

Cooperative Groundwater Monitoring Plan

Santa Rosa Creek Valley

Cambria, California

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## Introduction

The purpose of this proposal is to present a groundwater monitoring plan for seven cooperating farms in the Santa Rosa Creek Valley that will satisfy the water quality testing requirements of Agricultural Order No. RB3-2012-0011.

Figure 1 is a relief map of the Santa Rosa Creek watershed showing key topographic and cultural features (Ref 1). The Santa Rosa Creek portion of the watershed (exclusive of Perry Creek and its tributaries) comprises approximately 25 square miles. The creek rises in the Santa Lucia Mountains, and the upper section of the stream has a steep gradient and locally perennial flow. Below the "Narrows" the Lower Valley widens and forms a flatter alluvial valley with the creek locally entrenched. Perennial flow is present in the middle portion of the Lower Valley. Surface stream flow is seasonal just below the "Narrows" and through the town of Cambria. The westernmost two miles of the creek flow through the town of Cambria to the Pacific Ocean.

Most of the Santa Rosa Creek watershed is used for agricultural purposes, and the primary use is cattle grazing. Irrigated crop land is currently estimated to cover 360 acres (Ref.1). The valley floor is locally planted to irrigated peas, squash, tomatoes, berries and grapes and non-irrigated hay. Warmer areas on slopes have been planted in avocados and citrus. The seven cooperating farms are located in or adjacent to the Lower Valley (3 farms) and just upstream of the "Narrows" (4 farms). The principal crops of these farms are avocados, citrus, grapes, berries and miscellaneous vegetables. All seven farms have been designated as Tier 1 for purposes of Agricultural Order No. RB3-2012-0011. Figure 2 is a property tax map showing the participating properties and the outline of the Santa Rosa Creek aquifer (Ref. 2). Table 1 summarizes pertinent data for the participating farms.

Two references have been used extensively in the preparation of this proposal. They are: 1) a 2012 "Santa Rosa Creek Watershed Management Plan" and 2) a 1998 U. S. Geological Survey report on the hydrology of the Santa Rosa and San Simeon groundwater basins - Water-Resources Investigations Report 98-4061. See references for complete citations.

## Geology

The following geologic discussion is derived primarily from the discussion in Reference 2. The Santa Rosa Creek groundwater basin is a thin, narrow basin underlying the westernmost approximately six miles of Santa Rosa Creek valley. The eastern, upstream end of the main basin is at the "Narrows" shown on Fig. 1. Wells upstream of the "Narrows" show the aquifer sands and gravels to be present but thinner and less areally extensive than below the "Narrows". The main basin typically ranges from 1000' to 2000' wide. Basin fill consists of Quaternary to Recent unconsolidated to poorly

consolidated alluvial and stream terrace deposits. The alluvial deposits consist of channel and point bar deposits (sand and gravel) and overbank and flood plain deposits (silt and clay). The deposits are quite heterogeneous, and individual units generally exhibit limited lateral extent and continuity. The limited well control suggests that the continuity of units is greatest in the direction parallel to the valley/basin axis. The sands and gravels have high porosity and permeability and easily store and transmit groundwater. Well control shows the alluvial deposits to range up to 150 feet thick in the central part of the valley, tapering to zero thickness at the edges.

Figure 3 is a geologic map of the lower approximately eight miles of the Santa Rosa Creek valley (Ref. 2). The bottom and sides of the groundwater basin are formed by bedrock consisting mostly of the Jurassic Franciscan Complex and secondarily by Cretaceous and Tertiary sandstones. Several northwest trending normal faults cross the basin but are not believed to offset the young basin fill deposits. Also present in the area are blocks of metavolcanic rocks, such as those forming Mammoth Rock at the "Narrows".

The groundwater basin is essentially an ancient stream valley that has been filled in by alluvial and stream deposits. While there is some groundwater storage and contribution from fractures and porosity in the bordering and underlying bedrock, by far the most important contribution to storage and flow is the alluvial fill deposit. Figure 4 is a geologic cross section from Ref. 2 that has been modified for this report to extend upstream from the "Narrows" and include three additional wells. This section shows the overall continuity of the alluvial fill aquifer and the connection to the upstream area where the aquifer sands and gravels are thinner and less widespread. The cross section also shows that there are several buried ridges or high areas within the basin that locally constrict ground water flow and result in local perennial surface flow, such as from well 19H2 to below well 19K2. The main area of the Santa Rosa Creek aquifer is considered to be unconfined, and there are no continuous barriers to flow within the aquifer. Domestic and irrigation wells all produce from the same alluvial aquifer.

### Groundwater Movement

The following groundwater movement discussion is largely based on the discussion in Reference 2. Groundwater levels in the Santa Rosa Creek groundwater basin follow a seasonal pattern with the highest levels during the winter and gradual decline during the summer dry season. Recharge is rapid once flow increases the following winter. In most years the basin is fully recharged within a few weeks of the increase in stream flow. Total storage in the groundwater basin has been estimated at approximately 24,000 acre feet. Mean annual discharge of Santa Rosa Creek is approximately 6800 acre feet. Hydraulic characteristics have been estimated by several methods and are highly variable. Transmissivity estimates range from 718 to 44,200 ft<sup>2</sup>/d. Calibration of the groundwater flow model yielded estimates of hydraulic conductivity ranging from 1.6 to 400 ft/d and estimates of storage coefficient ranging from 0.045 to 0.10. Groundwater moves westerly toward the ocean except for local anomalies around producing wells.

Limited sea water intrusion has been documented within a mile or two of the ocean, but this is not a factor in the main part of the Santa Rosa Creek basin.

### Groundwater Quality

Due to limited development in the upper portion of the Santa Rosa Creek drainage and relatively high annual creek flow and aquifer recharge, groundwater quality is good in the aquifer. [REDACTED]

[REDACTED] The 2011 Consumer Confidence Report for Cambria Community Services District water wells (comingled production from Santa Rosa Creek well SR-4 and San Simeon Creek wells) showed nitrate (NO<sub>3</sub>) of 3 ppm, TDS of 350 ppm, and chloride of 22 ppm. Well SR-4 is located on the grounds of Coast Union High School approximately one mile downstream of the nearest cooperating farm. Appendix 1 contains copies of the above referenced water analyses.

### Proposed Groundwater Monitoring Plan

To satisfy the requirements of Order No. R3-2012-0011, the Santa Rosa Creek Groundwater Monitoring Cooperative will 1) submit recent (2011 and 2012) and new (2013) test results in 2013 and 2) submit additional test results in 2018.

The well data to be submitted in 2013 will be: [REDACTED]

[REDACTED] 3) Publically available water test data from Cambria Community Services District drinking water well SR-4. This data will consist of Consumer Confidence Reports (comingled well water) and individual well water analyses (if available).

In 2018 the Groundwater Monitoring Cooperative will conduct two rounds of water sampling and testing, one in March/April and one in September/October for [REDACTED]. In addition, the most current publically available data for CCSD well SR-4 will also be provided.

It is anticipated that FGL, a laboratory approved by the Regional Board to perform work for the order, will do the water sampling and testing and will test for the constituents noted in Table 3 of the MRP. Analytical results will be uploaded directly onto the GeoTracker databases in the required Electronic Deliverable Format. Data for well SR-4 will likely be provided by a paper copy.

Table 1

Santa Rosa Creek Groundwater Cooperative Members

[REDACTED]	[REDACTED] [REDACTED] [REDACTED] [REDACTED]	[REDACTED]	
[REDACTED]	[REDACTED] [REDACTED] [REDACTED] [REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED] [REDACTED] [REDACTED] [REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED] [REDACTED] [REDACTED] [REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED] [REDACTED] [REDACTED] [REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED] [REDACTED] [REDACTED] [REDACTED]	[REDACTED]	[REDACTED]
[REDACTED] [REDACTED] [REDACTED]	[REDACTED] [REDACTED] [REDACTED] [REDACTED]	[REDACTED]	

## REFERENCES

Reference 1: Stillwater Sciences, Central Coast Salmon Enhancement, and Greenspace - the Cambria Land Trust. 2012. Santa Rosa Creek Watershed management plan. Prepared for the California Department of Fish and Game, under a grant for the Fisheries Restoration Grant Program (P0740401).

Reference 2: Yates, E. B. and K. M. Van Konyenburg. 1998. Hydrology, water quality, water budgets, and simulated responses to hydrologic changes in Santa Rosa and San Simeon Creek ground-water basins, San Luis Obispo County, California. U. S. Geological Survey Water Resources Investigations Report 98-4061.

## Appendix 1

### Water Test Results