Stillwater Sciences

1203 Main St., Morro Bay, CA 93442
phone 805-570-7499

TECHNICAL MEMORANDUM

DATE: July 5, 2024

TO: Patrick Faverty

FROM: Ken Jarrett

SUBJECT: Pico Creek Stream Flow Management Plan

1 INTRODUCTION

The San Simeon Community Service District (District) provides water to the unincorporated community of San Simeon located within San Luis Obispo County on State Highway 1 along California's Central Coast. The existing land use of this District consists of residential (23.7 acres), commercial retail (26.3 acres), and vacant land (51.5 acres). The District manages two primary production wells that pump from the Pico Creek Valley Groundwater Basin and a third well (located on the Hearst Pico Creek Stables that is used for emergency purposes.[1] Additional water supply facilities operated by the District include a reverse osmosis treatment unit that is used during periods of high chloride concentrations that occur from saltwater intrusion within the groundwater basin, a 150,000-gallon storage reservoir, and a side stream recycled water treatment system (Pheonix 2018). Under its Water License (License 12272, Permit 12465), the District has the right to a maximum production of 140 acre-feet per year (AFY) from Pico Creek underflow with a maximum 7-day average extraction rate of 0.27 cubic feet per second (cfs) (121 gallons per minute).

In the 1980s, water production levels exceeded the District's water rights permit and a building moratorium was established to limit water use. Since that time, several efforts have been made to reduce annual production levels, which in recent years have averaged between 70- and 80-AFY. Because of the success of water conservation efforts, the District seeks to update its Master Plan (Pheonix 2018).[2] As part of this process, the District commissioned Akel Engineering Group, Inc. (Akel Engineering), to assess the system-wide water supply to determine the amount of water that is available for new development (Akel Engineering 2022[3]; Attachment A) and commissioned Stillwater Sciences and Cleath-Harris Geologists to assess the instream flows of Pico Creek and the stream flow needs of sensitive species to help inform pumping operations that are protective

[1] The third well can only be operated 5 days per year per the Division of Drinking Water permit and is not included in the District's firm capacity.
[2] Phoenix Civil Engineering, Inc. 2018. San Simeon CSD master plan—potable water, wastewater, recycled water and road network improvement plan. Prepared by Phoenix Civil Engineering, Inc., Santa Paula, California, for San Simeon Community Services District, San Simeon, California.
[3] Akel Engineering (Akel Engineering Group, Inc.). 2022. System-wide water supply assessment: addendum to 2018 master plan. Prepared by Akel Engineering Group, Inc., Fresno, California, for San Simeon Community Services District, San Simeon, California.

of environmental resources (Stillwater Sciences and Cleath-Harris Geologists 2024 [4]; Attachment B). This technical memorandum summarizes the findings of both reports and includes recommendations for minimizing impacts to sensitive species from District operations and monitoring environmental conditions related to pumping.

Representatives of the California Department of Fish and Wildlife and the California Coastal Commission reviewed and commented on drafts of the Pico Creek Stream Flow Management Plan (this technical memorandum) and the Pico Creek Instream Flow Study (Stillwater Sciences and Cleath-Harris Geologists 2024). Agency comments have been addressed in this technical memorandum and the updated Pico Creek Instream Flow Study included in Attachment B. A summary of comments from the California Department of Fish and Wildlife and the California Coastal Commission and responses to those comments are provided in Attachment C.

2 WATER SUPPLY ASSESSMENT

On behalf of the District, Akel Engineering assessed the water supply sufficiency to the projected water demands by evaluating the impact of the District's water demands on the water supplies through 2045 (Akel Engineering 2022). For the period from 2001 through 2020, annual water usage for San Simeon ranged from 72.4 AFY to 112.3 AFY; however, after the District implemented water conservation measures in 2009, water use declined to levels ranging between 73.2 AFY and 90.5 AFY for the period from 2010 through 2020. Projections of water demand were included in the supply estimate based on development information for a combination of residential and non-residential land use types including future developments on the District's Water Sewer Waitlist. Projected water demand is estimated to reach a total of 112.2 AFY by 2045 with approximately 34.2 AFY for residential and 78.0 AFY for commercial water demand.

The sustainable yield of groundwater was evaluated for the District in the 2014 Cleath-Harris Groundwater Availability Study for the Pico Creek Valley Groundwater Basin,[5] which assessed various well production levels. The concern with groundwater pumping from the Pico Creek Valley Groundwater Basin is the potential for saltwater intrusion, which can lead to high concentrations of chloride. Cleath-Harris (2014) found that saltwater intrusion increased significantly with both increased well production volumes and with increased length of drought, as follows. 80 AFY was identified as less likely to lead to saltwater intrusions until the second year of a severe drought; 110 AFY was identified as sustainable during a combination of normal wet and dry years, but intrusions would likely occur in some typical drought cycles; and 140 AFY led to saltwater intrusion during either a single dry year or multiple dry years. With the reverse osmosis system operating, the District could extract the full 140 AFY permitted under their existing water rights to produce 112 AFY of potable water (the reverse osmosis system's rejection rate is approximately 20%).

Comparing the groundwater sustainable yields of 112 AFY and projected water demands of 112.2 AFY by 2045, the water supply from the Pico Creek Valley Groundwater Basin is 0.2 AFY deficient to serve the estimated system-wide demand under normal water year conditions.

[4] Stillwater Sciences and Cleath-Harris Geologists, Inc. 2024. Pico Creek Instream Flow Study. Prepared by Stillwater Sciences, Morro Bay, California and Cleath-Harris Geologists, San Luis Obispo, California, for San Simeon Community Services District, San Simeon, California.
[5] Cleath-Harris Geologists, Inc. 2014. Groundwater Availability Study: Pico Creek Valley Groundwater Basin, 2014 Update. Prepared by Cleath-Harris Geologists, Inc., San Luis Obispo, California for San Simeon Community Services District, San Simeon, California.

Additionally, in a single dry year or consecutive dry years, the projected demand is expected to exceed the system supply in the 25-year window assessed (2020 to 2045). In normal water years, the 0.2-AFY supply deficiency may be resolved by implementing permanent water conservation actions, but in dry years, the District will likely be required to implement water conservation actions and procedures, such as declaring drought and calling for short-term water use reductions to address potential water shortages.

3 INSTREAM FLOW STUDY

As previously noted, the District also commissioned Stillwater Sciences and Cleath-Harris Geologists (2022) to evaluate instream flows in Pico Creek and assess aquatic habitat conditions and the potential influence of the District's groundwater pumping operations on stream flow in lower Pico Creek. Habitat conditions for special status aquatic species were assessed over a range of stream flows within lower Pico Creek, where the creek flows over the groundwater basin and stream flow is most likely to be influenced by groundwater pumping. Of the sensitive aquatic species found in Pico Creek, steelhead (*Oncorhynchus mykiss*) are the most vulnerable to changes in stream flow. Aquatic habitat conditions were evaluated at 4.10, 1.56, 0.86, 0.35, 0.14 and 0.11 cfs, and results from this study indicate that during stream flows of 1.56 cfs or less, aquatic habitat in lower Pico Creek is sensitive to changes in stream flows. Reductions in flow when stream flow is at 1.56 cfs or less leads to reduced habitat quantity and quality for juvenile steelhead in lower Pico Creek.

Individual pump tests were conducted for each of the District's two groundwater wells to assess the connection between the District's groundwater pumping operations and stream flows. A slight (~0.10-cfs) decrease in surface flow was observed during the pump test for Well #1 (refer to Figure 26 in Stillwater Sciences and Cleath-Harris Geologists 2024[4]), which pumps water from shallower in the groundwater basin compared to Well #2 (Figure 1). No decrease in surface flow was observed during the pump test for Well #2 (refer to Figure 27 in Stillwater Sciences and Cleath-Harris Geologists 2024[4]), which pumps water from deeper in the groundwater basin and below an impermeable clay layer separating the deeper section of the groundwater basin from the stream flow in lower Pico Creek (Figure 1). In addition, ongoing water quality monitoring of water produced from both Well #1 and Well #2 indicates levels of chloride and bacterial (total and *Escherichia coli*, or E-coli) concentrations from water in Well #1 are similar to surface water conditions, while concentrations in water from Well #2 are substantially lower (pers comm., Charles Grace). The differences in chloride and bacterial concentrations indicate a disconnect between the surface water and water pumped from Well #2.

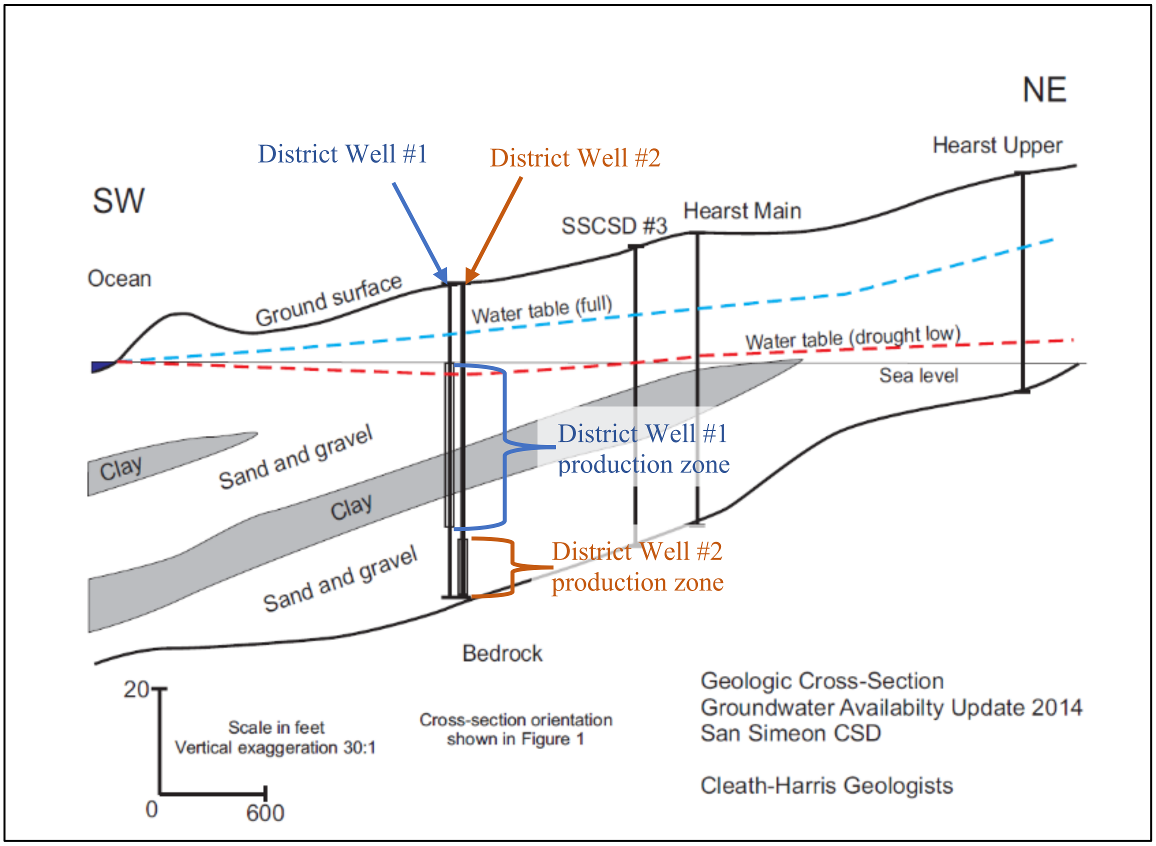

Figure 1. Cross section of Pico Creek Groundwater Basin and San Simeon Community Service District's wells. SSCSD = San Simeon Community Service District, from Stillwater Sciences and Cleath-Harris Geologists (2024).

4 RECOMMENDATIONS

Stillwater Sciences recommends the following actions to protect aquatic resources in lower Pico Creek.

4.1 Operations Management

Stillwater Sciences recommends that the District pump only from Well #2—the deep well—when stream flows are approximately 2 cfs or less, i.e., no pumping should occur at Well #1—the shallow well—when flows are less than 2 cfs. Surveys of steelhead habitat within lower Pico Creek indicate aquatic habitat is sensitive to changes in stream flows at 1.56 cfs. To protect steelhead, use of Well #1 should be restricted when stream flows are less than 2 cfs, which is slightly greater than the threshold of 1.56 cfs reported in the instream flow study (Stillwater Sciences and Cleath-Harris Geologists 2024[4]) where aquatic habitat quality starts to decline. Pumping at Well #2 from deeper in the groundwater basin and below the impermeable clay layer is expected to have little to no influence on surface flow conditions.

4.2 Long-term Monitoring

Long-term monitoring in association with the Stillwater Sciences' operational recommendations will be important to informing and managing the District's groundwater pumping operations. Stillwater Sciences recommends that the District conduct ongoing stream flow monitoring using a real-time stage recorder that provides multiple, daily water stage level readings. A site-specific stage-discharge rating curve should be developed and maintained to allow for converting water stage level to stream flow. Values observed from this monitoring should be used to alert the District to switch off Well #1 and pump only from Well # 2 when the 2-cfs threshold is triggered. In addition to stream flow monitoring, the following environmental monitoring measures and assessments are recommended to ensure environmental impacts are avoided during the District's pumping operations.

- Monitor for potential fish stranding for at least 2 years by conducting direct observation surveys in pool habitat as surface flows become disconnected (i.e., when stream flows are 0.25 cfs or less). If stranding is observed, monitoring should be continued.
- Monitor seasonal water quality conditions (temperature, dissolved oxygen, and salinity) in the Pico Creek lagoon at multiple water depths to assess water quality conditions and thermal stratification as it relates to District pumping operations. Record observations of lagoon mouth status (i.e., open or closed) during the seasonal monitoring efforts.
- Monitor wetland and riparian habitat conditions using remote sensing indicators of groundwater-dependent ecosystem health, such as the normalized difference vegetation index and the normalized difference moisture index.
- Monitor groundwater elevation at District wells and compare to daily rainfall amounts reported for the San Luis Obispo County rain gage (#764) and stream flows recorded for the real-time stage recorder levels to assess surface flow loss to groundwater basin recharge.
- Assess surface loss to groundwater basin recharge by installing a pressure transducer near the upstream end of Pico Creek where it flows over the groundwater basin to determine when surface flows first occur during the onset of the rainy season (fall/early winter) and determine how long until surface flows increase near the downstream end Pico Creek (downstream of Pico Creek Road).

4.3 Annual Reporting

Results from the long-term monitoring will be summarized annually in a report provided to the Technical Advisory Committee. The annual report will include the following information to assist in ongoing evaluation of District operations in the Pico Creek Valley Groundwater Basin:

1. Summary of District pumping operations in relation to stream flows near a real time stream gage, especially for the range of between 0 and 3 cfs, including the number of days and the rate of extraction;
2. Summary of fish stranding observations;
3. Summary of groundwater elevation monitoring, daily rainfall data, and stream flows as they relate to the onset of the rainy season;
4. Summary of Pico Creek lagoon water quality monitoring results; and
5. Results of vegetation monitoring.

Attachments

Attachment A

System-Wide Water Supply Assessment

SAN SIMEON
Community Services District

FINAL

MARCH 2022

System-Wide Water Supply Assessment

Addendum to 2018 Master Plan

AKEL
ENGINEERING GROUP, INC.

San Simeon Community Services District

SYSTEM-WIDE WATER SUPPLY ASSESSMENT

Addendum to 2018 Master Plan

FINAL

March 2022

REGISTERED PROFESSIONAL ENGINEER
ANTOINE A AKEL
C 041682
CIVIL
STATE OF CALIFORNIA
3/17/22

Prepared by:

AKEL
ENGINEERING GROUP, INC.

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ENGINEERING GROUP, INC.

Smart Planning Our Water Resources

March 17th, 2022

San Simeon Community Services District
111 Pico Avenue
San Simeon, CA 93452

Attention: Charles Grace, General Manager
San Simeon Community Services District

Subject: Addendum to the SSCSD 2018 Master Plan – System-Wide Water Supply Assessment

Dear Charles:

We are pleased to submit this System-Wide Water Supply Assessment (WSA) report for the San Simeon Community Services District (SSCSD), while meeting the requirements of California Water Code sections 10608, 10610-10656 (Urban Water Management Plan Act), and 10910-10915 (Water Supply Assessment Statute). Please note that this WSA is submitted as an addendum to the 2018 Master Plan.

The report quantifies water supply requirements for potential future developments, as identified on the Water/Sewer Waitlist, and compares supply versus demands through 2045, as stipulated in the 2020 Urban Water Management Planning Guide.

We are extending our thanks to you and to Cortney Murguia, for providing the very valuable information needed to complete this study and produce this report.

Sincerely,

AKEL ENGINEERING GROUP, INC.

Tony Akel, P.E.
Senior Principal

Enclosure: Report

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1.0 PROJECT BACKGROUND

1.1 Purpose

Law

10912 (b) …If a public water system has fewer than 5,000 service connections, then "project" means any proposed residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections, or a mixed-use project that would demand an amount of water equivalent to, or greater than, the amount of water required by residential development that would represent an increase of 10 percent or more in the number of the public water system's existing service connections.

SB 610 (2) …The bill would require the assessment to include, among other information, an identification of existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project and water received in prior years pursuant to those entitlements, rights, and contracts. The bill would require the city or county, if it is not able to identify any public water system that may supply water for the project, to prepare the water supply assessment after a prescribed consultation.

This Water Supply Assessment (WSA) report was intended to provide a system-wide water supply assessment for San Simeon Community Services District (District) that meets the requirements of California Water Code sections 10608, 10610-10656 (Urban Water Management Plan Act), and 10910-10915 (Water Supply Assessment Statute). Additionally, this WSA serves as an addendum to the District's 2018 Master Plan.

The study area of this WSA consists of the existing and future developments within the District's Service Area (Project). This WSA assesses the water supply sufficiency to the projected water demands by evaluating the impact of this Project's water demands on the water supplies through the horizon year of 2045.

Pursuant to California Water Code 10617, the district water service is considered a small community water supplier and is not qualified as an Urban Water Supplier. As a result, the District is not required to prepare an Urban Water Management Plan (UWMP). Nevertheless, the District requested the consultant (Akel Engineering Group) to prepare this master plan addendum based on certain requirements for the Urban Water Management Plan Act (UWMP Act) and 2020 Urban Water Management Plan Guidebook (Guidebook) for the purpose of obtaining a determination of water that is available for new developments.

Pursuant to California Water Code Division 6, Part 2.10, Sections 10910-10915, any city or county, which has proposed larger developments or land use plans that are subject to California Environmental Quality Act (CEQA), is required to prepare Water Supply Assessment (WSA) to document potential environmental impacts of the projects.

The report includes a discussion of this project's water supply requirements and potential impact on the District's supply availability. This report references multiple land use planning and groundwater supply documents, including the San Simeon 2018 CSD Master Plan (2018 Master Plan), 2007 North Coast Area Plan (2007 NCAP), the 2014 Groundwater Availability Study – Pico Creek Valley Groundwater Basin (2014 GAS), the San Simeon CSD Water Conservation Plan (Ordinance No.117), San Simeon CSD 2013 Water Usage Calculations (2013 EDU Study), Water License issued by the State Water Resource Control Board, the SSCSD 2020 Water Wait List Reconciliation (Wait List), and the updated Water Wait List Reconciliation.

1.2 Project Description

San Simeon is a small unincorporated community situated within San Luis Obispo County on California's central coast, is located along State Highway 1 approximately halfway between Los Angeles and San Francisco. The San Simeon community is bordered on the east side by open space owned by the Hearst Corporation, and the north and south sides by State Parks property. As an aside, Hearst Castle is visible from portions of the District. The community is located on a coastal plain, bordered by the Pacific Ocean on the west and the Santa Lucia mountain range on the east. The District's existing land uses are depicted in **Figure 1** and briefly described as follows:

- **Multi-Family Residential:** The existing multi-family residential land use area is approximately 23.7 acres within the District's service area, and will expand to a total of 40.1 acres in the buildout, as shown in **Figure 1**. This development was documented in the 2007 NACP, though the current conceptual land use plan has differing land use acreage than the 2007 NACP, which was documented as 39.21 acres.

- **Irrigation:** In the middle of the District Service Area, along Highway 1, which locates approximately 10.5 acres of existing irrigation land use, in the buildout, the irrigation land use is expected to decrease to approximately 6.2 acres. Approximately 4.3 acres of existing irrigation land use are proposed to be converted to commercial retail land use, which is a part of proposed No.1 development (Cavalier Inn Inc.) on the District's Water Sewer Connection Waitlist (**Appendix B**).

- **Commercial Retail:** This tourism-centric district includes approximately 26.3 acres of existing commercial retail land use on both sides of Highway 1, and will increase to approximately 41.4 acres in the buildout. This development was documented in the 2007 NACP, though the current conceptual land use plan has differing land use acreage than the 2007 NACP, which was documented as 41.81 acres.

- **Vacant:** Within the District Service Area, the 2020 existing vacant land use consists of approximately 12 acres of residential, 18.5 acres of commercial, and 21 acres of others land uses. Some proposed future developments were documented in the District's Water Sewer Connection Waitlist.

1.3 Relevant Reports

Several reports provide detailed information and factual data related to this analysis. Exhibits from these reports were included in the appendices for ease of reference.

- **San Simeon CSD Master Plan – Potable Water, Wastewater, Recycled Water and Road Network Improvement Plan, May 2018 (2018 Master Plan).** The District's 2018 Master Plan presents historical and projected water demands, identifies existing and future water system capacity deficiencies, recommends projects to correct these deficiencies, and identifies water facilities for servicing future developments.

- **County Of San Luis Obispo North Coast Area Plan, Revised October 2018 (NCAP).** The North Coast Area Plan is part of the County of San Luis Obispo Local Coastal Plan. The NCAP presents possible population growth within the District, county land use policies for the North Coast Planning Area, and general goals for communities within the planning area.

- **Groundwater Availability Study Pico Creek Valley Groundwater Study 2014 Update, September 2014 (Groundwater Study).** This Groundwater Sustainability Plan updates the previously Groundwater Availability Study, compares potential impacts of different groundwater productions, and summarizes plans to achieve groundwater sustainability and maintain groundwater quality.

- **San Simeon Community Services District – Water Usage Calculation, January 2014 (2013 EDU Study).** This EDU Calculation Report (**Appendix A**), prepared by the Phoenix Civil Engineering, documents the water usage from 2010 to 2013, a three (3) fiscal year period, by different account types. This study establishes a methodology to determine the average water consumption for one single family residence and calculate equivalent dwelling unit values for multi-family, motel, retail, restaurant, and irrigation accounts.

- **San Simeon CSD Resolution No. 20-426 Water Sewer Connection Waitlist, September 2020 (Water Waitlist).** This Waitlist (**Appendix B**), documents the proposed 11 future developments, including residential, motel, retail, restaurant development, along with the qualifications to add more positions to the Wait List. It is a foundational document and source of information about the proposed developments and projected water demands, water supplies, supply reliability, and potential vulnerabilities, water shortage contingency planning.

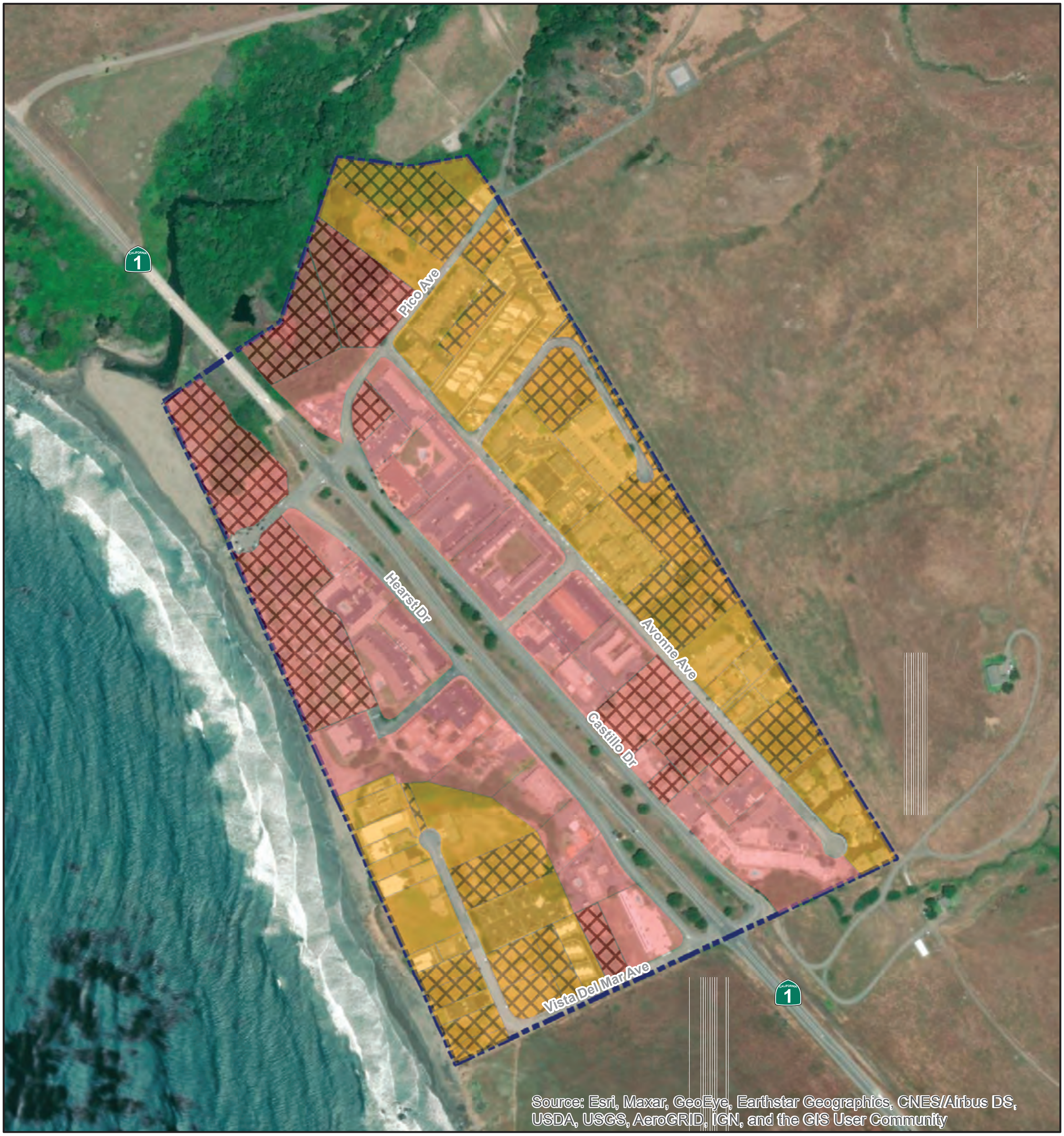
- **San Simeon CSD Water Waitlist Reconciliation, March 2022 (Updated Water Waitlist).** This updated water waitlist (**Appendix C**) received from District staff on 3/7/2022 includes 2 more proposed developments compared to the 2020 Water Waitlist. Also, the Hather proposed developments have been split up based on the date of request. The additional developments consist of residential and mixed use (retail) projects.

- **SSCSD Water Conservation Plan (Ordinance No. 117)**. On December 14, 2016, the District adopted Ordinance No. 117, which includes three (3) stages of water shortages. It's a foundational document for the crosswalk that translates the District's water shortage levels to DWR standardized 6-level water shortage contingency levels

- **State Water Board Water License 12272**. The water license issued to the District provides annual limits of 140 acre-feet per year and a maximum diversion rate of twenty-seven hundredths (0.27) cubic foot per second with other provisions allowing diversion of greater quantities over shorter periods of time while adhering to seven day limitations.

1.4 Conceptual Land Use Plans

According to the maps and Geodatabase of the District's Development Status and Zoning, a large portion of the conceptual land use plan areas is commercial retail land use (approximately 54% of the total buildable area), as shown in **Figure 1**; while approximately 46% of the developable area is multi-family residential land use within the District limits. The existing land use of this District consists of residential, commercial, and open space land uses. The District's existing Master Plan designates the project site as various land uses, including residential, commercial, and paved roads, the land use inventory is documented in **Table 1**.



Legend

Existing Land Use

- Residential Multi-Family
- Residential Multi-Family (Vacant)
- Commercial Retail
- Commercial Retail (Vacant)
- District Limit

Figure 1 Existing Land Use

System-Wide Water Supply Analysis
San Simeon Community Services District

Update: January 12, 2022

0 125 250 500 Feet

N S E W GIS

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Table 1 Existing and Future Land Use Inventory

System-Wide Water Supply Assessment
San Simeon Community Services District

Existing vs. Future	Unit	Land Use Type: Multi-Family Residential[1,2]	Commercial Retail[2]	Total
Existing				
Existing	(acres)	23.7	26.3	50.0
Future				
On Waitlist	(acres)	10.9	8.6	19.6
Not Yet on Waitlist	(acres)	3.1	1.9	5.0
Other Vacant	(acres)	2.4	4.5	6.9
Subtotal	(acres)	16.4	15.1	31.4
Non-Demand Generating				
Right-Of-Way	(acres)			20.0
Total				
	(acres)	**40.1**	**41.4**	**101.5**

AKEL ENGINEERING GROUP, INC.

3/9/2022

1. Existing dwelling units extracted from the U.S. 2020 Census database.
2. Land use acreage determined using GIS database received from District staff on 12/13/2021.
3. Land use type determined using the zoning designations in GIS database received from District staff on 12/13/2021.

1.5 Proposed Future Developments Phasing – Water Wait List

Law

> *10631 (f) …The urban water supplier shall include a detailed description of expected future water projects and programs…that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in normal and single dry water years and for a period of drought lasting five consecutive water years.. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.*

Combining the 2020 and recently updated SSCSD Water Wait Lists (dated 9/28/2020 and 03/07/2022), the total full buildout is estimated to be 1,500 EDUs, which includes approximately 1,057 present EDUs, 364 EDUs of proposed developments on the waitlist, and an estimated additional 100 EDUs of proposed development not on waitlist. The sites of the proposed future development are graphically shown in **Figure 2**.

Pursuant to the County's Growth Management Ordinance, the county-wide allowed annual dwelling units growth rate is generally 2.3% of the existing county dwelling units. Therefore, San Simeon CSD shall follow the county's guidelines, limit the maximum residential growth rate to 2.3 percent, the planned and actual residential development shall be under the growth cap.

Per District staff's comments, 2 more developments have been added to the Water Waitlist with position numbers of 13 and 14, which are not included in the SSCSD Resolution No. 20-426. And the Hather proposed developments (previous No.8 on waitlist), has been split up according to the request date. The Water Waitlist Reconciliation dated 3/7/2022 is shown in **Appendix C** for ease of reference.

The estimated water demand of the proposed future development on the waitlist was intentionally phased in 5-year windows through the planning horizon in order to satisfy the requirements of state law. Further details about water demand estimation are discussed in **section 2**.

It should be noted that the actual timing of construction for the proposed developments is subject to change, and might be different from this WSA. While the projected demands cover all construction work (on the waitlist), it is anticipated to be completed within the 25-year planning horizon of this WSA.

2.0 PROJECTED WATER DEMANDS

Domestic water demand unit factors are coefficients commonly used in planning level analysis to estimate future average daily demands for areas with predetermined land uses. The unit factors are multiplied by the number of dwelling units or net acreages for residential categories, and by the net acreages for non-residential categories, to yield the average daily demand projections.

Legend

General Plan Land Use

- Existing Developments
- Proposed Developments on Waitlist
- Proposed Developments Not Yet on Waitlist
- Other Vacant
- District Limit

Note:
The number on top of the parcels represents the position number on the water waitlist.

0 125 250 500 Feet

N S W E

Update: March 4, 2022

Figure 2
General Plan Land Use

System-Wide Water Supply Analysis
San Simeon Community Services District

AKEL ENGINEERING GROUP, INC.

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2.1 Water Use Demand Factors

There are several methods for developing the unit factors. The projected water demands in the currently adopted Master Plan were based on the entire system's average daily demand. The average daily demand represented the demand from all of the land uses and is not specific to commercial, residential or industrial uses. However, to account for the proposed developments, which consist of different types of land use, this WSA uses the 2013 EDU Study (prepared by Phoenix Civil Engineering, January 2014) as a fundamental document to project the future demand.

2.2 Equivalent Dwelling Unit

Equivalent Dwelling Unit (EDU), a standard unit of water demand equal to one single family residence. In the 2013 EDU Study, the methodology to calculate the EDU is first to review the metered water usage data by account type and manually remove the single family residential accounts that had been metered under 2,000 cubic feet per year, which was regarded as not occupied full time by the resident. The average historical 3-year single family residential water usage per account is defined as one EDU water demand. Through this process, the 2013 EDU Study came up with 1 EDU equaling to 4,050 cubic feet per year water consumption.

Akel Engineering Group has updated the EDU calculations by applying the methodology used in the 2013 Study and updating the water usage to the available recent data. In 2018-2019 fiscal year water usage records, 56 single family residential units had been metered having over 2,000 cfy water consumption, and their 3-year actual water usages were averaged to get the water consumption baseline per EDU.

In this way, one EDU is calculated as equaling 4,400 cubic feet per year, or 0.101 AFY. The EDU conversions have been updated accordingly and are documented in **Table 2**.

It should be noted that the 2013 EDU Study was prepared based on the water usage meter readings, which were water consumption data. In order to reflect the water losses in the system, the EDU calculation in this WSA was based on the water consumption data and balanced to the same year's water production amount.

2.3 Proposed Project Water Demand Projections

The development information provided by District staff identified the project site would develop as a combination of residential and non-residential land use types. It is assumed that the water use based on the most recent land use plan, zoning and updated Water Waitlist received from the District staff will supersede the estimates previously provided in the Master Plan. The calculated and phased water demand projection results of this Project from initiation to the year 2045 are documented in **Table 3** and **Table 4** and summarized below.

Table 2 Existing Water Demand and EDUs by Land Use

System-Wide Water Supply Assessment
San Simeon Community Services District

Land Use	Number of Units		EDU Conversion		Number of EDUs		Water Demand Unit Factor[3]		Water Demand	
	2013 EDU Study[1]	2022 WSA[2]	2013 EDU Study[1]	2022 WSA[2]	2013 EDU Study	2022 WSA	2013 EDU Study	2022 WSA	2013 EDU Study (AFY)	2022 WSA (AFY)
Single Family Residential	59[4]	56 units≥ 2,000 cfy 100 units< 2,000 cfy	1 unit = 1 EDU	1 unit = 1 EDU	59.0	81.4[5]	1 EDU = 4,050 cf/yr or 0.093 AFY	**1 EDU = 4,400 cf/yr or 0.101 AFY**	5.48[6]	8.22
Multi-Family Residential	9	8	1 unit = 9.6 EDUs	1 unit = 7.9 EDUs	86.4	63.2			8.03	6.38
Retail	5	5	1 unit = 2.2 EDUs	1 unit = 3.8 EDUs	11.0	19.0			1.02	1.92
Motel	11	10	1 unit = 52.9 EDUs	1 unit = 49.9 EDUs	581.9	499.0			54.10	50.41
Restaurant	6	6	1 unit = 10.1 EDUs	1 unit = 11.1 EDUs	60.4	66.6			5.62	6.73
Irrigation	12	12	1 unit = 1.1 EDUs	1 unit = 0.8 EDUs	13.2	9.6			1.33	0.97
				Total	**798.7**	**647.8**			**75.59**	**74.63**

AKEL ENGINEERING GROUP, INC.

3/1/2022

Notes:

1. Source: SSCSD - EDU Calculations, January 2014, prepared by Phoenix Engineering.
2. Based on 2018-2019 fiscal year water consumption data received from District staff on 1/19/2021.
3. Based on 2018-2019 Fiscal Year End Water Usage data and balanced using 2020 water production to water consumption ratio.
4. 2013 EDU study didn't document single family units of which annual water usage was lower than 2,000 cubic feet per year, which were regarded as "part-time" residents.
5. This WSA applies the same EDU calculation methodology as the 2013 Study to establish the water usage EDU baseline, and the EDU number documented was accounted for the actual 2020 water production amount.
6. This result should be lower than the actual projected demand, since water demand from "part-time" single family accounts are not included.

Table 3 Water Wait List

System-Wide Water Supply Assessment
San Simeon Community Services District

Position Number	Name	Proposed Future Developments	Estimated Water Demand (AFY)
1	Cavalier Inn Inc.[1]	145 Motel & 2400 sq ft. restaurant	11.81
2	Evans[1]	Retail	0.38
3	Mouchawar[1]	35 Motel	2.58
4	V& H Holdings[1]	1 Residence	0.10
5	Hurlbert for Tides of San Simeon[1]	6 Condos + 1 irrigation meter	0.65
6	Seifert[1]	6 Condos	0.61
7	Tyo[1]	3 Residences	0.30
8	Hather and/or Hulbert[1]	10 Residences	1.01
9	Sansone, Inc.[1]	30.5 (30 Multi-Family Edu's + .5 Irrigation)	3.07
10	Sansone, Inc.[1]	64.5 (64 Multi-Family EDU's + .5 Irrigation)	6.51
11	Sansone, Inc.[1]	10.5 (10 Multi-Family EDU's + .5 Irrigation)	1.05
12	Hather[2]	5 Residences	0.51
13	Lloyd Marcum[3]	26 (13 residential 13 mixed use)	6.30
14	V&H Holidings[3]	25 residential units	2.53
		Total	37.41

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Notes:

1. Source: San Simeon Community Services District Resolution No. 20-426, 2020 Water Sewer Connection Waitlist, Exhibit "A".
2. Proposed Hather developments were split up per updated Water Wait List Reconciliation document dated 03/07/2022.
3. 2 developments has been added to the waitlist per updated Water Wait List Reconciliation document provided by District staff on 03/07/2022.

Table 4 Water Demand Projections

System-Wide Water Supply Assessment

San Simeon Community Services District

	Projected Water Demand					
	2020[1] (AFY)	2025[2] (AFY)	2030[2] (AFY)	2035[2] (AFY)	2040[2] (AFY)	2045[2] (AFY)
Residential	16.6	20.11	23.64	27.16	30.69	34.2
Commercial	58.2	62.16	66.11	70.06	74.02	78.0
Total	74.78	82.27	89.75	97.23	104.71	112.2
Annual Percent Growth[3]	-	2.0%	1.8%	1.7%	1.5%	1.4%

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3/8/2022

Notes:

1. 2020 Demand based on 2020 yearly well production from RVS Month End Reports received from District staff on 12/13/2021.
2. Estimated Demand for future developments was extracted from Water Wait List Reconciliation received from District staff on 3/7/2022 and evenly distributed through the planning horizon.
3. Pursuant to the San Luis Obispo County's Growth Management Ordinance, the county-wide allowed annual dwelling units growth rate is generally 2.3% of the existing county dwelling units.

- **Residential Water Demand –** On the Updated Water Waitlist, the proposed future residential development has a total of 173 residential units and 2 irrigation accounts, which are equivalent to 173 EDUs and 2 EDUs. Using the updated water demand per EDU, the residential and irrigation water demands of the proposed future development on the waitlist within the District are estimated at approximately 17.5 AFY and 0.2 AFY, respectively. The total residential (with irrigation) water demand for the existing and proposed future development at the end of the 25-year horizon is estimated to be approximately 34.2 AFY.
- **Commercial Water Demand –** The proposed future commercial development consists of 14 retail, 1 restaurant, and 180 motel rooms. Applying the EDU conversions to the proposed development, the commercial developments are expected to result in a growth of 195.7 EDUs. The non-residential water demands of the proposed future development within the District are estimated at 19.8 AFY for developments on the waitlist. The total Commercial water demand for the existing developments and proposed future development at the end of the 25-year horizon is estimated to be 78.0 AFY.

  It should be noted that, according to the Water Waitlist, 1 motel room equals 0.73 EDU. Additionally, the projected demands of the on waitlist developments were intentionally evenly distributed to each year during the 25-year window, which was for information and analysis purposes only. The future actual demand is depending on the construction timing of each project, while this WSA basically covers the total demands of the Project.

3.0 PROJECTED WATER SUPPLY

This section characterizes the intended water supply that will be used to serve the estimated water demands as detailed in **Section 2**.

3.1 Groundwater Basin

Law

10631. (b)(4)	*If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:* *(B) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater.*

The District is located above the Pico Creek Valley Groundwater Basin. The San Simeon Community Services District is in the process of preparing the Pico Creek Valley Groundwater Basin Instream Flow Management Plan. Information from the draft and final version of the documents were not in the preparation of this WSA.

According to the 2014 Pico Creek Valley Groundwater Study, the groundwater basin includes an area of approximately 70 acres, and the Pico Creek watershed is approximately 14 square miles in area. The basin is noted as having significant seawater intrusion with the increases of water production and the length of the drought. The Groundwater Study also noted that the intrusion would typically not occur during normal wet and dry years at basin production levels of 80 AFY and 110 AFY (District well production only). However, during drought cycles, chloride concentrations would be significantly increased due to seawater intrusion, and last for a few months depending on the water production amount.

According to the District's Master Plan, three groundwater wells serve as the domestic water source of supply (**Table 5**). It should be noted that, per the Division of Drink Water Permit, Well 3 can only be operated 5 days per year.

3.2 Water Rights

Examples of legal factors that could impact the supply reliability of a water distribution system include pumping limitations in adjudicated groundwater basins and surface water contracts. Historically, groundwater has been the sole source of water supply within the District, and there are no new sources of supply currently planned. Groundwater is extracted from the Pico Creel Valley Groundwater Basin, which has not been adjudicated. According to the Water License (License 12272, Permit 12465), San Simeon Community Services District has the right to the maximum production of 140 AFY from Pico Creek underflow. Based on available information, including that which has been developed by the Groundwater Sustainability Agencies (GSAs) to date, the groundwater supply for the proposed future developments within the area of the District is expected to meet future demands, as discussed in the later sections.

3.3 Water Supply Reliability

There are two aspects of supply reliability to be considered. The first relates to immediate service needs and is primarily a function of the availability and adequacy of the supply facilities. This aspect is considered for emergency reliability. The second aspect is climate-related and involves the availability of water during mild or severe drought periods.

Law

10631 (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision 10631(a).

(4) (Provide a) detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonable available, including, but not limited to, historic use records.

Table 5 Existing Water Supply Facilities

System-Wide Water Supply Assessment

San Simeon Community Services District

Supply Facility	Location[1]	Design Capacity[2] (gpm)	Design Capacity[2] (AFY)	2020 Actual Production[3] (gpm)	2020 Actual Production[3] (AFY)
Well 1	**Pico Creek Valley**	300	483	26.3	42.4
Well 2	**Pico Creek Valley**	300	483	20.1	32.4
Well 3[4]	Hearst Pico Creek Ranch	100	161	0	0
System Well Supply Capacity					
	Total Well Capacity	700	1,127	46.4	74.8
	Firm Well Capacity[5]	**300**	**483**	**46.4**	**74.8**

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2/23/2021

Notes:

1. Source: Table 1 from Pico Creek Valley Groundwater Basin 2014 Groundwater Availability Update.
2. Well design capacity information from email received from District staff on 01/19/22.
3. Source: 2020 RVS Month End Reports received from San Simeon CSD staff on 12/13/2021.
4. Per Division of Drink Water (DDW) permit, Well 3 can only be operated 5 days per year.
   Therefore, Well 3 does not count as District's firm capacity.
5. Firm well capacity is defined as the largest available well is intentionally excluded for standby.

Legend

Existing System

- Tanks
- Wells
- RO Treatment Facility
- Hydrants

Pipelines by Diameter

- 4"
- 6"
- 8"
- 10"
- District Limit

Figure 3
Existing Water System

System-Wide Water Supply Analysis
San Simeon Community Services District

AKEL ENGINEERING GROUP, INC.

Update: January 5, 2022

0 125 250 500 Feet

N S E W

File Path: P:\xGIS\GIS_Projects\San_Simeon\211214-MP_Addendum\SS_Fig3_ExistingWaterSystem_010522.mxd

3.3.1 Groundwater Supply Facilities

The District currently uses local groundwater as its primary source of supply. Water supply for the municipal water system is extracted from underground aquifers via two existing 300 gallons per minute (gpm) groundwater wells located north of the community, in the Pico Creek Valley, and a third 100 gpm standby well on the Hearst Pico Creek Ranch (**Figure 3** and **Table 5**). The firm well capacity, which assumes the largest well standby for emergency purposes, of the supply system, is 300 gpm, or 483 acre-feet per year (AFY). Note that per the Division of Drink Water permit, the third well can only be operated 5 days per year. Therefore, Well 3 does not account for the District's firm capacity.

The District's Master Plan recommends the construction of future storage tanks to enhance long-term reliability. These facilities provide emergency storage sufficient to handle the service area needs during power outages or other emergencies. Adding supply and distribution system enhancements will also add reliability through redundancy.

3.3.2 Groundwater Basin Sustainable Yield

Law

10631 (b)(1)	*A detailed discussion of anticipated supply availability under a normal water year, single dry year, and droughts lasting at least five years, as well as more frequent and severe periods of drought, as described in the drought risk assessment. For each source of water supply, consider any information pertinent to the reliability analysis conducted pursuant to Section 10635, including changes in supply due to climate change.*

The Groundwater Study describes the simulated impacts to the groundwater levels for different total production amounts of the two wells. The severity and duration of seawater intrusion increase significantly with both increases in the well production and the length of the drought.

<u>80 AFY Groundwater Well Production</u>

The District has a current well production of approximately 80 AFY, which is identified in the Groundwater Study that intrusions are less likely to occur until the second year of severe drought. Based on the historical metered depths to groundwater provided by the District staff, which is shown in **Figure 4**, in the past 5 years, from 2016 to 2020, the groundwater level was consistent and wasn't significantly affected by the District's water production.

<u>110 AFY Groundwater Well Production</u>

At a production of 110 AFY, intrusions would not be expected during a combination of normal wet and dry years, but in some typical drought cycles. Therefore, the sustainable yield of Pico Creek Valley Groundwater Basin for the District is 110 AFY without water filtering facilities.

140 AFY Groundwater Well Production

According to the DWR Water License, the district is allowed to divert from the groundwater basin with an annual limit of 140 AFY. In the Groundwater Study, as the simulated well production increased to 140 AFY, it was observed that during either a single dry year or multiple dry years, the chloride concentrations would significantly exceed the practical limit of 1,000 mg/L. With the District's effort, a reverse osmosis (RO) unit was installed and used to treat brackish and mineral heavy community water from the existing well field.

However, during the RO treatment process, the pure water (product water) goes to the water storage tank, and the waste stream (RO reject water, or brine) that brings all the contaminants and chloride, goes down the drain. Per District staff direction, the District's RO system rejection rate is approximately 20%.

According to the Groundwater Study, if desalination facilities are available during dry winters and critical drought years, the well can produce 140 AFY groundwater without impacting water quality at the Hearst Pico Creek Stables. Therefore, during the RO operating period, the max amount of potable water supply is approximately 112 AFY, equaling 80 percent of the 140 AFY groundwater availability, as summarized in **Table 6**.

Under different RO facility statuses (online or offline), the potable water availabilities are observed to be similar to some extent, which are 112 AFY with RO facility online and 110 AFY without RO operating.

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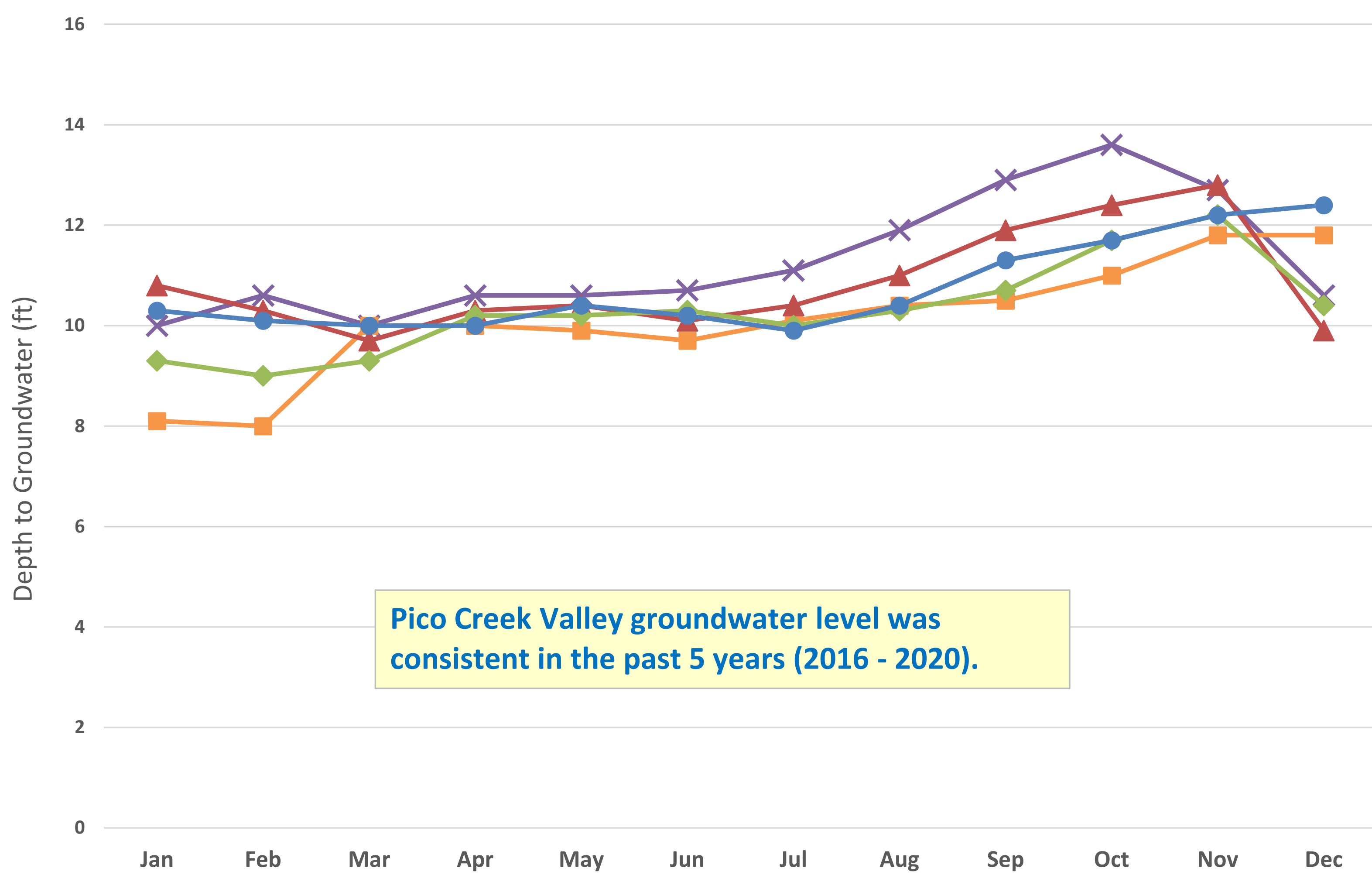

LEGEND

- Well Depth in 2016
- Well Depth in 2017
- Well Depth in 2018
- Well Depth in 2019
- Well Depth in 2020

Source: SSCSD 2021 Board Packet, January 2021, Page 4, Superintendent's Report.

February 24, 2022

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Figure 4

Historical Depth to Groundwater

System-Wide Water Supply Assessment

San Simeon Community Services District

Table 6 Water Supply Scenarios

System-Wide Water Supply Assessment

San Simeon Community Services District

Groundwater Basin Sustainable Yield[1] (AFY)	Water Availability For the District[2] (AFY)	Water Availability For the District[2] (gpm)	Average Production[3,4,5] (AFY)
140.0	112.0	69.4	86.9

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2/10/2022

Notes:

1. Source: Groundwater Availability Study Pico Creek Valley Groundwater Basin 2014 Update, Part I, Basin Sustainable Yield Estimate (with desalination facilities online).
2. Per District staff direction, approximate 20% of water loss (rejection) generated during the RO treatment process.
3. 2001-2013 annual water production extracted from 2014 Pico Valley Groundwater Basin Study Table 2.
4. 2014-2016 annual water production extracted from 2018 Master Plan Table 3.
5. 2020 annual water production based on 2020 RVS Month End Reports received from SSCSD staff on 12/13/2021.

Table 7 Historical Precipitation and Production
System-Wide Water Supply Assessment
San Simeon Community Services District

Year	Actual Precipitation San Simeon[1] (inch)	Actual Precipitation SLO West[2] (inch)	Year Type[3.4]	Actual Production[5,6,7] (AFY)
Historical				
2001	N/A	24.7	Wet	107.1
2002	N/A	5.5	Dry	102.5
2003	N/A	5.7	Dry	112.3
2004	N/A	21.4	Wet	89.0
2005	N/A	19.6	Wet	100.7
2006	N/A	20.0	Wet	93.3
2007	N/A	8.4	Dry	93.9
2008	N/A	14.8	Wet	84.1
2009	N/A	5.8	Dry	72.4
2010	N/A	18.7	Wet	81.3
2011	N/A	17.9	Wet	78.9
2012	16.6	9.7	Dry	75.8
2013	4.0	3.0	Dry	81.6
2014	13.7	12.7	Normal	76.5
2015	5.9	5.4	Dry	90.5
2016	20.6	17.3	Wet	89.6
2017	26.8	18.8	Wet	73.2
2018	14.9	10.9	Normal	78.7
2019	N/A	2.3	Dry	81.1
2020	N/A	2.3	Dry	74.8
Historical Average				
	14.6	**12.2**		**86.9**

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3/17/2022

Notes:

1. Historical precipitation per San Luis Obispo County Rain Gauge #764 San Simeon records from 2011 to 2019. Since data from some years are not available or imcomplete, records from this station are not used for analysis in this report.
2. Historical Precipitation per CIMS San Luis Obispo West Station (#160) Annual Precipitation from 2001 to 2020.
3. "Wet Year" assumes actual annual precipitation more than (average precipitation + 2 inch).
4. "Dry Year" assumes actual annual precipitation less than (average precipitation - 2 inch).
5. 2001-2013 annual water production extracted from 2014 Pico Valley Groundwater Basin Study Table 2.
6. 2014-2016 annual water production extracted from 2018 Master Plan Table 3.
7. 2017-2019 annual water production extracted from annual Board of Directors meeting packets.

4.0 SUPPLY SUFFICIENCY ANALYSIS

Law

> *10635 (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional or local agency population projections within the service area of the urban water supplier.*

Pursuant to California Water Code § 10910, the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project.

In this section, a detailed analysis of the water supply and demand comparison will be provided to determine the groundwater supply sufficiency within the District with proposed future developments, assuming the Project develops as the Water Sewer Waitlist received from District staff.

Historical precipitation data were used to determine the year type, when annual precipitation is 2 inches above the average amount, it's regarded as a wet year. Otherwise, if the annual precipitation is 2 inches below the average amount, it's regarded as a dry year, details are listed in **Table 7**. There is a San Luis Obispo rain gauge installed within the District's service area, however, available data only covered a limited time range (2011-2019 fiscal years). To have a more comprehensive understanding of the climate impacts, historical precipitation data collected by DWR's San Luis Obispo West Station #160 from 2001 to 2020 were used in this report.

Due to limited data of the historical water use under different conditions, the demand projections in this WSA were based on the production percentage of base year production under single dry and multiple dry years conditions, as summarized in **Table 8**.

The supply vs. demand analyses under different year types are listed below and summarized as shown in **Table 9**, **Table 10**, and **Table 11**.

- **Normal Year:** The normal year is a year that represents the median runoff levels from precipitation, as well as the same general pattern of runoff. The supply quantities would be similar to historical average supplies. According to the Groundwater Basin Study, the projected sustainable yield is 112 AFY, and the projected future water demand within the District's area is calculated as 112.2 AFY in 2045 under normal year conditions. There is a supply deficiency of 0.2 AFY in the year 2045 to meet the estimated water demand, generally, in normal years, minor supply deficiencies may be fixed by implementing permanent water conservation actions. Therefore, the system supply is expected to be sufficient to meet the future demand with the proposed developments on Water Waitlistunder normal year conditions if water conservations take effect. The comparisons are documented in **Table 9** and depicted in **Figure 5**.

- **Single-Dry Year**: The single dry year is defined as the individual year with the lowest usable water supply and slightly higher water demands, which is observed to be the year 2015 in the historical climate data. And the demand is projected to be approximately 132.7 AFY in the year 2045, which would exceed the sustainable yield by 20.7 AFY, as shown in **Table 10** and **Figure 6**. Pursuant to the District's Ordinance No. 117, water shortage stages shall be declared based on the water supply conditions and implement the Water Conservation Plan to promote water conservation. In this way, the limited water supply may be sufficient to meet the reduced water demand.

- **Multiple Dry Years**: Similar to single-dry year, the five consecutive-year droughts is defined as the five consecutive years with the lowest usable water supply and slightly higher water demands, which are observed to be the year 2012, 2013, 2014, 2015, and 2016. In the year 2045, the demand is projected to be approximately 111.1 AFY, 119.6 AFY, 112.2 AFY, 132.7 AFY, and 131.4 AFY, if it's the first, second, third, fourth, or fifth year in a prolonged drought cycle, respectively. Generally, the supply system is observed to be sufficient to meet the demand requirement in some dry years in prolonged droughts. The supply might not be able to satisfy the demand during the entire cycle, see details in **Table 11**. However, with the Water Conservation Plan taking effect, making the waste and unreasonable use of water being prevented, the limited water supply may meet the reduced water demand during drought.

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Table 8 Basis of Water Year Data

System-Wide Water Supply Assessment

San Simeon Community Services District

Year Type	Base Year	Actual Production (AFY)	Percentage of Average Production (%)
Base Year	**2014**	76.5	100%
Single-Dry Year	**2015**	90.5	118%
Consecutive Dry Years 1st Year	**2012**	75.8	99%
Consecutive Dry Years 2nd Year	**2013**	81.6	107%
Consecutive Dry Years 3rd Year	**2014**	76.5	100%
Consecutive Dry Years 4th Year	**2015**	90.5	118%
Consecutive Dry Years 5th Year	**2016**	89.6	117%

12/22/2021

Table 9 Normal Year Supply and Demand Comparison
System-Wide Water Supply Assessment
San Simeon Community Services District

	2025 (AFY)	2030 (AFY)	2035 (AFY)	2040 (AFY)	2045 (AFY)
Supply	112.0	112.0	112.0	112.0	112.0
Demand	82.3	89.7	97.2	104.7	112.2
Remaining Supply Capacity[1,2]	29.7	22.3	14.8	7.3	-0.2

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3/8/2022

Notes:

1. Remaining supply capacity is calculated by Supply minus Demand.
2. Minor supply deficiencies may be fixed by implementing permanent water conservation actions.

Table 10 Single Dry Year Supply and Demand Comparison
System-Wide Water Supply Assessment
San Simeon Community Services District

	2025 (AFY)	2030 (AFY)	2035 (AFY)	2040 (AFY)	2045 (AFY)
Supply	112.0	112.0	112.0	112.0	112.0
Demand	97.3	106.1	115.0	123.8	132.7
Remaining Supply Capacity[1,2]	14.7	5.9	-3.0	-11.8	-20.7

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3/8/2022

Notes:

1. Remaining supply capacity is calculated by Supply minus Demand.
2. According to Ordinance No. 117, during drought, water shortage levels may be declared as necessary, and water demand is expected to be reduced due to implementation of water conservation.

Table 11 Multiple Dry Years Supply and Demand Comparison
System-Wide Water Supply Assessment
San Simeon Community Services District

Consecutive Dry Years	Supply vs. Demand	2025 (AFY)	2030 (AFY)	2035 (AFY)	2040 (AFY)	2045 (AFY)
1st Year	Supply	112.0	112.0	112.0	112.0	112.0
	Demand	81.5	88.9	96.3	103.7	111.1
	Remaining Supply Capacity[1]	30.5	23.1	15.7	8.3	0.9
2nd Year	Supply	112.0	112.0	112.0	112.0	112.0
	Demand	87.7	95.7	103.7	111.7	119.6
	Remaining Supply Capacity[1,2]	24.3	16.3	8.3	0.3	-7.6
3rd Year	Supply	112.0	112.0	112.0	112.0	112.0
	Demand	82.3	89.7	97.2	104.7	112.2
	Remaining Supply Capacity[1,2]	29.7	22.3	14.8	7.3	-0.2
4th Year	Supply	112.0	112.0	112.0	112.0	112.0
	Demand	97.3	106.1	115.0	123.8	132.7
	Remaining Supply Capacity[1,2]	14.7	5.9	-3.0	-11.8	-20.7
5th Year	Supply	112.0	112.0	112.0	112.0	112.0
	Demand	96.3	105.1	113.8	122.6	131.4
	Remaining Supply Capacity[1,2]	15.7	6.9	-1.8	-10.6	-19.4

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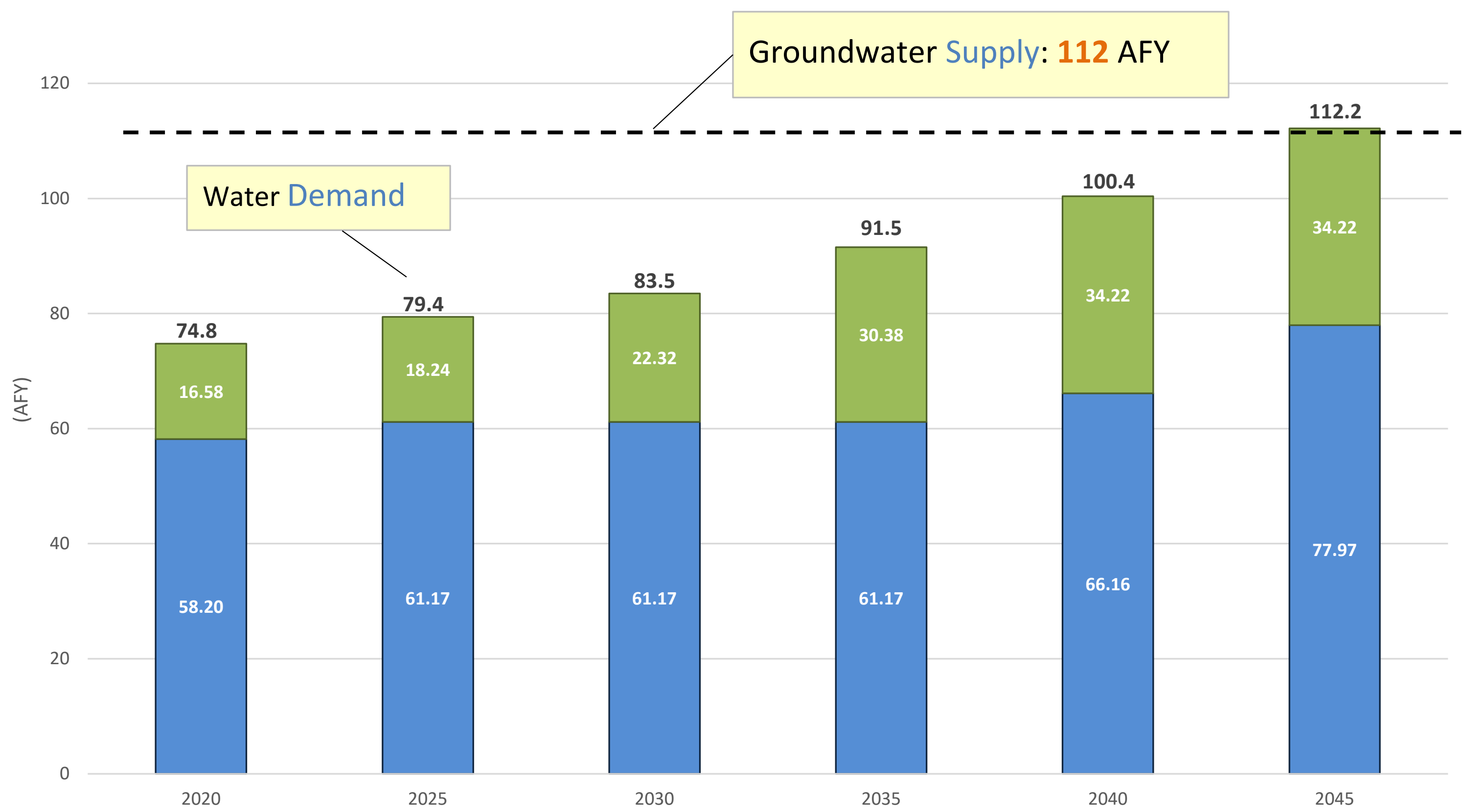
3/8/2022

Notes:

1. Remaining supply capacity is calculated by Supply minus Demand.
2. According to Ordinance No. 117, during drought, water shortage levels may be declared as necessary, and water demand is expected to be reduced due to implementation of water conservation.



LEGEND

Annual Water Demand

- Commercial
- Residential

March 8, 2022

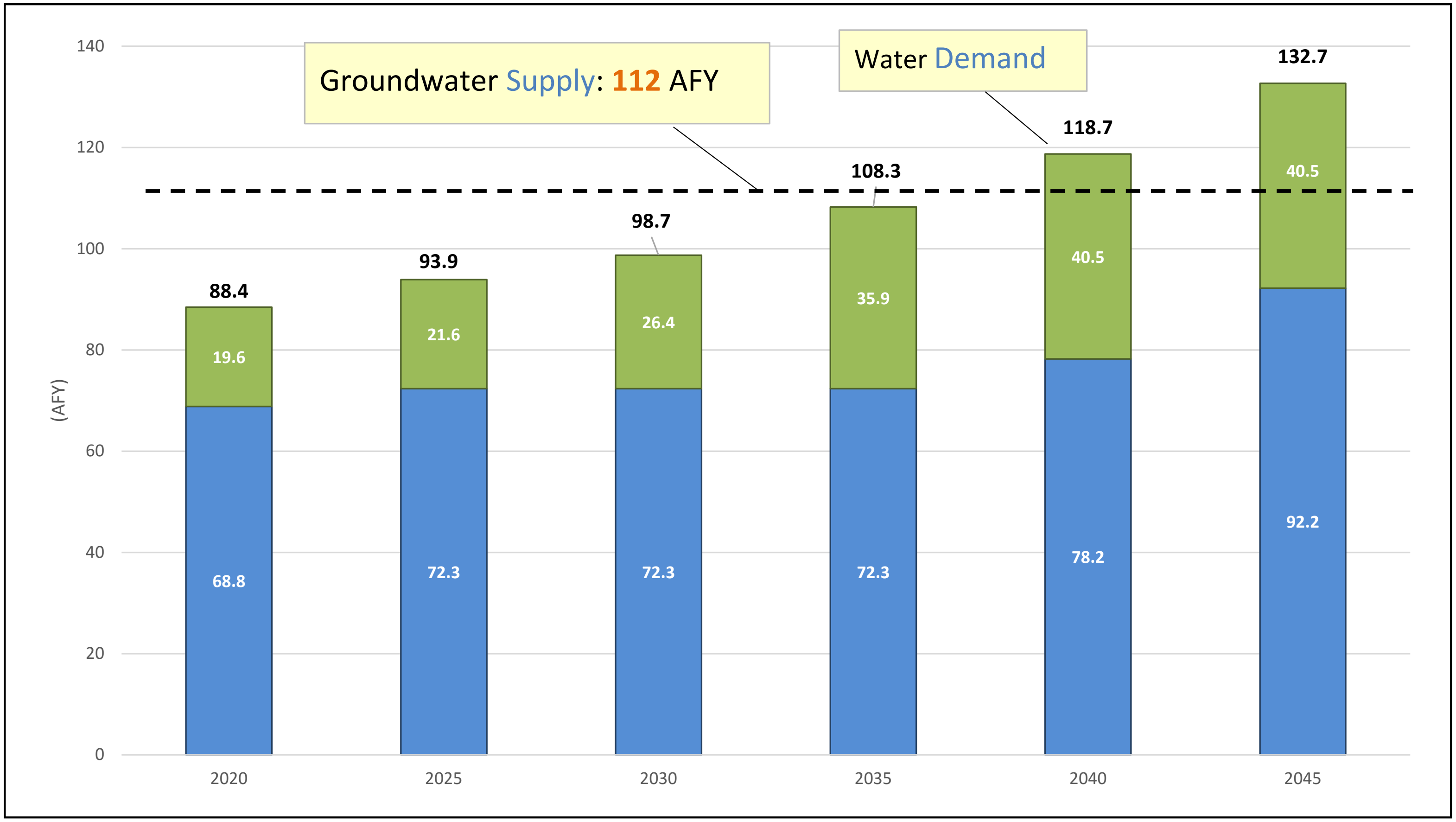
AKEL ENGINEERING GROUP, INC.

Figure 5

Existing and Projected Future Water Demand vs. Supply Comparison Under Normal Year Condition

System-Wide Water Supply Assessment

San Simeon Community Services District



LEGEND

Annual Water Demand

- Commercial
- Residential

March 8, 2022

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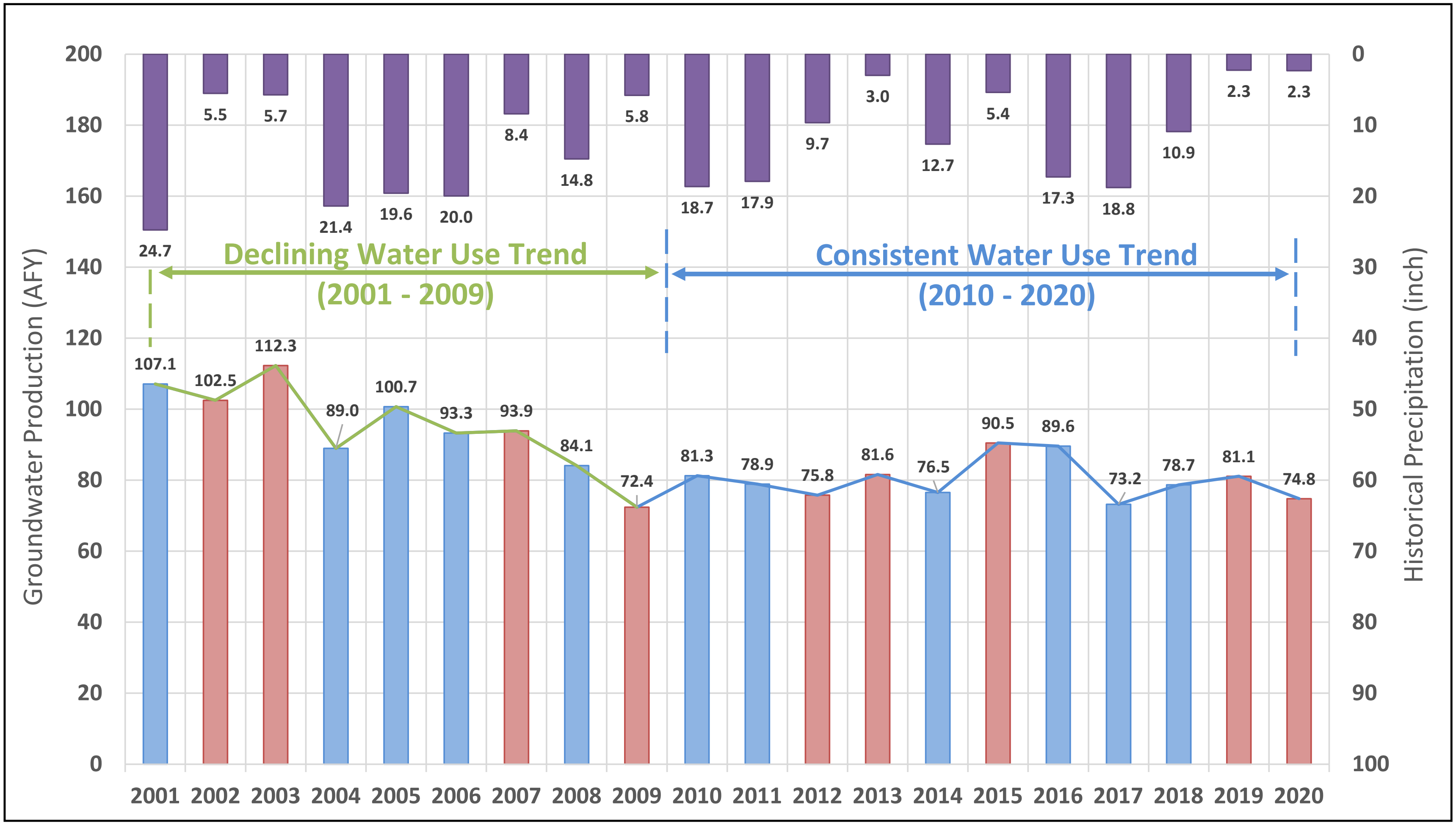
Figure 6

Existing and Projected Future Water Demand vs. Supply Comparison Under Single Dry Year Condition

System-Wide Water Supply Assessment

San Simeon Community Services District



LEGEND

Year Type

Normal Year or Wet Year Water Production

Dry Year Water Production

Precipitation

February 24, 2022

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Figure 7

Historical Groundwater Productions and Trends

System-Wide Water Supply Assessment
San Simeon Community Services District

It should be noted that, from the historical groundwater productions and trends (**Figure 7**), the actual water production has a significant reduction from 2001 to 2009 (approximately 20% declining), after 2009, the water consumption amount trends to be consistent.

Comparing the groundwater sustainable yields and water demands, the water supply from the Pico Creek Valley Groundwater Basin is 0.2 AFY deficient to serve the system-wide demand in the year 2045 under normal year conditions. However, if implementing permanent demand reduction actions, the supply may be able to meet the reduced water demands. Additionally, in a single dry year or consecutive dry years, the projected demand is expected to exceed the system supply. Therefore, water conservation actions and procedures, such as declaring drought and calling for short-term water use reductions, are necessary for maximizing the use of available supplies in order to meet the potential shortage, more details are discussed in the next section.

5.0 WATER SHORTAGE CONTINGENCY PLANNING

Law

10632 (a)(1) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply and an outline of specific water supply conditions which are applicable to each stage.

10632 (a)(3)

(A) Six standard water shortage levels corresponding to progressive ranges of up to 10, 20, 30, 40, and 50 percent shortages and greater than 50 percent shortage. Urban water suppliers shall define these shortage levels based on the suppliers' water supply conditions, including groundwater levels, changes in surface elevation or level of subsidence, or other changes in hydrological or other local conditions indicative of the water supply available for use. Shortage levels shall also apply to catastrophic interruption of water supplies, including but not limited to, a regional power outrage, an earthquake, and other potential emergency events.

(B) An urban water supplier with an existing water shortage contingency plan that uses different water shortage levels may comply with the requirement in subparagraph (A) by developing and including a cross-reference relating its existing categories to the six standard water shortage

The DWR-recommended six standard water shortage levels in the 2020 Urban Water Master Plan Guidebook, as documented in **Table 12**, that represent progressively increasing estimated shortages from the normal reliability. The shortage levels have been standardized to provide a consistent regional and statewide approach to conveying the relative severity of water supply shortage conditions. Identifying the appropriate shortage level will be in accordance with the supply conditions described in Ordinance No. 117, the District's Water Conservation Plan. This WSA maintains the current three stages of water shortages included in Ordinance No. 117 and develops a DWR approved crosswalk to meet overall reduction requirements stipulated by DWR.

As an example, if it's observed that the Pick Creek stops running to the ocean, which is Stage One in Ordinance No. 117, the District would be considered in an Alert or Significant Drought condition, corresponding to Stage One or Two in the DWR recommended stages.

With recommendations from District staff, the District Board of Directors has the authority to declare the appropriate conservation level considered necessary to manage the system demands and mitigate the water shortage. The Board of Directors can also downgrade, upgrade, or terminate a shortage response level based on District staff recommendations. The District's groundwater supply is dependent on natural recharge from surface water runoff as well as additional seawater intrusion. In periods of drought, when more groundwater is pumped out from the well field, the chloride concentrations of water from Pico Creek Valley Groundwater Basin would be expected to be significantly increased due to seawater intrusion. District Board of Directors will manage to reduce groundwater pumping to avoid severe seawater intrusion and minimize subsidence.

In order to reduce water consumption system-wide, the District has a water conservation ordinance that may be invoked to implement restrictions on water use. Currently, the District's conservation ordinance describes permanent water use restrictions as well as a multiple-stage water rationing plan that can be invoked to adjust water use with shortage conditions. Each water rationing stage includes a water demand reduction percentage, which is to be applied to normal water demands. The plan is dependent on the cause, severity, and anticipated duration of the water shortage, and a combination of voluntary and mandatory water conservation measures, which can be put in place to reduce system-wide water usage. The water shortage stages are summarized on the following page in **Table 12**.

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Table 12 Water Shortage Levels Crosswalk
System-Wide Water Supply Assessment
San Simeon Community Services District

SSCSD Stage	Supply Condition	SSCSD Percent Supply Reduction	Demand Reduction Actions	Corresponding Relationship	DWR Recommended Stages	Percent Supply Reduction
0	Normal supply.	None	Permanent water conservation requirements are effective at all times		0	None
1	Pico Creek stops running to the ocean.	Up 20%	- Use of fire hydrants shall be limited to firefighting and/or activities necessary to maintain public health and safety. - Washing trailers, boats, mobile homes, parking areas, and buildings, while using District Potable Water shall be limited to once a month. - Washing automobiles and trucks shall be limited to twice a month. - All outdoor irrigation with DPW shall be limited to once a week.		1	Up to 10%
					2	10 to 20%
2	Well field levels drop 5% below monthly historical average for 3 consecutive weeks.	20 to 40%	- Using DPW for the filling, refilling, or adding water to swimming pools, wading pools, or spas more than the necessary amount for operation is prohibited. - All outdoor irrigation using DPW shall be limited to twice per month. - Washing automobiles and trucks with DPW shall be limited to once per month, with minor rinsing allowed. - Use of DPW for construction compaction is prohibited.		3	20 to 30%
					4	30 to 40%
3	Well field levels drop 12% below monthly historical average for 3 consecutive weeks unless monitored chloride levels can be found below 250mg/L.	Greater than 40%	- All outdoor irrigation with DPW shall be prohibited - Washing and rinsing of automobiles and trucks with DPW shall be prohibited		5	40 to 50%
					6	Greater than 50%

AKEL ENGINEERING GROUP, INC.

1/5/2022

Notes:
1. Source: SSCSD 2016 Ordinance No. 117, Water Conservation Plan.

6.0 SUMMARY

The land use projections in this report were initially based on the information contained in the received District's Geodatabase, District's 2018 Master Plan, and NCAP 2018 Update. Proposed future development (on Waitlist) was integrated as part of this study, and phased in 5-year increments and through the project horizon year of 2045, with the very valuable assistance of San Simeon Community Services District staff. A summary of the findings include:

6.1 Land Use

The proposed future development within the San Simeon Community Services District consists of 3 commercial projects, 1 mixed use project (residential and retail), and 10 residential developments (**Table 3**). In the buildout, the land use is expected to consist of approximately 40.1 acres of residential, approximately 41.4 acres of commercial, and approximately 20 acres of other land uses (non-demand generating), which are summarized in **Table 1** and graphically depicted in **Figures 1** and **2**.

6.2 Water Demands

At the end of the 25-year period, for the on waitlist developments, the projected future residential water demand is approximately 17.6 AFY, and the future commercial water demand is approximately 19.8 AFY.

Based on combined existing and projected future water demands, the existing system along with the proposed on waitlist developments result in an estimated demand of 112.2 AFY at the end of the year 2045, and estimated demand of 37.4 AFY within the on waitlist developments, as documented in **Table 3**.

6.3 Water Supply

The total groundwater sustainable yield of the groundwater basin is expected to be 110 AFY when the reverse osmosis filter (RO) is offline or 140 AFY when the RO system is online (**Table 6**), which is estimated based on the Groundwater Availability Study – Pico Creek Valley Groundwater Basin 2014 Update. However, per the District staff's direction, during the RO treatment process, the water loss is expected to be approximately 20% of total water production. Therefore, with the RO facility in service, the max amount of potable water supply is estimated at 112 AFY, which is similar to the groundwater sustainable yield with the RO system offline.

6.4 Water Supply Sufficiency

Comparing the groundwater sustainable yields and water demands, the water supply from the Pico Creek Valley Groundwater Basin is 0.2 AFY deficient to serve the system-wide demand in the year 2045 under normal year conditions. The minor deficiency may be fixed by implementing permanent water conservation actions. Additionally, in a single dry year or consecutive dry years, the projected demand is expected to exceed the system supply in the 25-year window (**Tables 9,10,11** and **Figures 6, 7**). Therefore, water conservation actions and procedures (**Table 12**), such as declaring drought and calling for short-term water use reductions, are necessary for maximizing the use of available supplies in order to meet the potential shortage, more details are discussed in **Section 5**.

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Appendices

Appendix A

2013 EDU Calculation Study

Mr. Charles Grace January 20, 2014
San Simeon Community Services District
111 Pico Ave.
San Simeon, CA 93452

San Simeon Community Services District – Water Usage Calculations

Dear Mr. Grace -

The District retained Phoenix Civil Engineering, Inc. (Phoenix) to review the existing water usage meter readings for the District and develop an Equivalent Dwelling Unit (EDU) that could be used to determine future development impacts to the water/wastewater systems capacity.

An Equivalent Dwelling Unit is defined as any standard service unit determined to be equivalent to one single family dwelling unit. An EDU will consume water equivalent to a single family unit or discharge wastewater at a flow and strength equal to that of an average single family unit. EDUs are frequently used for wastewater flow calculations, but the same concept can be used for water demand values.

For the analysis, three years of water meter usage values were provided by the District. The years that were reviewed were from 2010/2011 to 2012/2013. A total of 327 residential (single family) accounts were provided along with multi-family, commercial, irrigation, hotel and restaurant accounts for that period. The method used to document the meter readings by the District creates a situation where if an account was in use for part of the period and then the account holder vacated the property (relocation, etc.), the account recorded zero values for the remainder of the period under review. Conversely, if an account was opened in the middle of the three year window, the account had no meter readings for the initial period. Both of these situations were eliminated from consideration as the data are considered incomplete. In addition, there were some accounts that from the meter readings were not occupied full time by the resident. The amount of water used by that account was not realistic when expanded to represent a daily potable water demand. For example, one cubic foot is equal to 7.48 gallons. So if an account meter recorded a usage of 2,000 cubic feet per year that would equal 14,960 gallons per year or 41 gallons per day. This is considered an extremely low water usage when factoring in the usage for laundry (typically 5 to 10 gallons per load), toilet use (approximately 2 gallons per flush), (5 to 10 gallons per shower), etc.

Once all of the incomplete or nonstandard single family accounts were removed from the group, a total of 59 single family residential accounts were used to determine the average annual water usage. This group was developed using only meter readings that were complete for all three years and had readings above 2,000 cubic feet. Using this group, it was determined that the average water consumption for a single family residence was 4,050 cubic feet per year or 83 gallons per day. This is an average value and low when compared to other communities, but consistent with the value calculated in the San Simeon CSD Water System Master and Wastewater Collection System Evaluation (Boyle, 2007 p. 12). That report calculated an average demand of 74 gallons per person per dwelling unit. Also provided in that report was that the County of San Luis Obispo estimates the number of residents per unit at 0.7 to 1.4 persons.

If the group was expanded to include other meter reading values that were either incomplete or not representative of a full time resident, the EDU value would be lower. The issue that could potentially be created by a low EDU base value is that future demand on the potable water system would be underestimated.

Using the 4,050 cubic feet value, the next step was to apply that value to each of the other metered type of customers (hotels, commercial, irrigation, etc.). From the tables attached, the EDU values for each metered account are shown. An example calculation would be as follows:

EDU Multifamily Account = 3 Year Average Multifamily Account / Single Family EDU of 4,050. This calculation was repeated for all of the accounts in the other categories. The summary table shows the respective EDU values for each account.

Sincerely,

____

Jon Turner, PE
Principal Engineer

San Simeon Community Services District
Water Usage Account Summary
Equivalent Dwelling Unit Calculation
Summary Table

Single Family Dwellings	2011-2012 Total Usage	2012-2013 Total Usage	3 YEAR BASE LINE AVG	Adjusted 3 Year Baseline Average
15	2,600	2,300	2,467	**2,467**
25	6,922	9,740	9,158	**9,158**
31	2,100	1,900	1,867	**1,867**
40	2,600	2,600	2,567	**2,567**
41	3,800	3,600	3,967	**3,967**
46	1,500	100	1,500	**2,200**
49	2,400	900	1,800	**2,250**
58	2,000	2,000	2,267	**2,267**
59	6,800	7,000	5,467	**6,900**
66	5,000	0	3,800	**5,700**
70	5,200	4,700	5,400	**5,400**
72	4,700	4,700	4,600	**4,600**
74	3,300	4,400	3,733	**3,733**
82	2,400	3,000	2,600	**2,600**
88	5,100	3,200	3,433	**2,600**
94	1,400	2,800	2,533	**3,100**
95	4,600	3,400	5,300	**4,000**
97	2,500	2,500	2,567	**2,567**
98	3,300	3,800	3,700	**3,700**
103	2,400	3,400	2,633	**2,633**
107	3,300	3,000	3,333	**3,333**
109	3,700	3,400	3,400	**3,400**
110	4,600	5,000	4,700	**4,700**
119	3,600	2,800	2,933	**2,933**
120	6,300	6,000	6,033	**6,033**
122	5,200	5,400	5,533	**5,533**
123	4,200	4,000	3,867	**3,867**
127	5,100	1,600	3,333	**4,200**
128	2,300	3,200	3,033	**3,033**
130	2,000	1,500	2,067	**2,067**
134	2,400	2,100	2,200	**2,200**
139	5,700	6,800	6,600	**6,600**
146	2,600	2,000	2,600	**2,600**
150	1,500	2,700	2,033	**2,033**
151	5,900	5,300	5,567	**5,567**
152	2,200	2,600	2,433	**2,433**
154	3,500	3,600	3,333	**3,333**
158	2,200	2,100	2,100	**2,100**
174	3,800	4,400	4,100	**4,100**
178	3,800	3,600	3,700	**3,700**

San Simeon Community Services District
Water Usage Account Summary
Equivalent Dwelling Unit Calculation
Summary Table

Single Family Dwellings	2011-2012 Total Usage	2012-2013 Total Usage	3 YEAR BASE LINE AVG	Adjusted 3 Year Baseline Average
187	8,800	8,500	8,667	**8,667**
188	4,000	4,200	4,200	**4,200**
189	2,500	1,900	2,000	**2,000**
197	10,900	5,100	7,467	**5,750**
200	11,300	9,100	10,433	**10,433**
201	4,800	4,200	3,933	**3,933**
204	3,400	2,800	3,167	**3,167**
209	2,600	2,700	2,600	**2,600**
240	2,100	2,200	2,133	**2,133**
243	2,700	2,200	2,433	**2,433**
250	6,300	6,300	5,533	**5,533**
257	9,600	7,800	8,767	**8,767**
269	2,700	2,400	2,567	**2,567**
271	8,300	7,100	7,533	**7,533**
272	2,700	1,900	2,333	**2,333**
287	2,300	1,500	2,167	**2,167**
288	3,600	3,900	3,467	**3,467**
294	6,900	6,800	5,467	**6,850**
298	6,500	6,300	4,767	**6,400**
total fiscal year end usage	246,522	224,040	231,534	**238,974**
(Usage in Cubic Feet)			**Equivalent Dwelling Unit**	**4,050**

Multi-Family Dwellings	2011-2012 Total Usage	2012-2013 Total Usage	3 YEAR BASE LINE AVG	Equivalent Dwelling Unit
16	93,000	115,100	69,367	**30.6**
217	300	300	1,000	**0.4**
26	56,900	60,200	42,733	**18.8**
221	300	300	2,333	**1.0**
27	17,800	15,900	17,300	**7.6**
28	11,100	10,900	17,300	**7.6**
29	20,200	20,800	14,200	**6.3**
30	30,300	17,200	15,867	**7.0**
37	25,000	20,000	15,367	**6.8**

San Simeon Community Services District
Water Usage Account Summary
Equivalent Dwelling Unit Calculation
Summary Table

MOTEL/HOTELS

4	116,500	119,700	109,100	**26.9**
225	269,800	252,900	270,300	**66.7**
223	88,800	123,400	92,933	**22.9**
219	254,800	257,400	238,300	**58.8**
1	594,200	440,200	546,733	**135.0**
218	147,600	154,600	136,600	**33.7**
6	274,900	235,900	238,300	**58.8**
252	120500	110400	128166.667	**31.6**
278	392,300	365,000	376,933	**93.1**
285	93,000	96,700	90,733	**22.4**
291	158,800	168,600	131,633	**32.5**
RESTAURANTS				
5	38,000	35,500	36,200	**8.9**
12	76,700	78,700	76,700	**18.9**
18	90,200	80,500	80,267	**19.8**
22	23,800	16,900	23,533	**5.8**
61	9,400	8,500	9,467	**2.3**
78	19,400	20,300	19,033	**4.7**
COMMERCIAL ACCTS				
7	2,800	1,300	2,400	**0.6**
8	23,000	36,800	29,500	**7.3**
33	3,100	3,000	3,067	**0.8**
38	8,600	6,600	7,733	**1.9**
213	1,400	1,200	1,267	**0.3**
IRRIGATION ACCTS				
60	18,300	12,200	14,200	**3.5**
73	320	350	347	**0.1**
84	800	1,000	767	**0.2**
124	9,800	7,100	8,567	**2.1**
126	14,500	15,500	13,267	**3.3**
131	3,700	3,400	3,400	**0.8**
133	1,100	1,200	1,200	**0.3**
160	1,900	2,300	2,133	**0.5**
171	400	300	367	**0.1**
177	6,400	6,500	6,867	**1.7**
194	1,900	3,900	2,700	**0.7**
289	100	200	150	**0.0**

Notes:

San Simeon Community Services District
Water Usage Account Summary
Equivalent Dwelling Unit Calculation
Summary Table

Equivalent Dwelling Unit calculated from data where the usage in the account was relatively cor
period analyzed. In cases where one usage values was an outlier from the remaining two, the
remaining two was calculated. Residential tab shows the accounts that were used in the calcu
Equivalent Dwelling Unit (EDU). EDU calculation for remaining account types were calculated
Average Usage of account/average single family residential use = EDU of the account in ques
Hotel usage was calculated as a summary of all accounts for the period in question.

San Simeon Community Services District
Water Usage Account Summary
Equivalent Dwelling Unit Calculation
Hotel Accounts

ACCT #	2010-2011 Total Usage	2011-2012 Total Usage	2012-2013 Total Usage	3 YEAR BASE LINE AVG.	Equivalent Dwelling Unit
4	80,200	99,400	102,200	93,933	
126	9,800	14,500	15,500	13,267	
211	1,100	2,600	2,000	1,900	
	91,100	**116,500**	**119,700**	**109,100**	**26.9**
225	251,600	234,200	215,600	233,800	
79	36,600	35,600	37,300	36,500	
	288,200	**269,800**	**252,900**	**270,300**	**66.7**
223	900	3,300	6,200	3,467	
86	65,700	85,500	114,500	88,567	
23	0	0	2,700	900	
	66,600	**88,800**	**123,400**	**92,933**	**22.9**
219	25,100	33,800	37,800	32,233	
19	177,600	221,000	219,600	206,067	
	202,700	**254,800**	**257,400**	**238,300**	**58.8**
1	9,300	13,600	12,500	11,800	
85	59,200	66,200	59,200	61,533	
10	217,400	234,300	202,200	217,967	
11	146,600	152,800	152,700	150,700	
215	166,100	119,800	1,900	95,933	
216	7,000	7,200	7,700	7,300	
222	200	300	4,000	1,500	
	605,800	**594,200**	**440,200**	**546,733**	**135.0**
218	73,100	96,500	112,000	93,867	
14	34,500	51,100	42,600	42,733	
17	0	0	0	0	
	107,600	**147,600**	**154,600**	**136,600**	**33.7**
6	112,900	143,300	134,600	130,267	
92	3,700	5,000	4,400	4,367	
212	5,400	6,500	5,300	5,733	
228	82,100	120,100	91,600	97,933	
	204,100	**274,900**	**235,900**	**238,300**	**58.8**
252	1500	1,100	1,800	1,467	
253	5500	700	400	2,200	
254	19900	15,700	18,700	18,100	
255	57200	46,900	44,400	49,500	
256	69500	56,100	45,100	56,900	
	153600	**120500**	**110400**	**128,167**	**31.6**
278	298400	301,600	280,600	280,600	
279	75100	90,700	84,400	84,400	
	373,500	**392,300**	**365,000**	**376,933**	**93.1**
285	2600	5,800	6,000	4,800	

San Simeon Community Services District
Water Usage Account Summary
Equivalent Dwelling Unit Calculation
Hotel Accounts

ACCT #	2010-2011 Total Usage	2011-2012 Total Usage	2012-2013 Total Usage	3 YEAR BASE LINE AVG.	Equivalent Dwelling Unit
286	79900	87,200	90,700	85,933	
	82,500	**93,000**	**96,700**	**90,733**	**22.4**
291	53000	120,800	121,400	98,400	
292	13100	33,400	43,700	30,067	
293	1400	4,600	3,500	3,167	
	67,500	**158,800**	**168,600**	**131,633**	**32.5**

San Simeon Community Services District
Water Usage Account Summary
Equivalent Dwelling Unit Calculation
Restaurant Accounts

ACCT #	2010-2011 Total Usage	2011-2012 Total Usage	2012-2013 Total Usage	3 YEAR BASE LINE AVG.	Equivalent Dwelling Unit
5	35,100	38,000	35,500	36,200	8.9
12	74,700	76,700	78,700	76,700	18.9
18	70,100	90,200	80,500	80,267	19.8
22	29,900	23,800	16,900	23,533	5.8
61	10,500	9,400	8,500	9,467	2.3
78	17,400	19,400	20,300	19,033	4.7
	237,700	257,500	240,400	245,200	

San Simeon Community Services District
Water Usage Account Summary
Equivalent Dwelling Unit Calculation
Commercial Accounts

ACCT #	2010-2011 Total Usage	2011-2012 Total Usage	2012-2013 Total Usage	3 YEAR BASE LINE AVG.	Equivalent Dwelling Unit
7	3,100	2,800	1,300	2,400	0.6
8	28,700	23,000	36,800	29,500	7.3
33	3,100	3,100	3,000	3,067	0.8
38	8,000	8,600	6,600	7,733	1.9
213	1,200	1,400	1,200	1,267	0.3
	44,100	38,900	48,900	43,967	

San Simeon Community Services District
Water Usage Account Summary
Equivalent Dwelling Unit Calculation
Irrigation Accounts

ACCT #	2010-2011 Total Usage	2011-2012 Total Usage	2012-2013 Total Usage	3 YEAR BASE LINE AVG.	Equivalent Dwelling Unit
60	12,100	18,300	12,200	14,200	3.5
73	370	320	350	347	0.1
84	500	800	1,000	767	0.2
124	8,800	9,800	7,100	8,567	2.1
126	9,800	14,500	15,500	13,267	3.3
131	3,100	3,700	3,400	3,400	0.8
133	1,300	1,100	1,200	1,200	0.3
160	2,200	1,900	2,300	2,133	0.5
171	400	400	300	367	0.1
177	7,700	6,400	6,500	6,867	1.7
194	2,300	1,900	3,900	2,700	0.7
289	0	100	200	150	0.0
	48,570	59,220	53,950	53,913	

San Simeon Community Services District
Water Usage Account Summary
Equivalent Dwelling Unit Calculation
Residential and Multifamiliy

ACCT #	2010-2011 Total Usage	2011-2012 Total Usage	2012-2013 Total Usage	3 YEAR BASE LINE AVG.	Adjusted 3 Year Baseline Average
15	2,500	2,600	2,300	2,467	2,467
25	10,811	6,922	9,740	9,158	9,158
31	1,600	2,100	1,900	1,867	1,867
40	2,500	2,600	2,600	2,567	2,567
41	4,500	3,800	3,600	3,967	3,967
46	2,900	1,500	100	1,500	2,200
49	2,100	2,400	900	1,800	2,250
58	2,800	2,000	2,000	2,267	2,267
59	2,600	6,800	7,000	5,467	6,900
66	6,400	5,000	0	3,800	5,700
70	6,300	5,200	4,700	5,400	5,400
72	4,400	4,700	4,700	4,600	4,600
74	3,500	3,300	4,400	3,733	3,733
82	2,400	2,400	3,000	2,600	2,600
88	2,000	5,100	3,200	3,433	2,600
94	3,400	1,400	2,800	2,533	3,100
95	7,900	4,600	3,400	5,300	4,000
97	2,700	2,500	2,500	2,567	2,567
98	4,000	3,300	3,800	3,700	3,700
103	2,100	2,400	3,400	2,633	2,633
107	3,700	3,300	3,000	3,333	3,333
109	3,100	3,700	3,400	3,400	3,400
110	4,500	4,600	5,000	4,700	4,700
119	2,400	3,600	2,800	2,933	2,933
120	5,800	6,300	6,000	6,033	6,033
122	6,000	5,200	5,400	5,533	5,533
123	3,400	4,200	4,000	3,867	3,867
127	3,300	5,100	1,600	3,333	4,200
128	3,600	2,300	3,200	3,033	3,033
130	2,700	2,000	1,500	2,067	2,067
134	2,100	2,400	2,100	2,200	2,200
139	7,300	5,700	6,800	6,600	6,600
146	3,200	2,600	2,000	2,600	2,600
150	1,900	1,500	2,700	2,033	2,033
151	5,500	5,900	5,300	5,567	5,567
152	2,500	2,200	2,600	2,433	2,433
154	2,900	3,500	3,600	3,333	3,333
158	2,000	2,200	2,100	2,100	2,100
174	4,100	3,800	4,400	4,100	4,100
178	3,700	3,800	3,600	3,700	3,700
187	8,700	8,800	8,500	8,667	8,667
188	4,400	4,000	4,200	4,200	4,200

San Simeon Community Services District
Water Usage Account Summary
Equivalent Dwelling Unit Calculation
Residential and Multifamiliy

ACCT #	2010-2011 Total Usage	2011-2012 Total Usage	2012-2013 Total Usage	3 YEAR BASE LINE AVG.	Adjusted 3 Year Baseline Average
189	1,600	2,500	1,900	2,000	2,000
197	6,400	10,900	5,100	7,467	5,750
200	10,900	11,300	9,100	10,433	10,433
201	2,800	4,800	4,200	3,933	3,933
204	3,300	3,400	2,800	3,167	3,167
209	2,500	2,600	2,700	2,600	2,600
240	2,100	2,100	2,200	2,133	2,133
243	2,400	2,700	2,200	2,433	2,433
250	4000	6,300	6,300	5,533	5,533
257	8900	9,600	7,800	8,767	8,767
269	2600	2,700	2,400	2,567	2,567
271	7200	8,300	7,100	7,533	7,533
272	2400	2,700	1,900	2,333	2,333
287	2700	2,300	1,500	2,167	2,167
288	2900	3,600	3,900	3,467	3,467
294	2700	6,900	6,800	5,467	6,850
298	1500	6,500	6,300	4,767	6,400
	224,040	246,522	224,040	231,534	238,974
				Equivalent Dwelling Unit	4050

ACCT #	2010-2011 Total Usage	2011-2012 Total Usage	2012-2013 Total Usage	3 YEAR BASE LINE AVG.	Equivalent Dwelling Unit
16	0	93,000	115,100	69,367	17.1
217	2,400	300	300	1,000	0.2
26	11,100	56,900	60,200	42,733	10.6
221	6,400	300	300	2,333	0.6
27	18,200	17,800	15,900	17,300	4.3
28	29,900	11,100	10,900	17,300	4.3
29	1,600	20,200	20,800	14,200	3.5
30	100	30,300	17,200	15,867	3.9
37	1,100	25,000	20,000	15,367	3.8

Appendix B

Water Sewer Wait List

(Adopted October 14, 2020)

San Simeon CSD Water Sewer Connection Waitlist
Exhibit "A" Hook Up Waiting List

9/28/2020

Water Wait List Reconciliation

Position Number	APN Number	Name	Deposit Amount	Date Added	Request from Property Owners	Multiplier (CF/YR)	Retail requested	Restaurant requested	Motel Units requested	Resident units requested	Irrigation meters requested
1		Cavalier Inn Inc. [1]	[2] 0.00	[3] 1/25/1972	[4] 145 Motel & 2400 sq ft. restaurant		0.0	1.0	145.0	0.0	0.0
2	013-071-018	Evans	$425.00	11/16/1975	Retail		1.0	0.0	0.0	0.0	0.0
3	013-391-001	Mouchawar	$30,445.00	6/1/1979	35 Motel		0.0	0.0	35.0	0.0	0.0
4	013-031-022	V& H Holdings [5]	$1,200.00	11/21/2013	1 Residence		0.0	0.0	0.0	1.0	0.0
5	013-402-012	Hurlbert for Tides of San Simeon	$2,280.00	9/6/1990	6 Condos + 1 irrigation meter		0.0	0.0	0.0	6.0	0.5
6	013-402-013	Seifert [7]	$2,280.00	3/9/2001	6 Condos		0.0	0.0	0.0	6.0	0.0
7	013-402-006	Tyo [6]	$6,840.00	12/11/2013	3 Residences		0.0	0.0	0.0	3.0	0.0
8	013-071-009	Hather and/or Hulbert [9]	$3,420.00	10/8/2014	15 Residences (added 5 Edu's on 11/2019)		0.0	0.0	0.0	15.0	0.0
9	013-091-030	Sansone, Inc. [8]	$6,498.00	7/11/2018	30.5 (30 Multi-Family Edu's + .5 Irrigation)		0.0	0.0	0.0	30.0	0.5
10	013-091-032, 013-071-023/024/025	Sansone, Inc.	$14,706.00	7/11/2018	64.5 (64 Multi-Family EDU's + .5 Irrigation)		0.0	0.0	0.0	64.0	0.5
11	013-031-049	Sansone, Inc.	$2,796.00	7/11/2018	10.5 (10 Multi-Family EDU's + .5 Irrigation)		0.0	0.0	0.0	10.0	0.5
					Total		1.0	1.0	180.0	135.0	2.0

	Multiplier (CF/YR)	Retail	Restaurant	Motel Units	Resident units	Irrigation meters
retail multiplier (see calculations below):	2.2	8,829.0				
See below restaurant multiplier (range 2.3 to 19.8 for 6 accounts) avg: 10.1 (this is used)	40,770.0		40,770.0			
motel unit multiplier = 0.73 EDU / motel unit	2,956.5			532,170.0		
residential multiplier:	4,050.0				546,750.0	
irrigation multiplier:	2,025.0					4,050.0
		8,829.0	40,770.0	532,170.0	546,750.0	4,050.0
total gallons:	8,471,616.1					
CF/Year for all uses:	1,132,569.0					
Convert to AF/ Year (divide by 43,560):	**-26.0**	(this is	51.8%	of the 50.2 AF available)		
AF available:	50.2					
Water available after list has been met:	24.2	which equals	279.6	EDU's		

1 Cavalier Inn Inc. acquired the rights and obligations of Dalton through bankruptcy proceedings in July 1989.
2 The deposit of Dalton was forfeited when he failed to comply with the Terms of Agreement with the District.
3 The Date of the agreement between the District and Dalton.
4 Per agreement, remaining balance of project after Mouchawar foreclosure on 105 units.
5 V&H Holdings purchased property and wait list position #4 From Raymond Long.
6 John & Ann Tyo Purchased property and wait list position #7 from Eva Redwood-Chavez
7 Seifert purchased the property from Ramirez in 2004.
8 Sansone, Inc submitted one payment in the amount of $24,000.00 for positions 9,10 & 11
9 Hather added 5 EDUs w/ a deposit in the amount of $1140 on 11/2019
10 Sansone added 2 EDUs w/ a deposit in the amount of $54 (there was a Cr. Bal. prior) on 9/2020

SUMMARY:	
140.0	AcFt Permit Available
126.0	AcFt avail after 10% Water Loss
-70.3	AcFt Current 3 yr avg Use (from our records)
55.7	AcFt remaining Available (math)
-5.6	10% contingency (math)
50.2	AcFt avail after 10% Contingency (math)
-26.0	AcFt Wait List Demand (from this sheet)
24.2	AcFt available less any RO losses (math)

Restaurant Avg. Calc:	8.9
	18.9
(data from Phoenix study "Restaurant Accou	19.8
	5.8
	2.3
	4.7
S.T.	60.4
Used for Cavalier Average:	**10.1**

Retail Commercial Account Avg. Calc:	0.6
	7.3
(data from Phoenix study "Commercial	0.8
	1.9
	0.3
S.T.	10.9
Used for Evans Average:	**2.2**

Cavalier and Evans (Visitor Serving uses)

51.4% % of the total estimated consumption **

**** this complies with the North Coast Area Plan by SLO County, page 7-71**

RESOLUTION NO. 20-426

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE SAN SIMEON COMMUNITY SERVICES DISTRICT ESTABLISHING A WAIT LIST FOR WATER, SEWER AND SERVICE ALLOCATIONS

WHEREAS, the San Simeon Community Services District ("District") adopted Ordinance No. 115 establishing water, sewer and service allocation transfer requirements; and

WHEREAS, Ordinance No. 115 defines "Wait List" as the list established by the District setting forth water, sewer and service allocations on parcels that are not active service or non-active service commitments.

WHEREAS, Ordinance No. 115 provides that the Board of Directors shall adopt the Wait List by resolution; and

NOW, THEREFORE, BE IT RESOLVED, by the San Simeon Community Services District Board of Directors as follows:

1. The above recitals are true and correct and are incorporated herein by this reference.

2. District Resolution 14-369 is repealed in its entirety and replaced and superseded by this Resolution 20-426.

3. The attached Exhibit A shall constitute the District's Wait List as discussed in Ordinance No. 115. Exhibit A may be amended from time to time by District Staff, including by not limited to, when additions to the Wait List are made or a request is made by a property owner to be removed from the Wait List.

4. Prior to any addition(s) to the Wait List, the following conditions will be met:

    a. District staff shall conduct a review of water availability. A request to be added to the Wait List shall be approved by District Staff if it has been determined that there is an adequate water supply for the requested number of EDUs.

b. The property owner shall submit a deposit to the District in an amount equal to ten percent (10%) of the capacity fee required for the requested number of EDUs (the "Wait List Deposit.") The capacity fee amount used to calculate the Wait List Deposit shall be the amount in effect at the time that the property owner is added to the Wait List.

5. Wait List Deposits shall be credited towards the total capacity fee amount owed by the property owner at the time the connection is made. The property owner may request a refund of the Wait List Deposit prior to issuance of a will serve letter and the District shall issue such a refund.

PASSED AND ADOPTED THIS 14th day of October, 2020. Upon motion of Chairperson Kellas seconded by Director de la Rosa and on the following roll call vote to wit:

AYES: Chairperson Kellas, Director Maurer, Director de la Rosa

NOES: Director Carson

ABSTAIN:

ABSENT:

[signature]

Gwen Kellas, Chairperson
Board of Directors

ATTEST:

[signature]

Charles Grace,
Secretary/General Manager

EXHIBIT "A"

HOOK UP WAITING LIST

Position Number	APN Number	Name	Deposit Amount	Date Added	EDU's
1		Cavalier Inn Inc. [1]	[2] 0.00	[3] 1/25/1972	[4] 145 Motel & 2400 sq ft restaurant
2	013-071-018	Evans	$425.00	11/16/1975	Retail
3	013-391-001	Mouchawar	$30,445.00	6/1/1979	35 Motel
4	013-031-022	V& H Holdings [5]	$1,200.00	11/21/2013	1 Residence
5	013-402-012	Hurlbert for Tides of San Simeon	$2,280.00	9/6/1990	6 Condos + 1 irrigation meter
6	013-402-013	Seifert [7]	$2,280.00	3/9/2001	6 Condos
7	013-402-006	Tyo [6]	$6,840.00	12/11/2013	3 Residences
8	013-071-009	Hather /or Hulbert[9]	$3420.00	10/8/2014	15 Residences (added 5 edu's)
9	013-091-030	Sansone, Inc. [8]	$6498.00	7/11/2018	30.5 (28 Multi-Family Edu's + .5 Irrigation)
10	013-091-032, 013-071-023/024/025	Sansone, Inc.	$14706.00	7/11/2018	64.5 (64 Multi-Family EDU's + .5 Irrigation)
11	013-031-049	Sansone, Inc.	$2796.00	7/11/2018	10.5 (10 Multi-Family EDU's + .5 Irrigation)

1 Cavalier Inn Inc. acquired the rights and obligations of Dalton through bankruptcy proceedings in July 1989.

2 The deposit of Dalton was forfeited when he failed to comply with the Terms of Agreement with the District.

3 The Date of the agreement between the District and Dalton.

4 Per agreement, remaining balance of project after Mouchawar foreclosure on 105 units.

5 V&H Holdings purchased property and wait list position #4 From Raymond Long.

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7 Seifert purchased the property from Ramirez in 2004.

8 Sansone, Inc submitted one payment in the amount of $24,000.00 for positions 9,10 & 11

9 9 Hather added 5 edus w/ a deposit in the amount of $1140 on 11/2019

10 Sansone added 2 EDU's with a deposit in the amount of $54.00 on 9/9/2020

Appendix C

Updated Water Sewer Wait List

(March 7, 2022)

San Simeon CSD Water Sewer Connection Waitlist

Exhibit "A" Hook Up Waiting List

3/7/2022

Water Wait List Reconciliation

Position Number	APN Number	Name	Deposit Amount	Date Added	Request from Property Owners	Multiplier (CF/YR)	Retail requested	Restaurant requested	Motel Units requested	Resident units requested	Irrigation meters requested
1		Cavalier Inn Inc. [1]	[2] 0.00	[3] 1/25/1972	[4] 145 Motel & 2400 sq ft. restaurant		0.0	1.0	145.0	0.0	0.0
2	013-071-018	Evans	$425.00	11/16/1975	Retail		1.0	0.0	0.0	0.0	0.0
3	013-391-001	Mouchawar	$30,445.00	6/1/1979	35 Motel		0.0	0.0	35.0	0.0	0.0
4	013-031-022	V& H Holdings [5]	$1,200.00	11/21/2013	1 Residence		0.0	0.0	0.0	1.0	0.0
5	013-402-012	Hurlbert for Tides of San Simeon	$2,280.00	9/6/1990	6 Condos + 1 irrigation meter		0.0	0.0	0.0	6.0	0.5
6	013-402-013	Seifert [7]	$2,280.00	3/9/2001	6 Condos		0.0	0.0	0.0	6.0	0.0
7	013-402-006	Tyo [6]	$6,840.00	12/11/2013	3 Residences		0.0	0.0	0.0	3.0	0.0
8	013-071-009	Hather and/or Hulbert [9]	$3,420.00	10/8/2014	10 Residences		0.0	0.0	0.0	10.0	0.0
9	013-091-030	Sansone, Inc. [8]	$6,498.00	7/11/2018	30.5 (30 Multi-Family Edu's + .5 Irrigation)		0.0	0.0	0.0	30.0	0.5
10	013-091-032, 013-071-023/024/025	Sansone, Inc.	$14,706.00	7/11/2018	64.5 (64 Multi-Family EDU's + .5 Irrigation)		0.0	0.0	0.0	64.0	0.5
11	013-031-049	Sansone, Inc.	$2,796.00	7/11/2018	10.5 (10 Multi-Family EDU's + .5 Irrigation)		0.0	0.0	0.0	10.0	0.5
12	013-071-009	Hather	$1,140.00	11/1/2019	5 Residences		0.0	0.0	0.0	5.0	0.0
13	013-071-016	Lloyd Marcum	$9,154.60	3/31/2021	26 (13 residential 13 mixed use)		13.0	0.0	0.0	13.0	0.0
14	013-031-022 & 013-031-045	V&H Holidings	$14,050.00	2/22/2022	25 residential units		0.0	0.0	0.0	25.0	0.0
					Total		14.0	1.0	180.0	173.0	2.0
					retail multiplier (see calculations below):	2.2	8,829.0				
					See below restaurant multiplier (range 2.3 to 19.8 for 6 accounts) avg: 10.1 (this is used)	40,770.0		40,770.0			
					motel unit multiplier = 0.73 EDU / motel unit	2,956.5			532,170.0		
					residential multiplier:	4,050.0				700,650.0	
					irrigation multiplier:	2,025.0					4,050.0
							8,829.0	40,770.0	532,170.0	700,650.0	4,050.0
					total gallons:	9,622,788.1					
					CF/Year for all uses:	1,286,469.0					
					Convert to AF/ Year (divide by 43,560):	**-29.5**	(this is	58.9%	of the 50.2 AF available)		
					AF available:	50.2					
					Water available after list has been met:	20.6	which equals	317.6	EDU's		

1 Cavalier Inn Inc. acquired the rights and obligations of Dalton through bankruptcy proceedings in July 1989.
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SUMMARY:	
140.0	AcFt Permit Available
126.0	AcFt avail after 10% Water Loss
-70.3	AcFt Current 3 yr avg Use (from our records)
55.7	AcFt remaining Available (math)
-5.6	10% contingency (math)
50.2	AcFt avail after 10% Contingency (math)
-29.5	AcFt Wait List Demand (from this sheet)
20.6	AcFt available less any RO losses (math)

Restaurant Avg. Calc:	8.9
	18.9
(data from Phoenix study "Restaurant Accou	19.8
	5.8
	2.3
	4.7
S.T.	60.4
Used for Cavalier Average:	**10.1**

Retail Commercial Account Avg. Calc:	0.6
	7.3
(data from Phoenix study "Commercial Accounts")	0.8
	1.9
	0.3
S.T.	10.9
Used for Evans Average:	**2.2**

Cavalier and Evans (Visitor Serving uses)

45.2% % of the total estimated consumption **

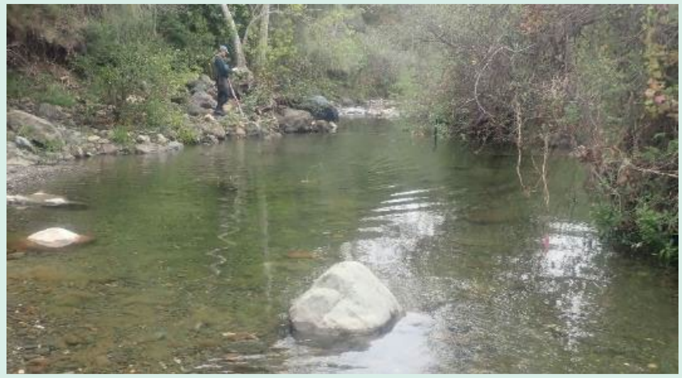
**** this complies with the North Coast Area Plan by SLO County, page 7-71**

Attachment B

Pico Creek Instream Flow Study

FINAL REPORT ◦ JULY 2024

Pico Creek Instream Flow Study



PREPARED FOR

San Simeon Community Services District
111 Pico Avenue
San Simeon, CA 93452

PREPARED BY

Stillwater Sciences
895 Napa Avenue, Suite B-3
Morro Bay, CA 93442

and

Cleath-Harris Geologists
75 Zaca Lane, Suite 110
San Luis Obispo, CA 93401

Stillwater Sciences

CHG

For more information:
Ken Jarrett, Stillwater Sciences, (916) 717-3113, ken@stillwatersci.com

Suggested citation:
Stillwater Sciences and Cleath-Harris Geologists. 2024. Pico Creek Instream Flow Study. Final Report. Prepared by Stillwater Sciences, Morro Bay, California and Cleath-Harris Geologists, San Luis Obispo, California for San Simeon Community Services District, San Simeon, California.

Cover photo: Riffle habitat in Pico Creek at approximately 4 cfs in January 2022 (top left), pool with stage level monitoring equipment (top right), California red-legged frog observed in Pico Creek (bottom left), and riffle habitat in Pico Creek dry in April 2022 (bottom right).

Table of Contents

Tables

Figures

1 BACKGROUND

The San Simeon Community Services District (District) conducted an Instream Flow Management Study in Pico Creek to assess the relationship between the District's groundwater pumping operations and sensitive aquatic habitat in Pico Creek. Results from this study will be included in an Addendum to the existing District Master Plan (Phoenix 2018), based on the requirements of Urban Water Management Plans.

Operation of the District's groundwater wells may affect the distribution and/or behavior of sensitive aquatic species in stream sections where streamflow is affected by groundwater pumping and groundwater infiltration. Sensitive species that occur in Pico Creek include federally threatened south-central California coast steelhead (anadromous *Oncorhynchus mykiss*), tidewater goby (*Eucyclogobius newberryi*), and California red-legged frog (*Rana draytoni*) (National Marine Fisheries Service [NMFS] 2013, Rathburn et al. 1993).

The Pico Creek watershed drains a 15-square-mile area of the southern Coast Range in San Luis Obispo County. Originating from the flanks of the Santa Lucia Mountains, Pico Creek transitions from mountainous headwater terrain (maximum elevation approximately 3,400 feet [ft] above mean sea level) to lower gradient valley depositional areas before draining to the Pacific Ocean approximately 4 miles north of the town of Cambria. Pico Creek is divided into two subbasins with their headwaters in the Santa Lucia Mountains: North Fork Pico Creek and South Fork Pico Creek (Figure 1).

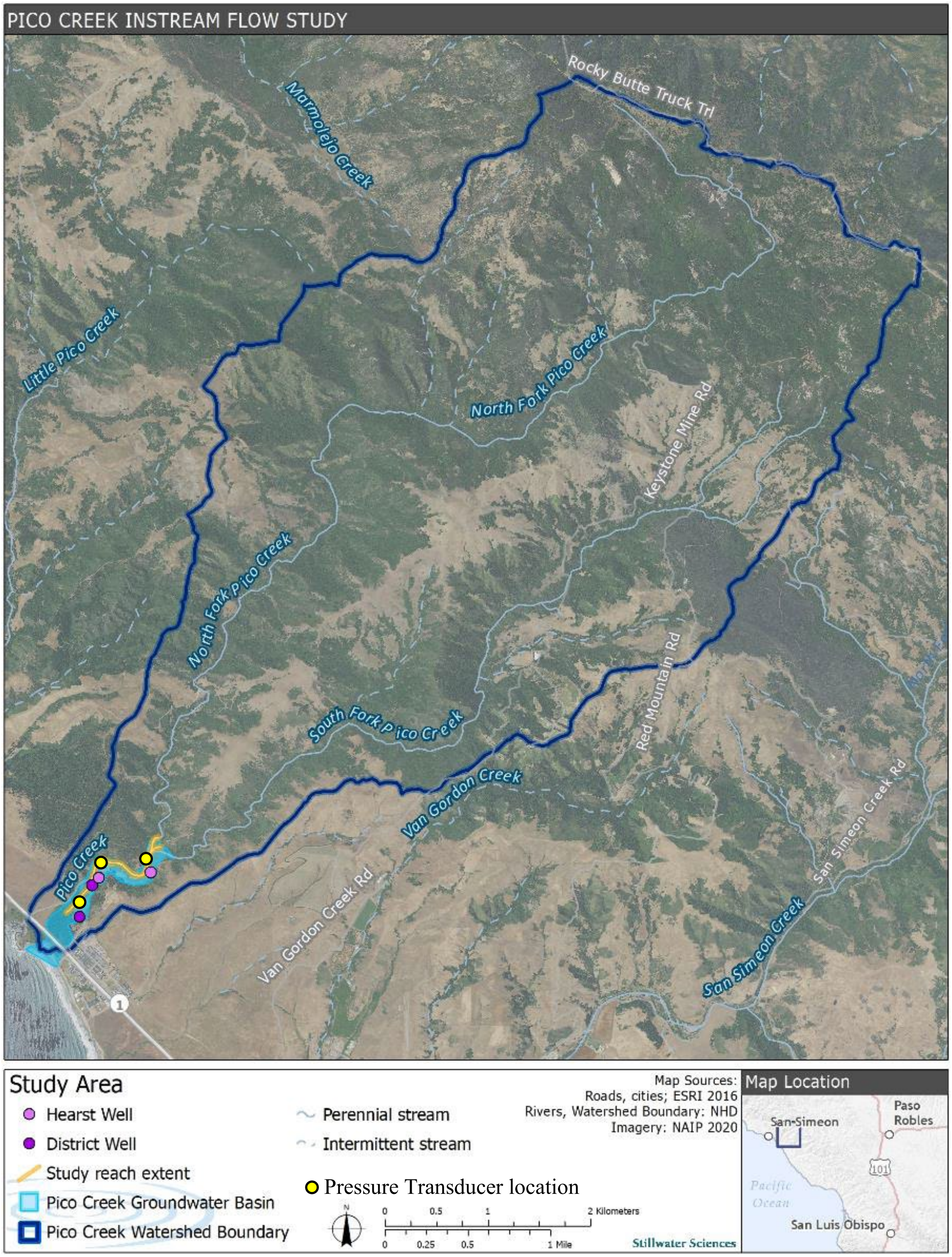


Figure 1. Study Area.

2 INTRODUCTION

Similar to other Coast Range watersheds, Pico Creek naturally exhibits seasonal surface flow and extensive intermittent reaches due to highly variable patterns of precipitation and the complex geology of the region (NMFS 2013). The highest flows in Pico Creek generally occur during the winter in response to high-intensity rainfall when stream flows typically increase, peak, and subside rapidly. This hydrologic attribute is characteristic of a "flashy" hydrograph, whereby a rapid increase in discharge occurs over a relatively short period with a quickly developed peak discharge in relation to normal baseflow. During the summer, extensive portions of Lower Pico Creek and North Fork Pico Creek frequently go dry, as would have occurred under natural conditions (NMFS 2013).

Stream flows provide many critical functions throughout the year, which support important fish development stages, maintain suitable water quality conditions in the lagoon, and support essential geomorphic processes. Figure 2 shows the timing of important development stages for steelhead along with the seasonal flow pattern for Pico Creek and the monthly average District production volumes. Descriptions of steelhead and other special status aquatic species found in Pico Creek are provided below.

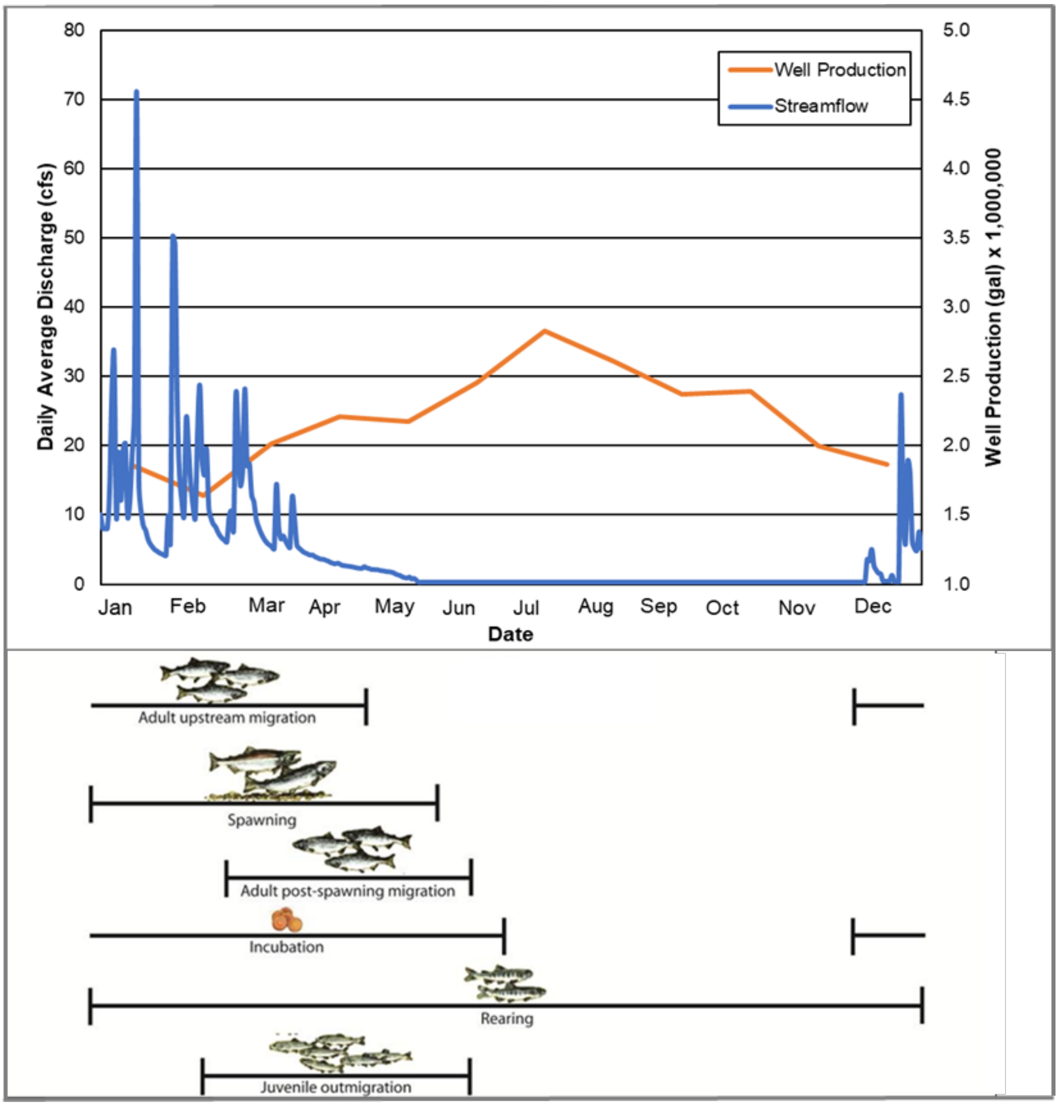


Figure 2. Hypothetical hydrograph showing seasonal flow variation within Pico Creek along with typical district pumping production volumes, and life history timing of steelhead (Shapovalov and Taft 1954).

2.1 Special Status Species

Special status aquatic species that occur in Pico Creek include two federally listed fish species including steelhead and tidewater goby, and one federally listed amphibian, California red-legged frog (CRLF).

2.1.1 Steelhead

Steelhead found in the Pico Creek watershed belong to the South-Central California Coast Distinct Population Segment (DPS), which includes steelhead populations that inhabit coastal stream networks from the Pajaro River (San Benito County) south to, but not including, the Santa Maria River (NMFS 2013). Within this DPS, the population of steelhead in the Pico Creek watershed has been identified as a Core 2 population, which means they have: (1) a high priority for recovery actions, (2) a known ability or potential to support viable populations, and (3) the capacity to respond to recovery actions. Although Core 2 populations are generally smaller and may have less diverse and complex threats than Core 1 populations, both Core 1 and Core 2 populations are the principal focus of NMFS recovery actions for the DPS (NMFS 2013). NMFS (2013) lists Pico Creek as one of the "best preserved and protected" streams in the region. The only threat rated as "high" for Pico Creek is the frequent channel drying within the mainstem and North Fork Pico Creek, which NMFS reports is natural but can be exacerbated by groundwater extraction and surface water diversions (NMFS 2013).

Steelhead is the anadromous form of *O. mykiss*, in which juveniles rear in freshwater rivers and creeks, migrate to the ocean to mature to adults, and return to freshwater rivers and creeks to spawn. Adult steelhead generally leave the ocean to return to their natal streams from December through March and spawn in late winter or spring (Figure 2) (Meehan and Bjornn 1991, Behnke 1992). Female steelhead construct redds in suitable gravels (0.39–1.18 inches in diameter [Moyle 2002]), often in pool tailouts and heads of riffles, or in isolated patches in cobble-bedded streams. Steelhead eggs incubate in the redds for 3–14 weeks, depending on water temperatures (Shapovalov and Taft 1954, Barnhart 1991). After hatching, young steelhead remain in the gravel for an additional two–five weeks while absorbing their yolk sacs, and then emerge in spring or early summer as fry (Figure 2) (Barnhart 1991).

After emergence, steelhead fry utilize shallow, low-velocity habitats, typically found along stream margins and in low-gradient riffles (Hartman 1965, Fontaine 1988). As fry grow and improve their swimming abilities in late summer and fall, they increasingly show a preference for higher water velocity and deeper mid-channel areas near the thalweg (the deepest part of the channel) in locations with cover (Hartman 1965, Everest and Chapman 1972, Fontaine 1988). Locations with high water velocity and cover likely provide juvenile steelhead resting locations while they watch for drifting invertebrates being carried by flow. Aquatic invertebrates comprise a key item in the diet of juvenile steelhead.

Juvenile steelhead typically rear in freshwater for two to three years before outmigrating to the ocean as smolts (NMFS 2013). The duration of time juveniles spend in freshwater appears to be related to growth rate, with larger, faster-growing members of a cohort smolting earlier (Peven et al. 1994). Steelhead in areas with warm water temperatures, where feeding and growth are possible throughout the winter, may require a shorter period in freshwater before smolting, while steelhead in colder, more northern, and inland streams may require three or four years before smolting (Roelofs 1983). Juvenile steelhead outmigration typically occurs from March through June (Figure 2). Monitoring efforts in San Luis Obispo Creek documented the majority of juvenile steelhead outmigration from March through May, along with a smaller secondary migration occurring during the fall (Spina et al. 2005).

Habitat requirements for different age classes of juvenile steelhead are relatively similar, except that as fish grow, they require more space for foraging and cover. Age 0+ steelhead use shallow-water and low-velocity habitats, such as stream margins and low-gradient riffles to meet their energetic demands and to escape predators (Hartman 1965, Moyle 2002). Older juvenile steelhead (age 1+/2+), because of their larger size, have higher energetic demands and require deeper, more complex pools, and large rocky substrate or in-channel wood for cover while feeding (Hartman 1965, Fontaine 1988, Spina 2003).

Nearly all elements of juvenile steelhead rearing habitat are strongly influenced by instream flows, which affect rearing habitat area, the depth and volume of pools, connectivity between habitat types, water velocity, and water temperatures. Streamflow also dictates the quantity of drifting invertebrates that reach feeding steelhead (Harvey et al. 2006), with higher summer flows allowing steelhead to better maintain feeding rates during periods of higher water temperatures when metabolic demands are greater (Krug et al. 2012). During periods of low flows and high air temperatures that can occur from the late spring through early fall, water temperature and food availability are critical environmental factors for rearing juvenile steelhead. In general, temperatures less than 20°C are considered suitable for rearing steelhead (Hayes et al. 2008); however, in locations near their southern extent, steelhead have been reported to have optimal performance at temperatures over 24°C (Verhille et al. 2016). In streams along the central California coast, deep pool habitat (>1.5 ft) with sufficient instream cover likely provides critical over-summer refuge habitat for juvenile steelhead in intermittent streams (Spina 2003).

In some central California coast watershed, seasonal lagoons have also been shown to provide a critical role in supporting steelhead populations by providing important juvenile steelhead rearing habitat. Juvenile steelhead that rear in lagoon habitat over the summer have been shown to have rapid growth rates compared to growth in upstream locations (Hayes et al. 2008). Larger steelhead that reared in seasonal lagoon habitat in Scott Creek (Santa Cruz County), for example, were found to account for over 80% of the returning adult population (Bond et al. 2008). In some cases, lagoons have the potential to contribute to the majority of steelhead smolt produced in small coastal watersheds (Smith 1990).

During studies conducted in Pico Creek, downstream of Pico Creek Road, during 1992–1993 Rathburn et al. (1993) reported observations of juvenile steelhead during the spring throughout Pico Creek and in the lagoon. By late June, juvenile steelhead were primarily found in isolated pools and the lagoon. In July, the channel was dry upstream of the District wells (Rathburn et al. 1993).

2.1.2 Tidewater goby

Tidewater goby are federally listed as endangered and designated as a species of special concern by the State of California. They are endemic to the California coast, mainly in small lagoons and near stream mouths in the uppermost brackish portion of larger bays (Moyle 2002, USFWS 2005). Tidewater goby have been observed in high abundance in Pico Creek lagoon; however, critical habitat for tidewater goby is not designated in the watershed. Critical habitat is designated nearby in Little Pico Creek to the north and in San Simeon Creek to the south (USFWS 2013).

Tidewater goby are small fish that are adapted to estuarine/lagoon environments. The species is considered short-lived (generally for one year), highly fecund (females produce 300–500 eggs per batch and spawn multiple times per year) and disperse infrequently via marine habitat but have no dependency on marine habitat for their life cycle (Swift et al. 1989, Lafferty et al. 1999). Reproduction is generally associated with the closure and filling of the estuary (late spring to fall), typically beginning in late April or May and continuing into the fall, although the greatest numbers of fish are usually produced in the first half of this time period. Breeding occurs in slack shallow waters of seasonally disconnected or tidally muted lagoons, estuaries, and sloughs. Males dig burrows vertically into sand 4 to 8 inches deep and defend the burrows until hatching (SCR Project Steering Committee 1996). Their diet consists mainly of small animals, usually mysid shrimp (*Mysidopsis bahia*), gamarid amphipods (*Gammarus roeseli*), and aquatic insects, particularly chironomid midge (Diptera: Chironomidae) larvae (Swift et al. 1989, Swenson 1997, Moyle 2002). Tidewater goby have been documented in high numbers in Pico Creek Lagoon and the lower few hundred meters of stream when surface flows are present (Rathburn et al. 1993).

The USFWS (2013) states that habitat characteristics required to sustain the tidewater goby's life history processes include:

> Persistent, shallow (in the range of approximately 0.3 to 6.6 ft), still-to-slow-moving lagoons, estuaries, and coastal streams with salinity up to 12 ppt, which provide adequate space for normal behavior and individual and population growth that contain one or more of the following: (a) Substrates (e.g., sand, silt, mud) suitable for the construction of burrows for reproduction; (b) Submerged and emergent aquatic vegetation, such as pondweed (Potamogeton pectinatus), widgeongrass (*Ruppia maritima*), bulrush (*Typha latifolia*), and sedges (*Scirpus* spp.), that provides protection from predators and high flow events; or (c) Presence of a sandbar(s) across the mouth of a lagoon or estuary during the late spring, summer, and fall that closes or partially closes the lagoon or estuary, thereby providing relatively stable water levels and salinity.

2.1.3 California red-legged frog

California red-legged frog (CRLF) are federally listed as threatened and are a California Department of Fish and Wildlife (CDFW) Species of Special Concern. The species' range occurs from south of Elk Creek in Mendocino County to Baja California, with isolated remnant populations occurring in the Sierra foothills, from sea level to approximately 8,000 ft (Stebbins 1985, Shaffer et al. 2004). Most CRLF populations are currently largely restricted to coastal drainages on the central coast of California. Critical habitat for CRLF is excluded from Pico Creek under a conservation easement (USFWS 2010).

CFLF habitat includes wetlands, wet meadows, ponds, lakes, and low-gradient, slow-moving stream habitat. Breeding generally occurs from December through April in aquatic habitats characterized by still or slow-moving water with deep pools (usually 1.6 ft deep or greater) and emergent and overhanging vegetation (Jennings and Hayes 1994). CRLF egg masses contain between 2,000 and 5,000 eggs (USFWS 2002). Breeding sites can be ephemeral or permanent; if ephemeral, inundation is usually necessary into the summer months (through July or August) for successful metamorphosis. However, locations that dry out after successful metamorphosis occurs can be beneficial to CRLF because it helps prevent invasive predators such as bullfrogs (*Lithobates catesbeianus*) from becoming established (USFWS 2010). Eggs require approximately 20-22 days to develop into tadpoles, and tadpoles require 11 to 20 weeks to develop into juveniles capable of surviving in upland habitats (Bobzien et. al. 2000; Storer 1925; Wright and Wright 1949, as cited in USFWS 2002). CRLF eggs and tadpoles require daily average water temperatures <23°C (73.4°F) (USFWS 2002).

Although some adults may remain resident year-round at favorable breeding sites, others may disperse overland up to one mile or more (Fellers and Kleeman 2007). Movements may be along riparian corridors, but many individuals move directly from one site to another without apparent regard for topography or watershed corridors (Bulger et al. 2003). CRLF sometimes enter a dormant state during summer or in dry weather (aestivation), finding cover in small mammal burrows, moist leaf litter, root wads, or cracks in the soil. However, CRLF frogs in coastal areas are typically active year-round because temperatures are generally moderate (USFWS 2002, Bulger et al. 2003).

2.2 District Pumping Operations

The District provides water services to the unincorporated town of San Simeon through the operation of two groundwater wells located along lower Pico Creek, with a third well located on the Hearst Pico Creek Ranch that provides additional capacity during emergency drought conditions (Figure 1) (Cleath-Harris Geologists 2014). The Hearst Corporation also operates two wells along lower Pico Creek as part of the Hearst Pico Creek Stables, which provide irrigation and water to livestock at an average of 10-acre feet per year (AFY). The District has a water rights license issued by the California State Water Resources Control Board to extract up to 140-AFY from the Pico Creek Valley groundwater basin; however, average annual production averages between 70- and 80-AFY. Groundwater extraction typically increases during the spring and peaks during the summer due to the influx of tourists to the community of San Simeon during this time (Figure 3).

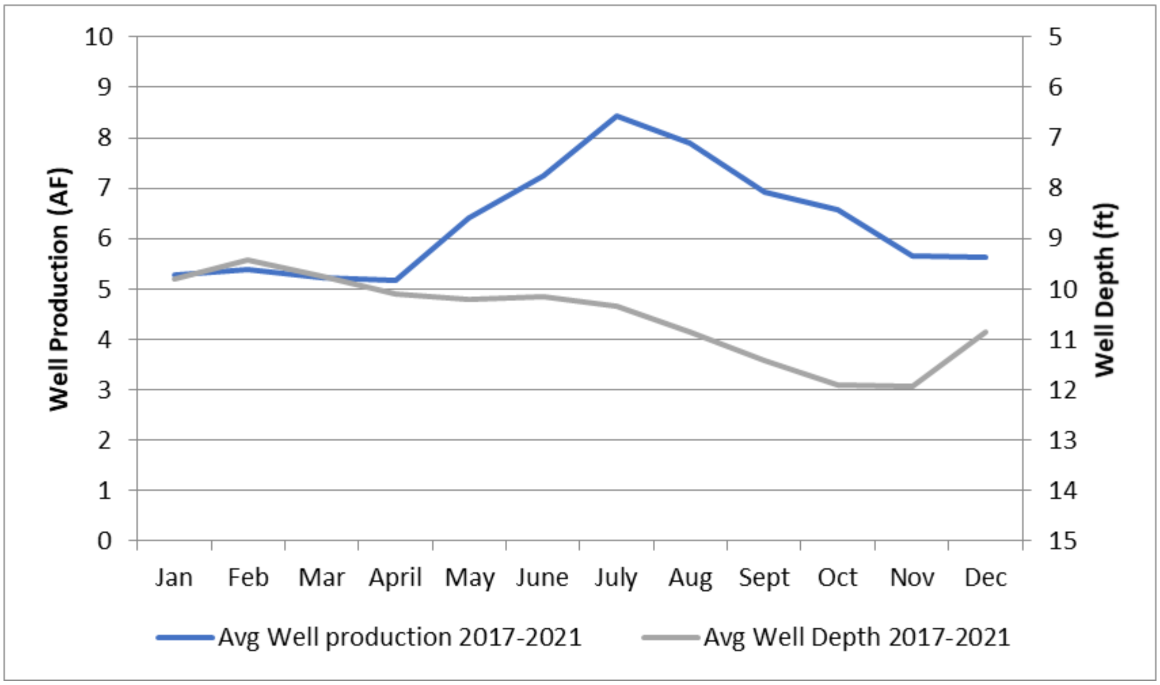


Figure 3. Monthly average groundwater well production and average well depth from District wells during 2017 through 2021.

Average monthly groundwater extraction ranges from 5.28 AF during the winter up to 8.44 AF a month during the summer (based on data collected between 2017–2021) (Figure 3), which is equivalent to daily average rates of 0.09 cfs and 0.14 cfs, respectively. Both wells are equipped with pumps that produce about 325 gallons per minute (0.72 cfs). However, water rights for the District limit groundwater extraction rates to a maximum daily average rate of 0.27 cfs.

Groundwater levels within the Pico Creek Valley groundwater basin generally become saturated after the first rain event in the winter (Cleath-Harris Geologists 2014) and begin to decrease in early spring until groundwater levels reach a minimum elevation during the fall months (Figure 3). The groundwater basin has been defined in earlier investigations. A map prepared of the alluvial deposits (1986 and updated in 2014) show that the alluvium beneath the stream channel adjacent to the District wells is shallower than where the wells are located. The base of the basin sediments also rises upstream, with the bedrock contact above mean sea level upstream of the Hearst Upper Well (Figure 4).

A previous pumping test (performed February 17, 2006) demonstrated that there is drawdown in the shallower well when the deeper well is pumped. However, the test did not show a flattening of the groundwater level indicating a recharge boundary, such as when a stream inflow boundary is encountered. The flow in the creek was not monitored during the previous test.

Well #1 produces water from aquifers at depths of 15–47 ft. Well #2 produces water from the deepest sand and gravel beds in the basin from depths of 50–60 ft. There is a clayey bed (aquitard) in the groundwater basin beneath the District's wells at depths from approximately 26 to 36 ft below ground. Where present, the aquitard inhibits downward groundwater movement from the shallower sand and gravels to the deeper sand and gravel layers. However, there are areas in the basin where sand and gravels extend from the surface to bedrock and no aquitard is present (e.g., near the Hearst Upper well) (Figure 4).

Test hole logs indicate that the main aquitard is not fully extensive over the basin. Therefore, the semi-confined deeper aquifer can be indirectly recharged from stream flow in the adjacent stream channel, as well as directly recharged from Pico Creek upstream of the Hearst Main Well (Figure 4).

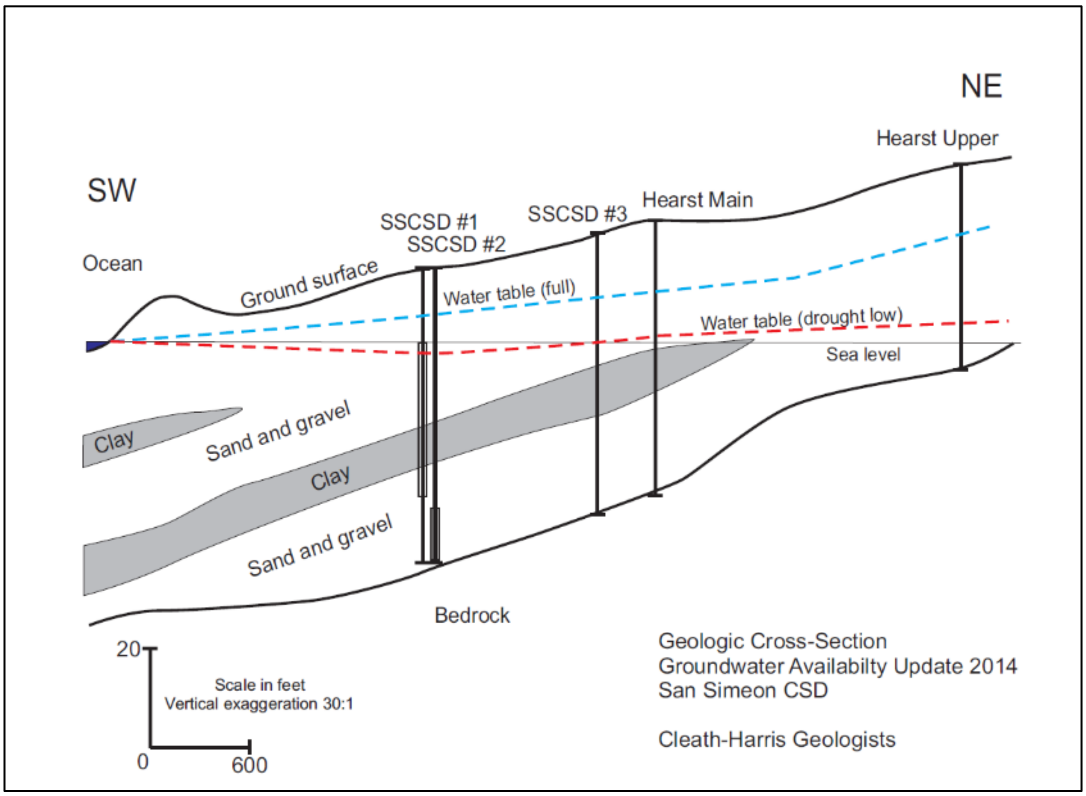


Figure 4. Cross section of Pico Creek groundwater basin and District pumps from Cleath-Harris (2014).

District pumping operations are expected to have the greatest potential influence on aquatic habitat when surface flows are low. With a maximum daily average groundwater pumping rate of

0.27 cfs, District pumping operations are not expected to influence habitat conditions during precipitation driven events when high migratory flows for steelhead likely occur. District pumping operations are also not expected to influence habitat conditions in lower Pico Creek during the summer months when the stream channel is dry, which is expected to occur frequently even under natural conditions (NMFS 2013). However, District pumping operations may potentially influence habitat conditions during relatively low flows (<5 cfs) that occur after the rainy season. During the spring, as surface flows are declining from 3 cfs to 1 cfs, and eventually drying up completely, critical life stages of sensitive aquatic species may be using lower Pico Creek. Juvenile steelhead are potentially rearing within the lower watershed or migrating as smolts downstream to the lagoon and ocean before the stream dries up (as described in Section 2.1.1). CRLF are potentially using this area to develop from eggs and tadpoles prior to metamorphosis into juveniles capable of surviving out of water (as described in Section 2.1.3). This spring period is therefore the most critical for understanding the potential for District pumping operations to influence surface flows and conditions for sensitive aquatic species.

2.3 Goals and Objectives of Study

The goal of the instream flow study is to inform District Master Plan as it relates to sensitive aquatic species that occur in lower Pico Creek. The study objective is to evaluate the relationship between aquatic habitat for sensitive species and District pumping operations in lower Pico Creek.

Results from this study will be used to (1) assess how District pumping operations might affect the biological needs of steelhead, CRLF, and tidewater goby in lower Pico Creek, (2) evaluate District pumping operations to identify constraints and opportunities to contribute towards meeting the biological needs of special status aquatic species in lower Pico Creek, and (3) identify long-term monitoring needs to ensure District pumping operations in the Pico Creek watershed minimize any potential impacts to special status aquatic species due to alterations in surface flows from groundwater pumping.

2.4 Study Area

The Study Area included lower Pico Creek where it flows over the Pico Creek Valley groundwater basin and where District pumps are located. A single Study Reach was established on Pico Creek within the Study Area and focused on the area most likely to be influenced by the District's groundwater pumping. The Study Reach began at the upstream end of the lagoon and extended 0.83 miles upstream to the confluence of the North and South Fork Pico Creek, overlapping with the Pico Creek Valley groundwater basin (Figure 1).

Stream flow data is limited for Pico Creek; however, surface flows within the Study Reach generally sustain steady baseflows during the winter months after the groundwater basin recharges following the first significant rain event. Flows begin to recede after the rainy season as the groundwater level recedes, typically during late spring (Figure 2). By early summer, surface flows typically cease and the channel remains dry through the fall until the groundwater basin refills.

The section of Pico Creek within the Study Area likely serves as a migratory corridor for steelhead, with adult spawning and juvenile rearing limited to the upper watershed where year-round flows are found. Modeling by Boughton and Goslin (2006) suggests similar historic use of Pico Creek by steelhead based on high potential over-summer habitat for juvenile steelhead predicted in the North Fork and South Fork of Pico Creek and "low potential" within Pico Creek downstream of the confluence (which was the researchers' lowest designation of habitat quality and assigned to intermittent reaches).

3 METHODS

3.1 Technical Advisory Committee

This project engaged stakeholders through the creation of a Technical Advisory Committee (TAC). The TAC includes individuals from CDFW. The TAC met regularly to assist and advise the project team in the instream flow assessment activities described in Section 3.2 through Section 3.7. The methods described here reflect input from the TAC received on March 3, 2022 and October 5, 2022.

3.2 Habitat Typing

Surveys to characterize physical habitat conditions within the Study Reach were conducted at the beginning of the study. Habitat mapping was conducted when flows were near winter baseflow conditions to facilitate the evaluation of habitat composition while distinct habitat unit breaks were expected to be most apparent. Habitat mapping was conducted following methods developed by Hawkins et al. (1993), McCain et al. (1990), and Flosi et al. (2010), which uses a three-tiered habitat mapping classification system to assist in the identification of individual habitat units in the field. Level III categories are adopted from McCain et al. (1990). Figure 5 shows the relationship among the three levels.

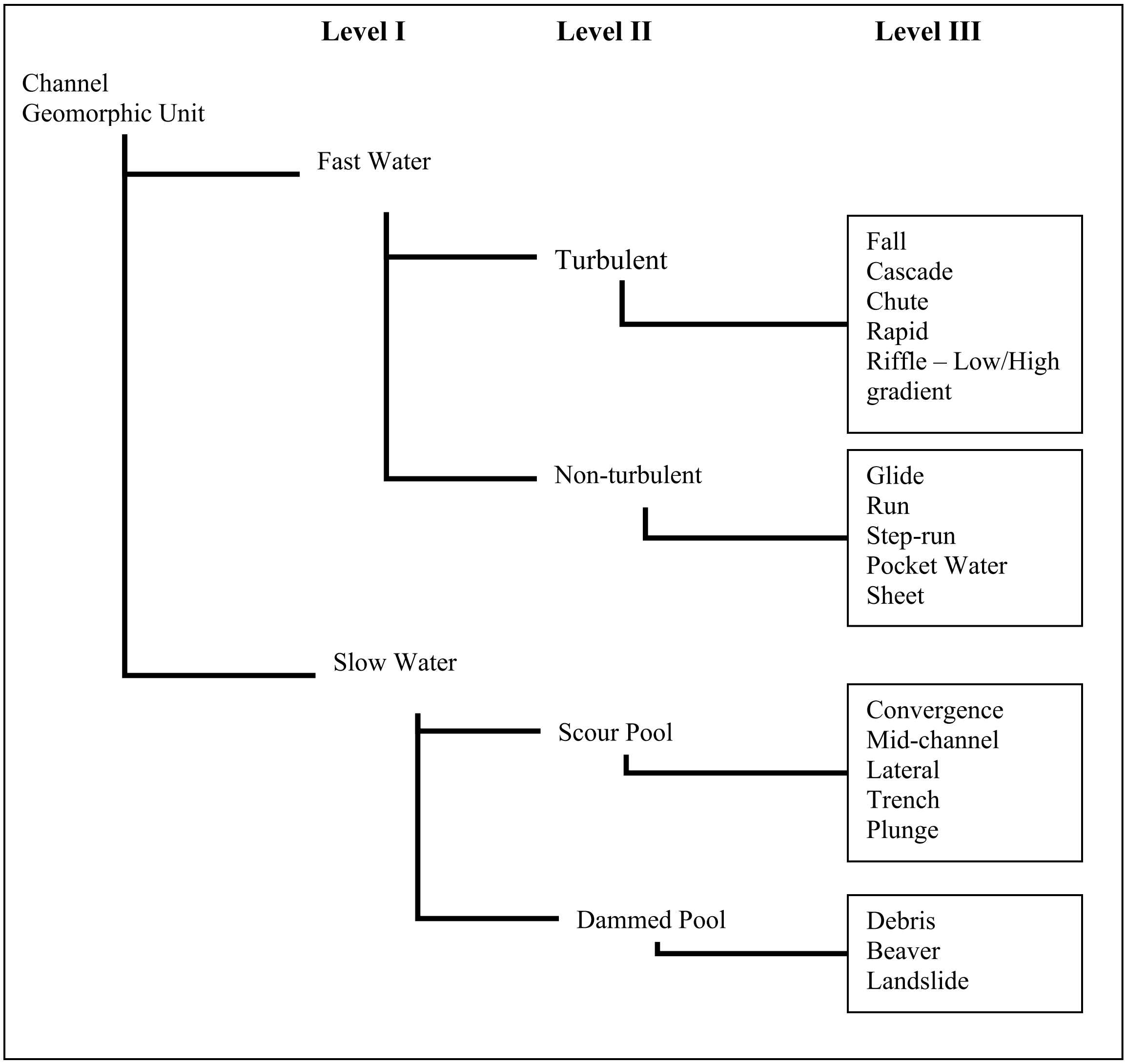


Figure 5. Three-tiered habitat mapping classification system adapted from Hawkins et al. (1993) and McCain et al. (1990).

The Study Reach was divided into individual habitat units that were designated a habitat type (e.g., riffle, run, pool) using the habitat types described in Table 1. Each habitat unit was separately identified where the unit length was at least equal to one to two times the active channel width (McCain et al. 1990, Flosi et al. 2010), or if the unit was otherwise distinctive. The team recorded the length of each habitat unit using a hip chain, which was referenced back to a known starting point or landmark. The mapping was contiguous, with each habitat unit abutted to the next unit. Each distinct habitat unit was numbered consecutively in an upstream direction, beginning at the downstream end of Study Reach. Habitat types used for reach characterization are listed in Table 1. Data from the habitat mapping were used to characterize the Study Reach and establish appropriate study sites.

Table 1. Habitat types to be used in mapping for the Pico Creek instream flow study (Adapted from McCain et al. 1990, Armantrout 1998, Payne 1992, McMahon et al. 1996, and Hawkins et al. 1993).

I. Fast Water:	**Riffles, rapid, shallow stream sections with steep water surface gradient.**
A. Turbulent:	**Channel units having swift current, high channel roughness (large substrate), steep gradient, and non-laminar flow and characterized by surface turbulence.**
1. Fall:	Steep vertical drop in water surface elevation. Generally not modellable.
2. Cascade:	Series of alternating small falls and shallow pools; substrate usually bedrock and boulders. Gradient high (more than 4%). Generally not modellable.
3. Chute:	Narrow, confined channel with rapid, relatively unobstructed flow and bedrock substrate.
4. Rapid:	Deeper stream section with considerable surface agitation and swift current; large boulder and standing waves often present. Generally not modellable.
5. Riffles:	Shallow, lower-gradient channel units with moderate current velocity and some partially exposed substrate (usually cobble). • Low gradient—Shallow with swift flowing, turbulent water. Partially exposed substrate dominated by cobble. Gradient moderate (less than 4%). • High gradient—Moderately deep with swift flowing, turbulent water. Partially exposed substrate dominated by boulder. Gradient steep (greater than 4%). Generally not modellable.
B. Non-turbulent:	**Channel units having low channel roughness, moderate gradient, laminar flow, and lack of surface turbulence.**
1. Sheet:	Shallow water flowing over smooth bedrock.
2. Run / Glide:	Shallow (glide) to deep (run) water flowing over a variety of different substrates.
3. Step Run	A sequence of runs separated by short riffle steps. Substrates are usually cobble and boulder dominated.
4. Pocket Water:	Swift flowing water with large boulder or bedrock obstructions creating eddies, small backwater, or scour holes. Gradient low to moderate.
II. Slow Water:	**Pools; slow, deep stream sections with nearly flat-water surface gradient.**
A. Scour Pool:	**Formed by scouring action of current.**
1. Trench:	Formed by scouring of bedrock.
2. Mid-channel:	Formed by channel constriction or downstream hydraulic control.
3. Convergence	Formed where two stream channels meet.
4. Lateral:	Formed where flow is deflected by a partial channel obstruction (streambank, rootwad, log, or boulder).
5. Plunge:	Formed by water dropping vertically over channel obstruction.
B. Dammed Pool:	**Water impounded by channel blockage.**
1. Debris:	Formed by rootwads and logs.
2. Beaver:	Formed by beaver dam.
3. Landslide:	Formed by large boulders.
4. Backwater:	Formed by obstructions along banks (Recorded as a comment or note to mapping).
5. Abandoned Channel:	Formed along main channel, usually associated with gravel bars (Not part of the main active channel – Recorded as a comment or note to mapping).

The following information was gathered during the habitat typing survey:

- Habitat unit number,
- Habitat unit type,
- Habitat unit length,
- Average width,
- Maximum pool depth,
- Substrate composition (two most dominant substrate types),
- Fish cover type, and
- Suitable CRLF breeding habitat based on depth (>1.6 ft) and emergent or overhanging vegetation for egg deposition (Jennings and Hayes 1994).

All habitat data were entered into a Microsoft Excel spreadsheet and checked for quality control. Analytical tasks included a description of existing stream habitat and conditions including the frequency of pool, riffle, and run habitat. Habitat type composition was calculated using the individual unit lengths as well as the number of representative habitat units. The substrate composition for the streambed was presented along with the average stream width, average pool depths, and available fish cover. Physical habitat conditions were summarized based on percent habitat composition (e.g., riffle, run, pool) within the Study Reach.

3.3 Water Surface Level and Temperature Monitoring

To assess habitat conditions for juvenile steelhead rearing, CRLF breeding, and CRLF over-summer rearing as surface flows recede, water depth and water temperature were monitored in three pool habitat locations within the upper, middle, and lower sections of the Study Reach. Hobo pressure transducers were placed within three deep pools (≥3 ft), that provide rearing habitat for juvenile steelhead and CRLF breeding. A fourth pressure transducer was installed above the stream to compensate for changes in barometric pressure. Locations monitored with pressure transducers (PT's) are shown on Figure 2 and Figure 6 and include the following locations:

- **PT1** located near the District groundwater wells, upstream of the lagoon;
- **PT2** located approximately halfway between the lagoon and the confluence of North Fork Pico Creek and South Fork Pico Creek; and
- **PT3** located downstream of the confluence North Fork Pico Creek and South Fork Pico Creek at the upstream end of the Pico Creek groundwater basin.

Data were collected during the spring through early summer to assess habitat conditions prior to desiccation. Monthly site visits were conducted to download pressure transducer data and measure water surface levels. Photos were taken of each pool where pressure transducers were installed and of the adjacent riffles. When surface flows were present, discharge was measured within at least one location in the Study Reach. A stage discharge rating curve was fit to the pressure transducer data to estimate stream flow over the course of the study period. Pressure transducers recorded water stage level and water temperatures at 15-minute intervals.

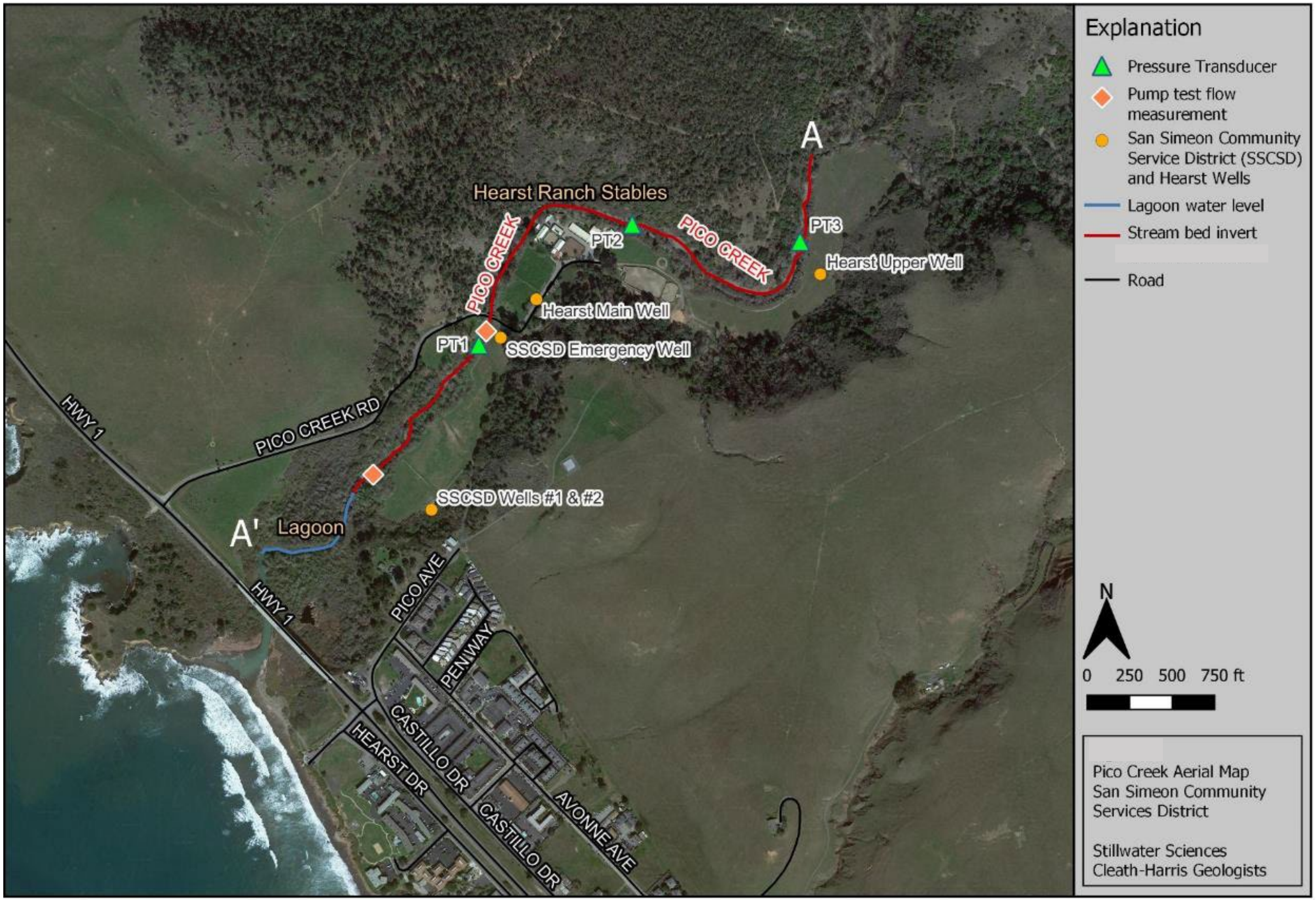


Figure 6. Study Area showing pressure transducer locations (PT1, PT2, and PT3) and pump test stream flow monitoring locations.

Water surface levels and water temperature data monitored using pressure transducers within pool habitats were evaluated to identify locations within the Study Reach where suitable habitat for steelhead and CRLF exists, and at which flows suitable habitat begins to diminish. Data collected from the water surface level and water temperature level monitoring effort were plotted against depth and temperature thresholds required to support suitable juvenile steelhead rearing and CRLF breeding habitat to assess what flows provide suitable habitat within pools. A stage discharge rating curve was fit to the pressure transducer data to estimate stream flows throughout the study period. Water elevation data from the pressure transducers were reviewed during the period when pump tests were conducted to assess changes in pool habitat that may be influenced by ground water pumping.

3.4 Riffle Habitat Assessment

Benthic macroinvertebrate (BMI) production and juvenile steelhead passage conditions were assessed within riffle habitat during each survey. Photo points were established at a minimum of five riffle locations and photographed during each survey. Observations of suitable BMI production in riffles were noted during each survey to assess food production and invertebrate drift into the upstream end of pool habitat where juvenile steelhead are likely to feed. Suitable BMI production was determined in riffles based on estimated water velocity of ≥1.0 ft/second and inundation of median substrate particles (D_{50}) per Orth and Maugham 1983, Gore et al. 2001, and Taylor et al. 2009. Fish passage conditions for juvenile steelhead were assessed by measuring water depths within each riffle where photo points occur. Water depths of 0.4 ft or greater within the thalweg of riffle crests were considered suitable for juvenile passage based on CDFW 2017. BMI production and juvenile steelhead passage conditions were referenced to discharge measurements collected during each site visit.

Observations from the riffle assessments were evaluated to understand the amount and distribution of suitable BMI habitat within the Study Reach and the stream flows required to support BMI production and juvenile steelhead passage. Photos collected from the riffle assessment were assessed to help characterize BMI habitat and juvenile steelhead passage conditions over a range of flows.

3.5 Dry and Intermittent Stream Segment Mapping

To help understand where suitable habitat for steelhead and CRLF occurs as stream flow recedes, surface flow conditions within the Study Reach were monitored during each site visit. Surface flow conditions were monitored by mapping dry and intermittent stream sections during each site visit. GPS coordinates of the upstream and downstream extent of each dry section were recorded during each site visit to document when and where surface flow become intermittent as flows receded. Data from the dry and intermittent stream segment mapping were analyzed to describe the seasonal pattern of declining surface flows. Results were compared to the water surface level monitoring data collected within pool locations to assess the ability of isolated pools to retain water without input from surface flows.

3.6 Lagoon Habitat

Pico Creek lagoon was monitored during the study to assess how aquatic habitat for sensitive species that use the lagoon may change as stream flow in Pico Creek recedes. Changes in lagoon size during the study were assessed by monitoring the upstream extent of the lagoon. The upstream extent of the lagoon was recorded during each site visit using handheld GPS and representative photos of the upstream section of the lagoon were collected. A pressure transducer was installed within the lagoon as part of the Surface Water/Groundwater Connectivity assessment described below (Section 3.7).

Locations of the upstream end of the lagoon were mapped to show changes in lagoon extent over the course of the study. Habitat conditions within the Pico Creek lagoon were assessed based on changes in the lagoon extent during the study period and changes in lagoon stage levels during the pumping tests. Pressure transducer data from the lagoon were assessed for elevation changes during the study period with and during the pumping tests to evaluate the potential influence from District pumping operations on lagoon habitat.

3.7 Surface Water/Groundwater Connectivity

Assessments of the relationship between groundwater extraction and surface flows were conducted to assess stream flow loss during groundwater pumping at each of the two main District Wells. Pumping tests were performed at each of the two District wells in conjunction with the water surface level monitoring discussed above (Section 3.4). Groundwater extractions during the pumping tests were maximized to the extent possible based on water availability and storage capabilities. Pumping tests were performed on weekends when maximum demand typically occurs and the longest duration of pumping could occur. Separate pumping tests were run for each of the two main District wells. All of the water produced during the pumping tests was used to replenish the District reservoir that was drained to a minimum level prior to the testing in order to maximize the duration of the test; none was discharged to waste, per direction from the District.

During these tests, Pico Creek stream flow was monitored to observe evidence of stream flow depletion due to pumping from the District wells. Stream flow monitoring points were established upstream of the wells near PT1 and downstream of the wells just upstream of the lagoon (Figure 6). Measurements were collected at each steam flow monitoring point just before pumping began and then approximately every 15 to 30 minutes throughout the pump test. In addition, the stage levels at PT1, PT2, PT3, and the lagoon level were monitored during these tests to assess the potential influence of groundwater pumping on pool and lagoon habitat.

This study also assessed the relationship between rainfall events and groundwater elevations during the onset of the rainy season to better understand groundwater recharge. Average groundwater levels recorded at the District wells were compared to daily rainfall totals reported for the San Simeon rain gage (#764) operated by the County of San Luis Obispo.

3.8 Wetland and Riparian Habitat Conditions

Wetland and riparian habitat conditions were assessed in the Study Area by reviewing maps of groundwater dependent ecosystems (GDEs), Google Earth imagery, and trends in remote sensing indices of vegetation health. Trends in Normalized Difference Vegetation Index (NDVI) and Normalized Difference Moisture Index (NDMI) were taken from the GDE Pulse 2.2 web application (TNC 2024b). NDVI and NDMI are both derived from Landsat data which has a resolution of approximately 100 ft. NDVI and NDMI data were analyzed for the following time periods (which were available on the Pulse 2.2 site):

- 1985-2023
- 2009-2023
- 2014-2023
- 2019-2023

4 RESULTS

4.1 Habitat Typing

Stream habitat typing was conducted throughout the Study Reach on January 14, 2022, beginning at the upstream end of the lagoon and extending approximately 0.83 miles upstream. The Study Reach is dominated by pool habitat (both mid-channel and lateral scour pools were observed), followed by riffle habitat and run habitat (Figure 7). Substrate withing pool habitat was predominantly sand while the riffle and run habitats were dominated by cobble and gravel substrates, respectively (Figure 8). The majority of the channel (43%) contained no cover for fish. The dominant cover type was overhanging vegetation followed by boulder (Figure 9).

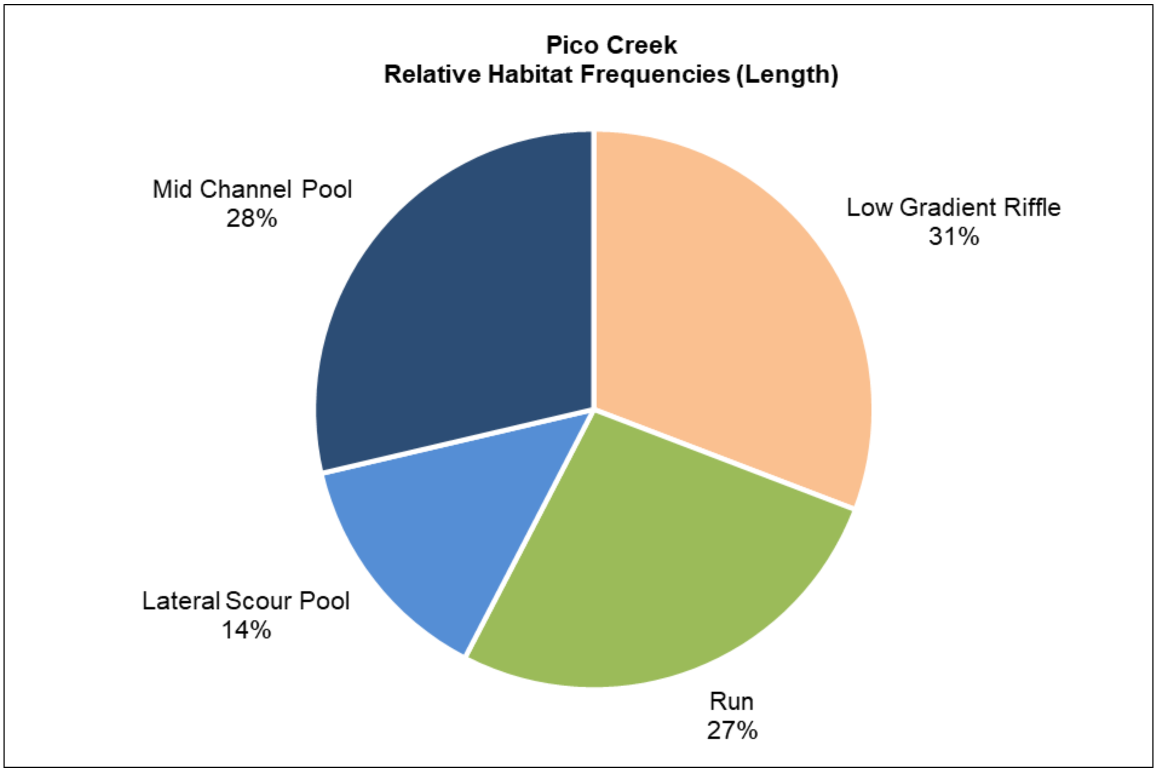


Figure 7. Relative frequency of habitat types (by length) in the Study Reach.

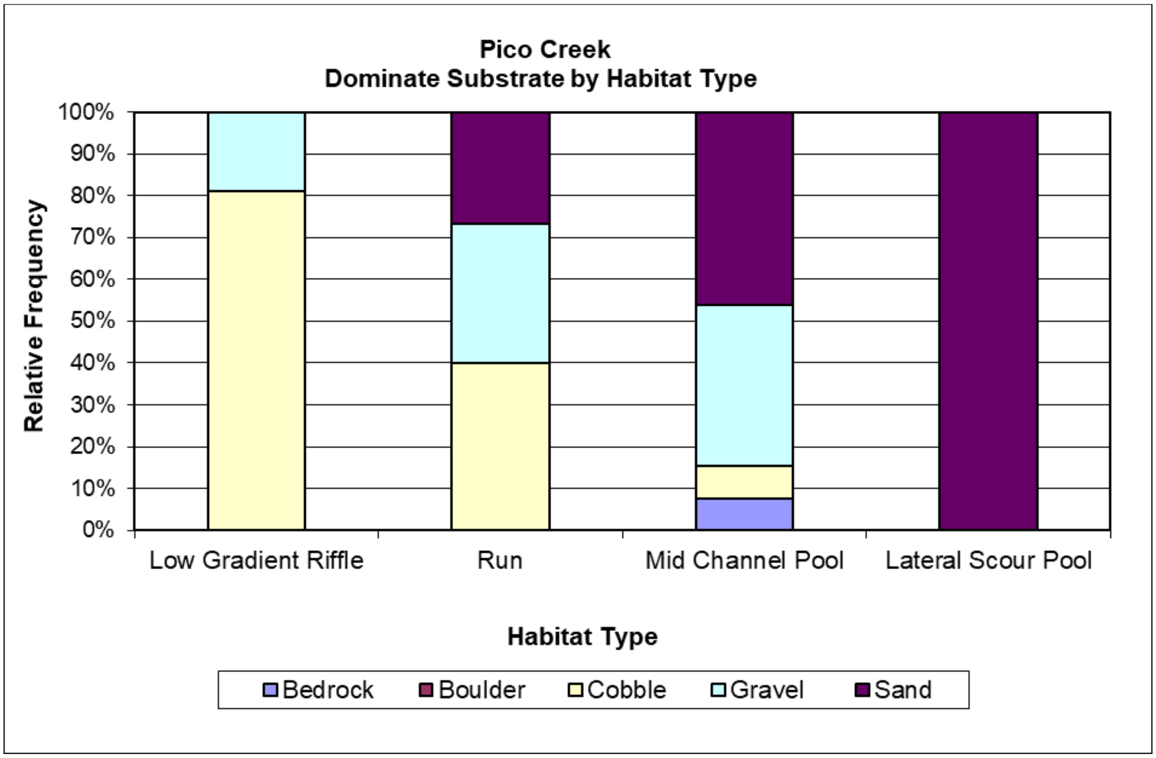


Figure 8. Dominant substrate by habitat type in the Study Reach.

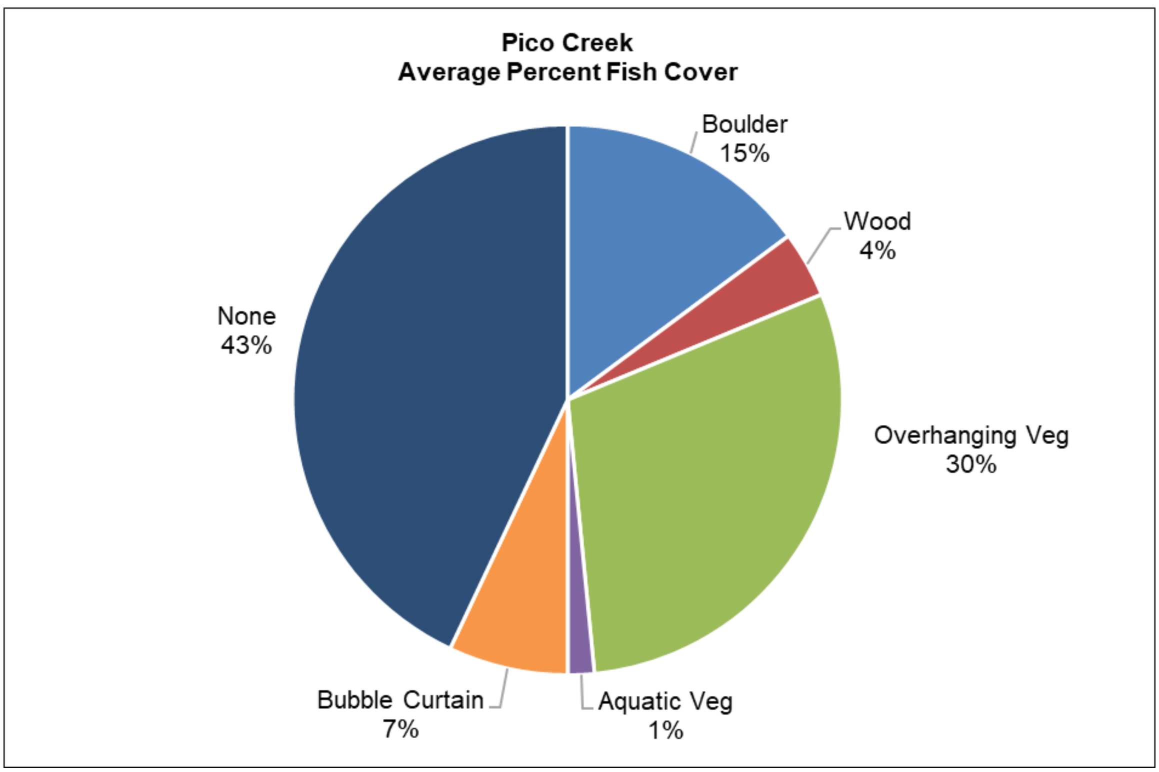


Figure 9. Average percent of fish cover within the Study Area.

4.2 Water Surface Level and Temperature

Pressure transducers were installed in Pico Creek on March 15, 2022, when stream flow was 0.35 cfs. Water levels in pools were generally stable until surface flows became disconnected, at which point pool depths began to decrease quickly. Pool depths showed a quick response to rain events that occurred in late March and in late April. The April rain event occurred after stream flows had become disconnected in the upper section of the Study Reach, when water depths at the pools where PT2 and PT3 were located began to drop. Following the April rain event, water levels in these locations briefly rose by approximately 0.5 ft but then began dropping almost immediately (Figure 10). Photos of each pool where pressure transducers were installed are shown in Figures 11–13.

The downstream pool monitored with a pressure transducer (PT1) had stable pool depths later into the year compared to the upper pools, with water depths remaining stable until early June before levels began dropping. Suitable depths for CRLF breeding and juvenile steelhead rearing remained at this location until early July (Figure 10). Water depths within pools at the upper end of the Study Reach (PT2 and PT3) were generally stable during March and April with the exception of a few spikes following rain events, then began to decrease in depth by late April (Figure 10). In these locations, water depths were suitable for CRLF breeding habitat until late May. Because the pressure transducers were not installed in the deepest part of the pools, PT2 and PT3 were out of the water by late May before the pools dried up. Both pools were observed to be completely dry during the next site visit, which occurred on June 13, 2022, and the pools no longer provided suitable habitat for juvenile steelhead.

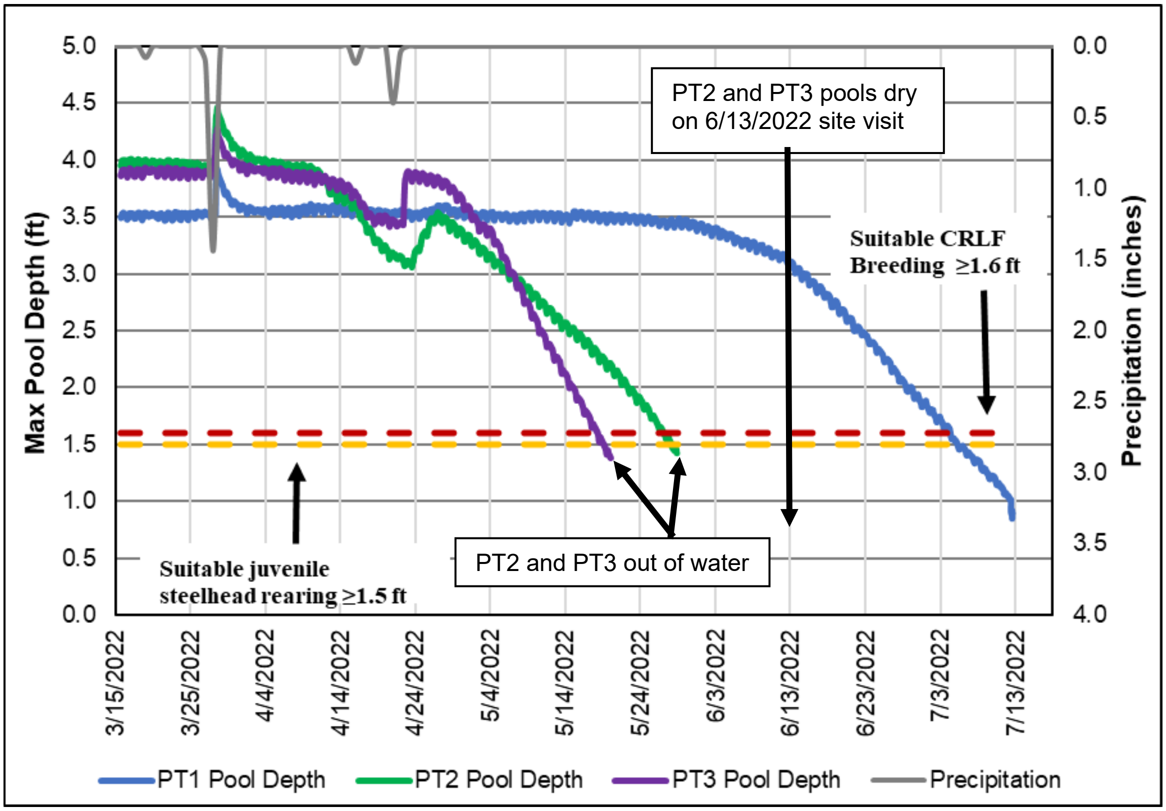


Figure 10. Pool depths in Pico Creek with depth thresholds for CRLF breeding and juvenile steelhead rearing.

** Note, pressure transducers were installed outside of the thalweg to prevent unit movement or loss during storm events and were installed above the stream bed to reduce sediment fouling of equipment, which resulted in Pressure transducers being 1.0 ft to 1.5 ft above the max pool depth.*

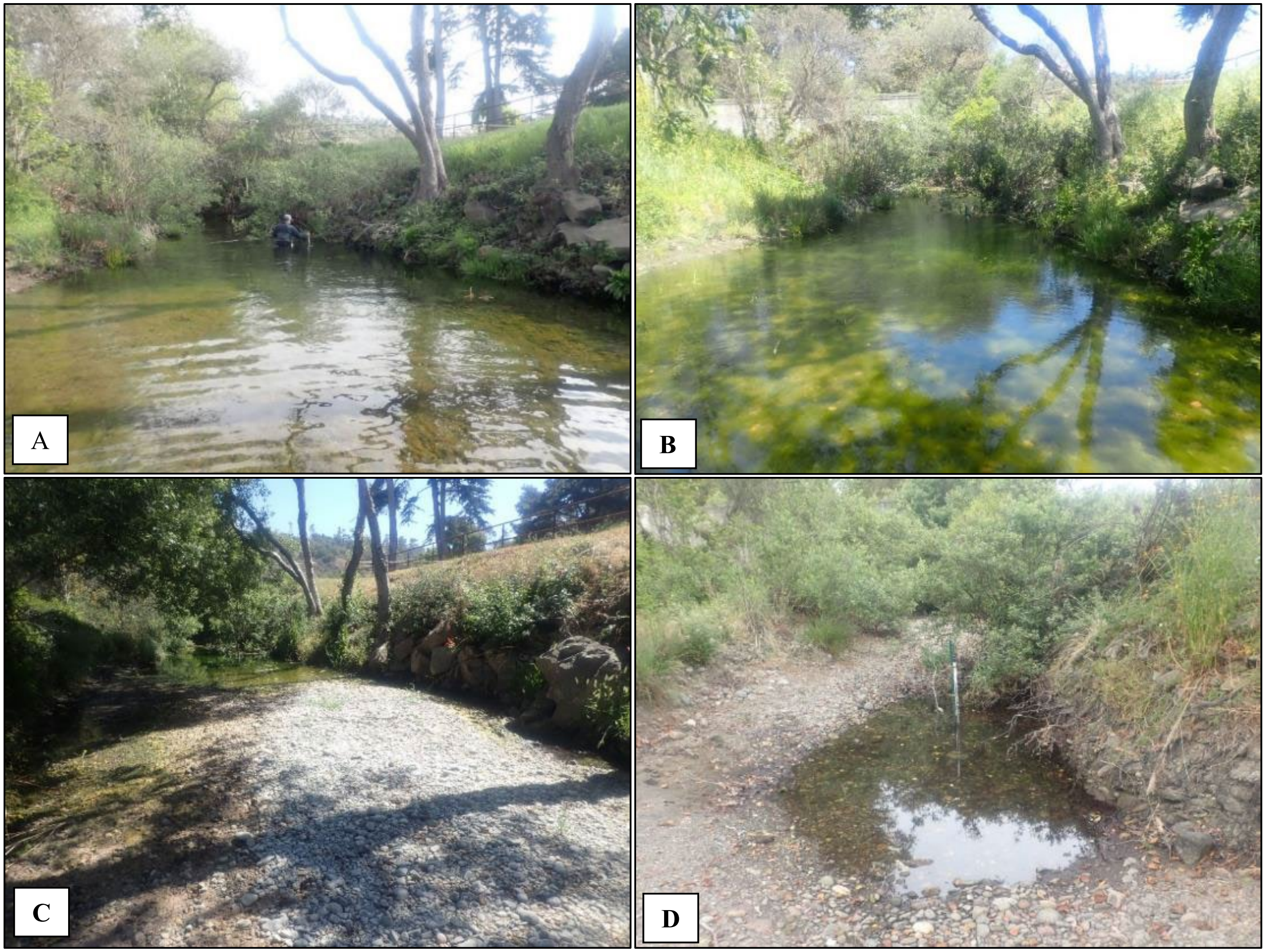


Figure 11. Looking upstream at pool where PT1 was installed on: (A) March 30 (0.86 cfs), (B) May 9 (0.05 cfs), (C) June 13 (0.0 cfs), and (D) July 12, 2022 (0.0 cfs).

Figure 12. Looking upstream at pool where PT2 was installed on: (A) March 30 (0.86 cfs), (B) April 15 (0.14 cfs), (C) May 9 (0.05 cfs), and (D) June 13, 2022 (0.0 cfs).

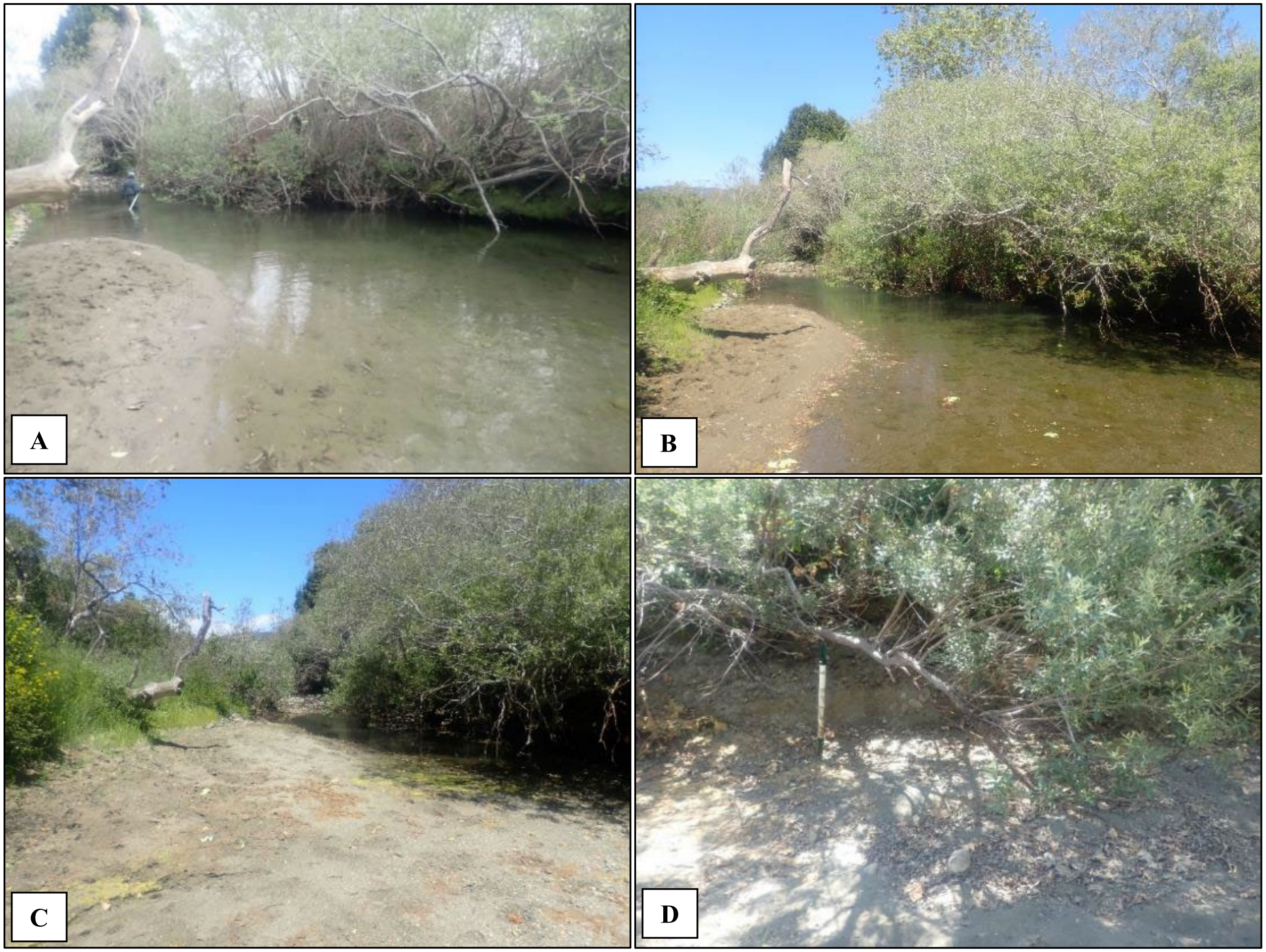


Figure 13. Looking upstream at pool where PT3 was installed on: (A) March 30 (0.86 cfs), (B) April 15 (0.14 cfs), (C) May 9 (0.05 cfs), and (D) June 13, 2022 (0.0 cfs).

4.2.1 Stage discharge ratings

Stream flow was measured throughout the study and ranged from 4.10 cfs on January 14, 2022, to 0.00 cfs on June 13, 2022 (Table 2). A stage discharge rating curve was applied to the pressure transducer stage levels collected at PT1 using the flow measurements collected after PT1 was installed in Pico Creek (March 13, 2022, and after). Estimated stream flow in Pico Creek at PT1 was less than 1.0 cfs for most of the monitoring period, with the exception of a brief spike in stream flow following a large rain event (>1.0 inches of precipitation) in late March 2022 (Figure 14).

Table 2. Stream flow measurements in Pico Creek downstream of the Pico Creek Road bridge.

Date	Stream Flow (cfs)	Notes
01/14/2022	4.10	Flow measured before pressure transducers were installed
2/8/2022	1.56	Flow measured before pressure transducers were installed
3/15/2022	0.35	Pressure transducers installed
3/30/2022	0.86	
4/15/2022	0.14	
4/28/2022	0.11	Outlier, removed from rating curve
5/9/2022	0.05	
6/13/2022	0.00	

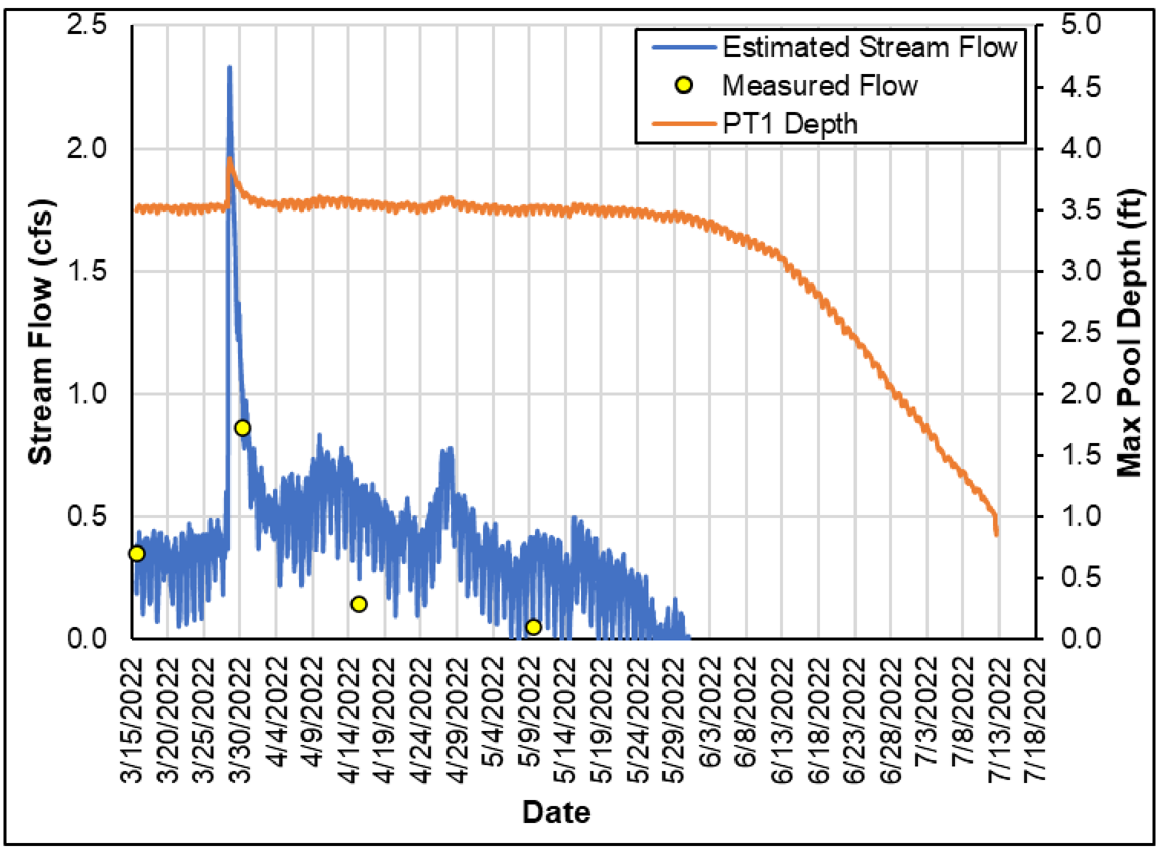


Figure 14. Estimated stream flow in Pico Creek based on stage discharge rating curve for PT1.

4.2.2 Water temperatures

Ambient temperature was recorded on PT1, PT2, and PT3 during the study. All three pools where pressures transducers were installed provided suitable water temperatures for steelhead and CRLF until the pools became dry. Stable and cool water temperatures were recorded on the PTs until pool depths began to decrease. As pool depths decreased, water temperatures became more responsive to the daily fluctuations in air temperature. The downstream end of the Study Reach remained wet later into summer than pools at the upstream end of the Study Reach. Water temperatures recorded at PT1, which remained under water throughout the study, never exceeded suitable levels for steelhead or CRLF (Figure 15) while water temperatures recorded at PT2 and PT3 remained suitable for steelhead and CRLF until they became dry in late May (Figure 16 and Figure 17).

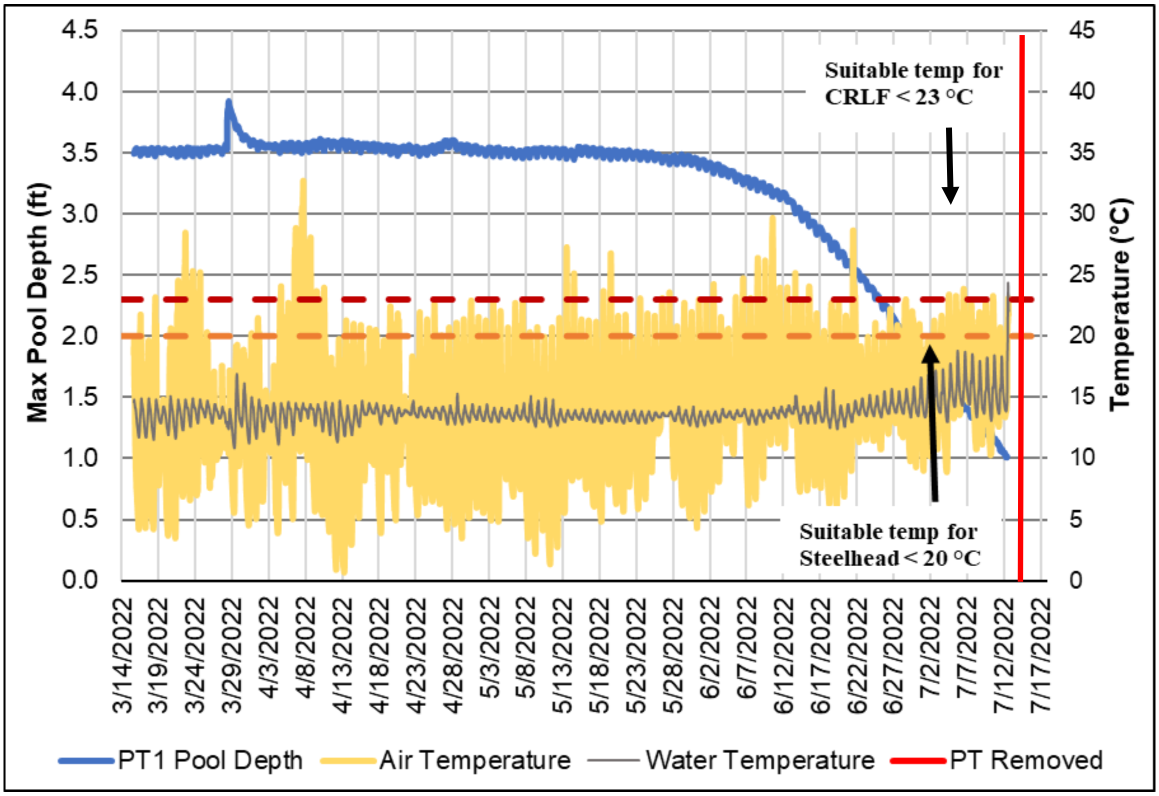


Figure 15. Pool depth and water temperature monitored at PT1.

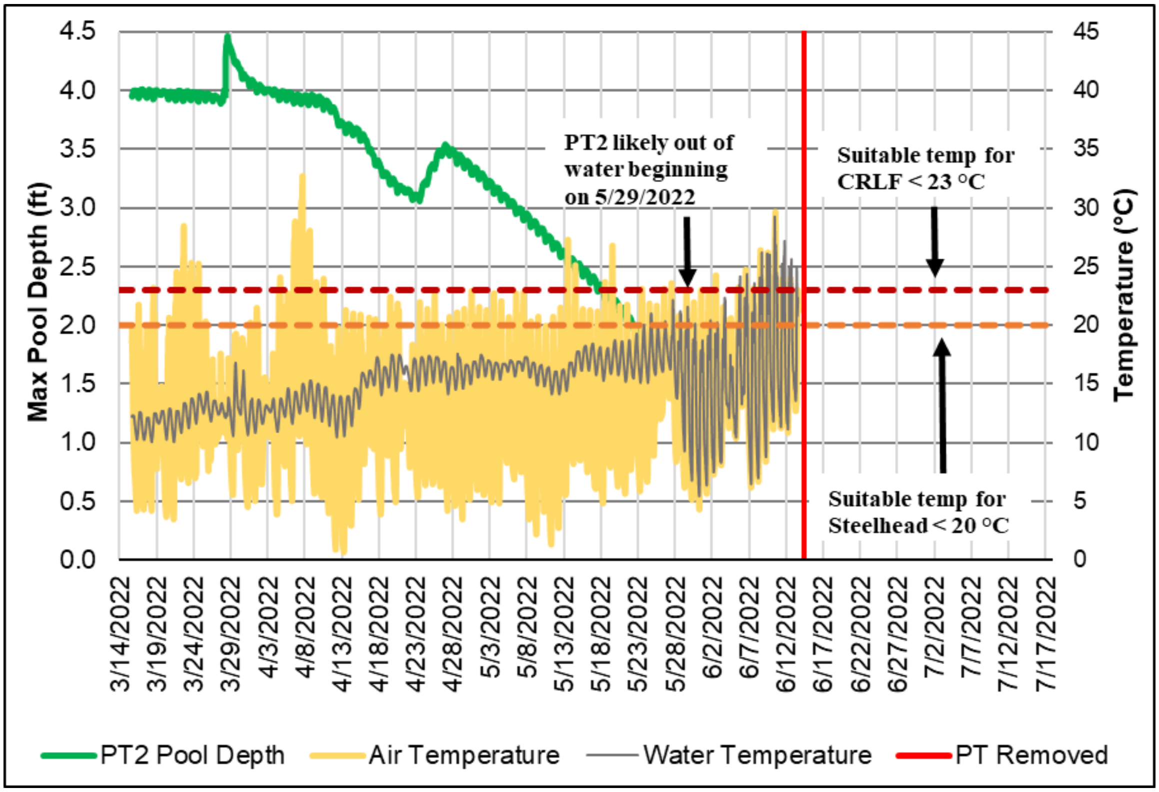


Figure 16. Pool depth and water temperature monitored at PT2.

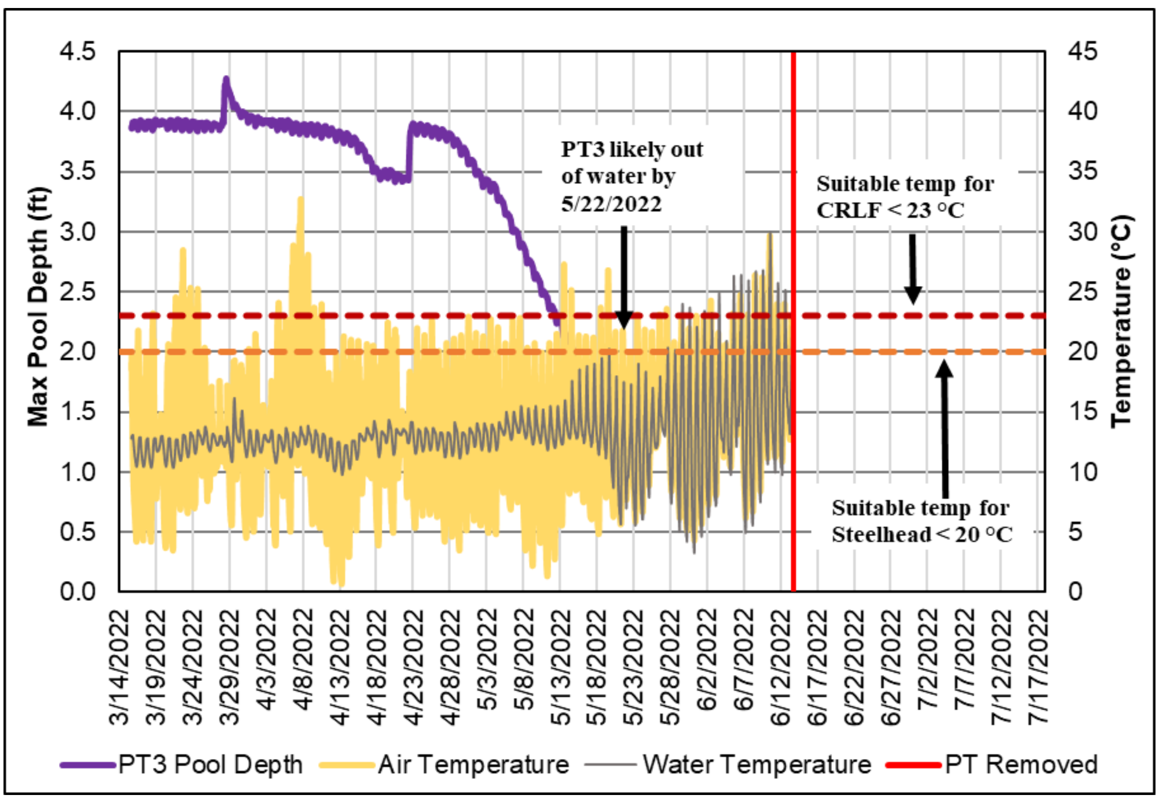


Figure 17. Pool depths and water temperature monitored at PT3.

4.3 Riffle Habitat Conditions

Observations from the riffle assessments were evaluated to understand what flows supported productive BMI habitat and passage conditions for juvenile steelhead within the Study Reach. Suitable conditions to support BMI production in riffles were observed at all riffles assess when flows ranged from 4.10 cfs to 0.86 cfs. At flows of 0.35 cfs, suitable conditions to support BMI production in riffles were observed at most riffles assessed while a few riffles no longer supported BMI production. When flows were below 0.35 cfs, no suitable habitat for BMI production was observed at any of the riffles assessed (Table 3). Photos showing riffle conditions over a range of flows are included in Figures 18–23.

Flows that provide passage for juvenile steelhead likely occur throughout the Study Reach at flows of 4 cfs and greater. Suitable conditions for juvenile steelhead were observed at all riffles assessed at 4.10 cfs and at most riffles assessed at 1.56 cfs. At 0.86 cfs, conditions to support juvenile steelhead passage were observed at just over half of the riffles assessed. When flows were at 0.35 cfs and below, conditions did not provide passage for juvenile steelhead at any of the riffles assessed (Table 3).

Table 3. Results of Pico Creek riffle habitat assessment for BMI production and juvenile steelhead passage conditions observed during surveys conducted between January 14 through April 28, 2022. *Note, surveys were conducted through July 12, 2022 but conditions no longer supported BMI production or juvenile fish passage after the April 15, 2022 survey.*

Location		Jan. 14, 2022 (4.10 cfs)		Feb. 8, 2022 (1.56 cfs)		March 30, 2022 (0.86 cfs)		March 15, 2022 (0.35 cfs)		April 15, 2022 (0.14 cfs)		April 28, 2022 (0.11 cfs)	
Habitat unit number	**PPT#**	**BMI production**	**Juvenile passage**	**BMI production**	**Juvenile passage**	**BMI production**	**Juvenile passage**	**BMI production**	**Juvenile passage**	**BMI production**	**Juvenile passage**	**BMI production**	**Juvenile passage**
13	1*	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No	No	No
15	1	--	--	--	--	Yes	Yes	Yes	No	No	No	No	No
17	2	--	--	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
29	3	--	--	--	--	Yes	Yes	Yes	No	No	No	No	No
33	4	--	--	--	--	Yes	No	No	No	No	No	Dry	Dry
35	5	--	--	--	--	Yes	Yes	No	No	No	Dry	No	Dry
37	6	Yes	Yes	Yes	No	Yes	No	Dry	Dry	No	No	Dry	Dry
40	7	--	--	--	--	Yes	Yes	No	No	Dry	Dry	Dry	Dry
46	8	--	--	Yes	Yes	Yes	Yes	Yes	No	Dry	Dry	Dry	Dry
50	9	--	--	--	--	Yes	No	Yes	No	Yes	No	Yes	No

-- indicates location was not assessed on the specified date. Photo points were established on March 15, 2022; however, some locations were photographed during earlier surveys conducted at higher flows during January and February 2022.

Figure 18. Riffle habitat at PPT1* showing suitable BMI habitat and juvenile steelhead passage at 4.10 cfs (A) and 1.56 cfs (B), BMI habitat but no juvenile steelhead passage at 0.86 cfs (C), and no BMI habitat or juvenile steelhead passage at 0.11 cfs (D).

Figure 19. Riffle habitat at PPT1 showing suitable BMI habitat and juvenile steelhead passage at 0.86 cfs (A), BMI habitat but no juvenile steelhead passage at 0.35 cfs (B) and 0.11 cfs (C), and no BMI habitat or juvenile steelhead passage at 0.05 cfs (D).

Figure 20. Riffle habitat at PPT2 showing suitable BMI habitat and juvenile steelhead passage at 1.56 cfs (A) and 0.86 cfs (B), BMI habitat but no juvenile steelhead passage at 0.35 cfs (C), and no BMI habitat or juvenile steelhead passage at 0.14 cfs (D).

Figure 21. Riffle habitat at PPT6 showing suitable BMI habitat and juvenile steelhead passage at 4.10 cfs (A), BMI habitat but no juvenile steelhead passage at 1.56 cfs (B) and 0.86 cfs (C), and no surface flow when flows measured downstream were 0.35 cfs of less (D).

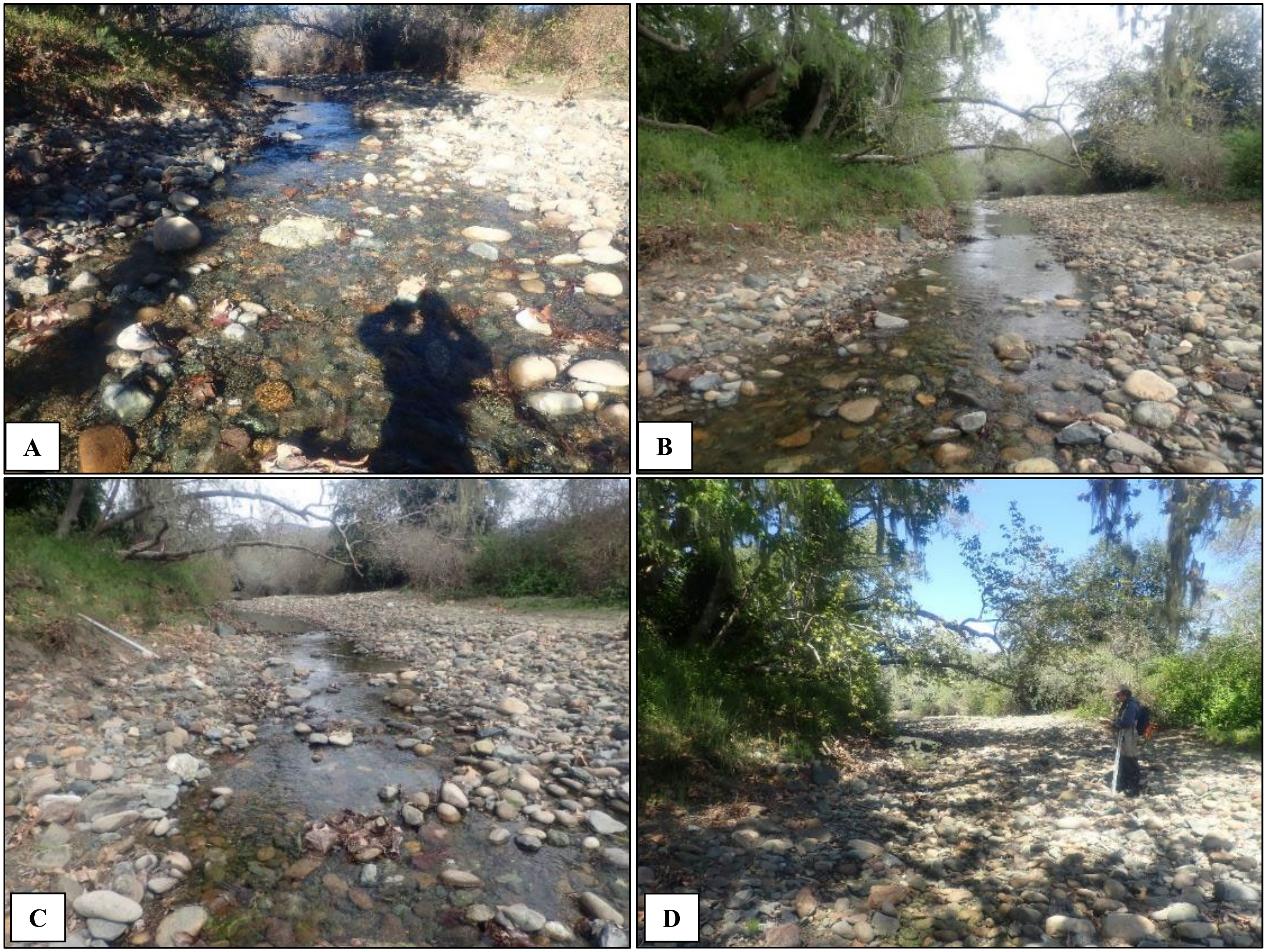


Figure 22. Riffle habitat at PPT8 showing suitable BMI habitat and juvenile steelhead passage at 1.56 cfs (A) and 0.86 cfs (B), BMI habitat but no juvenile steelhead passage at 0.35 cfs (C) and no surface flow when flows measured downstream were 0.14 cfs.

Figure 23. Riffle habitat at PPT9 showing suitable BMI habitat but no juvenile steelhead passage at 0.86 cfs (A), 0.35 cfs (B), and 0.14 cfs (C), and and no surface flow when flows measured downstream were 0.05 (D).

4.4 Wet and Dry Stream Channel Mapping

Observations of the stream channel drying out within the Study Reach were observed early in the study. The first observation of disconnected stream flow was observed during March 15, 2022 when a short segment within the middle of the Study Reach (at PPT6) was dry. Following a substantial rain event (1.44 inches) on March 28, 2022, surface flows were observed throughout the entire Study Reach. By April 15, 2022 dry stream channel segments were observed in two sections within the upper half of the Study Reach and both sections were dry again on April 28, 2022, even after a 0.40 inch rain event occurred on April 21, 2022. On May 9, 2022 the upper half of the Study Reach had no surface flow and water was limited to a few isolated pools. On June 13, 2022, the upper half of the Study Reach was completely dry with no surface flow and no water in isolated pools upstream of the Pico Creek Bridge to the confluence of North Fork and South Fork Pico Creek (Figure 24 and Figure 25). No surface flow was observed throughout the Study Reach on July 12, 2022 but a few small isolated pools were observed between Pico Creek Road and the lagoon.

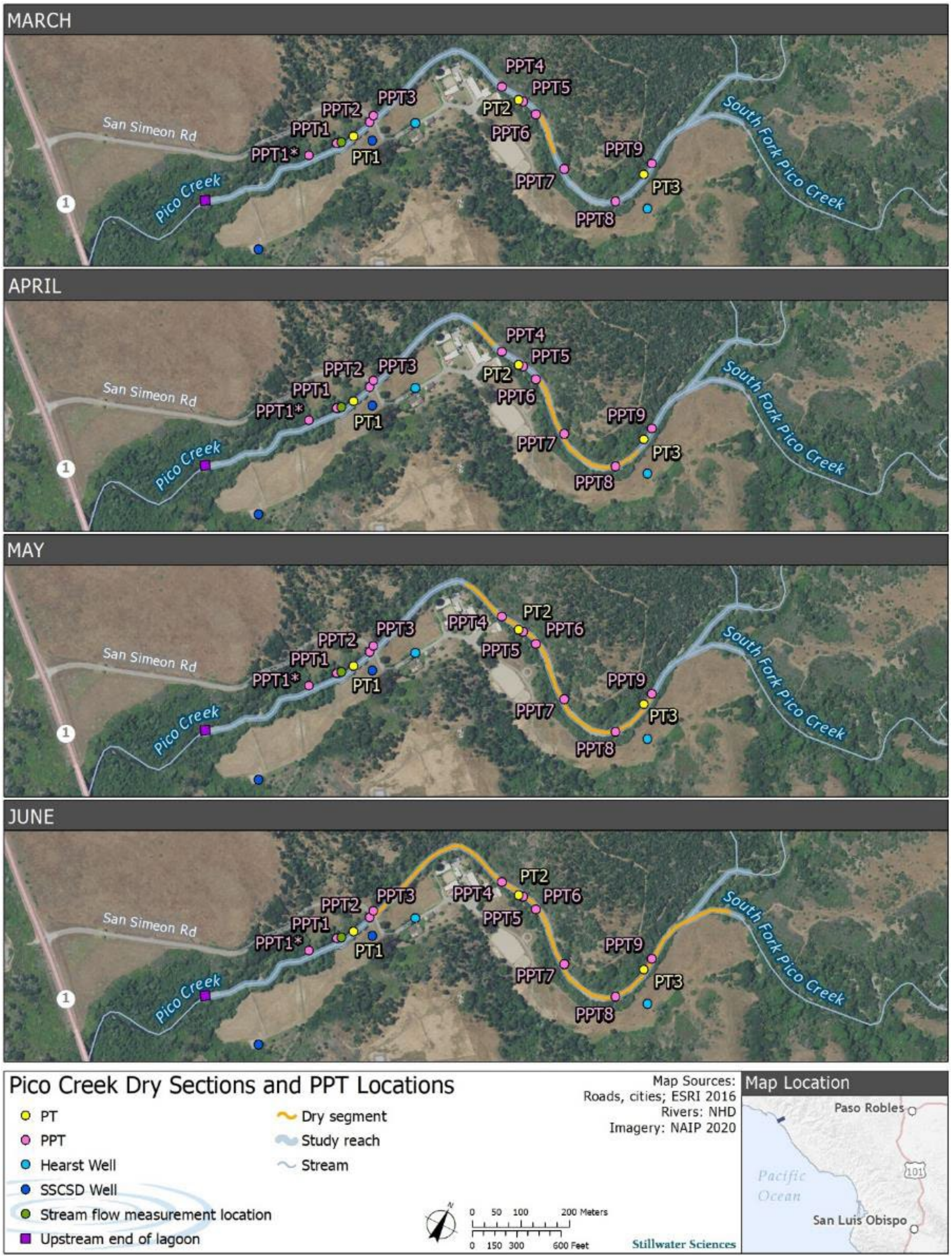


Figure 24. Pico Creek dry segment locations observed during surveys conducted during March through June 2022.

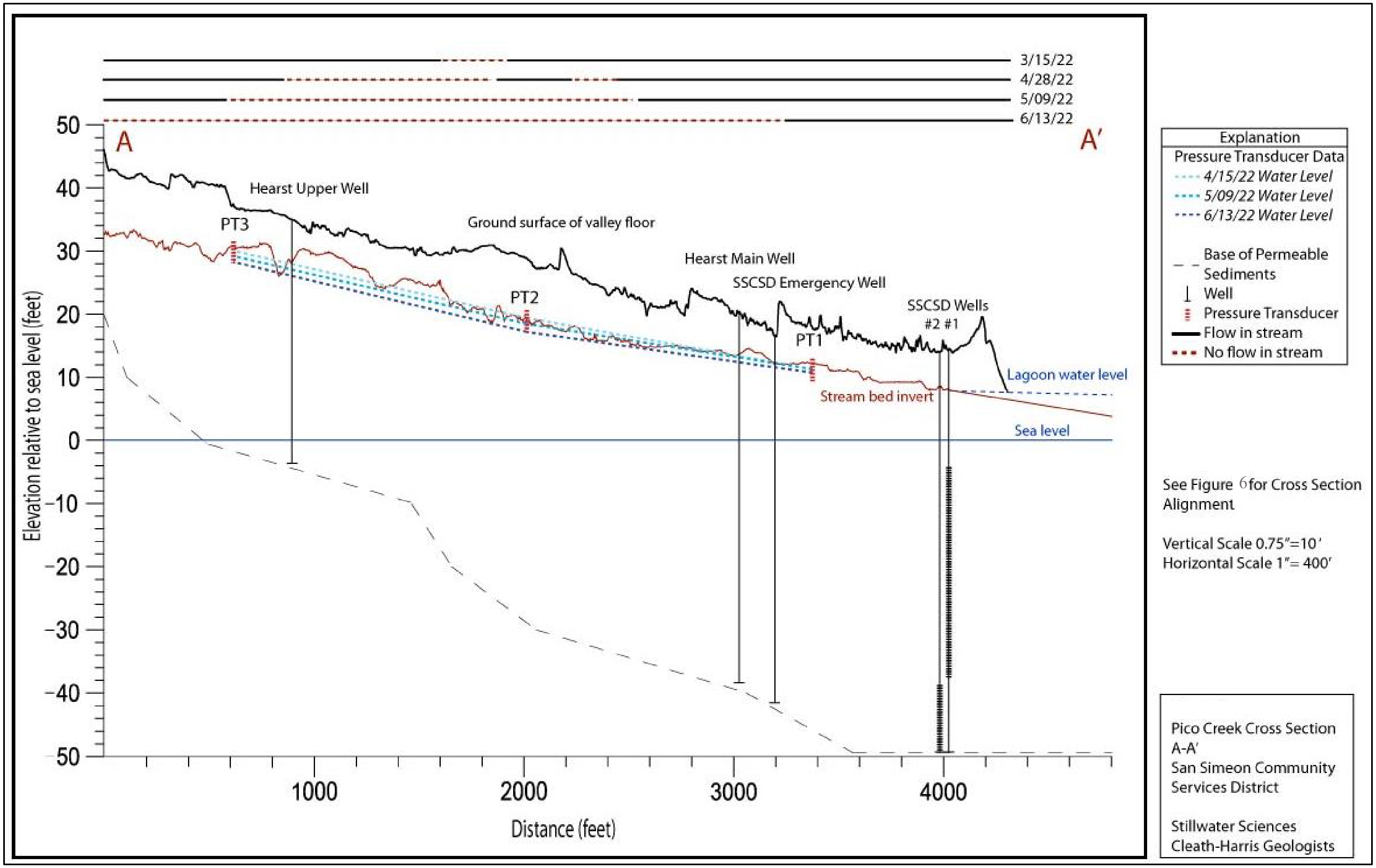


Figure 25. Pico Creek longitudinal elevation profile showing extent of intermittent stream flows in relation to groundwater wells along the Study Reach.

4.5 Surface Water/Groundwater Connectivity

Pump tests were conducted on April 16, 2022 at Well #1 which pumps from depths of 15–47 ft and on April 23, 2022 at Well #2 which pumps from depths of 50–60 ft. The volume of water pumped from the shallow well (Well #1) was 90,284 gallons and occurred over an 8-hour period (equivalent to a rate of 0.42 cfs). The volume of water pumped from the deep well (Well #2) was 108,834 gallons and occurred over a 9-hour period (equivalent to a rate of 0.45 cfs).

Stream flow during the pump tests at the upstream monitoring point was about half the rate at the downstream monitoring point. Stream flow measurements fluctuated during the tests up to roughly 0.20 cfs during testing at Well #1 and by roughly 0.05 cfs during testing at Well #2. However, the overall trend when the shallow well (Well #1) was pumped shows stream flows decrease by approximately 0.1 cfs at the upstream monitoring point while stream flow at the downstream monitoring point increased by approximately 0.1 cfs (Figure 26). The increase in flow observed downstream of the wells may be due to bank storage-drainage from the shallow aquifer into the stream channel. Stream flow at the upstream monitoring point of the deep well (Well #2) shows a decrease in stream flow of approximately 0.04 cfs, and no detectable trend in stream flow was observed at the downstream monitoring point (Figure 27). The sensor depth at PT1 for both tests declined by approximately 0.05 ft during pumping and then recovered after pumping ceased (Figure 26 and Figure 27). However, the fluctuation in sensor depth observed at PT1 during the pump tests were similar to the daily fluctuations observed during days when District well production was more than half the amount during the pump tests (Figure 28, see daily fluctuations for PT1 on 4/07/2022 and 4/25/2022 when daily well production was around 30,000 gallons).

Based on the daily fluctuations in sensor depths at all three PT sensors monitoring points, the drop in stage level observed at PT1 during the pump tests is likely in part due to evapotranspiration of phreatophyte/riparian vegetation that increases during the daylight hours and decreases as daily light fades. Steep declines in sensor depths observed at PT2 and PT3 began to occur in mid-April, which coincides with the timing when disconnected surface flow was increasing. A sharp increase in sensor depth occurred at PT2 on April 24, 2022 and at PT3 on April 23, 2022 (Figure 28), which are shortly after a 0.4 inch rain event occurred on April 21, 2022 that likely reconnected surface flow and refilled pool habitat (Figure 10). Overall, it appears that groundwater is connected to surface flows in the Study Reach, such that District pumping operations result in a small but detectable reduction in surface flow.

Groundwater levels respond to the first substantial rain event (i.e., daily total rainfall amounts >1.0 inches) of the rainy season. During the winter of 2020/2021groundwater levels increased slightly following several early season rainfall events, which produced less than 0.5inches of rain based on daily rainfall totals; however, the first substantial rain event occurred on January 27, 2021 of nearly 7 inches lead to an immediate increase in groundwater levels (Figure 29). In October 2021, the first rain event of the season was just over 1.5 inches and the following day groundwater levels increased from approximately 2.5 ft up to approximately 5.5 ft (Figure 30).

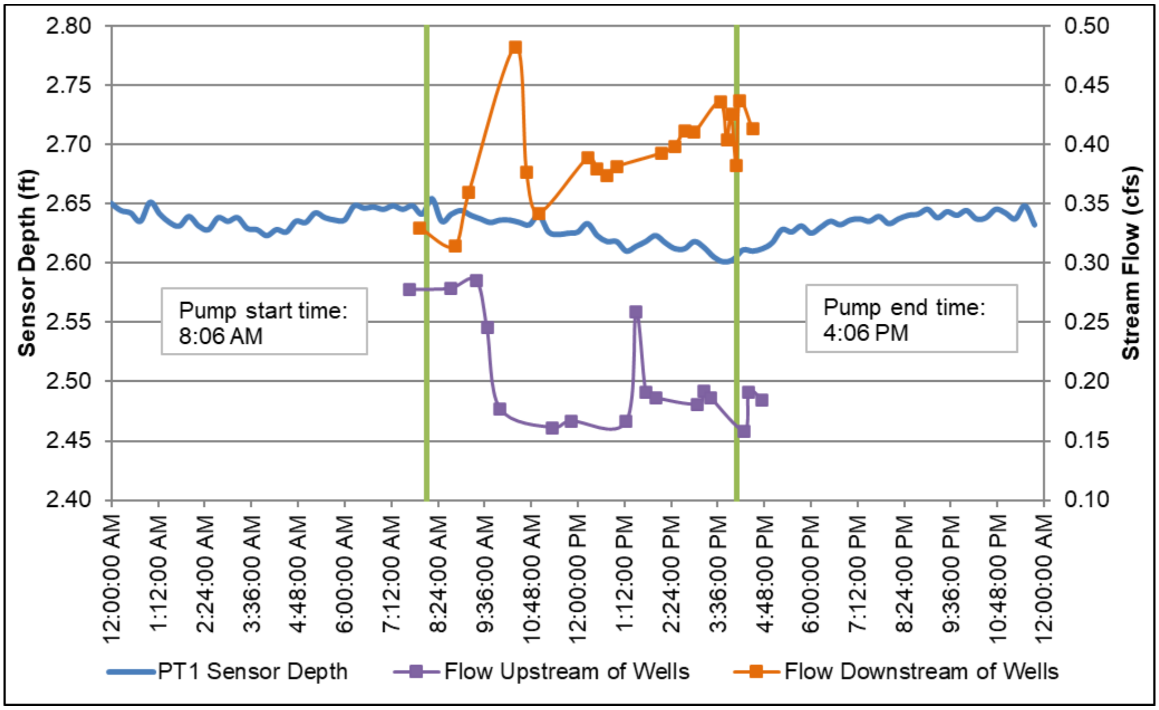


Figure 26. Pico Creek stream flow and PT1 sensor depths during April 16, 2022 pump test at District Well #1. Pumping volume on April 16, 2022 was 90,284 gallons, which is equivalent to a rate of 0.42 cfs.

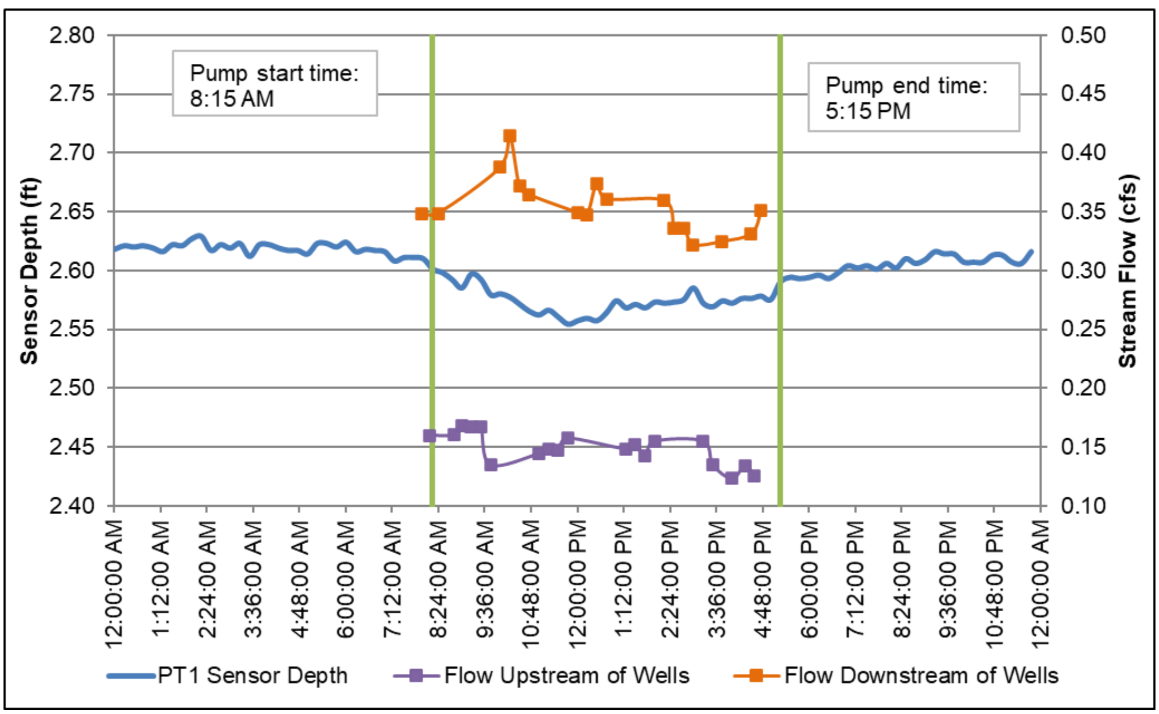


Figure 27. Pico Creek stream flow and PT1 sensor depths during April 23, 2022 pump test at District Well #2. Pumping volume on April 23, 2022 was 108,834 gallons, which is equivalent to a rate of 0.45 cfs.

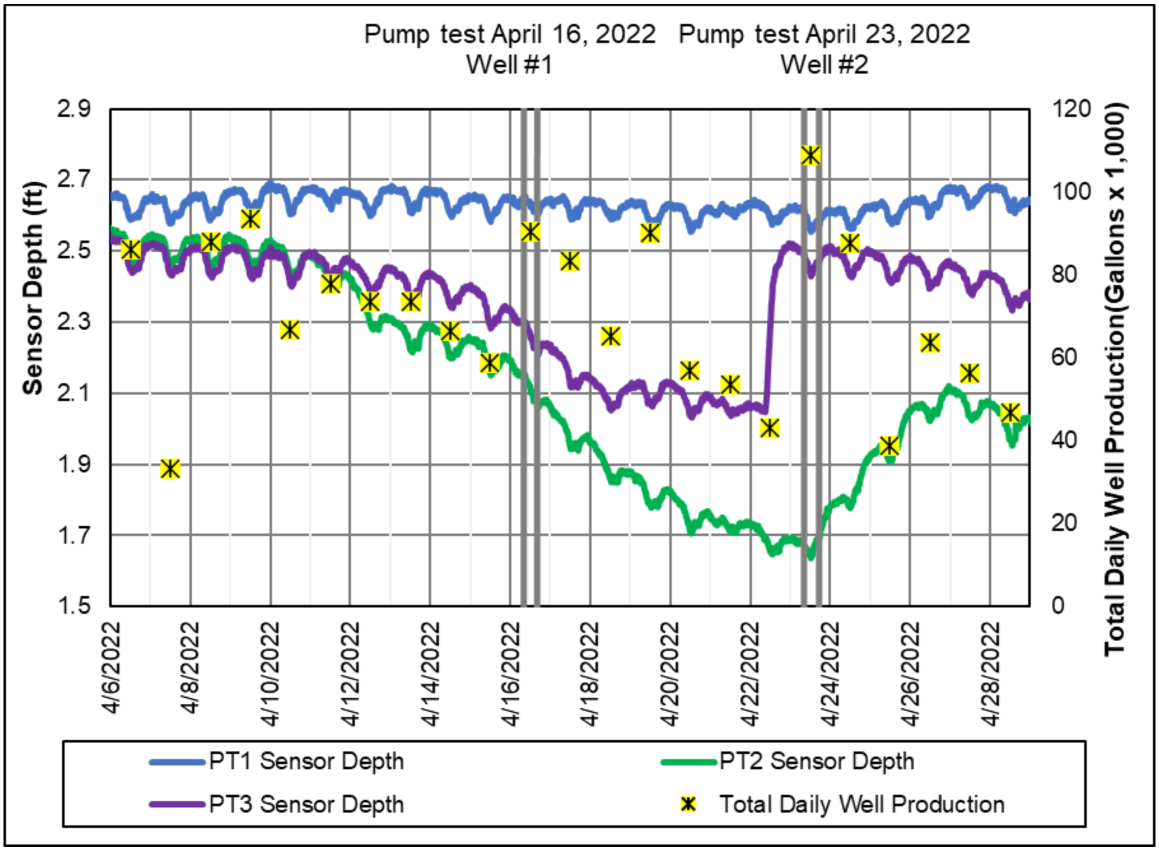


Figure 28. Pico Creek pressure transducer depths and daily well production during April 2022.

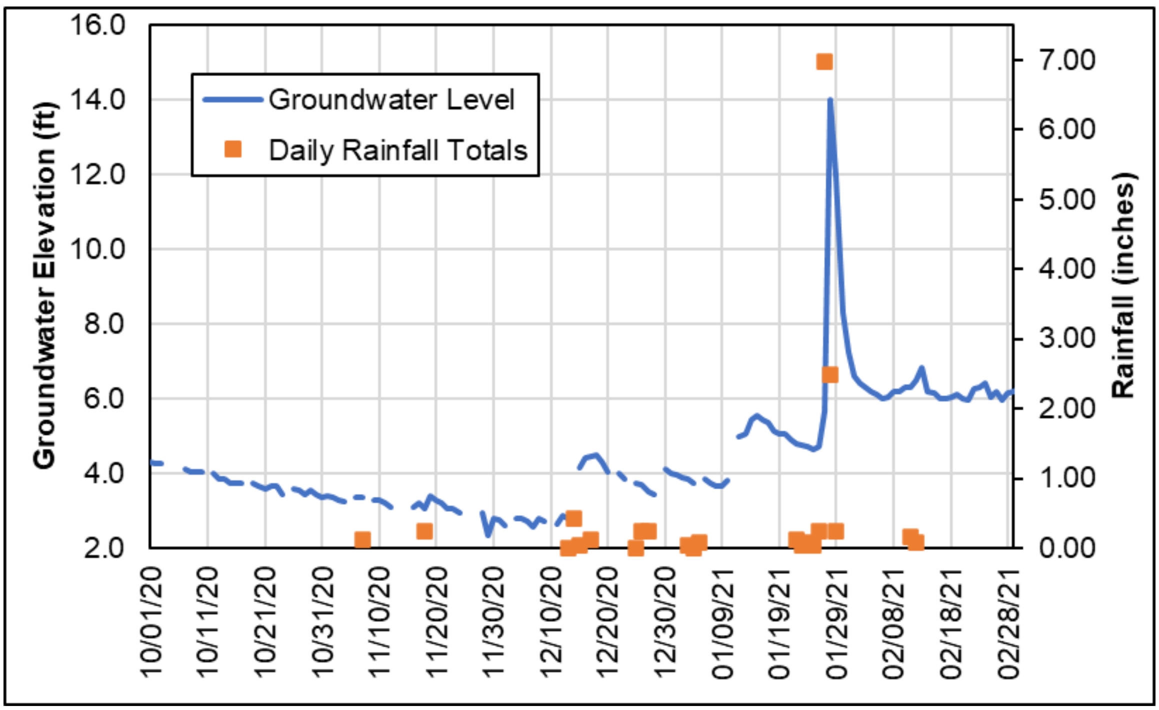


Figure 29. Average daily ground water level measured at District wells #1 and #2 and daily rainfall amounts during late-fall/winter of 2020/2021.

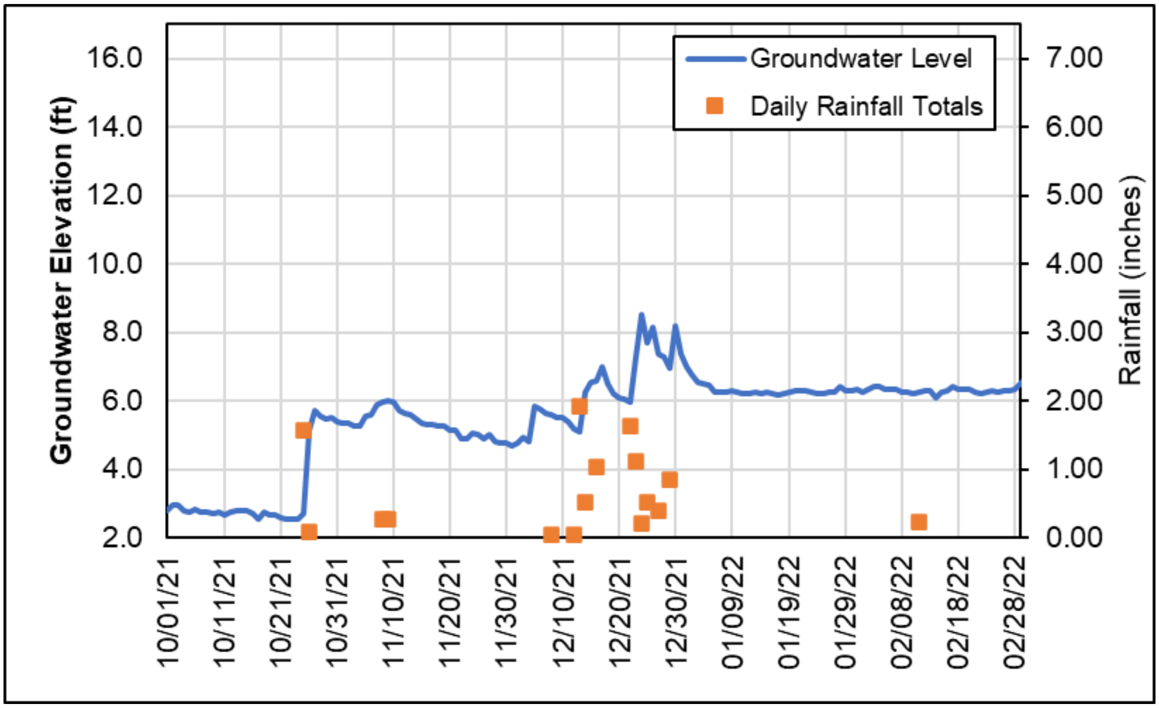


Figure 30. Average daily ground water level measured at District wells #1 and #2 and daily rainfall amounts during late-fall/winter 2021/2022.

4.5.1 Lagoon habitat

The wetted area of the lagoon remained relatively stable throughout the study. The upstream end of the lagoon begins at the end of a gravel bar with the channel quickly dropping in elevation as it enters the lagoon (Figure 29).

Water levels recorded in the lagoon showed minor fluctuations (<0.05 ft) on a regular basis each day. These daily fluctuations appear to be correlated with ocean tide heights, as increased sensor depths were generally recorded at high tides while reduced depths were generally recorded at low tides (Figure 29 and Figure 30). Lagoon depths showed a temporal pattern with increased depths in the morning and decreased depths in the afternoon, which suggests evapotranspiration influences lagoon water levels as well.

The magnitude and timing of daily fluctuations in the lagoon water levels appeared similar during the pump tests compared to days when pumping was reduced. The fluctuation observed in lagoon water levels appears to be the result of tidal activity and evapotranspiration. No impact to the lagoon due to pumping was evident during the test.

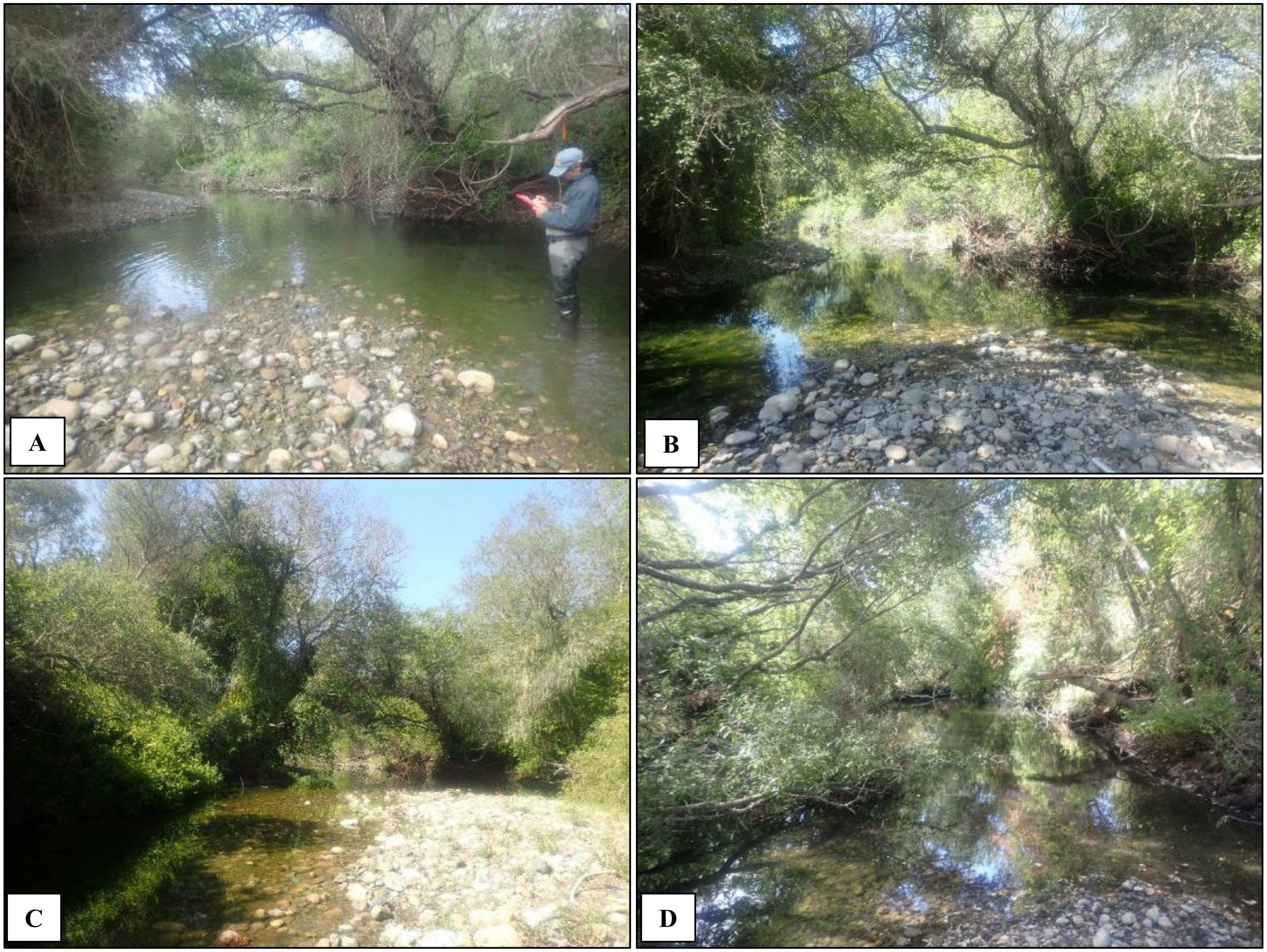


Figure 31. Upstream end of Pico Lagoon on March 30 (A), April 15 (B), April 28 (C), and July 12, 2022 (D).

Figure 32. Pico Creek Lagoon sensor depths during April 16, 2022 pump test at District Well #1.

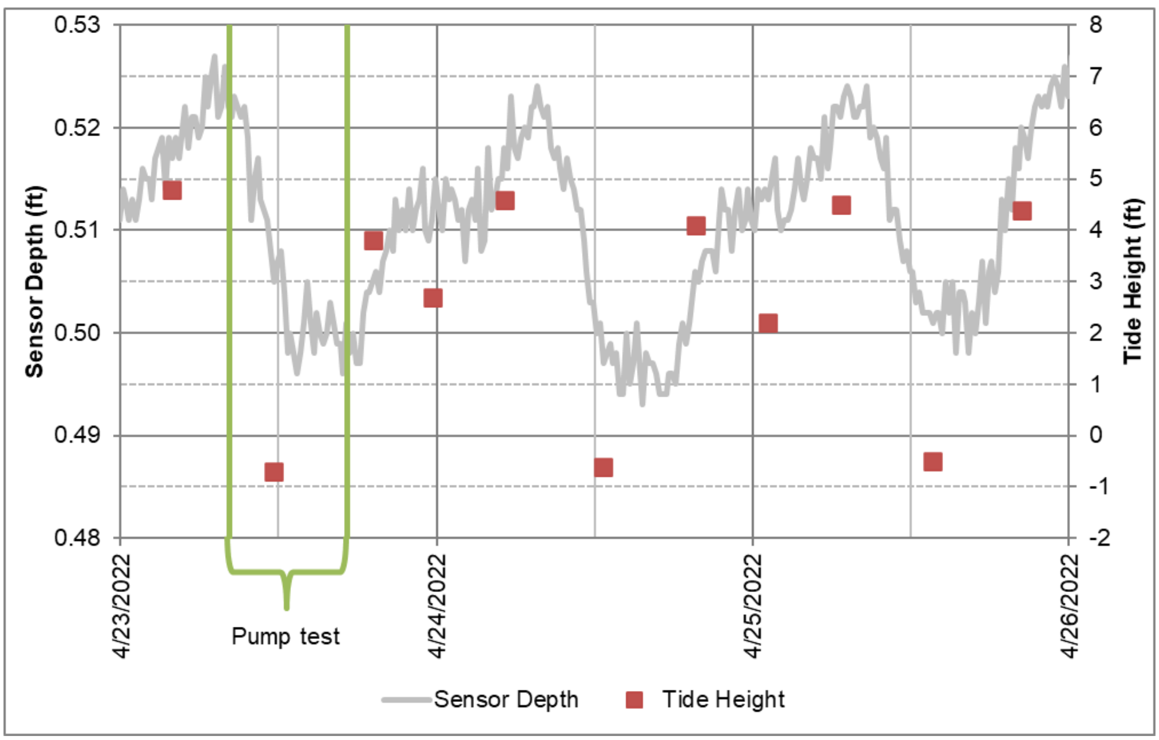


Figure 33. Pico Creek Lagoon sensor depths during April 23, 2022 pump test at District Well #2.

4.6 Wetland and Riparian Habitat Conditions

The TNC (2024a) dataset identifies 15 acres of GDEs in the Study Reach mapped in two polygons along Pico Creek. The first is located in the downstream section of the Study Area from the Highway 1 bridge to roughly 300 feet downstream of the Pico Creek Bridge and another section of the creek approximately 800 feet long just upstream of the horse stables (TNC 2024a). There is a narrow strip of riparian vegetation between these two mapped GDE polygons that is not included in the GDE map but could be linked to groundwater.

NDMI and NDVI of the two GDE polygons are relatively stable through time. Between 1985 and 2023 there were some declines in NDVI on the edges of the mapped GDEs but this is likely an artifact of land use changes coupled with limitations of the measurement technique rather than changes to groundwater. Because the pixel size from Landsat is large relative to the riparian zone width, the upstream GDE is only two pixels wide, in places. Areas of decline in NDVI or NDMI corresponded to areas where the NDVI pixels included both mapped GDEs as well as adjacent fields.The long-term stability of the NDVI and NDMI of mapped GDE polygons suggests that the GDEs likely remain connected to groundwater despite changes to groundwater levels.

Recent Google Earth imagery of the unmapped narrow strip of vegetation between the mapped GDEs shows a mixture of green vegetation and vegetation without leaves. Based on this analysis, it is not possible to assess whether the imagery captures a mix of dormant and regrowing vegetation or if some of the vegetation in this reach is dying. A study coupling groundwater measurements, modeling results, lidar topography, and field assessment of vegetation could address uncertainty in the strip pf vegetation between the mapped GDEs, but given that it is a narrow strip of vegetation often bordering farmland, any changes to vegetation could be from a variety of sources. Given the stability of vegetation health indicated by the NDVI and NDMI analysis and the relatively small area between the mapped GDE units, this additional study is not warranted at this time. However, ongoing monitoring of the mapped GDEs is recommended.

5 CONCLUSIONS

Pico Creek follows the northern side of the groundwater basin over much of the Study Reach. The basin sediments are highly permeable and allow for percolation of stream flow when it occurs, particularly upstream of the Pico Creek Road Bridge. As the inflow from the watershed declines, the groundwater level also declines and typically by early summer the water in the stream bed dries up. The stream channel, near where the District wells are located, has a longer duration of water presence than this upstream recharge area, but still dries by mid-summer. The lagoon at the mouth of Pico Creek has water year-round.

District pumping operations were observed to influence surface flows in Pico Creek around the section near the District pumps (i.e., downstream of the Pico Creek Road Bridge). Of the two main District wells, Well #1, which pumps water from shallower in the groundwater basin layer, has the most influence on surface flows and Well #2, which pumps from the deeper groundwater basin layer, has the least influence on surface flows. Additional monitoring in the lagoon would be needed to evaluate if any changes in lagoon water depth are occurring due to pumping versus other natural factors, such as tidal influence or evapotranspiration. However, the level of lagoon water depth fluctuation observed during this study appeared to be minimal (<0.05 ft). Additional monitoring of water quality conditions in the lagoon would be needed to evaluate the potential effects of pumping operations on habitat quality in the lagoon.

In the absence of District pumping operations, the lower reach of Pico Creek within the Study Area potentially provides migratory and rearing habitat for steelhead in the winter and spring when surface flows occur. Migration conditions for steelhead within the Study Area are expected to be supported under current District pumping operations. Adult steelhead passage, which requires high flows associated with precipitation events, is not likely to be influenced by the District's maximum daily average pumping rate of 0.27 cfs. Juvenile steelhead passage conditions assessed in riffle habitat during this study indicate passage for juvenile steelhead occurs at flows of approximately 4 cfs and greater, which is also not likely to be to be influenced by District pumping operations due to the limited capacity of the District wells and the maximum daily average pumping rate of 0.27 cfs. While steelhead migration flows are precipitation driven, surface flows lost during groundwater basin recharge at the on-set of the rainy season could lead to reductions in the already short migration periods. Based on observations of groundwater levels and rainfall data, basin recharge likely occurs rapidly after the first substantial rain event of the season and is not expected to affect steelhead migration. However, additional monitoring is needed to better understand the relationship between basin recharge and rainfall events and how they relate to stream flow conditions in Pico Creek.

This study did not directly assess the relationship between the amount of steelhead habitat and magnitude of surface flows, and instead focused on patterns of District Operations and steelhead life history. Observations of BMI habitat and juvenile migration conditions in riffles and juvenile steelhead rearing habitat conditions in pools were made during distinct flow events. At low stream flows, habitat in lower Pico Creek is sensitive to changes in surface flows, particularly when flows are at or below 1.5 cfs. Results of the surface water monitoring and riffle habitat assessments found habitat for juvenile steelhead is abundant at stream flows of 1.52 cfs based on abundant suitable BMI habitat and juvenile migration conditions in riffles habitat and abundant pool habitat greater than 1.5 ft deep which supports juvenile steelhead rearing. When stream flows were at 0.86 cfs or less, habitat was disconnected with limited passage in riffles for juvenile steelhead, and at 0.35 cfs BMI habitat was substantially reduced. A small reduction in flow when stream flow is less than 1.52 cfs, even by a small amount (e.g., 0.1 cfs) would reduce the quantity and quality of juvenile steelhead habitat in lower Pico Creek by reducing food availability from BMI, migration conditions, and pool depth.

Pools in the Study Area provide suitable water depth and temperature for rearing juvenile steelhead when surface occurs. Once surface flows cease, pools quickly dry up and become unsuitable for juvenile steelhead. During this study, conditions in pool habitat appeared suitable for steelhead rearing until around July, at which time surface flows ceased and nearly all wetted habitat in the Study Reach went dry. Since pool habitat remains suitable after surface flows cease temporarily, District pumping operations increases the risk of steelhead stranding and desiccation in isolated pool habitat that remains wetted after surface flows cease.

In summary, based on pumping capacity, District pumping operations have the potential to reduce the amount and quality of juvenile steelhead rearing habitat within Study Area at flows of around 1.5 cfs or less. District pumping operations will not influence aquatic habitat in Pico Creek after the channel has gone dry.

In addition to steelhead, the Study Area provides abundant suitable breeding habitat for CRLF with many pool locations observed with habitat conditions that remained suitable through the CRLF breeding season. In isolated pools that remain wet after surface flows cease, District pumping operations are likely to increase the rate at which pool habitat dries out, leading to egg desiccation or tadpole stranding. Suitable habitat for CRLF breeding is located within the Pico Creek lagoon and excavated ponds near the lagoon just upstream of the Highway 1 Bridge.

Remote sensing suggests that groundwater dependent vegetation in the Study Reach is relatively stable and healthy. Small changes are confined to the edges of the mapped vegetation patches and are likely due to edge effects of the Landsat imagery rather than real changes to vegetation. A more detailed understanding of riparian vegetation and wetlands in this reach could be explored with a detailed field study, but based on the stable remote sensing indices, this does not appear to be warranted at this time.

Key conclusions of this study are listed below:

- District pumping operations appear to influence surface flows in lower Pico Creek
- District pumping operations are not expected to influence adult steelhead migration in Pico Creek due to the magnitude of flow required to support adult steelhead passage.
- District pumping operations are not expected to influence juvenile steelhead migration in Pico Creek due to the magnitude of flow required to support juvenile steelhead passage.
- At low stream flows, habitat in lower Pico Creek is sensitive to changes in surface flows, particularly when flows are at or below 1.5 cfs and stream flow reductions when flows are in this range lead to reduced habitat quantity and habitat quality for juvenile steelhead
- District pumping operations that occur after surface flows cease may affect juvenile steelhead and CRLF rearing in isolated pools by decreasing pool water levels or speeding up the process by which pools dry out increasing the risk of stranding for juvenile steelhead and CRLF tadpoles.
- District pumping operations are not expected to impact aquatic habitat once the channel within the Study Area goes dry, which happens for extended periods of most years during summer and fall.
- District pumping operations do not appear to be affecting or reducing habitat conditions within the lagoon.
- District pumping operations do not appear to be affecting or reducing habitat conditions for tidewater goby.

6 LONG-TERM MONITORING

The following long-term monitoring efforts are suggested to ensure District pumping operations are minimizing impacts to sensitive aquatic species in Pico Creek:

- Monitor stream flow in Pico Creek near the District wells to develop a long-term record of stream flows in the watershed in relation to District pumping operations.
- Monitor isolated pool habitat within the Study Area to assess the risk of juvenile steelhead stranding in relation to District pumping operations.
- Monitor groundwater elevation at District wells and compare elevations to daily rainfall and stream flow levels to assess surface flow loss to groundwater basin recharge.
- Monitor water quality profiles in the lagoon, to assess water quality conditions and thermal stratification to assess influence of pumping.
- Monitor when the lagoon mouth opens/closes and how that relates to flows to assess potential project effects on lagoon passage for steelhead.
- Continued assessment of wetland and riparian habitat conditions using remote sensing indicators of GDE health including NDVI and NDMI.

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Attachment C

Comment Response Table

Table C-1. Responses to comments received on the Pico Creek Instream Flow Study and the Pico Creek Stream Flow Management Plan.

Comment #	Agency Name	Agency Comment	Response
1	California Coastal Commission	Is District pumping negatively impacting habitat, and can an instream flow management plan allow for more development in San Simeon?	The instream flow study concluded that the San Simeon Community Service District's (District's) pumping from Well #1—the shallow well—during sensitive flows (~2 cubic feet per second [cfs]) could have a negative impact to aquatic habitat; however, pumping from Well #2—the deep well—during sensitive flows is not likely to impact aquatic habitat because Well #2 draws from deeper in the groundwater table and is located beneath a partial clay barrier. Water supply and demand projections through the year 2045 were assessed in the System-wide Water Supply Assessment (Akel Engineering 2022). That assessment concludes that the District could resolve a small projected supply deficiency of 0.2 acre-feet per year (AFY) in normal water years by implementing water conservation actions, but the District will be required to implement water conservation actions and procedures, such as a declaring drought and calling for short-term water use reductions, to address potential water shortages in dry years. The Pico Creek Instream Flow Management Plan has been revised to include a summary of the findings from the System-Wide Water Supply Assessment.
2	California Coastal Commission	How much more development? Not answered.	The District evaluated water supply and demands through the year 2045 through a System-wide Water Supply Assessment Report (Akel Engineering 2022) that includes a summary of the findings from this assessment in the Pico Creek Instream Flow Management Plan.
3	California Coastal Commission	There is no analysis of sensitive wetland or riparian plants or other species that might have been considered and decided to leave out of the analysis.	The Pico Creek Instream Flow Study has been updated to include a wetland and riparian habitat assessment of the Study Area. The assessment included reviewing maps of groundwater-dependent ecosystems, Google Earth imagery, and trends in remote sensing indices of vegetation health.
4	California Coastal Commission	There are no findings related to agricultural activities that could be affected by pumping. The report does note, however, that the Hearst Corporation operates two wells along lower Pico Creek as part of the Hearst Pico Creek Stables, which provide irrigation and water to livestock at an average of 10-acre feet per year (AFY)	Assessing how the Hearst Corporation's wells influence surface flows is outside the scope of this study. However, the annual 10 AFY extraction for these wells was included in the 2014 groundwater modeling that evaluated the effects from groundwater extraction by the District and the Hearst wells on the Pico Creek Valley Groundwater Basin. Results of the groundwater modeling show that the District wells could produce the maximum permitted amount of 140 AFY without impacting water quality at the Hearst Pico Creek Stables.

Comment #	Agency Name	Agency Comment	Response
5	California Coastal Commission	How might Hearst Corporation well operation affect District pumping and stream flows	The annual extraction volume for the Hearst Corporation's wells is 10 AFY and is not expected to have a noticeable effect on surface flows.
6	California Coastal Commission	It was unclear where the stream flow measurements were taken.	Stream flow measurements were generally measured near pressure transducer PT1 (just downstream of the Pico Creek Road bridge). During the pump tests, stream flows were measured at two locations including one near the pressure transducer PT1 location and one just upstream of Pico Creek lagoon.
7	California Coastal Commission	Is the instream flow report saying the aquifer is fully recharged every year?	According to the Groundwater Availability Study (Cleath-Harris Geologists 2014), the Pico Creek Valley Groundwater Basin is recharged each year.
8	California Coastal Commission	Are there more wells in the drainage basin than those noted? Are the District wells the only ones doing significant pumping?	Aside from the District's wells, only two other wells that are operated by the Hearst Corporation are located in the Pico Creek Valley Groundwater Basin, and they are limited to a combined annual volume of 10 AFY. The District's wells are the only ones doing significant pumping.
9	California Coastal Commission	Habitat mapping was done in January; is there any data from later in the year? Or would there be any expected difference?	Habitat mapping in January delineated stream habitat types (e.g., pool, riffle, run) based on physical channel features (e.g., channel gradient, hydraulic control, substrate size classes), and habitat-type designations are not expected to change throughout the year. The quality of the habitat is expected to change at different stream flow levels throughout the year. How habitat quality changes under different flows was a key focus of the Pico Creek Instream Flow Study and included surveys from January through July over a range of flow conditions.
10	California Coastal Commission	The report notes rearing steelhead habitat declines at 0.86 cfs, but how do you know that it didn't start at higher flows that you didn't measure prior to 3/30/22 (above 0.86 cfs but below 1.56 cfs measured on 2/8/22)? Is BMI production the criteria for this? Is this why a 2cfs threshold is later recommended for a management trigger?	The Pico Creek Instream Flow Study found that habitat quality declined somewhere between 1.56 cfs and 0.82 cfs based on a decrease in juvenile steelhead passage conditions; however, the exact flow within this range where habitat quality declines is unknown. To protect habitat conditions, it was assumed that habitat quality declined near the upper end of this range at 1.56 cfs, which was the basis for a 2-cfs threshold included in the Pico Creek Stream Flow Management Plan. Benthic macroinvertebrate (or BMI) habitat conditions showed a decline between flows 0.82 cfs and 0.35 cfs.

Comment #	Agency Name	Agency Comment	Response
11	California Coastal Commission	How did the rain event on April 21 impact the drawdown levels in the second well test?	The rain event is not expected to have influenced the second well test because Well #2 pumps from deeper underground and is partially separated from the upper groundwater layer by the clay barrier. The rain event on April 21 produced 0.40 inch of rainfall and led to increased surface flows in the upper section of the study area where surface flows had become intermittent approximately 10 days earlier based on the sensor depths recorded at pressure transducers PT2 and PT3. However, farther downstream near the District's wells, surface flows remained constant before, during, and after the rain event based on sensor depths recorded at pressure transducer PT1.
12	California Coastal Commission	Is seawater intrusion an issue for the wells or the habitats? Would water extraction make this potential management issue worse?	Sea water intrusion was assessed in the System-wide Water Supply Assessment (Akel Engineering 2022), which concluded: at a production of 110 AFY, intrusions would not be expected during a combination of normal wet and dry years, but in some typical drought cycles. Therefore, the sustainable yield of Pico Creek Valley Groundwater Basin for the District is 110 AFY without water filtering facilities. With the District's reverse osmosis system, the sustainable yield is increased to 112 AFY. Additional details have been added to the Pico Creek Stream Flow Management Plan.
13	California Coastal Commission	What water year type was 2022? What might other water year types affect in terms of pumping recommendations/timing? Would the 2cfs threshold recommendation change?	Rainfall during 2021–2022 was roughly half of the average rainfall for San Simeon with 13.19 inches recorded at County Gauge #764 versus the 24-inch average. Under different water year types, the 2-cfs threshold would not change; however, the frequency and duration of the 2-cfs threshold would likely increase in wetter years and decrease in dryer years.
14	California Coastal Commission	Will management include other wells in the area, or only pertain to the 2 district wells?	The District's wells are the only well that will be managed.

Comment #	Agency Name	Agency Comment	Response
15	California Coastal Commission	How is daily well production determined? Just on dynamic demand? How does it compare the pumping regime tested?	The District has limited water storage, so production is fairly dynamic. Peak demand occurs in the summer after the stream channel has become dry. For the Pico Creek Instream Flow Study, pump tests were conducted in the spring when surface flow was still present but at lower levels, which were expected to be more responsive to the District's pumping.
16	California Coastal Commission	Can we get more data on what happens to flow when pump 2 (deeper well) is operated for long periods? Effects on groundwater levels? A previous pumping test (performed February 17, 2006) demonstrated that there is drawdown in the shallower well when the deeper well is pumped.	Extended pump tests are not feasible for because of the limited water storage capacity.
17	California Coastal Commission	What is the estimated maximum water supply that could be extracted from the district pumps if these limitations were in effect? What level of assurance to development could be provided, especially in case of successive drought years?	The management recommendations included in the Pico Creek Stream Flow Management Plan are not expected to change the amount of water extracted from the Pico Creek Valley Groundwater Basin but may extend the amount of time surface flows are present by pumping from Well #2, beneath the clay layer. Results from the System-wide Water Supply Assessment (Akel Engineering 2022) indicate that water supply from the District's wells is sustainable at 112 AFY during normal and dry years but during successive dry years and periods of drought, water conservation measures would likely be needed to meet future water demands. A summary of the findings from this assessment have been added to the Pico Creek Stream Flow Management Plan.
18	California Coastal Commission	Is the recommendation to operate stage monitoring continually going forward to observe the 2cfs threshold at the well #1/2? 2 years of fish stranding observations is not exactly long-term monitoring. Is it possible to readjust the threshold upon stranding observations?	Stage monitoring is recommended to be ongoing for several years to observe the 2-cfs threshold and to develop a flow record for this watershed. Monitoring for fish stranding is proposed for at least 2 years with the intent of re-evaluating conditions after that time. If stranding is observed and appears to be related to the District's operations, additional monitoring may be proposed, or the threshold may be revised.

Comment #	Agency Name	Agency Comment	Response
19	California Coastal Commission	The Coastal Act protects riparian habitat, and this is not limited to CRLF, tidewater gobies, and salmon. We would want more information on how riparian vegetation overall is influenced by stream drawdown. Is there evidence that intermittently dry areas are increased through pumping and exacerbating a lack of cover over the stream?	The Pico Creek Instream Flow Study has been updated to include a wetland and riparian habitat assessment of the study area. The assessment included reviewing maps of groundwater-dependent ecosystems, Google Earth imagery, and trends in remote sensing indices of vegetation health. Ongoing monitoring of remote sensing indices of vegetation health is recommended.
20	California Coastal Commission	How are you accounting for uncertainty in precipitation years and flow/groundwater connections?	Under different water year types, the 2-cfs threshold would not change; however, the frequency and duration when surface waters are in that range would likely increase in wetter years and decrease in dryer years.
21	California Coastal Commission	Are there plans for well tests to be done during other times of the year?	Groundwater pumping is expected to have the highest influence on surface flows near the end of the rainy season as surface flows decrease. The pumping test during the Instream Flow Study occurred in the spring when surface flows in Pico Creek were near 0.30 cfs, which is ideal for detecting an influence of groundwater pumping on surface flows. The generally higher flows during the winter would make the influence of groundwater pumping less apparent because a small proportion of surface flow is being affected and the Pico Creek Valley Groundwater Basin is generally full during the winter. Flows during the summer and fall are infrequent, making it difficult to target a flow lower than 0.3 cfs.
22	California Coastal Commission	Is there work on the water quality and/or salinity of the lagoon through the season?	Water quality monitoring of Pico Creek lagoon was added to the Pico Creek Stream Flow Management Plan.
23	California Coastal Commission	Agree that a real time stream gage would benefit management and building a long- term record	Comment noted.

Comment #	Agency Name	Agency Comment	Response
1	California Department of Fish and Wildlife	CDFW recommends that the IFS and Plan include an analysis of impacts from pumping to all special-status species that may to occupy Pico Creek, including but not limited to those listed above (steelhead, tidewater goby, and CRLF). CDFW recommends that the IFS identify the biological thresholds for each life history stage that are modeled for flow and that the study include field-verifying modeled thresholds to calibrate the model and assess the model's accuracy and precision. In addition to steelhead, the biological thresholds for other species could be field verified. CDFW recommends that the Plan focus on incorporating field verification of the modeled results and avoiding impacts to special-status species.	In fall 2022, Stillwater Sciences met with the California Department of Fish and Wildlife (CDFW) to discuss the watershed and best approaches to address key questions. Based on that consultation, it was determined that prior to conducting a detailed Instream Flow Incremental Methodology (IFIM), the highest priority was understanding general flow patterns in perennial/intermittent reaches, how pumping influences surface flows, how steelhead use the section of creek where the District's pumping is most likely to influence surface flow conditions, and what flows are most sensitive to the influence of the District's pumping. Results of this assessment suggest that the District's pumping operations have a small influence on surface flows, and habitat conditions are sensitive to changes in surface flows around approximately 1.5 cfs. Based on the current water extraction plans, Stillwater Sciences believes that the information obtained is sufficient to develop water use management recommendations for Pico Creek.
2	California Department of Fish and Wildlife	CDFW recommends that the IFS and Plan include an analysis of impacts from pumping to all special-status species that may to occupy Pico Creek, including but not limited to western pond turtle (*Emys marmorata*) and two-striped garter snake (*Thamnophis hammondii*) and the California Rare Plant Rank 1B.1 Monterey pine (Pinus radiata).	The Pico Creek Instream Flow Study Report has been updated to include a wetland and riparian habitat assessment of the study area. The assessment included reviewing maps of groundwater-dependent ecosystems, Google Earth imagery, and trends in remote sensing indices of vegetation health, which appears to be relatively stable and healthy and therefore is not likely to be impacted by the District's pumping activities. Based on this assessment, impacts to western pond turtle, two-striped garter snake, and Monterey pine are not likely to occur. Ongoing monitoring of wetland and riparian habitat conditions and water quality monitoring of Pico Creek lagoon have been proposed in the Pico Creek Stream Flow Management Plan and will help evaluate conditions for these species as they relate to future District pumping operations.
3	California Department of Fish and Wildlife	In addition to analyzing impacts to specific species, CDFW recommends that the IFS and Plan identify, analyze, and monitor impacts to riparian, wetland, and other ecosystems that may result from project related diversion and pumping	The Pico Creek Instream Flow Study has been updated to include a wetland and riparian habitat assessment of the study area. The assessment included reviewing maps of groundwater-dependent ecosystems, Google Earth imagery, and trends in remote sensing indices of vegetation health, which appear to be relatively stable and healthy and therefore are not likely to be impacted by the District's pumping activities.

Comment #	Agency Name	Agency Comment	Response
4	California Department of Fish and Wildlife	CDFW recommends that the IFS and Plan include a detailed description of the water rights and water entitlements that would pertain to their approval and related projects and address any applications or change petitions that may be filed. CDFW also recommends that the analysis include information on how related development projects may affect surface and subsurface water levels, and whether and to what extent additional well pumping or construction of additional wells will be necessary. CDFW recommends including specific triggers for evaluating changes to surface flow and subsurface water levels, and monitoring wetland and riparian habitats that would be affected by these changes	Current water rights are summarized in the Pico Creek Stream Flow Management Plan and the Pico Creek Instream Flow Study Report, including annual amounts and maximum extraction rates. No changes to water rights or building additional wells is proposed by the District.
5	California Department of Fish and Wildlife	CDFW recommends addressing other activities, in addition to municipal use, that may require well pumping, and including information on whether there is or will be infrastructure available to provide recycled water for certain uses. The incorporation of recycled water use may allow pumping operations to be minimized during certain times of the year.	A summary of the findings from the System-wide Water Supply Assessment conducted by Akel Engineering (2022) have been added to the Pico Creek Stream Flow Management Plan.
6	California Department of Fish and Wildlife	CDFW encourages monitoring that will better understand how well extraction, including the time of year and quantity extracted, may effect surface flows, in order to determine how to avoid impacts to aquatic species	The focus of this study was to monitor conditions to understand how groundwater pumping by the district may affect surface flow in order to determine how to avoid impacts to aquatic species. Ongoing stream flow monitoring is included as a recommendation to better understand flow conditions in the watershed.

Comment #	Agency Name	Agency Comment	Response
7	California Department of Fish and Wildlife	CDFW recommends that the IFS field-verify any modeling results and that instream flow be determined based on the biological needs of sensitive species (e.g., by life history stage, time of year, and with consideration to food production, temperature, and bioenergetics). CDFW recommends that the IFS analyze these flow requirements and develop measures to avoid or minimize stranding and mortality of aquatic species and incorporate these measures into the Plan to determine their effectiveness	In fall 2022, Stillwater Sciences met with CDFW to discuss the watershed and best approaches to address key questions. Based on that consultation, it was determined that prior to conducting a detailed IFIM, the highest priority was understanding general flow patterns in perennial/intermittent reaches, how pumping influences surface flows, how steelhead use the section of creek where District pumping is most likely to influence surface flow conditions, and what flows are most sensitive to the influence of the District's pumping. Results of this assessment suggest that the District's pumping operations have a small influence on surface flows, and habitat conditions are sensitive to changes in surface flows around approximately 1.5 cfs. Based on the current water extraction plans, Stillwater Sciences believes that the information obtained is sufficient to develop water use management recommendations for Pico Creek.
8	California Department of Fish and Wildlife	CDFW recommends that Standard Operation Procedures described within CDFW's Instream Flow website (Instream Flow Program Documents (ca.gov) be considered for the IFS.	See previous comment.
9	California Department of Fish and Wildlife	A longer-term study on stream flows that incorporates all water-year types would be useful for determining instream flow impacts from well pumping. Stream flows throughout the majority of the study were less than 1.56 cfs, including in March and April when precipitation generally leads to higher flows.	This study assessed conditions from January through June. While most flows assessed during this study were below 1.56 cfs, habitat conditions were suitable for juvenile steelhead rearing at 1.56 cfs based on productive benthic macroinvertebrate habitat and juvenile passage conditions observed. Habitat conditions didn't begin to have reduced quality until flows decreased below 1.56 cfs. Therefore, assessing conditions at flows greater than 1.56 cfs is not likely to change the conclusions of the Instream Flow Study.

Comment #	Agency Name	Agency Comment	Response
10	California Department of Fish and Wildlife	According to the IFS, flows below this point [1.56 cfs] may lead to reduced quality and quantity of rearing habitat for juvenile steelhead. If pumping operations follow the recommendations made in the IFS and Plan, use of Well #1 may be greatly limited. Given that Well #2 may therefore be the primary well from which water is pumped, CDFW recommends that additional data be provided to evaluate the impacts of pumping solely or predominately from Well #2 on surface flows during different times of year and under different stream flow conditions. If the depth from which water is pumped within these wells will vary, it will be important in informing pumping operations to understand the impacts to surface flows at varying pumping depths.	Well #1 produces water from aquifers over a depth range of 15-47 feet. There is a clayey bed (aquitard) in the basin where the District wells are located that is between about 26 and 36 feet depth. Well #2 produces water from a fairly confined depth range of 50 to 60 feet located in the deepest sand and gravel beds in the Pico Creek Valley Groundwater Basin and below the clay bed (aquitard). Pump tests performed during use of Well #2 found no detectable influence on surface flows during the study. The pump test targeted a time that balanced greatest water demand when surface flows were still present in Pico Creek. Conducting additional pump tests later in the summer would not allow for surface flow monitoring because Pico Creek goes dry in the summer conversely, conducting pump tests during periods with higher flows, such as in the winter, would make detecting small changes (~0.1 cfs) in surface flows more difficult.
11	California Department of Fish and Wildlife	According to the IFS, "groundwater" (which could be subsurface flow) extraction typically increases during the summer due to the influx of tourists. Increased water demand and pumping operations on Pico Creek during this timeframe coincide with the time of year during which flows are expected to be below 1.56 cfs and are likely to have an effect on juvenile steelhead. Summertime survival is critical for rearing juvenile steelhead and any impacts to habitat/pool availability during this time could have impacts on survival. In addition, a reduction in flows due to groundwater extraction may result in impaired fish movement through critical riffles, as these riffles become a barrier due to shallow conditions. Reductions in stream flows and pool depth due to pumping operations during the summer, when groundwater is needed most, could lead to several factors impacting steelhead such as stranding/mortality of steelhead, reduced steelhead mobility through shallow or dewatered riffle habitat, increased competition for limited habitat as pools dry, as well as increased water temperature and decreased dissolved oxygen levels	Lower Pico Creek is an intermittent stream that naturally goes dry in the spring and remains dry until the first significant rain event occurs in the fall or winter season. District pumping during the summer is not expected to influence aquatic habitat conditions because the channel is dry.

Comment #	Agency Name	Agency Comment	Response
12	California Department of Fish and Wildlife	CDFW recommends that the IFS address potential impacts to adult steelhead and their spawning habitat due to District pumping operations.	The section of Pico Creek within the study area likely serves as a migratory corridor for steelhead; adult spawning and juvenile rearing is limited to the upper watershed that has year-round flows . Flows that are high enough to support adult steelhead migration (estimated to be above 10 cfs) are not likely to be influenced by the District's pumping, which is limited to a maximum daily average rate of 0.27 cfs. In addition, the Instream Flow Study Report was updated to include information on groundwater recharge and monitoring groundwater elevations in relation to rainfall events and stream flows during the onset of the rainy season was added as a long-term monitoring recommendation.
13	California Department of Fish and Wildlife	CDFW recommends that the IFS and Plan include monitoring of water quality parameters such as temperature, salinity, dissolved oxygen, etc., in the lagoon	Water quality monitoring of Pico Creek lagoon was added to the Pico Creek Stream Flow Management Plan.
14	California Department of Fish and Wildlife	CDFW recommends field verification of the modeled results for water quality within habitats that are important for steelhead and other special status species using the Pico Creek watershed.	In fall 2022, Stillwater Sciences met with CDFW to discuss the watershed and best approaches to address key questions. Based on that consultation, it was determined that prior to conducting a detailed IFIM, the highest priority was understanding general flow patterns in perennial/intermittent reaches, how pumping influences surface flows, how steelhead use the section of creek where District pumping is most likely to influence surface flow conditions, and what flows are most sensitive to the influence of the District's pumping. Results of this assessment suggest that the District's pumping operations have a small influence on surface flows, and habitat conditions are sensitive to changes in surface flows around approximately 1.5 cfs. Based on the current water extraction plans, Stillwater Sciences believes that the information obtained is sufficient to develop water use management recommendations for Pico Creek.
15	California Department of Fish and Wildlife	DFW recommends consultation with the U.S. Fish and Wildlife Service for potential impacts to federal listed terrestrial and freshwater species and with the National Marine Fisheries Service for potential effects to steelhead and its critical habitat.	Stillwater assumes the District will coordinate with all agencies as appropriate.