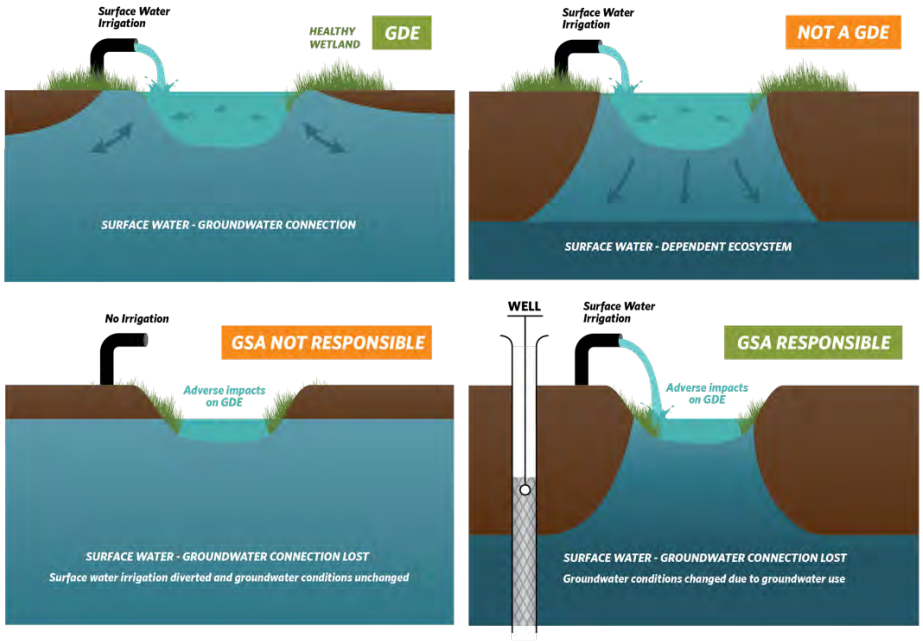


Figure 4. Ecosystems often depend on multiple sources of water. Top: (Left) Surface water and groundwater are interconnected, meaning that the GDE is supported by both groundwater and surface water. (Right) Ecosystems that are only reliant on non-groundwater sources are not groundwater-dependent. Bottom: (Left) An ecosystem that was once dependent on an interconnected surface water, but loses access to groundwater solely due to surface water diversions may not be the GSA's responsibility. (Right) Groundwater dependent ecosystems once dependent on an interconnected surface water system, but loses that access due to groundwater pumping is the GSA's responsibility.

[10] For a list of environmental beneficial users of surface water by basin, visit: https://groundwaterresourcehub.org/gde-tools/environmental-surface-water-beneficiaries/

BEST PRACTICE #4. Select Representative Groundwater Wells

Identifying GDEs in a basin requires that groundwater conditions are characterized to confirm whether polygons in the NC dataset are supported by the underlying aquifer. To do this, proximate groundwater wells should be identified to characterize groundwater conditions (Figure 5). When selecting representative wells, it is particularly important to consider the subsurface heterogeneity around NC polygons, especially near surface water features where groundwater and surface water interactions occur around heterogeneous stratigraphic units or aquitards formed by fluvial deposits. The following selection criteria can help ensure groundwater levels are representative of conditions within the GDE area:

- Choose wells that are within 5 kilometers (3.1 miles) of each NC Dataset polygons because they are more likely to reflect the local conditions relevant to the ecosystem. If there are no wells within 5km of the center of a NC dataset polygon, then there is insufficient information to remove the polygon based on groundwater depth. Instead, it should be retained as a potential GDE until there are sufficient data to determine whether or not the NC Dataset polygon is supported by groundwater.

- Choose wells that are screened within the surficial unconfined aquifer and capable of measuring the true water table.

- Avoid relying on wells that have insufficient information on the screened well depth interval for excluding GDEs because they could be providing data on the wrong aquifer. This type of well data should not be used to remove any NC polygons.

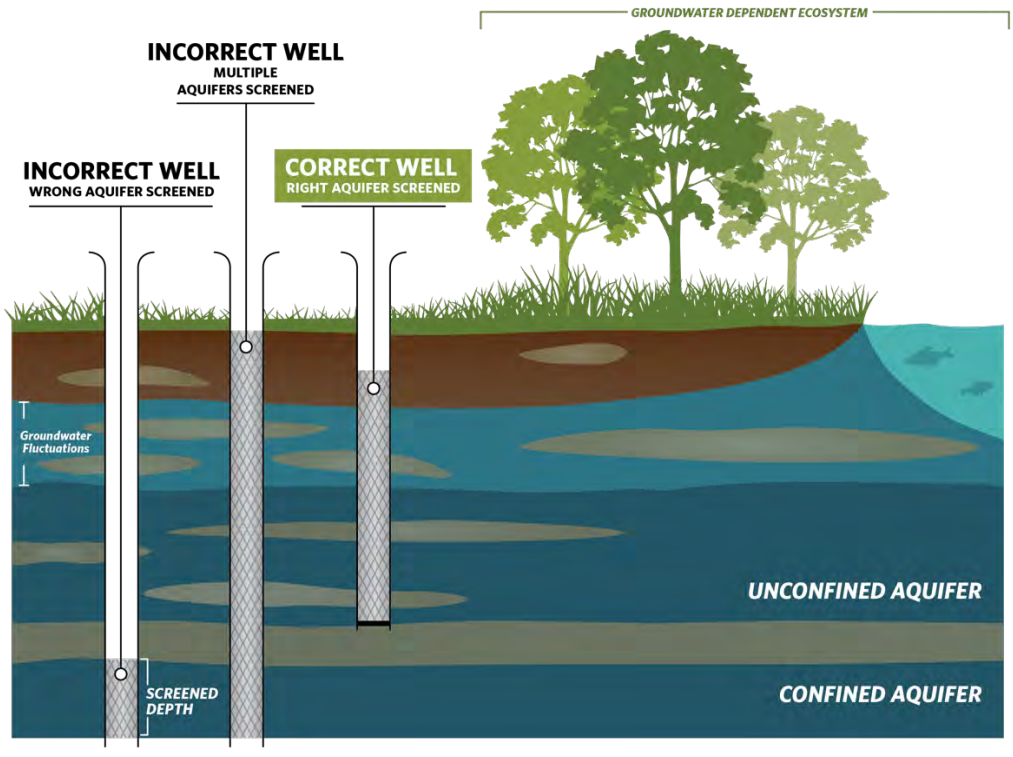


Figure 5. Selecting representative wells to characterize groundwater conditions near GDEs.

BEST PRACTICE #5. Contouring Groundwater Elevations

The common practice to contour depth-to-groundwater over a large area by interpolating measurements at monitoring wells is unsuitable for assessing whether an ecosystem is supported by groundwater. This practice causes errors when the land surface contains features like stream and wetland depressions because it assumes the land surface is constant across the landscape and depth-to-groundwater is constant below these low-lying areas (Figure 6a). A more accurate approach is to interpolate groundwater elevations at monitoring wells to get groundwater elevation contours across the landscape. This layer can then be subtracted from land surface elevations from a Digital Elevation Model (DEM)[11] to estimate depth-to-groundwater contours across the landscape (Figure b; Figure 7). This will provide a much more accurate contours of depth-to-groundwater along streams and other land surface depressions where GDEs are commonly found.

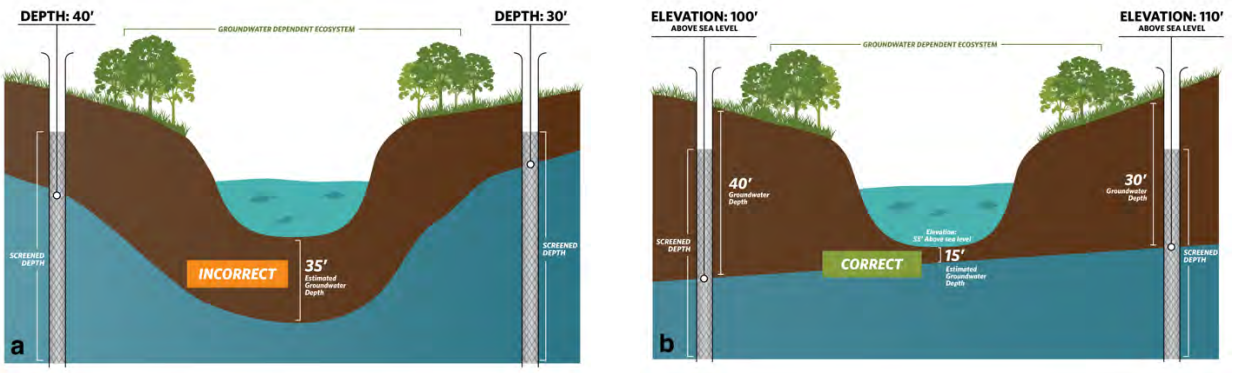


Figure 6. Contouring depth-to-groundwater around surface water features and GDEs. (a) Groundwater level interpolation using depth-to-groundwater data from monitoring wells. (b) Groundwater level interpolation using groundwater elevation data from monitoring wells and DEM data.

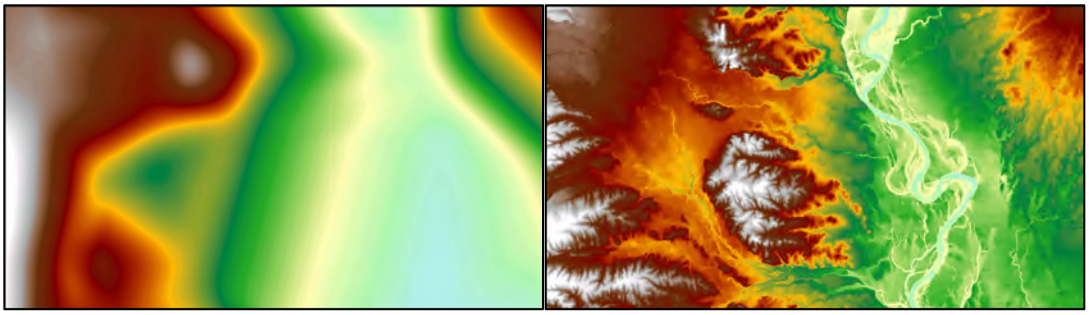


Figure 7. Depth-to-groundwater contours in Northern California. (Left) Contours were interpolated using depth-to-groundwater measurements determined at each well. (Right) Contours were determined by interpolating groundwater elevation measurements at each well and superimposing ground surface elevation from DEM spatial data to generate depth-to-groundwater contours. The image on the right shows a more accurate depth-to-groundwater estimate because it takes the local topography and elevation changes into account.

[11] USGS Digital Elevation Model data products are described at: https://www.usgs.gov/core-science-systems/ngp/3dep/about-3dep-products-services and can be downloaded at: https://iewer.nationalmap.gov/basic/

BEST PRACTICE #6. Best Available Science

Adaptive management is embedded within SGMA and provides a process to work toward sustainability over time by beginning with the best available information to make initial decisions, monitoring the results of those decisions, and using the data collected through monitoring programs to revise decisions in the future. In many situations, the hydrologic connection of NC dataset polygons will not initially be clearly understood if site-specific groundwater monitoring data are not available. If sufficient data are not available in time for the 2020/2022 plan, The Nature Conservancy strongly advises that questionable polygons from the NC dataset be included in the GSP until data gaps are reconciled in the monitoring network. Erring on the side of caution will help minimize inadvertent impacts to GDEs as a result of groundwater use and management actions during SGMA implementation.

KEY DEFINITIONS

Groundwater basin is an aquifer or stacked series of aquifers with reasonably well-defined boundaries in a lateral direction, based on features that significantly impede groundwater flow, and a definable bottom. *23 CCR §341(g)(1)*

Groundwater dependent ecosystem (GDE) are ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface. *23 CCR §351(m)*

Interconnected surface water (ISW) surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted. *23 CCR §351(o)*

Principal aquifers are aquifers or aquifer systems that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems. *23 CCR §351(aa)*

ABOUT US

The Nature Conservancy is a science-based nonprofit organization whose mission is *to conserve the lands and waters on which all life depends*. To support successful SGMA implementation that meets the future needs of people, the economy, and the environment, TNC has developed tools and resources (www.groundwaterresourcehub.org) intended to reduce costs, shorten timelines, and increase benefits for both people and nature.

Attachment E

Maps of representative monitoring sites in relation to key beneficial users

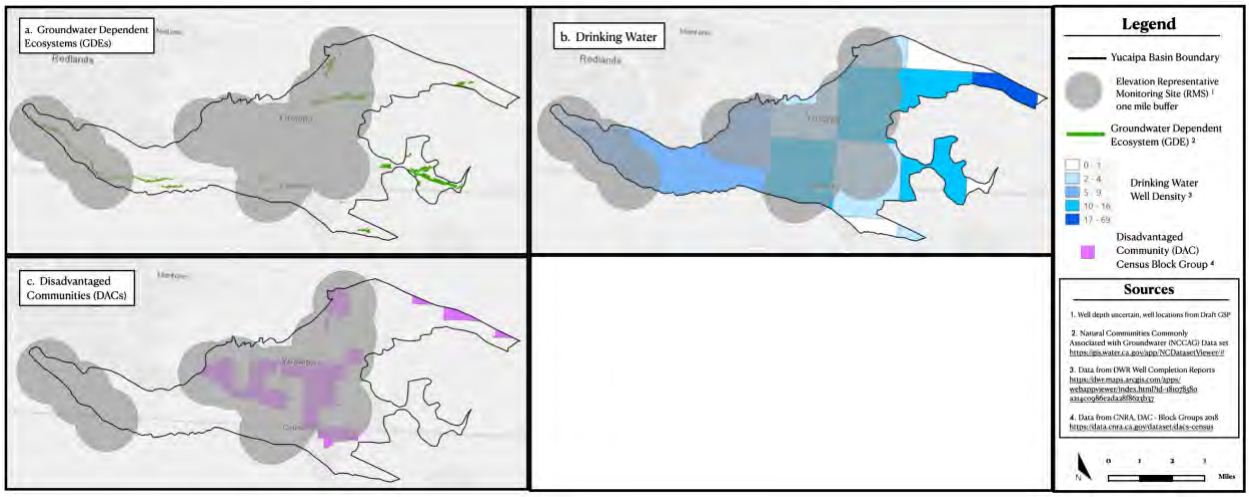


Figure 1. Groundwater elevation representative monitoring sites in relation to key beneficial users: a) Groundwater Dependent Ecosystems (GDEs), b) Drinking Water users, c) Disadvantaged Communities (DACs), and d) Tribes.

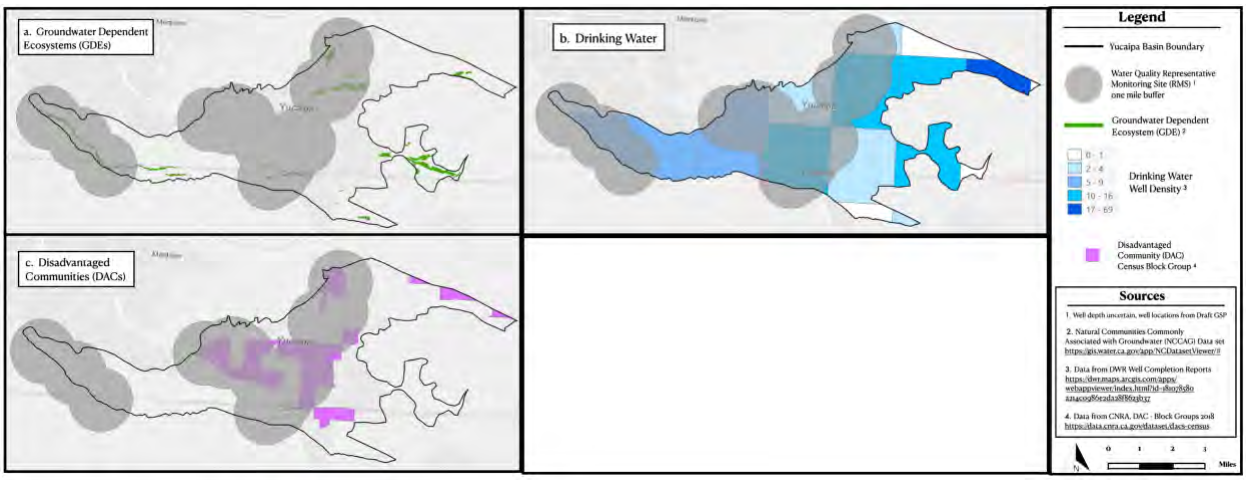


Figure 2. Groundwater quality representative monitoring sites in relation to key beneficial users: a) Groundwater Dependent Ecosystems (GDEs), b) Drinking Water users, c) Disadvantaged Communities (DACs), and d) Tribes.

Responses to Comments on Draft GSP

Public Draft Comments and Responses					
Section	**Page**	**Comment Item Description**	**Comment Received by**	**Date Comment Received**	**Response to Comment / Status of Revision**
ES-4	ES-xiv	Replace the last paragraph of ES-4 with the following text, "Some of the member agencies of the Yucaipa GSA have constructed stormwater capture basins to enhance recharge to the Subbasin. The Wilson Creek and Oak Glen Creek basins are designed to capture stormwater, but are primarily used to artificially recharge the Subbasin using surplus SWP water delivered by the SWP East Branch Extension. These basins are included in the YIHM to simulate their contributions to recharge to the Subbasin. The Wilson Creek and Oak Glen Creek basins have contributed an average 1,900 AFY and 170 AFY, respectively, since 2011. The other existing stormwater capture basins are estimated to capture approximately 1,800 AFY. These projects provide additional benefits including improving water quality in surface waters by reducing stormwater runoff volumes and providing wildlife habitat. The Yucaipa GSA identified proposed projects that have been designed, permitted, and are undergoing development or will in the near future. These include the Wilson Creek III Basins, the Pendleton Avenue Low Water Crossing, and the Upper Wildwood Creek Basin. The projects funded by the City of Yucaipa (with major funding also provided by SBVMWD for the Wilson III Basins) are designed to capture stormwater flows and enhance recharge to the Subbasin. The estimated average annual recharge contribution is approximately 1,500 AF. These basins will be located in the North Bench management area. These planned basins were not included in the future water budget analyses for the North Bench management area using the YIHM, because the North Bench management area is not projected to experience undesirable results over the 50-year planning and implementation horizon. However, these planned projects will provide additional opportunities to capture and recharge stormwater flows, thereby reducing the reliance on imported water to meet the basin measurable objectives."	City of Yucaipa	12/2/2021	Edits were made and tracked in the Public Draft.
1.3.1	1-11	Does Dudek have access to those GIS files, and if not, why not?	South Mesa	12/2/2021	Yes. Dudek received the GIS files from YVWD in June 2018.
1.3.1	1-11	Has Dudek requested Geoscience to identify the document references? When will the document references be available?	South Mesa	12/2/2021	Geoscience provided a reference to their report, "Determination of the Usable Capacity and Safe Yield for Each Sub-basin within the Yucaipa Basin Area", dated April 17, 2014. Subsequently, YVWD requested that the sub-basin (i.e. subarea) boundaries presented in that report be modified to comport with the modified boundary of the Yucaipa Subbasin (accepted by DWR in 2016) and to include the Singleton and Live Oak subareas. GIS files with revised boundaries of the nine subareas in the Yucaipa Subbasin were provided by Geoscience to YVWD in February 2017.
1.4.1.1.2	1-12	1.4.1.1.2 - City of Redlands is a majority shareholder in SMWC, and has historically operated and maintained their wells, but is not responsible for doing so. There is no Agreement obligating Redlands to operate and maintain SMWC wells. Also, Crafton Hills College is not located within the City of Redlands. 1.4.1.2.1 and 1.6.2.2.3 - Include similar language as above.	City of Redlands	11/4/2021	Edits were made and tracked in the Public Draft.
1.5.1.3	1-18	Please explain the meaning of “equivalent” as referenced in the text. We suggest revising the text to include that explanation, to avoid confusion from using “equivalent” in quotation marks.	South Mesa	12/2/2021	The following text was inserted for Section 1.5.1.3 for clarification: "In 2014, SBVMWD integrated the Subbasin into its existing program that calculates an annual change in groundwater storage for the San Bernardino Basin Area (SBVMWD 2018). DWR first calculated the annual change in storage in the San Bernardino Basin Area (SBBA) from 1934 to 1960. SBVMWD continued the work initiated by DWR and calculated the annual change in groundwater storage from 1961 to present. The calculated annual change in storage, or the volume of water lost or gained, is based on field groundwater level measurements at wells throughout the Subbasin. SBVMWD also calculates the annual change in storage for each of the hydrogeologic subareas in the Yucaipa Subbasin. Storage is an extremely important metric that the Yucaipa GSA will use to evaluate the effectiveness of the GSP."
1.5.1.3	1-18	Please provide further clarification and confirmation that 1993 is an appropriate base year for measuring changes in groundwater storage under SGMA.	South Mesa	12/2/2021	This section of Chapter 1 of the GSP introduces water resources monitoring programs that have been implemented in the Plan Area. One of these programs is the annual calculation of the change in groundwater in storage for the San Bernardino Basin Area and the Yucaipa Basin Area conducted by SBVMWD. This work provides an estimation of the change in storage in the Yucaipa Subbasin separate from the change in storage estimated from the YIHM that was used to prepare this GSP.

Public Draft Comments and Responses					
Section	**Page**	**Comment Item Description**	**Comment Received by**	**Date Comment Received**	**Response to Comment / Status of Revision**
1.5.3	1-31	Insert the following text at the end of the last paragraph for Section 1.5.3: "Other projects include the Wilson Creek and Oak Glen Creek basins with were designed to capture storm water, but are primarily used to artificially recharge the Subbasin using surplus SWP water delivered by the SWP East Branch Extension. These basins are included in the YIHM to simulate their contributions to recharge to the Subbasin. The Wilson Creek and Oak Glen Creek basins have contribute an average 1,900 AFY and 170 AFY, respectively, since 2011. The other existing storm water capture basins are estimated to capture approximately 1,800 AFY. These projects provide additional benefits including improving water quality in surface waters by reducing stormwater runoff volumes and providing wildlife habitat."	City of Yucaipa	12/2/2021	Edits were made and tracked in the Public Draft.
2.5.1.1	2-20	How, if at all, do the revised numbers stated in this section affect the GSP pumping allocations, replenishment fees, and credits that were presented at the August 2021, September 2021 and October 2021 Yucaipa GSA meetings?	South Mesa	12/2/2021	The production values listed in Section 2.5.1.1., and the production values presented in all sections discussing the other subareas in the Yucaipa Subbasin, are derived from the May 2021 revised version of the USGS YIHM. Previous production values included in the preliminary draft of the GSP were based on the September 2020 version of the YIHM. The changes in production values between the two versions of the YIHM are due to revisions, recalibration, and refinement of the September 2020 version of the YIHM and revisions to the methodology for extracting modeled outputs. The sustainable yield pumping allocations presented in Chapter 4 of the GSP are based on the information and results from the May 2021 version of the YIHM. Information presented in the August, September, and October 2021 GSA meetings were based on information from the May 2021 version of the YIHM.
2.5.1.2	2-20	How, if at all, do the revised numbers stated in this section affect the GSP pumping allocations, replenishment fees, and credits for this Management Area that were presented at the August 2021, September 2021 and October 2021 Yucaipa GSA meetings?	South Mesa	12/2/2021	Please see response to the comment on section 2.5.1.1. page 2-20.
2.5.1.2	2-21	Does YVWD hold surface water diversion permits/licenses with respect to YVWD-25? The revised text removes references to diversion of surface water.	South Mesa	12/2/2021	Water produced by YVWD-25 is characterized as "groundwater under the direct influence of surface water." Section 64651.50 (CCR Title 22) defines groundwater under the direct influence of surface water as "any water beneath the surface of the ground with significant occurrence of insects or other macroorgansisms, algae or large diameter pathogens such as *Giardia lamblia* or *Cryptosporidium* , or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity or pH which closely correlate to climatological or surface water conditions." (Text added to section 2.5.4.1 in GSP Chapter 2). Groundwater pumped from YVWD-25 is not extracted from a subterranean stream, which is a "body of groundwater flowing through known and definite channels." Therefore, water produced from YVWD-25 is not subject to the same permitting requirements as diversions from surface water streams as regulated by the State Water Resources Control Board. Therefore, no surface water diversion permit, or appropriative right to divert surface water, is applicable for YVWD-25.
2.5.1.2, 2.5.1.5, 2.5.1.6, 2.5.1.7, 2.8.2.3.3,	2-21 , 2-23, 2-24, 2-67	How, if at all, do the revised numbers stated in these sections affect the GSP pumping allocations, replenishment fees, and credits for Management Areas that were presented at the August 2021, September 2021 and October 2021 Yucaipa GSA meetings?	South Mesa	12/2/2021	Please see response to the comment on section 2.5.1.1. page 2-20.

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2.5.3	2-26	South Mesa appreciates the initial response, but requests further clarification on this subsection regarding YVWD-48 that pumps groundwater from the Beaumont Basin for partial use within the Yucaipa Subbasin. The response indicates that the fraction of water from YVWD-48 that is served within the Subbasin has not been quantified but further states that the YIHM "simulates production from YVWD-48" and estimates return flows in the Subbasin "based on water served in the Subbasin." Will Dudek please provide further clarification regarding the assumptions (pumping, return flows, water served within the Subbasin, etc.) utilized for YVWD-48 and also for the analogous South Mesa-04 (which also produces groundwater from the Beaumont Basin, for use within the Yucaipa Subbasin).	South Mesa	12/2/2021	Groundwater extracted from YVWD-48 is served within YVWD's service area. As previously noted, the fraction of YVWD-48 extractions served within YVWD's service area has not been quantified as part of this Plan preparation. Groundwater extractions from YVWD-48, as simulated by the YIHM, are presented in Table 2C-3 of the Public Draft GSP. The draft model documentation for the YIHM indicates that groundwater extraction rates in the model were obtained from SBVMWD, YVWD, SMWC, WHWC, and Geosciences Support Services Inc. (Alzraiee et al, 2021). The YIHM does not directly simulate the distribution of water served within the Subbasin. Instead, the YIHM calculates a water balance at the grid-cell level between groundwater inflows and outflows resulting in simulated changes in hydraulic head (i.e., change in storage). The USGS estimated average annual return flows for each groundwater subarea during the YIHM model development. These return flow volumes represent an aggregate of residential landscaping return flows, discharges from septic systems, and municipal system leaks (Cromwell et al, 2020a). Each of these subarea estimates were calculated by the USGS assuming that irrigation demands were approximately 4 AFY/acre to irrigate golf courses and approximately 1.6 AFY/acre to irrigate smaller parks and residential landscaping (Alzraiee et al, 2021)). The amount of return flow from these sources was estimated by the USGS to range from 15 to 30% of the total applied water at each location (Alzraiee et al). In addition to this, the USGS estimated that discharges from septic systems averaged approximately 70 gpd/person and that municipal system leaks were approximately 5-10% of the total municipal water demand (Alzraiee et al, 2021) Return flows from groundwater extracted at YVWD-48 and SMWC-04 and served within the Subbasin would be reflected in the total modeled return flows. Because the YIHM estimates the aggregate return flow volume for each subarea, the model does not directly describe where groundwater extracted from an individual well is served within the Subbasin. Accordingly, the YIHM does not provide the resolution to directly characterize how groundwater production from YVWD-48 and/or South Mesa-04 impact return flows in the Subbasin.
2.8.1.1	2-58	Please provide an update as to when SBVMWD anticipates receiving the USGS YIHM modeling report.	South Mesa	12/2/2021	USGS reported in early November 2021 that the two USGS reports, "Geology and Hydrogeology of the Yucaipa Groundwater Subbasin, San Bernardino and Riverside Counties, California" and "Hydrology of the Yucaipa Groundwater Subbasin: Characterization and integrated Numerical Model, San Bernardino and Riverside Counties, California" are in layout stage. Final approval and dissemination to the public will occur when layout is complete and the reports are published online. Expected publication date is end of 2021.
2.8.2.2.3	2-66	A copy of Dudek's revised draft Table 2C-3 is included with this letter as **Attachment "A"**. The revised text, Table 2C-3 and Dudek response to South Mesa's October 12, 2021 comment, appear to be inconsistent with the data provided by SMWC regarding South Mesa-04. The revised text appears to indicate that Well 4 data is being applied only back to 1988 is due to YIHM model parameters only going back to 1988. Is that correct? If so, why does the YIHM include YVWD importing water beginning 1981 via YVWD-16?	South Mesa	12/2/2021	The YIHM was designed by the USGS to simulate conditions in the Yucaipa Subbasin from January 1, 1947 through December 30, 2014. Dudek extracted model results from the YIHM to characterize the historical groundwater budget from water year 1965 through water year 2014, and then extended the model to simulate current and future conditions in the Subbasin. The historical model developed by the USGS operates South Mesa-04 beginning in the 1988 WY and YVWD-16 beginning the 1981 WY. Dudek did not change any of the historical model conditions as part of the Plan development. Dudek has discussed with South Mesa the accurate representation of historical pumping at South Mesa-04 and will look into incorporating the data into the next utilization of the YIHM. To better reflect that Table 2C-3 represents modeled groundwater extractions, rather than imported groundwater volumes, the title for Table 2C-3 has been changed from "Imported Groundwater to the Yucaipa Subbasin", to, "Groundwater Production from Wells Outside the Subbasin that Supplement Subbasin Water Supplies". In addition, Dudek has added a footnote to the table indicating that this data represents total production volumes, not imported groundwater volumes. Dudek has also updated the text in Section 2.8.2.2.3 to correctly reflect what this data represents.

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2.8.2.2.3	2-66	Table 2C-3 in Appendix 2C lists "0" AF imported by South Mesa-04 from 1987 and prior, and no reference is made prior to 1965. Please explain the those figures and date ranges, and how they are being applied.	South Mesa	12/2/2021	The 0 AFY importations from South Mesa-04 between 1965 and 1987 reflect the modeled pumping rates represented in the YIHM. Dudek did not adjust any of these historical pumping rates, which were incorporated into the model by the USGS during the YIHM development. Data prior to water year 1965 are not discussed because this data fall outside of the 50-year historical water budget time frame of WY 1965-2014. The 50-year time frame for the historical water budget was selected to characterize long-term conditions prior to water year 2015.
2.8.2.2.3	2-66	We invite Dudek to contact South Mesa to ensure that complete and accurate South Mesa-04 data is being utilized for the GSP.	South Mesa	12/2/2021	Dudek has discussed with South Mesa the accurate representation of historical pumping at South Mesa-04 and will look into incorporating the data into the next utilization of the YIHM.
4.2.2	4-16	In Section 4.2.2., entitled, "Management Action #2 - Sustainable Yield Pumping Allocations and Groundwater Replenishment," Dudek has made a revision to the draft GSP text at the request of SBVMWD that is of significant concern to South Mesa. The revision adds a sentence expressly stating that "Pumping credits cannot be transferred or sold to another entity within a given management area or within the Subbasin." That sentence should be deleted. The transferability of pumping credits is a significant policy matter that has not yet been specifically addressed by the Yucaipa GSA. In fact, the ability to transfer pumping credits within a management area or within the Subbasin could potentially provide an important management tool for the Subbasin and should be explored and discussed. Until that policy issue is addressed and decided, the GSP should not include language limiting or prohibiting transferability. We request that placeholder language be included in the GSP stating that "The Yucaipa GSA will continue to discuss transferability of pumping credits."	South Mesa	12/2/2021	The sentence, "Pumping credits cannot be transferred or sold to another entity within a given management area or within the Subbasin" was edited to read, "The Yucaipa GSA is continuing discussions on implementing a policy that will allow the transferability of pumping credits between groundwater users within a given management area or within the Subbasin." This sentence reflects South Mesa's concern that transferability of pumping credits has not been specifically addressed by the GSA.
4.2.3	4-23	Please provide a further detailed explanation regarding the accounting methodology for Surplus Supplemental Water. The response above indicates that Surplus Supplemental Water is not associated with Management Action #2, but indicates that that Surplus Supplemental water will nonetheless be available to offset production exceedances above sustainable yield pumping allocations (which allocations comprise an integral component of Management Action #2). We would appreciate added clarity regarding the interrelatedness and accounting methodology for Management Action #2 and Management Action #3.	South Mesa	12/2/2021	The following section, "which is not associated with Management Action No. 2 (Section 4.2.2)", will be deleted from the text to remove any confusion of the interrelationship between pumping credits defined in Management Action No. 2 and supplemental surplus spreading water defined in Management Action No. 3. The surplus supplemental water will be accessible to the water purveyor that purchased the water and percolated it at a spreading basin. This water will be available to help offset production exceedances above the sustainable yield pumping allocations instead of pumping credits earned via Management Action No. 2.
		Sec**tion 1. Consideration of Beneficial Uses and Users in GSP Development. Part A. Identification of Key Beneficial Uses and Users. Disadvantaged Communities and Drinking Water Users.** "The GSP fails to clearly state the population of each DAC or provide population of DAC's dependent on groundwater as their source of drinking water in the subbasin."	Nature Conservancy et al., Public Comment Letter for Yucaipa Subbasin Draft GSP	12/3/2021	Figure 1-13 was updated to include the populations for the DACs and SDACs identified in the Plan Area, and the source of water supplied to the DACs and SDACs. Section 1.8.8 was also revised with added text describing the sources of water for the disadvantaged communities.
		Section 1. Consideration of Beneficial Uses and Users in GSP Development. Part A. Identification of Key Beneficial Uses and Users. Interconnected Surface Waters. "The identification of Interconnected Surface Waters (ISWs) is insufficient, due to lack of supporting information provided for the ISW analysis." "The GSP does not provide a map of these reaches to illustrate the conclusions of the modeling analysis regarding which reaches are connected to groundwater."	Nature Conservancy et al., Public Comment Letter for Yucaipa Subbasin Draft GSP	12/3/2021	Chapter 2 of the GSP was updated to include a new section, titled “Section 2.7.8.1 Interconnected Surface Waters”. This section describes modeled surface water-groundwater interactions across the Yucaipa Subbasin and introduces revised Figures 2-56 and 2-57 that display the locations of ISWs confirmed by observed groundwater levels and potential ISWs simulated in the Plan Area. The locations of the ISWs are compared to mapped GDEs in the Plan Area. While the Yucaipa Integrated Hydrologic Model provides the best-available data characterizing ISWs in the Subbasin, we note that this component of the numerical model is uncertain and not well-constrained by surface water flow measurements. As part of this section, we identify the presence of ISWs as a data gap.

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		Section 1. Consideration of Beneficial Uses and Users in GSP Development. Part A. Identification of Key Beneficial Uses and Users. Groundwater Dependent Ecosystems. "NC dataset polygons were incorrectly removed if Normalized Difference Vegetation Index (NDVI) and Normalized Difference Moisture Index (NDMI) data did not correlate with groundwater level trends."	Nature Conservancy et al., Public Comment Letter for Yucaipa Subbasin Draft GSP	12/3/2021	NC dataset polygons were not removed solely based on the correlation between NDVI, NDMI, and nearby groundwater levels. Four of the five polygons that were characterized as habitats that do not rely on groundwater were characterized as such because the underlying water table is encountered at depths that exceed 100 ft. bgs, which is much deeper than the rooting depth of the overlying habitat. The fifth habitat that was characterized as not groundwater dependent was characterized as such because habitat health exhibited no response to groundwater production trends near the mapped ecosystem. Near this habitat, groundwater has historically been produced at an average rate of 100 AFY and the water table has been measured 44 ft. bgs to 77 ft. bgs. During the period where production averaged 100 AFY, habitat health increased.
		Section 1. Consideration of Beneficial Uses and Users in GSP Development. Part A. Identification of Key Beneficial Uses and Users. Groundwater Dependent Ecosystems. "The GSP could be improved by labeling the GDE units and labeling each well location provided on this figure (Figure 2-57), and providing the hydrographs of groundwater levels that are discussed qualitatively in the text."	Nature Conservancy et al., Public Comment Letter for Yucaipa Subbasin Draft GSP	12/3/2021	Well labels and GDE labels added to Figures 2-56 and 2-57. In addition, we have included hydrographs showing the depths-to-groundwater at the wells identified in Figures 2-56 and 2-57 in a new Appendix, 2-E, to Chapter 2.
		Section 1. Consideration of Beneficial Uses and Users in GSP Development. Part A. Identification of Key Beneficial Uses and Users. Native Vegetation and Management. "The integration of native vegetation into the water budget is insufficient." "Managed wetlands are not mentioned in the GSP, so it is not known whether or not they are present in the subbasin."	Nature Conservancy et al., Public Comment Letter for Yucaipa Subbasin Draft GSP	12/3/2021	The water budget analysis for the Yucaipa Subbasin was conducted with the YIHM. One of the groundwater outflows simulated by the YIHM is water usage via evapotranspiration by vegetation types based on land-use maps. Evapotranspiration of shallow groundwater by native vegetation may contribute to the total groundwater outflows in the Plan Area. These losses are not explicitly modeled by the YIHM, but were implicitly accounted for during model development and calibration. Further discussion of native vegetation water usage is included in Section 2.8.8. There are no managed wetlands in the Yucaipa Subbasin.
		Section 1. Consideration of Beneficial Uses and Users in GSP Development. Part B. Engaging Stakeholders. Stakeholder Engagement during GSP Development. "The plan lacks specific details of outreach and engagement targeted to environmental stakeholders. We recommend that the GSA engage with environmental stakeholders in the subbasin, which could include California Department of Fish and Wildlife or environmental non-profits."	Nature Conservancy et al., Public Comment Letter for Yucaipa Subbasin Draft GSP	12/3/2021	The Yucaipa GSA has presented meeting announcements with participant details for all meetings, and has welcomed stakeholders and interested parties to submit contact information to receive all public notices pertaining to the development of the GSP. The Yucaipa GSA will make efforts within the next 5 years of contacting individual domestic well owners to obtain well information and participation in the early stages of the GSP implementation phase.
		Section 1. Consideration of Beneficial Uses and Users in GSP Development. Part C. Considering Beneficial Uses and Users When Establishing Sustainable Management Criteria and Analyzing Impacts on Beneficial Uses and Users. Disadvantaged Communities and Drinking Water Users. "The GSP does not quantify the number of domestic wells that could go dry or otherwise consider or analyze the impact of minimum thresholds on domestic wells. The GSP does not sufficiently describe whether minimum thresholds will avoid significant and unreasonable loss of drinking water to domestic well users that are not protected by the minimum threshold."	Nature Conservancy et al., Public Comment Letter for Yucaipa Subbasin Draft GSP	12/3/2021	The current status of the domestic wells in the Plan Area is not known. The Yucaipa GSA will contact potential private domestic well users to obtain information about their wells and identify any active domestic wells that currently have potable water. The Yucaipa GSA will identify domestic wells that may be impacted by water level declines in the Plan Area.

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		Section 1. Consideration of Beneficial Uses and Users in GSP Development. Part C. Considering Beneficial Uses and Users When Establishing Sustainable Management Criteria and Analyzing Impacts on Beneficial Uses and Users. Disadvantaged Communities and Drinking Water Users. "The GSP does not establish SMC for groundwater quality."	Nature Conservancy et al., Public Comment Letter for Yucaipa Subbasin Draft GSP	12/3/2021	SMC were not established for the degraded water quality sustainability indicator because there are no current and projected significant and unreasonable effects to water quality in the Plan Area. Concerted efforts by the Yucaipa GSA member agencies to improve water quality by removing septic systems and connecting users to sanitary sewer systems, increasing wastewater treatment capacities and implementing advanced treatment technologies, along with a marked reduction in water use for agricultural purposes, has improved water quality throughout the Subbasin. Water quality issues only occur in localized areas (e.g., former Yucaipa landfill, active remediation of shallow groundwater in the Western Heights Management Area) that have not impacted water quality in the principal aquifer. Therefore, there are no water quality issues that may affect the long-term supply and beneficial uses of groundwater produced from the principal aquifer.
		Section 1. Consideration of Beneficial Uses and Users in GSP Development. Part C. Considering Beneficial Uses and Users When Establishing Sustainable Management Criteria and Analyzing Impacts on Beneficial Uses and Users. Groundwater Dependent Ecosystems and Interconnected Surface Waters. "Since GDEs are present in the subbasin, they must be considered when developing all relevant SMC." "Because ISWs have been identified in the subbasin, the GSA needs to define what significant and unreasonable effects are for ISWs.	Nature Conservancy et al., Public Comment Letter for Yucaipa Subbasin Draft GSP	12/3/2021	We have added YVWD-25 and YVWD-28 as representative monitoring points in the North Bench Management Area (see revised Figure 3-5). We will establish GDE SMCs at these wells following the same methodology used for the GDEs identified in the San Timoteo Management Area along San Timoteo Creek. Two new figures included in a new appendix, Appendix 3-C in Chapter 3, will show (1) the RMPs in relation to the mapped DACs and SDACs, and (2) the RMPs in relation to the GDEs. SMCs for ISWs are not established as part of this Plan because the location and extent of ISWs in the Subbasin are not well constrained by measured data and is a data gap. ISWs will be re-evaluated as measured data becomes available.
		Section 2. Climate Change. "The integration of climate change into the projected water budget is insufficient. The GSP would benefit from clearly and transparently incorporating the extremely wet and dry scenarios provided by DWR into projected water budgets or select more appropriate extreme scenarios for the subbasin. While these extreme scenarios may have a lower likelihood of occurring and their consideration is not required by DWR (only suggested), their consequences could be significant and their inclusion can help identify important vulnerabilities in the subbasin's approach to groundwater management."	Nature Conservancy et al., Public Comment Letter for Yucaipa Subbasin Draft GSP	12/3/2021	The inclusion of extreme climate scenarios may be considered for the 5-year update to the GSP when the YIHM is reevaluated using data obtained since the implementation of the GSP. The GSP includes Management Action No. 1, Reduce Net Use of Groundwater When Groundwater Levels Decline below Measurable Objectives, to protect the groundwater resource and beneficial users should groundwater levels decline below measurable objectives. A reduction in the net use of groundwater is equivalent to a reduction in the estimated sustainable yield because groundwater use is constrained to the estimated sustainable yield. A future decline in groundwater levels may be the result of less recharge due to climate change, in which case the GSA will reevaluate the estimate of sustainable yield and modify the value to reflect future conditions and protect all beneficial users.
		Section 2. Climate Change. "the sustainable yield is not calculated based on the projected water budget with climate change incorporated."	Nature Conservancy et al., Public Comment Letter for Yucaipa Subbasin Draft GSP	12/3/2021	The sustainable yield estimated for the Yucaipa Subbasin was based on a 50-year historical record of climate, pumping, and land use types, and the change in storage as a function of groundwater use. Management actions established in the GSP are designed to protect the groundwater resource should groundwater levels and groundwater storage decline via significant and unreasonable effects. Under such circumstances, the estimated sustainable yield for a particular management area will be reduced to limit groundwater withdrawals and protect the groundwater resource.
		Section 3. Data Gaps. "The consideration of beneficial users when establishing monitoring networks is insufficient, due to lack of specific plans to increase the Representative Monitoring Points (RMPs) in the monitoring network that represent water quality conditions and shallow groundwater elevations around domestic wells, GDEs, and ISWs in the subbasin." "The GSP does not provide specific plans, such as locations or a timeline, to fill the data gaps for GDEs. Because GDEs have been identified in the subbasin, these data gaps should be addressed now instead of waiting for groundwater extraction to increase in the future."	Nature Conservancy et al., Public Comment Letter for Yucaipa Subbasin Draft GSP	12/3/2021	The RMPs identified in the GSP were selected based on their ability to accurately represent conditions in the Plan Area. The density of these points equals the monitoring well density for an entire monitoring network in DWR's BMP guidance document on monitoring networks. These points are a subset of a broader monitoring network, which will continue to be used moving forward (see Section 3.6). If active domestic well users are identified, additional representative monitoring points may be recommended in future updates to the GSP. The Yucaipa GSA will incorporate YVWD-25 in the Oak Glen area and YVWD-28 in the Wildwood Canyon area as additional RMPs in the North Bench management area to evaluate groundwater level conditions in the proximity of the confirmed GDEs in those areas. These wells are already part of the groundwater monitoring network identified in the GSP.

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		Section 4. Addressing Beneficial Users in Projects and Management Actions. "The GSP fails to describe the explicit benefits or impacts to beneficial users, such as GDEs and DACs, from Management Action No. 3, Surplus Supplemental Water Spreading. We also note that the plan does not include a domestic well mitigation program to avoid significant and unreasonable loss of drinking water."	Nature Conservancy et al., Public Comment Letter for Yucaipa Subbasin Draft GSP	12/3/2021	The benefit of implementing Management Action No. 3, Surplus Supplemental Water Spreading, is supplying additional water vis-à-vis artificial recharge to the aquifer. Surplus supplemental water may be used to artificially recharge the aquifer during wet seasons or subsequent periods following a wet season to increase groundwater storage. The additional water is then available to meet higher demands during dry seasons. This management action increases and/or maintains groundwater supply and groundwater levels that will benefit all groundwater users, including GDEs and DACs. The GSP does include an adaptive groundwater management program with the establishment of Management Actions Nos. 1 and 2. These management actions call for a reduction in the net use of groundwater when groundwater levels decline below measurable objectives. The Yucaipa GSA will make a concerted effort to contact individual domestic well users to obtain information on their wells, including construction details and usage, to ensure that these sources of water are protected under the GSP.

Appendix 2-A

Annual Precipitation and Water Year Type at SBCFCD Climate Stations in the Yucaipa Subbasin

DRAFT Appendix 2-A. Annual Precipitation and Water Year-Type at San Bernardino County Flood Control District Climate Stations in the Yucaipa Subbasin

Water Year Ending	Western Heights					Calimesa					Crafton			Wilson Creek			
	2915 (2235')	3099 (2140')	3356 (2125')	% of Mean	Water Year Type	3126A (2813')	3132 (2710')	3386 (2620')	% of Mean	Water Year Type	2890 (2606')	% of Mean	Water Year Type	3126 (2815')	3128B (2860')	% of Mean	Water Year Type
1953							5.41		32%	Critically Dry				12.59	14.26	88%	Below Normal
1954							18.12		109%	Normal				17.84	16.92	114%	Above Normal
1955							13.75		82%	Below Normal				15.17	14.68	97%	Normal
1956							11.68		70%	Dry				11.72	11.83	77%	Below Normal
1957							14.47		87%	Below Normal				13.41		88%	Below Normal
1958		24.72		181%	Wet		26.48		159%	Wet				27.95		183%	Wet
1959		8.26		60%	Dry		9.13		55%	Dry				8.76		57%	Dry
1960		15.98		117%	Above Normal		14.03		84%	Below Normal				13.25		87%	Below Normal
1961		8.05		59%	Dry		2.50		15%	Critically Dry				7.63		50%	Critically Dry
1962		18.68		137%	Above Normal		16.78		101%	Normal				18.84		123%	Above Normal
1963		15.80		116%	Above Normal		14.01		84%	Below Normal				13.90		91%	Normal
1964		12.65		93%	Normal		11.04		66%	Dry				11.74		77%	Below Normal
1965		13.80		101%	Normal		13.02		78%	Below Normal							
1966		17.80		130%	Above Normal	19.63	18.19		113%	Above Normal							
1967		27.05		198%	Wet	27.41	24.76		156%	Wet							
1968		15.25		112%	Above Normal	15.46	16.80		97%	Normal							
1969		29.12		213%	Wet	38.22	35.36		221%	Wet							
1970		8.53		62%	Dry	10.26	9.91		60%	Dry					10.03	66%	Dry
1971		9.44		69%	Dry	13.44	13.75		82%	Below Normal					12.17	79%	Below Normal
1972		6.26		46%	Critically Dry	8.65	7.35		48%	Critically Dry					8.73	57%	Dry
1973		15.48		113%	Above Normal	22.33	19.93		127%	Above Normal					21.53	141%	Above Normal
1974		9.98		73%	Dry	14.32	11.83		78%	Below Normal					12.52	82%	Below Normal
1975		12.18		89%	Below Normal	17.74	14.98		98%	Normal					17.02	111%	Above Normal
1976		10.84		79%	Below Normal	18.19	15.89		102%	Normal					17.35	113%	Above Normal
1977						16.48	10.06		80%	Below Normal					13.49	88%	Below Normal
1978						36.63	29.65		199%	Wet					30.84	201%	Wet
1979						27.30	21.25		146%	Above Normal					22.51	147%	Above Normal
1980			24.67	181%	Wet	30.98	26.95		174%	Wet					21.03	137%	Above Normal
1981			7.43	54%	Dry	12.44	9.61		66%	Dry							
1982			16.05	118%	Above Normal	21.53	18.68		121%	Above Normal							
1983			28.58	209%	Wet	39.42	30.71		210%	Wet							
1984			6.87	50%	Dry	10.48	8.96		58%	Dry							
1985			10.33	76%	Below Normal	14.48	12.36		80%	Below Normal							
1986			12.36	91%	Normal	18.25	13.83		96%	Normal							
1987			8.84	65%	Dry	11.33	10.66		66%	Dry							
1988			12.10	89%	Below Normal	16.96	13.69		92%	Normal							
1989			9.20	67%	Dry	12.80	10.60	13.67	74%	Dry							
1990			7.40	54%	Dry	1.50	10.19	13.77	51%	Dry				10.99		72%	Dry
1991			15.38	113%	Above Normal	19.90	16.48	23.43	120%	Above Normal							
1992			14.88	109%	Normal	20.23	16.80	24.42	123%	Above Normal							
1993			28.18	206%	Wet	35.95	32.37	45.23	227%	Wet							

DRAFT Appendix 2-A. Annual Precipitation and Water Year-Type at San Bernardino County Flood Control District Climate Stations in the Yucaipa Subbasin

Water Year Ending	Western Heights					Calimesa					Crafton			Wilson Creek			
	2915 (2235')	3099 (2140')	3356 (2125')	% of Mean	Water Year Type	3126A (2813')	3132 (2710')	3386 (2620')	% of Mean	Water Year Type	2890 (2606')	% of Mean	Water Year Type	3126 (2815')	3128B (2860')	% of Mean	Water Year Type
1994			11.26	82%	Below Normal	12.95	11.35	15.80	80%	Below Normal							
1995			27.22	199%	Wet	31.84	28.54	38.36	197%	Wet							
1996			9.13	67%	Dry	12.12	10.19	14.06	73%	Dry	6.12	55%	Dry				
1997			16.67	122%	Above Normal	20.13	16.93	19.81	114%	Above Normal	13.12	118%	Above Normal				
1998			25.55	187%	Wet	32.10	28.60	33.27	188%	Wet	21.04	189%	Wet				
1999			7.29	53%	Dry	11.02	9.87	8.66	59%	Dry	9.20	83%	Below Normal				
2000			6.40	47%	Critically Dry	12.42	9.63	2.45	49%	Critically Dry	7.12	64%	Dry				
2001			10.49	77%	Below Normal	5.11	9.65	1.61	33%	Critically Dry	4.56	41%	Critically Dry				
2002			2.46	18%	Critically Dry	5.26	5.27	5.18	31%	Critically Dry	3.32	30%	Critically Dry				
2003			17.57	129%	Above Normal	21.32	19.50	16.92	115%	Above Normal	13.76	123%	Above Normal				
2004			9.47	69%	Dry	9.50	11.10	6.61	54%	Dry	9.16	82%	Below Normal				
2005	29.04		31.39	221%	Wet	41.67	32.73	31.70	212%	Wet	17.80	160%	Wet				
2006	9.08		11.45	75%	Below Normal		12.52	12.89	76%	Below Normal	10.92	98%	Normal				
2007	4.48		3.34	29%	Critically Dry	6.42	5.53		36%	Critically Dry	5.53	50%	Critically Dry				
2008	11.64		13.34	91%	Normal	17.94	14.79		98%	Normal	12.20	109%	Normal				
2009	8.80		9.90	68%	Dry	14.08	10.47		74%	Dry	13.04	117%	Above Normal				
2010	15.45		17.80	122%	Above Normal	16.40	17.68		102%	Normal	15.49	139%	Above Normal				
2011	14.35		24.52	142%	Above Normal	27.90	22.74		152%	Wet	20.91	188%	Wet				
2012	8.73		9.57	67%	Dry	10.85	10.80		65%	Dry	9.37	84%	Below Normal				
2013	9.96		9.69	72%	Dry	10.06	9.60		59%	Dry	10.36	93%	Normal				
2014	15.00		6.55	79%	Below Normal	7.55	7.58		45%	Critically Dry	6.92	62%	Dry				
2015	10.88		13.06	88%	Below Normal	14.78	12.39		81%	Below Normal	12.72	114%	Above Normal				
2016	9.64		10.56	74%	Dry	12.71	10.31		69%	Dry	10.42	93%	Normal				
2017	17.76		19.12	135%	Above Normal	21.49	18.38		120%	Above Normal	16.94	152%	Wet				
2018	6.08		6.27	45%	Critically Dry	7.52	6.48		42%	Critically Dry	6.44	58%	Dry				
AVERAGE			**13.65**					**16.68**			**11.15**				**15.31**		

DRAFT Appendix 2-A. Annual Precipitation and Water Year-Type at San Bernardino County Flood Control District Climate Stations in the Yucaipa Subbasin

Water Year Ending	Gateway				Live Oak					Triple Falls Creek			Oak Glen			
	3129 (2660')	3129A (2660')	% of Mean	Water Year Type	3239 (2080')	3239A (2281')	3023 (1285')	% of Mean	Water Year Type	3015 (4680')	% of Mean	Water Year Type	3121 (3695')	2800 (2946')	% of Mean	Water Year Type
1953	12.71		84%	Below Normal						10.52	43%	Critically Dry				
1954	16.54		110%	Normal						20.04	82%	Below Normal				
1955	12.74		84%	Below Normal						21.89	89%	Below Normal				
1956	10.82		72%	Dry						18.60	76%	Below Normal				
1957	14.34		95%	Normal						19.04	78%	Below Normal				
1958	28.13		186%	Wet						43.92	179%	Wet				
1959	7.57		50%	Dry						13.85	57%	Dry				
1960	13.17		87%	Below Normal						20.88	85%	Below Normal				
1961	5.48		36%	Critically Dry						11.33	46%	Critically Dry				
1962	20.06		133%	Above Normal						27.10	111%	Above Normal				
1963	10.31		68%	Dry						17.48	71%	Dry				
1964	11.41		76%	Below Normal			7.66	66%	Dry	21.71	89%	Below Normal				
1965	14.92		99%	Normal	10.60		9.59	86%	Below Normal	22.47	92%	Normal				
1966	19.14		127%	Above Normal	13.34		13.47	115%	Above Normal	31.05	127%	Above Normal				
1967	23.80		158%	Wet	17.11		17.52	148%	Above Normal	40.75	166%	Wet				
1968	15.77		105%	Normal	9.72		9.71	83%	Below Normal	20.20	82%	Below Normal				
1969	28.50		189%	Wet	24.72		24.30	210%	Wet	49.90	204%	Wet				
1970	9.51		63%	Dry	7.59		7.42	64%	Dry	17.15	70%	Dry				
1971	12.19		81%	Below Normal	8.99		9.05	77%	Below Normal	19.16	78%	Below Normal				
1972	8.04		53%	Dry	5.98		5.67	50%	Critically Dry	14.33	58%	Dry				
1973	18.16		120%	Above Normal	14.96		14.76	127%	Above Normal	33.31	136%	Above Normal				
1974	11.41		76%	Below Normal	11.27		10.28	92%	Normal	20.54	84%	Below Normal				
1975	16.84		112%	Above Normal	10.36		9.29	84%	Below Normal	22.73	93%	Normal				
1976	17.44		116%	Above Normal	13.17		12.15	108%	Normal	26.73	109%	Normal				
1977	13.31		88%	Below Normal	11.73		9.74	92%	Normal	20.81	85%	Below Normal				
1978	32.91		218%	Wet	24.46		21.67	197%	Wet	52.09	213%	Wet				
1979	20.40		135%	Above Normal	18.67		16.77	152%	Wet	33.77	138%	Above Normal				
1980		19.28	128%	Above Normal	22.14		22.90	193%	Wet	46.38	189%	Wet				
1981		9.43	62%	Dry	7.41		6.89	61%	Dry	14.90	61%	Dry	14.68		81%	Below Normal
1982		19.21	127%	Above Normal	14.90		14.46	126%	Above Normal	33.37	136%	Above Normal	28.00		154%	Wet
1983		31.48	209%	Wet	25.39		24.16	212%	Wet	50.38	206%	Wet	42.51		234%	Wet
1984		9.56	63%	Dry	5.97		4.99	47%	Critically Dry	18.80	77%	Below Normal	15.90		88%	Below Normal
1985		13.70	91%	Normal	9.02		8.72	76%	Below Normal	22.02	90%	Below Normal	20.70		114%	Above Normal
1986		15.33	102%	Normal	11.24		9.25	88%	Below Normal	26.00	106%	Normal	19.00		105%	Normal
1987		12.52	83%	Below Normal	7.90		7.79	67%	Dry	19.29	79%	Below Normal	5.75		32%	Critically Dry
1988		14.04	93%	Normal	12.49		11.18	101%	Normal	21.46	88%	Below Normal	10.07		55%	Dry
1989		10.76	71%	Dry	9.38		8.08	75%	Dry	17.82	73%	Dry	16.40		90%	Normal
1990		9.71	64%	Dry	7.19		7.21	62%	Dry	17.71	72%	Dry	15.80		87%	Below Normal
1991		17.52	116%	Above Normal	13.95		13.34	117%	Above Normal	26.92	110%	Normal	26.55		146%	Above Normal
1992		19.37	128%	Above Normal	14.58		14.96	126%	Above Normal	30.78	126%	Above Normal	27.72		153%	Wet
1993		34.60	229%	Wet	26.96		25.57	225%	Wet	57.96	237%	Wet	47.23		260%	Wet

DRAFT Appendix 2-A. Annual Precipitation and Water Year-Type at San Bernardino County Flood Control District Climate Stations in the Yucaipa Subbasin

Water Year Ending	Gateway				Live Oak					Triple Falls Creek			Oak Glen			
	3129 (2660')	3129A (2660')	% of Mean	Water Year Type	3239 (2080')	3239A (2281')	3023 (1285')	% of Mean	Water Year Type	3015 (4680')	% of Mean	Water Year Type	3121 (3695')	2800 (2946')	% of Mean	Water Year Type
1994		10.00	66%	Dry	11.90		10.06	94%	Normal	18.76	77%	Below Normal	18.19		100%	Normal
1995		14.70	97%	Normal	15.76		20.49	155%	Wet	57.92	236%	Wet	46.83		258%	Wet
1996		10.89	72%	Dry	0.65		8.08	37%	Critically Dry	20.04	82%	Below Normal	16.40		90%	Normal
1997		16.06	106%	Normal	9.03		10.77	85%	Below Normal	30.39	124%	Above Normal	22.92		126%	Above Normal
1998		24.70	164%	Wet	17.22		22.29	169%	Wet	49.46	202%	Wet	44.58		246%	Wet
1999		7.63	51%	Dry	6.30		6.46	55%	Dry	11.32	46%	Critically Dry	14.61	6.76	59%	Dry
2000		11.10	74%	Dry	5.68		7.41	56%	Dry	17.12	70%	Dry	14.64	12.20	74%	Dry
2001		9.92	66%	Dry	9.96		10.38	87%	Below Normal	11.24	46%	Critically Dry	17.23	12.12	81%	Below Normal
2002		5.66	38%	Critically Dry	3.97		3.35	31%	Critically Dry	6.72	27%	Critically Dry	8.60	4.52	36%	Critically Dry
2003		19.47	129%	Above Normal	16.45		12.18	122%	Above Normal	14.28	58%	Dry	29.20	14.36	120%	Above Normal
2004		11.84	78%	Below Normal	11.58		9.16	89%	Below Normal	18.39	75%	Below Normal	9.57	10.08	54%	Dry
2005		32.70	217%	Wet			24.43	209%	Wet	34.14	139%	Above Normal		38.28	211%	Wet
2006		13.14	87%	Below Normal		10.30	9.52	85%	Below Normal	22.58	92%	Normal		13.72	76%	Below Normal
2007		6.56	43%	Critically Dry		4.13	3.31	32%	Critically Dry	9.71	40%	Critically Dry		5.48	30%	Critically Dry
2008		14.67	97%	Normal		11.93	9.46	91%	Normal	27.54	112%	Above Normal		16.20	89%	Below Normal
2009		12.11	80%	Below Normal		11.35	8.91	87%	Below Normal	18.11	74%	Dry		11.52	63%	Dry
2010		18.79	125%	Above Normal		17.25	15.12	138%	Above Normal	29.72	121%	Above Normal		18.15	100%	Normal
2011		25.09	166%	Wet		22.33	17.38	170%	Wet	36.82	150%	Wet		24.96	138%	Above Normal
2012		11.80	78%	Below Normal		8.84	4.34	56%	Dry	15.13	62%	Dry		11.68	64%	Dry
2013		5.25	35%	Critically Dry		8.82	1.54	44%	Critically Dry	15.69	64%	Dry		9.56	53%	Dry
2014		4.45	29%	Critically Dry		6.92	2.08	38%	Critically Dry	14.07	57%	Dry		7.80	43%	Critically Dry
2015		12.49	83%	Below Normal		10.37	2.72	56%	Dry	20.54	84%	Below Normal		11.56	64%	Dry
2016		11.11	74%	Dry		8.61	1.70	44%	Critically Dry	18.80	77%	Below Normal		11.51	63%	Dry
2017		17.18	114%	Above Normal		16.90	14.42	134%	Above Normal	16.04	65%	Dry		17.56	97%	Normal
2018		6.47	43%	Critically Dry		5.53	5.43	47%	Critically Dry	7.44	30%	Critically Dry		7.36	41%	Critically Dry
AVERAGE		**15.09**				**11.69**				**24.50**				**18.15**		

DRAFT Appendix 2-A. Annual Precipitation and Water Year-Type at San Bernardino County Flood Control District Climate Stations in the Yucaipa Subbasin

Water Year Ending	Basin Wide		
	% of Mean	Avg. Rainfall (inches)	Water Year Type
1953	62%	11.24	Dry
1954	103%	17.36	Normal
1955	88%	14.09	Below Normal
1956	74%	11.51	Dry
1957	87%	14.07	Below Normal
1958	178%	26.82	Wet
1959	56%	8.43	Dry
1960	92%	14.11	Normal
1961	41%	5.92	Critically Dry
1962	121%	18.59	Above Normal
1963	86%	13.51	Below Normal
1964	78%	10.90	Below Normal
1965	91%	12.39	Normal
1966	122%	16.93	Above Normal
1967	165%	22.94	Wet
1968	96%	13.79	Normal
1969	207%	30.04	Wet
1970	64%	9.04	Dry
1971	78%	11.29	Below Normal
1972	52%	7.24	Dry
1973	127%	18.16	Above Normal
1974	81%	11.66	Below Normal
1975	98%	14.06	Normal
1976	105%	15.00	Normal
1977	87%	12.47	Below Normal
1978	206%	29.36	Wet
1979	143%	21.15	Above Normal
1980	167%	23.99	Wet
1981	64%	9.70	Dry
1982	130%	18.98	Above Normal
1983	213%	31.75	Wet
1984	64%	8.96	Dry
1985	88%	12.76	Below Normal
1986	98%	14.18	Normal
1987	65%	9.26	Dry
1988	86%	12.93	Below Normal
1989	75%	11.36	Below Normal
1990	66%	9.31	Dry
1991	120%	18.32	Above Normal
1992	127%	19.12	Above Normal
1993	231%	34.51	Wet

DRAFT Appendix 2-A. Annual Precipitation and Water Year-Type at San Bernardino County Flood Control District Climate Stations in the Yucaipa Subbasin

Water Year Ending	Basin Wide		
	% of Mean	Avg. Rainfall (inches)	Water Year Type
1994	83%	12.69	Below Normal
1995	191%	27.97	Wet
1996	68%	9.74	Dry
1997	114%	16.16	Above Normal
1998	192%	27.71	Wet
1999	58%	8.78	Dry
2000	62%	8.91	Dry
2001	61%	9.10	Dry
2002	30%	4.76	Critically Dry
2003	114%	18.07	Above Normal
2004	72%	9.81	Dry
2005	196%	31.08	Wet
2006	84%	11.50	Below Normal
2007	37%	4.98	Critically Dry
2008	98%	13.57	Normal
2009	80%	11.13	Below Normal
2010	121%	16.90	Above Normal
2011	158%	22.24	Wet
2012	68%	9.55	Dry
2013	60%	8.32	Dry
2014	51%	7.21	Dry
2015	81%	11.22	Below Normal
2016	71%	9.62	Dry
2017	117%	17.75	Above Normal
2018	44%	6.40	Critically Dry
AVERAGE		**15.86**	= weighted average

Appendix 2-B

Information from CalGEM

DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

CHECK LIST – WellStats ORPHAN WELL ENTRY PROJECT

API# 071-00041 **Well Name/#** 1 **Operator** ~~[redacted]~~ Colan Development Corp. Std.

PDOX	**Entry Date -** July and August 2003	**Initials -** Dave Curtis
WellStats	**Entry Date -** 5/10/05	**Initials -** CO
Map and Map Work	**Entry Date -** 5/26/2005 **Map #** W1-7	**Initials -** TH

- **Return Files(s) to Christina when Mapping is complete.**

(01745)

STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL AND GAS
SIXTH FLOOR
629 SOUTH HILL STREET
LOS ANGELES, CALIFORNIA

LOS ANGELES, CALIF.
MAY 2
630 PM
1933
ARCADE STA.

Colan Development Corp. Ltd.,

317 I. W. Hellman Bldg.,

Los Angeles, Cal.

Attention Mr. Bert[illegible] Colen

RETURN General Manager.

WRITE

CLAIMED

LOS ANGELES
MAY 25
1933
CALIF.

Los Angeles, Calif.
REASON FOR NON-DELIVERY CHECKED
Moved-No Address ____ Refused ____
Unknown at Address ____
No Such Number ____ Deceased ____
Time Received-No Order ____
Carrier's Initials ____ Route No. 2

8346

BEVERLY HILLS, CALIF.
MAY 4
1933

629 South Hill Street
Los Angeles, California
May 2, 1933.

Colan Development Corp. Ltd.,
317 I. W. Hellman Building,
Los Angeles, Cal.

Attention Mr. Bert N. Colan,
General Manager.

Gentlemen:

Your attention is directed to the fact that this Division has not received log, history and core record covering operations at your well No. 1, Sec. 25, T. 1 S., R. 2 W., San Bernardino County.

Please file these records in duplicate on the enclosed forms as soon as possible.

Yours truly,

Deputy Supervisor.

CLB:EM3

R. D. BUSH
STATE OIL AND GAS SUPERVISOR

E. HUGUENIN, DEPUTY

STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL AND GAS

629 South Hill Street
Los Angeles, California
May 2, 1933.

Colan Development Corp. Ltd.,
317 I. W. Hellman Building,
Los Angeles, Cal.

Attention Mr. Bert N. Colan,
General Manager.

Gentlemen:

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Please file these records in duplicate on the enclosed forms as soon as possible.

Yours truly,

E. Huguenin

Deputy Supervisor.

FORM 100. 75066 12-29 20M
CALIFORNIA STATE PRINTING OFFICE

SUBMIT LOG IN DUPLICATE
FILL THIS BLANK IN WITH TYPEWRITER. WRITE ON ONE SIDE OF PAPER ONLY

STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES

DIVISION OF OIL AND GAS

DIVISION OF OIL AND GAS
RECEIVED
FEB 9 - 1932
LOS ANGELES, CALIFORNIA

LOG OF OIL OR GAS WELL

FIELD Yucaipa Valley San Bernadino Cty COMPANY Colan Development Corp Ltd

Sec. 25, T. ____, R. 2,1 South S.B. B. & M., Elevation 2700 ft Well No. 1.

In compliance with the provisions of Chapter 718, Statutes of 1915, as amended, the information given herewith is a complete and correct record of the present condition of the well and all work done thereon, so far as can be determined from all available records.

Signed Burt Y Colan

Date February 8th, 1932. Title Pres.
(President, Secretary or Agent)

The summary on this page is for the ORIGINAL condition of the well

OIL SANDS

1st sand from 2163 to 2165. 4th sand from ____ to ____
2d sand from ____ to ____ 5th sand from ____ to ____
3d sand from ____ to ____ 6th sand from ____ to ____

IMPORTANT WATER SANDS

1st sand from 340 to 390 3d sand from ____ to ____
2d sand from ____ to ____ 4th sand from ____ to ____

CASING RECORD

Size of Casing	Where Landed	Where Cut	Weight Per Foot	Threads Per Inch	Kind of Shoe	Make of Casing	Cemented		
							Yes	No	Number of Sacks
11/5 1/4"	85 ft	-	60 lbs	10	-	Standard	Yes	-	30.

CEMENTING OR OTHER SHUT-OFF RECORD

Casing, Size	Sacks	Time Set	Method	Test and Result (Give water level and bailing results)

PLUGS AND ADAPTERS

Heaving Plug—Material ____ Length ____ Where set ____

Adapters —Material ____ Size ____

TOOLS

Rotary Tools were used from nil- ft. to 2168. ft.

Cable Tools were used from ____ ft. to ____ ft.

PERFORATIONS

State clearly whether a machine was used or casing was drilled in shop

From	To	Size of Holes	Number of Rows	Holes Per Foot	Machine—Shop
ft.	ft.				
ft.	ft.				
ft.	ft.				
ft.	ft.				
ft.	ft.				

Thirty days after completion well produced ____ barrels of oil per day.

The gravity of oil was ____ degrees Baumé. Water in oil amounted to ____ per cent.

NAMES OF DRILLERS

H.K.Weber.
J.S.Page.
Frank Dunn.

NAMES OF TOOL DRESSERS

Date drilling started June 1931.

Date well was completed ____

FORMATIONS PENETRATED BY WELL

DEPTH TO		Thickness	Name of Formation
Top of Formation	Bottom of Formation		

FORM 103. 76346 7-30 10M
CALIFORNIA STATE PRINTING OFFICE

STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES

DIVISION OF OIL AND GAS

DIVISION OF OIL AND GAS
RECEIVED
FEB 9 - 1932
LOS ANGELES, CALIFORNIA

History of Oil or Gas Well

FIELD YUCAIPA VALLEY, San Bernadino County COMPANY Colan Development Corp Ltd,

Sec. 25, T. ____, R. Two 1 South S.B. B. & M., Well No. 1.

Signed Burt Y Colan

Date February 8th 1932. Title Pres.

President, Secretary or Agent

It is of the greatest importance to have a complete history of the well. Please state in detail the dates of redrilling, together with the reason for the work and its results. If there were any changes made in the casing, state fully, and if any casing was "sidetracked" or left in the well, give its size and location. If the well has been dynamited, give date, size, position, and number of shots. If plugs or bridges were put in to test for water, state kind of material used, position, and results of pumping or bailing.

We took over the above mentioned well about June 1931, and cemented 85 feet of 11¾ surface casing with a 11¾ G.P. Blow out preventor attached at top. The bottom of hole at that time was approx 1980 feet with 375 feet of 3" drill pipe and bit at bottom, We cemented hole at approx 1450 ft and set 6-5/8" Whipstock and commenced drilling from that point, at 1975 ft set another Whipstock to sidetrack more junk at bottom, commenced drilling again to 2125 ft where we twisted off drill, pipe, leaving appox 100 ft drill pipe with collar and hughes bit, tried to fish out same but top of fish buried itself in a cavity , cemented up fish with 65 sacks of cement and started sidetracking, passed up fish and bottom of hole is now 2168 ft,.

Hard formation all the way with a few softer streaks of conglomerate, ### black lime, and brown shale hard shells and rock caps of country rock, considerable gas showings at 1750 ft and at intervals down to bottom of hole, had to carry very heavy mud at all times to hold down gas pressure, considerable trouble was incountered going in and out of hole from bridgeing omer at the various gas stratas, the hole was drilled with 9½" to 300 ft, and 7-5/8" Hughes Rock bit to bottom.

89

FORM 101-A. 82953 2-31 20M
CALIFORNIA STATE PRINTING OFFICE

SUBMIT IN DUPLICATE
FILL THIS BLANK IN WITH TYPEWRITER. WRITE ON ONE SIDE OF PAPER ONLY

STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES

DIVISION OF OIL AND GAS

CORE RECORD OF OIL OR GAS WELL

DIVISION OF OIL AND GAS
RECEIVED
FEB 9 - 1932
LOS ANGELES, CALIFORNIA

FIELD Yucaipa Valley COMPANY Colan Development Corp Ltd.

Sec. 25, T. ____, R 2, 1 South S.B. & M., Elevation 2700 Well No. 1.

In compliance with the provisions of Section 18, Chapter 718, Statutes of 1915, as amended, the information given herewith is a complete and correct record of all cores taken in this well to the depth on the accompanying log.

Signed Burt J Colan

Date February 8th 1932. Title Pres.
(President, Secretary or Agent)

DATE	MAKE OF BARREL	SIZE OF BARREL	FROM (DEPTH)	TO (DEPTH)	CORE RECOVERED	DESCRIPTION OF CORE	ETHER TEST	CONDITION OF CORE
1931.								
10-25	Hughes	5-5/8	2001	2005	2 ft	Hard bn shale, blk lime, rock		broken
10-30	"	"	2028	2031	1½ "	Brown shale, lime, country rock		
11-23	"	"	2077	2079	1 "	Greenish schist, Hard rk,		
12-19	"	"	2112	2115	1 "	Brown & Gray shale, & schist		
1932								
1-22	"	"	2147	2149	1¾ "	Hard formation, black lime,		
2-5	"	"	2158	2161	2 "	Brown Shale, streak oil sand,	slight cut	
2-6	"	"	2161	2164	2½ "	" : " black hard formation		

88

STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL AND GAS
FERRY BUILDING

R. D. BUSH
STATE OIL AND GAS SUPERVISOR

SAN FRANCISCO

November 20, 1931.

Mr. E. Huguenin,
Deputy Supervisor,
Los Angeles, Cal.

Dear Sir:

Mail addressed to

Lon Bernard Jones Co

J. E. Grey, Agent,
Colan Development Corp., Ltd.,
Yucaipa, Cal.

has been returned by the post office with the notation "Moved, left no address".

Shall I request another appointment?

Yours truly,

R. D. Bush

State Oil and Gas Supervisor.

629 South Hill Street
Los Angeles, California
July 17, 1931.

Mr. R. D. Bush,
State Oil and Gas Supervisor,
San Francisco, California.

Dear Sir:

I am informed that Yucaipa Oil Company, Ltd., well No. 1, Sec. 25, T. 1 S., R. 2 W., S. B. B. & M., San Bernardino County, was transferred to Fred Gray on February 1, 1931. On April 22, 1931, the well was transferred to Mr. F. H. Bowers and on May 15, 1931, the well was transferred to Colan Development Corporation, Ltd.

This information was contained in a letter dated July 9, 1931, from Colan Development Corporation, and a letter dated June 23, 1931, from Fred H. Gray, and confirmed in a conversation with Mr. Bowers and Mr. Bert Colan. Our records have been changed accordingly.

Request for the designation of agent should be addressed to Colan Development Corporation, Ltd., 317 I. W. Hellman Building, Los Angeles, Cal.

Yours truly,

Deputy Supervisor.

Corrections Made as Follows	By Whom
Weekly Summaries	CLB
121	CLB
Elev. and Loc. Cards	
Production Reports	
Well Records: Folders	
Well Records: Reports	
Pog Models	
Graphics	
Field Maps	

1.20.31

D. Leslie Lord, Sec'y-Treas.
Thos. L. Colangelo, Vice-Pres.

Field Address
DIVISION OF OIL AND GAS
RECEIVED
JUL 10 1931
LOS ANGELES, CALIFORNIA

COLAN DEVELOPMENT CORPORATION, Ltd.

BERT N. COLAN, Gen'l Mgr.
317 I. W. Hellman Bldg.
LOS ANGELES, CALIF.

July 9th, 1931.

Division of Oil & Gas
of the State of California
629 South Hill Street
Los Angeles California

Gentlemen:

In response to your request this will advise you that on May 15th, 1931, the Colan Development Corporation succeeded to the rights of F. H. Bowers on lease covering ground upon which an oil well was formerly attempted by Fred Gray, on a portion of Section 25 Twp. 1 S. Range 2 West SBM at Yucaipa California.

On account of steel which was twisted off at the -time, the Colan Development Corporation was obliged to offset and drill an entirely new hole which is now at a depth of approximately 1950 feet, and is at present encountering very hard formation, and the drilling is very slow.

The company contempletes drilling to a depth of 2500 feet at which depth it has been estimated by geologists, oil should be encountered in commercial quantities.

Trusting this information meets with your request and assuring you of our co-operation, we are

BLC/ B

Very truly yours,

Colan Development Corporation

By Bert N Colan

Transf. from Fred Gray to F. H. Bowerss
April 22, 1931
Transf. from Yucaipa to Fred Gray on Feb. 1, 1931

June 23 1931.

E.Huguenin Esq;

Div.of Oil and Gas;

State of California;

Dear Sir;

We would like to inform you that the well in Sec.25 T.Township/1 S. Rge 2 w.S.B.B.& M San Bernardino County,is now being drilled by Colin Development Co.whose office is 314 I.W.Hellman bldg Los Angeles.

They will be glad to comply with any requests you may make re information that the law requires of them.

Yours Respectfully,

Fred H.Gray.

Fred H.Gray.
234 E.Laurel
Compton Calif.

FORM 100. 73066 12-29 20M
CALIFORNIA STATE PRINTING OFFICE

Cyclan Development Corp. Ltd. #1

SUBMIT LOG IN DUPLICATE
FILL THIS BLANK IN WITH TYPEWRITER. WRITE ON ONE SIDE OF PAPER ONLY

STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES

DIVISION OF OIL AND GAS

DIVISION OF OIL AND GAS
RECEIVED
JAN 13 1931
LOS ANGELES, CALIFORNIA

LOG OF OIL OR GAS WELL

Yucaipa Oil Co. Ltd.

FIELD (Yucaipa) San Bernardino COMPANY Fred H. Gray)

Sec. 25, T. 1 S, R. 2, West San Bernardino B. & M., Elevation 2500 Well No. 1

In compliance with the provisions of Chapter 718, Statutes of 1915, as amended, the information given herewith is a complete and correct record of the present condition of the well and all work done thereon, so far as can be determined from all available records.

Signed Fred H Gray

Date Jan. 6. 1931

Title Operator
Reference to file of d(President, Secretary or Agent)

The summary on this page is for the ORIGINAL condition of the well.

Oil Sands	Cards	Forms 114	Forms 121
1st sand from ... to ...			
2d sand from ... to ...			
3d sand from ... to ...			
4th sand from None to			
5th sand from ... to ...			
6th sand from ... to ...			

Important Water Sands

1st sand from ... to ... 3d sand from ... to ...
2d sand from ... to ... 4th sand from ... to ...

Casing Record

Size of Casing	Where Landed	Where Cut	Weight Per Foot	Threads Per Inch	Kind of Shoe	Make of Casing	Cemented: Yes	Cemented: No	Cemented: Number of Sacks
No Casing Set									

Cementing or Other Shut-off Record

Casing, Size	Sacks	Time Set	Method	Test and Result (Give water level and bailing results)
				None

Plugs and Adapters

Heaving Plug—Material None Length ... Where set ...

Adapters —Material " Size ...

Tools

Rotary Tools were used from 0 ft. to 2000 ft.

Cable Tools were used from None ft. to ... ft.

Perforations

State clearly whether a machine was used or casing was drilled in shop

From	To	Size of Holes	Number of Rows	Holes Per Foot	Machine—Shop
ft.	ft.	None			
ft.	ft.				
ft.	ft.				
ft.	ft.				
ft.	ft.				

Thirty days after completion well produced ... barrels of oil per day.

The gravity of oil was ... degrees Baumé. Water in oil amounted to ... per cent.

Names of Drillers

H. V. Wilson

J. Galantine

H. T. Jones.

Names of Tool Dressers

Date drilling started Oct. 4. 1928.

Date well was completed ...

Formations Penetrated by Well

Depth to: Top of Formation	Depth to: Bottom of Formation	Thickness	Name of Formation

FORM 103. 72349 7-30 10M
CALIFORNIA STATE PRINTING OFFICE

STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES

DIVISION OF OIL AND GAS

DIVISION OF OIL AND GAS
RECEIVED
JAN 3 - 1931
LOS ANGELES, CALIFORNIA

History of Oil or Gas Well

FIELD SAN BERNARDINO COUNTY COMPANY Yucaipa Oil Co. Ltd

Sec. 25, T. 1 So., R. 2 W., S. B. B. & M., Well No. One (1)

Signed Fred H Gray

Date December 30-19-30 Title

President, Secretary or Agent

It is of the greatest importance to have a complete history of the well. Please state in detail the dates of redrilling, together with the reason for the work and its results. If there were any changes made in the casing, state fully, and if any casing was "side-tracked" or left in the well, give its size and location. If the well has been dynamited, give date, size, position, and number of shots. If plugs or bridges were put in to test for water, state kind of material used, position, and results of pumping or bailing.

Make	Model	Cross section	Cards	114	

Hole shot at 1340 feet. Steel in the hole. Unknown.
100 lbs. of 80% Gelatine.
Hole shot at 1576 feet. Rotary disc lost in hole. Tried to break disc to pieces. Failed.
100 lbs. of 80% Gelatine used.

Hole shot second time at 1576 to break up disc bit.
100 lbs. of 80% Gelatine and 15 quarts of nitro-glycerin. 30 ft. combination shot. Broke up disc bit and fished same out of hole.

Hole shot 1926 feet. Boulder riding bit, shot same out of way.
200 lbs. of 80% Gelatine.
78 feet of 3" drill pipe and drill collar were side-tracked at 1839 to 1927. Never touched same while side-tracking.

String of 3" Drill Pipe Froze 60 ft. off bottom - Backed out all but 360 ft. which is in Hole at present time.

90

LOG OF THE GRAY WELL NO. 1

Section 25, Township 1 S, R 2 W.
San Bernardino B and M.

0 to 18 ft.	Surface soil	748-753 ft.	Gray sand,
18 - 35	Conglomerate		streaks of lime
35 - 52	Sand stone	753-758	Tough shale
52 - 56	Hard Sand	758-763	Conglomerate
56 - 70	Conglomerate	763-767	Lime
70 - 90	Gray sand	767-775	Conglomerate
90 - 106	Gravel & Boulders	775-776	Shell
106- 129	Red clay	776-784	Hard sand, gas
129- 159	Sand Gravel		at this depth
159- 188	Blue shale	784-791	Conglomerate
188- 237	Sand & Boulders	791-798	Tough shale
237- 324	Hard sand	798-806	Conglomerate
324- 329	Sand & Gravel	806-815	Sandy shale
329- 333	Hard sand	815-820	Hard sandy shale
333- 348	Sandy shale	Gas blow plugged	drill collar 11
348- 378	Sand & Boulders	ft. while making	con.
378- 397	Hard sand	820-830	Hard sand, streaks
397- 430	Conglomerate		of lime
430- 465	Sand shale	830-839	Sandy shale, gas
465- 473	Hard shale		showing
473- 505	Sticky shale	839-840	Shell
505- 536	Conglomerate	840-849	Sticky shale,
536- 551	Sand shale		streaks of sand
551- 552	Shell	849-859	Conglomerate
552- 576	Conglomerate	859-860	Shell
576- 577	Shell	860-864	Hard sand
577- 580	Sand	864-868	Conglomerate
580- 581	Shell	868-874	Lime
581- 585	Hard sand	874-877	Tough Shale
585- 586	Shell	877-879	Shell
586- 591	Conglomerate	879-890	Conglomerate
591- 596	Tough shale	890-904	Shale
596- 600	Hard sand	904-921	Sandy shale
600- 611	Conglomerate	921-922	Shell
611- 612	Shell	922-929	Hard sand
612- 615	Sandy shale	929-938	Sandy shale
615- 620	Brown shale	938-944	Conglomerate
620- 623	Gas sand	944-951	Hard sand
623- 633	Tough shale	951-953	Shell
633- 636	Sandy shale	953-960	Conglomerate
636- 638	Shell	960-961	Shell
638- 645	Hard sand shale	961-965	Tough shale
645- 650	Conglomerate	965-966	Shell
650- 654	Lime	966-978-	Conglomerate
654- 664	Tough shale	978-983	Sticky shale
664- 678	Sandy shale	983-984	Shell
678- 682	Hard sand	984-986	Conglomerate
682- 683	Shell	986-992	Gray sand
683- 695	Lime	992-1004	Hard sand
695- 699	Tough shale	1004-1007	Blue shale,
699- 709	Hard sand		streaks of lime
709- 712	Shell	1007-1010	Sand streaked
712- 718	Conglomerate		with lime
718- 726	Sandy shale	1010-1014	Shell with lime
726- 730	Hard sand, Lime Streaks	1014-1018	Hard lime
730- 748	Sand shale	1018-1028	Conglomerate

85

1028-1038 ft.	Sandy shale
1038-1050	Conglomerate
1050-1053	Shell
1053-1060	Hard sandy shale
1060-1061	Shell
1061-1068	Conglomerate
1068-1080	Sandy shale
1080-1090	Hard sand
1090-1098	Conglomerate
1098-1100	Shell
1100-1112	Lime
1112-1113	Shell
1113-1127	Conglomerate
1127-1128	Shell
1128-1137	Lime conglomerate
1137-1139	Lime
1139-1157	Sandy shale
1157-1162	Hard sand
1162-1165	Hard sandy shale
1165-1178	Conglomerate
1178-1183	Hard sandy shale
1183-1191	Tough shale
1191-1192	Shell
1192-1204	Lime
1204-1208	Conglomerate
1208-1210	Tough shale
1210-1221	Conglomerate
1221-1231	Sandy shale,lime
1231-1238	Lime
1238-1243	Shale
1243-1258	Lime
1258-1261	Shale
1261-1304	Lime
1304-1311	Coring no recovery
1311-1340	Shell
1340-1341	Hard shell
1341-1349	Shell
1349-1350	Break in formation
1350-1366	Lime and sand
1366-1367	Break in formation
1367-1383	Lime
1383-1387	Shale with change
1387-1393	Blue shale
1393-1395	Sandy shale
1395-1396	Shell
1396-1400	Sand shale
1400-1401	Shell
1401-1408	Shell with break
1408-1409	Shale
1409-1434	Lime and streaks of shale
1434-1449	Lime conglomerate
1449-1468	Lime streaked with shale
1468-1501	Lime
1501-1528	Lime streaked shale
1528-1548	Lime
1548-1555	Blue shale
1555-1558	Hard sand
1558-1560	Lime
1560-1568 ft.	Blue shale
1568-1579	Hard sand, shale streaked
1579-1581	Lime and hard sand
1581-1582	Lime
1582-1585	Hard sand
1585-1588	Lime stone
1588-1589	Hard sand and lime
1589-1592	Lime
1592-1594	Lime, shale, some shells
1594-1602	Blue shale & lime
1602-1604	Hard sand
1604-1607	Brown shale
1607-1611	Hard sand, gray color with thin breaks
1611-1617	Hard sand, gas showing
1617-1618	Hard sand, marine shells
1618-1629	Brown shale
1629-1634	Shell
1634-1644	Hard & soft streaks
1644-1656	Hard shells with shale breaks
1656-1657	Break and soft
1657-1662	Hard sand shale, Streak brown sandy shale
1662-1678	Streaked thin shell
1678-1694	Hard sand
1694-1696	Soft break in formation
1696-1702	Blue shale
1702-1704	Lime & shells
1704-1715	Blue shale streaked hard sand, sticky shale.
1715-1730	Sticky Blue shale streaked hard sand
1730-1738	Blue shale
1738-1742	Shell
1742-1746	Lime streaked
1746-1750	Shell
1750-1767	Lime shale
1767-1792	Blue shale streaked with lime.
1792-1795	Hard gray sand with sofe breaks
1795-1806	Hard sand
1806-1823	Brown shale with hard sand streaks
1823-1828	Brown shale streaks with hard sand
1828-1838	Brown shale
1838-1844	Brown shale and layers of hard sand
1844-1855	Hard sand gray

1855-1860 ft.	Hard brown shale with thin shells
1865-1873	Shell
1873-1875	Hard gray sand - good gas pressure
1875-1878	Hard sand, gas showing in ditch
1878-1883	Hard sand - hard fine sand
1883-1886	Hard sand, sea shells, gas below shells
1886-1888	Hard sand, thin layers of B shale
1888-1891	Conglomerate - little gas
1891-1892	Shell
1892-1894	Lime streaks blue shale
1894-1902	Shell
1902-1903	Sea shells streaks green shale
1903-1904	Hard shell
1904-1905	Shell
1905-1906	Shell thin break. Good gas showing
1906-1909	Shell
1909-1911	Shell broke to oil sand Gas
1911-1913	Shell-Gas on ditch
1913-1915	Shell
1915-1916	Hard conglomerate-sea - shells
1916-1918	Conglomerate hard sand
1918-1923	Hard sand
1923-1924	Shell
1924-1926	Shale
1926-1929	Shell
1929-1935	Shell
1935-1937	Shell and hard sand
1937-1938	Shale
1938-1939½	Brown shale
1939½-1940	Shell
1940-1941	Shale to shell
1941-1943	Shell
1943-1949	Shell lime streaked brown shale
1949-1959	Lime streaked blue shale
1959-1963	Shell and shale
1963-1970	Shell
1970-1972	Break
1972-1975	Blue shale
1975-1976	Black Lime
1976-1982	Blue shale shells intermittent black lime
1982-1988	Shale and shells
1988-1991	Blue sand shale
1991-1992	Shell
1992-1997	Tough brown shale - good cut in this shale

611 New Orpheum Building
Los Angeles
December 30, 1930

Mr. R. D. Bush,
State Oil and Gas Supervisor,
San Francisco, Calif.

Dear Sir:

Fred H. Gray well No. 1, Sec. 25, T. 1 S., R. 2 W., San Bernardino County, was transferred to Yucaipa Oil Company, Limited, 519 Walter P. Story Building, Los Angeles, California, effective November 17, 1930. This information was contained in a letter received from Fred H. Gray dated December 19, 1930, and confirmed in a letter from Yucaipa Oil Company, Limited, dated December 26, 1930. We are, therefore, changing our records accordingly. Please request Yucaipa Oil Company, Limited, to appoint an agent.

Yours truly,

Deputy Supervisor.

EH-GH

Wallace Collins
Joshua

Corrections Made as Follows	By Whom
Weekly Summaries	B
131	
Elev. and Loc. Cards	
Production Reports	✓ EMS
Well Records: Forms	
Well Records: Reports	✓ aff
Peg Models	
Graphics	✓ E.J.K.
Field Maps	

W.C. Book - E.J.K.
12/31/30

YUCAIPA OIL COMPANY LIMITED.
519 Walter P Story Building,
Los Angeles. Calif:
December 26th,1930.

E Huggenin Esq,
Division of Oil & Gas,
611 New Orpheum Building,
Los Angeles. Calif:

Dear Sir,

Replying to your letter of the 22nd Inst,re Gray Well.

This is being drilled by the Yucaipa Oil Company Limited, of which I am the General Manager, and was transferred to us on November 17th.

I have had the property surveyed, and will file a corrected location within the next few days.

We were compelled to sidetract a junked hole at 1400 feet, so will give your department a correct log from that depth.

All notices for the present will be received at the above address.

Yours very truly,

WGT/JHS.

J. H. Gomez

Oct. 9,1928.

Division of Mines and Mining,
611 New Orpheum Bldg.,
Los Angeles,Calif.

Gentlemen:

Referring to your letter of Oct. 3rd, concerning the drilling operations on the Clyde Ranch in Section 25, Twp. I, S. R 2 W. S.B.B & M., I beg to advise you that I am assuming all the responsibility in connection with these operations and will be guided in my operations by the matters referred to in your communication of Sept. 21st, to my attorney John C.Miles.

Any further information I can furnish you from time to time I will be glad to do so. In the meantime,I remain

Yours very truly,

F.HG:M

611 New Orpheum Bldg.,
Los Angeles
September 13, 1928.

Mr. R. D. Bush,
State Oil and Gas Supervisor,
San Francisco, California.

Dear Sir:

The well carried in our records under the name of J. W. McPhearson well No. 1, Sec. 25, T. 1 S., R. 2 W., S.B.B.& M., San Bernardino County, was transferred on August 24, 1925 to Mr. Fred H. Gray whose address is Box 263, Compton, California.

This information was contained in a letter received from J. W. McPhearson dated September 10, 1928.

We are therefore changing our records accordingly. Please request Mr. Gray to appoint an agent.

Yours truly,

EH-MC

Deputy Supervisor.

Corrections Made as Follows		By Whom
Weekly Summaries		
121	✓	H
Elev. and Loc. Cards		
Production Reports		
Well Records	Folders ✓	E.A.A.R.
	Reports	
Peg Models		
Graphics		
Field Maps W.C.	✓	F.L.C.

W. C. BK.
F. L. C.

FORM 111. 53572 8-27 5M
CALIFORNIA STATE PRINTING OFFICE

STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES

DIVISION OF MINES AND MINING

PETROLEUM AND GAS

Report on Proposed Operations

No. P-1-16285

Los Angeles Cal. Oct. 25 1927

Mr. G. W. McPhearson

Yucaipa Cal.

Agent for . W. McPHEARSON ~~Company~~ 1-2

DEAR SIR: Should be J.

Your proposal to drill Well No. 1

Section 25, T. 1 S, R. 2 W, S.B. B. & M., -- Oil Field, San Bernardino County,

dated Oct. 7, 1927 received Oct. 21, 1927, has been examined in conjunction with records filed in this office.

Present conditions as shown by the records and the proposal are as follows:

THE NOTICE STATES:

"The well is 2800' N. and 700' W. from Southeast corner of Sec. 25.
The elevation of the derrick floor above sea level is 2600'.
We estimate that the first productive oil or gas sand should be encountered at a depth of about 500', more or less."

PROPOSAL:

"We propose to use the following strings of casing either cementing or landing them as here indicated:

Size of Casing Weight New or Second Hand Depth Landed or cemented
Casing program will depend upon formations encountered. Will core frequently.

It is understood that if changes in this plan become necessary we are to notify you before cementing or landing casing."

RECOMMENDATION:

This department has not sufficient data available upon which to base an estimate of the depth at which oil or gas bearing formations should be encountered in this vicinity, nor the depth at which a water shut-off should be effected.

The proposed drilling program is approved, however, subject to the recommendations that all possible steps shall be taken to determine the fluid content of porous formations encountered.

THIS DEPARTMENT MUST BE NOTIFIED AS FOLLOWS:

1. When a showing of oil or gas is encountered.
2. Before landing or cementing any casing.
3. To witness a bailing test of each possible water shut-off. Copies of our form 106 for this notification are enclosed herewith.

We would appreciate the filing of a memorandum log of the well with the notice of test of water shut-off.

cc--Company 5/17/28 McPhearson - Deceased

T.D 400'. no casing; no important showings. McPhearson said he is living on lease and is in charge but that others associated with him are attempting to take possession without his consent. He does not claim ownership changed. -11-29

HVD:ML
J.J.

(J.W.)

R. D. BUSH,
State Oil and Gas Supervisor

By H. L. Gaither Deputy

FORM 105. 43484 2-26 10M

CALIFORNIA STATE MINING BUREAU
RECEIVED
OCT 21 1927
Department of Petroleum and Gas

CALIFORNIA STATE MINING BUREAU

DEPARTMENT OF PETROLEUM AND GAS

071-00041

NOTICE OF INTENTION TO DRILL NEW WELL

This notice must be given before drilling begins

Colon Development Corp., Ltd. Jucaipa Cal. Oct 7 1927

MR. E. Haguenin

Deputy State Oil and Gas Supervisor

Los Angeles Cal.

DEAR SIR:

In compliance with Section 17, Chapter 718, Statutes of 1915, as amended, notice is hereby given that it is our intention to commence the work of drilling well number 1 Section 25 T. 1 S. R. 2 W., ~~S.~~ B. & M., ... Oil Field, San Bernardino County.

The well is 2800 feet N. ~~or S.~~, and 700 feet ~~E. or~~ W. from So. East Corner of Sec 25
(Give location in distance from section corners or other corners of legal subdivision)

The elevation of the derrick floor above sea level is 2600 feet.

We propose to use the following strings of casing, either cementing or landing them as here indicated:

Size of Casing, Inches	Weight, Lb. Per Foot	New or Second Hand	Depth	Landed or Cemented
Casing program will depend upon formations encountered. Will Core frequently.				

It is understood that if changes in this plan become necessary we are to notify you before cementing or landing casing.

We estimate that the first productive oil or gas sand should be encountered at a depth of about 500 feet, more or less. Second 2200

Respectfully yours,

Address R.R. No. 2 Box 30 Jucaipa Calif J. W. McLearnon
(Name of ~~Company~~ or Operator)

Telephone number.....

By J. W. McL

Address notice to Deputy State Oil and Gas Supervisor in charge of district where well is located

Reference to file of data

Maps	Mineral	Cross section	Cards	Forms	
WC F.L.C.	off.			✓	✓

W.C.
B.K.
F.L.C.

Lease consists of: 100 Acres
Topo. Sh. #66
E.9.K.

Appendix 2-C

Water Budget Analysis

Table 2-C1: Temperature Lapse Rates used in the YIHM								
Month	**Minimum temperature (T_{min})**						**Maximum temperature (T_{max})**	
	Temperature lapse rate (degrees C/ft.)			**Linear regression coefficient of determination**			**Temperature lapse rate (degrees C/ft.)**	**Linear regression coefficient of determination**
	Low-elevation	**Mid-elevation**	**High-elevaation**	**Low-elevation**	**Mid-elevation**	**High-elevation**		
January	-0.000267	-0.009122	-0.001069	0.375161	0.949365	0.254554	-0.006274	0.986521
February	-0.002090	-0.008838	-0.002369	0.410287	0.951706	0.254554	-0.006286	0.986626
March	-0.002894	-0.008079	-0.002473	0.607330	0.944339	0.618303	-0.005846	0.981146
April	-0.003499	-0.007159	-0.002392	0.728538	0.935666	0.555306	-0.005798	0.965877
May	-0.004425	-0.006001	-0.001270	0.831409	0.937605	0.225797	-0.004960	0.906887
June	-0.002725	-0.004569	-0.000979	0.636168	0.804955	0.104089	-0.004187	0.784555
July	-0.000511	-0.004723	-0.000030	0.038804	0.789060	0.000088	-0.004783	0.795607
August	-0.000715	-0.005240	-0.000809	0.079302	0.789060	0.071081	-0.005111	0.839502
September	-0.000432	-0.007149	-0.001582	0.019373	0.890501	0.205146	-0.005646	0.904514
October	-0.001161	-0.008536	-0.000633	0.134185	0.940326	0.049203	-0.005988	0.937825
November	-0.000545	-0.008684	-0.001768	0.028359	0.942844	0.341591	-0.006120	0.978148
December	0.000048	-0.008963	-0.001861	0.000249	0.946138	0.375161	-0.005976	0.986968

Data provided by the USGS

Table 2-C2: Historical Water Budget for the Yucaipa Subbasin

Water Year[A]	Water Year Type	Individual Components of the Basin Water Budget Reported in Units of Acre-Feet (AF)																								
		Inflows to Groundwater System (AF)											Outflows from Groundwater System												Change in Storage	
					Subsurface Inflows									Subsurface Outflows												
		Stream Leakage	Return Flows[B]	Precipitation Recharge	From Beaumont Basin	From San Timoteo Basin	From SBBA	From Crafton Hills	From Yucaipa Hills	From San Bernardino Mountains	*Subtotal*	Surface Water Spreading	Total Basin Inflows	ET	To Beaumont Basin	To San Timoteo Basin	To SBBA	To Crafton Hills	To Yucaipa Hills	To San Bernardino Mountains	*Subtotal*	GW Discharges to Streams	GW Extractions[C]	Surface Water Diversions[D]	Groundwater Discharge to Surface[E]	Total Basin Outflows	Annual	Cumulative
1965	Normal	9,416	2,101	2,209	2,023	6,511	269	47	2,732	1,455	*13,036*	0	26,761	2,340	740	8,980	3,281	0	1,925	13	*14,940*	2,199	9,899	0	7	29,385	-2,624	**-2,624**
1966	Above Normal	10,441	2,101	5,153	2,115	6,449	248	46	2,791	1,596	*13,243*	0	30,938	2,697	741	8,954	3,464	0	1,958	14	*15,132*	2,629	11,609	31	9	32,108	-1,169	**-3,794**
1967	Wet	10,656	2,101	4,957	2,212	6,382	234	44	2,832	1,705	*13,409*	0	31,122	2,399	760	8,944	3,516	0	1,954	13	*15,187*	2,792	11,057	36	10	31,481	-359	**-4,153**
1968	Normal	9,688	2,107	3,166	2,232	6,379	229	43	2,861	1,837	*13,581*	0	28,541	2,611	774	8,974	3,356	0	1,945	13	*15,063*	2,422	11,106	16	8	31,225	-2,684	**-6,837**
1969	Wet	12,421	2,101	11,878	2,251	6,300	209	43	3,016	2,374	*14,193*	0	40,593	2,821	766	8,872	3,650	0	2,072	15	*15,375*	3,967	9,658	127	11	31,959	8,634	**1,796**
1970	Dry	10,341	2,515	4,557	2,148	6,313	185	41	3,187	2,298	*14,172*	0	31,585	2,925	737	8,958	3,490	0	2,072	17	*15,275*	3,018	9,861	111	11	31,200	385	**2,181**
1971	Below Normal	10,382	2,439	4,088	2,204	6,327	174	41	3,075	2,453	*14,275*	0	*31,184*	2,774	733	8,981	3,512	0	2,059	18	*15,303*	3,038	9,849	142	10	*31,117*	67	**2,248**
1972	Dry	10,002	2,446	3,302	2,223	6,356	169	41	3,016	2,295	*14,100*	0	*29,850*	3,004	747	9,018	3,494	0	2,019	21	*15,299*	2,783	10,818	156	8	*32,068*	-2,218	**29**
1973	Above Normal	10,912	2,439	5,141	2,197	6,286	165	41	2,951	2,241	*13,881*	0	*32,373*	2,478	746	9,003	3,665	0	2,019	20	*15,452*	3,391	10,411	217	10	*31,960*	413	**442**
1974	Below Normal	10,663	2,392	4,457	2,128	6,267	161	40	3,036	2,070	*13,701*	0	*31,214*	2,888	736	9,001	3,688	0	2,007	20	*15,453*	3,109	11,484	206	10	*33,150*	-1,936	**-1,494**
1975	Normal	10,059	2,571	3,316	1,975	6,263	157	39	3,005	2,021	*13,459*	0	*29,405*	2,546	718	9,009	3,640	0	1,977	19	*15,362*	2,748	10,501	133	9	*31,299*	-1,894	**-3,388**
1976	Normal	10,530	2,641	4,050	1,820	6,282	156	39	2,958	2,077	*13,334*	0	*30,556*	2,662	701	9,020	3,709	0	1,961	18	*15,410*	2,747	10,366	88	8	*31,282*	-726	**-4,114**
1977	Below Normal	10,098	2,634	4,238	1,720	6,246	160	39	2,929	2,093	*13,187*	0	*30,158*	2,753	687	9,020	3,632	0	1,956	19	*15,313*	2,716	9,906	100	9	*30,798*	-640	**-4,754**
1978	Wet	13,296	2,634	16,145	1,883	6,210	158	38	3,311	2,517	*14,118*	0	*46,193*	3,137	695	8,931	3,896	0	2,205	19	*15,747*	4,909	10,002	220	14	*34,030*	12,163	**7,409**
1979	Above Normal	12,654	2,634	9,423	1,845	6,251	139	35	3,642	2,618	*14,530*	0	*39,242*	3,072	698	9,016	3,967	0	2,296	23	*16,001*	4,675	9,764	267	18	*33,797*	5,445	**12,854**
1980	Wet	15,176	3,278	15,677	1,580	6,351	126	34	3,958	3,033	*15,081*	0	*49,212*	3,550	654	9,010	4,017	0	2,485	25	*16,191*	6,449	10,075	332	20	*36,616*	12,596	**25,450**
1981	Dry	12,933	3,483	6,838	1,187	6,413	119	32	4,029	2,842	*14,623*	0	*37,877*	3,860	612	9,083	3,853	0	2,419	27	*15,993*	4,774	10,198	286	17	*35,129*	2,748	**28,198**
1982	Above Normal	13,988	3,483	8,545	927	6,452	119	33	3,823	2,987	*14,340*	0	*40,355*	3,152	592	9,079	4,104	0	2,370	30	*16,176*	5,490	8,880	299	19	*34,017*	6,338	**34,536**
1983	Wet	14,684	3,483	11,157	788	6,457	116	31	3,857	2,913	*14,163*	0	*43,486*	3,110	598	9,100	4,248	0	2,427	29	*16,402*	6,184	8,353	332	22	*34,405*	9,081	**43,617**
1984	Dry	12,179	3,492	6,583	684	6,475	108	29	3,978	2,581	*13,855*	0	*36,110*	4,117	597	9,184	4,005	0	2,429	27	*16,243*	4,257	10,278	279	18	*35,191*	918	**44,535**
1985	Below Normal	12,335	5,337	6,275	652	6,467	102	29	3,861	2,555	*13,668*	0	*37,615*	3,874	601	9,162	4,081	0	2,402	27	*16,274*	4,297	10,533	268	18	*35,264*	2,351	**46,886**
1986	Normal	12,023	5,961	5,568	513	6,459	98	29	3,741	2,505	*13,346*	0	*36,898*	3,857	685	9,176	4,042	0	2,343	26	*16,272*	4,106	9,823	257	19	*34,333*	2,564	**49,450**
1987	Dry	11,289	5,961	4,170	438	6,430	96	30	3,640	2,385	*13,020*	0	*34,439*	3,878	698	9,179	4,037	0	2,299	24	*16,237*	3,593	9,987	230	19	*33,945*	494	**49,944**
1988	Below Normal	11,108	5,978	3,721	400	6,411	99	30	3,533	2,304	*12,778*	0	*33,584*	3,738	762	9,198	4,057	0	2,260	23	*16,300*	3,459	10,857	218	21	*34,593*	-1,008	**48,936**
1989	Below Normal	10,602	5,961	3,336	382	6,375	106	30	3,433	2,122	*12,448*	0	*32,347*	3,885	818	9,166	4,004	0	2,215	22	*16,225*	3,142	11,266	194	20	*34,733*	-2,385	**46,551**
1990	Dry	10,285	2,208	2,023	442	6,391	114	31	3,349	1,953	*12,280*	0	*26,796*	3,689	822	9,156	3,914	0	2,170	21	*16,082*	2,891	11,626	172	19	*34,479*	-7,683	**38,868**
1991	Above Normal	11,275	942	5,677	654	6,429	124	31	3,334	1,959	*12,531*	0	*30,426*	3,628	683	9,084	4,031	0	2,186	19	*16,003*	3,403	11,657	198	16	*34,906*	-4,480	**34,387**
1992	Above Normal	11,389	945	5,911	832	6,464	127	31	3,430	1,986	*12,871*	0	*31,116*	3,662	656	9,131	4,083	0	2,243	18	*16,131*	3,596	11,743	235	16	*35,383*	-4,267	**30,120**
1993	Wet	14,133	1,173	17,007	954	6,483	128	29	3,879	2,434	*13,907*	0	*46,221*	3,989	683	9,037	4,126	0	2,487	22	*16,355*	5,707	11,481	302	21	*37,854*	8,367	**38,488**
1994	Below Normal	12,201	1,195	5,643	964	6,561	109	28	4,023	2,454	*14,139*	0	*33,177*	3,815	697	9,147	4,145	0	2,490	19	*16,499*	4,233	11,947	279	20	*36,794*	-3,617	**34,871**
1995	Wet	15,315	1,489	12,358	936	6,618	111	27	4,046	2,873	*14,612*	0	*43,774*	3,876	724	9,088	4,227	0	2,566	22	*16,627*	6,814	11,870	354	22	*39,562*	4,212	**39,083**
1996	Dry	13,062	1,592	5,069	975	6,722	97	25	4,114	2,530	*14,464*	0	*34,188*	4,352	700	9,211	4,195	0	2,531	21	*16,658*	5,069	12,841	330	17	*39,268*	-5,080	**34,002**
1997	Above Normal	12,896	1,588	5,442	1,086	6,768	88	25	3,966	2,470	*14,404*	0	*34,329*	4,141	709	9,183	4,231	0	2,489	22	*16,634*	4,894	13,184	305	16	*39,174*	-4,845	**29,157**
1998	Wet	15,355	1,588	12,254	1,227	6,777	85	25	4,036	2,743	*14,893*	0	*44,089*	3,465	696	9,137	4,464	0	2,568	23	*16,888*	6,870	12,511	347	22	*40,102*	3,987	**33,144**
1999	Dry	12,540	1,588	4,722	1,275	6,784	79	24	4,131	2,404	*14,696*	0	*33,546*	3,976	699	9,227	4,338	0	2,537	21	*16,823*	4,719	14,065	315	18	*39,917*	-6,371	**26,774**
2000	Dry	12,304	1,868	4,044	1,409	6,867	79	26	4,011	2,425	*14,817*	0	*33,032*	4,176	727	9,260	4,276	0	2,505	21	*16,790*	4,279	14,988	299	15	*40,546*	-7,514	**19,259**
2001	Dry	12,246	1,955	3,666	1,241	6,840	84	27	3,836	2,417	*14,445*	0	*32,312*	3,699	800	9,221	4,358	0	2,437	20	*16,838*	4,338	14,330	297	15	*39,516*	-7,204	**12,055**
2002	Critically Dry	10,896	1,955	2,245	1,135	6,864	90	29	3,747	2,206	*14,071*	36	*29,202*	3,864	955	9,234	4,126	0	2,373	21	*16,710*	3,400	15,346	235	12	*39,566*	-10,364	**1,691**
2003	Above Normal	11,589	1,955	3,589	1,219	6,847	98	29	3,606	2,133	*13,932*	691	*31,757*	3,435	946	9,206	4,294	0	2,344	20	*16,809*	3,722	14,513	242	19	*38,740*	-6,983	**-5,292**
2004	Dry	10,939	1,961	2,926	1,212	6,849	106	30	3,581	1,988	*13,767*	624	*30,216*	3,649	1,224	9,233	4,155	0	2,323	17	*16,952*	3,316	14,215	215	19	*38,367*	-8,151	**-13,443**
2005	Wet	13,561	2,831	11,620	1,205	6,795	106	30	3,757	2,257	*14,150*	135	*42,297*	3,483	1,173	9,112	4,413	0	2,442	19	*17,159*	5,250	13,561	276	19	*39,747*	2,550	**-10,894**
2006	Below Normal	11,309	3,126	4,449	1,193	6,807	90	29	3,894	2,152	*14,164*	17	*33,065*	3,685	1,290	9,203	4,248	0	2,435	17	*17,193*	3,628	13,478	239	13	*38,237*	-5,172	**-16,065**
2007	Critically Dry	10,581	3,126	2,745	1,218	6,866	84	29	3,741	2,284	*14,221*	4	*30,677*	3,823	1,604	9,220	4,102	0	2,382	17	*17,326*	3,132	13,166	199	10	*37,656*	-6,979	**-23,044**
2008	Normal	11,284	3,135	4,099	1,234	6,877	85	29	3,580	2,292	*14,098*	551	*33,166*	3,664	1,148	9,226	4,276	0	2,343	17	*17,010*	3,554	11,395	218	17	*35,858*	-2,693	**-25,737**
2009	Below Normal	11,112	3,126	4,005	1,251	6,825	84	29	3,482	2,096	*13,768*	1,337	*33,349*	3,769	831	9,200	4,214	0	2,284	17	*16,547*	3,503	10,171	215	38	*34,243*	-895	**-26,632**
2010	Above Normal	12,416	3,787	6,687	1,222	6,752	79	28	3,465	1,985	*13,532*	3,549	*39,971*	3,635	810	9,165	4,322	0	2,274	18	*16,591*	4,528	10,400	236	112	*35,502*	4,470	**-22,162**
2011	Wet	12,924	4,009	8,383	1,161	6,708	66	27	3,523	2,000	*13,487*	3,071	*41,875*	3,740	791	9,145	4,482	0	2,304	17	*16,738*	4,892	9,839	254	128	*35,591*	6,283	**-15,879**
2012	Dry	11,403	4,020	4,835	1,101	6,720	52	26	3,584	1,886	*13,369*	2,936	*36,564*	4,066	812	9,227	4,356	1	2,301	16	*16,712*	3,864	10,174	209	98	*35,123*	1,441	**-14,438**
2013	Dry	11,089	4,009	4,164	1,051	6,724	44	25	3,491	2,030	*13,366*	2,170	*34,799*	3,806	900	9,190	4,441	1	2,263	16	*16,810*	3,562	10,341	182	79	*34,781*	18	**-14,420**
2014	Dry	10,633	4,009	3,544	1,013	6,731	41	25	3,398	2,005	*13,212*	521	*31,920*	3,767	1,068	9,199	4,340	1	2,222	16	*16,846*	3,127	11,897	176	29	*35,840*	-3,920	**-18,340**
Historical Average		**11,812**	**2,829**	**6,101**	**1,315**	**6,544**	**123**	**32**	**3,524**	**2,277**	***13,815***	**313**	***34,870***	**3,460**	**795**	**9,109**	**4,011**	**0**	**2,272**	**20**	***16,207***	**3,984**	**11,346**	**217**	**23**	***35,237***	**-367**	
Critically Dry Wate Year Average		10,738	2,541	2,495	1,177	6,865	87	29	3,744	2,245	*14,146*	20	*29,940*	3,844	1,280	9,227	4,114	0	2,378	19	*17,018*	3,266	14,256	217	11	*38,611*	-8,671	
Dry Water Year Average		11,518	2,936	4,317	1,171	6,615	98	29	3,668	2,289	*13,870*	447	*33,088*	3,783	796	9,168	4,089	0	2,323	20	*16,397*	3,828	11,830	233	27	*36,098*	-3,010	
Below Normal Water Year Average		11,090	3,576	4,468	1,211	6,476	121	33	3,474	2,255	*13,570*	150	*32,855*	3,465	795	9,120	3,954	0	2,234	20	*16,123*	3,458	11,055	207	18	*34,325*	-1,471	
Normal Water Year Average		10,500	3,086	3,734	1,633	6,462	165	38	3,146	2,031	*13,475*	92	*30,888*	2,947	794	9,064	3,717	0	2,083	18	*15,676*	2,963	10,515	119	11	*32,230*	-1,343	
Above Normal Water Year Average		11,951	2,208	6,174	1,344	6,522	132	33	3,445	2,219	*13,696*	471	*34,501*	3,322	731	9,091	4,018	0	2,242	20	*16,103*	4,036	11,351	226	26	*35,065*	-564	
Wet Water Year Average		13,752	2,469	12,144	1,420	6,508	134	33	3,622	2,485	*14,201*	321	*42,886*	3,357	754	9,037	4,104	0	2,351	20	*16,267*	5,383	10,841	258	29	*36,135*	6,751	

[A]Water Year corresponds to October 1 of the previous year, through September 30th of the current year.

[B]Return flows consist of water that recharges the Subbasin via municipal distribution network leaks, septic system discharges, and infiltration of irrigation water

[C]Groundwater Extractions are broken down by Usage Sector in Table 2C-7

[D]Represents surface water diversions through the operation of YVWD-25

[E]The YIHM calculates groundwater discharges to land surface when groundwater elevations in a given cell are higher than the top elevation of the cell

Table 2-C3: Groundwater Production from Wells Outside the Subbasin that Supplement Subbasin Water Supplies					
Water Year Ending	Groundwater Production Volume (AF)[a]				
	South Mesa-04	YVWD-16	YVWD-48	YVWD-61	**Total**
1965	-	-	-	-	**-**
1966	-	0	0	0	**-**
1967	-	0	0	0	**-**
1968	-	0	0	0	**-**
1969	-	0	0	0	**-**
1970	-	0	0	0	**-**
1971	-	0	0	0	**-**
1972	-	0	0	0	**-**
1973	-	0	0	0	**-**
1974	-	0	0	0	**-**
1975	-	0	0	0	**-**
1976	-	0	0	0	**-**
1977	-	0	0	0	**-**
1978	-	0	0	0	**-**
1979	-	0	0	0	**-**
1980	-	0	0	0	**-**
1981	0	20	0	0	**20**
1982	0	104	0	0	**104**
1983	0	43	0	0	**43**
1984	0	18	0	0	**18**
1985	0	13	0	0	**13**
1986	0	6	0	0	**6**
1987	0	14	0	0	**14**
1988	263	19	0	0	**282**
1989	373	45	0	0	**418**
1990	469	41	0	0	**509**
1991	403	14	0	0	**417**
1992	353	2	0	0	**355**
1993	417	1	0	1	**419**
1994	488	12	0	1	**502**
1995	523	5	0	2	**529**
1996	582	5	0	2	**589**
1997	609	5	0	2	**615**
1998	504	2	0	2	**507**
1999	560	1	0	2	**563**
2000	577	24	0	2	**602**
2001	553	30	855	2	**1,439**
2002	537	49	1,467	2	**2,055**
2003	382	48	1,644	2	**2,075**
2004	474	37	1,618	2	**2,131**
2005	610	27	1,250	2	**1,890**
2006	643	26	1,682	2	**2,352**
2007	662	32	1,575	2	**2,271**
2008	509	23	754	0	**1,286**
2009	399	33	517	1	**951**
2010	422	25	640	0	**1,087**
2011	415	26	561	0	**1,002**
2012	441	26	668	0	**1,135**
2013	338	43	966	1	**1,349**
2014	417	31	1,166	1	**1,615**
Average	**479**	**25**	**1,097**	**1**	**858**

AF = acre-feet

Table 2-C4: Imported Surface Water Supplies to the Subbasin									
Water Year Ending	**From SBVMWD**				**From SGWPA**				**Total SWP Water Imported to the Subbasin (AF)**
	Delivered to YVWRFF (AF)	Delivered to Wilson Creek spreading Basins (AF)	Delivered to Oak Glen Creek spreading Basins (AF)	**Total SBVMWD Imports (AF)**	Delivered to YVWRFF (AF)	Delivered to Wilson Creek spreading Basins (AF)	Delivered to Oak Glen Creek spreading Basins (AF)	**Total SGPWA Imports (AF)**	
2003	855	0	0	**855**					**855**
2004	1,246	0	0	**1,246**	0	0	0	**0**	**1,246**
2005	1,357	0	0	**1,357**	0	0	0	**0**	**1,357**
2006	2,213	0	0	**2,213**	0	0	0	**0**	**2,213**
2007	3,539	0	0	**3,539**	0	0	0	**0**	**3,539**
2008	7,263	0	0	**7,263**	0	0	0	**0**	**7,263**
2009	7,428	0	48	**7,476**	0	0	0	**0**	**7,476**
2010	5,530	0	0	**5,530**	0	0	0	**0**	**5,530**
2011	5,581	1,542	141	**7,264**	0	0	0	**0**	**7,264**
2012	6,008	3,119	267	**9,394**	0	0	0	**0**	**9,394**
2013	5,846	2,824	220	**8,890**	0	0	0	**0**	**8,890**
2014	5,133	0	159	**5,292**	0	0	0	**0**	**5,292**
2015	3,845	0	0	**3,845**	0	0	0	**0**	**3,845**
2016	7,145	0	0	**7,145**	0	0	0	**0**	**7,145**
2017	8,764	6,579	0	**15,343**	0	0	0	**0**	**15,343**
2018	8,455	1,180	558	**10,192**	0	0	0	**0**	**10,192**
Total	**80,210**	**15,244**	**1,393**	**96,846**	**0**	**0**	**0**	**0**	**96,846**

AF = acre-feet

Table 2-C5: Spreading at the Oak Glen Creek and Wilson Creek Spreading Basins						
Water Year Ending	Imported Water Delivered (AF)			YVWRFF Water Diverted to Spreading Basins (AF)	**Total Water Delivered for Spreading at the Wilson Creek and Oak Glen Creek Spreading Basins (AF)**	**Simulated Spreading at the Oak Glen Creek and Wilson Creek Spreading Basins (AF)**
	to Wilson Creek Spreading Basins	to Oak Glen Creek Spreading Basins	**Total SWP Water Used for Spreading**			
2001				0	**0**	
2002				0	**0**	**36**
2003	0	0	**0**	0	**0**	**691**
2004	0	0	**0**	0	**0**	**624**
2005	0	0	**0**	0	**0**	**135**
2006	0	0	**0**	0	**0**	**17**
2007	0	0	**0**	0	**0**	**4**
2008	0	0	**0**	0	**0**	**551**
2009	0	48	**48**	0	**48**	**1,337**
2010	0	0	**0**	0	**0**	**3,549**
2011	1,542	141	**1,683**	0	**1,683**	**3,071**
2012	3,119	267	**3,386**	0	**3,386**	**2,936**
2013	2,824	220	**3,044**	0	**3,044**	**2,170**
2014	0	159	**159**	0	**159**	**521**
2015	0	0	**0**	133	**133**	**313**
2016	0	0	**0**	8	**8**	**N/A[a]**
2017	6,579	0	**6,579**	3	**6,582**	**N/A[a]**
2018	1,180	558	**1,737**	20	**1,757**	**N/A[a]**
Total	**15,244**	**1,393**	**16,637**	**164**	**16,801**	**15,955**

AF = acre-feet

[a]The YIHM was designed to simulate groundwater conditions through water year 2014, and therefore does not contain estimates of recharge at the Spreading Basins between 2015 and 2019.

Table 2-C6: Historical and Current Production by YVWD-25 and Surface Water Diversions in the Subbasin				
Water Year Ending	Groundwater Under the Influence of Surface Water (YVWD-25 Production (AF))	Surface Water Diversion from Oak Glen Creek (AF)	Surface Water Diversion from Birch Creek (AF)	**Total Surface Water Diversions (AF)**
2001	312	29	56	**85**
2002	303	65	81	**147**
2003	330	67	105	**171**
2004	288	24	48	**72**
2005	322	107	99	**206**
2006	327	46	148	**194**
2007	313	57	47	**105**
2008	278	95	9	**104**
2009	287	50	19	**69**
2010	302	61	0	**61**
2011	342	36	0	**36**
2012	267	8	0	**8**
2013	215	20	0	**20**
2014	230	13	0	**13**
2015	217	12	0	**12**
2016	210	13	0	**13**
2017	205	4	0	**4**
2018	192	0	0	**0**
Total	**4,938**	**707**	**611**	**1,319**

AF = acre-feet

Table 2-C7: Historical Groundwater Extractions by Usage Type in the Subbasin								
Water Year[A]	**Water Year Type[B]**	Municipal Groundwater Extractions (AF)			Irrigation (AF)		Private Well Extractions (AF)	Total Groundwater Extractions (AF)
		YVWD	South Mesa	WHWC	South Mountain	Subtotal		
1965	Normal	2,996	1,602	1,499	115	6,211	3,688	**9,899**
1966	Above Normal	3,189	2,732	1,436	376	7,734	3,876	**11,609**
1967	Wet	3,296	3,035	1,266	337	7,933	3,124	**11,057**
1968	Normal	3,252	2,869	1,278	456	7,855	3,251	**11,106**
1969	Wet	3,362	2,174	936	226	6,698	2,959	**9,658**
1970	Dry	3,433	2,195	1,085	405	7,117	2,743	**9,861**
1971	Below Normal	3,341	2,088	1,187	506	7,122	2,728	**9,849**
1972	Dry	3,489	2,098	1,498	467	7,551	3,267	**10,818**
1973	Above Normal	3,280	2,289	1,334	780	7,683	2,728	**10,411**
1974	Below Normal	3,990	2,518	1,428	815	8,751	2,734	**11,484**
1975	Normal	3,347	2,346	1,430	812	7,936	2,565	**10,501**
1976	Normal	3,403	2,260	1,391	779	7,832	2,534	**10,366**
1977	Below Normal	3,527	2,277	1,327	474	7,605	2,301	**9,906**
1978	Wet	3,204	2,297	1,373	567	7,441	2,561	**10,002**
1979	Above Normal	2,908	2,394	1,510	514	7,325	2,439	**9,764**
1980	Wet	3,140	2,530	1,445	426	7,541	2,534	**10,075**
1981	Dry	3,375	2,660	1,556	80	7,672	2,526	**10,198**
1982	Above Normal	2,635	1,960	1,399	579	6,573	2,307	**8,880**
1983	Wet	2,359	1,731	1,384	795	6,269	2,084	**8,353**
1984	Dry	3,288	2,243	1,670	900	8,100	2,178	**10,278**
1985	Below Normal	3,602	2,261	1,771	956	8,590	1,943	**10,533**
1986	Normal	3,883	1,309	1,864	867	7,924	1,899	**9,823**
1987	Dry	3,945	1,650	1,625	935	8,155	1,833	**9,987**
1988	Below Normal	4,547	1,756	1,838	1,000	9,142	1,715	**10,857**
1989	Below Normal	5,131	1,716	2,042	825	9,713	1,553	**11,266**
1990	Dry	5,323	1,755	2,130	687	9,895	1,731	**11,626**
1991	Above Normal	5,569	1,607	2,052	899	10,127	1,530	**11,657**
1992	Above Normal	5,628	1,596	2,065	1,063	10,352	1,391	**11,743**
1993	Wet	5,261	1,712	2,113	791	9,877	1,604	**11,481**
1994	Below Normal	5,509	1,694	2,181	793	10,177	1,770	**11,947**
1995	Wet	5,567	1,637	2,139	888	10,230	1,640	**11,870**
1996	Dry	6,243	1,781	2,353	1,016	11,392	1,450	**12,841**
1997	Above Normal	6,512	1,799	2,331	1,091	11,733	1,451	**13,184**
1998	Wet	5,929	1,685	3,038	744	11,396	1,116	**12,511**
1999	Dry	7,438	1,904	2,450	1,144	12,936	1,129	**14,065**
2000	Dry	8,519	1,991	2,418	913	13,841	1,147	**14,988**
2001	Dry	8,382	2,029	2,365	832	13,607	723	**14,330**
2002	Critically Dry	9,121	2,176	2,473	946	14,716	629	**15,346**
2003	Above Normal	8,506	2,282	2,346	743	13,877	636	**14,513**
2004	Dry	8,841	2,196	2,392	208	13,637	578	**14,215**
2005	Wet	8,555	1,965	2,383	69	12,972	588	**13,561**
2006	Below Normal	8,362	2,037	2,542	12	12,953	525	**13,478**
2007	Critically Dry	7,821	2,151	2,765	-	12,738	428	**13,166**
2008	Normal	6,350	2,198	2,460	-	11,008	387	**11,395**
2009	Below Normal	5,692	2,148	1,964	-	9,805	366	**10,171**
2010	Above Normal	6,205	1,934	1,873	-	10,012	388	**10,400**
2011	Wet	5,685	1,826	1,946	-	9,458	381	**9,839**
2012	Dry	5,824	1,905	2,093	-	9,822	352	**10,174**
2013	Dry	5,837	2,086	2,081	-	10,004	338	**10,341**
2014	Dry	7,227	2,023	2,114	210	11,574	323	**11,897**

Table 2-C7: Historical Groundwater Extractions by Usage Type in the Subbasin								
Water Year[A]	**Water Year Type[B]**	Municipal Groundwater Extractions (AF)			Irrigation (AF)		Private Well Extractions (AF)	Total Groundwater Extractions (AF)
		YVWD	South Mesa	WHWC	South Mountain	Subtotal		
Historical Average		**5,116**	**2,062**	**1,873**	**652**	**9,612**	**1,733**	**11,346**
Critically Dry Wate Year Average		8,471	2,164	2,619	946	13,727	529	**14,256**
Dry Water Year Average		5,797	2,037	1,988	650	10,379	1,451	**11,830**
Below Normal Water Year Average		4,856	2,055	1,809	673	9,317	1,737	**11,055**
Normal Water Year Average		3,872	2,097	1,654	606	8,128	2,387	**10,515**
Above Normal Water Year Average		4,937	2,066	1,816	756	9,491	1,861	**11,351**
Wet Water Year Average		4,636	2,059	1,802	538	8,981	1,859	**10,841**

AF = acre-feet

Table 2-C8: Estimates of Safe Yield in the Yucaipa Subbasin and Subareas (AFY)				
Subarea	Historical Sustainable Yield Estimated from the YIHM	GSSI (2014) Estimates of Safe Yield		
	YIHM Water Budget	Zero-Net Draft	Hill	Hydrologic Water Balance
Triple Falls Creek	394	215	310	-
Oak Glen	473	415	600	-
Gateway	1,947	1,775	1,440	-
Crafton	427	200	370	-
Wilson Creek	696	1,520	1,245	-
Western Heights	1,764	2,270	2,100	-
Calimesa	4,354	3,195	3,580	-
Live Oak	962	-	-	-
Singleton[a]	0	-	-	-
Yucaipa Subbasin	**10,981**	**9,590**	**9,645**	**9,683**

Estimates of safe yield have not previously been calculated for the Singleton and Live Oak Hydrogeologic Subareas

[a]Results from the YIHM indicate that groundwater in storage declined by approximately 36 AFY; this was subtractred from the total Subbasin sustainable yield, and represented as a zero for the Singelton Subarea sustainable yield

Table 2-C9:
Historical Water Year Type Distribution in the Subbasin

Water Year Type	Number of occurences between 1965 and 2014	Water Years
Critically Dry	2	2002, 2007
Dry	14	1970, 1972, 1981, 1984, 1987, 1990, 1996, 2000, 2001, 2004, 2012, 2013, 2014
Below Normal	9	1971, 1974, 1977, 1985, 1988, 1994, 2006, 2009
Normal	6	1965, 1968, 1975, 1976, 1986, 2008
Above Normal	9	1966, 1973, 1979, 1982, 1991, 1992, 1997, 2003, 2010
Wet	10	1967, 1969, 1978, 1980, 1983, 1993, 1995, 1998, 2005, 2011

Table 2-C10: Historical Surface Water Availability in the Subbasin					
Water Year Ending	Water Year Type	SWP water imported from SBVMWD	SWP water imported from SGPWA	Surface water diversions from Oak Glen Creek, Birch Creek, and Well 25	**Total Surface Water Availability**
2001	Dry	---	---	85	**85**
2002	Critically Dry	---	---	147	**147**
2003	Above Normal	855	---	171	**1,026**
2004	Dry	1,246	---	72	**1,319**
2005	Wet	1,357	---	206	**1,563**
2006	Below Normal	2,213	---	194	**2,407**
2007	Critically Dry	3,539	---	105	**3,644**
2008	Normal	7,263	---	104	**7,367**
2009	Below Normal	7,476	---	69	**7,545**
2010	Above Normal	5,530	---	61	**5,591**
2011	Wet	7,264	---	36	**7,300**
2012	Dry	9,394	---	8	**9,403**
2013	Dry	8,890	---	20	**8,909**
2014	Dry	5,292	---	13	**5,306**
Average		5,027	---	88	**4,401**
Critically Dry Wate Year Average		3,539	---	126	**1,895**
Dry Water Year Average		6,206	---	40	**5,004**
Below Normal Water Year Average		4,844	---	132	**4,976**
Normal Water Year Average		7,263	---	104	**7,367**
Above Normal Water Year Average		3,193	---	116	**3,309**
Wet Water Year Average		4,311	---	121	**4,431**

--- = Blank cells indicate that YVWD had not contracted with SWP providers during this period

Table 2-C11
Current Condition Water Budget for the Yucaipa Subbasin

Water Year	Water Year Type	Individual Components of the Basin Water Budget Reported in Units of Acre-Feet (AF)											
		Inflows to Groundwater System											
					Subsurface Inflows							Surface Water Spreading	Total Basin Inflows
		Stream Leakage	Return Flows[B]	Precipitation Recharge	From Beaumont Basin	From San Timoteo Basin	From SBBA	From Crafton Hills	From Yucaipa Hills	From San Bernardino Mountains	*Subtotal*		
2015	Below Normal	10,571	4,009	2,903	1,006	6,721	39	25	3,292	1,887	*12,970*	115	**30,568**
2016	Dry	10,576	4,020	3,647	996	6,700	39	26	3,223	1,751	*12,735*	6	**30,985**
2017	Above Normal	14,433	4,009	10,073	949	6,614	38	25	3,251	1,815	*12,692*	6,582	**47,790**
2018	Critically Dry	11,349	4,009	5,339	889	6,581	32	22	3,298	1,577	*12,399*	1,757	**34,854**
Average		**11,732**	**4,012**	**5,491**	**960**	**6,654**	**37**	**24**	**3,266**	**1,758**	***12,699***	**2,115**	**36,049**

[A]Water Year corresponds to October 1 of the previous year, through September 30th of the current year.

[B]Return flows consist of water that recharges the Subbasin via municipal distribution network leaks, septic system discharges, and infiltration of irrigation water

[C]Represents surface water diversions through the operation of YVWD-25

[D]The YIHM calculates groundwater discharges to land surface when groundwater elevations in a given cell are higher than the top elevation of the cell

Table 2-C11
Current Condition Water Budget for the Yucaipa Subbasin

Individual Components of the Basin Water Budget Reported in Units of Acre-Feet (AF)														
Outflows from Groundwater System													Change in Groundwater in Storage	
ET	Subsurface Outflows							GW Discharges to Streams	GW Extractions	Surface Water Diversions[C]	GW Discharge to Surface[D]	Total Basin Outflows		
	To Beaumont Basin	To San Timoteo Basin	To SBBA	To Crafton Hills	To Yucaipa Hills	To San Bernardino Mountains	*Subtotal*						Annual	Cumulative
3,426	1,066	9,186	4,372	1	2,180	17	*16,821*	3,073	10,461	188	9	**33,978**	**-3,410**	-3,410
3,443	916	9,199	4,437	1	2,138	17	*16,708*	3,026	7,915	189	10	**31,292**	**-307**	-3,717
3,719	944	9,127	4,550	1	2,176	21	*16,818*	6,557	7,223	205	320	**34,842**	**12,947**	9,230
3,965	1,003	9,163	4,454	1	2,154	20	*16,795*	3,852	9,073	182	191	**34,058**	**796**	10,026
3,638	**982**	**9,169**	**4,453**	**1**	**2,162**	**19**	***16,786***	**4,127**	**8,668**	**191**	**133**	**33,542**	**2,506**	**-**

Table 2-C12: Sustainable Yield for each Management Area in the Yucaipa Subbasin	
Management Area	**Sustainable Yield (AFY)**
North Bench	3,940
Calimesa	4,955
Western Heights	1,760
San Timoteo	325
Total	**10,980**

Table 2-C13: Projected Future Baseline Water Budget

Water Year[A]	Individual Components of the Basin Water Budget Reported in Units of Acre-Feet (AF)																									
	Inflows to Groundwater System												Outflows from Groundwater System												Change in Groundwater in Storage	
				Subsurface Inflows										Subsurface Outflows												
	Stream Leakage	Return Flows[B]	Precipitation Recharge	From Beaumont Basin	From San Timoteo Basin	From SBBA	From Crafton Hills	From Yucaipa Hills	From San Bernardino Mtns	Subtotal	Surface Water Spreading	Total Basin Inflows	ET	To Beaumont Basin	To San Timoteo Basin	To SBBA	To Crafton Hills	To Yucaipa Hills	To San Bernardino Mtns	Subtotal	GW Discharges to Streams	GW Extractions	Surface Water Diversions[C]	GW Discharge to SurfaceD	Total Basin Outflows	Annual	Cumulative
2019	11,119	4,009	3,705	891	6,574	27	21	3,200	1,574	12,287	2,139	33,260	3,429	1,068	9,160	4,488	1	2,114	16	16,846	3,534	10,563	139	106	34,617	-1,357	**-1,357**
2020	11,256	4,020	4,161	893	6,573	26	21	3,127	1,721	12,362	2,139	33,939	3,457	1,088	9,186	4,559	1	2,099	16	16,949	3,679	10,555	153	120	34,912	-973	**-2,330**
2021	11,381	4,009	4,687	889	6,540	24	22	3,069	1,682	12,226	2,139	34,443	3,337	1,102	9,154	4,576	1	2,080	17	16,929	3,760	10,557	150	118	34,852	-409	**-2,739**
2022	12,253	4,009	8,268	897	6,527	22	21	3,155	1,757	12,380	2,139	39,050	3,894	1,120	9,110	4,698	1	2,126	19	17,074	4,319	10,586	188	119	36,180	2,869	**131**
2023	12,601	4,009	8,223	877	6,500	18	20	3,233	1,797	12,446	2,139	39,418	3,532	1,142	9,110	4,798	1	2,154	19	17,224	4,602	10,600	192	123	36,273	3,145	**3,276**
2024	11,731	4,020	5,605	864	6,531	16	20	3,287	1,852	12,570	2,139	36,065	3,911	1,179	9,178	4,659	1	2,167	17	17,201	4,097	10,580	191	119	36,101	-36	**3,240**
2025	14,806	4,009	15,922	864	6,521	14	18	3,494	2,405	13,317	2,139	*50,193*	4,268	1,204	9,072	4,788	1	2,313	20	17,398	6,641	10,632	191	126	*39,256*	10,936	**14,177**
2026	12,928	4,009	6,836	818	6,502	10	17	3,691	2,308	13,346	2,139	*39,258*	4,552	1,212	9,165	4,835	2	2,332	20	17,565	5,294	10,619	192	123	*38,345*	913	**15,090**
2027	13,302	4,009	6,429	807	6,527	9	18	3,566	2,394	13,321	2,139	*39,200*	4,373	1,297	9,190	4,889	1	2,287	22	17,687	5,505	10,614	192	124	*38,495*	705	**15,795**
2028	12,384	4,020	4,901	800	6,575	10	19	3,498	2,267	13,169	2,139	*36,614*	4,589	1,368	9,227	4,809	1	2,255	22	17,682	4,762	10,603	192	118	*37,946*	-1,332	**14,463**
2029	13,775	4,009	7,923	796	6,526	11	20	3,440	2,337	13,129	2,139	*40,975*	3,888	1,427	9,181	5,024	1	2,262	23	17,918	5,942	10,630	192	126	*38,696*	2,279	**16,742**
2030	13,039	4,009	6,948	793	6,514	11	20	3,509	2,112	12,959	2,139	*39,094*	4,476	1,466	9,178	4,914	1	2,266	23	17,849	5,345	10,633	192	123	*38,618*	475	**17,217**
2031	12,531	4,009	5,242	782	6,488	10	21	3,480	2,058	12,839	2,139	*36,760*	3,932	1,515	9,201	4,976	1	2,253	21	17,968	4,863	10,617	192	124	*37,695*	-935	**16,282**
2032	12,807	4,020	5,934	777	6,532	11	22	3,426	2,087	12,854	2,139	*37,755*	4,044	1,539	9,213	4,922	1	2,236	21	17,933	4,857	10,612	192	122	*37,760*	-5	**16,277**
2033	12,687	4,009	6,488	780	6,497	11	22	3,399	2,146	12,855	2,139	*38,178*	4,390	1,558	9,198	4,935	1	2,233	22	17,947	4,934	10,616	192	125	*38,204*	-26	**16,250**
2034	16,306	4,009	20,771	793	6,500	10	19	3,829	2,645	13,796	2,139	*57,022*	4,944	1,562	9,109	4,944	2	2,478	24	18,120	8,567	10,656	192	133	*42,612*	14,410	**30,661**
2035	16,645	4,009	13,198	732	6,439	6	15	4,143	2,638	13,974	2,139	*49,965*	5,061	1,561	9,170	5,144	4	2,598	23	18,500	8,965	10,657	192	139	*43,513*	6,452	**37,112**
2036	18,647	4,020	18,833	733	6,530	6	15	4,425	3,042	14,750	2,139	*58,389*	5,916	1,668	9,184	5,217	5	2,749	23	18,845	11,184	10,659	192	143	*46,939*	11,450	**48,562**
2037	17,040	4,009	7,761	678	6,554	6	15	4,441	2,818	14,511	2,139	*45,461*	6,310	1,716	9,234	5,315	3	2,674	22	18,965	9,150	10,630	192	135	*45,381*	79	**48,642**
2038	17,748	4,009	9,711	668	6,583	6	18	4,221	3,000	14,496	2,139	*48,104*	5,089	1,839	9,227	5,290	2	2,598	24	18,980	10,011	10,647	192	141	*45,059*	3,044	**51,686**
2039	18,164	4,009	13,277	672	6,640	6	18	4,272	3,007	14,614	2,139	*52,204*	5,181	1,924	9,178	5,299	2	2,663	25	19,092	11,186	10,663	192	150	*46,465*	5,739	**57,425**
2040	15,910	4,020	7,992	649	6,640	6	17	4,341	2,619	14,272	2,139	*44,333*	6,392	1,990	9,275	5,307	2	2,657	22	19,254	8,643	10,644	192	137	*45,262*	-928	**56,497**
2041	15,544	4,009	6,661	640	6,628	7	20	4,193	2,581	14,069	2,139	*42,423*	5,568	2,048	9,310	5,248	2	2,583	24	19,214	7,880	10,636	192	131	*43,621*	-1,198	**55,299**
2042	15,227	4,009	5,659	645	6,635	6	23	4,063	2,563	13,936	2,139	*40,970*	5,383	2,065	9,355	5,346	2	2,522	23	19,313	7,276	10,624	192	127	*42,916*	-1,946	**53,353**
2043	14,169	4,009	4,511	647	6,623	6	24	3,925	2,435	13,661	2,139	*38,489*	5,130	2,079	9,371	5,291	2	2,461	24	19,227	6,320	10,612	192	125	*41,607*	-3,118	**50,235**
2044	13,612	4,020	4,634	657	6,630	6	25	3,813	2,369	13,501	2,139	*37,907*	4,824	2,065	9,386	5,285	2	2,422	24	19,183	5,805	10,609	192	124	*40,738*	-2,831	**47,404**
2045	12,613	4,009	4,203	666	6,608	6	26	3,712	2,167	13,186	2,139	*36,150*	4,877	2,044	9,354	5,116	2	2,385	23	18,924	5,032	10,605	192	120	*39,749*	-3,600	**43,804**
2046	12,063	4,009	3,357	679	6,620	7	27	3,617	1,994	12,944	2,139	*34,513*	4,586	2,027	9,344	5,113	2	2,338	22	18,846	4,440	10,597	192	120	*38,781*	-4,268	**39,536**
2047	13,045	4,009	7,889	703	6,645	9	27	3,579	2,012	12,976	2,139	*40,058*	4,639	1,985	9,272	5,094	2	2,348	20	18,721	5,171	10,620	192	122	*39,465*	593	**40,129**
2048	13,469	4,020	8,722	717	6,644	9	25	3,677	2,056	13,129	2,139	*41,479*	4,804	1,950	9,299	5,094	2	2,400	20	18,765	5,652	10,638	192	124	*40,176*	1,303	**41,432**
2049	16,117	4,009	20,186	719	6,662	7	21	4,121	2,504	14,034	2,139	*56,486*	5,544	1,910	9,211	5,120	2	2,640	24	18,908	8,621	10,655	192	133	*44,053*	12,433	**53,865**
2050	15,057	4,009	7,825	676	6,661	6	18	4,200	2,555	14,117	2,139	*43,147*	5,298	1,870	9,296	5,345	2	2,609	19	19,139	7,296	10,640	192	134	*42,699*	448	**54,313**
2051	17,364	4,009	15,080	688	6,699	6	19	4,225	2,980	14,617	2,139	*53,209*	5,404	1,952	9,237	5,310	2	2,656	23	19,180	10,033	10,657	192	141	*45,607*	7,602	**61,914**
2052	15,428	4,020	7,471	652	6,730	6	19	4,257	2,613	14,277	2,139	*43,336*	6,107	1,984	9,336	5,305	2	2,613	20	19,259	7,838	10,629	192	130	*44,157*	-821	**61,093**
2053	15,118	4,009	7,625	655	6,732	7	21	4,103	2,545	14,062	2,139	*42,954*	5,758	2,075	9,330	5,246	2	2,556	22	19,231	7,493	10,633	192	127	*43,434*	-480	**60,614**
2054	17,239	4,009	14,971	668	6,755	6	21	4,174	2,862	14,485	2,139	*52,843*	4,955	2,110	9,260	5,312	2	2,639	24	19,347	10,078	10,656	192	144	*45,371*	7,472	**68,085**
2055	15,011	4,009	6,458	645	6,734	6	20	4,253	2,465	14,122	2,139	*41,740*	5,644	2,124	9,323	5,388	2	2,605	21	19,462	7,692	10,626	192	137	*43,753*	-2,014	**66,072**
2056	14,730	4,020	6,041	647	6,789	7	23	4,115	2,466	14,046	2,139	*40,976*	5,846	2,166	9,407	5,387	2	2,548	21	19,531	6,783	10,614	192	126	*43,093*	-2,116	**63,955**
2057	14,518	4,009	5,559	647	6,748	6	25	3,940	2,483	13,849	2,139	*40,074*	5,131	2,187	9,372	5,344	2	2,477	21	19,403	6,730	10,625	192	127	*42,209*	-2,135	**61,821**
2058	12,801	4,009	3,545	657	6,745	6	26	3,841	2,237	13,512	2,139	*36,006*	5,290	2,183	9,406	5,251	2	2,414	22	19,278	5,168	10,606	192	120	*40,654*	-4,648	**57,173**
2059	13,513	4,009	5,957	672	6,732	6	27	3,706	2,218	13,361	2,139	*38,979*	4,735	2,157	9,345	5,282	2	2,397	22	19,204	5,677	10,618	192	125	*40,551*	-1,572	**55,601**
2060	12,683	4,020	4,733	691	6,742	7	27	3,684	2,052	13,203	2,139	*36,778*	4,978	2,138	9,393	5,200	2	2,373	21	19,126	4,968	10,614	192	120	*39,998*	-3,220	**52,381**
2061	15,279	4,009	14,869	706	6,711	7	25	3,853	2,383	13,685	2,139	*49,982*	4,890	2,099	9,249	5,149	2	2,496	22	19,017	7,701	10,653	192	133	*42,586*	7,396	**59,777**
2062	13,283	4,009	5,883	668	6,689	6	23	3,971	2,199	13,555	2,139	*38,870*	5,162	2,046	9,354	5,354	2	2,485	19	19,260	5,555	10,618	192	127	*40,914*	-2,044	**57,733**
2063	12,297	4,009	4,024	679	6,746	6	25	3,831	2,281	13,569	2,139	*36,039*	5,202	2,057	9,382	5,184	1	2,420	19	19,063	4,659	10,601	192	118	*39,835*	-3,796	**53,936**
2064	12,631	4,020	4,594	686	6,783	6	27	3,668	2,294	13,466	2,139	*36,851*	4,824	2,069	9,373	5,110	1	2,365	19	18,937	4,976	10,597	192	120	*39,646*	-2,796	**51,140**
2065	12,281	4,009	4,197	703	6,777	8	28	3,571	2,113	13,199	2,139	*35,825*	4,800	2,058	9,347	5,096	1	2,311	21	18,834	4,624	10,600	192	118	*39,168*	-3,343	**47,798**
2066	12,952	4,009	7,026	723	6,751	9	28	3,536	2,002	13,049	2,139	*39,175*	4,418	2,043	9,299	5,103	1	2,301	21	18,768	5,122	10,633	192	122	*39,256*	-81	**47,717**
2067	13,458	4,009	8,366	721	6,729	9	26	3,592	2,022	13,100	2,139	*41,072*	4,488	2,036	9,274	5,105	1	2,326	21	18,762	5,597	10,646	192	127	*39,812*	1,259	**48,976**
2068	12,170	4,020	4,298	717	6,741	8	26	3,655	1,918	13,065	2,139	*35,692*	4,734	2,019	9,355	5,181	1	2,320	19	18,895	4,460	10,609	192	120	*39,010*	-3,318	**45,658**
2069	11,722	4,009	3,765	729	6,770	8	27	3,551	2,060	13,145	2,139	*34,779*	4,394	2,001	9,313	5,054	1	2,279	18	18,665	4,150	10,596	190	117	*38,112*	-3,333	**42,326**
Average	**14,009**	**4,012**	**7,861**	**729**	**6,633**	**9**	**22**	**3,778**	**2,308**	**13,478**	**2,139**	**41,500**	**4,831**	**1,786**	**9,264**	**5,094**	**2**	**2,409**	**21**	**18,576**	**6,326**	**10,620**	**189**	**127**	**40,670**	**830**	**-**

[A]Water Year corresponds to October 1 of the previous year, through September 30th of the current year.

[B]Return flows consist of water that recharges the Subbasin via municipal distribution network leaks, septic system discharges, and infiltration of irrigation water

[C]Represents surface water diversions through the operation of YVWD-25

[D]The YIHM calculates groundwater discharges to land surface when groundwater elevations in a given cell are higher than the top elevation of the cell

Table 2-C14
Comparison of Average Annual Water Budget Components for the Historical, Current, and Projected Conditions

Water Budget Component		Simulation Period				
				Projected		
		Historical (AFY)	Current (AFY)	Future Baseline (AFY)	Future Baseline with Climate Change I (AFY)	Future Baseline with Climate Change II (AFY)
Stream Leakage		11,812	11,732	14,009	13,257	12,295
Return Flows		2,829	4,012	4,012	4,012	4,012
Precipitation Recharge		6,101	5,491	7,861	7,290	6,496
Subsurface Inflows	From Beaumont Basin	1,315	960	729	755	795
	From San Timoteo Basin	6,544	6,654	6,633	6,591	6,558
	From SBBA	123	37	9	11	13
	From Crafton Hills	32	24	22	22	23
	From Yucaipa Hills	3,524	3,266	3,778	3,612	3,393
	From San Bernardino Mountains	2,277	1,758	2,308	2,200	2,053
	Total Subsurface Inflows	13,815	12,699	13,478	13,191	12,834
Surface Water Spreading		313	2,115	2,139	2,139	2,139
Average Annual Inflows		*34,870*	*36,049*	*41,500*	*39,888*	*37,776*
ET		3,460	3,638	4,831	4,825	4,731
Subsurface Outflows	To Beaumont Basin	795	982	1,786	1,736	1,659
	To San Timoteo Basin	9,109	9,169	9,264	9,246	9,188
	To SBBA	4,011	4,453	5,094	4,910	4,630
	To Crafton Hills	0	1	2	1	1
	To Yucaipa Hills	2,272	2,162	2,409	2,325	2,211
	To San Bernardino Mountains	20	19	21	21	21
	Total Subsurface Outflows	16,207	16,786	18,576	18,240	17,710
GW Discharges to Streams		3,984	4,127	6,326	5,448	4,538
Surface Water Diversions		217	191	189	188	180
GW Extractions		11,346	8,668	10,621	10,611	10,589
GW Discharge to Surface		23	133	127	119	112
Average Annual Outflows		*35,237*	*33,542*	40,670	39,432	37,859
Average Annual Change in Storage		**-367**	**2,506**	**830**	**457**	**-83**

AFY = acre-feet per year

Table 2-C15: Projected Future Baseline with Climate Change I Water Budget

Water Year[A]	Individual Components of the Basin Water Budget Reported in Units of Acre-Feet (AF)																								
	Inflows to Groundwater System											Outflows from Groundwater System												Change in Groundwater in Storage	
				Subsurface Inflows									Subsurface Outflows												
	Stream Leakage	Return Flows[B]	Precipitation Recharge	From Beaumont Basin	From San Timoteo Basin	From SBBA	From Crafton Hills	From Yucaipa Hills	From San Bernardino Mtns	Subtotal	Surface Water Spreading	Total Basin Inflows	ET	To Beaumont Basin	To San Timoteo Basin	To SBBA	To Crafton Hills	To Yucaipa Hills	To San Bernardino Mtns	Subtotal	GW Discharges to Streams	GW Extractions	Surface Water Diversions[C]	GW Discharge to Surface[D]	Total Basin Outflows	Annual	Cumulative
2019	11,333	4,009	3,902	891	6,581	27	21	3,204	1,569	12,292	2,139	33,676	3,684	1,068	9,161	4,451	1	2,114	16	16,811	3,497	10,563	136	103	34,794	-1,118	**-1,118**
2020	11,178	4,020	4,560	894	6,571	26	21	3,150	1,739	12,400	2,139	34,298	3,820	1,088	9,175	4,555	1	2,106	17	16,941	3,617	10,555	153	117	35,203	-905	**-2,024**
2021	11,168	4,009	4,559	888	6,547	24	22	3,091	1,678	12,250	2,139	34,125	3,645	1,103	9,161	4,460	1	2,089	16	16,830	3,596	10,555	145	114	34,884	-759	**-2,783**
2022	12,035	4,009	7,682	892	6,531	23	21	3,152	1,741	12,360	2,139	38,225	4,074	1,122	9,115	4,638	1	2,120	19	17,016	4,127	10,577	185	115	36,094	2,132	**-651**
2023	12,396	4,009	8,043	880	6,510	19	20	3,218	1,798	12,445	2,139	39,032	3,765	1,140	9,116	4,692	1	2,147	19	17,115	4,380	10,588	190	119	36,157	2,875	**2,224**
2024	11,481	4,020	5,447	867	6,541	17	20	3,271	1,840	12,555	2,139	35,642	4,137	1,174	9,181	4,531	1	2,155	17	17,058	3,887	10,575	189	115	35,962	-320	**1,904**
2025	14,291	4,009	15,055	867	6,526	15	19	3,453	2,324	13,203	2,139	*48,698*	4,467	1,205	9,070	4,693	1	2,290	20	17,278	6,120	10,621	188	121	*38,794*	9,904	**11,808**
2026	12,388	4,009	6,309	826	6,523	11	17	3,628	2,230	13,235	2,139	*38,081*	4,769	1,212	9,158	4,680	1	2,303	20	17,375	4,780	10,612	192	118	*37,845*	235	**12,043**
2027	12,422	4,009	6,143	817	6,558	10	18	3,505	2,381	13,289	2,139	*38,003*	4,570	1,281	9,179	4,712	1	2,259	22	17,454	4,783	10,605	192	118	*37,722*	281	**12,324**
2028	11,721	4,020	4,495	812	6,605	11	20	3,423	2,233	13,104	2,139	*35,480*	4,673	1,360	9,212	4,638	1	2,219	22	17,451	4,202	10,594	192	112	*37,226*	-1,746	**10,578**
2029	12,976	4,009	6,744	809	6,550	12	21	3,335	2,247	12,974	2,139	*38,842*	3,965	1,410	9,166	4,882	1	2,202	22	17,683	5,164	10,623	192	120	*37,747*	1,095	**11,674**
2030	12,378	4,009	6,510	813	6,549	13	21	3,370	2,005	12,770	2,139	*37,807*	4,535	1,448	9,158	4,759	1	2,205	23	17,594	4,683	10,616	192	117	*37,738*	69	**11,742**
2031	11,838	4,009	4,740	803	6,526	13	21	3,350	1,917	12,630	2,139	*35,355*	4,018	1,487	9,178	4,755	1	2,183	21	17,625	4,249	10,596	192	118	*36,797*	-1,441	**10,301**
2032	12,392	4,020	5,716	801	6,556	13	22	3,295	1,924	12,610	2,139	*36,877*	4,084	1,513	9,182	4,748	1	2,162	21	17,627	4,300	10,586	192	116	*36,905*	-28	**10,273**
2033	12,067	4,009	6,550	806	6,514	13	22	3,297	2,015	12,667	2,139	*37,432*	4,518	1,530	9,162	4,750	1	2,176	20	17,640	4,408	10,593	192	119	*37,471*	-38	**10,235**
2034	15,581	4,009	19,261	818	6,490	12	19	3,669	2,480	13,488	2,139	*54,478*	4,923	1,529	9,090	4,835	2	2,400	23	17,878	7,614	10,645	192	126	*41,378*	13,100	**23,335**
2035	15,451	4,009	11,336	758	6,406	6	16	3,959	2,586	13,731	2,139	*46,666*	4,994	1,520	9,165	5,022	3	2,494	22	18,227	7,599	10,652	192	130	*41,794*	4,873	**28,207**
2036	17,238	4,020	16,588	761	6,477	6	16	4,162	2,877	14,299	2,139	*54,284*	5,799	1,608	9,193	5,034	3	2,611	23	18,472	9,216	10,653	192	131	*44,463*	9,820	**38,028**
2037	15,688	4,009	7,170	702	6,473	6	16	4,192	2,629	14,017	2,139	*43,024*	6,136	1,674	9,268	5,016	2	2,547	22	18,528	7,572	10,624	192	124	*43,176*	-153	**37,875**
2038	16,632	4,009	8,361	694	6,503	6	19	3,997	2,804	14,023	2,139	*45,165*	5,001	1,775	9,255	5,159	2	2,488	24	18,702	8,383	10,640	192	129	*43,047*	2,118	**39,993**
2039	17,515	4,009	11,890	695	6,517	6	19	4,012	2,882	14,132	2,139	*49,686*	5,190	1,853	9,219	5,273	2	2,520	26	18,894	9,710	10,663	192	138	*44,787*	4,899	**44,892**
2040	15,094	4,020	7,564	677	6,522	7	18	4,090	2,527	13,841	2,139	*42,658*	6,294	1,887	9,349	5,125	2	2,529	23	18,916	7,351	10,639	192	126	*43,517*	-859	**44,032**
2041	14,462	4,009	6,271	667	6,518	6	21	3,961	2,449	13,623	2,139	*40,504*	5,422	1,947	9,335	5,098	2	2,475	24	18,880	6,556	10,626	192	122	*41,797*	-1,293	**42,739**
2042	13,927	4,009	5,091	667	6,553	6	23	3,841	2,454	13,545	2,139	*38,711*	5,315	1,974	9,348	5,095	2	2,413	23	18,854	5,989	10,616	192	119	*41,084*	-2,372	**40,367**
2043	13,097	4,009	4,330	678	6,578	6	24	3,737	2,361	13,385	2,139	*36,960*	5,122	1,979	9,346	5,070	2	2,361	23	18,780	5,291	10,608	192	118	*40,111*	-3,150	**37,216**
2044	12,632	4,020	4,092	688	6,603	7	25	3,628	2,267	13,219	2,139	*36,102*	4,860	1,985	9,362	5,031	2	2,335	23	18,737	4,860	10,603	192	117	*39,369*	-3,267	**33,949**
2045	11,934	4,009	3,890	701	6,608	9	26	3,526	2,045	12,915	2,139	*34,887*	4,779	1,974	9,318	4,928	2	2,290	22	18,534	4,324	10,599	192	114	*38,542*	-3,655	**30,294**
2046	11,415	4,009	3,314	719	6,616	11	27	3,433	1,857	12,662	2,139	*33,540*	4,548	1,942	9,301	4,844	2	2,241	21	18,351	3,844	10,587	189	114	*37,632*	-4,092	**26,202**
2047	12,356	4,009	7,271	739	6,617	12	27	3,391	1,852	12,637	2,139	*38,413*	4,562	1,926	9,228	4,867	2	2,247	20	18,290	4,467	10,592	184	115	*38,210*	202	**26,404**
2048	12,649	4,020	7,655	755	6,635	12	25	3,461	1,892	12,781	2,139	*39,245*	4,770	1,898	9,259	4,920	2	2,287	19	18,386	4,772	10,617	192	117	*38,853*	391	**26,795**
2049	15,508	4,009	19,111	765	6,611	10	21	3,874	2,287	13,568	2,139	*54,336*	5,359	1,853	9,166	4,980	2	2,508	23	18,532	7,532	10,651	192	125	*42,391*	11,944	**38,740**
2050	13,764	4,009	7,509	715	6,578	6	19	3,994	2,428	13,739	2,139	*41,161*	5,220	1,821	9,273	5,094	2	2,499	19	18,708	5,950	10,630	192	125	*40,825*	336	**39,076**
2051	16,138	4,009	12,230	719	6,607	6	20	3,964	2,766	14,083	2,139	*48,599*	5,344	1,897	9,226	5,084	2	2,530	22	18,760	8,208	10,651	192	129	*43,284*	5,315	**44,390**
2052	14,323	4,020	6,511	691	6,621	6	20	3,967	2,511	13,816	2,139	*40,809*	5,766	1,922	9,340	5,078	2	2,484	20	18,846	6,454	10,623	192	120	*42,002*	-1,193	**43,198**
2053	14,116	4,009	7,486	695	6,627	6	22	3,859	2,479	13,688	2,139	*41,438*	5,504	1,970	9,312	5,052	2	2,444	22	18,801	6,305	10,629	192	118	*41,550*	-112	**43,086**
2054	16,470	4,009	14,193	703	6,629	6	21	3,930	2,749	14,039	2,139	*50,851*	4,917	2,015	9,254	5,185	2	2,521	23	19,000	8,658	10,654	192	133	*43,555*	7,295	**50,381**
2055	14,034	4,009	6,353	672	6,597	6	20	4,031	2,408	13,735	2,139	*40,270*	5,650	2,035	9,366	5,216	2	2,493	21	19,132	6,295	10,624	192	126	*42,019*	-1,749	**48,632**
2056	13,639	4,020	5,679	676	6,660	7	23	3,900	2,357	13,623	2,139	*39,101*	5,622	2,083	9,389	5,116	2	2,455	21	19,066	5,683	10,611	192	118	*41,292*	-2,191	**46,441**
2057	13,602	4,009	5,450	677	6,647	6	24	3,756	2,400	13,511	2,139	*38,711*	5,047	2,104	9,346	5,139	2	2,396	21	19,008	5,783	10,616	192	120	*40,767*	-2,056	**44,385**
2058	11,997	4,009	3,529	690	6,674	7	26	3,675	2,167	13,239	2,139	*34,913*	5,325	2,100	9,371	4,958	2	2,337	22	18,790	4,448	10,605	192	113	*39,473*	-4,560	**39,825**
2059	12,722	4,009	5,333	703	6,678	8	27	3,538	2,084	13,038	2,139	*37,242*	4,803	2,085	9,325	5,070	1	2,310	21	18,812	4,766	10,605	192	117	*39,295*	-2,054	**37,772**
2060	11,973	4,020	4,511	726	6,704	10	27	3,506	1,942	12,915	2,139	*35,558*	4,947	2,063	9,352	4,945	1	2,286	21	18,668	4,258	10,603	192	113	*38,781*	-3,223	**34,548**
2061	14,564	4,009	13,127	745	6,642	10	25	3,620	2,220	13,262	2,139	*47,102*	4,835	2,049	9,237	5,093	1	2,378	22	18,781	6,465	10,645	192	124	*41,042*	6,060	**40,608**
2062	12,461	4,009	5,412	710	6,624	7	24	3,748	2,008	13,121	2,139	*37,142*	5,123	2,006	9,315	5,021	1	2,370	19	18,732	4,733	10,615	192	118	*39,514*	-2,371	**38,236**
2063	11,391	4,009	3,727	718	6,693	7	25	3,618	2,101	13,161	2,139	*34,427*	5,104	2,015	9,319	4,816	1	2,310	19	18,481	3,881	10,599	188	111	*38,364*	-3,936	**34,300**
2064	11,866	4,020	4,276	733	6,743	9	27	3,483	2,179	13,174	2,139	*35,475*	4,662	2,012	9,307	4,950	1	2,272	19	18,562	4,142	10,595	191	113	*38,264*	-2,790	**31,510**
2065	11,604	4,009	3,969	743	6,734	11	27	3,387	1,983	12,885	2,139	*34,607*	4,637	2,003	9,279	4,860	1	2,216	20	18,380	3,934	10,589	191	111	*37,843*	-3,237	**28,274**
2066	12,372	4,009	6,476	756	6,693	12	27	3,344	1,899	12,732	2,139	*37,727*	4,321	1,993	9,235	4,879	1	2,200	22	18,330	4,458	10,605	191	116	*38,021*	-294	**27,980**
2067	12,985	4,009	8,252	761	6,674	12	26	3,407	1,912	12,791	2,139	*40,177*	4,494	1,965	9,216	4,940	1	2,226	22	18,370	4,935	10,629	192	120	*38,741*	1,436	**29,416**
2068	11,494	4,020	4,308	758	6,692	11	25	3,463	1,772	12,721	2,139	*34,684*	4,711	1,957	9,291	4,827	1	2,218	19	18,313	3,891	10,594	190	113	*37,812*	-3,128	**26,287**
2069	11,340	4,009	3,784	764	6,710	11	27	3,373	1,934	12,818	2,139	*34,089*	4,256	1,951	9,241	4,860	1	2,178	17	18,248	3,718	10,576	173	112	*37,083*	-2,993	**23,294**
Average	**13,257**	**4,012**	**7,290**	**755**	**6,591**	**11**	**22**	**3,612**	**2,200**	**13,191**	**2,139**	**39,888**	**4,825**	**1,736**	**9,246**	**4,910**	**1**	**2,325**	**21**	**18,240**	**5,448**	**10,611**	**188**	**119**	**39,432**	**457**	**27,632**

[A]Water Year corresponds to October 1 of the previous year, through September 30th of the current year.

[B]Return flows consist of water that recharges the Subbasin via municipal distribution network leaks, septic system discharges, and infiltration of irrigation water

[C]Represents surface water diversions through the operation of YVWD-25

[D]The YIHM calculates groundwater discharges to land surface when groundwater elevations in a given cell are higher than the top elevation of the cell

Table 2-C16: Projected Future Baseline with Climate Change II Water Budget

Water Year[A]	Individual Components of the Basin Water Budget Reported in Units of Acre-Feet (AF)																								
	Inflows to Groundwater System											Outflows from Groundwater System												Change in Groundwater in Storage	
				Subsurface Inflows									Subsurface Outflows												
	Stream Leakage	Return Flows[B]	Precipitation Recharge	From Beaumont Basin	From San Timoteo Basin	From SBBA	From Crafton Hills	From Yucaipa Hills	From San Bernardino Mtns	Subtotals	Surface Water Spreading	Total Basin Inflows	ET	To Beaumont Basin	To San Timoteo Basin	To SBBA	To Crafton Hills	To Yucaipa Hills	To San Bernardino Mtns	GW Discharges to Streams	GW Extractions	Surface Water Diversions[C]	GW Discharge to Surface[D]	Total Basin Outflows	Annual	Cumulative
2019	11,195	4,009	3,839	891	6,592	27	21	3,209	1,558	11,407	2,139	33,480	3,984	1,070	9,164	4,363	1	2,114	16	3,367	10,562	131	100	34,871	-1,390	**-1,390**
2020	10,994	4,020	4,494	894	6,577	26	21	3,151	1,729	11,504	2,139	34,045	4,101	1,090	9,178	4,461	1	2,106	16	3,466	10,551	145	112	35,227	-1,181	**-2,572**
2021	10,823	4,009	3,982	888	6,560	25	22	3,090	1,650	11,347	2,139	33,189	3,936	1,099	9,162	4,326	1	2,082	16	3,341	10,549	132	109	34,753	-1,564	**-4,135**
2022	11,708	4,009	6,983	893	6,536	24	22	3,111	1,703	11,396	2,139	37,129	4,221	1,116	9,118	4,533	1	2,092	19	3,834	10,563	173	110	35,780	1,349	**-2,786**
2023	11,996	4,009	7,106	883	6,512	21	22	3,148	1,727	11,429	2,139	37,562	3,979	1,141	9,117	4,555	1	2,105	20	4,027	10,574	181	113	35,813	1,750	**-1,037**
2024	11,050	4,020	4,928	874	6,538	19	21	3,188	1,719	11,485	2,139	34,497	4,280	1,168	9,176	4,377	1	2,104	17	3,521	10,565	168	109	35,486	-989	**-2,025**
2025	13,393	4,009	13,363	878	6,525	17	20	3,322	2,116	12,000	2,139	*45,783*	4,522	1,190	9,061	4,568	1	2,215	20	5,226	10,602	172	114	*37,692*	8,091	**6,066**
2026	11,545	4,009	5,755	847	6,547	14	19	3,483	2,048	12,111	2,139	*36,407*	4,815	1,188	9,142	4,469	1	2,230	19	4,018	10,592	192	110	*36,776*	-368	**5,697**
2027	11,458	4,009	5,504	840	6,585	13	20	3,372	2,207	12,196	2,139	*36,147*	4,544	1,255	9,154	4,500	1	2,193	20	3,967	10,587	192	111	*36,523*	-376	**5,321**
2028	10,959	4,020	3,891	840	6,623	14	21	3,290	2,081	12,030	2,139	*33,878*	4,566	1,319	9,186	4,417	1	2,150	21	3,559	10,578	188	106	*36,091*	-2,213	**3,108**
2029	12,036	4,009	5,549	839	6,565	15	22	3,184	2,097	11,884	2,139	*36,456*	3,910	1,355	9,145	4,632	1	2,121	20	4,292	10,590	191	114	*36,371*	85	**3,194**
2030	11,669	4,009	5,687	841	6,554	16	22	3,202	1,849	11,644	2,139	*35,990*	4,480	1,404	9,128	4,562	1	2,109	22	3,992	10,587	192	110	*36,588*	-598	**2,595**
2031	10,989	4,009	3,950	846	6,535	16	23	3,169	1,725	11,467	2,139	*33,400*	4,051	1,416	9,150	4,449	1	2,079	20	3,537	10,565	184	111	*35,562*	-2,162	**433**
2032	11,754	4,020	5,077	839	6,534	16	24	3,109	1,709	11,392	2,139	*35,221*	4,056	1,449	9,141	4,531	1	2,061	20	3,674	10,555	164	109	*35,761*	-540	**-106**
2033	11,235	4,009	6,183	845	6,500	17	23	3,111	1,818	11,469	2,139	*35,880*	4,445	1,462	9,119	4,505	1	2,073	19	3,691	10,561	184	113	*36,172*	-292	**-398**
2034	14,384	4,009	16,767	857	6,449	15	21	3,401	2,228	12,114	2,139	*50,270*	4,737	1,456	9,060	4,679	1	2,274	20	6,226	10,621	188	118	*39,380*	10,890	**10,492**
2035	13,938	4,009	9,525	801	6,380	10	18	3,652	2,333	12,392	2,139	*42,803*	4,802	1,450	9,125	4,797	2	2,336	21	6,037	10,645	192	121	*39,528*	3,275	**13,767**
2036	15,500	4,020	14,073	814	6,458	8	17	3,822	2,737	13,042	2,139	*49,589*	5,568	1,517	9,145	4,781	2	2,435	26	7,308	10,646	192	120	*41,741*	7,848	**21,615**
2037	13,841	4,009	7,058	762	6,452	6	17	3,876	2,469	12,821	2,139	*40,630*	5,835	1,560	9,199	4,669	2	2,404	23	5,941	10,614	192	114	*40,553*	77	**21,692**
2038	15,276	4,009	7,815	749	6,501	6	19	3,717	2,633	12,876	2,139	*42,863*	5,003	1,650	9,185	4,860	1	2,358	24	6,883	10,621	192	119	*40,899*	1,964	**23,656**
2039	16,655	4,009	11,322	751	6,473	7	19	3,745	2,794	13,038	2,139	*47,915*	5,135	1,730	9,188	5,068	2	2,384	27	8,401	10,654	192	128	*42,909*	5,006	**28,662**
2040	13,859	4,020	7,046	725	6,470	6	19	3,839	2,476	12,810	2,139	*40,599*	6,048	1,766	9,308	4,773	2	2,397	25	6,161	10,620	192	116	*41,408*	-809	**27,853**
2041	13,120	4,009	5,546	718	6,483	6	21	3,716	2,396	12,622	2,139	*38,154*	5,316	1,819	9,274	4,826	2	2,347	23	5,339	10,606	192	113	*39,857*	-1,703	**26,150**
2042	12,695	4,009	4,747	717	6,541	7	23	3,611	2,388	12,569	2,139	*36,876*	5,222	1,860	9,274	4,746	2	2,296	23	4,938	10,598	192	112	*39,262*	-2,386	**23,764**
2043	11,973	4,009	3,964	726	6,578	9	24	3,507	2,304	12,422	2,139	*35,233*	5,078	1,866	9,267	4,701	2	2,252	24	4,367	10,592	192	111	*38,450*	-3,217	**20,547**
2044	11,685	4,020	3,687	741	6,607	11	25	3,426	2,133	12,202	2,139	*34,475*	4,750	1,878	9,285	4,653	2	2,222	23	4,053	10,587	192	110	*37,754*	-3,280	**17,267**
2045	11,172	4,009	3,435	757	6,594	12	26	3,315	1,895	11,842	2,139	*33,354*	4,643	1,873	9,241	4,617	2	2,173	21	3,654	10,574	188	107	*37,094*	-3,740	**13,527**
2046	10,811	4,009	3,111	768	6,594	14	27	3,222	1,703	11,558	2,139	*32,397*	4,422	1,859	9,224	4,530	2	2,124	21	3,339	10,556	166	107	*36,350*	-3,953	**9,574**
2047	11,694	4,009	6,241	786	6,572	15	27	3,166	1,688	11,468	2,139	*36,337*	4,352	1,831	9,158	4,628	2	2,124	22	3,860	10,558	165	109	*36,809*	-472	**9,102**
2048	11,939	4,020	6,858	803	6,575	16	26	3,218	1,724	11,559	2,139	*37,318*	4,603	1,820	9,198	4,667	2	2,146	22	4,052	10,579	188	110	*37,386*	-67	**9,035**
2049	14,675	4,009	17,715	812	6,522	14	22	3,600	2,067	12,225	2,139	*51,575*	5,156	1,778	9,101	4,750	2	2,362	25	6,402	10,629	191	117	*40,513*	11,062	**20,097**
2050	12,510	4,009	6,848	755	6,503	8	20	3,746	2,170	12,446	2,139	*38,708*	5,161	1,750	9,197	4,728	2	2,366	19	4,831	10,612	192	116	*38,971*	-264	**19,833**
2051	14,706	4,009	11,268	763	6,551	7	20	3,681	2,641	12,901	2,139	*45,786*	5,257	1,809	9,160	4,853	2	2,397	22	6,614	10,636	192	119	*41,061*	4,725	**24,558**
2052	13,029	4,020	6,060	743	6,594	7	21	3,720	2,443	12,785	2,139	*38,777*	5,610	1,826	9,255	4,771	1	2,371	21	5,284	10,612	192	113	*40,057*	-1,280	**23,278**
2053	12,890	4,009	6,466	742	6,596	7	22	3,604	2,398	12,627	2,139	*38,872*	5,368	1,865	9,223	4,766	1	2,322	22	5,175	10,610	192	111	*39,655*	-783	**22,495**
2054	15,156	4,009	11,652	750	6,573	8	22	3,637	2,621	12,861	2,139	*46,567*	4,810	1,903	9,194	4,928	1	2,376	23	7,041	10,644	192	123	*41,237*	5,330	**27,825**
2055	12,527	4,009	5,918	729	6,550	7	21	3,721	2,300	12,599	2,139	*37,921*	5,483	1,921	9,279	4,752	1	2,358	21	5,040	10,612	192	116	*39,776*	-1,855	**25,970**
2056	12,104	4,020	5,152	726	6,611	7	23	3,614	2,284	12,540	2,139	*36,681*	5,371	1,978	9,289	4,754	1	2,318	21	4,456	10,597	192	110	*39,087*	-2,406	**23,564**
2057	12,264	4,009	5,478	730	6,616	9	24	3,485	2,327	12,462	2,139	*37,082*	4,881	1,983	9,247	4,843	1	2,267	21	4,556	10,597	192	113	*38,701*	-1,619	**21,945**
2058	11,049	4,009	3,391	739	6,648	10	25	3,423	2,074	12,181	2,139	*33,509*	5,132	2,021	9,265	4,555	1	2,210	22	3,655	10,590	191	106	*37,749*	-4,240	**17,705**
2059	11,768	4,009	4,535	757	6,636	12	27	3,314	1,945	11,934	2,139	*35,142*	4,675	2,001	9,238	4,665	1	2,184	21	3,908	10,585	191	110	*37,579*	-2,437	**15,269**
2060	11,154	4,020	3,769	769	6,650	14	27	3,265	1,784	11,740	2,139	*33,592*	4,730	1,987	9,260	4,560	1	2,147	21	3,555	10,572	188	105	*37,129*	-3,537	**11,732**
2061	13,319	4,009	10,979	792	6,570	14	26	3,316	2,001	11,927	2,139	*43,165*	4,677	1,958	9,163	4,820	1	2,215	23	5,119	10,609	191	115	*38,890*	4,275	**16,007**
2062	11,394	4,009	4,762	765	6,577	12	24	3,427	1,789	11,829	2,139	*34,898*	4,907	1,925	9,215	4,568	1	2,205	20	3,835	10,589	191	110	*37,565*	-2,667	**13,340**
2063	10,540	4,009	3,482	772	6,633	12	25	3,322	1,827	11,820	2,139	*32,762*	4,788	1,929	9,207	4,459	1	2,157	19	3,184	10,565	153	104	*36,565*	-3,802	**9,538**
2064	11,054	4,020	3,755	783	6,654	14	27	3,216	1,962	11,872	2,139	*33,624*	4,394	1,918	9,214	4,570	1	2,131	19	3,437	10,559	152	106	*36,502*	-2,878	**6,660**
2065	10,773	4,009	3,241	793	6,637	15	27	3,139	1,808	11,626	2,139	*32,582*	4,401	1,905	9,186	4,456	1	2,082	19	3,293	10,551	152	104	*36,149*	-3,568	**3,092**
2066	11,545	4,009	5,310	799	6,594	16	27	3,083	1,731	11,452	2,139	*35,253*	4,161	1,892	9,141	4,573	1	2,055	22	3,692	10,555	169	108	*36,369*	-1,116	**1,975**
2067	12,087	4,009	7,040	805	6,561	16	26	3,123	1,734	11,460	2,139	*37,540*	4,310	1,883	9,134	4,648	1	2,067	24	4,011	10,573	184	111	*36,947*	594	**2,569**
2068	10,608	4,020	3,781	808	6,589	16	26	3,155	1,543	11,329	2,139	*32,686*	4,521	1,862	9,193	4,419	1	2,057	20	3,191	10,562	155	105	*36,085*	-3,400	**-830**
2069	10,557	4,009	3,195	812	6,569	16	27	3,081	1,588	11,280	2,139	*31,993*	4,063	1,846	9,154	4,440	1	2,013	17	3,106	10,548	106	105	*35,399*	-3,406	**-4,237**
Average	**12,295**	**4,012**	**6,496**	**795**	**6,558**	**13**	**23**	**3,393**	**2,053**	**12,039**	**2,139**	**37,776**	**4,731**	**1,659**	**9,188**	**4,630**	**1**	**2,211**	**21**	**4,538**	**10,589**	**180**	**112**	**37,859**	**-83**	**11,589**

[A]Water Year corresponds to October 1 of the previous year, through September 30th of the current year.

[B]Return flows consist of water that recharges the Subbasin via municipal distribution network leaks, septic system discharges, and infiltration of irrigation water

[C]Represents surface water diversions through the operation of YVWD-25

[D]The YIHM calculates groundwater discharges to land surface when groundwater elevations in a given cell are higher than the top elevation of the cell

Table 2-C17: Parameter groups included in YIHM Calibration and Sensitivity Analysis		
Group Name	Model Component	Parameter Description
A	PRMS	Solar Radiation and PET parameters
B	PRMS, MODFLOW	Soil zone and
C	MODFLOW	Hydraulic conductivity
D	MODFLOW	Storage properties
E	MODFLOW	General head and constant head boundary condition properties
F	MODFLOW	Conductance parameters for faults and barriers to flow
G	MODFLOW	Streambed conductivity
H	MODFLOW	Unsaturated zone parameters, including brook-corey exponent, extinction depths, and surface leakage conductances

Table 2-C18: Historical Water Budget for the Western Heights Management Area

Water Year[A]	Water Year Type	Inflows to Principal Aquifer									Outflows from Principal Aquifer										Change in Storage	
					Subsurface Inflows									Subsurface Outflows								
		Stream Leakage	Return Flows	Precipitation Recharge	From North Bench MA	From Crafton Hills	From SBBA	From Calimesa MA	From San. Tim. MA	Subtotal	Total Inflows	ET	GW Production	GW Discharge to Streams	To North Bench MA	To Crafton Hills	To SBBA	To Calimesa MA	To San. Tim. MA	*Subtotal*	GW Discharge to Surface	Total Outflows	Annual	Cumulative
1965	Normal	0	72	80	335	11	0	733	73	*1,152*	1,305	1	2,646	0	0	0	0	60	148	*208*	0	2,855	***-1,550***	**-1,550**
1966	Above Normal	0	72	251	343	10	0	731	96	*1,181*	1,505	8	2,741	0	0	0	0	45	148	*194*	0	2,943	***-1,438***	**-2,988**
1967	Wet	0	72	260	332	10	0	708	119	*1,169*	1,502	10	2,315	0	0	0	0	45	151	*195*	0	2,520	***-1,018***	**-4,007**
1968	Normal	0	73	199	332	10	0	685	141	*1,167*	1,440	0	2,580	0	0	0	0	46	156	*202*	0	2,782	***-1,342***	**-5,349**
1969	Wet	1	72	692	341	10	0	690	176	*1,217*	1,982	16	1,986	0	0	0	0	43	162	*205*	0	2,208	***-225***	**-5,575**
1970	Dry	0	321	360	333	9	0	710	172	*1,225*	1,906	2	2,186	0	0	0	0	38	169	*208*	0	2,396	***-490***	**-6,064**
1971	Below Normal	0	202	235	334	9	0	716	150	*1,209*	1,646	2	2,259	0	0	0	0	29	171	*200*	0	2,460	***-814***	**-6,879**
1972	Dry	0	202	168	338	9	0	706	139	*1,192*	1,562	1	2,831	0	0	0	0	24	171	*195*	0	3,026	***-1,464***	**-8,343**
1973	Above Normal	0	202	153	338	9	0	686	135	*1,168*	1,523	4	2,381	0	0	0	0	20	170	*190*	0	2,575	***-1,052***	**-9,394**
1974	Below Normal	0	202	220	316	9	0	718	136	*1,180*	1,602	8	2,473	0	0	0	0	19	170	*189*	0	2,670	***-1,068***	**-10,462**
1975	Normal	0	204	179	294	9	0	737	135	*1,174*	1,557	0	2,326	0	0	0	0	27	170	*197*	0	2,523	***-966***	**-11,429**
1976	Normal	0	207	205	289	9	0	753	135	*1,186*	1,597	4	2,351	0	0	0	0	30	171	*201*	0	2,556	***-959***	**-12,388**
1977	Below Normal	0	206	190	299	8	0	768	135	*1,211*	1,607	6	2,214	0	0	0	0	27	171	*199*	0	2,418	***-811***	**-13,198**
1978	Wet	1	206	789	296	8	0	786	169	*1,260*	2,256	17	2,382	0	1	0	0	38	172	*211*	0	2,612	***-356***	**-13,554**
1979	Above Normal	0	206	489	289	8	0	828	178	*1,304*	1,999	15	2,410	0	0	0	0	43	178	*221*	0	2,646	***-648***	**-14,202**
1980	Wet	1	76	738	286	8	0	866	188	*1,349*	2,164	17	2,267	0	0	0	0	48	181	*229*	0	2,514	***-350***	**-14,552**
1981	Dry	0	32	482	284	8	0	900	173	*1,365*	1,880	0	2,236	0	0	0	0	50	184	*234*	0	2,470	***-590***	**-15,142**
1982	Above Normal	0	32	384	286	8	0	926	159	*1,379*	1,795	12	2,121	0	0	0	0	41	182	*223*	0	2,356	***-561***	**-15,703**
1983	Wet	1	32	464	277	8	0	938	178	*1,400*	1,897	16	1,957	0	0	0	0	39	183	*222*	0	2,195	***-298***	**-16,001**
1984	Dry	0	32	353	276	8	0	982	173	*1,439*	1,824	0	2,429	0	0	0	0	45	186	*232*	0	2,661	***-837***	**-16,838**
1985	Below Normal	0	50	280	284	8	0	1,010	155	*1,456*	1,787	0	2,533	0	0	0	0	45	185	*229*	0	2,762	***-975***	**-17,813**
1986	Normal	0	56	215	290	8	0	1,056	150	*1,503*	1,774	0	2,626	0	0	0	0	39	183	*222*	0	2,848	***-1,074***	**-18,887**
1987	Dry	0	56	190	294	7	0	1,086	147	*1,535*	1,781	0	2,460	0	0	0	0	32	181	*214*	0	2,674	***-894***	**-19,780**
1988	Below Normal	0	56	164	294	7	0	1,105	146	*1,552*	1,772	0	2,591	0	0	0	0	29	181	*210*	0	2,801	***-1,029***	**-20,809**
1989	Below Normal	0	56	136	296	7	0	1,122	137	*1,562*	1,754	0	2,641	0	0	0	0	28	179	*208*	0	2,848	***-1,094***	**-21,903**
1990	Dry	0	158	130	298	7	0	1,146	133	*1,584*	1,873	0	2,926	0	0	0	0	33	177	*210*	0	3,136	***-1,263***	**-23,167**
1991	Above Normal	0	192	273	297	7	0	1,131	141	*1,576*	2,042	5	2,624	0	0	0	0	32	176	*209*	0	2,838	***-796***	**-23,963**
1992	Above Normal	0	193	340	290	7	0	1,109	151	*1,557*	2,090	12	2,476	0	0	0	0	37	178	*215*	0	2,704	***-614***	**-24,576**
1993	Wet	1	411	954	283	7	0	1,097	207	*1,594*	2,961	17	2,616	0	1	0	0	53	182	*235*	0	2,868	***92***	**-24,484**
1994	Below Normal	0	432	509	293	7	0	1,132	195	*1,627*	2,568	0	2,795	0	0	0	0	68	190	*259*	0	3,054	***-487***	**-24,971**
1995	Wet	1	561	672	299	7	0	1,114	185	*1,605*	2,839	17	2,733	0	1	0	0	58	191	*249*	0	2,999	***-160***	**-25,131**
1996	Dry	0	606	455	290	7	0	1,088	172	*1,557*	2,618	0	2,863	0	0	0	0	60	193	*254*	0	3,117	***-499***	**-25,630**
1997	Above Normal	0	604	350	289	7	0	1,070	147	*1,512*	2,467	9	2,876	0	0	0	0	64	189	*253*	0	3,138	***-672***	**-26,302**
1998	Wet	1	604	528	279	7	0	1,066	175	*1,527*	2,660	15	3,228	0	0	0	0	71	188	*259*	0	3,502	***-842***	**-27,144**
1999	Dry	0	604	396	277	7	0	1,073	179	*1,536*	2,536	0	2,842	0	0	0	0	85	192	*278*	0	3,120	***-584***	**-27,728**
2000	Dry	0	640	298	283	7	0	1,051	148	*1,488*	2,426	0	2,503	0	0	0	0	77	190	*268*	0	2,771	***-345***	**-28,073**
2001	Dry	0	649	266	258	7	0	1,037	141	*1,442*	2,358	0	2,359	0	0	0	0	91	186	*278*	0	2,637	***-279***	**-28,352**
2002	Critically Dry	0	649	226	249	7	0	1,023	135	*1,414*	2,289	0	2,466	0	0	0	0	100	184	*284*	0	2,751	***-462***	**-28,814**
2003	Above Normal	0	649	224	245	7	0	1,003	138	*1,393*	2,266	4	2,340	0	0	0	0	106	182	*288*	0	2,631	***-365***	**-29,180**
2004	Dry	0	651	205	243	7	0	988	140	*1,377*	2,233	0	2,386	0	0	0	0	108	182	*291*	0	2,676	***-443***	**-29,622**
2005	Wet	1	456	500	237	7	0	988	180	*1,412*	2,369	14	2,380	0	0	0	0	116	183	*300*	0	2,694	***-326***	**-29,948**
2006	Below Normal	0	391	340	236	7	0	979	182	*1,403*	2,134	0	2,537	0	0	0	0	123	189	*312*	0	2,848	***-714***	**-30,662**
2007	Critically Dry	0	391	219	242	6	0	986	153	*1,388*	1,998	0	2,759	0	0	0	0	125	188	*313*	0	3,072	***-1,074***	**-31,736**
2008	Normal	0	392	219	245	6	0	997	148	*1,395*	2,006	0	2,456	0	0	0	0	129	186	*315*	0	2,771	***-765***	**-32,501**
2009	Below Normal	0	391	210	245	6	0	980	146	*1,377*	1,978	0	1,961	0	0	0	0	123	184	*307*	0	2,268	***-290***	**-32,791**
2010	Above Normal	0	400	316	245	6	0	963	156	*1,370*	2,087	3	1,870	0	0	0	0	120	184	*303*	0	2,177	***-90***	**-32,881**
2011	Wet	1	403	419	246	6	0	949	174	*1,376*	2,198	5	1,943	0	0	0	0	118	186	*304*	0	2,251	***-52***	**-32,934**
2012	Dry	0	404	342	250	6	0	958	158	*1,372*	2,119	0	2,089	0	0	0	0	122	188	*310*	0	2,398	***-280***	**-33,214**
2013	Dry	0	403	261	255	6	0	978	144	*1,383*	2,047	0	2,077	0	0	0	0	126	185	*311*	0	2,389	***-342***	**-33,555**
2014	Dry	0	403	212	259	6	0	974	138	*1,377*	1,991	0	2,110	0	0	0	0	125	183	*308*	0	2,418	***-426***	**-33,981**
Historical Average		**0**	**293**	**335**	**286**	**7.64**	***0***	***937***	***153***	***1,384***	***2,011***	***5***	***2,443***	***0***	***0***	***0***	***0***	***64***	***179***	***243***	***0***	***2,691***	***-680***	
Critically Dry Wate Year Avg		0	520	223	245	7	*0*	*1,005*	*144*	*1,401*	*2,143*	*0*	*2,613*	*0*	*0*	*0*	*0*	*113*	*186*	*299*	*0*	*2,912*	*-768*	
Dry Water Year Avg		0	369	294	281	7	*0*	*977*	*154*	*1,419*	*2,082*	*0*	*2,450*	*0*	*0*	*0*	*0*	*73*	*184*	*256*	*0*	*2,706*	*-624*	
Below Normal Water Year Avg		0	221	254	289	8	*0*	*948*	*154*	*1,397*	*1,872*	*2*	*2,445*	*0*	*0*	*0*	*0*	*55*	*180*	*235*	*0*	*2,681*	*-809*	
Normal Water Year Avg		0	167	183	297	9	*0*	*827*	*130*	*1,263*	*1,613*	*1*	*2,497*	*0*	*0*	*0*	*0*	*55*	*169*	*224*	*0*	*2,722*	*-1,109*	
Above Normal Water Year Avg		0	283	309	291	8	*0*	*939*	*145*	*1,382*	*1,975*	*8*	*2,427*	*0*	*0*	*0*	*0*	*56*	*176*	*233*	*0*	*2,668*	*-693*	
Wet Water Year Avg		1	289	602	288	8	*0*	*920*	*175*	*1,391*	*2,283*	*14*	*2,381*	*0*	*0*	*0*	*0*	*63*	*178*	*241*	*0*	*2,636*	*-354*	

[A]Water Year corresponds to October 1 of the previous year, through September 30th of the current year.

Table 2-C19: Historical Water Budget for the North Bench Management Area

Water Year[A]	Water Year Type	Inflows to Principal Aquifer													Outflows from Principal Aquifer												Change in Groundwater in Storage	
						Subsurface Inflows													Subsurface Outflows										
		Stream Leakage	Return Flows	Precipitation Recharge	Surface Water Spreading	From San Bernardino Mtns	From Crafton Hills	From Yucaipa Hills	From SBBA near Mill Creek	From San Timoteo Subbasin	From Calimesa	From Western Heights	Subtotal	Total Inflows	ET	GW Production	Surface Water Diversions	GW Discharge to Streams	To San Bernardino Mtns	To Crafton Hills	To Yucaipa Hills	To SBB near Mill Creek	To San Timoteo Subbasin	To Calimesa	To Western Heights	Subtotal	GW Discharge to Surface	Total Outflows	Annual	Cumulative
1965	Normal	1,829	1,992	1,253	0	1,455	36	2,510	263	436	14	0	4,714	9,787	1,092	2,477	0	2,006	13	0	1,910	238	12	2,088	335	4,598	5	10,178	***-391***	**-391**
1966	Above Normal	2,400	1,992	3,456	0	1,596	35	2,568	242	429	17	0	4,885	12,733	1,377	3,049	31	2,371	14	0	1,940	272	14	2,101	343	4,685	6	11,518	***1,215***	**823**
1967	Wet	2,533	1,992	3,160	0	1,705	34	2,603	228	433	14	0	5,017	12,702	1,145	2,845	36	2,512	13	0	1,937	296	13	2,167	332	4,757	6	11,301	***1,401***	**2,225**
1968	Normal	2,045	1,997	1,695	0	1,837	34	2,610	223	434	14	0	5,151	10,889	1,294	3,026	16	2,242	13	0	1,927	307	13	2,210	332	4,802	5	11,385	***-496***	**1,729**
1969	Wet	3,943	1,992	7,782	0	2,374	33	2,745	203	426	14	0	5,795	19,511	1,450	3,048	127	3,564	15	0	2,047	337	15	2,247	341	5,001	8	13,197	***6,314***	**8,043**
1970	Dry	2,480	1,992	2,294	0	2,298	32	2,848	180	464	13	0	5,836	12,602	1,459	2,905	111	2,820	17	0	2,051	373	9	2,260	333	5,044	7	12,346	***256***	**8,299**
1971	Below Normal	2,629	1,991	2,122	0	2,453	32	2,727	168	456	14	0	5,851	12,592	1,375	2,544	142	2,826	18	0	2,037	389	11	2,292	334	5,082	7	11,975	***617***	**8,916**
1972	Dry	2,391	1,996	1,574	0	2,295	32	2,702	163	452	15	0	5,658	11,620	1,543	2,597	156	2,602	21	0	2,000	403	12	2,361	338	5,135	5	12,038	***-418***	**8,498**
1973	Above Normal	3,131	1,991	3,300	0	2,241	32	2,660	159	433	18	0	5,543	13,964	1,265	3,133	217	3,117	20	0	1,999	414	15	2,392	338	5,177	6	12,914	***1,049***	**9,547**
1974	Below Normal	2,755	1,991	2,425	0	2,070	31	2,754	155	434	14	0	5,457	12,628	1,466	4,030	206	2,851	20	0	1,987	429	15	2,387	316	5,155	6	13,715	***-1,086***	**8,461**
1975	Normal	2,380	2,008	1,501	0	2,021	31	2,731	151	439	14	0	5,386	11,276	1,220	3,326	133	2,523	19	0	1,959	440	14	2,339	294	5,065	6	12,273	***-997***	**7,463**
1976	Normal	2,546	2,020	2,031	0	2,077	31	2,678	150	436	15	0	5,387	11,984	1,282	3,257	88	2,490	18	0	1,942	442	15	2,295	289	5,001	5	12,123	***-138***	**7,325**
1977	Below Normal	2,436	2,015	2,199	0	2,093	31	2,659	154	434	15	0	5,385	12,035	1,269	3,075	100	2,505	19	0	1,936	427	16	2,266	299	4,963	6	11,918	***118***	**7,443**
1978	Wet	4,728	2,015	10,722	0	2,517	30	3,024	152	454	13	1	6,191	23,656	1,676	2,739	220	4,464	19	0	2,173	433	13	2,370	296	5,304	10	14,413	***9,243***	**16,686**
1979	Above Normal	4,251	2,015	5,736	0	2,618	27	3,267	133	502	14	0	6,561	18,562	1,606	2,621	267	4,350	23	0	2,268	485	6	2,494	289	5,565	12	14,421	***4,142***	**20,828**
1980	Wet	6,368	1,096	9,452	0	3,033	25	3,558	121	540	15	0	7,293	24,209	1,946	2,985	332	6,004	25	0	2,445	517	6	2,626	286	5,905	13	17,184	***7,025***	**27,853**
1981	Dry	4,625	783	2,421	0	2,842	24	3,571	113	574	20	0	7,145	14,975	1,980	3,148	286	4,537	27	0	2,383	529	7	2,639	284	5,869	11	15,832	***-858***	**26,995**
1982	Above Normal	5,447	783	4,215	0	2,987	25	3,395	113	561	19	0	7,099	17,544	1,570	2,579	299	5,135	30	0	2,334	527	8	2,637	286	5,822	11	15,416	***2,128***	**29,123**
1983	Wet	5,952	783	6,453	0	2,913	24	3,475	110	604	21	0	7,147	20,336	1,491	2,178	332	5,790	29	0	2,388	545	8	2,729	277	5,976	13	15,781	***4,555***	**33,679**
1984	Dry	3,832	786	2,961	0	2,581	22	3,589	102	603	23	0	6,919	14,498	1,964	2,287	279	4,004	27	0	2,392	575	8	2,858	276	6,137	10	14,680	***-182***	**33,496**
1985	Below Normal	4,068	1,102	2,597	0	2,555	22	3,480	96	583	24	0	6,761	14,528	1,852	2,233	268	4,014	27	0	2,362	583	9	2,913	284	6,179	9	14,554	***-27***	**33,470**
1986	Normal	3,841	1,209	2,007	0	2,505	22	3,393	91	581	25	0	6,617	13,674	1,754	2,337	257	3,815	26	0	2,306	592	9	2,864	290	6,087	8	14,258	***-584***	**32,885**
1987	Dry	3,192	1,209	1,376	0	2,385	22	3,308	90	576	24	0	6,406	12,182	1,637	2,255	230	3,287	24	0	2,263	596	8	2,817	294	6,003	7	13,419	***-1,237***	**31,649**
1988	Below Normal	3,007	1,212	1,387	0	2,304	23	3,223	93	572	25	0	6,240	11,846	1,499	2,366	218	3,132	23	0	2,224	590	8	2,817	294	5,957	6	13,178	***-1,333***	**30,316**
1989	Below Normal	2,612	1,209	1,289	0	2,122	23	3,137	100	558	24	0	5,964	11,074	1,576	2,653	194	2,831	22	0	2,180	569	8	2,781	296	5,856	5	13,116	***-2,042***	**28,274**
1990	Dry	2,390	852	760	0	1,953	23	3,065	108	553	22	0	5,724	9,726	1,429	2,926	172	2,607	21	0	2,140	549	7	2,773	298	5,789	5	12,928	***-3,202***	**25,072**
1991	Above Normal	3,110	732	3,831	0	1,959	24	3,066	118	539	22	0	5,726	13,400	1,533	3,343	198	3,032	19	0	2,158	524	9	2,783	297	5,790	5	13,902	***-502***	**24,569**
1992	Above Normal	3,166	734	3,882	0	1,986	24	3,174	121	546	20	0	5,870	13,652	1,613	3,575	235	3,268	18	0	2,216	518	7	2,770	290	5,820	7	14,518	***-866***	**23,704**
1993	Wet	5,274	733	11,331	0	2,434	22	3,597	122	585	18	1	6,780	24,119	1,935	3,095	302	5,152	22	0	2,451	514	6	2,796	283	6,072	11	16,567	***7,552***	**31,255**
1994	Below Normal	3,709	733	2,711	0	2,454	20	3,651	103	610	20	0	6,859	14,012	1,724	3,164	279	3,953	19	0	2,458	544	6	2,801	293	6,121	10	15,252	***-1,239***	**30,016**
1995	Wet	6,562	895	8,087	0	2,873	20	3,685	105	597	21	1	7,301	22,845	1,948	2,793	354	6,340	22	0	2,533	544	7	2,882	299	6,287	12	17,732	***5,113***	**35,129**
1996	Dry	4,661	952	2,519	0	2,530	19	3,733	91	614	23	0	7,009	15,141	2,191	3,056	330	4,825	21	0	2,503	591	7	3,000	290	6,412	9	16,822	***-1,680***	**33,449**
1997	Above Normal	4,618	950	3,170	0	2,470	19	3,601	82	587	24	0	6,781	15,518	2,103	3,322	305	4,609	22	0	2,460	611	7	3,037	289	6,426	8	16,773	***-1,255***	**32,194**
1998	Wet	6,527	950	8,059	0	2,743	18	3,692	79	614	22	0	7,169	22,704	1,762	3,279	347	6,395	23	0	2,532	633	7	3,063	279	6,537	12	18,331	***4,373***	**36,567**
1999	Dry	4,078	950	1,928	0	2,404	18	3,756	73	623	22	0	6,895	13,850	1,918	4,203	315	4,450	21	0	2,511	663	7	3,072	277	6,552	10	17,447	***-3,597***	**32,971**
2000	Dry	3,974	1,193	1,696	0	2,425	19	3,620	73	599	23	0	6,759	13,622	2,062	5,509	299	4,026	21	0	2,474	650	7	3,002	283	6,438	8	18,341	***-4,718***	**28,252**
2001	Dry	3,940	1,271	1,731	0	2,417	20	3,475	78	580	24	0	6,594	13,536	1,804	5,252	297	4,050	20	0	2,411	620	7	2,838	258	6,155	8	17,566	***-4,030***	**24,223**
2002	Critically Dry	2,801	1,271	747	36	2,206	22	3,412	83	567	22	0	6,312	11,168	1,817	5,560	235	3,178	21	0	2,349	601	7	2,704	249	5,930	6	16,727	***-5,560***	**18,663**
2003	Above Normal	3,302	1,271	2,166	691	2,133	23	3,298	92	558	23	0	6,128	13,558	1,633	5,117	242	3,423	20	0	2,319	576	7	2,563	245	5,730	13	16,158	***-2,600***	**16,063**
2004	Dry	2,802	1,274	1,562	624	1,988	24	3,285	100	552	21	0	5,970	12,232	1,774	5,443	215	3,072	17	0	2,299	559	6	2,441	243	5,565	15	16,083	***-3,851***	**12,211**
2005	Wet	4,813	2,339	8,047	135	2,257	23	3,471	100	560	19	0	6,430	21,765	1,819	5,426	276	4,773	19	0	2,408	566	6	2,367	237	5,605	12	17,912	***3,853***	**16,064**
2006	Below Normal	2,942	2,700	2,113	17	2,152	22	3,555	84	582	18	0	6,413	14,184	1,795	5,187	239	3,373	17	0	2,411	611	6	2,347	236	5,628	8	16,230	***-2,046***	**14,019**
2007	Critically Dry	2,484	2,700	1,115	4	2,284	22	3,393	77	568	22	0	6,366	12,669	1,866	4,999	199	2,918	17	0	2,359	620	7	2,303	242	5,548	6	15,535	***-2,866***	**11,153**
2008	Normal	3,082	2,707	2,101	551	2,292	23	3,250	79	558	22	0	6,223	14,664	1,886	3,967	218	3,289	17	0	2,319	615	7	2,285	245	5,488	12	14,859	***-195***	**10,958**
2009	Below Normal	2,989	2,700	2,290	1,337	2,096	22	3,178	78	546	17	0	5,937	15,252	1,957	3,679	215	3,252	17	0	2,262	625	6	2,273	245	5,430	33	14,566	***686***	**11,644**
2010	Above Normal	4,099	3,347	4,485	3,549	1,985	22	3,187	73	526	16	0	5,809	21,289	1,954	3,956	236	4,187	18	0	2,253	666	8	2,291	245	5,482	107	15,921	***5,367***	**17,011**
2011	Wet	4,414	3,565	5,436	3,071	2,000	21	3,254	60	536	14	0	5,885	22,371	2,041	3,737	254	4,513	17	0	2,282	738	6	2,472	246	5,761	122	16,428	***5,943***	**22,954**
2012	Dry	3,216	3,575	2,564	2,936	1,886	20	3,291	45	544	13	0	5,799	18,091	2,154	3,806	209	3,622	16	0	2,280	809	6	2,683	250	6,045	93	15,929	***2,161***	**25,115**
2013	Dry	2,988	3,565	2,188	2,170	2,030	19	3,191	38	537	17	0	5,831	16,741	2,041	3,530	182	3,312	16	0	2,242	847	6	2,828	255	6,195	75	15,334	***1,407***	**26,522**
2014	Dry	2,634	3,565	1,541	521	2,005	18	3,100	35	529	16	0	5,703	13,964	1,933	4,560	176	2,899	16	0	2,204	867	6	2,996	259	6,348	25	15,941	***-1,977***	**24,545**
Historical Average		**3,600**	**1,714**	**3,429**	**313**	**2,277**	**25**	**3,204**	**117**	**533**	**19**	**0**	**6,174**	**15,230**	**1,690**	**3,444**	**217**	**3,686**	**20**	**0**	**2,244**	**539**	**9**	**2,586**	**286**	**5,685**	**16**	**14,739**	**491**	
Critically Dry Wate Year Avg		2,643	1,985	931	20	2,245	22	3,402	80	568	22	0	6,339	11,919	1,841	5,280	217	3,048	19	0	2,354	610	7	2,503	245	5,739	6	16,131	**-4,213**	
Dry Water Year Avg		3,372	1,712	1,937	447	2,289	22	3,324	92	557	20	0	6,303	13,770	1,849	3,677	233	3,579	20	0	2,297	616	8	2,755	281	5,978	20	15,336	**-1,566**	
Below Normal Water Year Avg		3,016	1,739	2,126	150	2,255	25	3,152	115	531	19	0	6,096	13,128	1,612	3,215	207	3,193	20	0	2,206	530	9	2,542	289	5,597	10	13,834	**-706**	
Normal Water Year Avg		2,621	1,989	1,765	92	2,031	29	2,862	159	481	17	0	5,580	12,046	1,421	3,065	119	2,727	18	0	2,061	439	12	2,347	297	5,173	7	12,513	**-467**	
Above Normal Water Year Avg		3,725	1,535	3,804	471	2,219	25	3,135	126	520	19	0	6,045	15,580	1,628	3,411	226	3,721	20	0	2,216	510	9	2,563	291	5,611	19	14,616	**964**	
Wet Water Year Avg		5,111	1,636	7,853	321	2,485	25	3,310	128	535	17	0	6,501	21,422	1,721	3,212	258	4,951	20	0	2,319	512	9	2,572	288	5,720	22	15,885	**5,537**	

[A]Water Year corresponds to October 1 of the previous year, through September 30th of the current year.