ALTA VISTA WATER SUPPLY WELL HYDROLOGIC MONITORING, WATER YEARS 2008 THROUGH 2018, MONTARA, CALIFORNIA

CLIENT REVIEW DRAFT

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Montara Water and Sanitary District

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1. EXECUTIVE SUMMARY

This report summarizes the results of an ongoing monitoring program designed to track hydrologic responses to pumping from Montara Water and Sanitary District's deep bedrock well at Alta Vista. The well is uniquely high yielding and draws on a fracture system primarily from a depth of about 800 feet in Montara Mountain. Though initially required for the first three years of pumping, the monitoring program was continued and expanded by MWSD out of interest in understanding how this well is sustained, and what effects may pumping the well have on adjoining natural resources. The monitoring proved to be a successful habitat-responsible adaptive-management approach to managing the complex fractured bedrock aquifer.

The monitoring program included:

a) Streamflow at Martini, Daffodil, and Montara Creeks;

b) Shallow groundwater levels near riparian vegetation, and applied conservative drawdown guidelines from Carmel Valley;

c) Bedrock groundwater elevations; and

d) Various groundwater age dating techniques.

Long-term viability of pumping the Alta Vista Well is best evaluated across a cycle of years of major recharge and of drought years – for example, from years of peak recharge, through drought years, and then completing the cycle with a return to a peak recharge. Given the range of water-year types encountered during the 11-year monitoring period, the findings, conclusions, and recommendations presented in this report reasonably represent a cycle of years with which operational pumping rates may be based.

Over the time scales which are the focus of this monitoring study, the shallow aquifer system (the alluvium and associated shallow weathered granitics) responded independently but is connected to the deep fractured granitic bedrock, from which the Alta Vista Well draws groundwater.

If carefully managed, the Alta Vista Well is suited to contribute sustainably as a groundwater source to the MWSD water system, supplying water to Montara and Moss Beach for current and near-future demand. From the inception of developing and implementing the Alta Vista Well, there has been concern that very high rates of pumping may affect nearby wells, springs, stream baseflow and riparian vegetation,

which was regulatory hurdle during the permitting period. These effects on what might be called the hydrogeologic neighborhood is a reminder that use of the Alta Vista Well needs to be tempered by the consideration of these other demands on groundwater. In this regard, the fracture system supplying the well did show limits to groundwater pumping mainly related to lower groundwater recharge during drought years. Nevertheless, the well has shown to support periods of increased pumping, which can potentially provide water in the event of an emergency, improve the overall reliability of the water system, and bridge multiyear droughts.

After eleven years of pumping the Alta Vista Well at rates equivalent to an average (continuous) rate of 86 gallons per minute, seawater intrusion remains physically impossible, given a strong westward hydraulic gradient from the Alta Vista Well to the ocean which was sustained throughout the drought of 2012 through 2015. At current water levels and pumping rates, intrusion of the fractured granitic aquifer is not a concern.

Continued monitoring is recommended to balance well pumping with groundwater recharge, particularly given changing the climate and variability of water-year type. The monitoring results provide a model for managing other high-yielding bedrock wells, and thus support a plan to continue exploration with an objective to add additional well sources drawing on the Montara Mountain bedrock fracture system.

2. PURPOSE AND SCOPE

Montara Water and Sanitary District (MWSD) is interested in understanding how the Alta Vista source well is sustained and what effects may pumping the well have on adjoining natural resources. The well is uniquely high yielding and draws on a fracture system primarily from a depth of about 800 feet in Montara Mountain. At the onset of implementing the well as a water source, a monitoring program was designed and executed to track hydrologic responses to pumping groundwater from this deep bedrock well. The monitoring plan was later expanded to include groundwater age dating techniques.

The Alta Vista water supply well (DWR No. 1095584) was completed on July 8, 2004. During the summer of 2007, MWSD installed a submersible pump in the well and piped it to the Alta Vista water treatment and storage facility. On October 29, 2007, MWSD obtained permission from the California Department of Health Services to pump the well water to their distribution system. Following chlorine sterilization and flushing of the well, MWSD began pumping the well on November 11, 2007, and has used the well as a primary source of water supply since that time.

An aquifer test was conducted during the first 60 days of pumping to satisfy a request by the California Coastal Commission (CCC) to assess any observed effects to streamflows and riparian habitat in the vicinity of the well. Results of the test were reported in a letter report from Balance Hydrologics (Balance) to MWSD, dated February 21, 2008. MWSD has also received certification of their Public Works Plan Phase 1 by the CCC, which included hydrologic and vegetation monitoring protocols for pumping the well. Dated November 17, 2008, the CCC adopted findings of application no. 2-06-006, Section 4 "Suggested Modifications," paragraph 2H, which identifies the monitoring protocols:

> *"Hydrologic monitoring shall continue for a period of three years according to the "Hydrologic and Vegetation Schedule: Alta Vista Well" and "Hydrologic and Vegetation Monitoring Plan: Alta Vista Well" dated September 5, 2008."*

Balance conducted hydrologic monitoring and prepared a letter report (dated January 12, 2011) discussing the monitoring results for the first three years of use (water

years[1] 2008, 2009, and 2010), which included three years of baseline (pre-pumping) monitoring. The report recommended groundwater management for the near term. Balance has since continued monitoring hydrologic conditions – now into its twelfth year of groundwater pumping. This current report updates the findings through water year 2018. Vegetation monitoring results are presented in separate reports.

[1]The term "water year" is defined as the 12-month period from October 1, for any given year, through September 30, of the following year. The water year is designated by the calendar year in which it ends, and thus, the year ending September 30, 2010 is called water year 2010, or WY2010.

3. DESCRIPTION OF THE ALTA VISTA WATER WELL AND AQUIFER

Located in the unincorporated community of Montara, California, the Alta Vista Well was drilled on APN 036-180-030 about 700 feet northeast from the MWSD water treatment facility and storage tanks on Alta Vista Road. The site is on a ridge that descends southwestward from Peak Mountain and North Peak on Montara Mountain. The ridge is a watershed divide that separates Daffodil Canyon to the north from Montara Creek to the south (**Figure 1**).

The Alta Vista water-supply well was drilled to a depth of 780 feet below ground surface (ft. bgs). Weathered granitic rock was found to a depth of 235 ft. bgs, with the uppermost 15 feet being heavily weathered.[2] Primarily unweathered, fractured granitic rock was encountered below 235 feet. During drilling, the first sustained water was encountered at a depth of 233 feet, just above the transition from primarily weathered granitics to fractured granitic rock. Below this depth, a considerable section of uniform, almost unfractured granitic rock was encountered, yielding very little water. High-yielding open joints and fractures were intersected below 714 ft. bgs, near the bottom of the well. These deep open joints are a principal pathway by which groundwater enters the well.[3] The well construction and open joints are illustrated in a west-to-east schematic profile showing marine terraces at the coast, weathering depth of and Montara Mountain granitic rock, related perched aquifer, streams, and valley alluvium (**Figure 2**). The geologic and geophysical logs and construction diagram for the Alta Vista Well is in **Appendix A**, and detailed drilling observations are described in our well completion report (Woyshner and others, 2005).

The Alta Vista Well was completed with solid 12-inch steel (conductor) casing from the surface to competent bedrock at 370 ft. bgs, with a neat-cement tremie seal from 370 feet to ground surface. Below the casing and seal, an uncased 9-inch diameter borehole extends from 370 feet to the deep water-yielding joints and bottom of the well.

The 370-ft seal not only mechanically stabilized the upper portion of the well but also limits inflow to the well to just groundwater flowing through bedrock fractures, foremost

[2] At other locations in the area, weathered and fractured bedrock more generally extends to depths of 300 or 350 feet. (Laduzinsky and others, 1988)

[3] Two large open joints were found at 724 and 727 ft. bgs, which we interpreted as a primary source of the high yields. The largest joint (at 724 ft. bgs) strikes 3 degrees west of north, and dips east 58 degrees east (or dipping 58° N87°E). The other joint strikes north 21 degrees east, and dips 40 degrees east (40° N111°E).

from the deep open joints found at the bottom of the well. Sealing the well this deep also provides a safety factor for potential cross-aquifer groundwater movement through the well bore, and minimizes potential effects to the overlying weathered granitic aquifer, from which domestic wells draw water. It also minimizes potential direct effects to surface waters. Consequently, no significant effects were discerned on water levels in the weathered granitic aquifer, the shallow alluvial aquifer, or the surface waters during pumping tests conducted following well completion, only drawdown in the upgradient fractured-bedrock monitoring wells (Woyshner and others, 2005). Results of hydrologic monitoring during the subsequent 60-day aquifer test (Woyshner and others, 2008), conducted from November 10, 2007 to January 10, 2008, showed similar responses as was observed during shorter pumping tests conducted after drilling the well. Results showed groundwater drawdown in the fractured bedrock aquifer but no discernible drawdown in the overlying weathered granitic aquifers from which domestic wells draw water. Similarly, no effect on streamflow in Montara Creek and Daffodil Canyon could be detected. In addition, limits to the fractured bedrock aquifer (such as low-permeability or no-flow boundaries) were not encountered during the test. Findings reported after three years of pumping the Alta Vista Well (Woyshner and others, 2011) and after six years of pumping (Woyshner and others, 2013) showed that dry-season drawdown in the shallow alluvial aquifer recovered during the wet season, while groundwater elevations in the bedrock aquifer are largely related to the rate of pumping at the Alta Vista Well, with an imperceptible response to wet-season recharge.

3.1 Groundwater Recharge

Groundwater recharge to the fractured bedrock aquifer would logically be most significant during wet years, when soil moisture is replenished, groundwater storage in the overlying alluvium and colluvial wedges is enhanced, and infiltration is prolonged during the extended wet-season. Recharge to the fractured bedrock aquifer was observed in groundwater elevations during water year 2006 in the months preceding pumping the Alta Vista Well. WY2006 was a year with 160 percent of mean annual rainfall (**Table 1**).[4] Since pumping the Alta Vista Well, only water years 2011 and 2017

[4]Monitoring began in the dry season of WY2005, also a wet year with 145 percent of mean annual rainfall; thus, any recharge to the bedrock aquifer during 2005 was not recorded.

would be classified as a 'wet year', and eclipsed by changing pumping rates at the Alta Vista Well, direct recharge was only discernible during 2017.[5]

To help understand recharge to the fractured bedrock aquifer, we have included age-dating of groundwater in the monitoring program. Monitoring the age of groundwater pumped from a source well can help interpret the extent to which the well extracts groundwater recharged many thousands of years ago, and is producing younger groundwater that has been recharged over recent years and decades. Accordingly, our approach is to evaluate the extent that the well draws on ancient water during multi-year droughts and/or periods of higher use, and the extent that the well draws on groundwater recently recharged during normal and wet years. Age-dating the groundwater is an independent line of evidence from the water-level and hydraulic data discussed above.

The Alta Vista Well was first sampled for age-dating analyses on March 28, 2011 by the U.S. Geological Survey (Data Series 874 by Davis and Shelton, 2014), as part of the Ambient Groundwater Monitoring and Assessment (GAMA) program in cooperation with the California State Water Resources Control Board (SWRCB). This sample was taken during a wet year. The sample was analyzed for stable-isotope ratios of hydrogen and oxygen, carbon-14, tritium activity and dissolved noble gases, as well as inorganic and radioactive constituents. Balance subsequently sampled the Alta Vista Well, on October 30, 2014, following three consecutive dry years. At that time, a groundwater sample was also collected at the Portola #3 well (**Figure 1**), after deepening the well in March 2014 to a depth of 540 feet in fractured granitic bedrock. Balance sampled the two wells again in 2015, 2016 and 2017. The sampling on October 27, 2015 followed a fourth consecutive dry year, while the sampling on October 20, 2016 followed slightly below average rainfall, and sampling on August 23. 2017 followed significantly above normal rainfall. Two other source wells were sampled in 2016 – the Drake and Wagner wells – relatively shallow wells (depth<200 ft) located in the upper alluvial valley of Montara Creek (**Figure 1**). The results of all these samplings are included in this report.

[5]Followed three consecutive dry years, rainfall during WY2010 was 111 percent of mean and 2011 was 131 percent of mean, likely enough to provide recharge to the fractured bedrock aquifer. Similarly, following four consecutive dry years, one year being an extreme dry year, WY2016 was 97 percent of the mean and possibly contributed marginal recharge to the fractured bedrock aquifer. Then recharge was clearly observed during wet year 2017.

4. MONITORING STATIONS AND METHODS

4.1 Groundwater Elevations

Five monitoring wells served to monitor groundwater drawdown effects from pumping the Alta Vista water supply well, as described below. Geologic and geophysical logs and the construction diagram and descriptors for each well are compiled in **Appendix A**. Locations of the monitoring wells are shown in the attached **Figure 1** with the following descriptions:

- Well 04-3 is a deep bedrock well located upgradient and northeast of the Alta Vista Well. This well has a total depth of 798 feet, and sealed to a depth of 53 feet. As with the Alta Vista Well, it was installed in 2004, to a similar depth, and monitors the same fractured-bedrock system.[6]

- Well 04-5 is a shallow well, 85 feet deep and located south of the Alta Vista Well. It is positioned down-valley of the spring-related riparian woodland adjoining the north fork of Montara Creek. It is screened in uppermost weathered and fractured granitic rock at the contact of the underlying valley alluvium, and monitors the same fractured bedrock system as the Alta Vista Well.

- Two shallow monitoring wells were installed in the valley alluvium to monitor water levels near the spring-related riparian woodland on the north fork of Montara Creek. The spring appears to drain the toe of a landslide located downslope of the Alta Vista Well head. It is associated with the riparian woodland on of the valley floor between the slide and Montara Creek (see **Figure 1**).

    - MW-1 is located upstream of the spring and riparian woodland, and

    - MW-2 is located downstream of the woodland.

- Well 04-2 is a bedrock well located at the mouth of Daffodil Canyon. It is 554 feet deep and screened across both weathered/decomposed granitic rock and underlying fractured granitic bedrock. Water in the well is influenced by both shallow alluvial groundwater and groundwater found in fractured bedrock. This well was sited to explore for water along inferred faults trending NNW near the well site, such that static water levels may be affected by effects on either

[6]Well 04-3 was drilled to a depth of 832 ft. bgs just prior to drilling the Alta Vista water supply well but did not intersect the deep open joints. It is used as an upgradient monitoring well.

aquifer. We believe the well is located downgradient of the Alta Vista Well, yet proved to be unaffected by all pumping tests.

Each monitoring well was equipped with a datalogger (Solinst® Levelogger) to record water level every hour. Periodic depth-to-water measurements were performed using a Solinst® water-level meter (sounder) to calibrate the datalogger record. Groundwater monitoring observations by Balance staff are tabulated in **Appendix B**. Dataloggers were installed in the five monitoring wells in May 2005, and have since recorded groundwater elevations.[7] Depth to water measurements in the Alta Vista Well and flow meter readings were regularly collected by MWSD staff as part of the operations protocols for the well.

4.2 Streamflow gaging

In addition to monitoring groundwater levels, streamflow was gaged at three stations (**Figure 1**)[8]:

- At the mouth of Daffodil Canyon at Old San Pedro Road;
- North Fork Montara Creek at Riviera Road, just upstream of the confluence with the main stem Montara Creek; and
- Above MWSD's headwater springs diversion on Montara Creek.

Periodic flow measurements were also taken above the MWSD diversion on Montara Creek either by emptying the water in the diversion box and measuring the time it takes to refill, or more recently with a portable cutthroat flume.[9] The Montara Creek at Riviera Road station and the Daffodil Canyon station were gaged using conventional open-channel methods (Rantz and others, 1982). Each station was equipped with a datalogger to monitor water level every 15 minutes and a USGS Style C staff plate from which to take stage readings. Flow ("discharge") measurements were periodically performed using either (1) a federally approved bucket-wheel current meter protocol, including a top-setting wading rod, (2) a portable cutthroat flume, or (3) bucket and

[7]For datalogger calibration, periodic manual measurements of depth to water were also conducted by Balance Hydrologics staff.

[8]All flow measurements were collected by Balance Hydrologics staff. Daffodil Canyon was monitored beginning in October 2006, and Montara Creek North Canyon beginning in June 2007.

[9] Prior to August 2013, MWSD staff took these measurements, and since, Balance staff have taken the measurements.

stopwatch at lower flows.[10] Flow measurements were correlated to the corresponding stage reading to construct a stage-to-discharge relationship ("rating curve"). The hydrologic observations by Balance staff are tabulated in **Appendix B**. A stage-to-discharge rating developed from the field measurements was applied to the datalogger record to calculate a record of daily mean discharge. The hydrologic record for all three streamflow stations for each water year gaged is compiled in **Appendix C**. Monthly discharge at each stream station is presented in **Table 2**. Though initially not part of the monitoring plan for pumping the Alta Vista Well, Martini Creek has been gaged since 2004, also using conventional open-channel methods.[11] The record of flows provides runoff and baseflow data for this generally unmodified 'index' watershed on Montara Mountain.

4.3 Rainfall Stations

Rainfall was measured at the Alta Vista water treatment and storage facility.[12] From water year 2001 through 2008 daily rainfall was manually measured at the facility each morning at 8:00 by MWSD staff. From water year 2009 to date, measurements were automated with a tipping-bucket rain gage and datalogger. Real-time data for this station can be found at online.[13] During water years 2004 through 2007 rainfall was also recorded using tipping-bucket rain gage and datalogger at two locations in the Martini Creek watershed: at Old San Pedro Road and at the watershed divide. The rainfall record for each water year gaged is compiled in **Appendix C**. The monthly totals since January 2001 are listed in **Table 1**.

Starting in March 2016, a NOAA weather station was installed at the MWSD office, 8888 Cabrillo Highway, Montara, California, located at the mouth of Montara Creek. Data

[10] For MWSD work, Balance uses methods endorsed by the Federal Interagency Sedimentation Program (FISP). Bucket-wheel current meters are also the preferred means of measuring flows used by the Division of Water Rights of the State Water Resource Control Board.

[11] Maintained by Balance and funded by MWSD, these gaging data are included in this report for use in our hydrologic analysis.

[12] A rain gage is typically placed away from objects that obstruct the wind and at a distance from two to four times the height of the obstruction. Though the rain gage is located in the most open area of the facility property, there are relatively tall trees approximately 40 feet west of the gage that may alter the flow of wind at the site.

[13] http://balancehydro.com/gaging-site/rainfall-at-mwsd/

from this station were not used in this report. Data from other stations in the region, including the Half Moon Bay Airport, can be downloaded at MesoWest.[14]

Although not a subject of this report, it is noted that precipitation on Montara Mountain and a number of other Coastside rain gages do vary from patterns observed elsewhere in San Mateo County and the Bay Area in general, sometimes surprisingly so.[15] Use of local data are suggested in future analyses.

[14] http://mesowest.utah.edu/

15 For example, on April 8, 2019, a random date during preparation of this report, cumulative seasonal rainfall at Alta Vista was 83% of the seasonal average of 30.66, while Bon Tempe Lake, similarly elevated above the coast, was at 107% of the annual mean at that rain age.

5. GROUNDWATER AGE-DATING METHODS

The age of groundwater is the length of time since the water has been isolated from the atmosphere, or the time since groundwater recharge. Several methods have been developed to estimate groundwater age, and owing to uncertainties in each method, multiple methods are typically used for a given field condition to cross-check results. Age-dating techniques should always be used as means to independently affirm a conceptual understanding of the groundwater system based on other lines of evidence – such as geologic, geophysical, water quality, modeling and historical evidence -- rather than as a seemingly-sufficient conclusive result. Relatively common methods used to estimate groundwater age include: a) the travel time of groundwater from the point of recharge as calculated by Darcy's law combined with an equation of continuity; b) the decay of radionuclides which have entered water from contact with the atmosphere, such as tritium (hydrogen-3) and carbon-14; c) the accumulation in groundwater of products of radioactive reactions in the subsurface, such as radiogenic helium (helium-4); d) anthropogenic constituents such as chlorofluorocarbons (CFCs) and sulfur hexafluoride (SF_6); and e) matching the chronology of past climates with paleoclimate indicators in water, such as the ratio of stable isotopes of water (hydrogen-2 / oxygen-18) or the concentration of noble gasses. There other less common methods as well (Clark and Fritz, 1997; Cook and Herczeg, 2000; Davis and Bentley, 1982; Kendall and McDonnell, 1998).

Six laboratory methods were used to date the groundwater samples collected from the Alta Vista and Portola #3 wells:

- tritium-helium;
- chlorofluorocarbons and sulfur hexafluoride;
- radiogenic helium;
- carbon-14;
- stable isotopes of oxygen and hydrogen; and
- noble gases.

A general mineral analysis was also performed. Tritium-helium, chlorofluorocarbons and sulfur hexafluoride date young or the modern fraction of groundwater, while radiogenic helium and carbon-14 methods date the old (or ancient) groundwater fraction. Concentrations of noble gases and the stable isotopes of oxygen and hydrogen were used to interpret the recharge temperature and conditions.

5.1 Tritium-Helium

Tritium concentrations identify waters recharged subsequent to the late-1950s and early 1960s, when atmospheric testing of nuclear arsenals took place.

Tritium (^3H) is a naturally-occurring radioactive isotope of hydrogen with a half-life of 12.32 years and derived in the stratosphere interaction with cosmic radiation. Continental heating mixes the upper atmosphere and releases tritium from the stratosphere into the troposphere – a phenomenon known as the 'Spring Leak'. Tritium is removed from the lower atmosphere by precipitation and molecular exchange, and the ocean is a sink. Across North America, tritium concentrations in precipitation, therefore, generally increase with latitude and distance from the ocean. Within California, tritium concentrations are lowest at the coast and increase inland.

Normally in very low abundance, tritium concentrations in the atmosphere increased several orders of magnitude above the background levels from above ground nuclear weapons testing during the 1950s and early 1960s, releasing tritium to the atmosphere until the nuclear test ban went into effect in 1963. Since that time, tritium's decay to stable helium isotope (^3He) has since progressively decreased tritium concentrations in the atmosphere (**Figure 3**). In groundwater, tritium is isolated from the atmosphere and also undergoes natural decay. Measurement of both tritium and its daughter product helium-3 in a groundwater sample allows for the calculation of the initial tritium concentration present at the time of groundwater recharge. This helium ingrowth method is described in detail on the USGS Reston Groundwater Dating Laboratory website[16] and summarized in **Appendix D**. Given that the concentrations are so small, tritium is reported in a unique concentration unit call a 'tritium unit' or TU.[17] The reported age is the mean age of that portion of the groundwater sample that contains measurable tritium.

The tritium-helium method dates 'modern' groundwater, that component of groundwater recharged since the nuclear testing in the atmosphere peaked in 1963. It also helps to coarsely estimate the fraction of pre-modern groundwater in a sample, and dates groundwater wholly recharged before 1952 where samples contain no tritium (or at a practical level < 1 pCi/L or < 0.3 TU). Given the depth of the Alta Vista

[16] https://water.usgs.gov/lab/3h3he/background/

[17] One tritium unit (TU) is equivalent to one tritium atom per 10^{18} hydrogen atoms. Tritium is also reported in terms of activity (pico-Curies per liter, *p*Ci/L) or decay (disintegrations per minute per liter, dpm/L), whereas 1 TU = 7.2 dpm/L = 3.2 *p*Ci/L.

Well, we considered it possible to obtain a zero-tritium result. The problem to define the tritium concentration at the time of groundwater recharge is complex, and most studies make only a qualitative judgment of groundwater age based on tritium concentrations.

5.2 Chlorofluorocarbons and Sulfur Hexafluoride

Chlorofluorocarbons – CCl_3F (CFC-11), CCl_2F_2 (CFC-12), $Cl_2FC\text{-}CClF_2$ (CFC-113) – are synthetic compounds and have no natural sources. The measurement of CFC concentrations in groundwater can date that fraction of groundwater recharged from the 1940s (at on the onset of industrial production) through the mid to late 1990s when atmospheric concentrations peaked (**Figure 4**). Sulfur hexafluoride (SF_6) is a trace atmospheric gas but with significant synthetic production beginning in the 1960s for use in high voltage electrical switches. Unlike CFCs with declining atmospheric mixing ratios, atmospheric concentrations of SF6 continue increase, and therefore can potentially date post-1990s groundwater. The dating methods and its applications are detailed in International Atomic Energy Agency (IAEA, 2006), Plummer and Busenberg (2000), and Ekwurzel and others (1994).

CFCs were first synthesized in 1928 as replacements for the toxic ammonia, methyl chloride, and sulfur dioxide refrigerants that were in use since the late 1800s. Commercial production began in 1930 and CFCs gradually replaced older refrigerants in cooling devices. After the mid-1940s, CFCs became the preferred aerosol propellants, and were widely used as solvents and degreasers, and as blowing agents for plastic foam. By the 1950s and 1960s, CFCs were widely used in the air-conditioning of homes, commercial buildings and automobiles. CFCs are a prime contributor to stratospheric ozone depletion, and as a result of the Montreal Protocol on Substances that Deplete the Ozone Layer (an international agreement to phase out production of CFCs) air mixing ratios of CFC-11, CFC-12 and CFC-113 peaked in the northern hemisphere in about 1994, 2001 and 1996, respectively. The estimate of the

atmospheric lifetime of CFC-11 is 45 ± 7 years, 87 ± 17 years for CFC-12, and 100 ± 32 years for CFC-113.[18]

SF_6 a colorless, odorless, nonflammable, nontoxic, extremely stable gas with excellent insulating and arc-quenching properties. Its estimated atmospheric lifetime is 800 to 3200 years, and is also stable in reducing groundwater environments. Industrial production of SF_6 began in 1953 with the introduction of SF_6-filled electrical switches. The SF_6 atmospheric mixing ratio has since rapidly increased owing to the following conditions: (1) its long lifetime in the atmosphere; (2) its low solubility in water; (3) its high stability in soils and groundwater; and (4) the other lack of natural sinks. SF_6 is an extremely potent greenhouse gas, with the highest value measured for any gas, estimated to be 23,900 times that of CO_2. Because of its low solubility, apparent ages can be very sensitive to excess air.

Given that the bomb tritium signal has decayed to a point where results can be difficult to interpret in many groundwater systems, CFCs and SF_6 results can strengthen the interpretation of tritium results. Our basic approach is to confirm the recharge of young water relative to previous sample results. By collecting samples each year, any progressively increasing amounts of recharge would potentially increase the overall average within the aquifer, relative to pre-1990s concentrations. Given that sorption and biodegradation reduces CFC concentrations, thereby potentially biasing a result to an older apparent recharge year, an increase relative to previous sample result would confirm recharge.

5.3 Radiogenic Helium

The subsurface accumulation of ^4He is from the decay of heavy radionuclides in the earth's crust – primarily uranium (U) and thorium (Th) decay – and known as 'radiogenic helium'. It increases in groundwater with time, and hence increases along a

[18] The atmospheric lifetime, or residence time, of a molecule can be simply thought of as the time it remains in the atmosphere. [Note: there is a trend to use lifetime when referring to the loss by a chemical process, and residence time when the loss is by a physical process, but the two terms are generally interchangeable.] The lifetime of an atmospheric pollutant, such as a CFC, is the time for the concentration to return to its natural (or baseline) level as a result of either being converted to another chemical compound or being taken out of the atmosphere via a sink. Species may have multiple different loss processes, and the combination of these processes estimates the overall lifetime. For many long-lived species, such as CFCs, loss processes include photochemical breakdown in the stratosphere, oxidation and deposition processes in the troposphere, and degradation in the hydrosphere or in soils. This term is not equivalent to half-lives, a different means of characterizing exponential decay rates.

groundwater flow path. However, the newly formed ^{4}He resides in solid material and the rate at which is diffuses into groundwater is not well known, and thus precise age dating is not possible. The method dates a considerably older groundwater component than tritium and CFC methods, on the order of hundreds to thousands of years. Groundwater with a subsurface residence time greater than a few hundred years usually contains detectable radiogenic helium. The method references and technical procedures are described in detail in **Appendix D**.

5.4 Carbon-14

Like tritium, carbon-14 is formed in the upper atmosphere by interaction with cosmic rays, and also was formed during above-ground nuclear-weapons testing until the ban in 1963. Atmospheric carbon-14 is incorporated into carbon dioxide (CO_2), mixed in the atmosphere, and distributed in precipitation as a bicarbonate ion. Carbon-14 is consumed by plants and accumulates in soil, carbonate rocks and minerals. Carbon-14 is distributed subsurface as bicarbonate and carbonate ions in groundwater recharge. With a half-life of 5,730 years, carbon-14 dates old groundwater, on the order of thousands of years, and can affirm radiogenic-helium age estimates. Carbon-14 age estimates can be complicated with abundance of carbonate minerals or organic material in the aquifer or recharge areas. Where chemical complications are minimal, groundwater dates with a +/- 20 percent accuracy may be possible, otherwise estimates may easily have an error band of 100 percent (Davis and Bentley. 1982). Nevertheless, order-of-magnitude estimates can be of great value. Chemical complications are generally minimal in the Montara Mountain granitic bedrock, we believe, with the exception of possible calcite precipitation and dissolution in soil, weathered-bedrock vadose zone, fractures and joints.

5.5 Stable Isotopes of Water

The two stable isotopes of hydrogen (^{1}H and ^{2}H) and the three stable isotopes of oxygen (^{16}O, ^{17}O, and ^{18}O) are frequently used to help understand the origin and movement and groundwater (**Figure 5**). Oxygen-18 and hydrogen-2 (deuterium) are heavy isotopes[19] and their relative abundances in water change slightly (or fractionate)

[19] Isotopes are atoms of the same element that have different numbers of neutrons, thus have different masses. Deuterium (^{2}H) has one neutron and one proton, and is approximately equal to twice the mass of protium (^{1}H). All isotopes of oxygen have eight protons but an oxygen atom with a mass of 18 (^{18}O) has 2 more neutrons than oxygen with a mass of 16 (^{16}O). Oxygen-18 and deuterium occur in water at abundances of 0.204% of all oxygen atoms and 0.015% of all hydrogen atoms, respectively.

during physical phase change processes such as evaporation, condensation, and snowmelt. They are either enriched or depleted based the greater energy required to break the hydrogen bonds of heavy isotopes than water containing lighter isotopes (and consequently, they will react more slowly). Heavy isotopes, therefore, are enriched in the more condensed phases. Water with a higher deuterium and oxygen-18 content is generally found near the coast, at low elevations, in warm rains, and in water which has undergone partial evaporation. Lower deuterium and oxygen-18 content (i.e., greater negative values) is found inland, at higher elevations, in cooler climates, and in evaporated water. At a given coastal location where there are no imported Sierran waters (such as from Hetch Hetchy) to confound results and a negligible groundwater flow gradient, stable isotopes of water may support a conclusion of pre-modern groundwater recharged during a colder climate. This was the case of a coastal groundwater sample in the Pajaro Groundwater Basin (Hanson, 2003a,b). These results are shown in **Figure 5**, as an example.

The relationship of $\delta^{18}O$ to $\delta^{2}H$ is known as the meteoric (or meteorological) water line (MWL). If a local meteoric water line (LMWL) is not available (reflecting local variations in climate, rainfall seasonality, and geography), it is common practice to use the global meteoric water line (GMWL) as a reference against which to compare sampling results. Departures from the GMWL can be caused by evaporation (known as an evaporation line), deuterium excess (from re-evaporation and precipitation of terrestrial water), seawater intrusion, and groundwater reaction with minerals.

5.6 Noble Gases

The solubilities of the noble gases (He, Ne, Ar, Kr, and Xe) in water vary as a function of temperature and pressure. The concentrations of noble gases in groundwater should, therefore, reflect the surface temperature at the time of groundwater recharge, provided that recharge is reasonably rapid and goes directly to the aquifer. Water table temperatures inferred from dissolved noble gas concentrations (noble-gas temperatures, NGT) are useful as a quantitative proxy for air temperature change since the last glacial maximum (Cey and others, 2009).

The concentrations of noble gases in groundwater are also used to estimate the quantity of 'excess air' – air bubbles entrained during recharge and fluctuations in the water table that subsequently dissolve at depth in groundwater. The concentration of excess air provides valuable information about the recharge process, and is an important consideration when calculating the tritium-helium age.

Excess air concentration and recharge temperature is discussed in more detail in **Appendix D**.

5.7 General Minerals

The composition of general minerals within a groundwater sample is commonly interpreted to identify or to confirm a source and pathway of groundwater. Samples collected on October 27, 2015, on October 20, 2016, and on August 23, 2017 were delivered to Monterey Bay Analytical Services (a California-certified analytical laboratory) for analysis of general minerals, primarily to assist with the analysis and interpretation of the carbon-14 results (**Appendix E**). General-mineral results were also published for the March 28, 2011 sample (Davis and Shelton, 2014). These results were plotted on a Piper diagram (**Figure 6**), which is a useful standard tool in distinguishing amongst different water types and identifying mixed sources. It plots the ionic charge composition (percent in milliequivalents per liter) of the water samples. Clusters of sample points indicate samples with similar compositions. Groundwater from the Alta Vista, Drake and Wagner wells appear to have a similar Montara Mountain bedrock source as stream baseflows in the region. However, The ionic composition of groundwater from the Portola #3 well and from the potential well sites A and B (sampled at boreholes on Caltrans right-of-way property; Porras and others, 2015) shows a separation from these wells and streams with more magnesium, sodium and chloride, as well as more dissolved solids, which suggests a unique local source groundwater (see locations on **Figure 1**).

5.8 Sample Collection

We collected groundwater samples during late dry-seasons 2014, 2015, 2016 and 2017, when there was very little cumulative seasonal rainfall prior to sampling with clearly no groundwater recharge.

- The dry-season 2014 samples were sent it to HydroTrace, LLC for analysis and interpretation. HydroTrace is an administrative vehicle contracted with the Chemical Sciences Division of Lawrence Livermore National Laboratory (LLNL) for high-precision tritium-age and noble gas analyses.[20] Sample results from LLNL were reviewed and interpreted by Dr. Jean Moran of California State University

[20] Hydrotrace offered this service because it is difficult to contract with the LLNL, especially for small projects (a limitation of the government lab contracting policy). HydroTrace's contract with the lab took 17 months to execute. Hydrotrace and LLNL has since discontinued this agreement.

East Bay. We followed sample collection methods provided by HydroTrace (**Appendix F**).

- The dry-season 2015 and 2016 samples were sent to the Dissolved and Noble Gas Lab at the University of Utah for CFC analysis. USGS CFC sampling method was used (detailed in **Appendix G**).
- The dry-season 2017 samples were sent to the Dissolved and Noble Gas Lab at the University of Utah for CFC, SF_6, tritium-age and noble gas analyses. USGS $^3H/^3He$ Noble Gas Sampling Method (**Appendix F**), USGS CFC sampling method (**Appendix G**), and USGS SF_6 sampling method (**Appendix H**) were used.
- 2015, 2016, and 2017 samples were also sent to the Environmental Isotope Laboratory at the University of Waterloo for the analysis of isotopes of hydrogen (^2H, ^3H), carbon (^{13}C, ^{14}C), and, oxygen (^{18}O). Duplicate samples were collected, each sample in a 250 mL boston round clear glass bottle with an open top cap and silicon septum following procedures similar to CFC sampling.

6. MONITORING RESULTS

6.1 Rainfall and Recharge Conditions Prior to the Onset of Pumping

MWSD began pumping the Alta Vista Well for water supply early in water year 2008. Antecedent rainfall during water years 2005 and 2006 was above average, with 2006 being notably wetter than normal (**Table 1**). Evidence of groundwater recharge was observed at several monitoring stations during 2006:

a) 4-foot water-level rise in bedrock monitoring wells 04-3 and 04-5 during the wet season (**Figure 8**);

b) Very shallow water levels in shallow alluvial monitoring wells (MW-1 and MW-2) near the riparian area on Montara Creek (**Figure 8**); and

c) Elevated baseflows in Martini and Montara Creeks (**Figure 11**).

Following these two wet years, rainfall was below normal during water year 2007. During this dry year, these stations showed minimal recharge to shallow groundwater and streams and even much less recharge to deeper bedrock fractures, though levels receded marginally (**Figure 8**). Significantly lower levels of baseflows (both summer baseflows and winter baseflows) were recorded in Montara Creek and Martini Creek, as the 'carry-over' from wet years 2005 and 2006 was apparently exhausted (**Figure 11**).

6.2 Pumping the Alta Vista Well

The rate of pumping from the Alta Vista Well varies based on operational decisions made to meet system demand while also considering the availability of other supply wells and their water quality. The Alta Vista Well has been regularly pumped since November 10, 2007 at a monthly average rate as low as 15 gpm and as high as 140 gpm (**Figure 7**). The pumping rate has averaged 73.8 gpm for the period of record 2008 through 2018 (**Table 3**). During the first five years of operation, the average annual pumping rate ranged from 52 to 69 gpm (averaging 60 gpm). It was then increased during water years 2013 through 2015 to an average of 99 gpm with the highest annual average of 115 gpm during WY2014 (an extreme drought year). In 2016 through 2018 pumping returned to an average of 60 gpm, similar to the first five years of operation. Pumping averaged 70 gpm in 2016 (a year of below average rain), 50 gpm in 2017 (a wet year), and 61 gpm in 2018 (a dry year).

On average, 114 acre-feet per year has been pumped from the aquifer (**Table 3**). Assuming an average spatially-uniform recharge rate of 4 inches per year (a

reasonably conservative assumption), this volume would be roughly equivalent to a recharge area of 341 acres (0.53 square miles), which is approximately equivalent to (or 95% of) the topographic watershed upstream of the well.[21] In addition, the ground-watershed can extend beyond the boundaries of the surface-watershed, especially for the deep joints, from which the Alta Vista Well draws. This preliminary 'first-order' check[22] suggests MWSD has been drawing on the aquifer at an appropriate pumping rate, but not without consideration to the year-to-year effects on local drawdown, streamflows and habitat; for example, is a long-term average pumping rate suitable during a multi-year drought?

Drawdown in the fractured bedrock aquifer as a result of pumping the Alta Vista Well (as seen in the data presented in **Figure 7**) has fluctuated with the varied pumping rate, and this fluctuation overshadows any discernible rise to groundwater elevation in the bedrock aquifer from seasonal recharge. Corresponding to increased pumping rates during water years 2013 through 2015, groundwater elevations in the bedrock aquifer have receded to lower levels. Drawdown in the Alta Vista Well was 170 feet by the end of water year 2015 (**Figure 7**), 50 feet in the deep fractured-bedrock monitoring well (04-3), and 41 feet in the shallow bedrock well (04-5) (**Figure 8**). Groundwater elevations in the bedrock aquifer have risen to pre-2013 levels with decreased pumping and potentially groundwater recharge during 2016 and 2017, and have maintained that elevation in 2018. Seasonal recharge to the shallow aquifer, spring, and stream flows are discussed in a separate section (below).

6.3 Rainfall, Recharge, and Stream Baseflows While Pumping the Alta Vista Well

Following the onset of pumping the Alta Vista Well, water years 2008 and 2009 were consecutive dry years during a three-year drought that started in water year 2007. Watersheds on Montara Mountain received notable rainfall from large winter storms during January 2008, but the remainder of the year was drier than normal and the duration of the dry-season extended. Similarly, rainfall during February 2009 was above

[21] The Alta Vista Well is located on the watershed divide between Daffodil Canyon and the north fork of Montara Creek, and the combined area of these two watersheds upgradient of a perpendicular NW-SE line intersecting the well is roughly 360 acres. Other ways of estimating recharge area are also possible.

[22] This analysis assumes that there is little or no wide-spread irrigation or additional pumping from the topographic watershed upstream of the Alta Vista Well. There are no major pumping wells that we know of in this area, but it is possible the drawdown from the Drake and Wagner wells or any potential downstream agricultural wells extends upstream into this area. We believe this effect to be small.

normal, but in total, the water year was drier than normal with a long dry season (**Table 1, Appendix C**).

Following the 3-year drought from 2007 through 2009, rainfall during water year 2010 returned to normal and rainfall during water year 2011 was above normal (**Table 1, Appendix C**). Water year 2010 began with an extraordinarily large storm on October 13th, but above-normal rainfall then didn't return until January, and the remainder of the season was wetter than normal.[23] After the 2010 dry-season, rainfall during October, November and December of water year 2011 was above normal, followed by a typical mid-winter dry spell persisting through mid-February. Wet weather then returned through the end of March and isolated late-season storms continued into July, with June being the wettest on record. The duration of the dry-season during water year 2011 was distinctly abbreviated.

Below-normal rainfall returned during water years 2012 through 2015, with 2014 being extremely dry (**Table 1, Appendix C**). By mid-January 2012, only 6.45 inches of rain had fallen and by March 1st the cumulative rainfall for the water year was only 10.76 inches. Storms during March and early April then contributed an additional 11 inches of rain. During water year 2013, most rain fell during a storm period in late November and then again in the later part of December with then only a few small isolated storms during the remainder of the season. Dry-season 2013 was especially long, lasting to February 2014, which then was followed by extreme dry conditions. Water year 2014 was marked by 59 percent of normal rainfall, with nearly all falling during February and March. Water year 2015 was a fourth consecutive drought year with 82 percent of mean annual rainfall. Nearly all of rain fell from November 30 to December 22, with a record peak of 5.25 inches on December 11, 2014. Generally dry conditions then persisted through the remainder of the wet-season, interrupted only by 2.5 inches of rain falling in early February and a few late-season small storms.

Rainfall during water year 2016 was average, and 2017 was a wet year with a total of 42.5 inches of rain for the year (**Table 1, Appendix B**). WY2017 was the wettest year since pumping the Alta Vista Well started, and the wettest year since WY2005 and WY2006. Total pumping from Alta Vista Well was also the least of all years of pumping

[23] Recharge to the Montara Creek alluvium (MW-1 and MW-2) following the early-October event seems to have been about 1 to 3 feet, which quickly dissipated during the 45 days following October 13 which were essentially rainless (see figure 8).

(similar pumping total during 2008 and 2012). WY2018 was a dry year with below average rainfall totaling 19.0 inches.

Of the eleven years of pumping the Alta Vista Well (2008 through 2018), rainfall during seven of the water years was below average, while two years were notably above average (2011 and 2017). As pumping the Alta Vista Well drew down groundwater in the fractured bedrock supplying the well, infiltration and streamflows from winter storms consistently recharged shallow groundwater, which is observed as rising groundwater elevations above dry-season base levels in the shallow monitoring wells MW-1 and MW-2 (**Figure 8**). Recharge to the shallow groundwater during water year 2014 (an extreme dry year), though significant, was notably less than other dry years. The recharge to shallow groundwater during 2014 appeared similar to 2007 (prior to pumping the Alta Vista Well).

Dry-season base levels in the shallow monitoring wells were lower during dry years 2007 (prior to pumping), 2008 and 2009 relative to elevations during the pre-pumping wet year 2005 and 2006. Dry-season base levels were also lower in 2010, a year slightly exceeding normal rainfall. Dry-season base levels during wet year 2011 then returned to levels similar to pre-pumping wet year 2005 and 2006, in accord with the wetter antecedent conditions. During water year 2012, though below normal rainfall, recharge to shallow groundwater in conjunction with any carry-over from 2011 sufficiently supported dry-season base levels. These findings indicate no observed significant pumping effects in the shallow groundwater levels at the riparian woodland along Montara Creek during the 3-year drought from 2007 through 2009.

Drought conditions were longer and more extreme during the 4 years from 2012 through 2015, during which groundwater pumping from the Alta Vista Well increased through 2014, then decreased a bit in 2015. Dry-season base levels in the shallow monitoring wells were lower during water year 2013 relative to previous dry years, then significantly exceeded base levels during water years 2014 and 2015. These drawdown levels may be interpreted using the Monterey Peninsula Water Management District's McNiesh drawdown criteria, as proposed in the MWSD Public Works Plan Draft

Environmental Impact Report.[24] The following drawdown thresholds are shown in **Figure 9** for MW-1 (located above the riparian woodland on Montara Creek) and **Figure 10** for MW-2 (located below the riparian woodland):

> *"Drawdown will have nominal effects to riparian habitat when soil water is readily available, generally ending in late May or early June, but varying from year to year. After soil water becomes limited, severe water stress may be expected with 8 feet or more drawdown below wet-season base water levels, mild water stress with 4 to 8 feet of drawdown, and no effect with less than 4 feet of drawdown."*

Results suggest a potential for severe stress to the Montara Creek riparian habitat during late dry season 2014 and again during late dry season 2015. This interpretation of the drawdown data is supported by streamflow data (below). This potential for severe stress to riparian vegetation during 2014 and 2015 was alleviated with near normal rainfall during 2016 and wet conditions during 2017 in conjunction with less pumping (**Figures 9 and 10**).

Baseflows in Martini Creek and in Montara Creek above the MWSD headwater springs diversion were sustained through the 2007 through 2009 dry years and the 2012 through 2015 dry years with some variation in flow rate relative to the quantity of antecedent rainfall (**Figure 11**). Flows in Daffodil Canyon, likewise, showed sustained dry-season flow rates relative to antecedent rainfall (**Appendix C**). Approximately 0.5 miles downstream of the diversion on the north fork of Montara Creek, flow at Riviera Road typically receded to less than 1 gpm and dried down while the diversion of headwater spring flows and consumptive use by upstream riparian vegetation were sustained (**Appendix C**). Baseflow at this station was sustained during the wetter-than-normal water year 2011. Flows persisted in Martini Creek and Daffodil Canyon through the extreme dry water year 2014, but Montara Creek at Riviera Road was dry nearly all year, with recorded flow exceeding 1 gpm on 5 days only. Baseflows during water year 2015 were lowest on record, highlighting the limited recharge to the bedrock aquifer that

[24]Conservative guidelines for groundwater drawdown for the lower Carmel Valley (McNiesh, 1986) were recommended in the Draft EIR for the MWSD Public Works Plan Phase I (MHA, 2005) initially as part of the adaptive management approach to hydrological monitoring but may be modified if the criteria are overly protective or are not protective enough. For a number of reasons, the guidelines may overstate likely effects on riparian vegetation from pumping the Alta Vista Well (Section 3.3.3 of Woyshner and others, 2005), including the alluvial aquifers in the Montara area contain little of the gravel and cobbles which allow rapid drawdown in the Carmel Valley system.

supplies the late dry-season baseflow to the streams. Baseflows recovered to normal levels in water years 2016 through 2018.

6.4 Results of Age-Dating Analyses

Results for age-dating analyses of groundwater samples collected from source wells in the Montara Mountain fractured granitic aquifer are summarized in **Table 4**. Tritium-helium (^3H-^3He), chlorofluorocarbons (CFCs) and sulfur hexafluoride (SF_6) date young or the 'modern' fraction of groundwater, recharged over recent years and decades. Radiogenic helium and carbon-14 methods date old or 'pre-modern' groundwater fraction, recharged hundreds to thousands of years before modern water.

6.4.1 Modern Groundwater

The reported tritium (^3H) concentration of the sample collected from the Alta Vista Well on October 30, 2014 (after three dry years) was similar to the USGS sample collected on March 28, 2011 (a wet year), but marginally above the 1.0 picoCuries per liter (pCi/L) minimum level necessary to estimate tritium-helium age (**Figure 3**). The estimated tritium-helium age was 23.8 years (with a 3.9-year analytical uncertainty). The samples contained no detectable radiogenic helium (described below) and, therefore, classified as containing only 'modern' groundwater in the Hydrotrace report (**Appendix D**).

CFC results of samples collected in subsequent years also indicated modern groundwater (**Table 4**).[25] However, the recharge year estimated from CFC concentrations in the 2015 sample from the Alta Vista Well was notably older than the recharge years estimated from tritium concentrations in the 2014 and 2011 samples. These results suggest potentially negligible recharge and progressively drawing on deeper/older groundwater following increased pumping during four consecutive dry years. The inference that the Alta Vista Well increasingly drew on older groundwater into 2015 (following four dry years) is supported by lower groundwater elevations and the absence of wet years – important recharge years – since the 2011(**Figure 7**).[26] Conditions reversed in 2016 with reduced pumping and drawdown recovery at the Alta Vista Well along with near-normal rainfall. The CFC results from the 2016 sample

[25] Variability in the CFC results can be generally attributed to anaerobic degradation, mixing in the capture zone, but potentially also to method uncertainties and progressively expanding pumping during the 2012-2015 drought (as noted in the carbon-14 results).

[26] Rainfall during water year 2010 was near normal and WY2011 was wet. Similarly, water year 2016 was near normal and WY2017 was wet. Other years were dry.

indicate younger groundwater. Furthermore, CFC, SF_6, and tritium concentrations in samples collected in 2017 (a wet year) similarly indicate younger groundwater than sampled in 2015, with a return to the levels sampled in 2014 and 2011 (**Table 4**).

6.4.2 Pre-Modern Groundwater

The groundwater age calculated from carbon-14 activity is referred to as an "uncorrected radiocarbon age", a groundwater age not corrected for the initial carbon-14 activity of recharging groundwater and geochemical reactions that occur between groundwater and aquifer materials. Initial Carbon-14 activity of groundwater in the study area was estimated through the collection of groundwater samples from the Drake and Wagner wells, which are known to draw groundwater from the Montara Creek alluvial 'shoestring' aquifer and recharged with modern water. Corrected radiocarbon ages were checked against radiogenic helium results.

The radiogenic helium result and corrected radiocarbon age in the 2011 sample and the radiogenic helium result in the 2014 sample did not indicated a pre-modern groundwater component (**Table 4**). However, similar to the trend observe in the results for modern water (discussed above), carbon-14 activity in the 2015 sample indicated the presence of pre-modern water, suggesting potentially negligible recharge and progressively drawing on deeper groundwater following increased pumping during four consecutive dry years. As with modern water, the conditions reversed in 2016 with reduced pumping and drawdown recovery at the Alta Vista Well along with near-normal rainfall. Sample results in 2016 did not indicated a pre-modern groundwater component, which was repeated with samples collected in 2017 (a wet year).

6.4.3 Stable Isotopes of Water

The stable isotopes of water plot within the range of coastal waters under current climatic conditions (**Figure 5**). As with most groundwater, water temperatures approximate the mean annual air temperature for the region. The mean annual average maximum air temperature at Half Moon Bay airport is 16.8°C (62.2°F), and the mean annual average minimum air temperature is 8.4°C (47.2°F) for the period of record 7/1/1948 to 12/31/2005.[27] The temperature of the groundwater when sampling the Alta Vista Well was 19.1°C (66.2°F) (**Table 1**). This higher temperature corresponds to the geothermal gradient of 25°C per 1000 meters (or about 1°F per 75 ft) for granitic rocks away from active plate boundaries. Similar temperature results are also shown for

[27] http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?cahalf+sfo

the Portola #3 well. The calculated noble-gas recharge temperature for 2011 and 2014 samples from Alta Vista Well (and the 2011 sample from Portola #3 well) was 13 to 14 degrees Celsius (55 to 57 °F), similar to current recharge temperatures. Higher noble-gas recharge temperatures calculated with the 2017 samples could be interpreted as recent, shallow, low-elevation recharge. It could also be a bias in the noble-gas result possibly caused from excess gas or sampling and/or lab error.

The isotopic ranges of rain and fog are illustrated in **Figure 5** with the Point Reyes data of Ingraham and Mathews (1994). Rain water is more depleted than fog and has a more negative value because water undergoes several cycles of evaporation and condensation before its final precipitation. Given values typical of fog are much less negative, then one can infer a measureable contribution of fog water into the fracture system aquifer supplying the Alta Vista and Portola #3 wells. Dr. Sergio Aragon is currently conducting a field sampling program to investigate isotopic ranges of fog, rain, and groundwater for Montara Water and Sanitary District.

7. DISCUSSION

The principal pathway by which groundwater enters the Alta Vista Well is through high-yielding open joints and fractures in the granitic bedrock intersected below 714 ft. bgs (near the bottom of the well), which is about 550 feet beneath the monitored riparian woodland on Montara Creek. The well was pumped at an average continuous rate of 60 gpm during the initial 5-year period from water year 2008 through 2012. This period included the effects of the 3-year drought of 2007 through 2009 and wet year 2011. During this period, the shallow groundwater in the alluvium near Montara Creek and baseflows in Montara Creek and Daffodil Canyon appeared to receive sufficient recharge during each wet season to offset down-valley groundwater flow and potential percolation to bedrock fractures from which the Alta Vista Well draws groundwater. Neither surface waters nor shallow groundwater showed apparent drawdown effects from pumping the Alta Vista Well during this 5-year period. Concurrently, natural recharge to the underlying fractured bedrock generally affected the spring flows to Montara Creek, Daffodil Canyon, and Martini Creek, all of which showed higher baseflows during wet years and lower baseflows during dry years. Groundwater elevations in bedrock monitoring wells, however, were inconclusive in identifying direct recharge due to fluctuations related to the frequently changing pumping rates, even during wet year 2011.

During the subsequent 3-year period, from 2013 through 2015 conditions changed. Pumping at Alta Vista Well increased while the multi-year drought that started in 2012 deepened. Stream discharge, dry-season groundwater elevations in alluvium, and age of groundwater pumped from Alta Vista Well relative to rainfall and volume pumped are summarized in **Table 5** to illustrate a measureable imbalance in groundwater recharge and pumped volume during this period. The aquifer over-drafted condition that developed, however, was subsequently moderated during 2016 through 2018 (discussed below). Drought conditions were longer and more extreme during the four years 2012 through 2015. Concurrently more groundwater was pumped from the Alta Vista Well during years 2013 through 2015, an average continuous rate of 99 gpm with the highest pumping during water year 2014, the driest year (**Table 3**). The following notable conditions were observed during this period:

- Though streamflows persisted through 2014 in Martini Creek and Daffodil Canyon (at an expected lower rate than normal), and as well at the Montara Creek headwater diversion, the Montara Creek station at Riviera Road was dry nearly all year with recorded flow exceeding 1 gpm on 5 days only (**Appendix C**).

- Dry-season baseflows during water year 2015 were lowest on record across all stream stations despite large storms during December 2014, highlighting the condition of depleted groundwater storage (**Appendix C**).
- Upstream of the Montara Creek gaging station, dry-season groundwater levels in the shallow monitoring wells near Montara Creek were lower during water year 2013 relative to previous dry years; then during water years 2014 and 2015, groundwater levels significantly exceeded all previous dry-season base levels (**Figure 8**).
- Fluctuating groundwater levels lowered roughly 20 feet at the bedrock monitoring wells (**Figure 8**).
- The estimated age of groundwater sampled at the Alta Vista Well increased during water year 2015 relative to samples taken in 2014 and 2011.

In 2016 and continuing through 2018, MWSD implemented an adaptive-management action of reducing pumping from the Alta Vista Well (both as a lower rate and duration) to respond to the cumulative effect of a) the unusually severe and prolonged drought, b) the recent increased pumping at the Alta Vista Well, and c) the headwater diversion of baseflow in Montara Creek. Concurrently, rainfall during water year 2016 was average, followed by a wet year in 2017. The following notable conditions were observed:

- Baseflows in Martini Creek, Daffodil Canyon, and Montara Creek recovered to normal levels in water year 2016, and higher levels observed in 2017.
- Dry-season base levels observed in the shallow monitoring wells near Montara Creek recovered and the potential for severe stress to riparian vegetation observed during 2014 and 2015 was alleviated in water years 2016 through 2018.
- Groundwater elevations in the bedrock aquifer rose to pre-2013 levels in water years 2016 and 2017, and was sustained through 2018 (and extremely dry year).
- The groundwater sampled at the Alta Vista Well was characterized as modern groundwater, and returned to the younger levels observed in samples taken in 2014 and 2011.

Our prior work in the granitic watersheds of the Carmel basin, where low flows have been carefully measured since 1995 (Hecht and others, 2013), shows that very wet years are of vastly disproportionate importance in recharging weathered-granitic

aquifers, and can result in multiple years of augmented baseflow persistence. For example, spring and summer baseflows in 1999 (following an extremely wet 1998) were about 5 times those measured in 2004, despite essentially equivalent rainfall totals at the primary regional rain gage at San Clemente Dam. The difference appears attributable to 1999 following the very wet 1998 year, while 2004 came after five consecutive years of normal or subnormal rainfall, lacking a major recharge year. We concluded that such very wet years typically have seasonal rainfall totals in excess of about 160 percent of mean annual precipitation (Brown and others, 2011). Differences in recharge between 2006 (160% of mean annual precipitation) and the other years reported in this report support the logic that wet years are disproportionately important in the deeply-weathered and fractured Montara Mountain watersheds as well. Our measurements on Apanolio Creek and other tributaries of Pilarcitos Creek for the San Mateo County RCD beginning in water year 1998 (Owens and others, 2001) also support the likelihood that the Carmel data is applicable to the Montara granitics. Hence, it should be noted that the monitoring period began in wetter conditions than those eight years later, at the end of water year 2015. The start and end points of the monitoring require that persistence from the 2006 water year be considered when comparing 2007 or 2008 data with drought-influenced 2012 and 2015 data, and that comparisons must include consideration and/or adjustments for this difference. Similarly, during wet years following droughts, the rate and magnitude of recharge may be diminished as storage in the vadose zone and aquifer are replenished.

Recharge from wet years is persistent in the Montara granitic aquifer system, with water levels in the bedrock aquifer maintaining or increasing water levels for up to 12 to 18 months following a year of substantially above-average rainfall (**Figure 8**). Following an extremely wet year (tentatively taken to be more than about 160% of mean annual rainfall), water-level persistence can extend for several years in areas with similar geology within the region (Hecht and others, 2013). Water year 2006 was an extremely wet year but no events of this magnitude have occurred since the Alta Vista Well was put into use in 2007 (**Figure 12**). Extremely wet years have also recurred in 1998, 1983, and 1982. Water year 2017 was a wet year, but not an extremely wet year across the Montara watersheds. Long-term management of the deep granitic aquifer needs to consider the effects of these potential landmark years on long-term yield.

Our data lead to calculations that approximately 360 acres of open-space land on Montara Mountain can sustain the pattern of pumping observed since 2007 (assuming

an average of 4 inches/year recharge).[28] The calculations assume that near-mean long-term precipitation and recharge patterns have prevailed during monitoring period, which is not necessarily so. They also assume that 100 percent of the recharge from this 360 acres drains to the Alta Vista Well, which also is not realistic in a fractured granitic aquifer.[29] In fact, the actual recharge area is somewhat larger than that computed. The 'boundaries' of the actual recharge area may be diffuse or transitional, with irregular edges. Nonetheless, we believe that other wells may be drilled into the deep granitics, producing yields of similar quality and yielding significant quantities, particularly if Montara Mountain is managed as a single recharge/extraction unit, extending beyond the ridgeline.

Continued monitoring helps identify how and how quickly the pumping depression re-fills during wet years. Continued monitoring of the existing wells, and use of streamflow gaging data, and tracking the ages of water pumped from maximally pumped to maximally recharged wells can help shed light on the mechanisms, rates, and locations of recharge especially once a wet-year set of recharge data is collected.

The potential for seawater intrusion is an issue frequently considered by the California Coastal Commission and other regulatory bodies. We therefore considered whether a sustained seaward gradient (driving flow to ocean) or landward (flow landward from the ocean, with potential for seawater intrusion) prevailed during the monitoring period. Given the observed westward hydraulic gradient from the Alta Vista Well and the downgradient monitoring well 04-2 (and then to sea level at the coast), at the current water levels and pumping rates, seaward gradients are being maintained, and intrusion is presently not physically possible (**Figure 13**).

[28] As noted above, the area needed to sustain recharge for this level of pumping is based on the assumption that recharge averages 4 inches per year – a conservative assumption for a sandy area receiving 28 (near the shore) to 40 inches (near the crest of Montara Mountain. If, in fact, mean recharge averages 8 inches per year, the acreage needed to sustain pumping in quasi-equilibrium is calculated to be180 acres.

[29] Assuming little to no effect from any wide-spread irrigation or pumping of other wells.

8. CONCLUSIONS AND RECOMMENDATIONS

Long-term viability of pumping the Alta Vista Well is best evaluated across a cycle of years of major recharge and of drought years – for example, from years of peak recharge, through drought years, and then completing the cycle with a return to a peak recharge (Woyshner and others, 2005). Continuous pumping of the Alta Vista Well started in November 2007. Pre-pumping monitoring began during wet year 2005 and extremely wet year 2006, followed by dry year 2007.[30] The first two years of pumping the well were during year two and three of the 3-year drought that started in 2007. The following two years were considered an above average rainfall year (WY2010) and a wet year (WY2011). Four more drought years then followed during water years 2012 through 2015, with 2014 an extremely dry year. The 4-year drought concluded with water year 2016, a year with average rainfall. Then water year 2017 was a wet year, and 2018 an extremely dry year. Given this range of water year types during the monitoring period, the findings, conclusions, and recommendations presented in this report reasonably represent a cycle of years with which operational pumping rates may be based.

Over the time scales which are the focus of this monitoring study, the shallow aquifer system (the alluvium and associated shallow weathered granitics) responded independently from the deep fractured granitic bedrock. Groundwater recharge to the shallow alluvial aquifer was clearly apparent during all years monitored. Wet-year 'carry over' or recharge persistence was also significant for maintaining stream baseflows into the following year (or more). Montara Creek, Daffodil Canyon, and Martini Creek all showed higher baseflows during wet years and lower baseflows during dry years, suggesting significant recharge to the underlying bedrock aquifer during wet years, which is consistent with independent observations on other coastal streams (discussed in Section 6 above). Direct evidence of recharge to the underlying bedrock aquifer in the groundwater monitoring data was overshadowed by fluctuating water levels from varying pumping rates at the Alta Vista Well and generally not apparent, except during wet year 2017 when pumping from Alta Vista Well fluctuated within a consistent range.

The following summary of the monitoring results support the notion that, while the fracture system from which the Alta Vista Well draws groundwater does have limits to groundwater pumping, it can support periods of increased pumping to provide water in

[30] Water year type classification: Extremely Dry <70%; Dry 70-90%; Average 90-110%; Above Average 110-125%; Wet 125-160%; Extremely Wet >160%.

the event of an emergency and to improve the overall reliability of the water system during multiyear droughts:

- During water years 2008 through 2012, pumping the Alta Vista Well showed groundwater drawdown in the fractured bedrock aquifer (as expected), but no apparent drawdown effects to the overlying shallow groundwater and to streamflow in Montara Creek and Daffodil Canyon. The average continuous pumping rate for this 5-year period was 60 gpm.

- During the following three years, 2013 through 2015, pumping increased to an average continuous pumping rate of 99 gpm. During water years 2014 and 2015, however, shallow groundwater elevations receded to potential severe-stress levels for riparian habitat during the late dry-season, as defined by the McNiesh criteria used in similar rock types along the Carmel River. Also during water years 2014 and 2015, flow in Montara Creek was recorded only during storms and shortly thereafter – logically a cumulative effect of a) the extreme and prolonged drought, b) increased pumping at the Alta Vista Well, and c) less water flowed past the headwater diversion in Montara Creek simply because operating the diversion as in all prior years took a higher proportion of flows in the north fork of Montara Creek.

- Streamflows and shallow groundwater levels rose to (or approaching) pre-2014 levels during water year 2016 with average rainfall, observed groundwater recharge, and decreased pumping from the Alta Vista Well, all which continued through wet year 2017. Furthermore, pre-2014 pumping rates and groundwater elevations were maintain during water year 2018, an extremely dry year. The average continuous pumping rate for this 3-year period from 2016 through 2018 was 60 gpm, similar to pre-2014 pumping rates.

- Results of age-dating analyses suggest an increased reliance on pre-modern groundwater (potentially thousands of years old) and on older modern groundwater (recharged over recent years and decades) while pumping at higher rates during consecutive dry years, a condition moderated during subsequent average and wet years with reducing pumping rates and durations.

- After eleven years of pumping the Alta Vista Well at an average (continuous) rate of 86 gallons per minute, seawater intrusion remains physically impossible, given a strong westward hydraulic gradient from the Alta Vista Well to the ocean observed throughout the drought. At current water levels and pumping rates, intrusion is not a concern.

9. LIMITATIONS

This report was prepared in general accordance with the accepted standard of practice existing in Northern California at the time the investigation was performed. No other warranties, expressed or implied, are made. It should be recognized that interpretation of geologic information and evaluation of dynamic flow and subsurface conditions are difficult and inexact arts.

Balance Hydrologics (Balance) has drawn on conventional published data sources and previous studies of the site and vicinity for much of this evaluation; our staff have not independently verified mapping or findings by agencies and other established sources, though checks on the reasonableness of results were performed. Balance did not independently assess the accuracy of calculations by others, only the appropriateness of the methodology and its consistency with the standards of professional care currently practicing in northern California.

Balance prepared this monitoring report for the client's exclusive use on this particular study. Analyses and information included in this report are intended for the related use and planning purposes of the Alta Vista Well, described above. Analyses of channels, lagoons and other water bodies, rocks, alluvial and fluvial deposits, fractured rock, groundwater properties, topography and/or environmental processes are generalized to be useful at the scale of the Alta Vista Well and related aquifers, both spatially and temporally, with emphasis on the weathered and fractured bedrock and deposits closest to the well. Information and interpretations presented in this report should not be applied to specific projects or sites without the expressed written permission of Balance Hydrologics and the authors, nor should they be used beyond the particular area to which we have applied them.

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TABLES

Table 1. Monthly Rainfall at Alta Vista Water Treatment and Storage Facility, Montara, California

Montara Water and Sanitary District, San Mateo County

Latitude N37°32'54.02", Longitude W122°29'53.33", NAD27, Elevation 475 feet

WATER YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	*% of MEAN*
	(inches)	*(inches)*	*(inches)*	*(inches)*	*(inches)*	*(inches)*	*(inches)*	*(inches)*	*(inches)*	*(inches)*	*(inches)*	*(inches)*	*(inches)*	*(percent)*
2001	--	--	--	4.75	6.65	1.65	2.10	0.00	0.25	0.10	0.15	0.35	incomplete	--
2002	0.60	7.00	14.20	2.70	3.10	3.30	0.80	1.10	0.45	0.30	0.30	0.00	33.85	*112%*
2003	0.10	0.99	10.70	3.45	2.80	2.25	6.05	1.70	0.25	0.00	0.30	0.20	28.79	*95%*
2004	0.10	3.65	13.85	4.50	4.20	1.50	0.75	0.80	0.10	0.65	0.90	0.05	31.05	*103%*
2005	3.86	2.15	10.80	5.40	6.35	6.15	2.85	3.10	2.40	0.30	0.20	0.30	43.86	*145%*
2006	1.15	3.20	14.20	5.55	4.50	10.70	8.35	0.50	0.00	0.20	0.00	0.10	48.45	*160%*
2007	0.65	4.50	4.70	1.70	7.50	1.25	2.05	0.80	0.10	0.80	0.05	0.35	24.45	*81%*
2008	3.25	1.30	4.50	10.97	3.15	0.50	0.30	0.30	0.00	0.20	0.50	0.02	24.99	*83%*
2009	0.69	2.56	2.44	1.26	9.19	3.22	0.37	2.24	0.19	0.48	0.18	0.93	23.75	*79%*
2010	4.02	1.02	4.02	8.29	5.32	4.15	3.73	1.68	0.49	0.03	0.57	0.29	33.61	*111%*
2011	2.36	4.14	11.58	2.07	2.67	8.88	1.58	1.49	3.39	0.59	0.70	0.11	39.56	*131%*
2012	3.67	2.42	0.36	3.20	1.02	7.56	3.97	0.28	0.62	0.61	0.21	0.04	23.96	*79%*
2013	2.07	7.12	9.71	0.62	0.96	2.58	0.70	0.40	1.40	0.07	0.43	0.74	26.80	*89%*
2014	0.00	1.77	0.30	0.27	7.30	3.73	2.53	0.19	0.30	0.16	0.14	0.94	17.63	*58%*
2015	1.25	3.26	15.19	0.00	2.60	0.25	1.31	0.31	0.12	0.18	0.09	0.15	24.71	*82%*
2016	0.29	2.67	6.56	8.28	1.01	8.45	1.44	0.09	0.06	0.21	0.13	0.02	29.21	*97%*
2017	4.64	2.32	7.17	11.37	8.76	3.90	3.34	0.04	0.46	0.02	0.15	0.30	42.47	*141%*
2018	0.37	4.41	0.29	6.03	0.96	4.20	2.16	0.20	0.08	0.10	0.17	0.00	18.97	*63%*
2019	0.15	4.08	1.94	4.77	7.90	5.82								
Mean	*1.62*	*3.25*	*7.36*	*4.48*	*4.52*	*4.21*	*2.47*	*0.85*	*0.59*	*0.28*	*0.29*	*0.27*	*30.36*	
Cumulative	*1.62*	*4.88*	*12.24*	*16.72*	*21.24*	*25.46*	*27.92*	*28.77*	*29.36*	*29.64*	*29.93*	***30.20***	*--*	
Maximum	*4.64*	*7.12*	*15.19*	*11.37*	*9.19*	*10.70*	*8.35*	*3.10*	*3.39*	*0.80*	*0.90*	*0.94*	*48.45*	
Minimum	*0.00*	*0.99*	*0.29*	*0.00*	*0.96*	*0.25*	*0.30*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*17.63*	
Std. Dev.	*1.599*	*1.770*	*5.274*	*3.379*	*2.792*	*2.984*	*2.083*	*0.872*	*0.915*	*0.244*	*0.242*	*0.304*	*8.848*	
Skew	*0.711*	*0.936*	*0.068*	*0.667*	*0.226*	*0.724*	*1.597*	*1.288*	*2.342*	*0.872*	*1.289*	*1.374*	*0.647*	
Kurtosis	*-1.090*	*0.655*	*-1.489*	*-0.239*	*-1.321*	*-0.293*	*2.817*	*1.125*	*5.117*	*-0.415*	*1.125*	*0.945*	*-0.400*	
Sample Size	*18*	*18*	*18*	*19*	*19*	*19*	*18*	*18*	*18*	*18*	*18*	*18*	*17*	

Notes: WY2001 through WY2008 daily rainfall manually measured at the treatment facility each morning at 8:00 by MWSD staff.
WY2009 through WY2019 measurements automated with a tipping-bucket rain gage.
Real-time data posted to http://balancehydro.com/gaging-site/rainfall-at-mwsd/
Data are provisional and subject to revision.

Table 2. Monthly discharge from streams, Montara, California

WATER YEAR	OCT (acre-feet)	NOV (acre-feet)	DEC (acre-feet)	JAN (acre-feet)	FEB (acre-feet)	MAR (acre-feet)	APR (acre-feet)	MAY (acre-feet)	JUN (acre-feet)	JUL (acre-feet)	AUG (acre-feet)	SEPT (acre-feet)	ANNUAL (acre-feet)
Martini Creek above Old San Pedro Road *(watershed area = 0.82 square miles)*													
2004	na	na	na	na	54.20	66.19	44.16	37.94	30.52	27.57	16.33	15.36	na
2005	19.58	22.42	67.74	90.10	72.00	122.98	62.79	50.00	57.40	49.99	38.02	25.45	678
2006	26.46	21.31	211.30	114.62	83.80	121.86	188.30	109.57	73.37	56.82	54.46	54.43	1116
2007	41.05	28.14	49.61	51.31	44.40	52.34	34.93	24.40	24.71	25.53	22.09	12.47	411
2008	16.12	18.43	17.81	63.40	63.94	27.56	37.36	34.02	24.62	34.06	12.00	12.18	361
2009	19.34	29.75	46.82	59.12	81.74	54.20	na	na	na	na	na	na	na
2010	18.96	25.91	24.36	66.54	66.58	87.84	45.26	23.25	8.29	7.97	12.56	20.56	408
2011	22.12	23.79	76.45	50.19	74.44	157.82	76.02	61.65	51.35	48.89	54.78	na	na
2012	na	na	na	na	na	na	na	na	29.58	39.09	28.73	23.33	na
2013	20.70	27.08	70.79	45.07	28.06	28.72	28.96	27.32	20.14	22.78	20.10	16.42	356
2014	16.11	16.16	22.72	18.06	22.43	24.52	26.55	21.86	17.76	12.89	12.02	14.63	226
2015	14.40	12.19	55.32	30.38	18.67	15.51	14.17	14.21	9.70	9.61	9.46	9.80	213
2016	14.48	16.07	20.77	43.14	32.60	104.52	32.42	35.78	34.96	27.76	24.98	22.79	410
2017	27.14	24.78	42.02	204.33	195.49	118.03	95.53	69.26	55.75	53.55	45.93	32.76	965
2018	31.69	44.86	28.50	30.92	27.68	41.83	50.62	20.45	18.66	17.83	17.93	21.32	352
Average	***22.2***	***23.9***	***56.5***	***66.7***	***61.9***	***73.1***	***56.7***	***40.7***	***32.6***	***31.0***	***26.4***	***21.7***	***513***
Cumulative	***22.2***	***46.1***	***103***	***169***	***231***	***304***	***361***	***402***	***434***	***465***	***492***	***513***	***--***
											cubic feet per second (cfs) =		0.71
											cfs per square mile =		0.86
Daffodil Canyon at Old San Pedro Road *(watershed area = 0.20 square miles)*													
2008	na	na	3.45	9.00	10.67	4.69	na	na	0.49	0.97	0.73	0.84	na
2009	0.64	1.55	1.28	0.73	4.32	2.70	na	0.95	0.79	0.64	0.77	0.85	15.2
2010	1.10	1.73	2.45	7.46	5.17	11.71	1.94	1.83	1.45	1.05	0.43	0.57	36.9
2011	0.31	2.85	19.14	8.76	18.48	40.57	8.42	0.57	0.94	5.81	11.44	10.17	127
2012	1.93	2.42	0.78	1.12	0.18	8.01	3.14	0.74	1.13	1.19	1.23	4.66	26.6
2013	4.73	3.00	16.83	13.24	2.67	0.94	1.87	1.66	0.71	0.58	2.11	1.57	49.9
2014	0.33	0.78	4.90	3.14	3.30	2.63	4.52	1.08	2.75	3.65	2.11	0.56	29.8
2015	0.32	0.26	21.47	1.66	0.49	0.39	0.95	0.55	0.15	0.08	0.13	0.40	26.8
2016	0.62	0.87	1.93	11.42	4.26	33.55	1.56	0.87	0.25	0.17	0.78	0.94	57.2
2017	0.96	0.14	5.79	47.78	40.80	15.06	10.89	2.30	0.63	0.72	1.12	0.78	127
2018	1.27	1.94	1.62	5.88	2.43	4.16	7.53	1.83	0.94	0.49	1.03	0.84	30.0
Average	***1.22***	***1.56***	***7.24***	***10.0***	***8.43***	***11.3***	***4.54***	***1.24***	***0.93***	***1.39***	***1.99***	***2.02***	***51.9***
Cumulative	***1.22***	***2.78***	***10.0***	***20.0***	***28.5***	***39.8***	***44.3***	***45.6***	***46.5***	***47.9***	***49.9***	***51.9***	
											cubic feet per second (cfs) =		0.072
											cfs per square mile =		0.36
Montara Creek at Riviera Road *(watershed area = 0.78 square miles)*													
2008	16.20	2.00	5.82	19.23	27.44	6.12	0.53	na	na	na	0.02	0.04	na
2009	0.23	0.21	0.00	0.00	0.16	0.00	0.03	0.01	0.00	0.00	0.00	0.01	0.65
2010	0.42	0.02	0.33	31.78	35.84	44.52	11.01	12.13	1.67	0.67	0.00	0.00	138
2011	3.42	29.86	86.92	26.87	17.45	50.63	46.83	35.17	13.60	7.90	2.95	3.21	325
2012	9.62	9.40	1.98	2.97	0.93	12.91	23.58	2.96	1.45	3.50	1.24	0.00	70.5
2013	0.03	6.22	19.21	10.15	2.54	0.51	1.69	0.00	0.00	0.00	0.00	0.00	40.3
2014	0.00	0.00	0.00	0.00	0.00	0.04	0.05	0.00	0.00	0.00	0.00	0.00	0.10
2015	0.01	0.02	21.84	1.39	0.10	0.00	0.04	0.00	0.00	0.00	0.00	0.00	23.4
2016	0.01	0.12	2.05	34.70	10.65	84.35	6.69	9.59	3.24	0.09	0.00	0.00	151
2017	0.01	0.00	7.81	47.84	134.32	97.44	76.23	69.56	54.62	32.03	12.71	9.69	542
2018	7.93	5.64	0.53	19.38	6.71	11.90	15.57	0.67	1.57	0.03	0.01	7.30	77
Average	***3.44***	***4.86***	***13.3***	***17.7***	***21.5***	***28.0***	***16.6***	***13.0***	***7.61***	***4.42***	***1.54***	***1.84***	***134***
Cumulative	***3.44***	***8.31***	***21.6***	***39.3***	***60.8***	***88.8***	***105***	***118***	***126***	***130***	***132***	***134***	
											cubic feet per second (cfs) =		0.18
											cfs per square mile =		0.24

Notes:
1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the measurement precision.
2. na = data not available, generally due to datalogger malfunction.
3. Annual mean flows are not presented for an incomplete annual record.
4. In addition to other land uses on private lands affecting the creek flow, MWSD has been diverting from Montara Creek since 1907 under a pre-1914 water right at a point or diversion about 0.5 miles upstream of our gaging station at Riviera Road. Water is gravity piped to the Alta Vista water treatment and storage facility.

Data preliminary and subject to revision.

Table 3. Annual volume of groundwater pumped from the Alta Vista well, Montara Water and Sanitary District, San Mateo County, CA

Water Year	Volume Pumped [1]		Average Pumping Rate [2]	Water Year Type [3]
	(million gallons)	(acre-feet)	(gallons per minute)	
2008[4]	28.5	87.5	54.1	Dry
2009	36.4	112	69.2	Dry
2010	31.7	97.4	60.4	Above Average
2011	32.3	99.2	61.5	Wet
2012	27.6	84.7	52.4	Dry
2013	49.4	151	93.9	Dry
2014	60.7	186	115	Extremely Dry
2015	61.4	141	87.6	Dry
2016	48.9	113	69.6	Average
2017	35.2	81.0	50.1	Wet
2018	42.7	98.2	60.7	Extremely Dry
Average	37.1	114	86.1	

Notes:

[1] Data preliminary and subject to revision, provided by MWSD.

[2] The average pumping rate is presented on a continuous pumping basis.

[3] Water year type classification: Extremely Dry <70%; Dry 70-90%; Average 90-110%; Above Average 110-125%; Wet 125-160%; Extremely Wet >160%.

[4] Continuous pumping began Nov. 2007

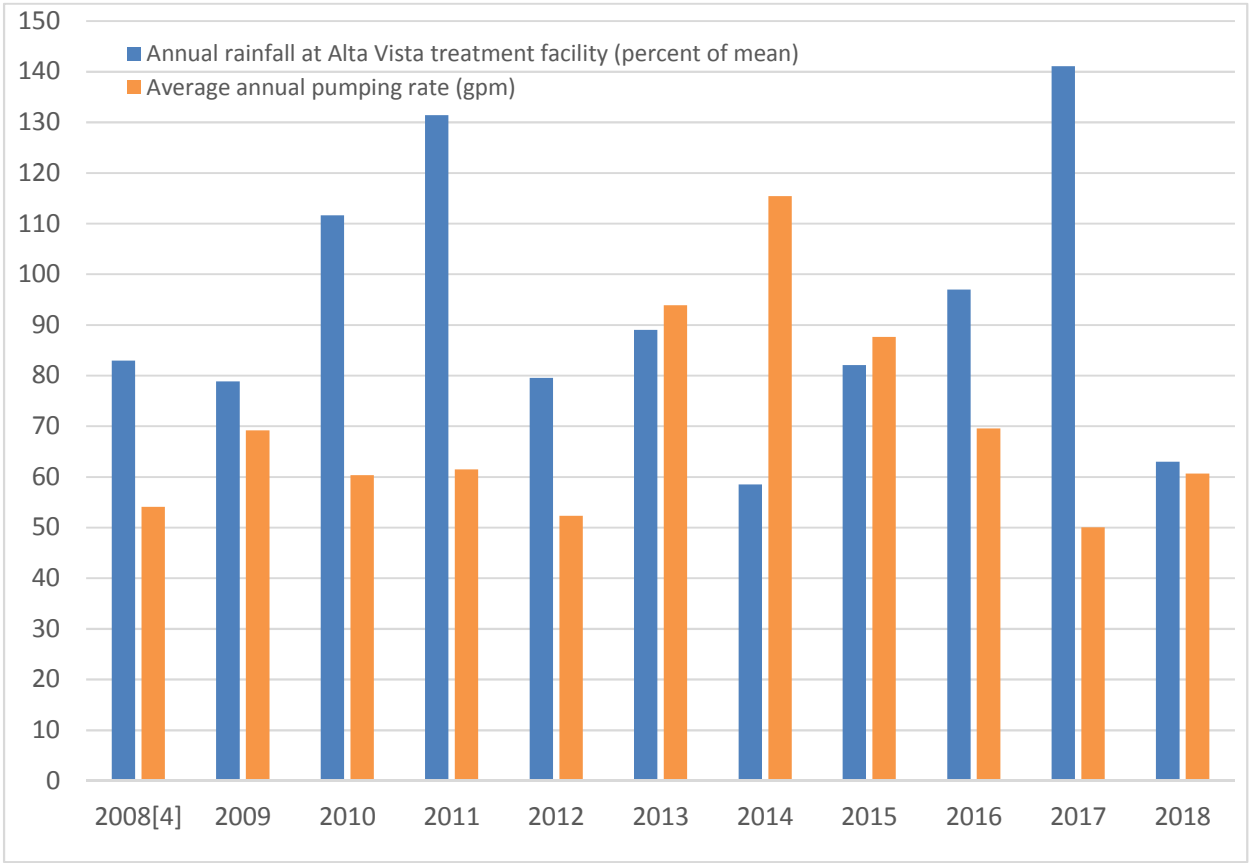


Table 4. Results for age-dating analyses of groundwater samples collected from source wells in the Montara Mountain fractured granitic aquifer, Montara Water and Sanitary District, San Mateo County, CA

Sample location	Alta Vista Well	Alta Vista Well	Alta Vista Well	Alta Vista Well	Alta Vista Well	Portola #3 Well	Portola #3 Well	Portola #3 Well	Portola #3 Well	Drake Well	Wagner Well	Montara Cr at Diversion
Latitude (WGS84)	37°33'0.66"N	37°33'0.66"N	37°33'0.66"N	37°33'0.66"N	37°33'0.66"N	37°32'23.98"N	37°32'23.98"N	37°32'23.98"N	37°32'23.98"N	37°32'36.29"N	37°32'36.69"N	37°33'8.15"N
Longitude (WGS84)	122°29'48.15"W	122°29'48.15"W	122°29'48.15"W	122°29'48.15"W	122°29'48.15"W	122°29'57.45"W	122°29'57.45"W	122°29'57.45"W	122°29'57.45"W	122°29'53.55"W	122°29'47.40"W	122°29'34.16"W
Ground surface elevation (WGS84)	530	530	530	530	530	206	206	206	206	241	253	580
Well depth (ft)	780	780	780	780	780	540	540	540	540	195	155	--
Aquifer type	fractured granitic rock	fractured granitic rock	fractured granitic rock	fractured granitic rock	fractured granitic rock	fractured granitic rock	fractured granitic rock	fractured granitic rock	fractured granitic rock	alluvium overlying weathered fractured granitic rock	alluvium overlying weathered fractured granitic rock	alluvium overlying weathered fractured granitic rock
Sample date	3/28/2011	10/30/2014	10/27/2015	10/20/2016	8/23/2017	11/14/2014	10/27/2015	10/20/2016	8/23/2017	10/20/2016	10/20/2016	9/11/2017
Sampled by	USGS[1]	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance
Well use (gpm)	77	121	127	120		42	27	37		39	57	135
Depth to water (ft)	192	393	386	--	344	86.7	93.2	--	131	--	--	--
Specific conductance (µmhos/cm at 25°C)	289	329	301	277	296	574	559	493	576	403	321	194
Water temperature (°C)	18.5	19.1	19.1	18.1	--	19.4	19.5	17.4	--	17.9	19.0	16.2
Laboratory used	Lawrence Livermore National Laboratory	Lawrence Livermore National Laboratory	U. Waterloo (isotopes); U. Utah (CFCs)	U. Waterloo (isotopes); U. Utah (CFCs)	U. Waterloo (isotopes, C14); U. Utah (CFCs, SF6, 3H, noble gases)	Lawrence Livermore National Laboratory	U. Waterloo (isotopes); U. Utah (CFCs)	U. Waterloo (isotopes); U. Utah (CFCs)	U. Waterloo (isotopes, C14); U. Utah (CFCs, SF6, 3H, noble gases)	U. Waterloo (isotopes); U. Utah (CFCs)	U. Waterloo (isotopes); U. Utah (CFCs)	U. Utah (CFCs)
Stable isotope ratios												
δ^2H (per mil)	–33.7	--	-32.6 (repeat -32.6)	-32.18 (repeat -33.34)	-33.73 (repeat -33.29)	--	-33.0	-31.51	-32.72 (repeat -31.96)	-31.96 (repeat -32.79)	-31.77	--
δ^{18}O (per mil)	–5.56	--	-5.69 (repeat -5.52)	-5.86 (repeat -5.98)	-5.67 (repeat -5.78)	--	-5.60	-5.46	-5.46 (repeat -5.43)	-5.74 (repeat -5.82)	-5.76	--
δ^{13}C (per mil)	–19.01	--	-18.75	-19.01	-20.16	--	-18.88	-19.90	-19.97 (repeat -19.56)	-21.21	-20.20	--
Carbon-14 (percent modern carbon)[2]	78.7	--	67.1	83.1	81.6	--	68.8	64.7	66.3	82.6	84.2	--
Radiocarbon age ± CSU (uncorrected) (years BP)[3]	1,865	--	3,203 ± 30	1,491 ± 33	1,630 ± 29	--	3,003 ± 34	3,496 ± 70	3,296 ± 31	1,533 ± 25	1,378 ± 84	--
Radiocarbon age ± CSU (corrected) (years BP)[4]	little to no pre-modern water	--	1,300	no pre-modern water	no pre-modern water	--	1,100	1,600	1,400	no pre-modern water	no pre-modern water	--
Tritium result[5]												
Tritium activity ± CSU (pCi/L)	1.28 ± 0.29	1.52 ± 0.28	--	--	1.89 ± 0.13	0.44 ± 0.15	--	--	0.98 ± 0.32	--	--	--
Tritium Units (TU)	0.40	0.48	--	--	0.59 ± 0.04	0.14	--	--	0.31 ± 0.10	--	--	--
Initial tritium estimate at recharge[6]												
Tritium activity ± CSU (pCi/L)	inconclusive	5.8 ± 1.0	--	--	inconclusive	3H result < 1 pCi/L	--	--	1.6	--	--	--
Tritium Units (TU)	inconclusive	1.82	--	--	inconclusive	--	--	--	0.5	--	--	--
Tritium/Helium-3 age (years)	inconclusive	23.8 ± 3.9	--	--	inconclusive	too small to estimate	--	--	too small to estimate	--	--	--
Average recharge year	inconclusive	1991	--	--	inconclusive	before 1950	--	--	recent wet years or before 1950	--	--	--
Dissolved noble gases												
Argon (cm^{3}STP/g)	3.745E-04	3.937E-04	--	--	3.934E-04	4.277E-04	--	--	3.541E-04	--	--	--
Helium-3/Helium-4	1.420E-06	1.421E-06	--	--	1.447E-06	1.488E-06	--	--	1.359E-06	--	--	--
Helium-4 (cm^{3}STP/g)	5.830E-08	6.122E-08	--	--	5.814E-08	8.901E-08	--	--	6.325E-08	--	--	--
Krypton (cm^{3}STP/g)	8.620E-08	8.922E-08	--	--	7.886E-08	9.557E-08	--	--	7.488E-08	--	--	--
Neon (cm^{3}STP/g)	2.490E-07	2.514E-07	--	--	2.450E-07	3.088E-07	--	--	2.465E-07	--	--	--
Xenon (cm^{3}STP/g)	1.160E-08	1.198E-08	--	--	9.835E-09	1.207E-08	--	--	9.910E-09	--	--	--
Excess Air (% of equil. Ne)[7]	28%	29%	--	--	32%	59%	--	--	32%	--	--	--
Radiogenic helium (% of equil. He)[8]	0%	0%	--	--	0%	23%	--	--	2%	--	--	--
Radiogenic helium age (years)	0	0	--	--	0	1,038	--	--	pre-modern	--	--	--
Noble-gas recharge temperature (°C)[9]	14.3 ± 0.5	13.3 ± 1.0	--	--	17.1 ± 2.4	13.8 ± 1.0	--	--	19.1 ± 1.6	--	--	--
Chlorofluorocarbons[10]												
CFC-11 (pptv)	--	--	33.0	115	113	--	64.1	53.6	94.6	112	115	179
CFC-12 (pptv)	--	--	118	467	333	--	208	349	349	383	371	459
CFC-113 (pptv)	--	--	8.01	28.7	28.9	--	16.1	17.8	24.1	34.8	no result	47.2
CFC-11 (piston-flow model recharge year)	--	--	1966	1975	1975	--	1970	1969	1973	1975	1975	1981
CFC-12 (piston-flow model recharge year)	--	--	1969	1989	1982	--	1974	1982	1983	1985	1984	1988
CFC-113 (piston-flow model recharge year)	--	--	1972	1981	1982	--	1977	1978	1980	1983	no result	1986
Sulfur hexafluoride[11]												
SF6 (pptv) (corrected for excess air)	--	--	--	--	1.92	--	--	--	2.36	--	--	--
SF6 (piston-flow model recharge year)	--	--	--	--	1988	--	--	--	1990	--	--	--

Table 4. Results for age-dating analyses of groundwater samples collected from source wells in the Montara Mountain fractured granitic aquifer, Montara Water and Sanitary District, San Mateo County, CA

Table 4 Notes:

[1] Davis, T.A., and Shelton, J.L., 2014, Groundwater-quality data in the Santa Cruz, San Gabriel, and Peninsular Ranges Hard Rock Aquifers study unit, 2011–2012—Results from the California GAMA Program: U.S. Geological Survey Data Series 874, 142 p., http://dx.doi.org/10.3133/ds874.

[2] Carbon-14 measurements are normalized to -25 permil using $\delta^{13}C$ values to correct for fractionation by photosynthesis in order to calculate decayed.

[3] RCAge (years BP) = -8033*LN(PMC/100) - (year sampled - 1950)/1.03; where -8033 represents the mean lifetime of Carbon-14 (Stuiver and Polach, 1977) and 0 BP = 1950 AD. These ages are referred to as "uncorrected ages", groundwater ages not corrected for the initial 14C activity of recharging groundwater and geochemical reactions that occur between groundwater and aquifer materials.

[4] Initial Carbon-14 activity of groundwater in the study area was estimated through the collection of groundwater samples from the Drake and Wagner wells, which are know to draw groundwater from the Montara Creek alluvial 'shoestring' aquifer and recharged with modern water.

[5] Tritium is reported in terms of activity (picocuries per liter, pCi/L), or decay (disintegrations per minute per liter, dpm/L. One tritium unit (TU) = 7.2 dpm/L = 3.2 pCi/L.

[6] In groundwater, tritium is isolated from the atmosphere and undergoes natural decay to the stable helium isotope (3He) with a half-life of 12.34 years. The daughter product helium-3 is added to the tritium result to estimate the tritium concentration at time of recharge and age. Results less than 1 pCi/L (0.31 TU) are assumed to be primarily pre-modern groundwater, recharged before mid-1950s.

[7] Measured dissolved gas concentrations are often greater than expected for equilibrium conditions, and this 'excess air' is attributed to entrainment of air bubbles in the vadose zone during recharge and water table fluctuation, which subsequently dissolve at depth under higher fluid pressure. Typical amounts of excess air observed in groundwater range from 0 to 30 cubic centimeters (STP)-air per kg-water.

[8] Reported as a percent of equilibrium, radiogenic helium increases in groundwater with time from the decay of heavy radionuclides, and hence increases along a groundwater flow path.

[9] The conservative behavior of noble gases allows for the estimation of water table temperatures at the time of groundwater recharge, which is generally near the mean annual surface temperature. It is common to measure the concentrations multiple noble gases in a groundwater sample to calculate the noble-gas recharge temperature (as well as the excess air).

[10] Chlorofluorocarbons (CFCs) are synthetic compounds and have no natural sources. CFC concentrations in groundwater can date that fraction of groundwater recharged from the 1940s at on the onset of industrial production through the mid to late 1990s when atmospheric concentrations peaked. CFC-12 has the highest range of atmospheric concentrations, and therefore is most sensitive for dating groundwater. CFCs do degrade under anaerobic conditions.

[11] Sulfur hexafluoride (SF6) is primarily of anthropogenic origin but also occurs naturally in fluid inclusions in some minerals and igneous rocks, and in some volcanic and igneous fluids. SF6 is extremely stable, with an estimated atmospheric lifetime of 800 to 3200 years. Significant production of SF6 began in the 1960s for use in high voltage electrical switches. Atmospheric concentrations continue to increase.

[12] Unit definitions: CSU = 1-sigma combined standard uncertainty; cm3STP/g = cubic centimeters per gram at standard temperature and pressure; pptv = parts per trillion by volume

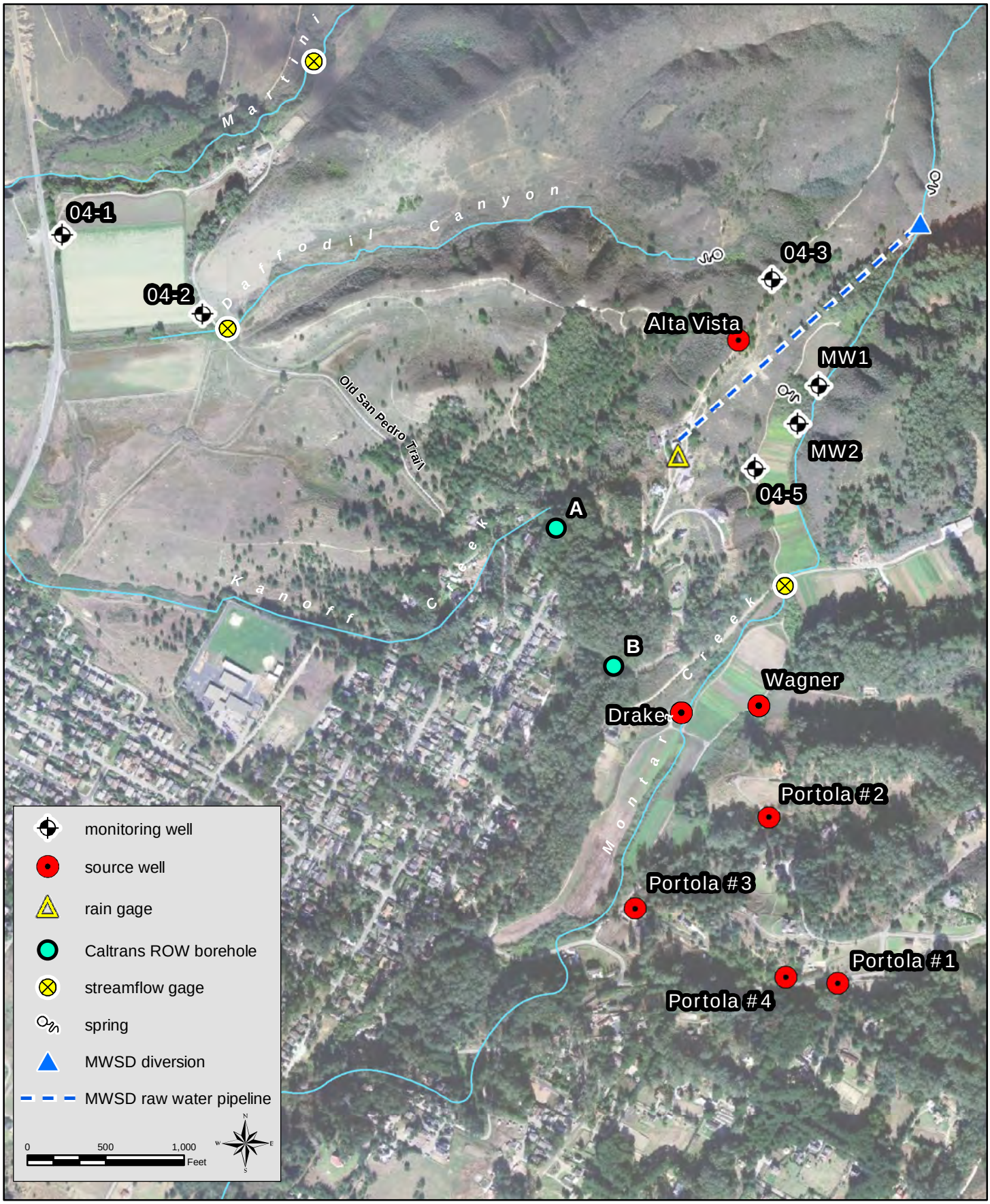
Table 5. Stream discharge, dry-season groundwater elevations in alluvium, and age of groundwater pumped from Alta Vista Well relative to rainfall and volume pumped, Montara Water and Sanitary District, San Mateo County, CA

Varying with rainfall, Martini Creek and Daffodil Canyon are perennial streams, while with deeper alluvium and flows modified upstream by the MWSD headwater diversion and by agricultural and dog-park land uses, the north fork of Montara Creeks is perennial only during wet years. Montara Creek was especially dry during 2009 (the third consecutive dry year), and during 2014 (an extreme dry year). During the severe drought conditions, pumping increased in 2013 and was highest during 2014. Pumping returned to earlier lower levels in 2016 along with near normal rainfall, followed by wet year 2017. While pumping at the higher rates during consecutive dry years, late dry-season groundwater elevations in Montara Creek alluvium lowered significantly, and we saw an increased reliance on pre-modern groundwater and older modern groundwater at the Alta Vista well. The pumping in excess of recharge was moderated in 2016 and 2017.

CONDITIONS						RESPONSES					INDICATORS				
		Rainfall at Alta Vista Gage			AV Well	Discharge at Stream Gages			Groundwater Minimum [1]		Alta Vista Well Groundwater Age[2]				
Water Year		Water Year Type [3]	Annual Total (inches)	Percent of Mean	Volume Pumped (ac-ft)	Martini Cr (unimpaired) (ac-ft)	Daffodil Cyn (unimpaired) (ac-ft)	Montara Cr (impaired) (ac-ft)	MW-1 Elevation (ft NGVD29)	MW-2 Elevation (ft NGVD29)	Sample Date	Modern Water		Pre-Modern Water	
												Recharge Year [4]	Method	Result (P/A)	Methods
2005		Wet	43.9	145%	--	678	--	--	369	359	--	--	--	--	--
2006		Extremely Wet	48.5	160%	--	1116	--	--	369	359	--	--	--	--	--
2007	Drought	Dry	24.5	81%	--	411	--	--	365	358	--	--	--	--	--
2008	Drought	Dry	25.0	83%	87.5	361	--	--	364	356	--	--	--	--	--
2009	Drought	Dry	23.8	79%	112	partial record	15	1	364	355	--	--	--	--	--
2010		Above Average	33.6	111%	97.4	408	37	138	364	357	--	--	--	--	--
2011		Wet	39.6	131%	99.2	partial record	127	325	367	358	3/28/11	Inconclusive but Present	^{3}H-^{3}He	Absent	Carbon-14 Radiogenic helium
2012	Drought	Dry	24.0	79%	84.7	partial record	27	71	366	358	--	--	--	--	--
2013	Drought	Dry	26.8	89%	151	356	50	40	361	354	--	--	--	--	--
2014	Drought	Extremely Dry	17.6	58%	186	226	30	0	347	< 350 (well dry)	10/30/14	1991 ± 4 yrs	^{3}H-^{3}He	Absent	Radiogenic helium
2015	Drought	Dry	24.7	82%	141	213	27	23	347	< 350 (well dry)	10/27/15	1966 to 1972	CFCs	Present	Carbon-14
2016		Average	29.2	97%	113	410	57	151	360	355	10/20/16	1975 to 1989	CFCs	Absent	Carbon-14
2017		Wet	42.5	141%	81.0	965	127	542	367	357	8/23/17	1975 to 1988	CFCs, SF_6 ^{3}H-^{3}He	Absent	Carbon-14 Radiogenic helium
2018		Extremely Dry	19.0	63%	98.2	352	30	77	360	354	--	--	--	--	--
Mean		--	30.1	100%	114	513	52	134	--	--	--	--	--	--	--

Notes:
[1] Two shallow monitoring wells were installed in the valley alluvium to monitor water levels near the spring-related riparian woodland on the north fork of Montara Creek. MW-1 is located upstream of the spring and riparian woodland, and MW-2 is located downstream.
[2] The age of groundwater is the length of time since the water has been isolated from the atmosphere, or the time since groundwater recharge. Tritium-helium (^{3}H-^{3}He), chlorofluorocarbons (CFCs) and sulfur hexafluoride (SF_6) date young or the 'modern' fraction of groundwater, recharged over recent years and decades. Radiogenic helium and carbon-14 methods date old or 'pre-modern' groundwater fraction, recharged hundreds to thousands of years before modern water (generally dated before 1950).
[3] Water year type classification: Extremely Dry <70%; Dry 70-90%; Average 90-110%; Above Average 110-125%; Wet 125-160%; Extremely Wet >160%.
[4] The calculated average age of modern water is subtracted from the sample date to estimate the recharge year. A number of method assumptions described in the report text can bias the result in addition to differential mixing during groundwater recharge and flow to the well. Therefore, interpretation of the data is always used as means to independently affirm a conceptual understanding of the groundwater system based on other lines of evidence rather than as an independent conclusive result.

FIGURES



Source: Aerial photo from USGS, captured 2/27/2004.

Figure 1. Source wells and hydrologic monitoring, Montara Water and Sanitary District, San Mateo County, California.

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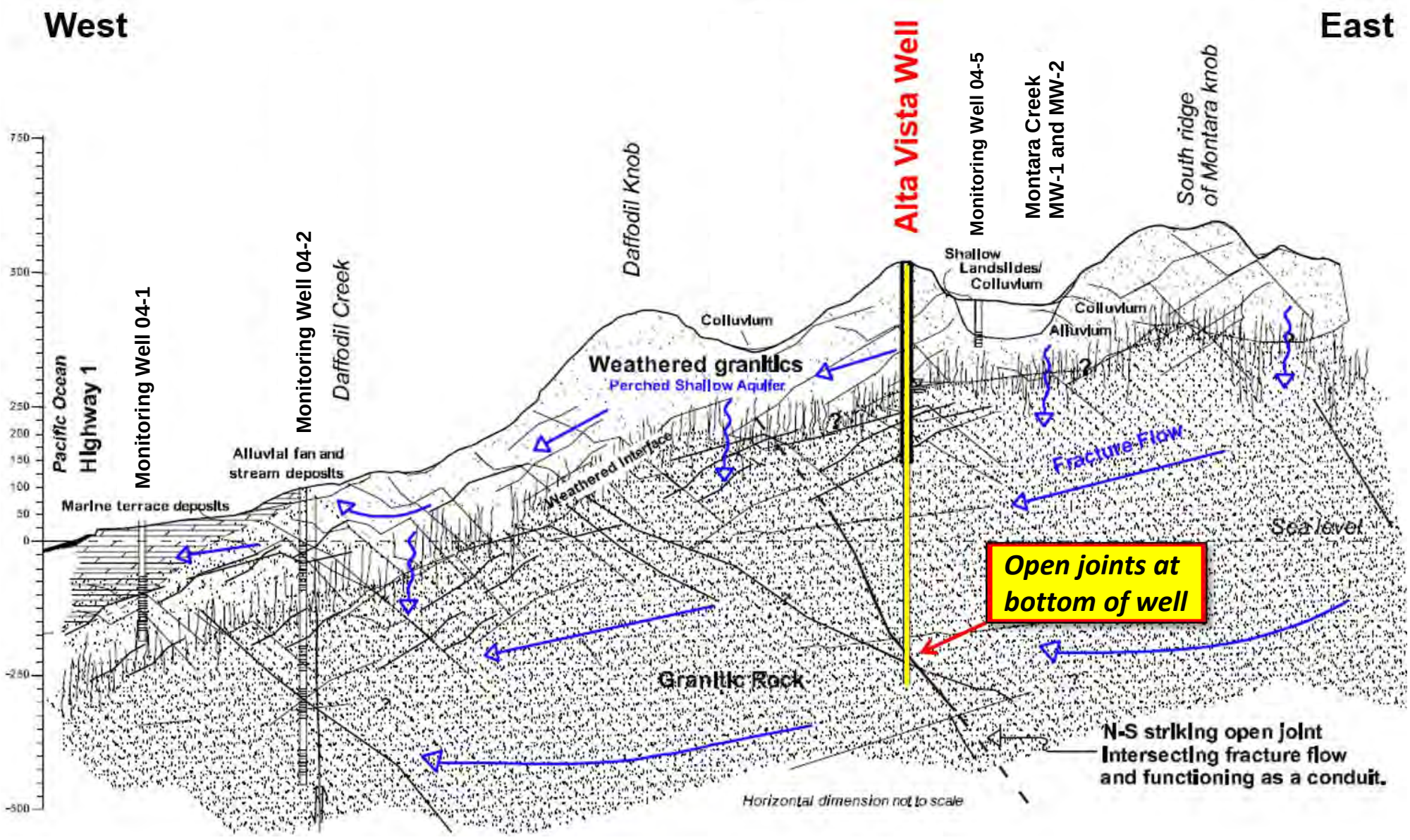

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Figure 2. Schematic profile eastward from Montara State Beach to the Alta Vista source well, Montara Water and Sanitary District San Mateo County, California. Cross section illustrates marine terraces at the coast, weathering depth of Montara Mountain granitic rock and related perched aquifer, streams and valley alluvium, and the deep open joints at the bottom of Alta Vista source well, at about 250 ft below sea level.

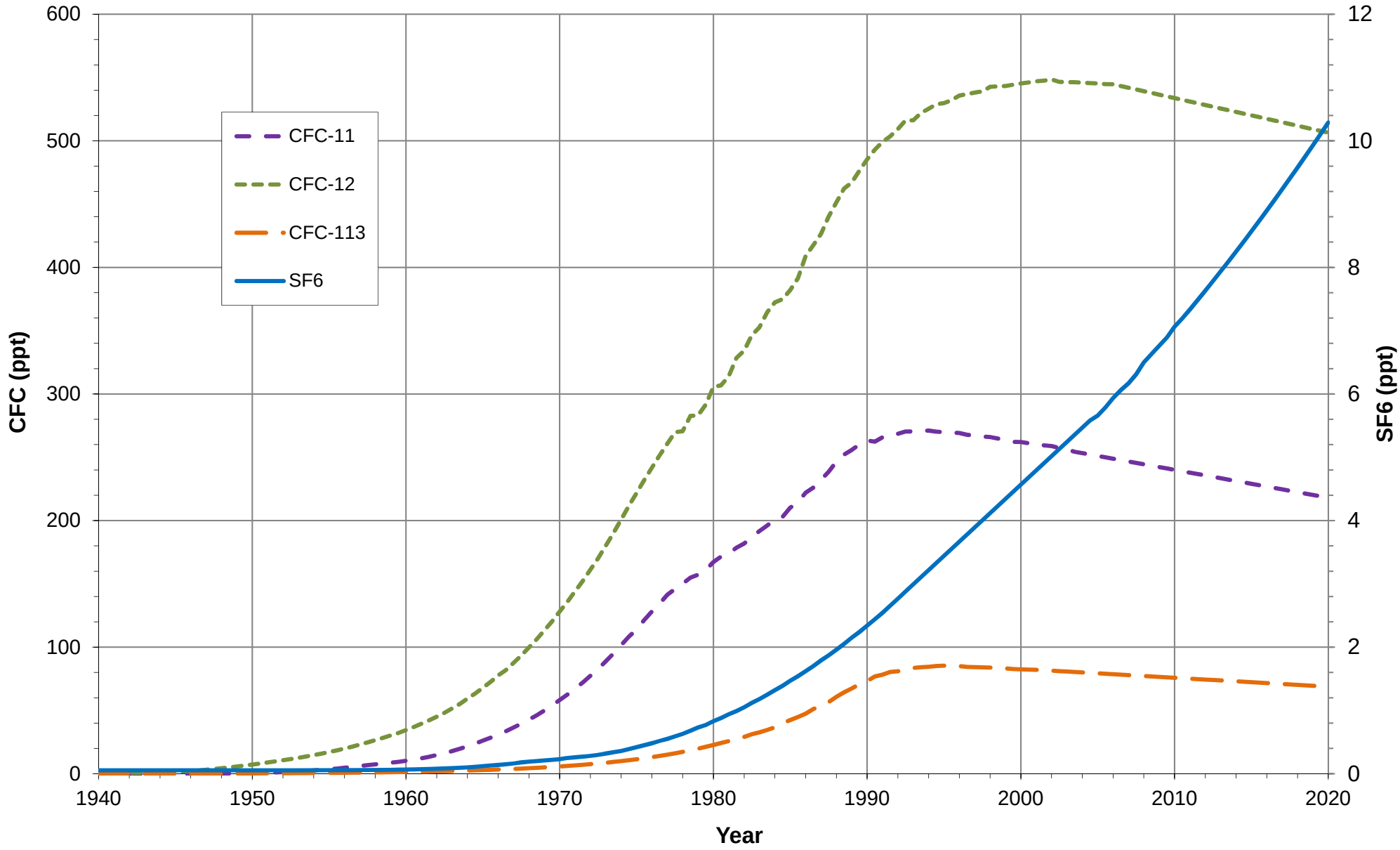

Figure 4. Atmospheric concentrations of chlorofluorocarbons (CFCs) and sulfur hexafluoride (SF6) since 1940. The atmospheric concentration of CFC-11 began declining in 1994; as of 2013 it had dropped to its 1987 value. The concentration of CFC-12 started declining in 2001 and by 2013 it had dropped to its 1994 value. Similarly, the concentration of CFC-113 began declining in 1996 and by 2013 had dropped to its 1989 value. Atmospheric concentrations of SF6 has rapidly increased since industrial production began in 1953.

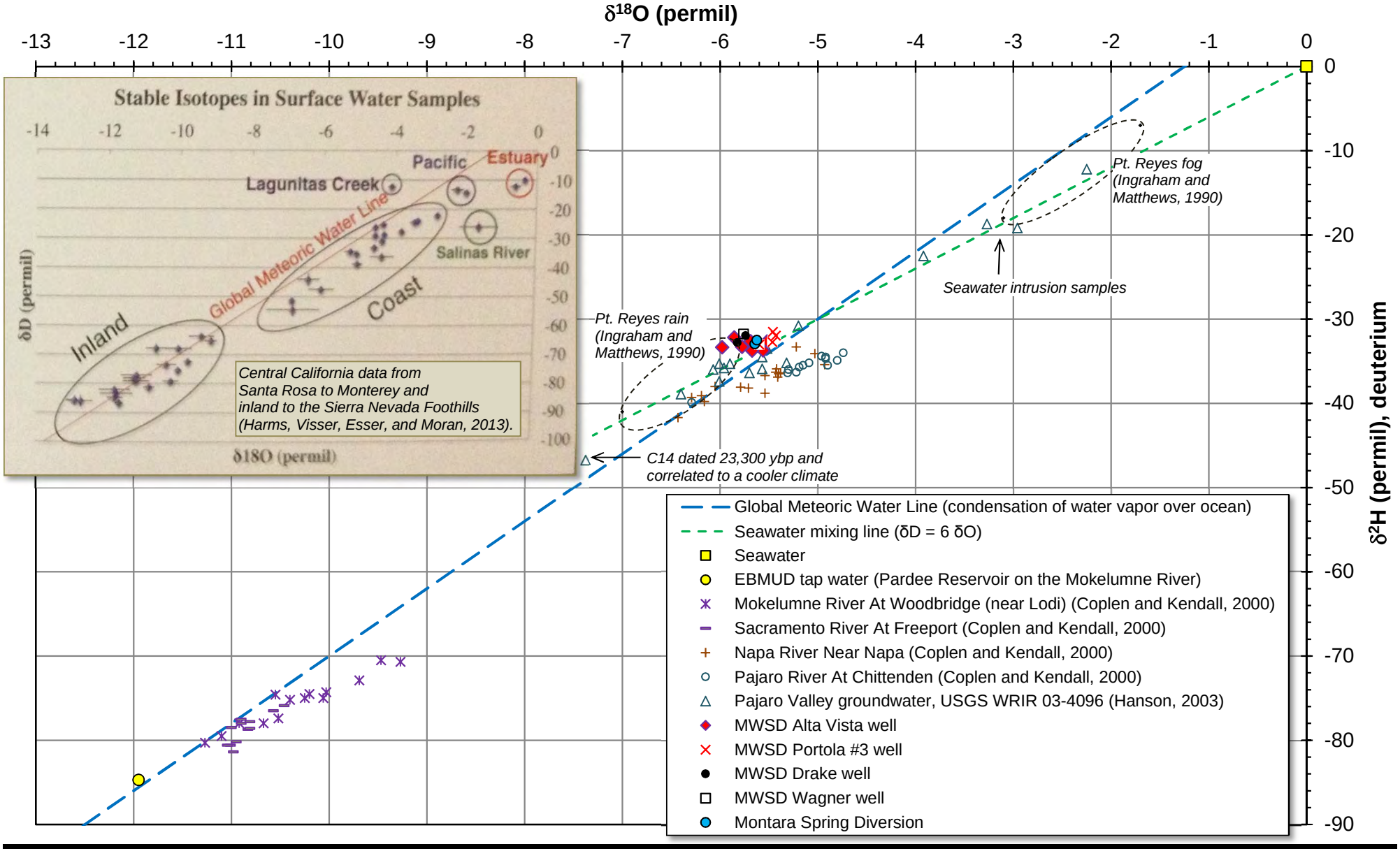

Figure 5. Stable isotopes of oxygen and hydrogen in groundwater from the Alta Vista, Portola #3, Drake and Wagner wells relative to published results from coastal and inland waters. Water with a higher deuterium content is generally found near the coast, at low elevations, in warm rains, and in water which has undergone partial evaporation. The variation of oxygen-18 content generally follow those of deuterium. Groundwater samples collected from MWSD's wells plot within the range of coastal waters. Differences between coastal and inland waters are shown on inset.

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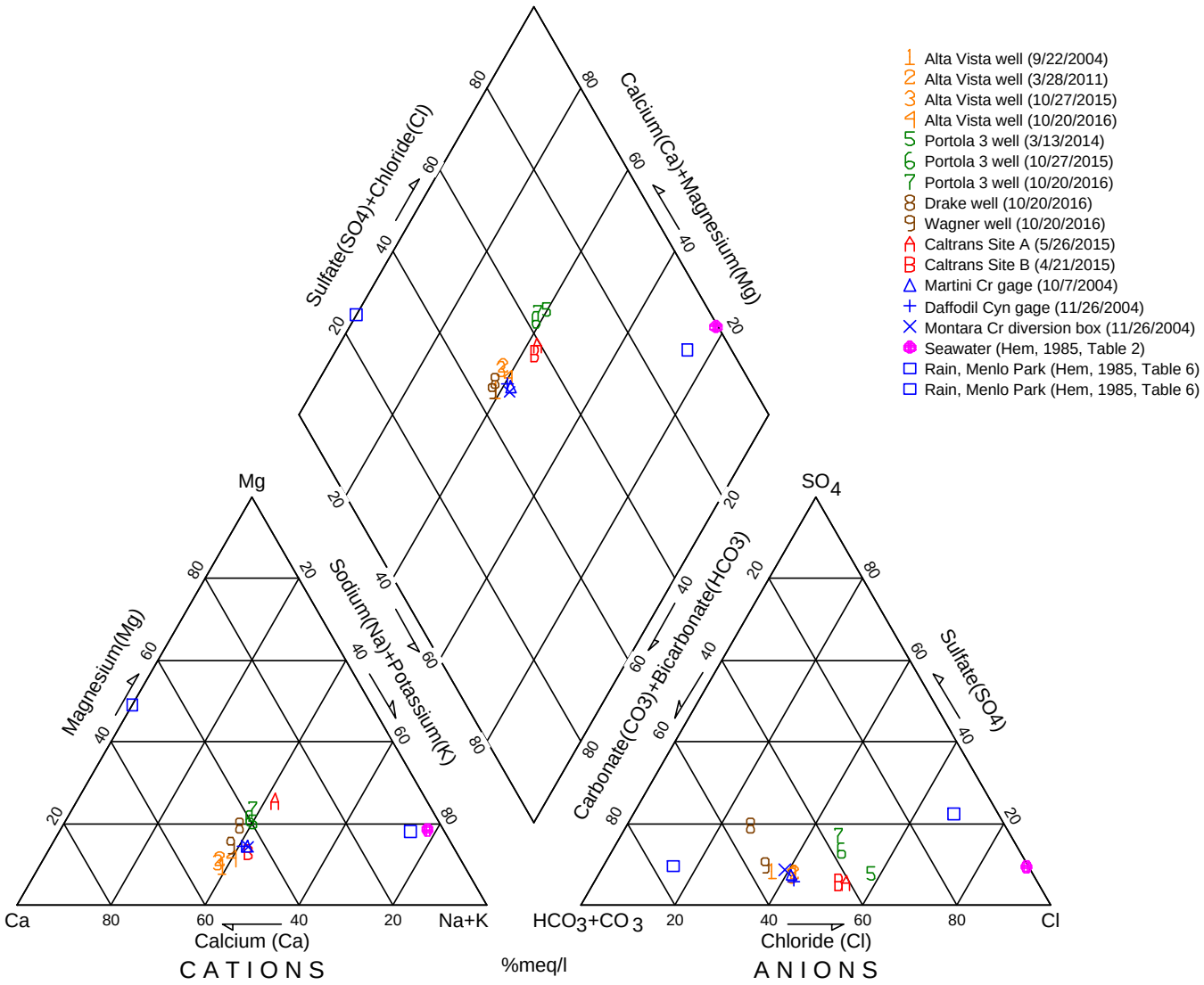

This diagram shows cations in the ternary graph on the left and anions on the right graph. The diamond graph in the center illustrates both cations and anions. Hardness dominated water plots to the left and top of the diamond graph, soft monovalent-salt dominated water to the right, and soft alkaline water towards the bottom. The ionic composition of rainfall varies widely from a calcium-magnesium bicarbonate signature to being largely dominated by sodium and chloride, similar to seawater. Groundwater samples are mixed calcium bicarbonate and sodium chloride.

Figure 6. Piper diagram illustrating ionic signatures of source water samples relative to stream baseflow, Caltrans potential well sites A and B, seawater and rain, Montara Water and Sanitary District, San Mateo County, California.

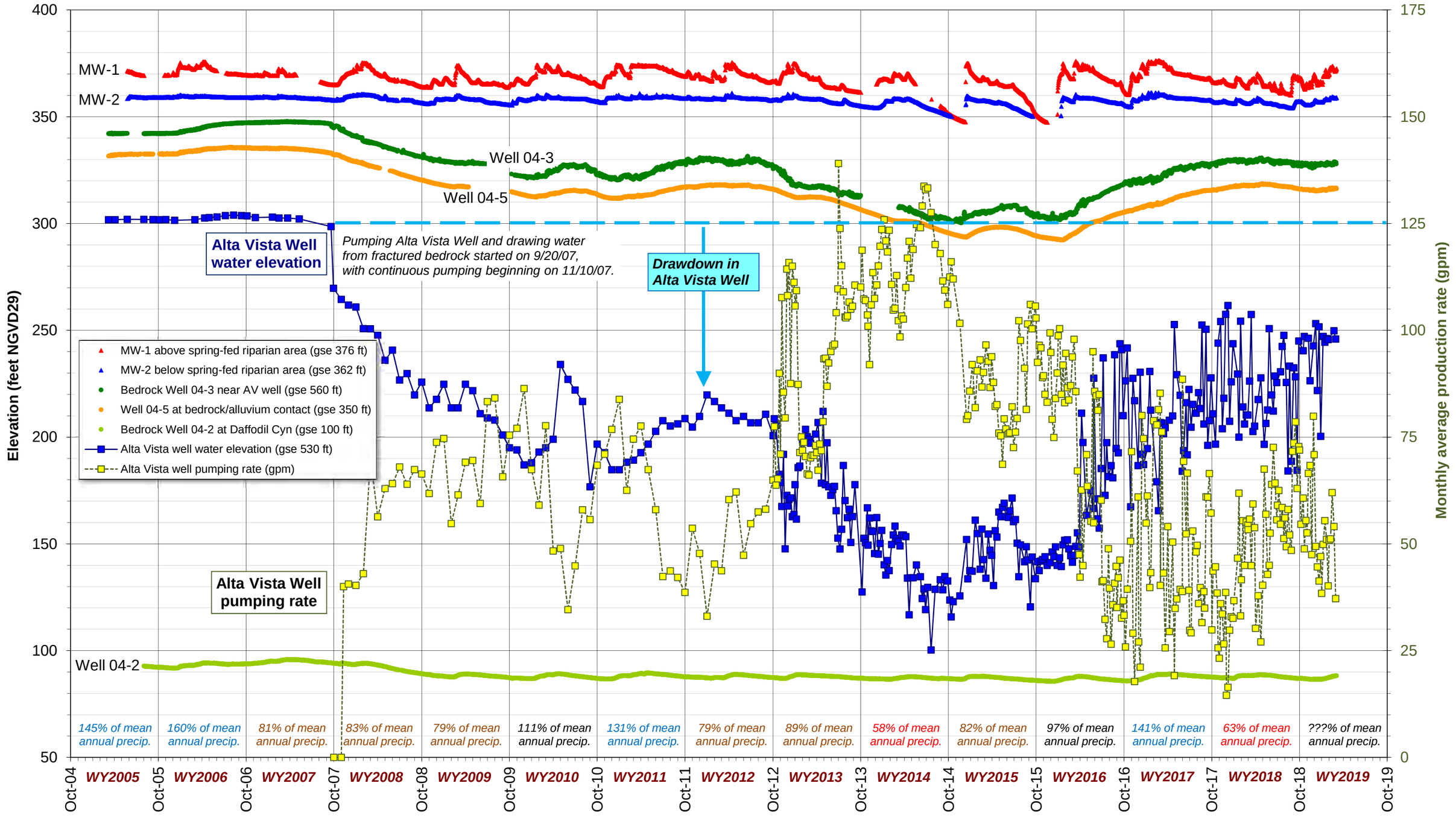

Figure 7. Pumping rate and drawdown in the Alta Vista water-supply well relative to groundwater elevations in monitoring wells, Montara Water and Sanitary District, San Mateo County, California. Drawdown in the bedrock wells responds to the Alta Vista well pumping rate while shallow wells near riparian vegetation show seasonal recharge to alluvial aquifer (detailed in Figure 8). Precipitation measured at the MWSD Alta Vista water treatment and storage facility since January 2001.

PRELIMINARY AND SUBJECT TO REVISION

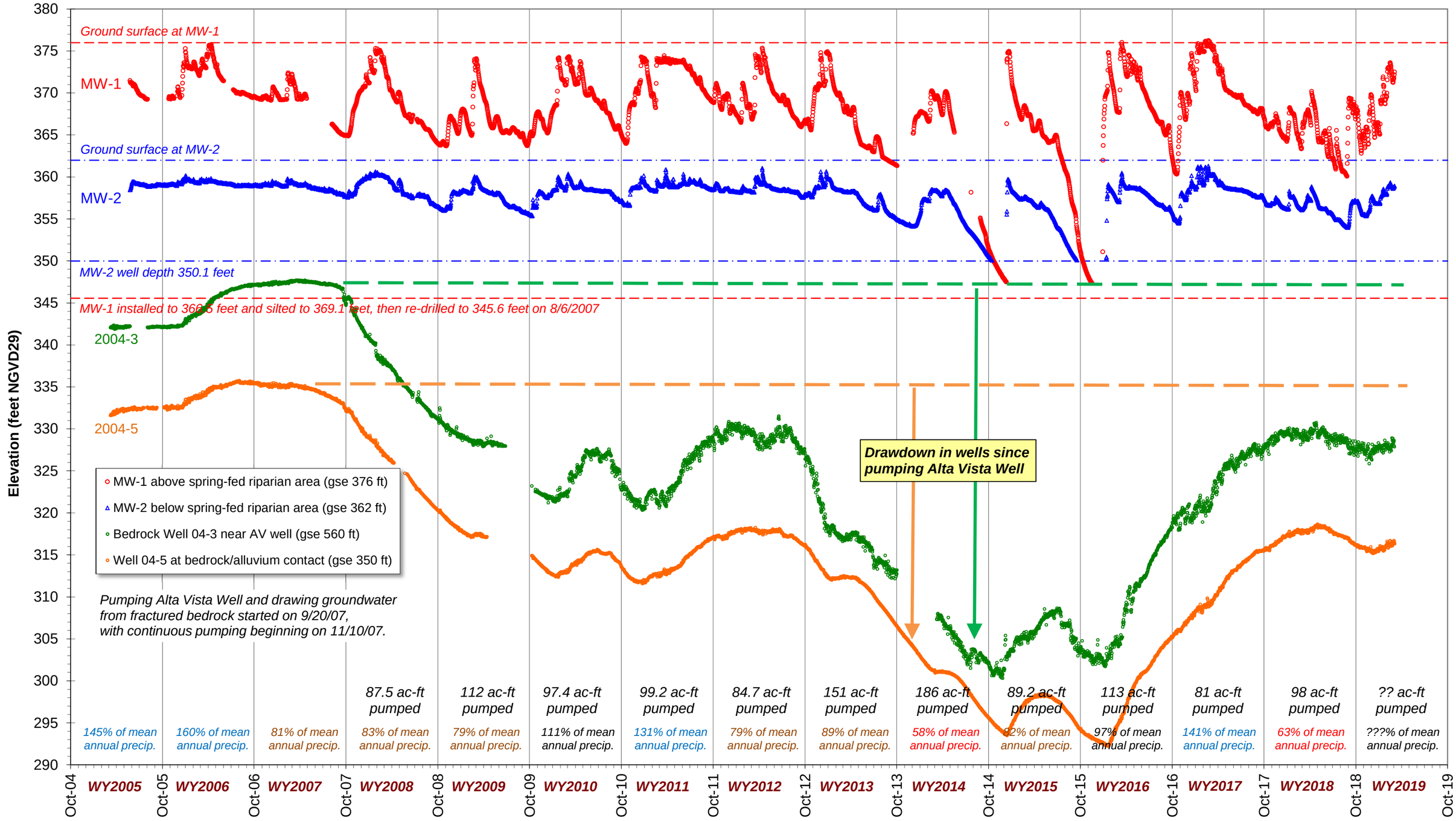

Figure 8. Groundwater elevations at monitoring wells in the vicinity of the Alta Vista water supply well, San Mateo County, California.
Shallow groundwater near the spring-fed riparian woodland on North Fork Montara Creek (MW-1 and MW-2) responded in a typical pattern of wet-season recharge while pumping the Alta Vista well lowered water levels in the fractured bedrock near the well. Dry-season drawdown during water years 2014 and 2015 exceeded base levels during previous dry years, which recovered in 2016 with above normal rainfall and less pumping.

PRELIMINARY AND SUBJECT TO REVISION

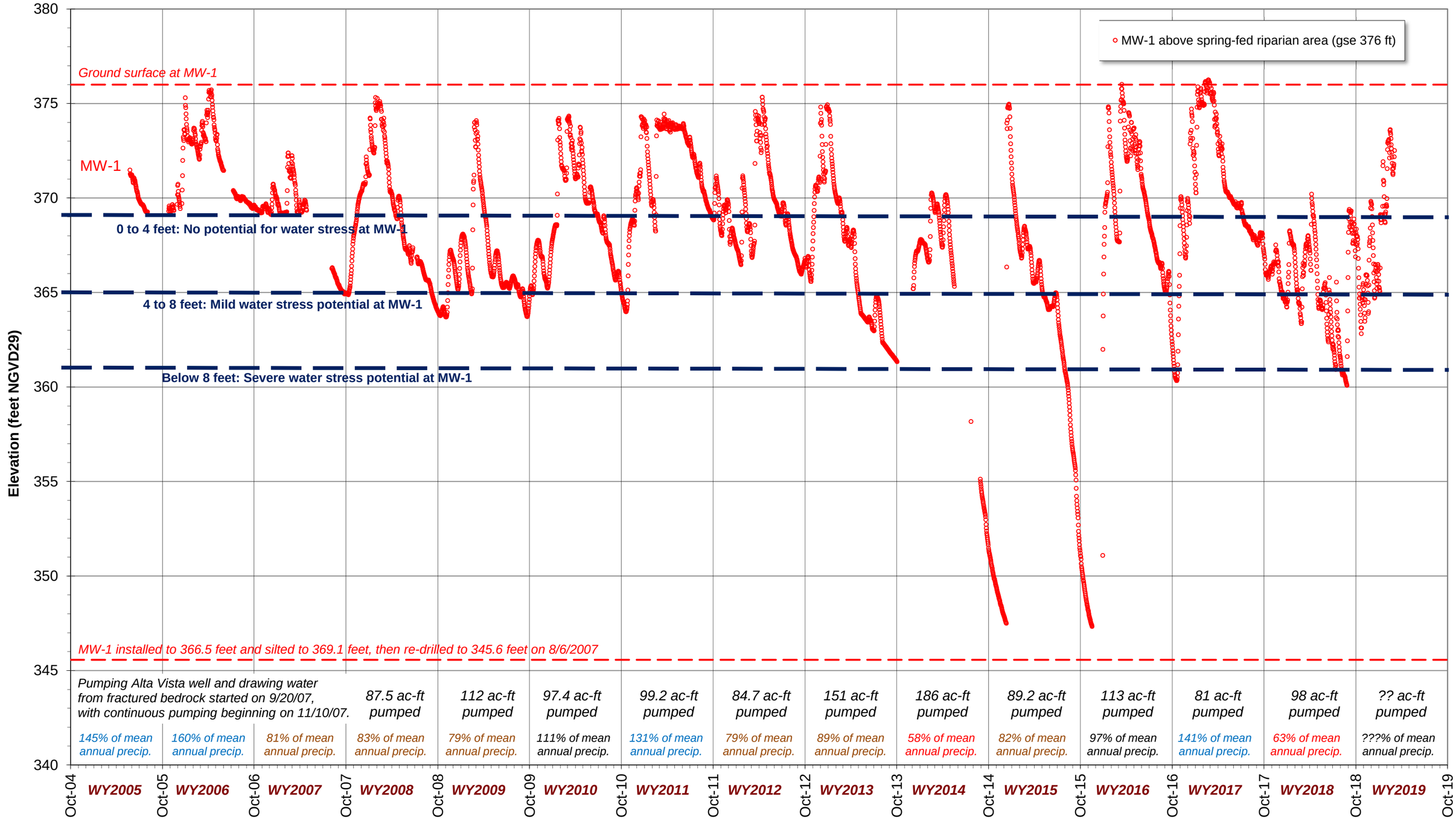

Figure 9. Groundwater elevations at shallow monitoring well MW-1 near Montara Creek riparian habitat, upstream of prominent spring, San Mateo County, California.
Drawdown will have nominal effects to riparian habitat when soil water is readily available, generally ending in late May or early June, but varying from year to year. After soil water becomes limited, severe water stress may be expected with 8 feet or more drawdown below wet-season base water levels, mild water stress with 4 to 8 feet of drawdown, and no effect with less than 4 feet of drawdown (conservative guidelines for the lower Carmel Valley based on McNiesh, 1986). These guidelines may likely be an overestimate of effects on riparian vegetation from pumping the Alta Vista well (Section 3.3.3 of Woyshner and others, 2005).

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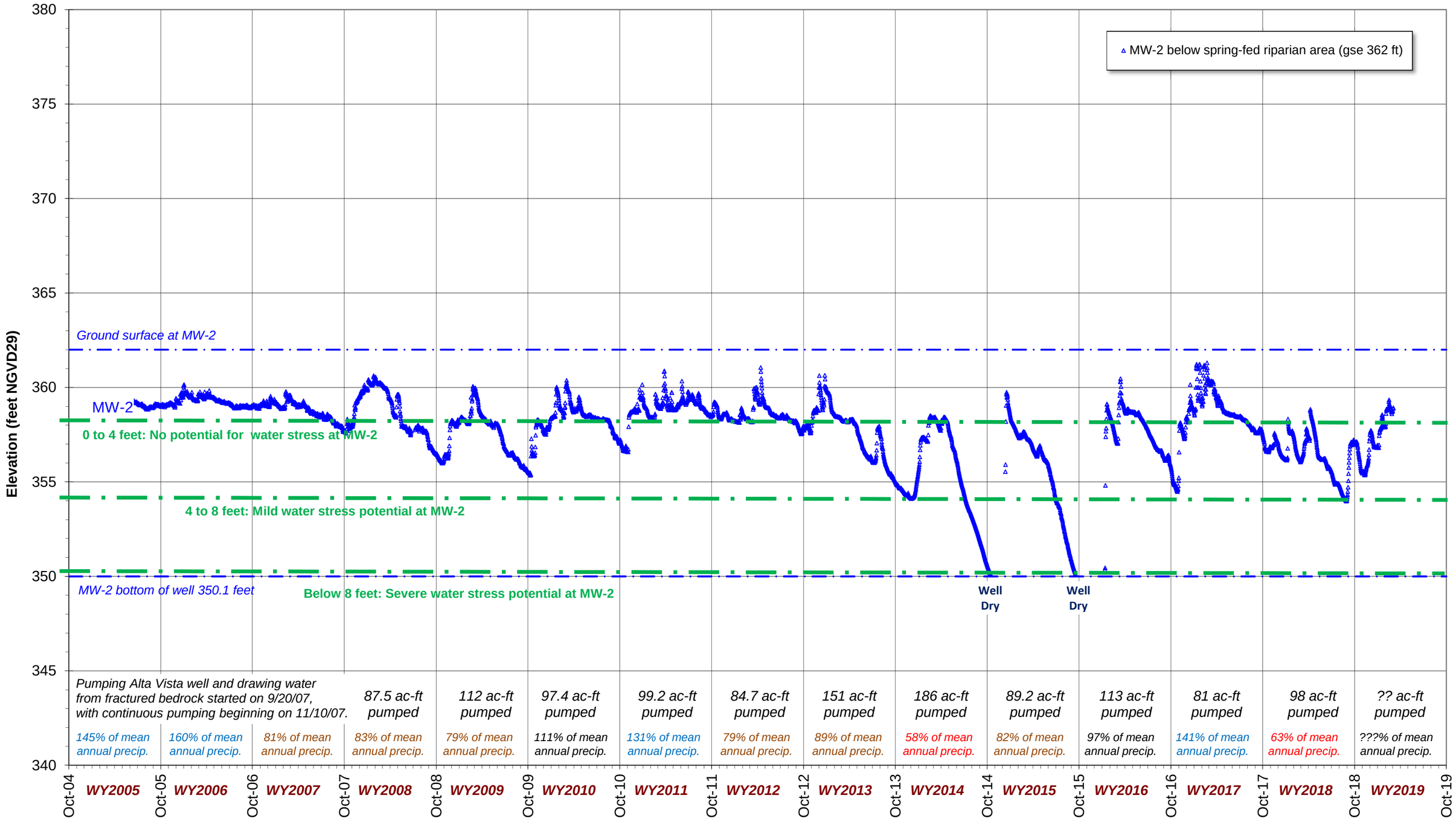
PRELIMINARY AND SUBJECT TO REVISION



Balance Hydrologics

Figure 10. Groundwater elevations at shallow monitoring well MW-2 near Montara Creek riparian habitat, downstream of spring, San Mateo County, California.
Drawdown will have nominal effects to riparian habitat when soil water is readily available, generally ending in late May or early June, but varying from year to year. After soil water becomes limited, severe water stress may be expected with 8 feet or more drawdown below wet-season base water levels, mild water stress with 4 to 8 feet of drawdown, and no effect with less than 4 feet of drawdown (conservative guidelines for the lower Carmel Valley based on McNiesh, 1986). These guidelines may likely be an overestimate of effects on riparian vegetation from pumping the Alta Vista well (Section 3.3.3 of Woyshner and others, 2005).

PRELIMINARY AND SUBJECT TO REVISION

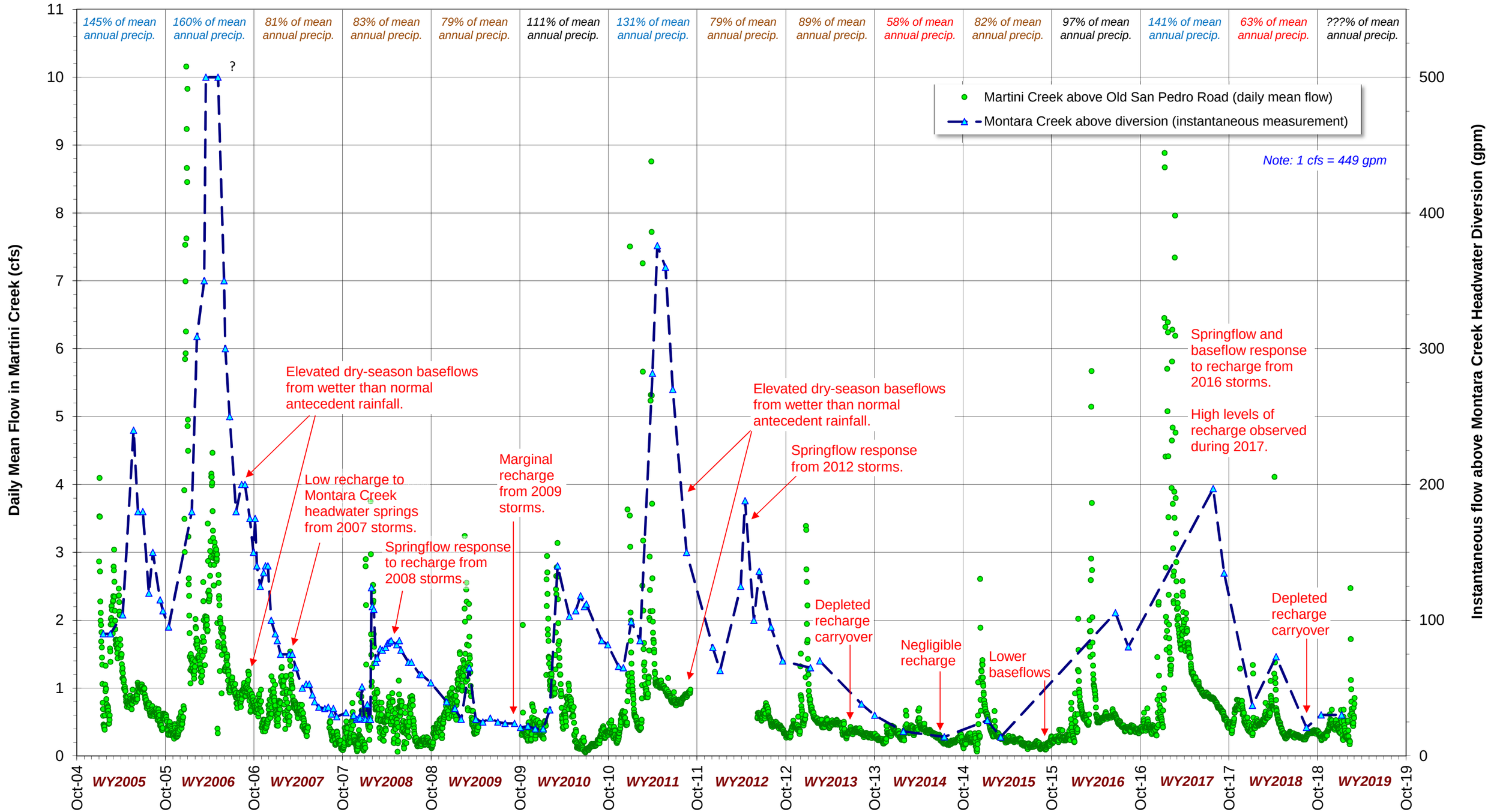


Figure 11. Daily mean flow in Martini Creek above Old San Pedro Road and flow measurements at MWSD diversion on Montara Creek, San Mateo County, California.
Rainfall during water years 2005 and 2006 was wetter than normal and high springflows were recorded. Rainfall was drier than normal during water years 2007, 2008, and 2009 and springflows receded to lower levels, but recovered during water year 2010 with rainfall slightly exceeding normal. Higher springflows were then recorded during wetter than normal water year 2011. Rainfall was again drier than normal during water years 2012 through 2015 with 2014 being extremely dry, and springflows receded to a prolonged baselevel. Springflows and baseflows responded to recharge from 2016 storms, and high levels of recharge during 2017, a wet year. Water year 2018 was extremely dry with depleted dry-season baseflow.

PRELIMINARY AND SUBJECT TO REVISION

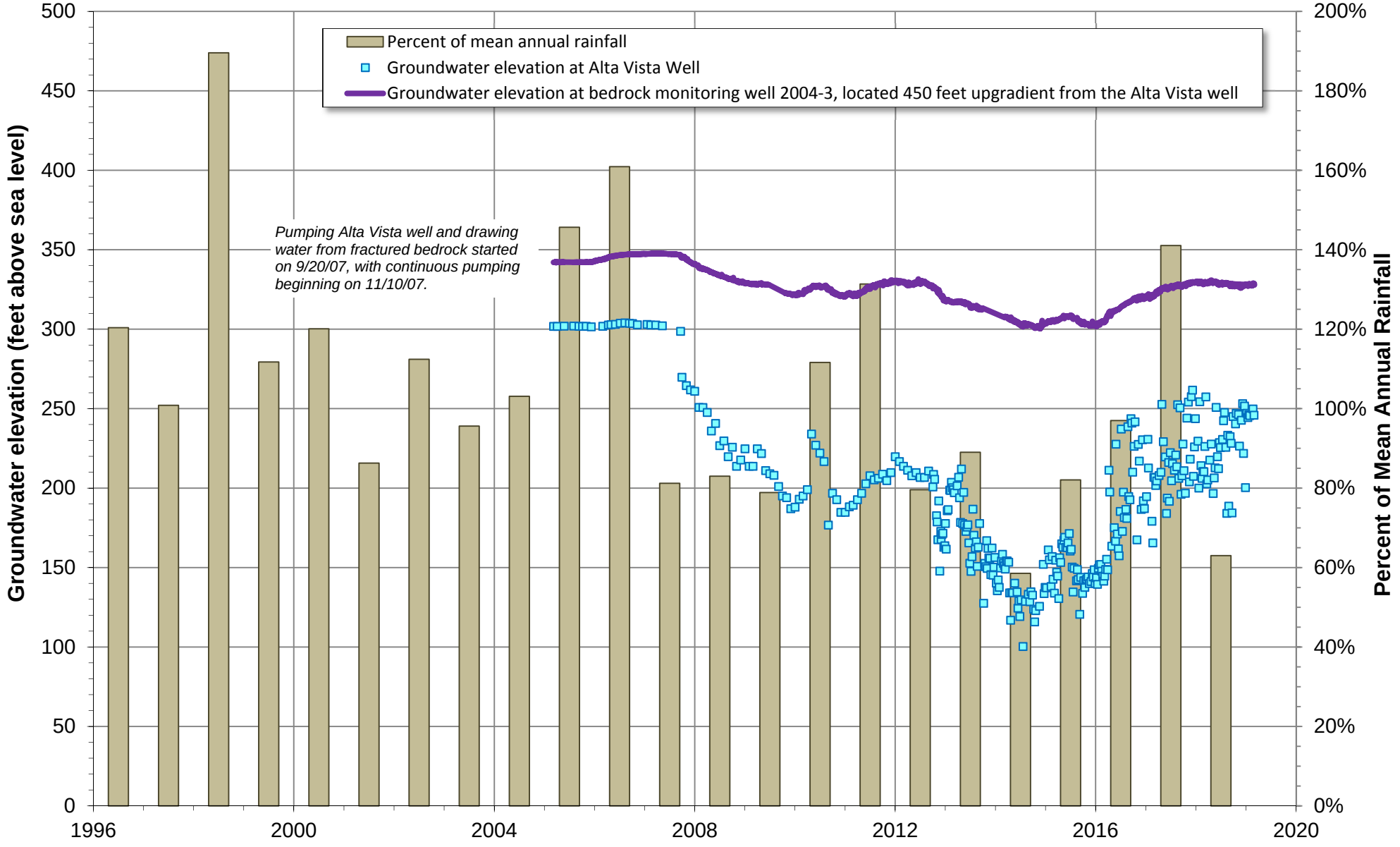


Figure 12. Groundwater elevation at the MWSD Alta Vista well compared to annual rainfall.
Notable years of recharge to bedrock fractures are 1998 and 2006 (>160% of mean). Other years likely with meaningful recharge are 2005, 2011, and 2017. Rainfall data source: MWSD Alta Vista water treatment and storage facility for water years 2002 through 2018; NOAA NCDC Half Moon Bay station 043714 for water years 1996 through 2001. [Water year type classification (for reference): Extremely Dry <70%; Dry 70-90%; Average 90-110%; Above Average 110-125%; Wet 125-160%; Extremely Wet >160%.]

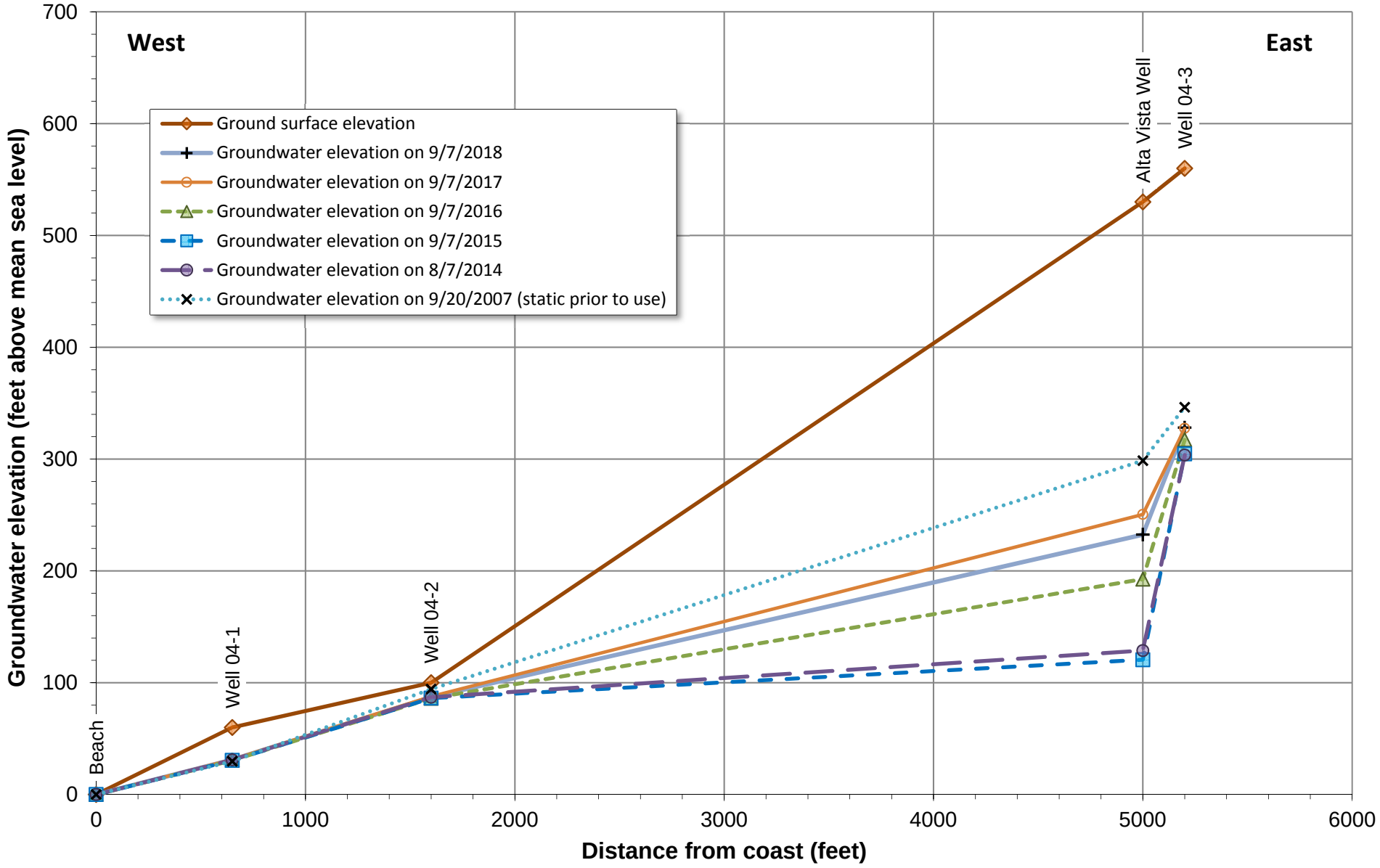


Figure 13. Groundwater elevation profile eastward from Montara State Beach to the Alta Vista source well, including moniroting wells, San Mateo County, California. Given the observed westward hydraulic gradient from the Alta Vista well to monitoring well 2004-2 (and then to sea level at the coast), at the current water levels and pumping rates, seawater intrusion is presently not physically possible at this location.

APPENDICES

APPENDIX A

Summary of well construction descriptors;

Geologic and geophysical logs and construction diagrams;

DWR well completion reports.

Appendix C. Well drilling and construction descriptors, Montara Water and Sanitary District, San Mateo County, California

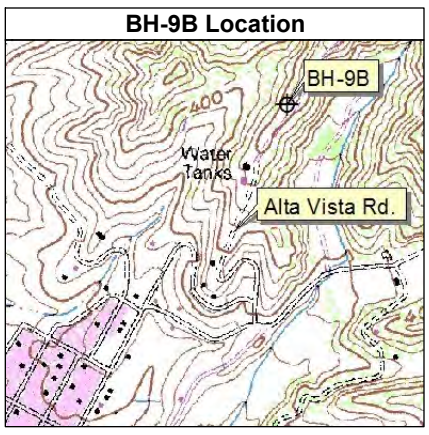
	Well 04-1	Well 04-2	Well 04-3	Alta Vista Water Supply Well (04-4)	Well 04-5	MW-1	MW-2
Site locators							
Borehole number	BH-1	BH-3	BH-9	BH-9b	BH-11	MW-1	MW-2
Well drillers report number	0915990	1095583	1095582	1095584	425740	--	--
Assessors parcel number	036-330-040	036-320-100	036-180-030	036-180-030	036-180-110	036-180-110	036-180-110
Latitude, NAD27	N37.5519	N37.5505	N37.5512	N37.5502	N37.5478	N37.5492	N37.5486
Longitude, NAD27	W122.5107	W122.5077	W122.4951	W122.4957	W122.4957	W122.4941	W122.4945
Elevation, feet	60	100	560	530	350	376	362
Drilling and well construction discriptors							
Date of well completion	1/20/2004	2/30/2004	4/2/2004	7/7/2004	7/19/2004	5/25/2005; redrilled 8/6/2007	5/25/2005
Depth of static water, feet below ground surface	25	artesian	200	234	14	4.18	3.65
Air lift test, gpm	21	48	23	200+	20	none	none
Specific conductance, umhos/cm @ field temperature	840	357	295	224	446	--	--
Tempurature, C	17	21	19	19	19	--	--
Diameter of well casing, inches	5	6	6	12	12	2	2
Depth of seal, feet below ground surface	85	52	53	370	54	5	2.5
Screened intervals, feet	95 to 195	90 to 190 290 to 350 370 to 440 470 to 530	358 to 418 458 to 538 578 to 638 718 to 798	9" noncased hole below 370	58 to 78	5 to 30	3.5 to 12
Bottom of casing, feet below ground surface	215	552	798	no casing	81	30	12.00
Depth of borehole, feet below ground surface	235	554	832	780	85	30.43	12.25

Balance Hydrologics, Inc.

Appendix C: Geologic and geophysical logs and construction diagram for well 2004-4, APN 036-180-030, San Mateo County, California

APN:	**036-180-030**	Driller:	**Steven Estebon, Maggiora Bros. Drilling**
Location:	**Alta Vista Rd., Montara, CA**	Drilling rig:	**Ingersoll Rand 1150/350**
Latitude, Longitude:	**N37.5502, W122.4957 NAD27**	Driling bits:	**8¾ in. air rotary, 8¾ in. air hammer, 16 in. rotary ream**
Ground surface elevation:	**530 feet**		**Cutting samples taken every 5 feet**
Start drilling date:	**May 19, 2004**	Depth of borehole:	**780 feet**
Well completion date:	**July 7, 2004**	Depth of casing:	**370 feet**
Borehole geologists:	**Jason Parke, Gustavo Porras, Vic Abadie**	Diameter of casing:	**12 inches, I.D.**
Geophysical log:	**Bill Henrich, Norcal Geophysics, June 1, 2004**		**9 inch non-cased borehole below 370 feet**

BH-9B Location



Depth feet

Lithology

Hydrology

Well Construction

Remarks

Caliper Inches (6 – 16)

Natural Gamma API Cs. (0 – 80)

16N Ohm-m (10 – 10000) / **64N** Ohm-m

SPR Ohm (0 – 700) / **SP** milliVolt (-120 – -50)

Acoustic Tele Viewer Amplitude (360° view) N E S W N

0

CLAYEY SAND: 0 to 15 ft.: Orangish brown, poorly sorted, mostly feldspar, cohesive sandy clay (SC)

WEATHERED GRANITICS: 15 to 235 ft. - Montara Mountain Granitic Rock: Decomposed angular to subrounded light brown quartz diorite; 20 ft: orangish yellow brown mostly feldspar 5% clay

55 ft: 50% orangish yellow brown feldspar, 30-40% quartz

75 ft: increasing clay content

85 ft: brownish color 10% hornblende

115 ft: brownish orangish brown 50-60%feldsp 30%qtz, 10% hornblende

145 ft: cont. increasing clay content

210 ft: orangish brown increasing dampness, 5-10% clay

GRANITICS: 235 to 780 ft. - Montara Mountain Granitic Rock: Fractured angular to subangular greenish grey quartz diorite

235 ft: 50% feldspar, 30-40% greenish gray hornblende, 15% quartz

240 to 285 ft: Hornblende greater than 40% of rock

245 ft: 80% greenish gray hornblende

295 ft: 60% feldspar, 10% quartz, 30-25% hornblende

315 ft: 75-80% greenish gray hornblende, 20% feldspar and quartz, 5% hornblende

420 ft: 40-50% black and greenish gray hornblende, 40-45% feldspar, 5-10% quartz

545 ft: 40-60% feldspar, 30-40% greenish gray hornblende, 5-10% quartz

235 ft: first water, static water level

240 ft: 10 gpm drilling

260 ft: 15 gpm (est) drilling

300 ft: 25 gpm drilling

340 ft: 30 gpm drilling

380 ft: 30 gpm drilling

440 ft: 26 gpm drilling

0-180+ ft: neat concrete/bentonite seal 2 inches around casing

0-14ft: May 19 started drilling with 8 3/4 inch, air rotary

14-274 ft: May 21 approx. drilling rate is 30 ft/hr

37 feet of 10-inch casing is installed as temporary conductor casing

260 ft: specific conductance 252 micro-mhos/cm at 20C

274-417 ft: May 24 approx. drilling rate is 30 ft/hr

300 ft: specific conductance 220 micro-mhos/cm at 18C

310 ft: approx. drilling rate is 300 ft/hr

332 ft: approx. drilling rate is 100 ft/hr

360 ft: approx. drilling rate is 30 ft/hr

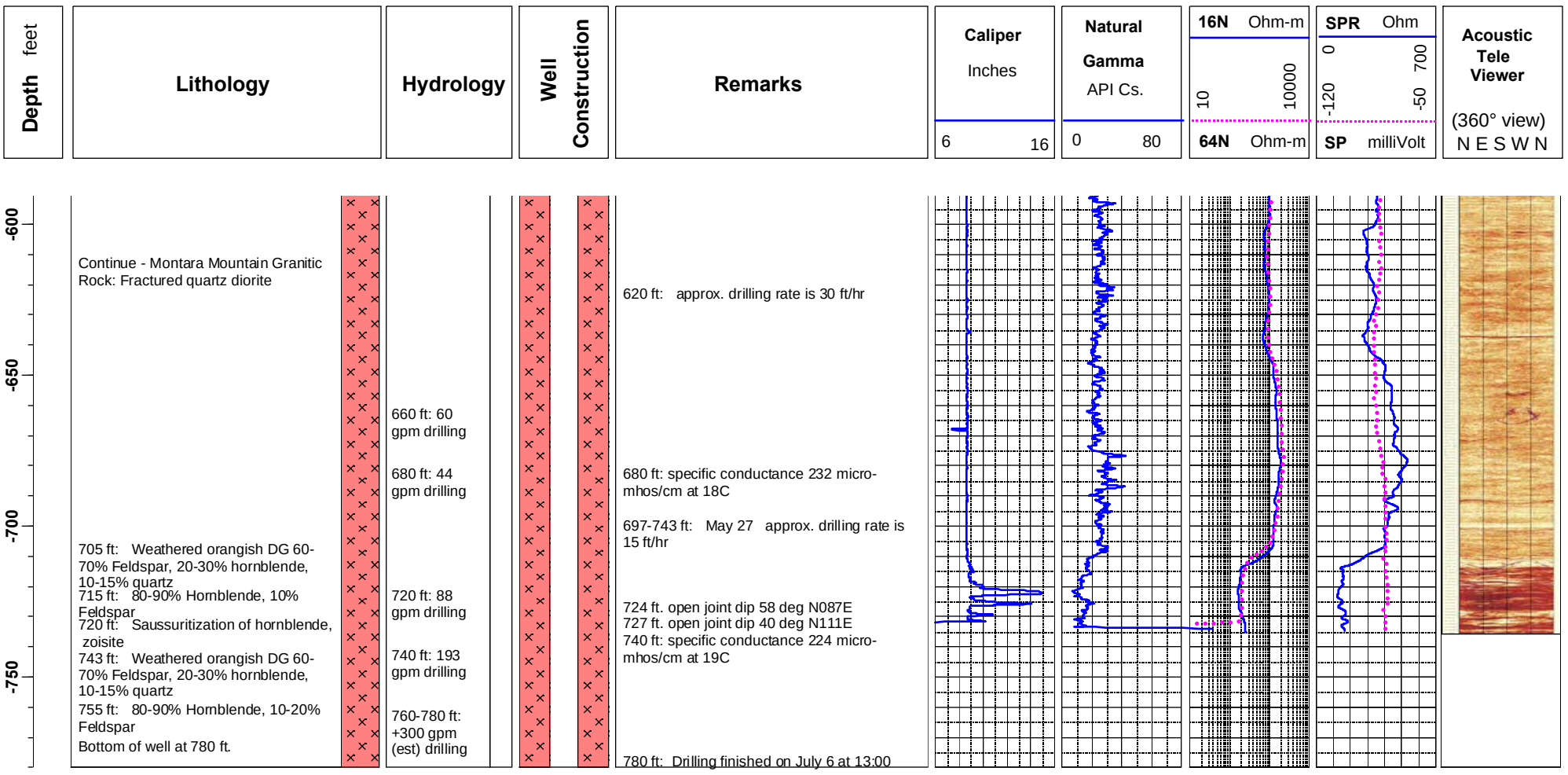
0-370 ft: Jun. 5 to 16, reamed to 16-inch dia.; Jun. 17, installed 12-inch steel conductor casing; Jun. 30, poured concrete seal; July 2 to 7, cleaned borehole to 743 ft. and advanced to 780 ft.

417-577 ft: May 25 approx. drilling rate is 30 ft/hr

505 ft: approx. drilling rate is 15 ft/hr

565 ft: approx. drilling rate is 50 ft/hr

577-697 ft: May 26 approx. drilling rate is 30 ft/hr



07/21/2005 10:56 8317243226

ORIGINAL
File with DWR

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 1095584

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

Page ___ of ___
Owner's Well No. WELL #BH-6b
Date Work Began 5/19/04 Ended 7/8/04
Local Permit Agency SAN MATEO CITY HEALTH
Permit No. 04-0623 Permit Date 5/20/04

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD AIR ROTARY FLUID ___

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION Describe material, grain size, color, etc.
0	2	TOP SOIL AND CLAY
2	235	DECOMPOSED GRANITE
235	250	GRANITE
250	275	GREEN ROCK & GRANITE
275	420	GRANITE
420	440	SERPENTINE & GRANITE
440	751	GRANITE
751	776	GREEN ROCK

TOTAL DEPTH OF BORING 776 (Feet)
TOTAL DEPTH OF COMPLETED WELL 776 (Feet)

WELL OWNER
Name MONTARA WATER & SANITATION DIST.
Mailing Address P. O. BOX 370131
City MONTARA, CA 94037-0131 STATE ZIP

WELL LOCATION
Address N. CABRILLO HWY
City MONTARA
County SAN MATEO
APN Book 036 Page 180 Parcel 030
Township ___ Range ___ Section ___
Lat ___ N DEG. MIN. SEC. Long ___ W DEG. MIN. SEC.

LOCATION SKETCH
NORTH / WEST / EAST / SOUTH
Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)
___ NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

USES (✓)
WATER SUPPLY
___ Domestic ___ Public
___ Irrigation ___ Industrial
MONITORING ___
TEST WELL ___
CATHODIC PROTECTION ___
HEAT EXCHANGE ___
DIRECT PUSH ___
INJECTION ___
VAPOR EXTRACTION ___
SPARGING ___
REMEDIATION ___
OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL
DEPTH TO FIRST WATER ___ (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 233 (Ft.) & DATE MEASURED 8/13/04
ESTIMATED YIELD * 200 (GPM) & TEST TYPE AIR LIFT
TEST LENGTH ___ (Hrs.) TOTAL DRAWDOWN ___ (Ft.)
* May not be representative of a well's long-term yield.

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	370	12	X				STEEL	12	250	
370	776	8					OPEN HOLE			

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	370	XX			NEAT

ATTACHMENTS (✓)
___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other ___
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.
NAME MAGGIORA BROS. DRILLING, INC. (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS 595 AIRPORT BLVD. CITY WATSONVILLE, CA STATE 95076 ZIP
Signed ___ C-57 LICENSED WATER WELL CONTRACTOR
DATE SIGNED 02/05/04
C-57 LICENSE NUMBER 249957

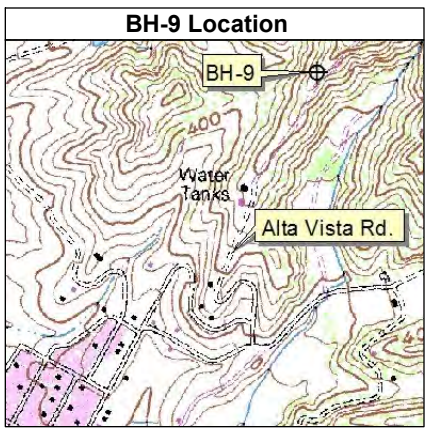
DWR 188 REV. 05-03 IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM OSP 03 78836

Balance Hydrologics, Inc.

Appendix C: Geologic and geophysical logs and construction diagram for well 2004-3, APN 036-180-030, San Mateo County, California

APN:	**036-180-030**	Driller:	**Jose Fernandez, Maggiora Bros. Drilling**
Location:	**Alta Vista Rd., Montara, CA**	Drilling rig:	**Ingersoll Rand TH-60**
Latitude, Longitude:	**N37.5512, W122.4951 NAD27**	Driling bits:	**8¾ in. air rotary**
Ground surface elevation:	**560 feet (approximately)**		**Cutting samples taken every 5 feet**
Start drilling date:	**March 15, 2004**	Depth of borehole:	**832 feet**
Well completion date:	**April 2, 2004**	Depth of casing:	**798 feet**
Borehole geologists:	**Jason Parke, Gustavo Porras, Vic Abadie**	Diameter of casing:	**6 inches, I.D.**
Geophysical log:	**Bill Henrich, Norcal Geophysics, March 30, 2004**		

BH-9 Location



Depth feet

Lithology

CLAYEY SAND: 0 to 25 ft.: Orangish yellow brown, poorly sorted, cohesive sandy clay (SC), mostly feldspar, 5 ft: 15-20% clay; 10ft: >30% clay

WEATHERED GRANITICS: 25 to 190 ft.: Montara Mountain Granitic Rock: Decomposed sub angular to subrounded light brown quartz diorite; 25 ft: decreasing clay content, yellowish brown

GRANITICS: 190 to 832 ft. - Montara Mountain Granitic Rock: Fractured angular to sub angular greenish grey quartz diorite

235 ft: Granitic fragments in DG

247ft: Granitic mostly feldspar with 5-10% greenish gray hornblende

307ft: Granitic 60-70% feldspar, 30-25% hornblende, 10% quartz

362 ft: Granitic 70-80% feldspar, 5-10% hornblende, 10% quartz

372 ft: Granitic 60-70% feldspar, 15-20% hornblende, 10% quartz

377 ft: Granitic 50-60% feldspar, 20-30% black and greenish gray hornblende, 5-10% quartz

537 ft: Granitic 50-60% feldspar, 25-35% black and greenish gray hornblende, 5-10% quartz

562 to 582 ft: Granitic 50-60% feldspar, 25-40% black and greenish gray hornblende, 5-10% quartz

Hydrology

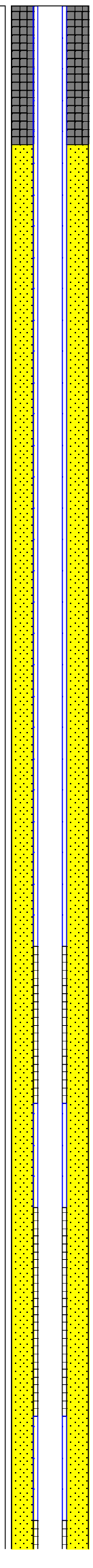
220 ft: first water and static water level

420 ft: Air lift test = 13 gpm

500 ft: Air lift test = 15 gpm

<--- Approx. mean sea level

Well Construction



Remarks

0-360 ft: 6-inch F-480 PVC casing
0-195 ft: Mar 15 air-drilling started . Hole collapsed at 190 ft.

185-190 ft: Mar. 16 cleaned hole to 190 ft.

195-302 ft: drilling at approx. 30 ft/hr

drilling at approx. 10 ft/hr

switch to drilling with air hammer and water

302-369 ft: Mar. 17 drilling with air hammer and water, using foam periodically. Rate changes from approx. 20 ft/hr to 7.5 ft/hr

drilling rate slows down from approx. 30 ft/hr to 15 ft/hr

369-422 ft: Mar. 8 drilling rate approx. 10 ft/hr

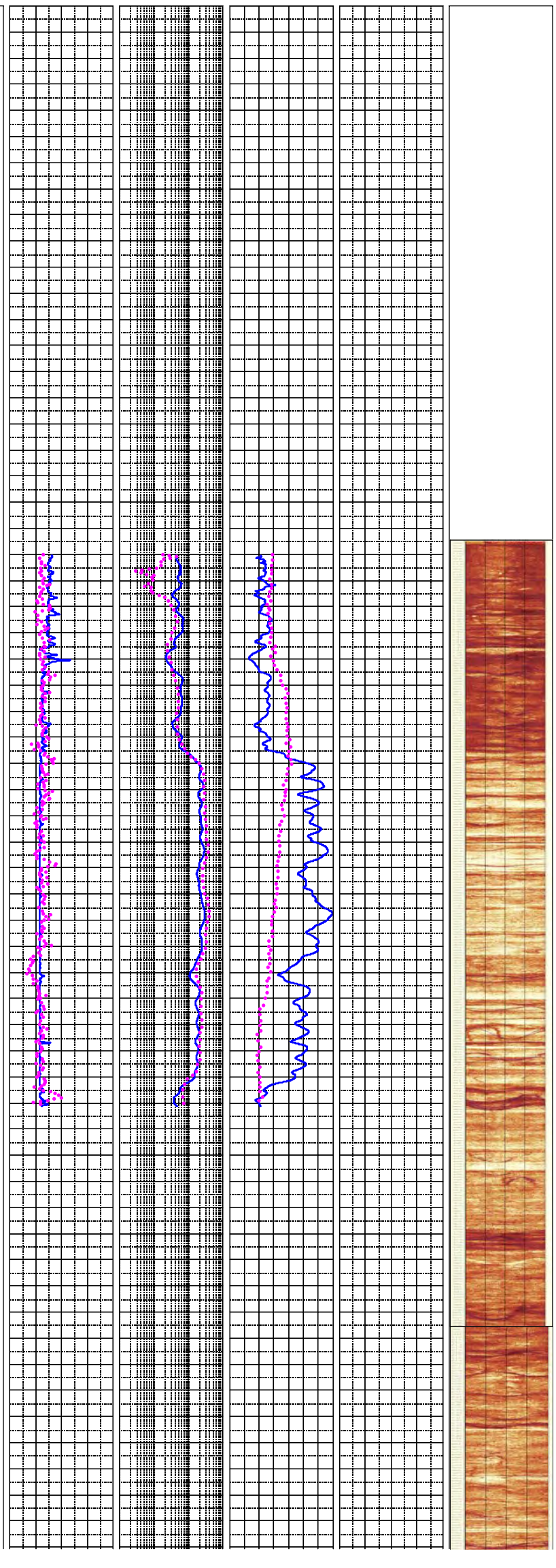
392-397 ft: approx. drilling rate is 15 ft/hr
397-402 ft: approx. drilling rate is 5 ft/hr

407-412 ft: approx. drilling rate is 150 ft/hr

420 ft: specific conductance 276 micro-mhos/cm at 17.6C
422-502 ft; Mar. 19 approx. drilling rate is 12 ft/hr

500 ft: specific conductance 343 micro-mhos/cm at 18.4C
502-587 ft: Mar. 22 water coming up is green; approx. drilling rate is 40 ft/hr

587-682 ft: Mar. 23 approx. drilling rate is



Depth feet	Lithology	Hydrology	Well Construction	Remarks	Caliper Inches (0 – 6 – 16 / 80) Natural Gamma API Cs.	16N Ohm-m (10 – 10000) 64N Ohm-m	SPR Ohm (0 – 700 / -120 – -50) SP mVolt	SC mS/m (160 – 240 / 15 – 19) Fluid Temp °C	Acoustic Tele Viewer (360° view) N E S W N
-600	Continue - Montara Mountain Granitic Rock: Fractured subangular to subrounded quartz diorite 607 ft: Increasing % black and greenish gray hornblende, abundance of weathered feldspar	600 ft: Air lift test = 17 gpm		24 ft/hr 600 ft: specific conductance 321 micro-mhos/cm at 18.7C					
-650				632-637 drilling with air hammer; approx. drilling rate is 60 ft/hr 637-642 ft: approx. drilling rate is 9 ft/hr					
-700	712 ft: Granitic 50-60% feldspar, 20-30% black and greenish gray hornblende, 5-10% quartz Below 720 ft:: Saussuritized granitics and altered veined rocks 737 ft: Granitic 75-80% greenish gray hornblende, 20% feldspar and quartz, 5% hornblende	720 ft: Air lift test = 19 gpm 740 ft: Air lift test = 23 gpm		682-782 Mar. 25 approx. drilling rate is 15 ft/hr 720 ft: specific conductance 292.5 micro-mhos/cm at 18.8C					
-750	757 ft: Granitic 50-60% feldspar, 20-30% black and greenish gray hornblende, 5-10% quartz			782-815 ft: Mar. 26 approx. drilling rate is 13 ft/hr; casing installed					
-800	Bottom of well at 832 ft.			798-832 ft: Loose decomposed granite fallen in from the upper portion of the hole. 832 ft: Drilling finished on Mar. 29 at 17:14					

ORIGINAL
File with DWR

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 1095582

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

Page ___ of ___
Owner's Well No. WELL #SH-9
Date Work Began 3/15/04 Ended 4/2/04
Local Permit Agency SAN MATEO CTY HEALTH
Permit No. 04-0109 Permit Date 3/4/04

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD MUD ROTARY DRILLING FLUID

DEPTH FROM SURFACE ft.	to ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	15	TOP SOIL AND CLAY
15	210	DECOMPOSED GRANITE
210	230	DECOMPOSED GRANITE & QUARTZ
230	282	DECOMPOSED GRANITE
282	832	GRANITE

TOTAL DEPTH OF BORING 832 (Feet)
TOTAL DEPTH OF COMPLETED WELL 792 (Feet)

WELL OWNER

Name MONTARA WATER & SANITATION DIST.
Mailing Address P. O. BOX 370131
City MONTARA, CA 94037-0131 State Zip

WELL LOCATION

Address N. CABRILLO HWY
City MONTARA
County SAN MATEO
APN Book 036 Page 180 Parcel 030
Township ___ Range ___ Section ___
Lat ___ DEG. ___ MIN. ___ SEC. N Long ___ DEG. ___ MIN. ___ SEC.

LOCATION SKETCH

NORTH / WEST / EAST / SOUTH

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

✓ NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY (Describe Procedures and Mats Under "GEOLOGIC L
USES (✓)
WATER SUPPLY
✓ Domestic ___ Publ
___ Irrigation ___ Indu
MONITORING
TEST WELL
CATHODIC PROTECTION
HEAT EXCHANGE
DIRECT PUSH
INJECTION
VAPOR EXTRACTION
SPARGING
REMEDIATION
OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER ___ (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 210 (Ft.) & DATE MEASURED 3/15/04
ESTIMATED YIELD * 20 (GPM) & TEST TYPE AIR LIFT
TEST LENGTH ___ (Hrs.) TOTAL DRAWDOWN ___ (Ft.)
* *May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (inches)	TYPE (✓) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (inches)
SEE ATTACHED									

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft. to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 – 50	XX			10 SACK
50 – 832			XX	8 X 14

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME MAGGIORA BROS. DRILLING, INC.
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS 595 AIRPORT BLVD. CITY WATSONVILLE, CA STATE 95076 ZIP
Signed ___ (C-57 LICENSED WATER WELL CONTRACTOR) DATE SIGNED 02/05/04
C-57 LICENSE NUMBER 249957

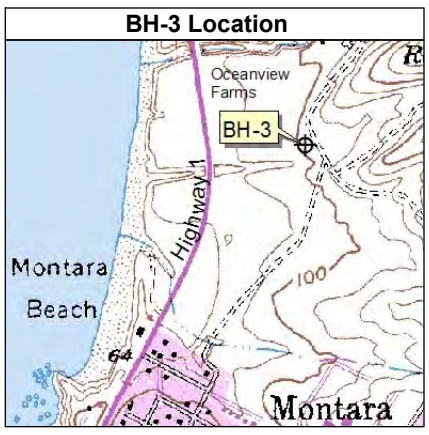
DWR 188 REV. 05-03 IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM OSP 03 71

Balance Hydrologics, Inc.

Appendix C: Geologic and geophysical logs and construction diagram for well 2004-2, APN 036-320-100, San Mateo County, California

APN:	**036-320-100**	Driller:	**Jose Fernandez, Maggiora Bros. Drilling**
Location:	**Oceanview Farms, Montara, CA**	Drilling rig:	**Ingersoll Rand 1150/350**
Latitude, Longitude:	**37.5505, W122.5077 NAD 27**	Driling bits:	**8¾ in. air rotary; 9 7/8 in. rotary, air hammer**
Ground surface elevation:	**100 feet**		**Cutting samples taken every 5 feet**
Start drilling date:	**January 23, 2004**	Depth of borehole:	**554 feet below ground surface**
Well completion date:	**February 29, 2004; airlift on March 3, 2004**	Depth of casing:	**552 feet below ground surface**
Borehole geologists:	**Jason Parke, Gustavo Porras, Vic Abadie**	Diameter of casing:	**6 inches, I.D.**
Geophysical log:	**Bill Henrich, Norcal Geophysics on Feb. 12, 2004**		

BH-3 Location



Depth feet | **Lithology** | **Hydrology** | **Well Construction** | **Remarks**

Caliper inches (0 – 6 – 16; 0 – 80) | **Natural Gamma** API Cs.

16N Ohm-m (10 – 10000) | **64N** Ohm-m

SPR Ohm (0 – 700)

SC uS/cm (260 – 340; 18 – 22) | **Fluid Temp** °C

Acoustic Tele Viewer Amplitude (360° view) N E S W N

0
-50
-100
-150
-200
-250
-300
-350
-400
-450
-500
-550

TOPSOIL: 0 to 5 ft.: organic topsoil loam, high clay content

TERRACE DEPOSITS: 5 to 25 ft.: Light brown to yellowish orange poorly sorted cohesive sandy clay (SC)

WEATHERED GRANITICS: 25 to 150 ft. - Montara Mountain Granitic Rock: Decomposed quartz diorite

GRANITICS: 150 to 460 ft. - Montara Mountain Granitic Rock: Fractured quartz diorite

---- Fractures indicated by lines

----- Marked increase in green hornblende abundance

--o-- Open fractures

GRANITICS: 460 to 552 ft. - Montara Mountain Granitic Rock: Quartz diorite, no geophysical log performed

Artisian flow of approx. 1.0-1.5 gpm 10 ft: First water

<--- Approx. mean sea level

160 ft.: airlift test = 36 gpm

300 ft.: airlift test = 43 gpm

400 ft.: airlift test = 48 gpm

520 ft.: airlift test = 45 gpm

0-90 ft: 6-inch F480 pipe

0-50 ft: concrete grout

18-154 ft: Jan. 26 started air-drilling with 8¾ inch bit

35-100ft: Jan 29 started mud-drilling with 9 7/8-inch bit through collapsed hole. Installed 65 ft. of steel conductor casing.

70-147 ft: Jan. 30 Resume cleaning but collapses back up to 120 ft.

97 ft: Jan. 26 Switch to foam

120-192 ft: Jan. 31 Cleaned to 154 ft. and resumed drilling. Bit is dull and replaced.

160 ft.: specific conductance: 374 micro-mhos/cm at 21C

182 ft: Drilling slows from 240 ft/hr to 5 ft/hr

192-222 ft: Feb. 5 New button bit, drilling with mud

222-238 ft: Feb. 6 another button bit, continue drilling with mud

238-304 ft: Feb 10 Cleaned hole, switched to air-hammer. Advanced conductor casing to 153 ft.

300 ft.: specific conductance: 357 micro-mhos/cm at 21C

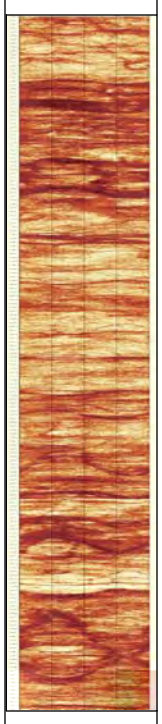
304-464 ft: Feb. 11 drilling with air-hammer, water & foam; 120 ft/hr

400 ft: specific conductance: 357 micro-mhos/cm at 21C

464-552 ft: Feb. 13 Drilling with air-hammer

520 ft: specific conductance: 337 micro mhos/cm at 25C

554 ft: Drilling finished on Feb. 13 at 14:50



~~QUADRUPLICATE~~
For Local Requirements

Page ___ of ___

Owner's Well No. WELL #BH-3

Date Work Began 1/22/04, Ended 3/5/04

Local Permit Agency SAN MATEO CTY HEALTH

Permit No. 0440102 Permit Date 2/4/04

STATE OF CALIFORNIA

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. 1095583

DWR USE ONLY — DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DRILLING METHOD MUD ROTARY FLUID WATER

DEPTH FROM SURFACE Ft. to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0 to 20	TOP SOIL AND CLAY
20 to 155	DECOMPOSED GRANITE
155 to 550	GRANITE

TOTAL DEPTH OF BORING 550 (Feet)

TOTAL DEPTH OF COMPLETED WELL 550 (Feet)

WELL OWNER

Name MONTARA WATER & SANITATION DIST

Mailing Address P.O. BOX 370131

CITY MONTARA STATE CA ZIP 94037-0131

WELL LOCATION

Address N. CABRILLO HWY

City MONTARA

County SAN MATEO

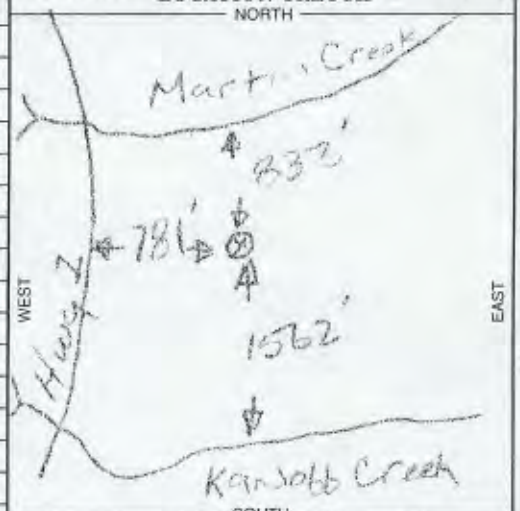
APN Book 036 Page 320 Parcel 100

Township ___ Range ___ Section ___

Lat ___ DEG. ___ MIN. ___ SEC. N

Long ___ DEG. ___ MIN. ___ SEC. W

LOCATION SKETCH



Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. ***PLEASE BE ACCURATE & COMPLETE.***

ACTIVITY (✓)

✓ NEW WELL

MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)

___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

USES (✓)
WATER SUPPLY
✓ Domestic ___ Public
___ Irrigation ___ Industrial
___ MONITORING
___ TEST WELL
___ CATHODIC PROTECTION
___ HEAT EXCHANGE
___ DIRECT PUSH
___ INJECTION
___ VAPOR EXTRACTION
___ SPARGING
___ REMEDIATION
___ OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER ___ (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL ___ (Ft.) & DATE MEASURED ___

ESTIMATED YIELD * ___ (GPM) & TEST TYPE ___

TEST LENGTH ___ (Hrs.) TOTAL DRAWDOWN ___ (Ft.)

** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
SEE ATTACHED									
90 to 190	12		X			SDR 21	6	PVC	.032
290 to 350	12		X			PVC	6	SDR 21	.032
370 to 450	12		X			PVC	6	SDR 21	.032
470 to 530	12		X			"	"	"	.032
530 to 550	12	X				PVC	6	SDR 21	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft. to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 to 70	XX			10 SACK
70 to 550			XX	6 X 12

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other ___

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME MAGGIORA BROS. DRILLING INC
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS 595 AIRPORT BLVD. CITY WATSONVILLE STATE CA ZIP 95076

Signed [signature] 02/05/04
C-57 LICENSED WATER WELL CONTRACTOR DATE SIGNED

C-57 LICENSE NUMBER 749957

DWR 188 REV. 05-03

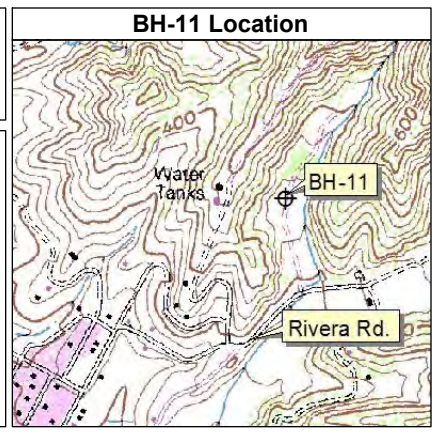
IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Balance Hydrologics, Inc.

Appendix C: Geologic and geophysical logs and construction diagram for well 2004-5, APN 036-180-110, San Mateo County, California

APN:	**036-180-110**	Driller:	**Wilkinson Drilling**
Location:	**Rivera Rd., Montara, CA**	Drilling rig:	**Ingersoll Rand 1150/350**
Latitude, Longitude:	**N37.5478, W122.4957 NAD27**	Driling bits	**8¾ in. air rotary, 8¾ in. air hammer, 17½ in. rotary ream**
Ground surface elevation:	**350 feet**		**Cutting samples taken every 5 feet**
Start drilling date:	**7/9/2004**	Depth of borehole:	**164 feet, completed 85 feet**
Well completion date:	**7/9/2004**	Depth of casing:	**84 feet**
Borehole geologists:	**Jason Parke, Gustavo Porras, Vic Abadie**	Diameter of casing:	**12 inches, I.D.**
Geophysical log:	**Bill Henrich, Norcal Geophysics**		

BH-11 Location



Depth feet

Lithology

ALLUVIUM: 0-15 ft: rusty brown sandy gravelly clay, unsorted sandstone to gravel; subrounded, subangular, up to 0.5 cm

15-60 ft: green gray turning with depth rusty brown sandy gravelly clay, coarse arkosic fragments, sub angular, subrounded

WEATHERED GRANITICS: 60-80 ft. - Montara Mountain Granitic Rock: Decomposed quartz diorite, coarser gravel sized granitic fragments, up to 4-5 cm

GRANITICS: 80-164 ft. - Montara Mountain Granitic Rock: Fractured quartz diorite with overall rusty color, with clear qtz and white feldspar and dk green hornblende

Hydrology

19ft: static water level

Well Construction

Remarks

0ft: started drilling with water, adding polymer and bentonite.
0-58 ft: 12-inch F480 PVC casing
10 ft: switched to drilling with mud, approx. drilling rate is 60 ft/hr

45 ft: approx. drilling rate is 60 ft/hr

60 ft: approx. drilling rate is 38 ft/hr
58-78 ft: screened section 12-inch F480 0.035 slot

78-84ft: 12-inch F480 PVC casing
84 ft: Bottom of well at 84 ft.

164 ft: Drilling finished on June 28 at 15:00

Caliper Inches
6 16

Not logged

Natural Gamma API Cs.
0 40

16N Ohm-m
10 10000
64N Ohm-m

SPR Ohm
0 700
-120 -50
SP Millivolt

Acoustic Tele Viewer Amplitude (360° view)
N E S W N

Not logged

TRIPLICATE
Owner's Copy

Page 1 of 1
Owner's Well No. 11
Date Work Began 7/9/2004 Ended 7/9/2004
Local Permit Agency San Mateo County Environmental Health
Permit No. 04-0643 Permit Date 6/22/2004

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 425740

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) ✓ VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DEPTH TO FIRST WATER ___ (Ft.) BELOW SURFACE

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	5	topsoil, clay
5	10	sand, brown clay
10	15	black clay
15	25	brown clay, sand
25	60	sand, gravel
60	65	white rock

TOTAL DEPTH OF BORING 65 (Feet)
TOTAL DEPTH OF COMPLETED WELL 65 (Feet)

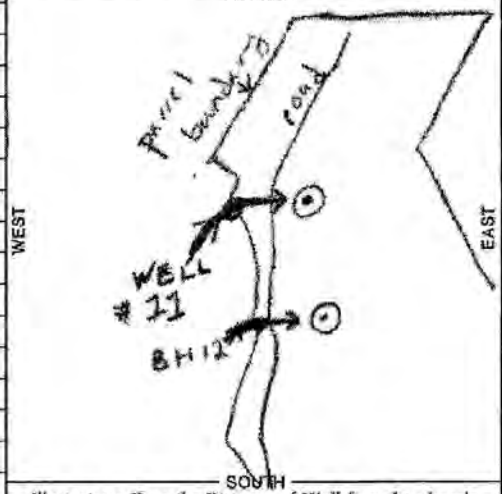
WELL OWNER

Name Montara Water & Sanitary District
Mailing Address P.O. Box 370131
City Montara State CA Zip 94037

WELL LOCATION

Address 371 Rivera Rd.
City Montara
County San Mateo
APN Book 036 Page 140 Parcel 110
or Township ___ Range ___ Section ___
or Latitude ___ DEG. MIN. SEC. NORTH Longitude ___ DEG. MIN. SEC. WEST

LOCATION SKETCH



Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc.
PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

✓ NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USE(S) (✓)

___ MONITORING
WATER SUPPLY
✓ Domestic
___ Public
___ Irrigation
___ Industrial
___ "TEST WELL"
___ CATHODIC PROTECTION
___ OTHER (Specify)

DRILLING METHOD rotary FLUID water

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL ___ (Ft.) & DATE MEASURED ___
ESTIMATED YIELD* ___ (GPM) & TEST TYPE ___
TEST LENGTH ___ (Hrs.) TOTAL DRAWDOWN ___ (Ft.)
* *May not be representative of a well's long-term yield.*

CASING(S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	65	12	✓				PVC-40	12	F480	
45	65	12		✓			PVC-80	12	F480	.035

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	54'5"	✓			neat cement
54'5"	65			✓	#3 Sonoma sand

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other ___

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME [illegible] Wilkinson Enterprises Inc
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS PO Box 3218 CITY Half Moon Bay STATE CA ZIP 94019
Signed [signature] (WELL DRILLER/AUTHORIZED REPRESENTATIVE)
DATE SIGNED 11/5/04 C-57 LICENSE NUMBER 511063

DWR 188 REV. 7-99

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

APPENDIX B

Log of hydrologic observations

Appendix A. Hydrologic monitoring observations, water year 2016, Montara Water and Sanitary District, San Mateo County, California

Site Conditions				Streamflow					Water Quality Observations				High-Water Marks		Datalogger	Remarks
Time Zone	Date/Time	Observer(s)	Staff Plate	Measured Discharge	Measured Discharge	Estimated Discharge	Instrument Used	Estimated Accuracy	Water Temperature	Specific Conductance at field temp.	Specific Conductance at 25C	Samples	Estimated stage at staff plate	Inferred dates?	Datalogger Downloaded?	
(PST/PDT)	(mm/dd/yr)	(see notes)	(feet)	(cfs)	(gpm)	(cfs)	(AA/PY)	(e/g/f/p)	(°C)	(µmhos/cm)	(at 25 °C)	(see notes)	(feet)	(mm/dd/yr)	(Y/N)	
Montara Creek North Fork at Riviera Road (MORR)																
PDT	10/13/15 13:21	gp	0.20	0.000	0		obs								yes	dry; no evidence of recent flows; not relaunched
PST	12/12/15 13:25	gp	0.20	0.000	0		obs								yes	dry; no evidence of recent flows; relaunched
PST	1/12/16 11:00	gp	0.20	0.000	0		obs								no	dry; evidence of recent flows: sand level reached 0.4 in staff plate. Reduced back to 0.2 prior to leaving; not relaunched; channel upstream of culvert shows HMW of approx. 0.5 ft. above dry bed.
PST	3/4/16 13:30	mw	0.20	0.000	0		obs								no	
PDT	3/14/16 13:02	gp	0.85	3.771	1692		AA	g	13.9	212	268				no	
PDT	4/6/16 17:00	gp	0.34	0.049	22		bucket	g							yes	Relaunched at 16:15 PST
PDT	5/13/16 14:44	gp	0.43	0.098	44		bucket	g	14.9	199	247				no	Not relaunched.
PDT	6/20/16 16:00	gp	0.30	0.018	8		bucket	g	19.7	207	232				no	Not relaunched.
PDT	8/12/16 12:00	gp	0.20	0.000	0		obs								no	dry; no evidence of recent flows
PDT	9/30/16 14:24	gp	0.20	0.000	0		obs								yes	Not relaunched.
Montara Creek above diversion																
	10/27/15 15:38	gp	---	---	---	---	---	---								Unable to open flash board. No samples taken.
	3/4/16 11:00	mw	---	---	---	---	---	---	13.0	200	265					Cleaned sediment; could not measure flow.
PDT	6/20/16 15:00	gp	---	0.24	106	0.25		g								Diversion box was almost full of sediment and degraded granite. Cleaned box prior to flow measurement
PDT	8/12/16 13:20	gp	---	0.18	80			g	14.0	161	204					Once again, diversion box was almost full of sediment and degraded granite. Cleaned box prior to flow measurement
Daffodil Canyon at Old San Pedro Road (DASP)																
PDT	10/13/15 16:52	gp	5.06	---	---				16.3	204	245				yes	No flow measurement. Not relaunched.
PST	12/12/15 15:39	gp	5.10	0.011	5.0		bucket	p	11.7	190	255				yes	Relaunched.
PST	1/12/16 12:43	gp	5.14	0.035	15.5		bucket	p	11.5	205	276		5.3	last week?	no	Not relaunched.
PST	3/4/16 16:15	mw	5.21	0.089	40.1		pigmy	g	14.0	240	310				no	Not relaunched.
PDT	3/14/16 16:11	gp	5.92	2.135	958.0		AA	g/e	13.7	191	244			none	no	Not relaunched. Wildlife camera installed left bank d/s of staff plate.
PDT	4/6/16 13:55	gp	5.15	---	---										yes	No flow measurement. Relaunched at 13:15 PST
PDT	5/13/16 17:13	gp	5.11	0.010	4.6		bucket	p	15.0	213	264				no	Not relaunched.
PDT	6/20/16 13:13	gp	5.10	0.007	3.0		bucket	g, p	16.5	152	181				no	Not relaunched.
PDT	8/12/16 17:05	gp	5.10	0.005	2.1		bucket	p	14.5	205	258				no	Not relaunched.
PDT	9/30/16 11:00	gp	5.10	0.009	3.9		bucket	p	13.6	116	148				yes	Not relaunched.

Martini Creek above Old San Pedro Road (MASP)

PDT	10/13/15 16:23	gp	16.80	---	---				19.7	193	213				yes	No flow measurement. Not relaunched.
PST	12/12/15 15:00	gp	16.82	0.230	103		pigmy	e	12.2	159	211				yes	Water is clear. Relaunched
PST	1/12/16 12:21	gp	16.83	0.297	133		pigmy	e	11.9	108	144		17.10	last week?	no	Water is clear. Not relaunched
PST	3/4/16 15:24	mw	16.89	0.673	302		pigmy	e	14.0	200	258				no	Water is slightly turbid from rain this morning
PDT	3/14/16 15:06	gp	17.45	5.315	2385		AA	e	13.7	195	248				no	Water is turbid
PDT	4/6/16 13:10	gp	16.85	---	---										yes	No flow measurement. Relaunched at 13:00 PST. Replaced tape holding Levelogger at same distance from top of stilling well. Orange flag labeled 'A' was plced next to our standard cross section stake.
PDT	5/13/16 16:26	gp	16.84	0.555	249		pigmy	e, g	13.9	181	229				no	Cleared branch that fell over measurement section; water is clear.
PDT	6/20/16 17:02	gp	16.83	0.575	258		pigmy	e, g	15.0	165	205				no	A different branch fell overbank just downstream of measurement section, probably will fall onto creek in near future;water is clear.
PDT	8/12/16 16:08	gp	16.80	0.387	174		pigmy	e, g	13.5	187	240				no	
PDT	10/1/16 13:32	gp	16.81	0.354	159		pigmy	e, g	14.0	180	228				yes	Not relaunched

Notes:

1) jp = Jason Park, gp = Gustavo Porras, mw = Mark Woyshner

2) NR is not recorded

3) NA or "-" is not applicable

4) Abbreviations: SCT = specific conductance and temperature; DL = datalogger; PT = pressure transducer; HWM = high water mark

Appendix A. Groundwater monitoring observations, water year 2016, Montara Water and Sanitary District, San Mateo County, California

Site Conditions			Water Level		Water Quality Observations				Datalogger	Remarks
Time Zone	Date/Time	Observer(s)	Depth to Water	WSE	Water Temperature	Specific Conductance at field temp.	Specific Conductance at 25C	Samples	Datalogger Downloaded ?	
(PST/PDT)	(2004-4)	(see notes)	(feet)	(ft amsl)	(^{o}C)	(µmhos/cm)	(at 25 ^{o}C)	(see notes)	(Y/N)	
MW-1 (upstream of landslide spring and willow thicket)										
Reference point elevation (ft amsl) = 379.00										
Stickup (feet) = 3.00										
Ground surface elevation (ft amsl) = 376.00										
Depth of well from ground surface (feet) = 30.43										
Depth to Levelogger from RP (feet) = 13.80										
PDT	10/13/15 15:30	gp	29.33	349.67	15.3	239	293		yes	Not relaunched
PDT	4/6/16 18:27	gp	6.98	372.02					yes	Relaunched at 18:00 PST; Barologger relaunched at 18:00 PST
PDT	9/30/16 15:35	gp	16.63	362.37					yes	Not relaunched
MW-2 (downstream of landslide spring and willow thicket)										
Reference point elevation (ft amsl) = 366.00										Well depth from RP (feet) = 16.10
Stickup (feet) = 4.00										
Ground surface elevation (ft amsl) = 362.00										
Depth of well from ground surface (feet) = 12.00										
Depth to Levelogger from RP (feet) = 16.00										
PDT	10/13/15 12:48	gp	16.00	350.00	DRY				yes	DRY; TD from RP = 16.10. Not relaunched
PDT	4/6/16 18:10	gp	7.41	358.59					yes	Relaunched at 18:00 PST
PDT	9/30/16 15:02	gp	10.20	355.80					yes	Not relaunched
Well 2004-5 (BH-11) (located east of Liccicitos Road, north of Riviera Street)										
Reference point elevation (ft amsl) = 351.00										
Stickup (feet) = 1.00										
Ground surface elevation (ft amsl) = 350.00										
Depth of well from ground surface (feet) = 84.00										
Depth to Levelogger from RP (feet) = 75.00										
PDT	10/13/15 13:40	gp	57.12	293.88					yes	Not relaunched. Need a replacement of measurement tape. LL is 109 feet from RP.
PDT	10/27/15 16:30	gp							no	Replaced tape. LL is 109 feet from RP.
PDT	4/6/16 17:31	gp	53.27	297.73					yes	Relaunched at 17:00 PST
PDT	9/30/16 14:42	gp	45.88	305.12					yes	Not relaunched

Well 2004-3 (BH-9) (located at the end of Alta Vista Road, upgradient of Alta Vista Well)

Reference point elevation (ft amsl) = 561.60
Stickup (feet) = 1.60
Ground surface elevation (ft amsl) = 560.00
Depth of well from ground surface (feet) = 798.00
Depth to Levelogger from RP (feet) = 313.90

PDT	10/13/15 14:20	gp	258.65	302.95					yes	LL time is still PST+10 minutes. Relaunched at 14:00 PST. Move weight ball down from F100 Levelogger
PDT	4/6/16 15:49	gp	251.60	310.00					no	Not able to communicate with Levelogger. Left it in place until replacement arrives.
PDT	4/29/16 7:00	cn	251.22	310.38					no	Levelogger was replaced with Levelogger SN0052057289
PDT	9/30/16 14:01	gp	243.52	316.48					yes	Not relaunched

Well 2004-2 (BH-3) (located on Ocean View Farms at the mouth of Daffodil Canyon)

Reference point elevation (ft amsl) = 100.80
Stickup (feet) = 0.80
Ground surface elevation (ft amsl) = 100.00
Depth of well from ground surface (feet) = 552.00
Depth to Levelogger from RP (feet) = 27.30 (checked 10-15-2014)

PDT	10/13/15 17:20	gp	14.83	85.97	16.6	252	301		yes	No relaunch
PDT	4/6/16 14:15	gp	12.89	87.91					yes	Relaunched at 14:00 PST
PDT	9/30/15 16:15	gp	15.00	85.80					yes	Not relaunched

Notes:
1) jp = Jason Park, gp = Gustavo Porras, mw = Mark Woyshner
2) NR is not recorded
3) NA or "-" is not applicable
4) Abbreviations: SCT = specific conductance and temperature; DL = datalogger; PT = pressure transducer;

Appendix A. Hydrologic monitoring observations, water year 2015, Montara Water and Sanitary District, San Mateo County, California

Site Conditions				Streamflow					Water Quality Observations				High-Water Marks		Datalogger	Remarks
Time Zone	Date/Time	Observer(s)	Staff Plate	Measured Discharge	Measured Discharge	Estimated Discharge	Instrument Used	Estimated Accuracy	Water Temperature	Specific Conductance at field temp.	Specific Conductance at 25C	Samples	Estimated stage at staff plate	Inferred dates?	Datalogger Downloaded?	
(PST/PDT)	(mm/dd/yr)	(see notes)	(feet)	(cfs)	(gpm)	(cfs)	(AA/PY)	(e/g/f/p)	(^{o}C)	(µmhos/cm)	(at 25 ^{o}C)	(see notes)	(feet)	(mm/dd/yr)	(Y/N)	
Montara Creek North Fork at Riviera Road (MORR)																
PDT	10/24/14 18:00	gp	0.20	0.000	0		obs								yes	dry
PST	12/5/14 16:30	mw													no	dry; leaf evidence of some flow
PST	12/12/14 10:11	mw	0.20	0.000	0		obs								no	dry; leaf evidence of some flow
PST	1/9/15 3:00	mw	0.37	0.019	9		bucket	g	13.0	270	358				no	
PST	2/10/15 12:00	gp	0.20	0.000	0		obs						1.2	last week?	no	dry; sand deposit near staff plate evidence of some flow
PST	3/5/15 16:30	gp	0.20	0.000	0		obs								no	dry; no evidence of recent flows
PDT	4/8/15 16:00	gp	0.20	0.000	0		obs								no	dry; no evidence of recent flows
PDT	5/28/15 14:08	gp	0.20	0.000	0		obs								yes	dry; no evidence of recent flows; not relaunched
PDT	9/17/15 13:40	gp	0.20	0.000	0		obs								no	dry; no evidence of recent flows
Montara Creek above diversion																
PDT	10/15/14 12:00	gp	---	---					16.2	229	278					Not flow measurement as it was not possible to open flashboard.
PST	1/9/15 2:13	mw	---	0.058	26		tank	g								measured flow to fill 1 inch deep in diversion box
PST	3/5/15 15:50	gp	---	0.031	14		tank	f	14.0	170	219					measured flow to fill 0.5 inch deep in diversion box
PDT	6/12/15 15:00	gp	---	---	---	---	---	---	16.0	174	209					No access to diversion due to wasp nests on the way.
Daffodil Canyon at Old San Pedro Road (DASP)																
PDT	10/15/14 15:21	gp	5.06	0.003	1		bucket	p	16.9	242	288				yes	
PST	12/5/14 15:45	mw	5.11			1 gpm	vis		16.0	249	305		5.15	48 hrs	no	
PST	12/12/14 9:23	mw	5.71	1.440	648		pygmy	p					6.0	12/11/2014	no	
PST	1/9/15 17:30	mw	5.17	0.034	15		pygmy	p	11.0	278	388				no	
PST	2/10/15 15:37	gp	5.13	0.014	6		bucket	p	13.1	260	336				no	Bucket measurement at knick point ~215 ft. u/s of gage. Water is clear.
PDT	4/9/15 14:17	gp	5.08	0.012	6		bucket	p	12.5	191	251				no	Bucket measurement at knick point ~215 ft. u/s of gage. Water is clear.
PDT	5/28/215 17:02	gp	5.07	0.009	4		bucket	p	13.1	166	215				yes	Bucket measurement at knick point ~215 ft. u/s of gage. Water is clear with tannins. Not relaunched
PDT	9/17/15 17:05	gp	5.06	0.004	1.8		bucket	p	16.5	210	251				no	Bucket measurement at knick point ~215 ft. u/s of gage. Water is clear.
Martini Creek above Old San Pedro Road (MASP)																
PDT	10/15/14 14:30	gp	16.80	0.160	72		pigmy	p,f	15.7	212	258				yes	Water is clear. Levelogger was not relaunched.
PST	12/5/14 15:03	mw	16.83	0.337	151		pigmy	p	15.0	248	312		17.4	48 hrs	no	
PST	12/12/14 8:22	mw	17.37	1.890	848		pigmy	f					18.1	12/11/2014	no	SCT meter malfunctioned
PST	1/9/15 10:19	mw	16.90	0.573	257		pigmy	f	12.0	200	272				no	
PST	2/10/15 15:23	gp	16.90	0.400	180		pigmy	f	15.7	206	263		17.3	last week	no	Water is clear
PST	3/5/15 17:42	gp	16.85	0.270	121		pigmy	g	14.0	190	245				no	Water is clear
PDT	5/28/15 14:00	gp	16.83	0.240	108		pigmy	e	12.8	180	235		16.95	?	yes	Water is clear; not relaunched
PDT	9/17/15 16:40	gp	16.80	0.210	94		pigmy	e	15.8	160	191				no	Water is clear

Notes:

1) jp = Jason Park, gp = Gustavo Porras, mw = Mark Woyshner

2) NR is not recorded

3) NA or "-" is not applicable

4) Abbreviations: SCT = specific conductance and temperature; DL = datalogger; PT = pressure transducer; HWM = high water mark

Appendix A. Groundwater monitoring observations, water year 2015, Montara Water and Sanitary District, San Mateo County, California

Site Conditions			Water Level		Water Quality Observations				Datalogger	Remarks
Time Zone	Date/Time	Observer(s)	Depth to Water	WSE	Water Temperature	Specific Conductance at field temp.	Specific Conductance at 25C	Samples	Datalogger Downloaded ?	
(PST/PDT)	(2004-4)	(see notes)	(feet)	(ft amsl)	(^{o}C)	(µmhos/cm)	(at 25 ^{o}C)	(see notes)	(Y/N)	
MW-1 (upstream of landslide spring and willow thicket)										
Reference point elevation (ft amsl) = 379.00										
Stickup (feet) = 3.00										
Ground surface elevation (ft amsl) = 376.00										
Depth of well from ground surface (feet) = 30.43										
Depth to Levelogger from RP (feet) = 13.80										
PDT	10/24/14 18:32	gp	29.16	349.84					yes	Not relaunched
PDT	5/14/15 14:28	gp	14.25	364.75					yes	Not relaunched
MW-2 (downstream of landslide spring and willow thicket)										
Reference point elevation (ft amsl) = 366.00										Well depth from RP (feet) = 16.10
Stickup (feet) = 4.00										
Ground surface elevation (ft amsl) = 362.00										
Depth of well from ground surface (feet) = 12.00										
Depth to Levelogger from RP (feet) = 16.00										
PDT	10/24/14 18:20	gp	16.00	350.00	DRY				yes	DRY; TD from RP = 16.10
PDT	4/22/15 17:50	gp	9.31	356.69					yes	Not relaunched
PDT	5/14/15 14:04	gp	9.71	356.29					yes	Not relaunched
Well 2004-5 (BH-11) (located east of Liccicitos Road, north of Riviera Street)										
Reference point elevation (ft amsl) = 351.00										
Stickup (feet) = 1.00										
Ground surface elevation (ft amsl) = 350.00										
Depth of well from ground surface (feet) = 84.00										
Depth to Levelogger from RP (feet) = 75.00										
PDT	10/24/14 18:09	gp	56.15	294.85					yes	Not relaunched
PDT	4/22/15 17:25	gp	52.65	298.35					yes	Not relaunched. Lock code for enclosed area: 1973

Well 2004-3 (BH-9) (located at the end of Alta Vista Road, upgradient of Alta Vista Well

Reference point elevation (ft amsl) = 561.60
Stickup (feet) = 1.60
Ground surface elevation (ft amsl) = 560.00
Depth of well from ground surface (feet) = 798.00
Depth to Levelogger from RP (feet) = 313.90

PDT	10/24/14 17:35	gp	261.03	300.57					yes	Did not relaunch Levelogger
PDT	4/22/15 16:45	gp	254.19	307.41					yes	Did not relaunch Levelogger. LL time is PST+10 minutes

Well 2004-2 (BH-3) (located on Ocean View Farms at the mouth of Daffodil Canyon)

Reference point elevation (ft amsl) = 100.80
Stickup (feet) = 0.80
Ground surface elevation (ft amsl) = 100.00
Depth of well from ground surface (feet) = 552.00
Depth to Levelogger from RP (feet) = 27.30 (checked 10-15-2014)

PDT	10/15/14 15:55	gp	14.00	86.80	16.1	286	344		yes	No relaunch
PDT	4/14/15 12:03	gp	13.40	87.40	15.9	269	325		yes	No relaunch

Notes:
1) jp = Jason Park, gp = Gustavo Porras, mw = Mark Woyshner
2) NR is not recorded
3) NA or "-" is not applicable
4) Abbreviations: SCT = specific conductance and temperature; DL = datalogger; PT = pressure transducer;

Appendix A. Hydrologic monitoring observations, water year 2014, Montara Water and Sanitary District, San Mateo County, California

Site Conditions				Streamflow					Water Quality Observations				High-Water Marks		Datalogger	Remarks
Time Zone	Date/Time	Observer(s)	Staff Plate	Measured Discharge	Measured Discharge	Estimated Discharge	Instrument Used	Estimated Accuracy	Water Temperature	Specific Conductance at field temp.	Specific Conductance at 25C	Samples	Estimated stage at staff plate	Inferred dates?	Datalogger Downloaded?	
(PST/PDT)	(mm/dd/yr)	(see notes)	(feet)	(cfs)	(gpm)	(cfs)	(AA/PY)	(e/g/f/p)	(° C)	(µmhos/cm)	(at 25 ° C)	(see notes)	(feet)	(mm/dd/yr)	(Y/N)	
Montara Creek North Fork at Riviera Road (MORR)																
PDT	10/2/13 11:00	mw	0.20	0.00	0		obs								yes	dry; relaunched Levelogger at 11:00 PST
PST	12/11/13 16:00	gp	0.20	0.00	0		obs								yes	dry
PST	1/28/14 16:10	gp	0.20	0.00	0		obs								no	dry
PDT	3/13/14 14:00	gp	0.20	0.00	0		obs								yes	dry; did not relaunch
PDT	5/23/14 13:10	mw	0.20	0.00	0		obs								no	dry
PDT	7/16/14 14:30	mw	0.20	0.00	0		obs								no	dry
PDT	8/28/14 13:30	mw	0.20	0.00	0		obs								no	dry
Montara Creek above diversion																
PDT	8/9/13 15:15	gp	---	0.09	38		tank	g								
PDT	10/2/13 9:30	mw	---	0.07	30		tank	g								
PST	12/11/13 15:30	gp	---													No flow measurement as flashboards are allowing significant flowthough impeding reservoir fillup.
PST	1/28/14 15:30	gp	---	0.04	18		tank	g								Most of flashboard flowthough was blocked allowing reservoir fillup. Flowthrough calculated to be 4gpm.
PDT	5/23/14 14:15	mw	---						14.0	170	*219*					tank leaking and evaluated alternatives for measuring flow
PDT	7/16/14 15:30	mw	---	0.03	14		tank	g								cleaned out ~6 to 8 inches of sediment; measured first couple of inches of refill before leaks through boards; bucket measurement at drain valve at bottom of hill was 15 gpm transient flow
Daffodil Canyon at Old San Pedro Road (DASP)																
PDT	10/2/13 13:40	mw	5.06	0.013	6.0		bucket	f	13.2	192	253				yes	Relaunched Levelogger
PST	12/11/13 13:38	gp	5.08	0.012	5.3		bucket	f	7.2	171	258				yes	Bucket measurement at knick point ~215 ft. u/s of gage. Water is clear.
PST	1/28/14 17:36	gp	5.10	0.012	5.2		bucket	f	11.5	193	261				no	Bucket measurement at knick point ~215 ft. u/s of gage. Water is clear.
PDT	3/13/14 15:38	gp	5.08	0.012	5.3		bucket	p	13.7	179	228				yes	
PDT	5/23/14 10:45	mw	5.05	0.012	5.5		bucket	p							no	
PDT	7/16/14 15:30	mw	5.04	0.010	4.5		bucket	p	17.5	220	*259*				yes	reset LL
PDT	8/28/14 16:05	mw	5.03	0.0017	0.75		bucket	p	16.0	215	*263*				no	
Martini Creek above Old San Pedro Road (MASP)																
PDT	10/2/13 12:30	mw	16.84	0.264	118		pigmy	g	13.0	151	200				yes	Relaunched Levelogger at 12:30 PST
PST	12/11/13 12:18	gp	16.85	0.294	132		pigmy	g	8.4	174	255				yes	Water is clear.
PST	1/28/14 17:00	gp	16.85	0.279	125		pigmy	g	13.3	172	208					
PDT	3/12/14 12:48	gp	16.82	0.220	99		pigmy	g	12.1	163	217				no	Water is clear.
PDT	5/23/14 10:00	mw	16.825	0.347	156		pigmy	p	13.0	190	*252*				no	
PDT	7/16/14 15:30	mw	16.820	0.182	81.5		pigmy	p	15.9	202	*248*				yes	reset LL
PDT	8/28/14 15:24	mw	16.800	0.155	69.6		pigmy	p	16.0	188	*230*				no	

Notes:

1) jp = Jason Park, gp = Gustavo Porras, mw = Mark Woyshner

2) NR is not recorded

3) NA or "-" is not applicable

4) Abbreviations: SCT = specific conductance and temperature; DL = datalogger; PT = pressure transducer; HWM = high water mark

Appendix A. Groundwater monitoring observations, water year 2014, Montara Water and Sanitary District, San Mateo County, California

Site Conditions			Water Level		Water Quality Observations				Datalogger	Remarks
Time Zone	Date/Time	Observer(s)	Depth to Water	Groundwater Elevation	Water Temperature	Specific Conductance at field temp.	Specific Conductance at 25C	Samples	Datalogger Downloaded ?	
(PST/PDT)	(mm/dd/yr hr:mn)	(see notes)	(feet)	(ft amsl)	(^{o}C)	(µmhos/cm)	(at 25 ^{o}C)	(see notes)	(Y/N)	
MW-1 (upstream of landslide spring and willow thicket)										
Reference point elevation (ft amsl) = 379.00										
Stickup (feet) = 3.00										
Ground surface elevation (ft amsl) = 376.00										
Depth of well from ground surface (feet) = 30.43										
Depth to Levelogger from RP (feet) = 13.80										
PDT	10/2/13 17:00	mw	17.66	361.34					yes	Relaunched Levelogger.
PST	3/7/14 16:11	gp	9.45	369.55					yes	No re-launch
PDT	7/23/14 16:53	gp	20.83	358.17	13.1	220	284		yes	Relaunched Levelogger.
PDT	8/28/14 13:40	mw	23.83	355.17					no	Lowered LL to 30 ft + 5.5 inches = 30.46 ft from RP
MW-2 (downstream of landslide spring and willow thicket)										
Reference point elevation (ft amsl) = 366.00										
Stickup (feet) = 4.00										
Ground surface elevation (ft amsl) = 362.00										
Depth of well from ground surface (feet) = 12.00										
Depth to Levelogger from RP (feet) = 16.00										
PDT	10/2/13 16:45	mw	11.02	354.98					yes	Relaunched Levelogger.
PST	3/7/14 16:01	gp	7.58	358.42					yes	No relaunch
PDT	7/23/14 16:31	gp	12.52	353.48	14.1	407	511		yes	Relaunched Levelogger at 16:00 PST
PDT	8/28/14 14:19	mw	13.90	352.10					no	
Well 2004-5 (BH-11) (located east of Liccicitos Road, north of Riviera Street)										
Reference point elevation (ft amsl) = 351.00										
Stickup (feet) = 1.00										
Ground surface elevation (ft amsl) = 350.00										
Depth of well from ground surface (feet) = 84.00										
Depth to Levelogger from RP (feet) = 75.00										
PDT	10/2/13 16:30	mw	44.50	306.50					yes	Relaunched Levelogger.
PST	3/7/14 14:44	gp	49.92	301.08					yes	No relaunch
PDT	7/23/14 15:41	gp	52.71	298.29					yes	Relaunched Levelogger at 15:00 PST
PDT	8/28/14 14:19	mw	54.18	296.82					no	

Well 2004-3 (BH-9) (located at the end of Alta Vista Road, upgradient of Alta Vista Well)

Reference point elevation (ft amsl) = 561.60
Stickup (feet) = 1.60
Ground surface elevation (ft amsl) = 560.00
Depth of well from ground surface (feet) = 798.00
Depth to Levelogger from RP (feet) = 313.90

PDT	10/2/13 16:00	mw	249.30	312.30					yes	Did not relaunch Levelogger
PST	3/7/14 14:00	gp	254.52	307.08					yes	Relaunched Levelogger 15:00 PST
PDT	7/23/14 13:55	gp	259.34	302.26					yes	Relaunched Levelogger at 14:00 PST

Well 2004-2 (BH-3) (located on Ocean View Farms at the mouth of Daffodil Canyon)

Reference point elevation (ft amsl) = 100.80
Stickup (feet) = 0.80
Ground surface elevation (ft amsl) = 100.00
Depth of well from ground surface (feet) = 552.00
Depth to Levelogger from RP (feet) = 30.00

PDT	10/2/13 14:50	mw	13.65	87.15					yes	Relaunched Levelogger.
PST	3/7/14 12:18	gp	13.66	87.14					yes	No relaunch
PDT	7/23/14 11:40	gp	13.80	87.00	16.1	286	344		yes	Relaunched Levelogger at 12:00 PST

Notes:

1) jp = Jason Park, gp = Gustavo Porras, mw = Mark Woyshner

2) NR is not recorded

3) NA or "-" is not applicable

4) Abbreviations: SCT = specific conductance and temperature; DL = datalogger; PT = pressure transducer;

Appendix A. Hydrologic monitoring observations, water year 2013, Montara Water and Sanitary District, San Mateo County, California

Site Conditions				Streamflow					Water Quality Observations				High-Water Marks		Datalogger	Remarks
Time Zone (PST/PDT)	Date/Time (mm/dd/yr)	Observer(s) (see notes)	Staff Plate (feet)	Measured Discharge (cfs)	Measured Discharge (gpm)	Estimated Discharge (cfs)	Instrument Used (AA/PY)	Estimated Accuracy (e/g/f/p)	Water Temperature (°C)	Specific Conductance at field temp. (µmhos/cm)	Specific Conductance at 25C (at 25 °C)	Samples (see notes)	Estimated stage at staff plate (feet)	Inferred dates? (mm/dd/yr)	Datalogger Downloaded? (Y/N)	
Montara Creek North Fork at Riviera Road																
PDT	10/26/12 13:30	mw	dry												yes	F15 BSN 1893
PST	12/14/12 13:00	mw	0.45	0.0862	38.7		bucket	g	12.0	160	*218*				no	
PST	3/1/13 16:40	gp	0.31	0.0111	5.0		bucket	g	11.9	138	185				yes	Bypass flow was minimized down to ~0.1gpm. Water is clear.
PDT	4/5/13 17:05	gp	0.30	0.0038	1.7		bucket	g	12.6	117	153				yes	Levelogger is in PST; F15 Bal # 1593, sn 1038046
PDT	4/23/13 13:33	mw	0.29	0.0000012	0.001			g							no	dripping from culvert at approx. 1 drop per 2 seconds
PDT	6/13/13 17:26	mw	0.29	0.00	0		obs	e							no	dry
PDT	8/9/13 16:06	gp	0.20	0.00	0		obs	e							no	dry
PDT	10/2/13 11:00	mw	0.20	0.00	0		obs	e							yes	dry; relaunched Levelogger at 11:00 PST
PST	12/11/13 16:00	gp	0.20	0.00	0		obs	e							yes	dry
Montara Creek above diversion																
PDT	8/9/13 15:15	gp	---	0.09	38.4		tank	g								
PDT	10/2/13 9:30	mw	---	0.07	30.1		tank	g								
PST	12/11/13 15:30	gp	---													No flow measuirement as flashboards are allowing significant flowthough impeding reservoir fillup
Daffodil Canyon at Old San Pedro Road																
PDT	10/26/12 11:00	mw	5.00	0.030	13.5		pigmy	p	12.0	185	*252*				yes	F15 BSN 1892; relaunched levelogger on continuous mode
PST	12/14/12 12:00	mw	5.02	0.063	28.4		pigmy	p	10.0	195	*280*				no	
PST	3/1/13 13:03	gp	5.07	0.018	8.2		bucket	g	11.5	181	243				yes	Bucket measurement at knick point ~215 ft. u/s of gage. Water is clear.
PDT	4/5/13 16:07	gp	5.08	0.020	8.9		bucket	g	13.3	200	257				yes	saa. Levelogger is in PST; Bal #1892, sn 1038044.
PDT	6/13/13 18:37	mw	5.07	0.000	0.0	0			14.1	181	226				no	Q trickle, not measurable
PDT	8/9/13 17:55	gp	5.03	0.013	5.8		bag	f/p	16.9	220	260				no	Baggie measurement at knick point ~215 ft. u/s of gage. Water is clear.
PDT	10/2/13 13:40	mw	5.06	0.013	6.0		bucket	f	13.2	192	253				yes	Relaunched Levelogger
PST	12/11/13 13:38	gp	5.08	0.012	5.3		bucket	f	7.2	171	258				yes	Bucket measurement at knick point ~215 ft. u/s of gage. Water is clear.
Martini Creek above Old San Pedro Road																
PDT	10/26/12 12:15	mw	16.90	0.350	157		pigmy	f	13.0	185	*245*				yes	
PST	12/14/12 13:00	mw	16.92	0.508	228		pigmy	f	10.5	170	*241*				no	
PST	3/1/13 12:28	gp	16.84	0.440	197		pigmy	g	11.5	163	220				yes	Cleared branches hanging over channel to allow measurement in straight, undivided flow. Water is clear.
PDT	4/5/13 15:48	gp	16.87	0.460	206		pigmy	e	13.4	189	242				yes	Water is clear. Levelogger is in PST; Bal# 1890; sn 1038040
PDT	6/13/13 18:12	mw	16.86	0.373	167		pigmy	f	14.2	190	244				no	
PDT	8/9/13 17:42	gp	16.82	0.339	152		pigmy	g	14.1	196	247				no	Water is clear.
PDT	10/2/13 12:30	mw	16.84	0.264	118		pigmy	g	13.0	151	200				yes	Relaunched Levelogger at 12:30 PST
PST	12/11/13 12:18	gp	16.85	0.294	132.0		pigmy	g	8.4	174	255				yes	Water is clear.

Notes:

1) jp = Jason Park, gp = Gustavo Porras, mw = Mark Woyshner

2) NR is not recorded

3) NA or "-" is not applicable

4) Abbreviations: SCT = specific conductance and temperature; DL = datalogger; PT = pressure transducer; HWM = high water mark

Appendix A. Groundwater monitoring observations, water year 2013, Montara Water and Sanitary District, San Mateo County, California

Site Conditions			Water Level		Water Quality Observations				Datalogger	Remarks
Time Zone	Date/Time	Observer(s)	Depth to Water	Groundwater Elevation	Water Temperature	Specific Conductance at field temp.	Specific Conductance at 25C	Samples	Datalogger Downloaded?	
(PST/PDT)	(mm/dd/yr hr:mn)	(see notes)	(feet)	(ft amsl)	(^{o}C)	(µmhos/cm)	(at 25 ^{o}C)	(see notes)	(Y/N)	
MW-1 (upstream of landslide spring and willow thicket)										
	Reference point elevation (ft amsl) =		379.00							
	Stickup (feet) =		3.00							
	Ground surface elevation (ft amsl) =		376.00							
	Depth of well from ground surface (feet) =		30.43							
PDT	10/7/11 17:00	gp	9.16	369.84					yes	
PDT	4/3/12 13:11	mw	4.95	374.05					yes	Replaced old Levelogger (sn 62218) with Balance sn 2011 (sn 0021057496) F15
PDT	6/5/12 12:44	mw	9.19	369.81					yes	downloaded barologger too
PDT	10/26/12 14:00	mw	13.31	365.69					yes	F15 BSN 2011; downloaded barologger BSN 2009
PST	3/1/13 17:25	gp	10.41	368.59	12.6	168	220		yes	Downloaded barologger as well.
PDT	10/2/13 17:00	mw	17.66	361.34					yes	Relaunched Levelogger.
MW-2 (downstream of landslide spring and willow thicket)										
	Reference point elevation (ft amsl) =		366.00							
	Stickup (feet) =		4.00							
	Ground surface elevation (ft amsl) =		362.00							
	Depth of well from ground surface (feet) =		12.00							
PDT	10/7/11 17:20	gp	7.40	358.60					yes	Levelogger on PDT
PDT	4/3/12 12:44	mw	6.49	359.51					yes	Replaced old Levelogger (sn 63850) with Balance sn 2010 (sn 0021057839) F15
PDT	6/5/12 12:30	mw	7.46	358.54					yes	
PDT	10/26/12 14:17	mw	8.36	357.64					yes	F15 BSN 2010
PST	3/1/13 17:11	gp	7.68	358.32	13.0	245	317		yes	
PDT	10/2/13 16:45	mw	11.02	354.98					yes	Relaunched Levelogger.
Well 2004-5 (BH-11) (located east of Liccicitos Road, north of Riviera Street)										
	Reference point elevation (ft amsl) =		351.00							
	Stickup (feet) =		1.00							
	Ground surface elevation (ft amsl) =		350.00							
	Depth of well from ground surface (feet) =		84.00							
PDT	10/7/11 17:32	gp	34.14	316.86					yes	Levelogger on PST
PDT	4/3/12 12:25	mw	33.31	317.69					yes	
PDT	6/5/12 12:09	mw	33.25	317.75					yes	uploaded new firmware and relaunched
PDT	10/26/12 14:25	mw	35.87	315.13					yes	F65 BSN 2167
PST	3/1/13 16:50	gp	38.50	312.50	15.1	393	486		yes	
PDT	10/2/13 16:30	mw	44.50	306.50					yes	Relaunched Levelogger.

Well 2004-3 (BH-9) (located at the end of Alta Vista Road, upgradient of Alta Vista Well)

Reference point elevation (ft amsl) = 561.60
Stickup (feet) = 1.60
Ground surface elevation (ft amsl) = 560.00
Depth of well from ground surface (feet) = 798.00

PDT	10/7/11 17:52	gp	233.10	328.50					yes	Levelogger on PST; downloaded barologger
PDT	4/3/12 10:45	mw	233.30	328.30					yes	Could not connect to Barologger, incompatable version, did not replace it
PDT	6/5/12 9:30	mw	233.20	328.40					yes	
PDT	10/26/12 14:55	mw	236.95	324.65					yes	F100 BSN 2166
PST	3/1/13 15:44	gp	245.20	316.40					yes	
PDT	10/2/13 16:00	mw	249.30	312.30					yes	Did not relaunch Levelogger

Well 2004-2 (BH-3) (located on Ocean View Farms at the mouth of Daffodil Canyon)

Reference point elevation (ft amsl) = 100.80
Stickup (feet) = 0.80
Ground surface elevation (ft amsl) = 100.00
Depth of well from ground surface (feet) = 552.00

PDT	10/7/11 17:52	gp	13.10	87.70					yes	LL = 14:25, PC = 15:11; synchronized time to PC
PDT	4/3/12 10:45	mw	12.42	88.38					yes	Replaced old Levelogger (sn 64272) with Balance sn 1833 (sn 003019270) F30
PDT	6/5/12 14:08	mw	12.37	88.43					yes	
PDT	10/26/12 9:25	mw	13.67	87.13					yes	F30 BSN 1833; top of tape needed repositioning, raised it 0.2 feet
PST	3/1/13 14:25	gp	12.43	88.37	16.0	282	341		yes	
PDT	10/2/13 14:50	mw	13.65	87.15					yes	Relaunched Levelogger.

Notes:

1) jp is Jason Park, tb is Travis Baggett, jm is Jennie Munster, ms is Mark Strudley, mw is Mark Woyshner, gp is Gustavo Porras
2) NR is not recorded
3) NA or "-" is not applicable
4) Abbreviations: SCT = specific conductance and temperature; DL = datalogger; PT = pressure transducer; HWM = high water mark

Appendix A. Hydrologic monitoring observations, water year 2012, Montara Water and Sanitary District, San Mateo County, California

Site Conditions				Streamflow				Water Quality Observations				High-Water Marks		Datalogger	Remarks
Time Zone (PST/PDT)	Date/Time (mm/dd/yr)	Observer(s) (see notes)	Staff Plate (feet)	Measured Discharge (cfs)	Estimated Discharge (cfs)	Instrument Used (AA/PY)	Estimated Accuracy (e/g/f/p)	Water Temperature (°C)	Specific Conductance at field temp. (µmhos/cm)	Specific Conductance at 25C (at 25 °C)	Samples (see notes)	Estimated stage at staff plate (feet)	Inferred dates? (mm/dd/yr)	Datalogger Downloaded? (Y/N)	
Montara Creek North Fork at Riviera Road															
PDT	10/4/11 16:36	gp	0.60	0.14		Qmeter	f	15.0	172	214				yes	
PDT	4/3/12 13:35	mw	0.65	0.26	0.33	pigmy	p							yes	also a bucket test 5 gal in 2 sec
PDT	4/19/12 18:22	gp	0.60	0.46		bucket	p	---	---	---				yes	
PDT	6/5/12 10:00	mw	0.54												roadside vegetation recently cut; gage height prior to entering the channel
PDT	6/5/12 11:00	mw	0.40	0.031		bucket	g	13.5	165	*216*				yes	cleared weed-wacked debris and other garbage from channel; installed sheet metal to culvert for measuring flow with a bucket and stopwatch; levelogger stopped recording on 3/4/12, memory full, though set on continuous; uploaded new firmware and relaunched
PDT	7/10/12 16:00	gp	0.41	0.020		bucket	g	16.0	183	226				no	
PDT	8/8/12 11:17	jp	0.34	0.0005		bucket	g	---	---	---				yes	Stilling well appeared to be clogged with mud and not connected to the water surface. Cleaned and replaced.
PDT	8/8/12 15:22	jp	0.36	0.0006		bucket	g	19.8	200	222				no	Second measurement of the day.
PDT	10/26/12 13:30	mw	dry											yes	F15 BSN 1893
Daffodil Canyon at Old San Pedro Road															
PDT	10/7/11 14:35	gp	0.92	0.02		pigmy	p	13.4	196	252				yes	
PDT	4/3/12 15:30	mw	1.04	0.16		pigmy	p							yes	Levelogger off tape and had to removed staff plate and still well to retrieve; need to re-install
PDT	4/19/12 12:32	gp	5.15	0.25		pigmy	f	13.2	173	224				no	New staff plate and still well installed today on left bank of creek, across from old staff plate. New staff plate range is: 3.33 to 6.66 ft.Levelogger Bal#1892, sn 21038044 launched at 12:00pm PST
PDT	6/5/12 15:40	mw	4.99	0.024		bucket	f	16.0	200	*245*				yes	first measurement since GP installed new staff plate
PDT	7/10/12 15:00	gp	4.99	0.018		bucket	f	13.8	196	249				no	
PDT	10/26/12 11:00	mw	5.00	0.030		pigmy	p	12.0	185	*252*				yes	F15 BSN 1892; relaunched levelogger on continuous mode
PDT	8/8/12 12:30	jp	5.01	0.02		pigmy	f	14.4	179	224					Measued flow approx 30ft upstream of the gage. Xsection is very narrow and shallow. No high water mark visable.
Martini Creek above Old San Pedro Road															
PDT	10/7/11 12:37	gp	16.88	0.50		pigmy	g	12.7	186	243				yes	Water is clear
PDT	6/5/12 15:15	mw	17.23	0.48		pigmy	f							yes	dogwood choking stream downstream of staff plate; debris jam developing amd needs clearing; uploaded new firmware and relaunched
PDT	7/10/12 12:27	gp	17.28	0.64		pigmy	f	12.9	183	237				no	before clearing brush in creek
PDT	7/10/12 12:55	gp	16.95	0.64		pigmy	f							no	after clearing brush in creek
PDT	8/8/12 13:50	jp	16.90	0.51		pigmy	g	14.2	180	228		none visible		yes	Sand is at stage of 16.84 ft on staff plate. Dug out staff plate and stilling well. Cleaned out stilling well and ajusted sensor to rest just above the base of the stilling well rather than on it. Sensor may have been above water at this stage. No high water marks visible.
PDT	10/26/12 12:15	mw	16.90	0.35		pigmy	f	13.0	185	*245*				yes	

Notes:

1) jp = Jason Park, gp = Gustavo Porras, mw = Mark Woyshner

2) NR is not recorded

3) NA or "-" is not applicable

4) Abbreviations: SCT = specific conductance and temperature; DL = datalogger; PT = pressure transducer; HWM = high water mark

Appendix A. Groundwater monitoring observations, water year 2012, Montara Water and Sanitary District, San Mateo County, California

Site Conditions			Water Level		Water Quality Observations				Datalogger	Remarks
Time Zone (PST/PDT)	Date/Time (mm/dd/yr hr:mn)	Observer(s) (see notes)	Depth to Water (feet)	Groundwater Elevation (ft amsl)	Water Temperature (^oC)	Specific Conductance at field temp. (µmhos/cm)	Specific Conductance at 25C (at 25 ^oC)	Samples (see notes)	Datalogger Downloaded? (Y/N)	
MW-1 (upstream of landslide spring and willow thicket)										
Reference point elevation (ft amsl) =			379.00							
Stickup (feet) =			3.00							
Ground surface elevation (ft amsl) =			376.00							
Depth of well from ground surface (feet) =			30.43							
PDT	10/7/11 17:00	gp	9.16	369.84					yes	
PDT	4/3/12 13:11	mw	4.95	374.05					yes	Replaced old Levelogger (sn 62218) with Balance sn 2011 (sn 0021057496) F15
PDT	4/19/12 15:38	gp	4.39	374.61	11.1	151	205		yes	Levelogger was raised 4.0 feet; Barologger installed. Levelogger F15Gold Bal#2011, Baro Bal#2009
PDT	6/5/12 12:44	mw	9.19	369.81					yes	downloaded barologger too
PDT	10/26/12 14:00	mw	13.31	365.69					yes	F15 BSN 2011; downloaded barologger too BSN 2009
MW-2 (downstream of landslide spring and willow thicket)										
Reference point elevation (ft amsl) =			366.00							
Stickup (feet) =			4.00							
Ground surface elevation (ft amsl) =			362.00							
Depth of well from ground surface (feet) =			12.00							
PDT	10/7/11 17:20	gp	7.40	358.60					yes	Levelogger on PDT
PDT	4/3/12 12:44	mw	6.49	359.51					yes	Replaced old Levelogger (sn 63850) with Balance sn 2010 (sn 0021057839) F15
PDT	4/19/12 16:28	gp	6.36	359.64	12.9	156	203		yes	LL Bal#2010
PDT	6/5/12 12:30	mw	7.46	358.54					yes	
PDT	10/26/12 14:17	mw	8.36	357.64					yes	F15 BSN 2010
Well 2004-5 (BH-11) (located east of Liccicitos Road, north of Riviera Street)										
Reference point elevation (ft amsl) =			351.00							
Stickup (feet) =			1.00							
Ground surface elevation (ft amsl) =			350.00							
Depth of well from ground surface (feet) =			84.00							
PDT	10/7/11 17:32	gp	34.14	316.86					yes	Levelogger on PST
PDT	4/3/12 12:25	mw	33.31	317.69					yes	
PDT	4/19/12 16:50	gp	33.30	317.70	15.2	417	513		yes	Levelogger F-65 M20 Gold, Bal#2167, sn 1044975
PDT	6/5/12 12:09	mw	33.25	317.75					yes	uploaded new firmware and relaunched
PDT	10/26/12 14:25	mw	35.87	315.13					yes	F65 BSN 2167

Well 2004-3 (BH-9) (located at the end of Alta Vista Road, upgradient of Alta Vista Well)

Reference point elevation (ft amsl) = 561.60
Stickup (feet) = 1.60
Ground surface elevation (ft amsl) = 560.00
Depth of well from ground surface (feet) = 798.00

PDT	10/7/11 17:52	gp	233.10	328.50					yes	Levelogger on PST; downloaded barologger
PDT	4/3/12 10:45	mw	233.30	328.30					yes	Could not connect to Barologger, incompatable version, did not replace it
PDT	4/19/12 17:18	gp	233.17	328.43					yes	Levelogger was re-launched at18:00 PDT after download.
PDT	6/5/12 9:30	mw	233.20	328.40					yes	
PDT	10/26/12 14:55	mw	236.95	324.65					yes	F100 BSN 2166

Well 2004-2 (BH-3) (located on Ocean View Farms at the mouth of Daffodil Canyon)

Reference point elevation (ft amsl) = 100.80
Stickup (feet) = 0.80
Ground surface elevation (ft amsl) = 100.00
Depth of well from ground surface (feet) = 552.00

PDT	10/7/11 17:52	gp	13.10	87.70					yes	LL = 14:25, PC = 15:11; synchronized time to PC
PDT	4/3/12 10:45	mw	12.42	88.38					yes	Replaced old Levelogger (sn 64272) with Balance sn 1833 (sn 003019270) F30
PDT	4/19/12 14:10	gp	12.07	88.73	15.3	278	342		yes	O-ring in good condition
PDT	6/5/12 14:08	mw	12.37	88.43					yes	
PDT	10/26/12 9:25	mw	13.67	87.13					yes	F30 BSN 1833; top of tape needed repositioning, raised it 0.2 feet

Notes:

1) jp is Jason Park, tb is Travis Baggett, jm is Jennie Munster, ms is Mark Strudley, mw is Mark Woyshner, gp is Gustavo Porras

2) NR is not recorded

3) NA or "-" is not applicable

4) Abbreviations: SCT = specific conductance and temperature; DL = datalogger; PT = pressure transducer; HWM = high water mark

Appendix A. Hydrologic monitoring observations, water year 2011, Montara Water and Sanitary District, San Mateo County, California

Site Conditions				Streamflow				Water Quality Observations				High-Water Marks		Datalogger	Remarks
Time Zone (PST/PDT)	Date/Time (mm/dd/yr)	Observer(s) (see notes)	Staff Plate (feet)	Measured Discharge (cfs)	Estimated Discharge (cfs)	Instrument Used (AA/PY)	Estimated Accuracy (e/g/f/p)	Water Temperature (°C)	Specific Conductance at field temp. (µmhos/cm)	Specific Conductance at 25C (at 25 °C)	Samples (see notes)	Estimated stage at staff plate (feet)	Inferred dates? (mm/dd/yr)	Datalogger Downloaded? (Y/N)	
Montara Creek North Fork at Riviera Road															
PDT	10/18/10 12:15	gp	dry	0.000		pigmy	f					none			Channel is dry with no evidence of recent flow. Dry soil up to 0.6 in staff plate.
PST	1/12/11 11:09	jp	0.575	0.244											
PST	2/9/11 16:43	gp	0.420	0.019		bucket	f	11.0	188	256				yes	8.7 gpm
PDT	3/24/11 13:20	gp, tlb	0.930	1.840		pigmy	f	11.2	151	204				no	Qmeas u/s of culvert
PDT	4/1/11 14:35	gp	0.750	0.578											
PDT	5/5/11 14:30	gp	0.760	0.578											
PDT	7/13/11 13:20	tb	0.640	0.123		pigmy								?	
PDT	10/7/11 16:36	gp	0.600	0.138		pigmy	f	15.0	172	214				yes	
Daffodil Canyon at Old San Pedro Road															
PDT	10/18/10 17:00	gp	0.980	0.008		bucket	g								
PST	1/12/11 9:59	jp	0.985	0.143											LL was reset to PST
PST	2/9/11 15:49	gp	0.960	0.019										yes	Creek has incised at least 6 inches since last GP visit on 10/18/10
PDT	3/24/11 12:10	gp, tlb	1.710	2.610		AA	f	10.7	126	173				no	
PDT	4/1/11 15:51	gp	1.100	0.378											
PDT	5/5/11 12:55	gp	0.930	0.026		pigmy	f	11.7	187	251				yes	
PDT	10/7/11 14:35	gp	0.920	0.020		pigmy	p	13.4	196	252				yes	
Martini Creek above Old San Pedro Road															
PDT	10/18/10 16:05	gp	16.730	0.310		pigmy	g	13.1	183	237				yes	No leaf dams, water is clear.
PST	1/11/11 10:33	jp	16.890	0.850		pigmy	g	10.0	182	253				yes	Turbulent flow lines
PST	1/12/11 8:47	jp	16.900											no	No Q measurement
PST	2/9/11 13:05	gp	16.800	0.470				9.5	171	243				no	SCT BSN1260; water is clear, no well defined HMW
PDT	3/21/11 9:00	gp, jk	17.230	2.770											
PDT	3/24/11 11:00	gp, tlb	17.380	4.684		AA	g	10.8	148	203				no	Water is turbid.
PDT	4/1/11 16:49	gp	17.180	2.180		AA	g								
PDT	5/5/11 11:28	gp	16.960	1.136		pigmy	g	12.1	159	211				yes	Water is clear
PDT	7/13/11 14:55	tb	16.885	0.700		pigmy								?	
PDT	10/7/11 12:37	gp	16.880	0.500		pigmy	g	12.7	186	243				yes	Water is clear

Notes:

1) jp is Jason Park, tb is Travis Baggett, jm is Jennie Munster, ms is Mark Strudley, mw is Mark Woyshner, gp is Gustavo Porras

2) NR is not recorded

3) NA or "-" is not applicable

4) Abbreviations: SCT = specific conductance and temperature; DL = datalogger; PT = pressure transducer; HWM = high water mark

Appendix A. Groundwater monitoring observations, water year 2011, Montara Water and Sanitary District, San Mateo County, California

Site Conditions			Water Level		Water Quality Observations				Datalogger	Remarks
Time Zone (PST/PDT)	Date/Time (mm/dd/yr hr:mn)	Observer(s) (see notes)	Depth to Water (feet)	Groundwater Elevation (ft amsl)	Water Temperature (^{o}C)	Specific Conductance at field temp. (µmhos/cm)	Specific Conductance at 25C (at 25 ^{o}C)	Samples (see notes)	Datalogger Downloaded? (Y/N)	
MW-1 (upstream of landslide spring and willow thicket)										
Reference point elevation (ft amsl) =			379.00							
Stickup (feet) =			3.00							
Ground surface elevation (ft amsl) =			376.00							
Depth of well from ground surface (feet) =			30.43							
PDT	10/18/10 11:08	gp	15.10	363.90						
PST	2/9/11 16:59	gp	9.81	369.19					yes	LL time = 17:27; obs time = 17:01 LL was restarted after downloading data
PDT	10/7/11 17:00	gp	9.16	369.84					yes	
MW-2 (downstream of landslide spring and willow thicket)										
Reference point elevation (ft amsl) =			366.00							
Stickup (feet) =			4.00							
Ground surface elevation (ft amsl) =			362.00							
Depth of well from ground surface (feet) =			12.00							
PDT	10/18/10 11:36	gp	9.38	356.62						
PST	2/9/11 17:12	gp	7.62	358.38					yes	LL time = 17:56; obs time = 17:14 LL was restarted after downloading data
PDT	10/7/11 17:20	gp	7.40	358.60					yes	Levelogger on PDT
Well 2004-5 (BH-11) (located east of Liccicitos Road, north of Riviera Street)										
Reference point elevation (ft amsl) =			351.00							
Stickup (feet) =			1.00							
Ground surface elevation (ft amsl) =			350.00							
Depth of well from ground surface (feet) =			84.00							
PDT	10/18/10 11:50	gp	38.15	312.85						
PST	2/9/11 17:21	gp	38.33	312.67					yes	
PDT	10/7/11 17:32	gp	34.14	316.86					yes	Levelogger on PST

Well 2004-3 (BH-9) (located at the end of Alta Vista Road, upgradient of Alta Vista Well)

Reference point elevation (ft amsl) = 561.60
Stickup (feet) = 1.60
Ground surface elevation (ft amsl) = 560.00
Depth of well from ground surface (feet) = 798.00

PDT	10/18/10 10:39	gp	239.04	322.56						Levelogger rope tangled that kept LL from reaching total rope length by approx. 10 feet.
PST	2/9/11 17:39	gp	239.00	322.60					yes	Barologger was relaunched starting at 18:00
PDT	10/7/11 17:52	gp	233.10	328.50					yes	Levelogger on PST; downloaded barologger

Well 2004-2 (BH-3) (located on Ocean View Farms at the mouth of Daffodil Canyon)

Reference point elevation (ft amsl) = 100.80
Stickup (feet) = 0.80
Ground surface elevation (ft amsl) = 100.00
Depth of well from ground surface (feet) = 552.00

PDT	10/5/10 17:26	gp	13.78	87.02						
PST	2/9/11 16:08	gp	12.56	88.24					yes	
PDT	10/7/11 17:52	gp	13.10	87.70					yes	LL = 14:25, PC = 15:11; synchronized time to PC

Notes:

1) jp is Jason Park, tb is Travis Baggett, jm is Jennie Munster, ms is Mark Strudley, mw is Mark Woyshner, gp is Gustavo Porras
2) NR is not recorded
3) NA or "-" is not applicable
4) Abbreviations: SCT = specific conductance and temperature; DL = datalogger; PT = pressure transducer; HWM = high water mark

Appendix A. Hydrologic monitoring observations, water years 2008 through 2010, Montara Water and Sanitary District, San Mateo County, California

Site Conditions					Streamflow					Water Quality Observations				High-Water Marks		Datalogger	Remarks
Time Zone	Date/Time	Observer(s)	Staff Plate	Hydrograph	Measured Discharge	Estimated Discharge	Instrument Used	Estimated Accuracy		Water Temperature	Specific Conductance at field temp.	Specific Conductance at 25C	Samples	Estimated stage at staff plate	Inferred dates?	Datalogger Downloaded?	
(PST/PDT)	(mm/dd/yr)	(see notes)	(feet)	(R/F/S/B)	(cfs)	(gpm)	(cfs)	(AA/PY)	(e/g/f/p)	(° C)	(µmhos/cm)	(at 25 ° C)	(see notes)	(feet)	(mm/dd/yr)	(Y/N)	
Montara Creek North Fork at Riviera Road																	
	11/9/07 10:47	jp	0.42		0.006	2.7		bucket	f	15.8	229	274	---	---	---	Y	Cleaned stilling well; area upstream of culvert is almost all very fine sediment due to vegetation overgrowth.
	12/28/07 11:30	jp	0.42		0.086	38.6		bucket	f	10.7	196	276	---	---	---	Y	Cleared sediment from around stilling well.
	1/9/08 16:24	jp	0.44		0.219	98.3		bucket	f	11.8	191	255	---	---	---		
	1/14/08 12:00	jp	0.44		0.175	78.5		bucket	f	12.1	188	250	---	---	---	Y	
	1/14/08 12:15	jp	0.42		0.180	80.8		bucket	f	12.1	188	250	---	---	---		
	2/7/08 16:31	gp	0.51		0.715	320.9		bucket	f	11.1	167	231	---	---	---	Y	
	4/9/08 16:00	gp	0.30		0.009	4.0		bucket	f	12.1	156.0	209	---	---	---	Y	
PDT	5/22/08 14:35	gp	0.28		0.009	4.0		bucket	g	---	---	---	---	---	---	Y	
	4/14/09 12:00	mw	0.53		0.016	7.3		bucket	g	---	---	---	---	---	---		
	4/15/09 11:00	mw	0.51		0.014	6.5		bucket	g	13.0	185.0	245	---	---	---		
PDT	10/8/09 15:45	jp	0.28		0.000	0.0		---	---	---	---	---	---	---	---		dry
PST	11/5/09 10:44	jp	0.28		0.000	0.0		---	---	---	---	---	---	---	---		dry
PST	12/3/09 11:27	jp	0.28		0.000	0.0		---	---	---	---	---	---	---	---		dry
PST	1/8/10 8:52	jp	0.28		0.000	0.0		---	---	---	---	---	---	---	---		dry
	3/5/10 16:24	jp	1.00					PY	g								Road runoff channeled into gage
PDT	5/12/10 10:43	gp	0.94		0.053	23.8											Leaf dams cleared after this gage reading
PDT	5/12/10 11:02	gp	0.77		0.053	23.8											Q meas after leaf dams cleared and Q stabilized
Daffodil Canyon at Old San Pedro Road																	
	11/9/07 14:00	jp	0.59		0.052	23.3		PY		13.4	160	206	---	---	---	Y	Relaunched levelogger; old gage.
	11/13/07 12:50	jp	0.64		0.038	17.1		PY		13.6	189	241	---	---	---		b, old gage
	11/13/07 13:45	jp	0.78		0.026	11.7		PY		13.6	189	241	---	---	---		b, new gage location
	12/28/07 12:40	jp	0.82		0.096	43.1		PY		8.9	174	251	---	---	---	Y	Cleaned leaf dam downstream
	1/14/08 13:35	jp	0.92		0.173	77.6		PY	f	11.0	183	250	---	---	---		
	2/11/08 14:45	gp	0.50		0.304	136.4		PY	f,g	11.3	158	214	---	---	---		Water is milky brown, turbid
	4/20/08 18:00	gp	0.28		0.031	13.9		PY	f,g	10.3	171	238	---	---	---	N	Water is turbid, green
	5/22/08 16:44	gp	0.30		0.015	6.7	-	bucket	g	12.7	192	250	---	---	---	---	Installed Levelogger
	7/9/08 13:55	jp	0.31		0.025	11.2											
	11/7/08 14:48		0.35		0.017	7.6											
	4/14/09 13:30	mw	0.38		0.012	5.4		bucket	g	---	---	---	---	---	---	N	
	4/15/09 12:00	mw	0.86		0.030	13.5		bucket	g	---	---	---	---	---	---	N	Installed Levelogger
	9/22/09 13:37	tb	0.90		---		0.02	visual	f	---	---	---	---	---	---	N	No good place for a pygmy flow meter measurement. Flow estimated, will need a bucket and pvc or a weir.
PDT	10/8/09 15:00	jp, tb	0.85		0.017	7.6	-	bucket	g	---	---	---	---	---	---	N	Placed a pvc pipe upstream of the gage and sealed with bentonite for better flow measurements.
PDT	10/9/09 11:55	jp	0.87		0.021	9.4	-	bucket	g	---	---	---	---	---	---	Y	PVC drain looks to be holding up and not leaking.
PST	11/5/09 9:06	jp	0.91		0.023	10.3	-	bucket	g	13.6	204	261	---	---	---	Y	Could not see high water mark. Cleared some leaves form downstream to see if there was water impounded. There looks to be something back watering the site from constrictions downstream that I cant get to.
PST	12/3/09 11:00	jp	0.89		0.025	11.2	-	bucket	g	8.6	170	249	---	---	---	Y	Cleared some debris from behind the pvc. Site still looks back watered.
	3/5/10 17:18	jp	1.28				1.00	est.	g	---	---	---	---	---	---		
PDT	5/4/10 17:30	gp	0.94		0.044	19.7											

Site Conditions					Streamflow					Water Quality Observations				High-Water Marks		Datalogger	Remarks
Time Zone	Date/Time	Observer(s)	Staff Plate	Hydrograph	Measured Discharge	Estimated Discharge	Instrument Used	Estimated Accuracy		Water Temperature	Specific Conductance at field temp.	Specific Conductance at 25C	Samples	Estimated stage at staff plate	Inferred dates?	Datalogger Downloaded?	
(PST/PDT)	(mm/dd/yr)	(see notes)	(feet)	(R/F/S/B)	(cfs)	(gpm)	(cfs)	(AA/PY)	(e/g/f/p)	(° C)	(µmhos/cm)	(at 25 ° C)	(see notes)	(feet)	(mm/dd/yr)	(Y/N)	
Martini Creek above Old San Pedro Road																	
	11/9/07 15:15	jp	0.45		0.38	170.5		PY	f	13.4	190	244	---			Y	Lots of crossing flow lines and shallow high velocity verticals
	12/20/07 16:45	jo	0.50		0.46	206.4											
	1/9/08 15:30	jp	0.46		0.61	273.8		PY	g	11.2	176	242					
	2/5/08 18:25	gp	0.52		2.17	973.9		AA	f,g	10.8	158	218		1.45	2/3/2008		
	4/20/08 16:45	gp	0.32		0.50	224.4		PY	f,g	10.7	166	229				Y	
	5/22/08 16:09	gp	0.32		na	na	---	---	---	---	---	---	---	---	---	Y	
	4/14/09 15:30	mw	16.83		0.42	188.5											Removed CSI datalogger, Druck PTs, solar panel, and long staff plate (0-6.66 ft)
PDT	10/8/09 12:00	jp	16.76		0.33	148.1	-	py	g	---	---	---	---			N	Old staff plate readings = New -16.32. Installed Solinst Levelogger and stilling well today. No high water mark available. Good linear flow cross section available.
PST	11/5/09 10:00	jp	16.77		0.23	103.2	-	py	g	13.7	193	246	---			Y	Good cross section with parallel flow lines. Pressure transducer is in about 0.2 to 0.3 ft. Base of staff plate is at 16.66. Zero flow is at approximately 16.4 ft - just below the staff plate.
PST	12/3/09 9:53	jp	16.80		0.26	116.7	-	py	g	8.4	167	245	---			Y	Good cross section with parallel flow lines. Pressure transducer is in about 0.2 to 0.3 ft. Base of staff plate is at 16.66. Zero flow is at approximately 16.4 ft - just below the staff plate.
PST	1/8/10 11:00	jp	16.81		0.26	116.7	-	py	g	11.6	189	253	---			Y	No leaf dams, cleaned and lowered stilling well at 11:26 stage did not change.
PDT	5/12/10 13:00	gp	16.81		0.40	179.5											

Notes:

1) jp is Jason Park, tb is Travis Baggett, jm is Jennie Munster, ms is Mark Strudley, mw is Mark Woyshner, gp is Gustavo Porras

2) NR is not recorded

3) NA or "-" is not applicable

4) Abbreviations: SCT = specific conductance and temperature; DL = datalogger; PT = pressure transducer; HWM = high water mark

Appendix A. Groundwater monitoring observations, water years 2008-10, Montara Water and Sanitary District, San Mateo County, California

Site Conditions			Water Level		Water Quality Observations				Datalogger	Remarks
Time Zone (PST/PDT)	Date/Time (mm/dd/yr hr:mn)	Observer(s) (see notes)	Depth to Water (feet)	Groundwater Elevation (ft amsl)	Water Temperature (^{o}C)	Specific Conductance at field temp. (µmhos/cm)	Specific Conductance at 25C (at 25 ^{o}C)	Samples (see notes)	Datalogger Downloaded? (Y/N)	
MW-1 (upstream of landslide spring and willow thicket)										
Reference point elevation (ft amsl) =	379.00									
Stickup (feet) =	3.00									
Ground surface elevation (ft amsl) =	376.00									
Depth of well from ground surface (feet) =	30.43									
	9/12/07 15:07	jp	13.95	365.05						
	11/9/07 12:14	jp	10.41	368.59						
	1/9/08 16:54	jp	5.61	373.39						
	2/7/08 15:15	gp	4.14	374.86						
	4/9/08 15:14	gp	9.48	369.52						
	5/22/08 15:04	gp	11.51	367.49						
	7/9/08 12:43	jp	12.07	366.93						
	11/7/08 12:40	jp	15.00	364.00						
	2/25/10 16:03	jp	7.68	371.32						
	5/12/10 9:13	gp	9.13	369.87						
PDT	10/18/10 11:08	gp	15.10	363.90						
PST	2/9/11 16:59	gp	9.81	369.19					yes	LL time = 17:27; obs time = 17:01 LL was restarted after downloading data
PDT	10/7/11 17:00	gp	9.16	369.84					yes	

MW-2 (downstream of landslide spring and willow thicket)

Reference point elevation (ft amsl) = 366.00
Stickup (feet) = 4.00
Ground surface elevation (ft amsl) = 362.00
Depth of well from ground surface (feet) = 12.00

Site Conditions			Water Level		Water Quality Observations				Datalogger	Remarks
Time Zone (PST/PDT)	Date/Time (mm/dd/yr hr:mn)	Observer(s) (see notes)	Depth to Water (feet)	Groundwater Elevation (ft amsl)	Water Temperature (^{o}C)	Specific Conductance at field temp. (µmhos/cm)	Specific Conductance at 25C (at 25 ^{o}C)	Samples (see notes)	Datalogger Downloaded? (Y/N)	
	6/28/07 12:46	jp	7.60	358.40						
	8/6/07 12:45	jp	7.66	358.34						
	8/7/07 15:32	jp	7.80	358.20						
	9/12/07 15:02	jp	8.04	357.96						
	11/9/07 11:58	jp	7.58	358.42						
	1/9/08 16:38	jp	5.77	360.23						
	2/7/08 15:50	gp	5.66	360.34						
	4/9/08 15:35	gp	7.00	359.00						
	5/22/08 15:20	gp	8.02	357.98						
	7/9/08 12:24	jp	8.11	357.89						
	11/7/08 12:05	jp	9.58	356.42						
	2/25/10 15:45	jp	7.10	358.90						
	5/12/10 10:02	gp	7.49	358.51						
PDT	10/18/10 11:36	gp	9.38	356.62						
PST	2/9/11 17:12	gp	7.62	358.38					yes	LL time = 17:56; obs time = 17:14 LL was restarted after downloading data
PDT	10/7/11 17:20	gp	7.40	358.60					yes	Levelogger on PDT

Site Conditions			Water Level		Water Quality Observations				Datalogger	Remarks
Time Zone	Date/Time	Observer(s)	Depth to Water	Groundwater Elevation	Water Temperature	Specific Conductance at field temp.	Specific Conductance at 25C	Samples	Datalogger Downloaded?	
(PST/PDT)	(mm/dd/yr hr:mn)	(see notes)	(feet)	(ft amsl)	(^{o}C)	(µmhos/cm)	(at 25 ^{o}C)	(see notes)	(Y/N)	

Well 2004-5 (BH-11) (located east of Liccicitos Road, north of Riviera Street)

Reference point elevation (ft amsl) = 351.00
Stickup (feet) = 1.00
Ground surface elevation (ft amsl) = 350.00
Depth of well from ground surface (feet) = 84.00

	6/28/07 12:18	jp	13.90	337.10						
	8/7/07 15:18	jp	14.45	336.55						
	9/12/07 15:32	jp	15.00	336.00						
	11/9/07 11:43	jp	16.91	334.09						
	1/14/08 12:30	jp	19.49	331.51						
	2/7/08 16:09	gp	20.22	330.78						
	4/9/08 15:48	gp	22.14	328.86						
	7/9/08 12:11	jp	25.25	325.75						
	11/7/08 11:52	jp	28.72	322.28						
	10/9/09 14:49	jp	36.06	314.94						
	2/25/10 15:02	jp	38.06	312.94						Replaced F30 #1825 with F65 #2167
	5/12/10 10:24	gp	36.00	315.00						
PDT	10/18/10 11:50	gp	38.15	312.85						
PST	2/9/11 17:21	gp	38.33	312.67					yes	
PDT	10/7/11 17:32	gp	34.14	316.86					yes	Levelogger on PST

Site Conditions			Water Level		Water Quality Observations				Datalogger	Remarks
Time Zone (PST/PDT)	Date/Time (mm/dd/yr hr:mn)	Observer(s) (see notes)	Depth to Water (feet)	Groundwater Elevation (ft amsl)	Water Temperature (^{o}C)	Specific Conductance at field temp. (µmhos/cm)	Specific Conductance at 25C (at 25 ^{o}C)	Samples (see notes)	Datalogger Downloaded? (Y/N)	
Well 2004-3 (BH-9) (located at the end of Alta Vista Road, upgradient of Alta Vista Well)										
	Reference point elevation (ft amsl) = 561.60									
	Stickup (feet) = 1.60									
	Ground surface elevation (ft amsl) = 560.00									
	Depth of well from ground surface (feet) = 798.00									
	6/28/07 15:23	jp	214.36	347.24						
	8/7/07 17:00	jp	214.54	347.06						
	9/12/07 16:10	gp	214.89	346.71						
	11/13/07 16:30	jp	218.48	343.12						
	1/9/08 17:14	jp	221.10	340.50						
	2/5/08 13:15	gp	223.25	338.35						
	4/9/08 12:10	gp	224.85	336.75						
	5/22/08 13:10	gp	226.42	335.18						
	7/9/08 13:03	jp	228.15	333.45						
	11/7/08 12:55	jp	231.45	330.15						
	3/5/10 14:25	jp	239.24	322.36						
	5/12/10 8:25	gp	234.08	327.52						
PDT	10/18/10 10:39	gp	239.04	322.56						Levelogger rope tangled that kept LL from reaching total rope length by approx. 10 feet.
PST	2/9/11 17:39	gp	239.00	322.60					yes	Barologger was relaunched starting at 18:00
PDT	10/7/11 17:52	gp	233.10	328.50					yes	Levelogger on PST; downloaded barologger

Site Conditions			Water Level		Water Quality Observations				Datalogger	Remarks
Time Zone (PST/PDT)	Date/Time (mm/dd/yr hr:mn)	Observer(s) (see notes)	Depth to Water (feet)	Groundwater Elevation (ft amsl)	Water Temperature (^{o}C)	Specific Conductance at field temp. (µmhos/cm)	Specific Conductance at 25C (at 25 ^{o}C)	Samples (see notes)	Datalogger Downloaded? (Y/N)	
Well 2004-2 (BH-3) (located on Ocean View Farms at the mouth of Daffodil Canyon)										
Reference point elevation (ft amsl) = 100.80										
Stickup (feet) = 0.80										
Ground surface elevation (ft amsl) = 100.00										
Depth of well from ground surface (feet) = 552.00										
	6/28/07 17:22	jp	5.96	94.84						
	9/12/07 11:55	gp,mw	6.76	94.04						
	11/9/07 13:32	jp	6.79	94.01						
	12/28/07 13:08	jp	7.50	93.30						
	1/14/08 13:57	jp	7.29	93.51						
	2/5/08 17:05	gp	6.94	93.86						
	4/20/08 15:46	gp	8.21	92.59						
	5/22/08 17:15	gp	8.94	91.86						
	7/9/08 13:39	jp	10.05	90.75						
	11/7/08 13:40	jp	12.31	88.49						
	2/25/10 17:01	jp	12.52	88.28						
	5/4/10 11:27	gp	11.70	89.10						
PDT	10/5/10 17:26	gp	13.78	87.02						
PST	2/9/11 16:08	gp	12.56	88.24					yes	
PDT	10/7/11 17:52	gp	13.10	87.70					yes	LL = 14:25, PC = 15:11; synchronized time to PC
Well 2004-1 (BH-1)										
Reference point elevation (ft amsl) = 61.00										
Stickup (feet) = 1.00										
Ground surface elevation (ft amsl) = 60.00										
Depth of well from ground surface (feet) = 215.00										
	8/25/09 8:53	jp	29.70	31.30						
	10/9/09 11:19	jp	30.10	30.90						
	2/25/10 16:35	jp	27.89	33.11						
	5/4/10 11:27	gp	27.98	33.02						
PDT	10/18/10 17:34	gp	30.04	30.96						
PST	2/9/11 16:12	gp	28.06	32.94					yes	
PDT	10/7/11 15:25	gp	29.64	31.36					yes	Levelogger on PST

Notes:

1) jp is Jason Park, tb is Travis Baggett, jm is Jennie Munster, ms is Mark Strudley, mw is Mark Woyshner, gp is Gustavo Porras

2) NR is not recorded

3) NA or "-" is not applicable

Appendix A. Hydrologic monitoring observations, water year 2004 through 2007, Montara Water and Sanitary District, San Mateo County, California

Site Conditions				Streamflow				Water Quality Observations				High-Water Marks		Remarks
Date/Time (mm/dd/yr hh:mm)	Observer	Stage (feet)	Hydrograph (R/F/S/B)	Measured Discharge (cfs)	Estimated Discharge (cfs)	Instrument Used (AA/PY)	Estimated Accuracy (e/g/f/p)	Water Temperature (oC)	Field Specific Conductance (µmhos/cm)	Adjusted Specific Conductance (at 25 oC)	Additional sampling? (Qbed, etc.)	Estimated stage at staff plate (feet)	Inferred dates? (mm/dd/yr)	
Montara Creek North Fork at Riviera Road														
3/8/2005 13:06	jp	na	b	0.063		py		14.0	184					us of wetland
3/8/2005 13:30	jp	na	b	0.317		py		13.2	177	229	n			ds of wetland
3/8/2005 14:05	jp	na	b	0.052		py		14.4	186	232	n			us of wetland
3/8/2005 15:05	jp	na	b	0.279		py		14.8	168	209	n			at diversion - diverted water would stop about every 15 min and flow down creek
2/28/2006 12:30	jp	na			150-170 gpm	visual		12.0	156	208	n			
4/11/2006 9:57	jp	na			180-200 gpm	visual		12.2	155	206	n			
5/1/2006 10:45	jp	na			175-200 gpm	visual		12.8	149	194	n			
6/2/2006 15:10	jp	na			200-250 gpm	visual		15.0	153	189	n			water is clear
8/10/2006 18:30	jp	na			30 to 40 gpm	visual		16.6	163	207	n			water is clear
10/5/2006	jp	na			not done			na						brush was very thick - needs machete
11/9/2006	jp	na			not done			na						brush was very thick - needs machete
3/23/2007 13:40	jp	na	b		50-60 gpm	visual	g	12.2	267	358				
5/10/2007 14:45	jp	na	b		15.07	bucket	g	13.5	198					
Daffodil Canyon at Old San Pedro Road														
3/3/2005 16:02	jp	na	b	0.761		py	g/f	12.8	161	214				
4/4/2005 12:00	jp	na	b		0.334	visual	f	11.9	165	225				
4/28/2005 12:30	jp	na	b		0.223	visual	f	13.1	120	159				
5/25/2005 14:10	jp	na	b		0.067	visual	f	14.6	201	255				
8/2/2005 16:45	jp	na	b		0.071	float	f	14.6	209	265				
9/9/2005 14:05	jp	na	b		0.062	visual	f	14.3	210	268				
10/6/2005	jp	na	b	0.0414		bucket	e	12.9	182	242				
11/8/2005 16:15	jp	na	b	0.0512		bucket	e	13.3	215	283				
12/8/2005 16:00	jp	na	b	0.048		bucket	e	11.7	197	270				
2/28/2006 14:50	jp	na	b	0.308		py	g	12.2	160	217				
4/11/2006 11:42	jp	na	b	0.578		py	g	12.1	188	255				water was murky and turbid
5/1/2006 13:42	jp	na	b	0.189		py	g	13.2	159	210				water was fairly clear
6/2/2006 16:50	jp	na	b	0.0904		py	g	15	191	239				water was fairly clear
7/6/2006 14:48	jp	na	b	0.149		py	g	14.9	207	261				water was fairly clear
8/10/2006 18:30	jp	na	b	0.05		py	g	14.9	215	271				water was fairly clear
9/12/2006 14:45	gp	na	b	0.077		py	f	na	na	na				
10/5/2006 14:15	jp	na	b	0.045		py	g	14.2	219	274				
11/9/2006 15:55	jp	na	b	0.051		py	g	12.8	206	269				
1/19/2007 15:41	jp	na	b	0.046		py	g	8.8	183	264				
2/15/2007 17:24	jp	na	b	0.179		py	g	11.8	210	286				water has a slight milky look
3/23/2007 14:40	jp	na	b	0.095		py	g	13.5	188					hwm is approx. 0.5 ft above water level
5/10/2007 15:34	jp	na	b	0.056		py	g	12.5	188					
Martini Creek above Old San Pedro Road														
11/11/2003 17:30	mw	0.3	B											installed staff plate and data logger, adjusted stage offset, downloaded rain gage at ranger house, installed rain gage at divide
11/20/2003 12:45	mw	0.29	B	0.31		PY	F							downloaded data and adjusted stage offset

Site Conditions				Streamflow				Water Quality Observations				High-Water Marks		Remarks
Date/Time (mm/dd/yr hh:mm)	Observer	Stage (feet)	Hydrograph (R/F/S/B)	Measured Discharge (cfs)	Estimated Discharge (cfs)	Instrument Used (AA/PY)	Estimated Accuracy (e/g/f/p)	Water Temperature (oC)	Field Specific Conductance (µmhos/cm)	Adjusted Specific Conductance (at 25 oC)	Additional sampling? (Qbed, etc.)	Estimated stage at staff plate (feet)	Inferred dates? (mm/dd/yr)	
1/7/2004 18:00	mw	0.29	F	0.66		PY	F					0.55		gage vandalized on 11/24/03 14:30; had to remove sediment at staff plate to take reading
1/13/2004 15:30	mw	0.65	B	0.8		PY	G	12.0	180	245				reinstalled staff plate and still well; stage shift
1/16/2004 15:30	jp, mw	0.64	B											see jp's notes
1/17/2004 15:30	mw	0.64	B											downloaded data, adjusted stage offset, reprogrammed SC, now working
1/21/2004 13:40	jp	0.585	B	0.603		PY	G	12.0	181					good xsection
1/27/2004 13:00	jp	0.585	B			PY		11.9	183					Q not measured since it was the same stage as 1/21/04
2/6/2004 15:25	gp	0.575	B	0.59		PY	G	12.0	185	247		1.1	2/2/04	2.5' seasonal HWM, right bank is undercut approx. 1inch
2/13/2004 14:38	jp	0.56	B	0.593		PY	G	11.3	182	247				
2/25/2004 19:00	jp	0.65	F	2.11		PY	F	12.5	170			0.98	2/25/04	storm monitoring, step water level surface across staff plate
3/2/2004 9:30	jp	0.593	B	1.536		PY	B	11.3	176			1	2/25/04	removed debris against staff plate & stage rose
3/19/2004 16:20	jp	0.51	B	0.812		PY	G/F	14.0	188	242		--	--	
3/25/2004 12:36	jp	0.5	B	0.77		PY	G					--	--	took repeat measurements for QA
3/30/2004 12:42	jp, mw	0.47	B	0.616		PY	G/F	13.0	175			--	--	
4/14/2004 14:25	jp	0.48	B	0.583		PY	G/F	12.9	185	240		--	--	
4/27/2004 14:25	mw	0.48	B	0.38		PY								downloaded data; half through mmnt turbid from truck upstream
5/6/2004 12:15	jp	0.485	B	0.81		PY	G/F	13.1	186	240		0.53	diurnal HWM?	bath tub ring at 0.53' on staff plate - easily whipped off, sediment at 0.2', water surface piling US of PT is at 0.53' see drawing on Q form
5/13/2004 12:15	mw	0.47	B	0.54		PY	G	13.0	175	232		0.52		downloaded data; cleaned HWM from staff plate
5/14/2004 11:26	jp	0.482	B	0.682		PY	G	13.2	186	241		0.53	diurnal HWM?	flume measured approx. 0.5 cfs but not sure accuracy since the lower staff divided by the upper was 0.57 and should not be more than 0.5 according to manufacturer, Hydraulic jump from US PT 0.53' to .048' on our staff plate
5/20/2004 12:07	jp	0.465	B	0.513		PY	G	12.9	186	242		0.519	diurnal HWM?	sediment still at 0.2 on staff plate, hydraulic jump from US PT 0.52 to 0.465'
6/2/2004 14:45	gp	0.47	B	0.47		PY	G	13.1	188	244				downloaded data
6/10/2004 16:20	gp	0.47	B	0.55		PY	G	13.5	186	238		0.6	since last week	downloaded data stage between 0.48 at 16:20 and 0.45 at 16:51
6/23/2004 14:07	jp	0.422	B	0.343		PY	G	--	--	--		0.48	since 6/10/04	removed small stick from in front of PT and stage rose from .42 to .43 Used all surface measurements since headphones not working
7/9/2004 10:23	jp	0.44	B	0.432		PY	G	13.7	185	236		0.48	since 6/23/04	stage measured through day to see if PT record of flux is real or temperature related. Scum on staff plate is well defined and easily wiped off - between 0.48 and 0.5 Did a download and changed battery
7/9/2004 10:13	jp	0.44												stage observation only
7/9/2004 10:55	jp	0.445												stage observation only
7/9/2004 11:06	jp	0.44												stage observation only
7/9/2004 12:48	jp	0.44												stage observation only
7/9/2004 15:17	jp	0.43												stage observation only
7/9/2004 15:32	jp	0.425												stage observation only
7/9/2004 15:45	jp	0.43												stage observation only
7/19/2004 16:40	gp	0.388	B	0.43				16.0	204					
9/2/2004 8:08	jp	0.402	B									0.44		stage observation only
9/2/2004 8:40	jp	0.402	B									0.44		stage observation only
9/2/2004 9:02	jp	0.402	B					13.6	187			0.44		stage observation only
9/2/2004 13:29	jp	0.402	B					14.7	192			0.44		stage observation only

Site Conditions				Streamflow				Water Quality Observations				High-Water Marks		Remarks
Date/Time (mm/dd/yr hh:mm)	Observer	Stage (feet)	Hydrograph (R/F/S/B)	Measured Discharge (cfs)	Estimated Discharge (cfs)	Instrument Used (AA/PY)	Estimated Accuracy (e/g/f/p)	Water Temperature (oC)	Field Specific Conductance (µmhos/cm)	Adjusted Specific Conductance (at 25 oC)	Additional sampling? (Qbed, etc.)	Estimated stage at staff plate (feet)	Inferred dates? (mm/dd/yr)	
9/2/2004 13:29	jp	0.395	B									0.44		stage observation only
9/2/2004 17:38	jp	0.39	B					15.2	191			0.44		stage observation only
9/15/2004 13:35	jp	0.39	B	0.252				14.6	191			0.47		HWM is probably diurnal
10/21/2004 15:26	jp	0.445	B	0.308				13.1	196					leaf dam on the US side of the stilling well stage rose from 0.415 to 0.445 when removed. Leaves were localized on the stilling well and did not affect the DS flow measurement
11/8/2004 13:19	jp	0.43	B	0.412		py	g				no			
12/15/2004 11:02	jp	0.388	B	0.379		py	g				no			
1/11/2005	gp	0.54	F	1.77		py	f-g	12.9	192	255	no	2	Last 2 weeks	
1/25/2005 13:11	jp	0.47	B	0.649		py	g				no			leaf dam removal at the PT stilling well, stage went from 0.42 to 0.47, bed may take a day or so to fully equilibrate due to the amount of sediment behind the dam, sed is now at 0.28 on the staff plate
3/3/2005 14:30	jp	0.615	B	2.354		py	g	13.4	182	239	no		na	water is very turbid, no leaf dams or obstructions US or DS
3/22/2005 10:45	smc	0.6	F	1.21		py	g-f	12.9	160	213	no			water is slightly turbid, no leaf dams, standing wave through section
4/6/2005 14:15	jp	0.485	B	1.085		py	g	13.2	160	211	no			removed small branch on US of stilling well, water fairly clear
6/13/2005 13:15	jp	0.486	B	0.716		py	g	13.9	148	191	no			rained last week, sed on base of staff at 0.04
8/2/2005 18:00	jp	0.455	B	0.556		py	g	14.6	191	243	no			water was fairly even across stilling well and staff
9/9/2005 15:15	jp	0.44	B	0.416		py	g	14.1	192	247	no			
10/6/2005 16:15	jp	0.415	B	0.403		py	g	13.9	197	255	no			removed some leaves from front of stilling well at 15:54
11/8/2005 12:15	jp	0.445	B	0.486		py	g	13.2	202	266	no			removed some leaves from front of stilling well at 11:39
12/14/2005 16:45	jp	0.435	B	0.384		py	g	11.4	187	258	no			removed some leaves from front of stilling well at 16:30,
1/3/2006 17:15	jp	0.895	U	5.043		AA	g	12.8	151	201	no			winter base flow
2/2/2006 16:30	jp	0.62	B	2.036		py	g	13.1	171	226	no	1.47	previous storm	removed debris from stilling well at 16:11
2/28/2006 16:00	jp	0.62	U	1.32		py	g	12.7	177	236	no			removed debris from stilling well at 15:39
4/11/2006 13:15	jp	0.76	R	3.829		AA	g	12.4	142	191	no			not sure if a shift was caused by my foot traffic - it may have been
5/1/2006 15:15	jp	0.62	B	2.778		py	g	14.4	175	223	no			
6/2/2006 18:15	jp	0.55	B	1.5244		py	g	15.0	190	239	no			
7/7/2006 16:00	jp	0.505	B	0.926		py	g/f	14.2	190	244	no			no signs of diversions upstream, left bank has been mowed for about 1/2 mile US of gage
8/10/2006 19:30	jp	0.505	B	0.844		py	g	14.7	194	246	no			removed stick from back of staff plate that was causing water to pile up behind it - stage went from 0.57' to 0.505
9/12/2006 15:45	gp	0.5	B	1.049		py	g							GP's measurements were spaced at 0.4' as opposed to the regular 0.2' . Based on the rating curve and subsequent measurements this method over estimated flow by ~25%
10/5/2006 16:30	jp	0.505	B	0.5875		py	g							cleaned pts
11/9/2006 11:45	jp	0.49	B	0.4927		py	g	12.7	189	247	no			riffle appears to have filled in completely with sand to fine (2-3 mm) gravel, cobbles have been aggraded over with sand, water was piled up on a leaf dam on the US side of the stilling well. When removed the stage didn't change a whole lot but the water in the stilling well prob. did
1/19/2007 16:45	jp	0.48		0.52		PY	g	10.3	177	246	no			warmed up today from mid winter draught and cold spell for the last month large willow has fallen across the access to the data logger - access is difficult sand had built up behind the staff but not in front of it

Site Conditions				Streamflow				Water Quality Observations				High-Water Marks		Remarks
Date/Time	Observer	Stage	Hydrograph	Measured Discharge	Estimated Discharge	Instrument Used	Estimated Accuracy	Water Temperature	Field Specific Conductance	Adjusted Specific Conductance	Additional sampling?	Estimated stage at staff plate	Inferred dates?	
(mm/dd/yr hh:mm)		*(feet)*	*(R/F/S/B)*	*(cfs)*	*(cfs)*	*(AA/PY)*	*(e/g/f/p)*	*(oC)*	*(µmhos/cm)*	*(at 25 oC)*	*(Qbed, etc.)*	*(feet)*	*(mm/dd/yr)*	
2/15/2007 11:45	jp	0.49		0.789		PY	g	12.2	252	336	no			stream reach though gage looks to have cont. to aggrade with sediment water is clear, q vis est 250-300gpm 11:23 removed debris from staff flow lines were converging on the cross section but there was not a better spot, recent rain has been warm and wet from the south followed by warm weather
3/23/2007 16:00	jp	0.5		0.56		PY	g	13.8	185		no			usual xsection has aggraded a small DG bar has formed on the left side of the stream, sediment and accumulated on the back side of the staff and scoured in front of it, it rained last week about 0.12", it is now spring like conditions

Notes:

Observer Key: Mark Woyshner (mw), Jason Parke (jp)

Stage: Water level observed at outside staff plate

Hydrograph: Describes stream stage as rising (R), falling (F), steady (S), or baseflow (B)

Instrument: If measured, typically made using a standard (AA) or pygmy (PY) bucket-wheel ("Price-type") current meter. If estimated, from rating curve (R) or visual (V).

Estimated measurement accuracy: Excellent (E) = +/- 2%; Good (G) = +/- 5%; Fair (F) = +/- 9%; Poor (P) estimated percent accuracy given

High-water mark (HWM): Measured or estimated at location of the staff plate

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Additional Sampling: Qbed = Bedload, Qss = Suspended sediment, Nutr = nutrients; other symbols as appropriate

Appendix A. Groundwater monitoring observations, water years 2004 through 2007, Montara Water and Sanitary District, San Mateo County, California

Site Conditions		Depth to water from top of casing								Water Quality Observations			Remarks
Date/Time (mm/dd/yr hh:mm)	Observer	2004-1 at BH-1 (ft)	2004-2 at BH-3 (ft)	2004-3 at BH-9 (ft)	2004-4 at BH-9b (ft)	Farm well near diversion (ft)	2004-5 at BH-11 (ft)	MW-1 above willow thicket (ft)	MW-2 below willow thicket (ft)	Water Temperature (oC)	Field Specific Conductance (µmhos/cm)	Adjusted Specific Conductance (at 25 oC)	
1/21/2004 17:06	jp					18.9							
1/22/2004 8:42	jp	28.21											BH1 stick up ~1.7 ft.
1/22/2004 9:10	jp	28.21											
1/22/2004 9:21	jp					19.2							
1/23/2004 11:58	jp	27.68											
1/23/2004 12:07	jp		5.26										
1/23/2004 13:15	jp					19.1							
1/23/2004 16:48	jp					19.1							
1/23/2004 17:01	jp	27.96											
1/26/2004 9:07	jp	27.72											
1/26/2004 9:17	jp					19.4							
1/26/2004 16:41	jp	27.72											
1/26/2004 16:33	jp					19.3							
1/27/2004 11:40	jp	27.72											
1/27/2004 11:50	jp					19.3							
1/28/2004 10:18	jp	27.76											
1/28/2004 10:26	jp					19.4							water level sensor smelled like horse manure/sewage
2/10/2004 4:40	jp					19.4							
2/10/2004 4:50	jp	28.37											
2/13/2004 16:35	jp	28.42											
3/4/2004 17:10	jp	28.05											
3/5/2004 12:22	jp		2.50										
3/5/2004 14:05	jp		2.30										
3/5/2004 12:35	jp	27.97											
3/12/2004 14:45	mw		0.68										2004-2 stickup = 1.3 ft from pad
3/12/2004 14:50	mw	27.80											2004-1 stickup = 1.3 ft from pad
3/15/2004 0:00	jp		0.58										
3/15/2004 14:20	jp	27.86											
3/18/2004 10:30	jp			200.98						16.4	240	288	hole not cased depth at time of measurement 372'
3/19/2004 11:22	jp			201.10						16.1	232	278	hole not cased depth at time of measurement 422'
3/25/2004 9:33	jp			197.42						15.0	198	244	hole not cased depth at time of measurement 682'
3/26/2004 16:30	jp		0.50										
3/26/2004 16:40	jp	28.05											
3/29/2004 9:00	driller Jose			210.00						14.0	215	275	hole not cased depth at time of measurement 815'
3/31/2004 8:42	jp			212.96									hole not cased depth at time of measurement 798'
4/1/2004 16:09	jp	28.05											
4/1/2004 16:19	jp					18.6							water does not smell like sewage this time

Site Conditions		Depth to water from top of casing								Water Quality Observations			Remarks
Date/Time (mm/dd/yr hh:mm)	Observer	2004-1 at BH-1 (ft)	2004-2 at BH-3 (ft)	2004-3 at BH-9 (ft)	2004-4 at BH-9b (ft)	Farm well near diversion (ft)	2004-5 at BH-11 (ft)	MW-1 above willow thicket (ft)	MW-2 below willow thicket (ft)	Water Temperature (oC)	Field Specific Conductance (µmhos/cm)	Adjusted Specific Conductance (at 25 oC)	
4/1/2004 16:30	*jp*		*0.70*										
4/8/2004 13:25	*mw*			*210.34*									*2004-3 stickup = 2.5 ft from pad*
4/8/2004 16:00	*mw*		*0.80*										
4/8/2004 16:12	*mw*	*28.30*											
4/14/2004 16:51	*jp*	*28.44*											
4/14/2004 16:57	*jp*					*18.6*							
4/14/2004 17:05	*jp*		*0.60*										
4/27/2004 14:30	*mw*			*209.06*									
5/6/2004 13:19	*jp*	*28.90*	*0.98*			*18.6*							
5/14/2004 13:27	*jp*	*29.18*	*1.14*	*208.69*		*19.2*							
5/13/2004 8:30	*mw*			*208.85*									
5/20/2004 11:00	*jp*	*29.29*	*1.27*	*208.81*		*19.4*							
6/2/2004 10:50	*gp*	*29.46*											
6/2/2004 10:39	*gp*		*1.87*										
6/2/2004 10:10	*gp*			*213.44*									
6/2/2004 10:16	*gp*				*220.63*								
6/4/2004 13:05	*gp*	*29.52*											
6/4/2004 12:51	*gp*		*1.99*										
6/4/2004 11:45	*gp*			*213.34*									
3/3/2005 15:42	jp	27.60								14.7	279	353	
3/4/2005 16:21	jp		5.90										
3/8/2005 15:38	jp				229.94								data missing from 11/30/04 due to full data logger
3/8/2005 16:41	jp			219.44									data missing from 11/30/04 due to full data logger
3/8/2005 17:19	jp						16.35						took pt from bh9b and put it in bh11 today
4/4/2005 10:40	jp						15.98						insert pt today after removing from BH9b
4/4/2005 10:50	jp						15.97						
4/4/2005 11:01	jp				229.91								removed pt from well and put in BH11
4/4/2005 11:06	jp			219.50									download
4/4/2005 11:16	jp			219.56									reinsert pt
4/4/2005 11:44	jp	27.45											
4/4/2005 11:55	jp		6.06							14.7	270.6	343	
5/25/2005 13:40	jp	28.30											
5/25/2005 14:05	jp		7.18										
5/25/2005 14:35	jp				229.80								download
5/25/2005 14:57	jp			219.47									download and baro download
5/25/2005 16:23	jp							6.94					wetland piezo installed today
5/25/2005 17:00	jp							7.18					wetland piezo installed today
5/25/2005 17:34	jp								7.65				
6/2/2005 16:10	jp								6.73				bailed the well after DTW to clear out fines
6/2/2005 17:19	jp							7.93					bailed the well after DTW to clear out fines

Site Conditions		Depth to water from top of casing								Water Quality Observations			Remarks
Date/Time (mm/dd/yr hh:mm)	Observer	2004-1 at BH-1 (ft)	2004-2 at BH-3 (ft)	2004-3 at BH-9 (ft)	2004-4 at BH-9b (ft)	Farm well near diversion (ft)	2004-5 at BH-11 (ft)	MW-1 above willow thicket (ft)	MW-2 below willow thicket (ft)	Water Temperature (oC)	Field Specific Conductance (µmhos/cm)	Adjusted Specific Conductance (at 25 oC)	
6/13/2005 14:38	jp						15.48						before pt removal for download
6/13/2005 15:30	jp						15.47						after reinserting pt after download
8/2/2005 12:01	jp						15.48			na			no bailer for sct
8/2/2005 12:016	jp						15.48						after reinserting pt after download
8/2/2005 12:27	jp								7.03	15.6	304	376	
8/2/2005 12:40	jp								7				after reinserting pt after download
8/2/2005 12:53	jp								9.75	15.1	222	278	tape broke and had to reset pt on a new tape
8/2/2005 14:10	jp			219.34									
8/2/2005 15:00	jp				229.76								
8/2/2005 15:25	jp	28.05											
8/2/2005 16:19	jp		8.07										
8/2/2005 16:41	jp		8.07										after reinserting pt after download
9/9/2005 11:53	jp						15.5						
9/9/2005 12:06	jp						15.5						after reinserting pt after download
9/9/2005 12:12	jp								6.89				
9/9/2005 12:20	jp								6.91				after reinserting pt after download
9/9/2005 12:30	jp							dry					
9/9/2005 12:45	jp							dry					after reinserting pt after download
9/9/2005 13:09	jp			219.46									
9/9/2005 13:38	jp				229.85								
9/9/2005 13:51	jp	29.40											
9/9/2005 14:01	jp		8.58							17.1	287	341	
10/6/2005 12:19	jp						15.48						
10/6/2005 12:30	jp						15.47						
10/6/2005 12:36	jp								7.02				
10/6/2005 12:50	jp								7.02				
10/6/2005 13:07	jp							dry					total depth of piezo is now~6.54 ft from ground, when installed it was 12 ft. from ground surface
10/6/2005 13:51	jp			219.40									
10/6/2005 14:15	jp				229.95								
10/6/2005 14:52	jp		8.81										
10/6/2005 15:15	jp	29.63											
11/1/2005 15:40	jp						15.42						reinsert pt
11/1/2005 15:50	jp						15.42						
11/1/2005 15:56	jp								6.88	14.8	218	275	
11/1/2005 16:08	jp								6.89				
11/1/2005 16:17	jp							9.68		13.9	211	273	total depth with stickup is 10.3', tape with pt is 9.9
11/1/2005 16:32	jp							9.68					reinsert pt, Montara Creek was flowing
11/1/2005 16:47	jp			219.27									
11/1/2005 17:00	jp			219.24									

Site Conditions		Depth to water from top of casing								Water Quality Observations			Remarks
Date/Time (mm/dd/yr hh:mm)	Observer	2004-1 at BH-1 (ft)	2004-2 at BH-3 (ft)	2004-3 at BH-9 (ft)	2004-4 at BH-9b (ft)	Farm well near diversion (ft)	2004-5 at BH-11 (ft)	MW-1 above willow thicket (ft)	MW-2 below willow thicket (ft)	Water Temperature (oC)	Field Specific Conductance (µmhos/cm)	Adjusted Specific Conductance (at 25 oC)	
11/1/2005 17:09	jp				229.85								
11/7/2005 15:37	jp		9.01							16.4	289	350	
11/7/2005 15:47	jp		9.01										
11/7/2005 16:24	jp	29.70											
12/8/2005 13:32	jp						15.41						
12/8/2005 13:41	jp						15.41						
12/8/2005 13:48	jp								6.77	14.2	230	295	
12/8/2005 14:00	jp								6.75				
12/8/2005 14:07	jp							9.24					total depth with stickup is 10.01
12/8/2005 14:20	jp							9.24					
12/8/2005 14:38	jp			219.34									down loaded baro logger also
12/8/2005 15:18	jp				230.20								
12/8/2005 15:35	jp		9.18							15.9	287	352	
12/8/2005 15:43	jp		9.18										
2/2/2006 13:15	jp			218.15									
2/2/2006 14:05	jp			218.10									
2/2/2006 14:12	jp				229.90								
2/2/2006 14:39	jp						14.3						
2/2/2006 14:48	jp						14.32						
2/2/2006 14:53	jp								6.32				
2/2/2006 15:01	jp								6.38	13.2	210	277	total well depth is 16.14 with stickup
2/2/2006 15:09	jp							5.45					
2/2/2006 15:17	jp							5.43		11.5	161	221	total well depth 9.78', about 120 gpm in creek sct is: 201uS at 25C, 154uS at 13.3C
2/28/2006 12:05	jp							6.41		11.3	167	232	well depth 9.8' including stickup
2/28/2006 12:29	jp								6.4	12.9	207	275	
2/28/2006 12:43	jp								6.34				when relaunch date looks wrong
2/28/2006 12:48	jp						14.26						
2/28/2006 12:59	jp						14.26						
2/28/2006 13:12	jp				217.95								
2/28/2006 13:38	jp				217.94								
2/28/2006 13:45	jp			229.80									
2/28/2006 14:01	jp	27.58											
2/28/2006 14:16	jp		7.91							14.9	280	353	
4/11/2006 9:37	jp								6.46	12.8	197	257	
4/12/2006 9:30	jp								6.44				
4/12/2006 9:45	jp							3.59					
4/12/2006 9:52	jp							3.59		12.2	134	177	
4/12/2006 10:21	jp			216.35									
4/12/2006 10:46	jp			216.35									

Site Conditions		Depth to water from top of casing								Water Quality Observations			Remarks
Date/Time (mm/dd/yr hh:mm)	Observer	2004-1 at BH-1 (ft)	2004-2 at BH-3 (ft)	2004-3 at BH-9 (ft)	2004-4 at BH-9b (ft)	Farm well near diversion (ft)	2004-5 at BH-11 (ft)	MW-1 above willow thicket (ft)	MW-2 below willow thicket (ft)	Water Temperature (oC)	Field Specific Conductance (µmhos/cm)	Adjusted Specific Conductance (at 25 oC)	
4/12/2006 10:58	jp				229.10								
4/12/2006 11:57	jp		6.71							14.3	277	348	
5/1/2006 10:35	jp							5.97		12.9	138	179	
5/1/2006 10:51	jp								6.59				
5/1/2006 10:51	jp								6.57	13.5	179	230	
5/1/2006 11:20	jp						13.00						
5/1/2006 11:28	jp						13.00						
5/1/2006 14:07	jp	26.90											
5/1/2006 11:39	jp			215.85									
5/1/2006 11:59	jp			215.82									
5/1/2006 12:06	jp				228.90								
5/1/2006 13:30	jp		6.75							14.5	272	340	
6/2/2006 14:20	jp						12.95						
6/2/2006 14:38	jp								6.8	14.4	188	235	
6/2/2006 14:58	jp							7.75		13.4	155	198	
6/2/2006 15:31	jp			215.50									
6/2/2006 16:06	jp				228.66								
6/2/2006 16:29	jp		7.03							15.2	274	338	
6/2/2006 17:14	jp	27.95											
7/6/2006 14:26	jp		7.30							16.1	283	345	
7/6/2006 15:07	jp	27.80											
7/7/2006 13:15	jp						12.62						
7/7/2006 13:28	jp								6.93				
7/7/2006 13:45	jp							8.50		14.0	172	216	
7/7/2006 15:02	jp			214.90									
7/7/2006 15:28	jp				227.98								
9/12/2006	gp	28.97								na	na	na	
9/12/2006	gp		7.29										
9/12/2006	gp						12.47						
9/12/2006	gp								7.03				
9/12/2006	gp							not done					
9/12/2006	gp			214.65									
9/12/2006	gp				228.00								
10/5/2006 13:00	jp		12.56										adjust time from 12:28 to 13:12 watch time
10/5/2006 13:22	jp								6.95	15.4	231	283	
10/5/2006 13:40	jp							9.50					
10/5/2006 14:12	jp			214.43									
10/5/2006 14:15	jp				228.16								
11/9/2006 15:50	jp		6.91										
11/9/2006 16:02	jp	29.45											

Site Conditions		Depth to water from top of casing								Water Quality Observations			Remarks
Date/Time (mm/dd/yr hh:mm)	Observer	2004-1 at BH-1 (ft)	2004-2 at BH-3 (ft)	2004-3 at BH-9 (ft)	2004-4 at BH-9b (ft)	Farm well near diversion (ft)	2004-5 at BH-11 (ft)	MW-1 above willow thicket (ft)	MW-2 below willow thicket (ft)	Water Temperature (oC)	Field Specific Conductance (µmhos/cm)	Adjusted Specific Conductance (at 25 oC)	
11/9/2006 16:15	jp				228.95								
11/9/2006 16:26	jp			214.39									
11/9/2006 16:54	jp						12.78						
11/9/2006 16:58	jp								7.00	14.9	224	278	
11/9/2006 17:12	jp							9.44		13.6	201	257	
1/19/2007 14:52	jp	28.78											
1/19/2007 15:01	jp		5.82							14.7	260	323	
1/19/2007 14:13	jp			214.05									
1/19/2007 14:38	jp				228.71								
1/19/2007 12:52	jp						12.88						
1/19/2007 13:23	jp							dry					Montara Cr at Upper Wetland is dry but looks to have flowed recently
1/19/2007 13:05	jp								7.02	12.9	255	336	Flow ~50 gpm vis. Est; at road crossing it is about the same ~50gpm and sct= 185uS at 11.5C, 253uS at 25C
2/15/2007 16:57	jp	28.90											
2/15/2007 17:12	jp		5.80										
2/15/2007 16:29	jp			214.28									
2/15/2007 16:44	jp				229.11								
2/15/2007 15:30	jp						13.15						
2/15/2007 16:02	jp							6.93					
3/23/2007 14:25	jp	27.80											
3/23/2007 14:59	jp		5.20										
3/23/2007 13:48	jp			213.98									
3/23/2007 14:14	jp				229.12								
3/23/2007 12:52	jp						12.77						
3/23/2007 13:21	jp							dry					channel at Montara Cr was dry and looked to have been dry for at least a few weeks
3/23/2007 13:04	jp								6.92				could hear flow in the Montara Cr - the reach between the upper and lower wetland is a gaining stream flow area
5/10/2007 12:55	jp	28.60											
5/10/2007 13:05	jp		5.31							14.0	260		daffodil cyn = 0.56 cfs, sct 188 uS at 12.5C, water was clear
5/10/2007 15:11	jp			214.12									there was a red jeep with two teen boys (licence plate was recorded)
5/10/2007 15:34	jp				229.57								
5/10/2007 13:58	jp						13.31						
5/10/2007 14:30	jp							dry					Montara Cr was not flowing but looked to have flowed very recently approx. 2 ft wide 0.25 ft deep
5/10/2007 14:10	jp								7.21	14.8	210		Flow at Montara Cr was audible

Notes:

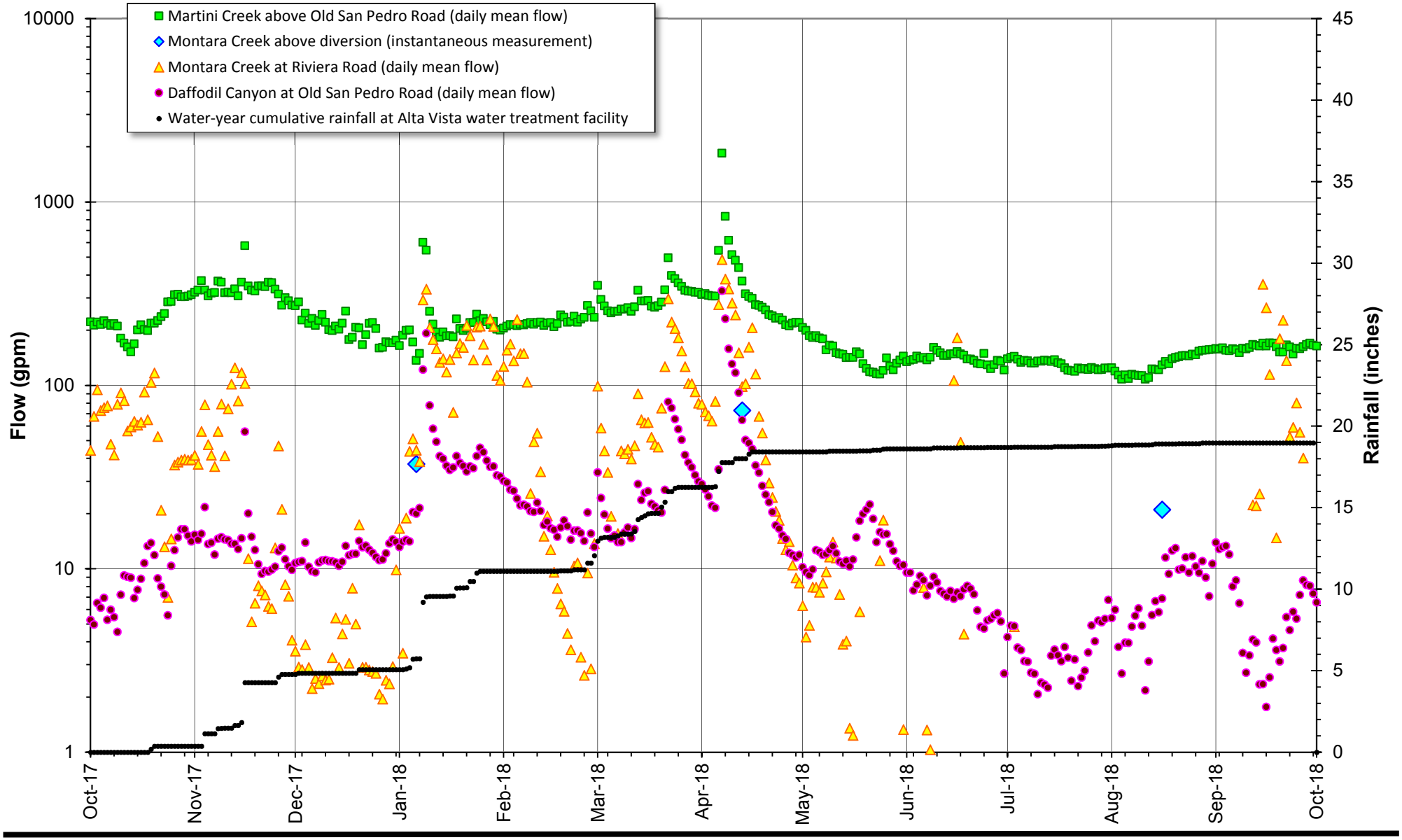
Observer Key: Mark Woyshner (mw), Jason Parke (jp), Gustavo Porras (gp)

Specific conductance: Measured in micromhos/cm in field; then adjusted to 25degC by equation (1.8813774452 - [0.050433063928 * field temp] + [0.00058561144042 * field temp^2]) * Field specific conductance

Stick-up is the height of the casing above the ground surface

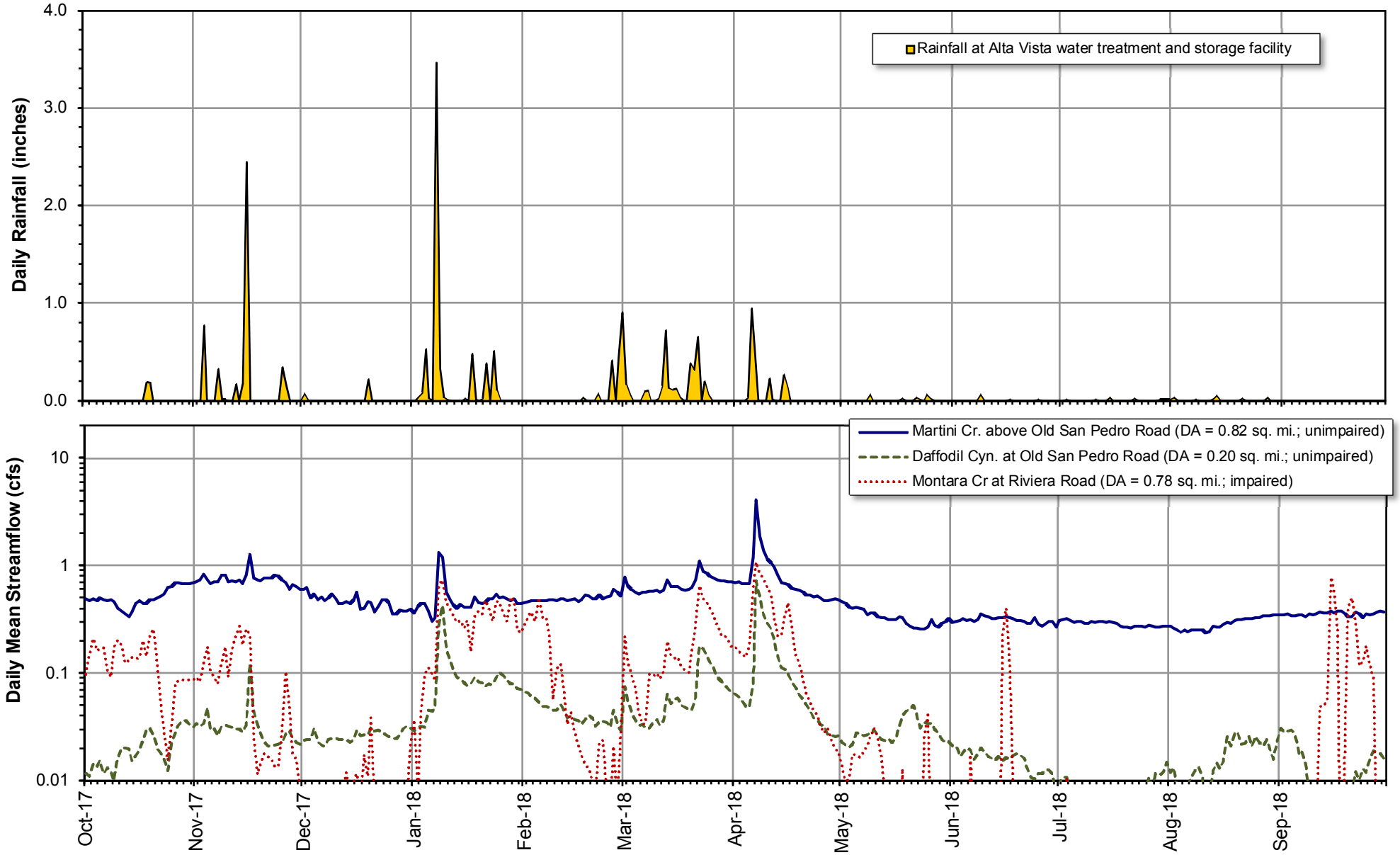
APPENDIX C

Annual rainfall and steamflow records



Appendix B. Flows in Montara Creek, Daffodil Canyon, and Martini Creek during water year 2018, San Mateo County, California. Water year 2018 was a dry year with below average rainfall totaling 19.0 inches or 63 percent of average. Baseflows at the three stream stations persisted into the wet season primarily from the wetter than normal antecedent rainfall during WY2017. Rainfall was measrued during mid November, early January, and through March and mid April. These wet periods were separated by mid-winter dry spells during late November through December, and during late January through February. Generally dry conditions then persisted from mid April through the remainder of the year. Baseflows persisted in Martini Creek and Daffodil Canyon but with any carryover from WY2017 seemingly depleted.

Data preliminary and subject to revision.



Balance Hydrologics

Appendix B. Daily rainfall and streamflow, water year 2018, Montara Water and Sanitary District, San Mateo County, California. MWSD operates a long-standing headwater diversion on Montara Creek about a half of a mile upstream of the gaging station; agricultural and dog-park activities operate on valley floor.

Data preliminary and subject to revision.

Form 1. Annual Rainfall Record: Alta Vista Water Treatment and Storage Facility

Station Location

Located at end of Alta Vista Road on 12 ft. post on east side of water treatment building.
Coordinates: 37°32'52.53"N 122°29'53.68"W, WGS84. Elevation: 480 feet, WGS84.
Site limitations: Gage elevated above roof; trees 40 feet west of gage.

Water Year: **2018**
Station: AVWT
County, State: San Mateo County, CA
Station Location Map:

Period of Record

Tipping-bucket rain gage installed December 2, 2007.
Sponsored by the Montara Water & Sanitation District.
WY2001 through WY2008 daily rainfall manually measured at 8:00 AM by MWSD staff.
Mean annual rainfall = 30 inches

Seasonal Maximum Daily Rainfall

Date	Inches	Date	Inches	Date	Inches	Date	Inches
1/27/08	3.70	3/5/16	1.94				
2/15/09	2.24	12/10/16	2.05				
10/13/09	3.71	1/8/2018	3.47				
1/19/11	2.28						
1/20/12	2.06						
11/30/13	2.85						
2/8/14	1.46						
12/11/15	5.25						

Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.00	0.00	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.01	0.00
2	0.00	0.00	0.07	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.03	0.00
3	0.00	0.00	0.00	0.04	0.00	0.06	0.00	0.00	0.00	0.01	0.00	0.00
4	0.00	0.77	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.53	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.02	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.09	0.55	0.00	0.00	0.00	0.00	0.00
8	0.00	0.32	0.00	3.47	0.00	0.10	0.00	0.00	0.00	0.00	0.01	0.00
9	0.00	0.01	0.00	0.32	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00
10	0.00	0.01	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.01	0.00	0.02	0.23	0.00	0.00	0.01	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.15	0.01	0.00	0.00	0.00	0.00	0.00
13	0.00	0.17	0.00	0.00	0.00	0.72	0.00	0.00	0.00	0.00	0.02	0.00
14	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.05	0.00
15	0.00	0.18	0.00	0.00	0.00	0.11	0.27	0.00	0.00	0.03	0.00	0.00
16	0.00	2.45	0.00	0.02	0.00	0.12	0.13	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.01	0.00	0.00	0.00
18	0.00	0.00	0.00	0.48	0.03	0.00	0.00	0.02	0.00	0.00	0.00	0.00
19	0.19	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.18	0.00	0.22	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.02	0.00	0.31	0.00	0.00	0.00	0.00	0.02	0.00
22	0.00	0.00	0.00	0.38	0.07	0.65	0.00	0.03	0.00	0.02	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.51	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.11	0.00	0.06	0.00	0.06	0.01	0.00	0.00	0.00
26	0.00	0.34	0.00	0.00	0.41	0.00	0.00	0.02	0.00	0.00	0.00	0.00
27	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.00	0.03	0.00
29	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.01	0.00	0.00
30	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.01	0.00	0.00
31	0.00	--	0.00	0.00	--	0.00	--	0.00	--	0.01	0.00	--
Total	0.37	4.41	0.29	6.03	0.96	4.20	2.16	0.20	0.08	0.10	0.17	0.00
Max	0.19	2.45	0.22	3.47	0.45	0.90	0.94	0.06	0.06	0.03	0.05	0.00
Rain Days	2	9	2	15	4	17	7	6	3	7	7	0

Monitor's Comments

Water Year Summary

Total Annual	18.97	(inches)
Maximum Daily Total	3.47	(inches)
No. of days with rain	79	

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

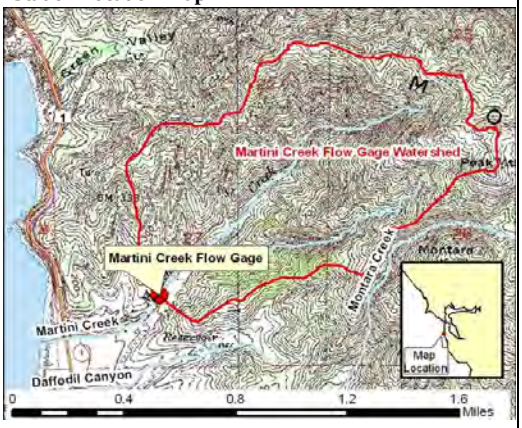
Form 2. Annual Hydrologic Record: Martini Creek above Old San Pedro Road

Station Location / Watershed Descriptors

Located on right bank 500 feet upstream of Old San Pedro Road Bridge.
Coordinates: N37.55454 W122.50625, NAD27. Elevation: 110 feet, NGVD 1929.
Watershed area above gage = 0.82 square miles.
Land use: Open space; McNee Ranch SP and Golden Gate National Recreation Area

Water Year: 2018
Stream: Martini Creek
Station: MASP
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder installed on 11/18/03.
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.71 cubic feet per second
Unit runoff for period of record: 0.86 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
12/29/03	---- no record ----			3/17/12	---- no record ----		
2/25/04	22:30	1.26	9.63	12/23/12	16:30	1.37	9.52
12/27/04	6:30	1.66	26.90	3/31/14	13:00	0.88	2.32
12/31/05	5:30	1.53	18.75	12/11/14	8:15	1.64	11.02
2/26/07	16:30	0.66	2.25	3/5/16	21:45	1.42	10.68
1/25/08	13:30	1.54	19.46	1/10/17	19:30	1.67	16.23
2/16/09	---- no record ----			4/7/18	3:15	1.25	8.40
3/3/10	5:45	1.15	6.40				
3/26/11	8:15	1.69	29.49				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.50	0.72	0.61	0.37	0.46	0.78	0.70	0.46	0.30	0.31	0.28	0.35
2	0.47	0.74	0.64	0.42	0.47	0.66	0.71	0.44	0.31	0.32	0.27	0.35
3	0.49	0.83	0.51	0.44	0.48	0.60	0.69	0.42	0.31	0.32	0.25	0.36
4	0.48	0.74	0.55	0.45	0.48	0.57	0.68	0.41	0.32	0.31	0.24	0.35
5	0.50	0.69	0.49	0.38	0.47	0.55	0.68	0.41	0.31	0.30	0.25	0.34
6	0.48	0.71	0.52	0.30	0.48	0.56	1.21	0.40	0.32	0.31	0.24	0.35
7	0.47	0.72	0.47	0.33	0.48	0.56	4.11	0.40	0.31	0.30	0.26	0.35
8	0.48	0.82	0.50	1.34	0.48	0.58	1.86	0.35	0.32	0.29	0.25	0.34
9	0.47	0.81	0.54	1.22	0.49	0.58	1.38	0.37	0.36	0.29	0.25	0.35
10	0.40	0.71	0.49	0.56	0.48	0.59	1.15	0.36	0.35	0.30	0.25	0.35
11	0.38	0.72	0.45	0.48	0.49	0.56	1.07	0.34	0.34	0.30	0.24	0.36
12	0.36	0.71	0.44	0.43	0.49	0.60	0.98	0.33	0.32	0.31	0.25	0.37
13	0.34	0.75	0.47	0.41	0.47	0.74	0.83	0.33	0.32	0.30	0.27	0.37
14	0.38	0.69	0.45	0.44	0.49	0.64	0.70	0.32	0.33	0.30	0.27	0.36
15	0.45	0.81	0.49	0.41	0.49	0.64	0.68	0.32	0.33	0.31	0.27	0.38
16	0.48	1.29	0.57	0.42	0.47	0.65	0.66	0.32	0.34	0.30	0.29	0.37
17	0.45	0.77	0.40	0.41	0.48	0.60	0.61	0.34	0.33	0.29	0.30	0.38
18	0.44	0.74	0.41	0.51	0.54	0.59	0.61	0.33	0.33	0.28	0.29	0.38
19	0.49	0.73	0.46	0.45	0.52	0.61	0.59	0.29	0.31	0.27	0.31	0.36
20	0.49	0.78	0.46	0.44	0.49	0.63	0.57	0.28	0.31	0.27	0.32	0.34
21	0.50	0.78	0.37	0.46	0.50	0.74	0.54	0.26	0.30	0.27	0.32	0.34
22	0.53	0.77	0.42	0.49	0.53	1.11	0.53	0.26	0.29	0.28	0.32	0.37
23	0.55	0.81	0.49	0.49	0.49	0.89	0.52	0.26	0.29	0.27	0.32	0.36
24	0.63	0.81	0.49	0.54	0.51	0.85	0.52	0.26	0.33	0.28	0.32	0.33
25	0.64	0.75	0.45	0.50	0.52	0.81	0.51	0.27	0.29	0.27	0.33	0.35
26	0.69	0.70	0.36	0.52	0.61	0.77	0.48	0.31	0.27	0.28	0.33	0.35
27	0.70	0.61	0.36	0.49	0.57	0.73	0.47	0.28	0.29	0.28	0.34	0.36
28	0.68	0.67	0.39	0.48	0.52	0.73	0.49	0.27	0.31	0.27	0.35	0.37
29	0.68	0.64	0.38	0.50	--	0.72	0.49	0.29	0.30	0.27	0.35	0.38
30	0.68	0.61	0.38	0.45	--	0.72	0.49	0.31	0.27	0.28	0.35	0.37
31	0.70	--	0.39	0.45	--	0.72	--	0.32	--	0.28	0.35	--
MEAN	0.52	0.75	0.46	0.50	0.50	0.68	0.85	0.33	0.31	0.29	0.29	0.36
MAX. DAY	0.70	1.29	0.64	1.34	0.61	1.11	4.11	0.46	0.36	0.32	0.35	0.38
MIN. DAY	0.34	0.61	0.36	0.30	0.46	0.55	0.47	0.26	0.27	0.27	0.24	0.33
cfs days	16.0	22.6	14.4	15.6	14.0	21.1	25.5	10.3	9.41	8.99	9.04	10.7
ac-ft	31.7	44.9	28.5	30.9	27.7	41.8	50.6	20.4	18.7	17.8	17.9	21.3

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.49	(cfs)
Max. daily discharge	4.11	(cfs)
Min. daily discharge	0.24	(cfs)
Total	178	(cfs-days)
Total Volume	352	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

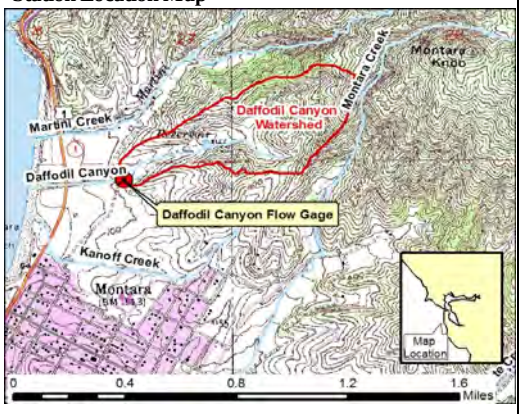
Form 3. Annual Hydrologic Record: Daffodil Canyon at Old San Pedro Road

Station Location / Watershed Descriptors

Located at hiking trail 80 feet upstream of Old San Pedro Road.
Coordinates: N37.55033 W122.5072, NAD27. Elevation: 110 feet, NGVD 1929
Watershed area above gage = 0.20 square miles.
Land use: Open space; Golden Gate National Recreation Area

Water Year: 2018
Stream: Daffodill Canyon
Station: DASP
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.072 cubic feet per second
Unit runoff: 0.36 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/19/08	21:50	0.60	0.64	3/31/14	13:15	1.18	0.48
2/24/09	1:50	0.70	1.13	12/11/14	23:15	1.95	3.13
3/3/10	6:00	0.97	4.13	3/13/16	14:45	2.17	4.18
12/28/10	22:00	2.06	4.57	1/20/17	4:45	2.96	7.27
3/16/12	20:30	1.30	0.81	4/7/18	4:30	1.58	1.20
12/23/12	16:30	1.63	2.36				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.01	0.03	0.02	0.03	0.07	0.07	0.06	0.02	0.02	0.01	0.01	0.03
2	0.01	0.03	0.02	0.03	0.07	0.05	0.06	0.02	0.02	0.01	0.01	0.03
3	0.01	0.03	0.02	0.03	0.06	0.04	0.06	0.02	0.02	0.01	0.01	0.03
4	0.01	0.05	0.03	0.03	0.06	0.04	0.05	0.02	0.02	0.01	0.01	0.03
5	0.02	0.03	0.02	0.05	0.05	0.03	0.05	0.03	0.02	0.01	0.01	0.03
6	0.01	0.03	0.02	0.04	0.05	0.03	0.08	0.03	0.02	0.01	0.01	0.02
7	0.01	0.03	0.02	0.05	0.05	0.03	0.73	0.03	0.02	0.01	0.01	0.02
8	0.01	0.03	0.02	0.27	0.05	0.03	0.51	0.03	0.02	0.01	0.01	0.01
9	0.01	0.03	0.02	0.43	0.05	0.04	0.35	0.03	0.02	0.01	0.01	0.01
10	0.02	0.03	0.02	0.17	0.05	0.04	0.29	0.03	0.02	0.00	0.01	0.01
11	0.02	0.03	0.02	0.13	0.05	0.03	0.26	0.03	0.02	0.01	0.00	0.01
12	0.02	0.03	0.02	0.11	0.05	0.04	0.20	0.02	0.02	0.01	0.01	0.01
13	0.02	0.03	0.02	0.09	0.04	0.06	0.14	0.02	0.02	0.01	0.01	0.01
14	0.02	0.03	0.02	0.09	0.04	0.05	0.11	0.02	0.02	0.01	0.01	0.01
15	0.02	0.03	0.02	0.08	0.04	0.06	0.11	0.02	0.02	0.01	0.01	0.01
16	0.02	0.12	0.03	0.08	0.04	0.06	0.10	0.02	0.02	0.01	0.02	0.00
17	0.02	0.04	0.03	0.08	0.03	0.05	0.08	0.03	0.02	0.01	0.03	0.01
18	0.03	0.03	0.03	0.09	0.04	0.05	0.07	0.04	0.02	0.01	0.02	0.01
19	0.03	0.03	0.03	0.08	0.04	0.05	0.06	0.04	0.02	0.01	0.03	0.01
20	0.03	0.02	0.03	0.08	0.04	0.05	0.06	0.05	0.02	0.01	0.03	0.01
21	0.02	0.02	0.03	0.08	0.03	0.06	0.05	0.05	0.02	0.01	0.02	0.01
22	0.02	0.02	0.03	0.08	0.04	0.18	0.05	0.04	0.01	0.01	0.02	0.01
23	0.02	0.02	0.03	0.08	0.04	0.17	0.04	0.03	0.01	0.01	0.03	0.01
24	0.01	0.02	0.03	0.09	0.03	0.15	0.04	0.04	0.01	0.01	0.02	0.01
25	0.02	0.02	0.03	0.10	0.03	0.13	0.03	0.03	0.01	0.01	0.03	0.01
26	0.03	0.03	0.02	0.10	0.05	0.11	0.03	0.03	0.01	0.01	0.02	0.02
27	0.03	0.03	0.03	0.09	0.03	0.09	0.03	0.03	0.01	0.01	0.02	0.02
28	0.04	0.03	0.03	0.08	0.03	0.08	0.03	0.03	0.01	0.01	0.02	0.02
29	0.04	0.02	0.03	0.08	--	0.08	0.03	0.02	0.01	0.01	0.02	0.02
30	0.03	0.02	0.03	0.07	--	0.07	0.03	0.02	0.01	0.01	0.02	0.02
31	0.03	--	0.03	0.07	--	0.07	--	0.02	--	0.02	0.02	--
MEAN	0.02	0.03	0.03	0.10	0.04	0.07	0.13	0.03	0.02	0.01	0.02	0.01
MAX. DAY	0.04	0.12	0.03	0.43	0.07	0.18	0.73	0.05	0.02	0.02	0.03	0.03
MIN. DAY	0.01	0.02	0.02	0.03	0.03	0.03	0.03	0.02	0.01	0.00	0.00	0.00
cfs days	0.64	0.98	0.82	2.97	1.22	2.10	3.79	0.92	0.47	0.25	0.52	0.42
ac-ft	1.27	1.94	1.62	5.88	2.43	4.16	7.53	1.83	0.94	0.49	1.03	0.84

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.041	(cfs)
Max. daily discharge	0.73	(cfs)
Min. daily discharge	0.00	(cfs)
Total	15	(cfs-days)
Total Volume	30	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

Form 4. Annual Hydrologic Record: Montara Creek at Riviera Road

Station Location / Watershed Descriptors

Located: Downstream side of the Riviera Road crossing of Montra Creek
Coordinates: N37.5456 W122.495, NAD27. Elevation: 296 feet, NGVD 1929
Watershed area above gage: 0.78 square miles; MWSD diversion 0.5 mile upstream of gage
Land use: Agriculture and open space; Golden Gate National Recreation Area

Water Year: 2018
Stream: Montara Creek
Station: MORR
County, State: San Mateo County, CA

Station Location Map

Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.18 cubic feet per second
Unit runoff: 0.24 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/6/08	1:00	0.64	0.85	3/31/14	13:15	0.77	0.62
2/16/09	9:30	1.08	0.66	12/16/15	2:30	0.87	1.79
3/2/10	9:00	1.42	1.82	3/15/16	15:45	0.75	3.22
11/27/10	7:45	1.42	2.96	1/11/17	21:30	2.09	4.57
10/5/11	1:15	1.00	1.46	4/7/18	2:45	0.79	1.43
12/2/12	8:15	0.78	0.98				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.10	0.09	0.01	0.04	0.28	0.22	0.18	0.01	0.00	0.00	0.00	0.00
2	0.15	0.08	0.01	0.01	0.35	0.13	0.16	0.01	0.00	0.00	0.00	0.00
3	0.21	0.13	0.01	0.04	0.37	0.10	0.15	0.01	0.00	0.01	0.00	0.00
4	0.16	0.17	0.01	0.10	0.30	0.07	0.14	0.02	0.00	0.00	0.00	0.00
5	0.17	0.11	0.01	0.11	0.51	0.04	0.18	0.02	0.00	0.00	0.00	0.00
6	0.17	0.09	0.00	0.10	0.33	0.03	0.61	0.02	0.02	0.00	0.00	0.00
7	0.11	0.08	0.01	0.09	0.33	0.03	1.08	0.02	0.00	0.00	0.00	0.00
8	0.09	0.13	0.01	0.65	0.23	0.10	0.85	0.02	0.00	0.00	0.00	0.00
9	0.18	0.18	0.01	0.74	0.06	0.09	0.75	0.03	0.00	0.00	0.00	0.00
10	0.20	0.09	0.01	0.46	0.11	0.10	0.63	0.03	0.00	0.00	0.00	0.00
11	0.18	0.17	0.01	0.40	0.12	0.09	0.54	0.03	0.00	0.00	0.00	0.00
12	0.13	0.23	0.01	0.35	0.08	0.10	0.34	0.02	0.00	0.00	0.00	0.05
13	0.13	0.28	0.01	0.30	0.03	0.20	0.22	0.01	0.00	0.00	0.00	0.05
14	0.14	0.18	0.01	0.31	0.04	0.14	0.23	0.01	0.00	0.00	0.00	0.06
15	0.14	0.26	0.01	0.26	0.03	0.14	0.36	0.00	0.24	0.00	0.00	0.79
16	0.14	0.23	0.01	0.31	0.02	0.14	0.46	0.00	0.40	0.00	0.00	0.59
17	0.20	0.03	0.01	0.16	0.02	0.12	0.26	0.00	0.11	0.00	0.00	0.26
18	0.14	0.01	0.02	0.33	0.01	0.11	0.15	0.01	0.01	0.00	0.00	0.00
19	0.23	0.01	0.01	0.38	0.01	0.10	0.12	0.00	0.00	0.00	0.00	0.03
20	0.26	0.02	0.04	0.36	0.01	0.17	0.09	0.00	0.00	0.00	0.00	0.40
21	0.12	0.02	0.01	0.47	0.01	0.28	0.07	0.00	0.00	0.00	0.00	0.50
22	0.05	0.02	0.01	0.41	0.02	0.66	0.05	0.00	0.00	0.00	0.00	0.30
23	0.03	0.01	0.01	0.31	0.02	0.49	0.05	0.00	0.00	0.00	0.00	0.12
24	0.02	0.01	0.01	0.46	0.01	0.45	0.04	0.02	0.00	0.00	0.00	0.13
25	0.03	0.03	0.01	0.47	0.01	0.41	0.03	0.04	0.00	0.00	0.00	0.18
26	0.08	0.10	0.00	0.37	0.02	0.34	0.03	0.00	0.00	0.00	0.00	0.12
27	0.09	0.05	0.00	0.31	0.01	0.28	0.03	0.00	0.00	0.00	0.00	0.09
28	0.09	0.02	0.01	0.51	0.03	0.23	0.02	0.00	0.00	0.00	0.00	0.00
29	0.09	0.02	0.01	0.47	--	0.23	0.02	0.00	0.00	0.00	0.00	0.00
30	0.09	0.01	0.01	0.25	--	0.21	0.02	0.00	0.00	0.00	0.00	0.00
31	0.09	--	0.02	0.24	--	0.18	--	0.00	--	0.00	0.00	--
MEAN	0.13	0.09	0.01	0.32	0.12	0.19	0.26	0.01	0.03	0.00	0.00	0.12
MAX. DAY	0.26	0.28	0.04	0.74	0.51	0.66	1.08	0.04	0.40	0.01	0.00	0.79
MIN. DAY	0.02	0.01	0.00	0.01	0.01	0.03	0.02	0.00	0.00	0.00	0.00	0.00
cfs days	4.00	2.84	0.27	9.77	3.38	6.00	7.85	0.34	0.79	0.02	0.00	3.68
ac-ft	7.93	5.64	0.53	19.4	6.71	11.9	15.6	0.67	1.57	0.03	0.01	7.30

Monitor's Comments

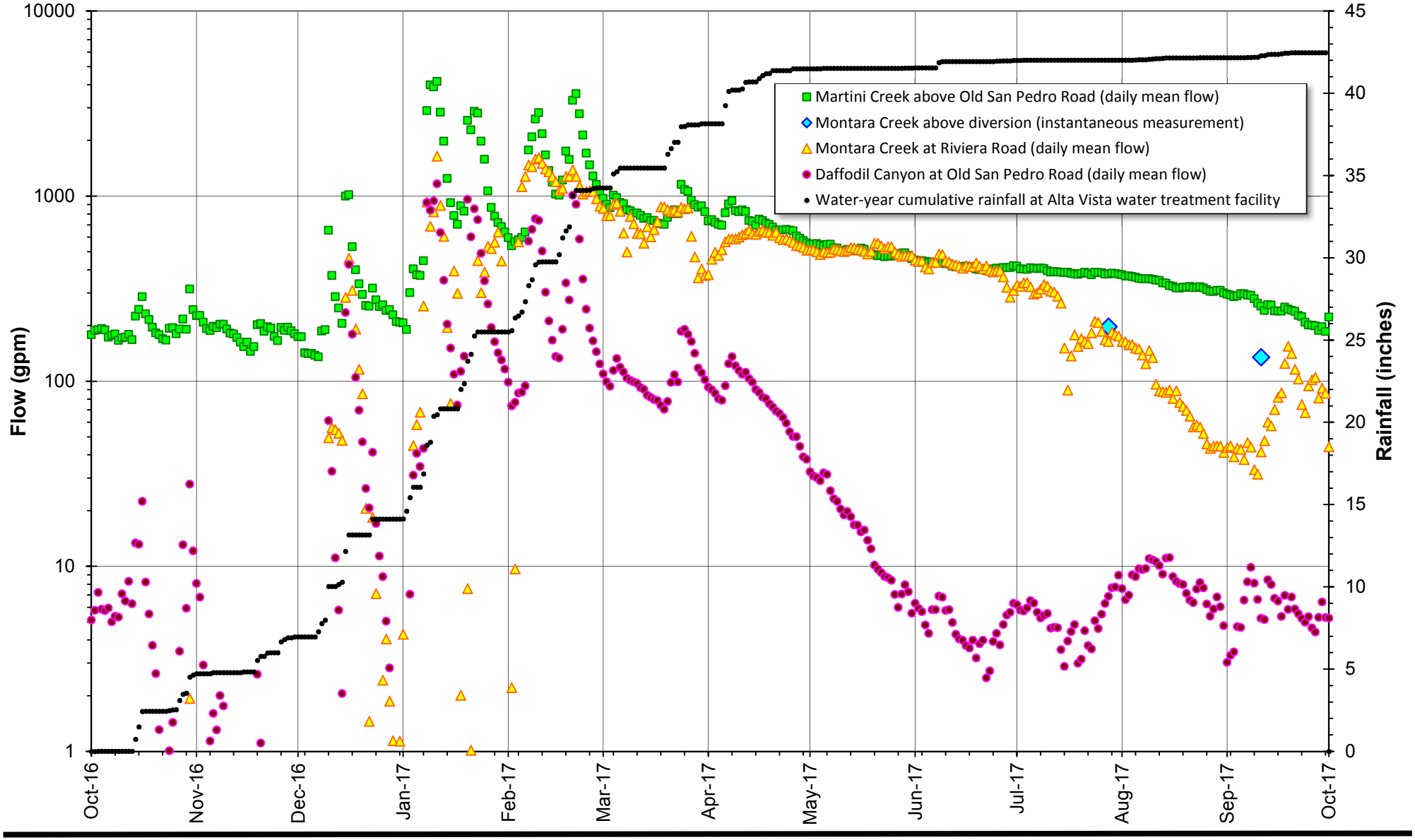
1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.11	(cfs)
Max. daily discharge	1.08	(cfs)
Min. daily discharge	0.00	(cfs)
Total	39	(cfs-days)
Total Volume	77	(ac-ft)

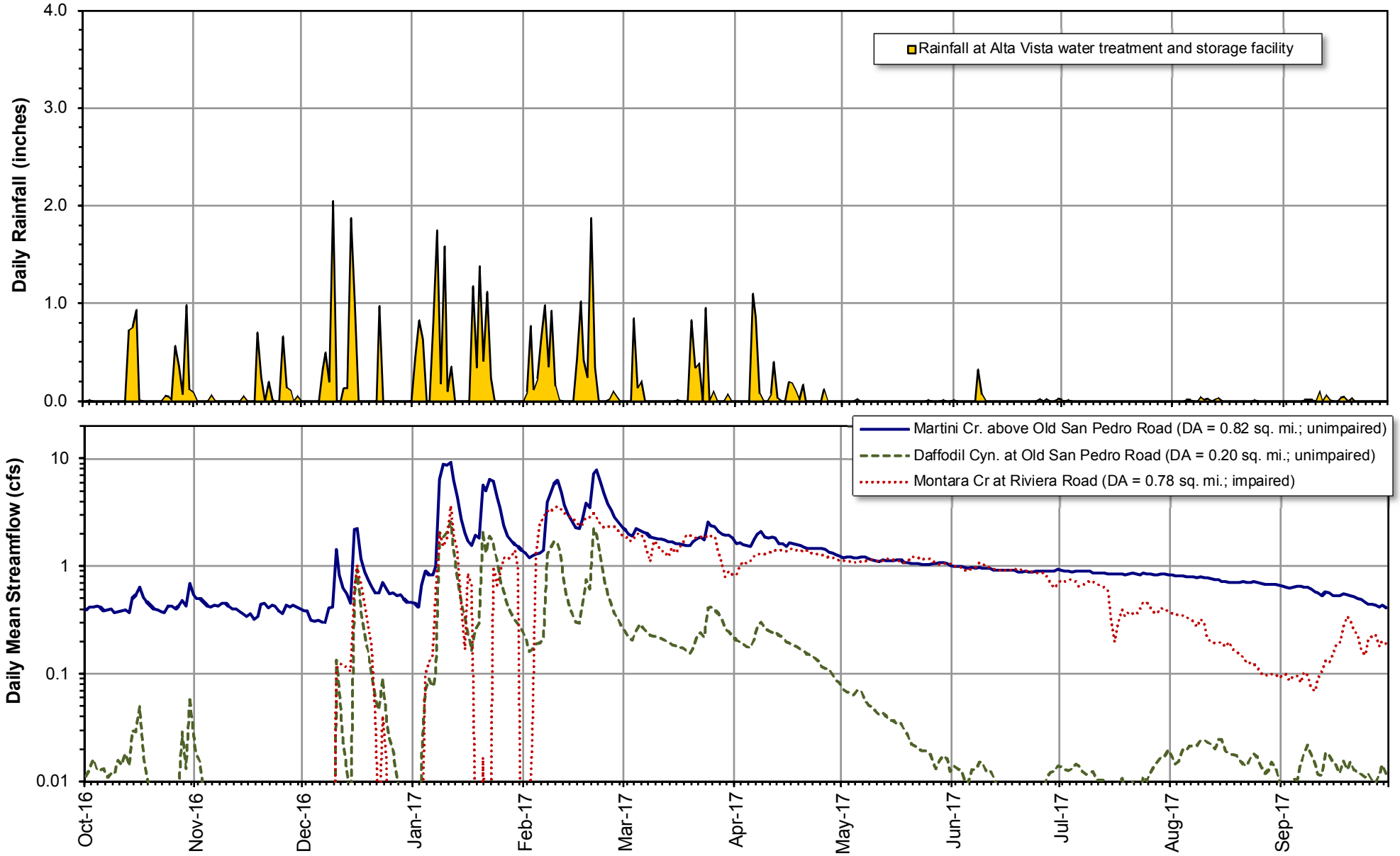
Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.



Appendix B. Flows in Montara Creek, Daffodil Canyon, and Martini Creek during water year 2017, San Mateo County, California. Water year 2017 was an exceptionally wet year with annual rainfall totaling 42.5 inches or 141 percent of average at the MWSD Alta Vista rain gage. WY2017 was the wettest year since WY2005 and WY2006, and followed four consecutive dry years and near normal rainfall during 2016. Baseflows at the three stream stations during 2017 were significantly higher and comparable to levels observed during wet year 2011, and during 2006 before pumping the well. Elevated dry-season baseflows from the wetter than normal antecedent rainfall persisted through the seasonally dry conditions from mid-April through October.

Data preliminary and subject to revision.



Balance Hydrologics

Appendix B. Daily rainfall and streamflow, water year 2017, Montara Water and Sanitary District, San Mateo County, California. MWSD operates a long-standing headwater diversion on Montara Creek about a half of a mile upstream of the gaging station; agricultural and dog-park activities operate on valley floor.

Data preliminary and subject to revision.

Form 1. Annual Rainfall Record: Alta Vista Water Treatment and Storage Facility

Station Location

Located at end of Alta Vista Road on 12 ft. post on east side of water treatment building.
Coordinates: 37°32'52.53"N 122°29'53.68"W, WGS84. Elevation: 480 feet, WGS84.
Site limitations: Gage elevated above roof; trees 40 feet west of gage.

Water Year: 2017
Station: AVWT
County, State: San Mateo County, CA
Station Location Map:

Period of Record

Tipping-bucket rain gage installed December 2, 2007.
Sponsored by the Montara Water & Sanitation District.
WY2001 through WY2008 daily rainfall manually measured at 8:00 AM by MWSD staff.
Mean annual rainfall = 30 inches

Seasonal Peak Daily Rainfall

Date	Inches	Date	Inches	Date	Inches	Date	Inches
1/27/08	3.70	3/5/16	1.94				
2/15/09	2.24	12/10/16	2.05				
10/13/09	3.71						
1/19/11	2.28						
1/20/12	2.06						
11/30/13	2.85						
2/8/14	1.46						
12/11/15	5.25						

Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.09	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00
2	0.00	0.00	0.00	0.46	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.01	0.00	0.00	0.83	0.77	0.00	0.00	0.00	0.00	0.01	0.00	0.00
4	0.00	0.00	0.00	0.63	0.12	0.85	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.23	0.14	0.00	0.02	0.00	0.00	0.01	0.00
6	0.00	0.06	0.00	0.00	0.63	0.21	1.10	0.00	0.00	0.00	0.01	0.00
7	0.00	0.00	0.32	0.81	0.98	0.00	0.86	0.00	0.00	0.00	0.00	0.01
8	0.00	0.00	0.50	1.75	0.35	0.00	0.08	0.00	0.32	0.00	0.00	0.01
9	0.00	0.00	0.20	0.18	0.92	0.00	0.00	0.00	0.07	0.00	0.04	0.01
10	0.00	0.00	2.05	1.58	0.16	0.00	0.00	0.00	0.00	0.00	0.01	0.00
11	0.00	0.00	0.00	0.10	0.01	0.00	0.07	0.00	0.00	0.00	0.02	0.10
12	0.00	0.00	0.00	0.35	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.13	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.02	0.06
14	0.73	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.01
15	0.76	0.05	1.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.93	0.00	1.00	0.00	0.44	0.01	0.20	0.00	0.00	0.00	0.00	0.00
17	0.01	0.00	0.00	0.00	1.02	0.00	0.19	0.00	0.00	0.00	0.00	0.03
18	0.00	0.00	0.00	1.18	0.42	0.00	0.11	0.00	0.00	0.00	0.00	0.04
19	0.00	0.70	0.00	0.34	0.25	0.00	0.01	0.00	0.00	0.00	0.00	0.00
20	0.00	0.25	0.00	1.38	1.87	0.83	0.17	0.00	0.00	0.00	0.00	0.03
21	0.00	0.00	0.00	0.41	0.34	0.34	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.20	0.00	1.12	0.00	0.39	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.01	0.97	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.05	0.00	0.00	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.01	0.00
25	0.04	0.00	0.00	0.00	0.02	0.01	0.00	0.01	0.02	0.00	0.00	0.00
26	0.01	0.66	0.00	0.00	0.10	0.10	0.12	0.00	0.00	0.00	0.00	0.00
27	0.57	0.14	0.00	0.00	0.04	0.00	0.00	0.00	0.02	0.00	0.00	0.00
28	0.36	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.07	0.00	0.00	0.00	--	0.00	0.00	0.01	0.00	0.00	0.00	0.00
30	0.98	0.05	0.00	0.00	--	0.07	0.00	0.00	0.02	0.00	0.00	0.00
31	0.12	--	0.00	0.00	--	0.00	--	0.00	--	0.00	0.00	--
Total	4.64	2.32	7.17	11.37	8.76	3.90	3.34	0.04	0.46	0.02	0.15	0.30
Max	0.98	0.70	2.05	1.75	1.87	0.95	1.10	0.02	0.32	0.01	0.04	0.10

Monitor's Comments

Water Year Summary

Total Annual	42.47	(inches)
Maximum Daily Total	2.05	(inches)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

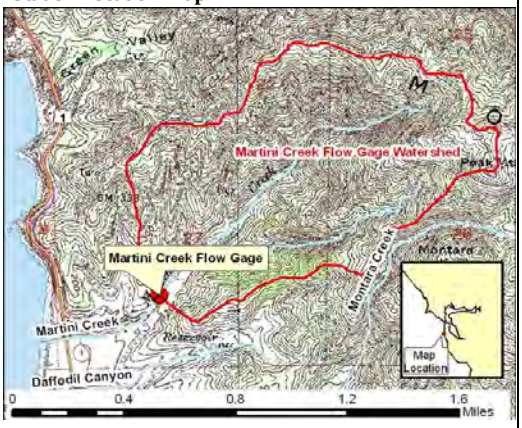
Form 2. Annual Hydrologic Record: Martini Creek above Old San Pedro Road

Station Location / Watershed Descriptors

Located on right bank 500 feet upstream of Old San Pedro Road Bridge.
Coordinates: N37.55454 W122.50625, NAD27. Elevation: 110 feet, NGVD 1929.
Watershed area above gage = 0.82 square miles.
Land use: Open space; McNee Ranch SP and Golden Gate National Recreation Area

Water Year: 2017
Stream: Martini Creek
Station: MASP
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder installed on 11/18/03.
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.71 cubic feet per second
Unit runoff for period of record: 0.86 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
12/29/03	---- no record ----			3/17/12	---- no record ----		
2/25/04	22:30	1.26	9.63	12/23/12	16:30	1.37	9.52
12/27/04	6:30	1.66	26.90	3/31/14	13:00	0.88	2.32
12/31/05	5:30	1.53	18.75	12/11/14	8:15	1.64	11.02
2/26/07	16:30	0.66	2.25	3/5/16	21:45	1.42	10.68
1/25/08	13:30	1.54	19.46	1/10/17	19:30	1.67	16.23
2/16/09	---- no record ----						
3/3/10	5:45	1.15	6.40				
3/26/11	8:15	1.69	29.49				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.40	0.50	0.39	0.46	1.33	2.16	1.63	1.22	1.01	0.93	0.84	0.66
2	0.42	0.50	0.39	0.42	1.20	2.01	1.66	1.23	1.00	0.90	0.82	0.65
3	0.42	0.46	0.32	0.67	1.26	1.93	1.61	1.23	1.00	0.90	0.83	0.64
4	0.43	0.43	0.31	0.90	1.29	2.25	1.57	1.22	0.99	0.90	0.82	0.65
5	0.42	0.42	0.31	0.84	1.33	2.18	1.55	1.20	0.97	0.91	0.81	0.66
6	0.39	0.44	0.31	0.83	1.42	2.06	1.81	1.22	0.98	0.91	0.80	0.66
7	0.39	0.43	0.30	1.00	3.95	2.03	2.02	1.22	0.97	0.90	0.80	0.65
8	0.40	0.45	0.42	6.45	4.65	1.88	2.10	1.17	0.98	0.91	0.79	0.65
9	0.37	0.45	0.42	8.88	5.81	1.85	1.86	1.17	0.97	0.90	0.80	0.62
10	0.38	0.43	1.46	8.67	6.28	1.80	1.83	1.13	0.96	0.88	0.79	0.59
11	0.38	0.40	0.83	9.27	4.84	1.80	1.87	1.12	0.96	0.87	0.78	0.57
12	0.40	0.40	0.64	6.32	3.72	1.75	1.84	1.15	0.93	0.87	0.78	0.54
13	0.37	0.38	0.55	4.41	3.06	1.69	1.64	1.14	0.92	0.87	0.76	0.58
14	0.50	0.36	0.46	2.78	2.65	1.70	1.63	1.14	0.92	0.86	0.75	0.57
15	0.54	0.34	2.23	2.05	2.28	1.64	1.55	1.12	0.93	0.86	0.73	0.53
16	0.64	0.36	2.27	1.75	2.25	1.64	1.67	1.17	0.93	0.86	0.72	0.53
17	0.51	0.32	1.19	1.57	2.72	1.59	1.64	1.15	0.92	0.85	0.71	0.53
18	0.48	0.34	0.89	1.97	3.89	1.58	1.60	1.08	0.92	0.85	0.71	0.56
19	0.44	0.45	0.75	1.84	3.51	1.57	1.57	1.08	0.90	0.84	0.72	0.55
20	0.41	0.46	0.66	5.70	7.34	1.71	1.52	1.07	0.89	0.85	0.71	0.54
21	0.40	0.41	0.57	5.08	7.96	1.79	1.47	1.06	0.90	0.86	0.72	0.53
22	0.38	0.44	0.57	6.39	6.19	1.88	1.47	1.06	0.88	0.85	0.71	0.50
23	0.37	0.43	0.71	6.24	4.76	1.79	1.46	1.05	0.89	0.84	0.72	0.50
24	0.43	0.39	0.61	4.41	3.80	2.58	1.48	1.05	0.90	0.86	0.72	0.46
25	0.43	0.37	0.56	3.52	3.28	2.41	1.47	1.05	0.91	0.86	0.71	0.45
26	0.40	0.43	0.58	2.37	2.86	2.36	1.45	1.07	0.91	0.86	0.70	0.45
27	0.43	0.42	0.54	1.94	2.57	2.12	1.36	1.06	0.91	0.84	0.68	0.44
28	0.48	0.44	0.54	1.73	2.36	2.00	1.32	1.10	0.91	0.84	0.68	0.42
29	0.43	0.42	0.51	1.60	--	1.94	1.28	1.10	0.91	0.85	0.69	0.44
30	0.70	0.40	0.47	1.52	--	1.97	1.25	1.06	0.94	0.85	0.69	0.41
31	0.54	--	0.46	1.42	--	1.84	--	1.02	--	0.84	0.67	--
MEAN	0.44	0.42	0.68	3.32	3.52	1.92	1.61	1.13	0.94	0.87	0.75	0.55
MAX. DAY	0.70	0.50	2.27	9.27	7.96	2.58	2.10	1.23	1.01	0.93	0.84	0.66
MIN. DAY	0.37	0.32	0.30	0.42	1.20	1.57	1.25	1.02	0.88	0.84	0.67	0.41
cfs days	13.7	12.5	21.2	103.0	98.6	59.5	48.2	34.9	28.1	27.0	23.2	16.5
ac-ft	27.1	24.8	42.0	204	195	118	95.5	69.3	55.8	53.6	45.9	32.8

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	1.33	(cfs)
Max. daily discharge	9.27	(cfs)
Min. daily discharge	0.30	(cfs)
Total	486	(cfs-days)
Total Volume	965	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

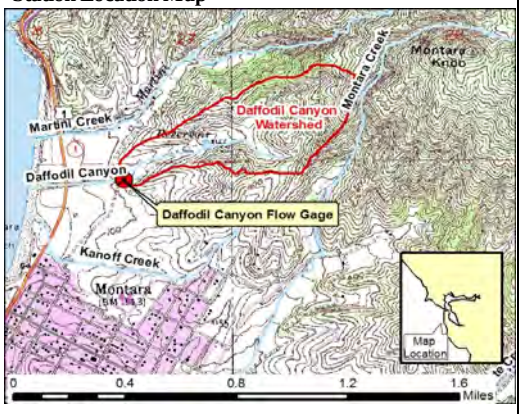
Form 3. Annual Hydrologic Record: Daffodil Canyon at Old San Pedro Road

Station Location / Watershed Descriptors

Located at hiking trail 80 feet upstream of Old San Pedro Road.
Coordinates: N37.55033 W122.5072, NAD27. Elevation: 110 feet, NGVD 1929
Watershed area above gage = 0.20 square miles.
Land use: Open space; Golden Gate National Recreation Area

Water Year: 2017
Stream: Daffodill Canyon
Station: DASP
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.072 cubic feet per second
Unit runoff: 0.36 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/19/08	21:50	0.60	0.64	3/31/14	13:15	1.18	0.48
2/24/09	1:50	0.70	1.13	12/11/14	23:15	1.95	3.13
3/3/10	6:00	0.97	4.13	3/13/16	14:45	2.17	4.18
12/28/10	22:00	2.06	4.57	1/20/17	4:45	2.96	7.27
3/16/12	20:30	1.30	0.81				
12/23/12	16:30	1.63	2.36				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.01	0.02	0.00	0.00	0.22	0.24	0.21	0.07	0.01	0.01	0.02	0.01
2	0.01	0.02	0.00	0.00	0.16	0.22	0.20	0.07	0.01	0.01	0.01	0.01
3	0.02	0.01	0.00	0.02	0.17	0.21	0.19	0.07	0.01	0.01	0.02	0.01
4	0.01	0.00	0.00	0.07	0.19	0.25	0.18	0.06	0.01	0.01	0.02	0.01
5	0.01	0.00	0.00	0.09	0.19	0.30	0.18	0.07	0.01	0.01	0.02	0.01
6	0.01	0.00	0.00	0.08	0.21	0.27	0.21	0.07	0.01	0.01	0.02	0.01
7	0.01	0.00	0.00	0.10	1.27	0.25	0.28	0.06	0.01	0.01	0.02	0.02
8	0.01	0.00	0.00	2.06	1.47	0.23	0.30	0.05	0.02	0.01	0.02	0.02
9	0.01	0.00	0.00	1.87	1.68	0.22	0.27	0.05	0.02	0.01	0.02	0.02
10	0.02	0.00	0.14	2.10	1.65	0.22	0.25	0.05	0.01	0.01	0.02	0.01
11	0.01	0.00	0.07	2.60	1.12	0.22	0.24	0.04	0.01	0.01	0.02	0.01
12	0.02	0.00	0.02	1.42	0.67	0.21	0.25	0.04	0.01	0.01	0.02	0.01
13	0.01	0.00	0.01	0.78	0.47	0.20	0.23	0.04	0.01	0.01	0.02	0.02
14	0.03	0.00	0.00	0.45	0.37	0.19	0.22	0.04	0.01	0.01	0.02	0.02
15	0.03	0.00	0.52	0.34	0.30	0.18	0.20	0.04	0.01	0.01	0.02	0.01
16	0.05	0.00	0.95	0.24	0.30	0.18	0.19	0.03	0.01	0.01	0.02	0.01
17	0.02	0.00	0.40	0.17	0.42	0.18	0.18	0.03	0.01	0.01	0.02	0.01
18	0.01	0.00	0.23	0.25	0.76	0.17	0.18	0.03	0.01	0.01	0.02	0.02
19	0.01	0.01	0.16	0.30	0.61	0.16	0.17	0.03	0.01	0.01	0.02	0.01
20	0.01	0.00	0.10	2.14	2.25	0.17	0.16	0.02	0.01	0.01	0.02	0.02
21	0.00	0.00	0.06	1.34	2.01	0.22	0.15	0.02	0.01	0.01	0.01	0.01
22	0.00	0.00	0.05	1.90	1.31	0.24	0.15	0.02	0.01	0.01	0.01	0.01
23	0.00	0.00	0.09	1.66	0.79	0.22	0.14	0.02	0.01	0.01	0.02	0.01
24	0.00	0.00	0.04	1.09	0.55	0.41	0.13	0.02	0.01	0.01	0.02	0.01
25	0.00	0.00	0.03	0.78	0.43	0.43	0.12	0.02	0.01	0.01	0.02	0.01
26	0.00	0.00	0.02	0.58	0.37	0.40	0.11	0.02	0.01	0.01	0.01	0.01
27	0.01	0.00	0.01	0.43	0.32	0.37	0.11	0.01	0.01	0.01	0.01	0.01
28	0.03	0.00	0.01	0.36	0.28	0.32	0.10	0.02	0.01	0.02	0.01	0.01
29	0.01	0.00	0.00	0.32	--	0.26	0.09	0.02	0.01	0.02	0.02	0.01
30	0.06	0.00	0.00	0.29	--	0.25	0.08	0.02	0.01	0.02	0.01	0.01
31	0.03	--	0.00	0.26	--	0.23	--	0.01	--	0.02	0.01	--
MEAN	0.02	0.00	0.09	0.78	0.73	0.25	0.18	0.04	0.01	0.01	0.02	0.01
MAX. DAY	0.06	0.02	0.95	2.60	2.25	0.43	0.30	0.07	0.02	0.02	0.02	0.02
MIN. DAY	0.00	0.00	0.00	0.00	0.16	0.16	0.08	0.01	0.01	0.01	0.01	0.01
cfs days	0.48	0.07	2.92	24.1	20.6	7.60	5.49	1.16	0.32	0.36	0.56	0.39
ac-ft	0.96	0.14	5.79	47.8	40.8	15.1	10.9	2.30	0.63	0.72	1.12	0.78

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.18	(cfs)
Max. daily discharge	2.60	(cfs)
Min. daily discharge	0.00	(cfs)
Total	64	(cfs-days)
Total Volume	127	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

Form 4. Annual Hydrologic Record: Montara Creek at Riviera Road

Station Location / Watershed Descriptors

Located: Downstream side of the Riviera Road crossing of Montra Creek
Coordinates: N37.5456 W122.495, NAD27. Elevation: 296 feet, NGVD 1929
Watershed area above gage: 0.78 square miles; MWSD diversion 0.5 mile upstream of gage
Land use: Agriculture and open space; Golden Gate National Recreation Area

Water Year: 2017
Stream: Montara Creek
Station: MORR
County, State: San Mateo County, CA

Station Location Map

Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.18 cubic feet per second
Unit runoff: 0.24 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/6/08	1:00	0.64	0.85	3/31/14	13:15	0.77	0.62
2/16/09	9:30	1.08	0.66	12/16/15	2:30	0.87	1.79
3/2/10	9:00	1.42	1.82	3/15/16	15:45	0.75	3.22
11/27/10	7:45	1.42	2.96	1/11/17	21:30	2.09	4.57
10/5/11	1:15	1.00	1.46				
12/2/12	8:15	0.78	0.98				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.00	0.00	0.01	0.00	1.91	0.84	1.14	1.00	0.74	0.37	0.10
2	0.00	0.00	0.00	0.00	0.00	1.74	1.02	1.14	0.99	0.72	0.36	0.10
3	0.00	0.00	0.00	0.00	0.02	1.75	1.11	1.12	0.99	0.76	0.35	0.09
4	0.00	0.00	0.00	0.10	1.26	2.01	1.07	1.08	0.92	0.76	0.35	0.10
5	0.00	0.00	0.00	0.13	2.50	2.04	1.14	1.12	0.90	0.72	0.34	0.10
6	0.00	0.00	0.00	0.15	2.84	1.85	1.26	1.10	0.97	0.66	0.33	0.08
7	0.00	0.00	0.00	0.57	3.29	1.41	1.31	1.11	0.98	0.67	0.31	0.10
8	0.00	0.00	0.00	2.07	3.21	1.11	1.31	1.15	1.08	0.70	0.28	0.10
9	0.00	0.00	0.00	1.53	3.53	1.73	1.31	1.15	1.08	0.74	0.33	0.07
10	0.00	0.00	0.11	1.84	3.59	1.58	1.34	1.13	1.00	0.72	0.30	0.07
11	0.00	0.00	0.12	3.66	3.35	1.40	1.38	1.12	0.98	0.68	0.21	0.09
12	0.00	0.00	0.12	1.99	3.12	1.40	1.40	1.14	0.95	0.68	0.20	0.11
13	0.00	0.00	0.12	1.35	3.02	1.24	1.46	1.17	0.95	0.64	0.20	0.13
14	0.00	0.00	0.11	0.43	2.84	1.52	1.39	1.17	0.93	0.59	0.19	0.13
15	0.00	0.00	0.63	0.17	2.66	1.34	1.38	1.15	0.91	0.34	0.20	0.16
16	0.00	0.00	1.03	0.88	2.39	1.47	1.44	1.14	0.94	0.20	0.18	0.18
17	0.00	0.00	0.69	0.66	2.45	1.62	1.46	1.12	0.93	0.30	0.20	0.19
18	0.00	0.00	0.43	0.00	2.84	1.95	1.42	1.08	0.93	0.40	0.17	0.28
19	0.00	0.00	0.26	0.00	2.85	1.95	1.42	1.12	0.97	0.34	0.16	0.34
20	0.00	0.00	0.19	0.02	3.09	1.88	1.37	1.24	0.93	0.38	0.15	0.31
21	0.00	0.00	0.05	0.00	2.85	1.83	1.42	1.24	0.90	0.37	0.14	0.26
22	0.00	0.00	0.00	0.00	2.52	1.87	1.33	1.20	0.93	0.36	0.13	0.23
23	0.00	0.00	0.04	1.00	2.28	1.84	1.30	1.16	0.88	0.41	0.13	0.17
24	0.00	0.00	0.02	0.67	2.36	1.94	1.31	1.18	0.87	0.47	0.13	0.15
25	0.00	0.00	0.00	0.87	2.37	1.90	1.28	1.19	0.88	0.46	0.12	0.21
26	0.00	0.00	0.01	1.19	2.36	1.92	1.26	1.11	0.88	0.41	0.10	0.23
27	0.00	0.00	0.01	1.16	2.15	1.35	1.21	1.08	0.82	0.37	0.10	0.23
28	0.00	0.00	0.00	1.25	1.97	1.04	1.20	1.05	0.72	0.37	0.10	0.18
29	0.00	0.00	0.00	1.42	--	0.81	1.18	1.06	0.63	0.41	0.10	0.20
30	0.00	0.00	0.00	0.99	--	0.90	1.14	1.06	0.69	0.40	0.10	0.19
31	0.00	--	0.00	0.00	--	0.83	--	1.06	--	0.39	0.09	--
MEAN	0.00	0.00	0.13	0.78	2.42	1.58	1.28	1.13	0.92	0.52	0.21	0.16
MAX. DAY	0.00	0.00	1.03	3.66	3.59	2.04	1.46	1.24	1.08	0.76	0.37	0.34
MIN. DAY	0.00	0.00	0.00	0.00	0.00	0.81	0.84	1.05	0.63	0.20	0.09	0.07
cfs days	0.01	0.00	3.94	24.1	67.7	49.1	38.4	35.1	27.5	16.1	6.41	4.89
ac-ft	0.01	0.00	7.81	47.8	134	97.4	76.2	69.6	54.6	32.0	12.7	9.69

Monitor's Comments

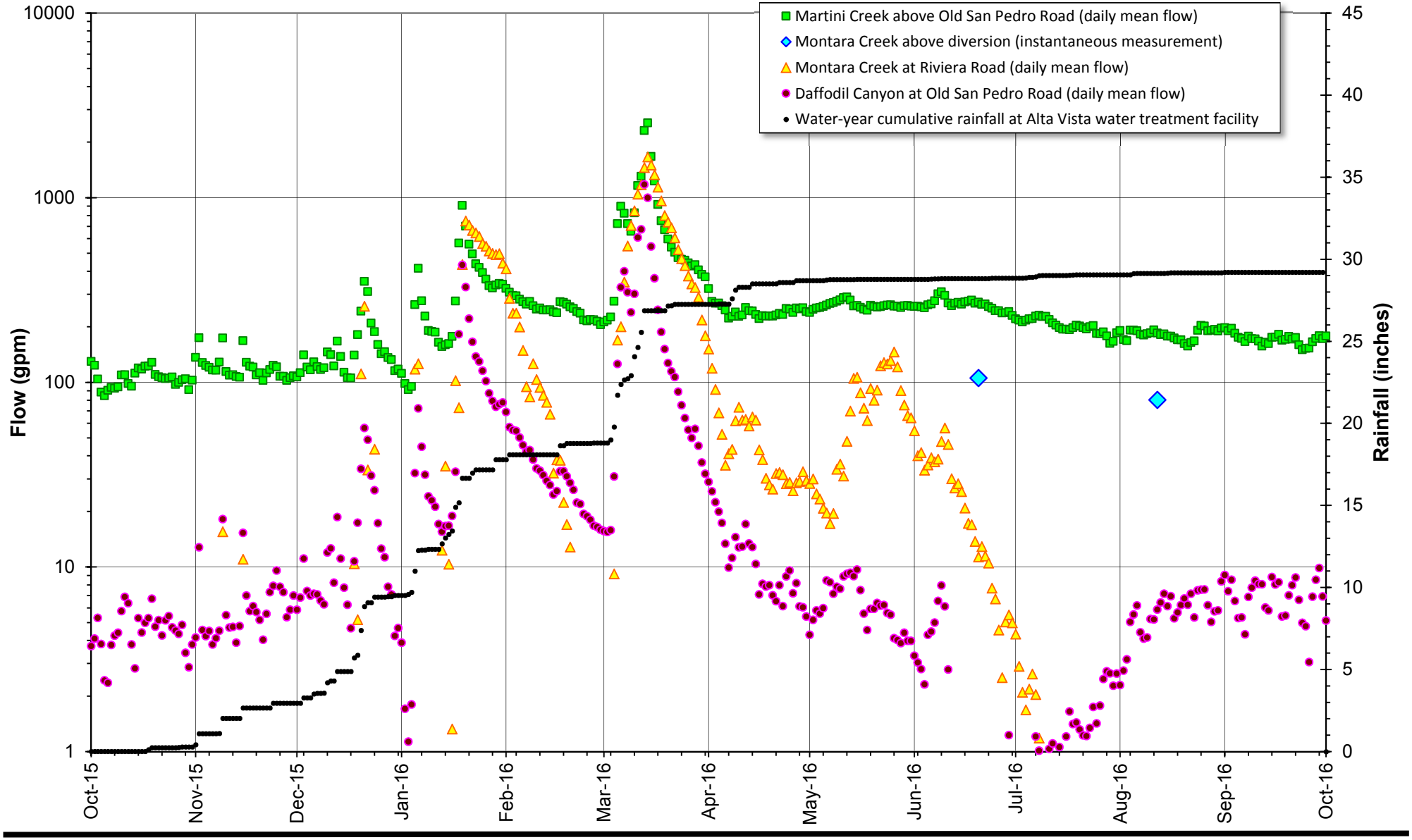
1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.75	(cfs)
Max. daily discharge	3.66	(cfs)
Min. daily discharge	0.00	(cfs)
Total	273	(cfs-days)
Total Volume	542	(ac-ft)

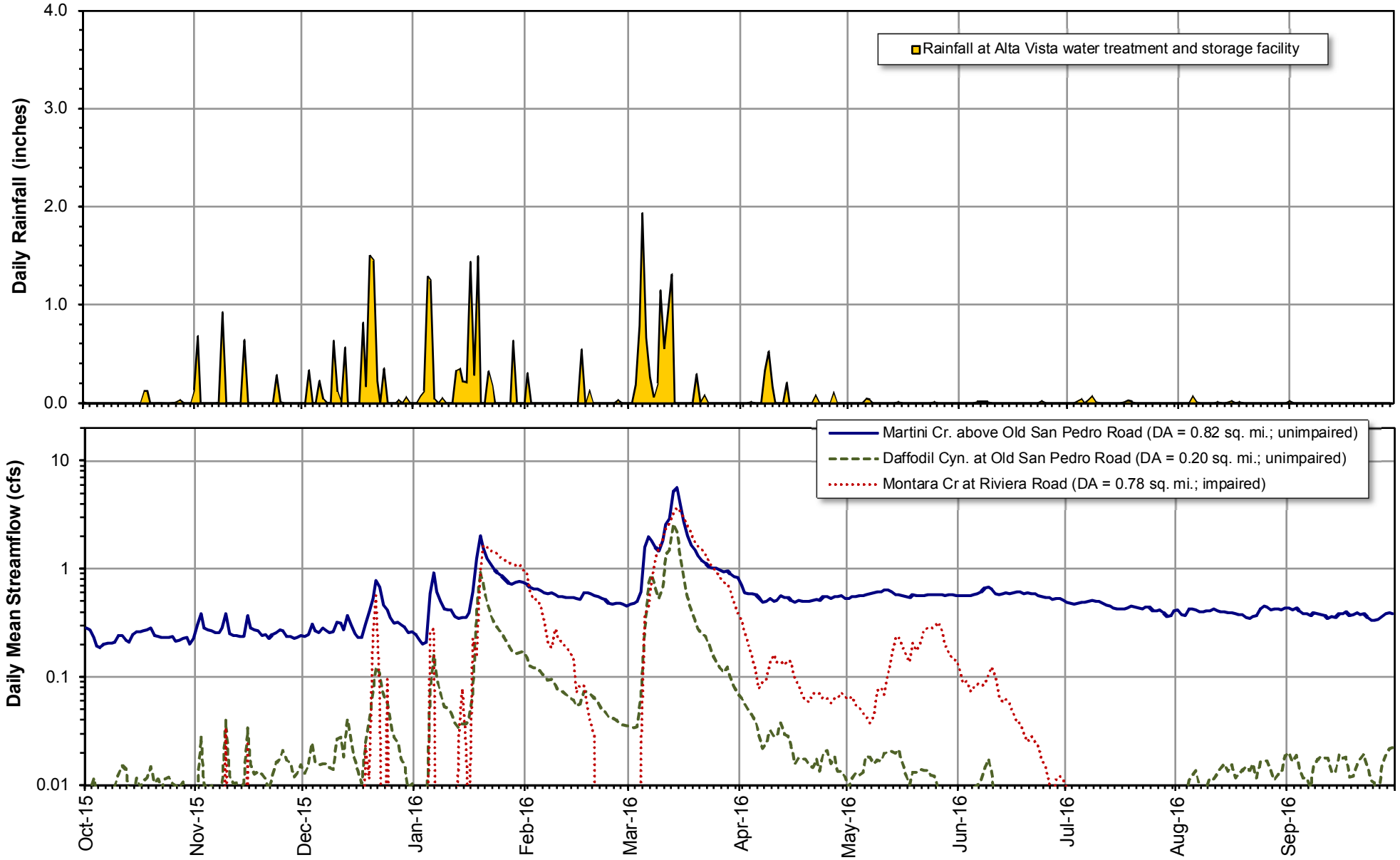
Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.



Appendix B. Flows in Montara Creek, Daffodil Canyon, and Martini Creek during water year 2016, San Mateo County, California. Following four consecutive dry years, rainfall during water year 2016 totaled 29.2 inches or 97 percent of average. 18 inches of rain fell during November, December and January, followed by a mid-winter dry spell during February. An additional 9 inches of rain then fell during early March, generating seasonal peak flows. Generally dry conditions then persisted through the remainder of the year, interrupted by few minor storms totaling 2.3 inches of rain primarily during March and April. Baseflows recovered relative to previous dry years, indicating recharge to the bedrock aquifer that supplies the baseflow to the streams.

Data preliminary and subject to revision.



Balance Hydrologics

Appendix B. Daily rainfall and streamflow, water year 2016, Montara Water and Sanitary District, San Mateo County, California. MWSD operates a long-standing headwater diversion on Montara Creek about a half of a mile upstream of the gaging station; agricultural and dog-park activities operate on valley floor.

Data preliminary and subject to revision.

Form 1. Annual Rainfall Record: Alta Vista Water Treatment and Storage Facility

Station Location

Located at end of Alta Vista Road on 12 ft. post on east side of water treatment building.
Coordinates: 37°32'52.53"N 122°29'53.68"W, WGS84. Elevation: 480 feet, WGS84.
Site limitations: Gage elevated above roof; trees 40 feet west of gage.

Water Year: **2016**
Station: AVWT
County, State: San Mateo County, CA
Station Location Map:

Period of Record

Tipping-bucket rain gage installed December 2, 2007.
Sponsored by the Montara Water & Sanitation District.
WY2001 through WY2008 daily rainfall manually measured at 8:00 AM by MWSD staff.
Mean annual rainfall = 30 inches

Seasonal Peak Daily Rainfall

Date	Inches	Date	Inches	Date	Inches	Date	Inches
1/27/08	3.70	3/5/16	1.94				
2/15/09	2.24						
10/13/09	3.71						
1/19/11	2.28						
1/20/12	2.06						
11/30/13	2.85						
2/8/14	1.46						
12/11/15	5.25						

Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.01	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
2	0.00	0.68	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.33	0.07	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.12	0.00	0.79	0.01	0.00	0.00	0.02	0.00	0.00
5	0.00	0.00	0.00	1.29	0.00	1.94	0.00	0.00	0.00	0.04	0.07	0.00
6	0.00	0.00	0.23	1.25	0.00	0.66	0.00	0.04	0.01	0.00	0.01	0.00
7	0.00	0.00	0.04	0.04	0.00	0.27	0.00	0.03	0.01	0.03	0.00	0.00
8	0.00	0.01	0.00	0.00	0.00	0.06	0.33	0.00	0.01	0.07	0.00	0.00
9	0.00	0.92	0.01	0.05	0.00	0.20	0.53	0.00	0.01	0.01	0.00	0.00
10	0.00	0.00	0.63	0.00	0.00	1.15	0.17	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.12	0.00	0.00	0.56	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.01	0.00
13	0.00	0.00	0.57	0.33	0.00	1.31	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.35	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00
15	0.00	0.64	0.00	0.22	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00
16	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
17	0.00	0.00	0.00	1.44	0.55	0.00	0.00	0.00	0.00	0.01	0.00	0.00
18	0.12	0.00	0.82	0.28	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00
19	0.12	0.00	0.17	1.50	0.13	0.01	0.00	0.00	0.00	0.01	0.00	0.00
20	0.00	0.00	1.51	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	1.46	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.23	0.32	0.00	0.08	0.08	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.28	0.35	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
25	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.01	0.00	0.00	0.00	0.03	0.00	0.11	0.00	0.00	0.00	0.00	0.00
28	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.06	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	--	0.00	0.00	--	0.00	--	0.00	--	0.00	0.00	--
Total	0.29	2.67	6.56	8.28	1.01	8.45	1.44	0.09	0.06	0.21	0.13	0.02
Max	0.12	0.92	1.51	1.50	0.55	1.94	0.53	0.04	0.02	0.07	0.07	0.02

Monitor's Comments

Water Year Summary

Total Annual	29.21	(inches)
Maximum Daily Total	1.94	(inches)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

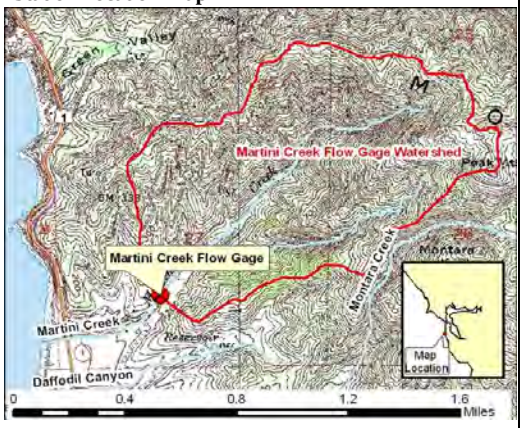
Form 2. Annual Hydrologic Record: Martini Creek above Old San Pedro Road

Station Location / Watershed Descriptors

Located on right bank 500 feet upstream of Old San Pedro Road Bridge.
Coordinates: N37.55454 W122.50625, NAD27. Elevation: 110 feet, NGVD 1929.
Watershed area above gage = 0.82 square miles.
Land use: Open space; McNee Ranch SP and Golden Gate National Recreation Area

Water Year: 2016
Stream: Martini Creek
Station: MASP
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder installed on 11/18/03.
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.71 cubic feet per second
Unit runoff for period of record: 0.86 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
12/29/03	---- no record ----			3/3/10	5:45	1.15	6.40
2/25/04	22:30	1.26	9.63	3/26/11	8:15	1.69	29.49
12/27/04	6:30	1.66	26.90	3/17/12	---- no record ----		
12/31/05	5:30	1.53	18.75	12/23/12	16:30	1.37	9.52
2/26/07	16:30	0.66	2.25	3/31/14	13:00	0.88	2.32
1/25/08	13:30	1.54	19.46	12/11/14	8:15	1.64	11.02
2/16/09	---- no record ----			3/5/16	21:45	1.42	10.68

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.29	0.30	0.24	0.25	0.72	0.47	0.72	0.53	0.57	0.49	0.42	0.44
2	0.28	0.39	0.25	0.22	0.69	0.48	0.61	0.55	0.58	0.48	0.38	0.42
3	0.23	0.28	0.31	0.20	0.66	0.50	0.60	0.56	0.57	0.47	0.37	0.44
4	0.20	0.27	0.27	0.21	0.65	0.61	0.60	0.57	0.57	0.48	0.43	0.41
5	0.19	0.27	0.26	0.59	0.63	1.61	0.58	0.57	0.59	0.49	0.43	0.39
6	0.20	0.26	0.29	0.92	0.61	2.00	0.55	0.58	0.59	0.49	0.42	0.39
7	0.21	0.26	0.27	0.62	0.59	1.83	0.50	0.60	0.62	0.51	0.41	0.37
8	0.21	0.29	0.26	0.51	0.61	1.61	0.51	0.60	0.67	0.51	0.40	0.40
9	0.21	0.39	0.27	0.43	0.58	1.46	0.54	0.61	0.69	0.51	0.41	0.38
10	0.24	0.25	0.33	0.42	0.56	1.84	0.51	0.62	0.66	0.51	0.41	0.38
11	0.25	0.24	0.31	0.42	0.56	2.59	0.52	0.64	0.60	0.49	0.43	0.37
12	0.22	0.24	0.27	0.37	0.55	2.91	0.57	0.65	0.58	0.47	0.41	0.35
13	0.21	0.24	0.37	0.35	0.55	5.14	0.54	0.62	0.60	0.45	0.40	0.37
14	0.25	0.24	0.31	0.36	0.55	5.67	0.54	0.58	0.60	0.44	0.41	0.36
15	0.27	0.37	0.25	0.36	0.54	3.73	0.52	0.58	0.59	0.43	0.40	0.39
16	0.26	0.29	0.24	0.40	0.53	2.74	0.49	0.57	0.61	0.43	0.40	0.39
17	0.27	0.27	0.24	0.61	0.61	2.04	0.51	0.55	0.61	0.43	0.39	0.40
18	0.27	0.27	0.31	1.27	0.60	1.67	0.51	0.55	0.62	0.44	0.38	0.38
19	0.29	0.24	0.40	2.02	0.59	1.49	0.51	0.58	0.60	0.45	0.38	0.38
20	0.25	0.25	0.54	1.56	0.57	1.33	0.51	0.57	0.61	0.45	0.36	0.39
21	0.24	0.23	0.79	1.25	0.56	1.20	0.52	0.57	0.59	0.44	0.35	0.38
22	0.24	0.25	0.69	1.10	0.54	1.13	0.53	0.57	0.59	0.43	0.37	0.39
23	0.23	0.26	0.47	0.98	0.53	1.05	0.52	0.58	0.57	0.45	0.37	0.36
24	0.23	0.28	0.42	0.93	0.48	1.03	0.56	0.58	0.56	0.45	0.43	0.33
25	0.24	0.27	0.36	0.87	0.48	1.02	0.56	0.59	0.54	0.41	0.45	0.34
26	0.22	0.24	0.32	0.81	0.49	0.99	0.53	0.58	0.54	0.41	0.45	0.34
27	0.22	0.24	0.33	0.74	0.49	0.95	0.56	0.58	0.53	0.42	0.42	0.37
28	0.23	0.23	0.30	0.72	0.48	0.97	0.56	0.57	0.53	0.40	0.43	0.38
29	0.23	0.24	0.30	0.75	0.46	0.91	0.57	0.58	0.54	0.36	0.43	0.40
30	0.20	0.24	0.26	0.76	--	0.85	0.54	0.58	0.51	0.37	0.42	0.38
31	0.23	--	0.26	0.76	--	0.83	--	0.58	--	0.41	0.44	--
MEAN	0.24	0.27	0.34	0.70	0.57	1.70	0.54	0.58	0.59	0.45	0.41	0.38
MAX. DAY	0.29	0.39	0.79	2.02	0.72	5.67	0.72	0.65	0.69	0.51	0.45	0.44
MIN. DAY	0.19	0.23	0.24	0.20	0.46	0.47	0.49	0.53	0.51	0.36	0.35	0.33
cfs days	7.30	8.10	10.5	21.8	16.4	52.7	16.3	18.0	17.6	14.0	12.6	11.5
ac-ft	14.5	16.1	20.8	43.1	32.6	105	32.4	35.8	35.0	27.8	25.0	22.8

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.57	(cfs)
Max. daily discharge	5.67	(cfs)
Min. daily discharge	0.19	(cfs)
Total	207	(cfs-days)
Total Volume	410	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

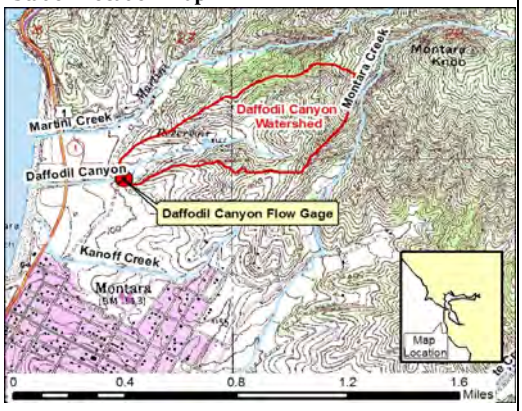
Form 3. Annual Hydrologic Record: Daffodil Canyon at Old San Pedro Road

Station Location / Watershed Descriptors

Located at hiking trail 80 feet upstream of Old San Pedro Road.
Coordinates: N37.55033 W122.5072, NAD27. Elevation: 110 feet, NGVD 1929
Watershed area above gage = 0.20 square miles.
Land use: Open space; Golden Gate National Recreation Area

Water Year: 2016
Stream: Daffodill Canyon
Station: DASP
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.072 cubic feet per second
Unit runoff: 0.36 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/19/08	21:50	0.60	0.64	3/31/14	13:15	1.18	0.48
2/24/09	1:50	0.70	1.13	12/11/14	23:15	1.95	3.13
3/3/10	6:00	0.97	4.13	3/13/16	14:45	2.17	4.18
12/28/10	22:00	2.06	4.57				
3/16/12	20:30	1.30	0.81				
12/23/12	16:30	1.63	2.36				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.01	0.01	0.01	0.01	0.15	0.03	0.06	0.01	0.01	0.00	0.01	0.02
2	0.01	0.03	0.02	0.00	0.13	0.03	0.06	0.01	0.01	0.00	0.01	0.02
3	0.01	0.01	0.02	0.00	0.12	0.04	0.05	0.01	0.01	0.00	0.01	0.02
4	0.01	0.01	0.02	0.00	0.12	0.07	0.04	0.01	0.01	0.00	0.01	0.01
5	0.01	0.01	0.02	0.07	0.11	0.28	0.04	0.01	0.01	0.00	0.01	0.01
6	0.01	0.01	0.02	0.16	0.10	0.73	0.03	0.02	0.01	0.00	0.01	0.01
7	0.01	0.01	0.02	0.10	0.09	0.89	0.02	0.02	0.01	0.00	0.01	0.01
8	0.01	0.01	0.01	0.07	0.10	0.69	0.02	0.02	0.01	0.00	0.01	0.02
9	0.01	0.04	0.01	0.05	0.09	0.53	0.03	0.02	0.02	0.00	0.01	0.02
10	0.01	0.01	0.03	0.05	0.08	0.67	0.03	0.02	0.01	0.00	0.01	0.02
11	0.02	0.01	0.03	0.05	0.07	1.36	0.03	0.02	0.01	0.00	0.01	0.02
12	0.01	0.01	0.02	0.04	0.07	1.50	0.04	0.02	0.00	0.00	0.01	0.02
13	0.01	0.01	0.04	0.03	0.07	2.63	0.03	0.02	0.00	0.00	0.01	0.01
14	0.01	0.01	0.02	0.04	0.06	2.23	0.03	0.02	0.00	0.00	0.02	0.01
15	0.01	0.03	0.02	0.04	0.05	1.21	0.02	0.02	0.00	0.00	0.01	0.02
16	0.01	0.02	0.01	0.04	0.06	0.82	0.02	0.02	0.00	0.00	0.02	0.02
17	0.01	0.01	0.01	0.07	0.07	0.55	0.02	0.01	0.00	0.00	0.01	0.02
18	0.01	0.01	0.02	0.41	0.07	0.42	0.02	0.01	0.00	0.00	0.01	0.01
19	0.02	0.01	0.04	0.96	0.07	0.34	0.02	0.01	0.00	0.00	0.01	0.01
20	0.01	0.01	0.08	0.73	0.06	0.28	0.02	0.01	0.00	0.00	0.02	0.02
21	0.01	0.01	0.13	0.49	0.06	0.26	0.01	0.01	0.00	0.00	0.01	0.02
22	0.01	0.01	0.11	0.37	0.05	0.24	0.02	0.01	0.00	0.00	0.02	0.02
23	0.01	0.02	0.07	0.31	0.05	0.20	0.01	0.01	0.00	0.00	0.01	0.01
24	0.01	0.02	0.06	0.29	0.04	0.17	0.02	0.01	0.00	0.00	0.02	0.01
25	0.01	0.02	0.04	0.26	0.04	0.14	0.02	0.01	0.00	0.00	0.02	0.01
26	0.01	0.02	0.03	0.23	0.04	0.12	0.02	0.01	0.00	0.00	0.02	0.01
27	0.01	0.02	0.03	0.19	0.04	0.11	0.02	0.01	0.00	0.01	0.01	0.02
28	0.01	0.01	0.02	0.18	0.04	0.12	0.01	0.01	0.00	0.01	0.01	0.02
29	0.01	0.01	0.02	0.16	0.04	0.10	0.01	0.01	0.00	0.01	0.01	0.02
30	0.01	0.02	0.01	0.17	--	0.08	0.01	0.01	0.00	0.01	0.01	0.02
31	0.01	--	0.01	0.17	--	0.07	--	0.01	--	0.01	0.02	--
MEAN	0.01	0.01	0.03	0.19	0.07	0.55	0.03	0.01	0.00	0.00	0.01	0.02
MAX. DAY	0.02	0.04	0.13	0.96	0.15	2.63	0.06	0.02	0.02	0.01	0.02	0.02
MIN. DAY	0.01	0.01	0.01	0.00	0.04	0.03	0.01	0.01	0.00	0.00	0.01	0.01
cfs days	0.31	0.44	0.97	5.76	2.15	16.9	0.79	0.44	0.13	0.09	0.39	0.47
ac-ft	0.62	0.87	1.93	11.4	4.26	33.6	1.56	0.87	0.25	0.17	0.78	0.94

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.079	(cfs)
Max. daily discharge	2.63	(cfs)
Min. daily discharge	0.00	(cfs)
Total	29	(cfs-days)
Total Volume	57	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

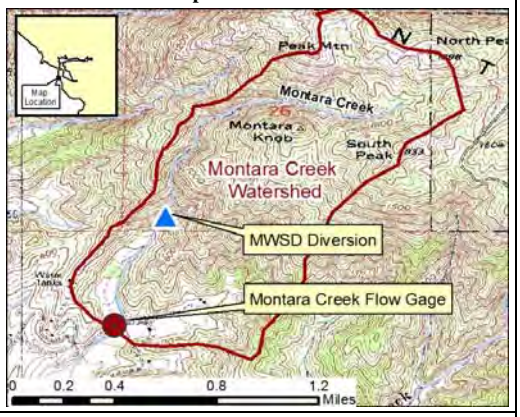
Form 4. Annual Hydrologic Record: Montara Creek at Riviera Road

Station Location / Watershed Descriptors

Located: Downstream side of the Riviera Road crossing of Montra Creek
Coordinates: N37.5456 W122.495, NAD27. Elevation: 296 feet, NGVD 1929
Watershed area above gage: 0.78 square miles; MWSD diversion 0.5 mile upstream of gage
Land use: Agriculture and open space; Golden Gate National Recreation Area

Water Year: 2016
Stream: Montara Creek
Station: MORR
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.18 cubic feet per second
Unit runoff: 0.24 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/6/08	1:00	0.64	0.85	3/31/14	13:15	0.77	0.62
2/16/09	9:30	1.08	0.66	12/16/15	2:30	0.87	1.79
3/2/10	9:00	1.42	1.82	3/15/16	15:45	0.75	3.22
11/27/10	7:45	1.42	2.96				
10/5/11	1:15	1.00	1.46				
12/2/12	8:15	0.78	0.98				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.00	0.00	0.00	0.92	0.00	0.34	0.06	0.12	0.01	0.00	0.00
2	0.00	0.00	0.00	0.00	0.63	0.00	0.27	0.07	0.09	0.01	0.00	0.00
3	0.00	0.00	0.00	0.00	0.53	0.00	0.20	0.06	0.09	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.53	0.02	0.15	0.05	0.07	0.00	0.00	0.00
5	0.00	0.00	0.00	0.26	0.44	0.38	0.12	0.05	0.08	0.00	0.00	0.00
6	0.00	0.00	0.00	0.28	0.33	0.45	0.08	0.04	0.09	0.01	0.00	0.00
7	0.00	0.00	0.00	0.00	0.21	0.78	0.09	0.04	0.08	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.19	1.22	0.10	0.04	0.09	0.00	0.00	0.00
9	0.00	0.03	0.00	0.00	0.28	1.58	0.14	0.08	0.11	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.23	1.89	0.16	0.08	0.13	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.21	2.33	0.14	0.07	0.10	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.19	2.62	0.14	0.11	0.07	0.00	0.00	0.00
13	0.00	0.00	0.00	0.03	0.17	3.24	0.13	0.16	0.06	0.00	0.00	0.00
14	0.00	0.00	0.00	0.08	0.15	3.71	0.14	0.23	0.06	0.00	0.00	0.00
15	0.00	0.02	0.00	0.02	0.07	3.35	0.14	0.24	0.06	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.08	2.97	0.10	0.20	0.05	0.00	0.00	0.00
17	0.00	0.00	0.00	0.23	0.08	2.54	0.09	0.16	0.04	0.00	0.00	0.00
18	0.00	0.00	0.02	0.16	0.05	2.14	0.07	0.14	0.04	0.00	0.00	0.00
19	0.00	0.00	0.01	0.97	0.04	1.78	0.06	0.21	0.03	0.00	0.00	0.00
20	0.00	0.00	0.25	1.66	0.03	1.64	0.06	0.18	0.03	0.00	0.00	0.00
21	0.00	0.00	0.58	1.58	0.00	1.53	0.07	0.20	0.03	0.00	0.00	0.00
22	0.00	0.00	0.07	1.48	0.00	1.35	0.07	0.27	0.03	0.00	0.00	0.00
23	0.00	0.00	0.00	1.44	0.00	1.17	0.07	0.28	0.02	0.00	0.00	0.00
24	0.00	0.00	0.10	1.37	0.00	1.04	0.06	0.28	0.02	0.00	0.00	0.00
25	0.00	0.00	0.00	1.26	0.00	0.96	0.06	0.29	0.01	0.00	0.00	0.00
26	0.00	0.00	0.00	1.22	0.00	0.84	0.06	0.32	0.01	0.00	0.00	0.00
27	0.00	0.00	0.00	1.15	0.00	0.76	0.06	0.27	0.01	0.00	0.00	0.00
28	0.00	0.00	0.00	1.11	0.00	0.73	0.06	0.20	0.01	0.00	0.00	0.00
29	0.00	0.00	0.00	1.10	0.00	0.64	0.07	0.17	0.01	0.00	0.00	0.00
30	0.00	0.00	0.00	1.11	--	0.48	0.07	0.15	0.01	0.00	0.00	0.00
31	0.00	--	0.00	0.98	--	0.40	--	0.14	--	0.00	0.00	--
MEAN	0.00	0.00	0.03	0.56	0.19	1.37	0.11	0.16	0.05	0.00	0.00	0.00
MAX. DAY	0.00	0.03	0.58	1.66	0.92	3.71	0.34	0.32	0.13	0.01	0.00	0.00
MIN. DAY	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.01	0.00	0.00	0.00
cfs days	0.00	0.06	1.03	17.5	5.37	42.5	3.37	4.84	1.63	0.04	0.00	0.00
ac-ft	0.01	0.12	2.05	34.7	10.7	84.3	6.69	9.59	3.24	0.09	0.00	0.00

Monitor's Comments

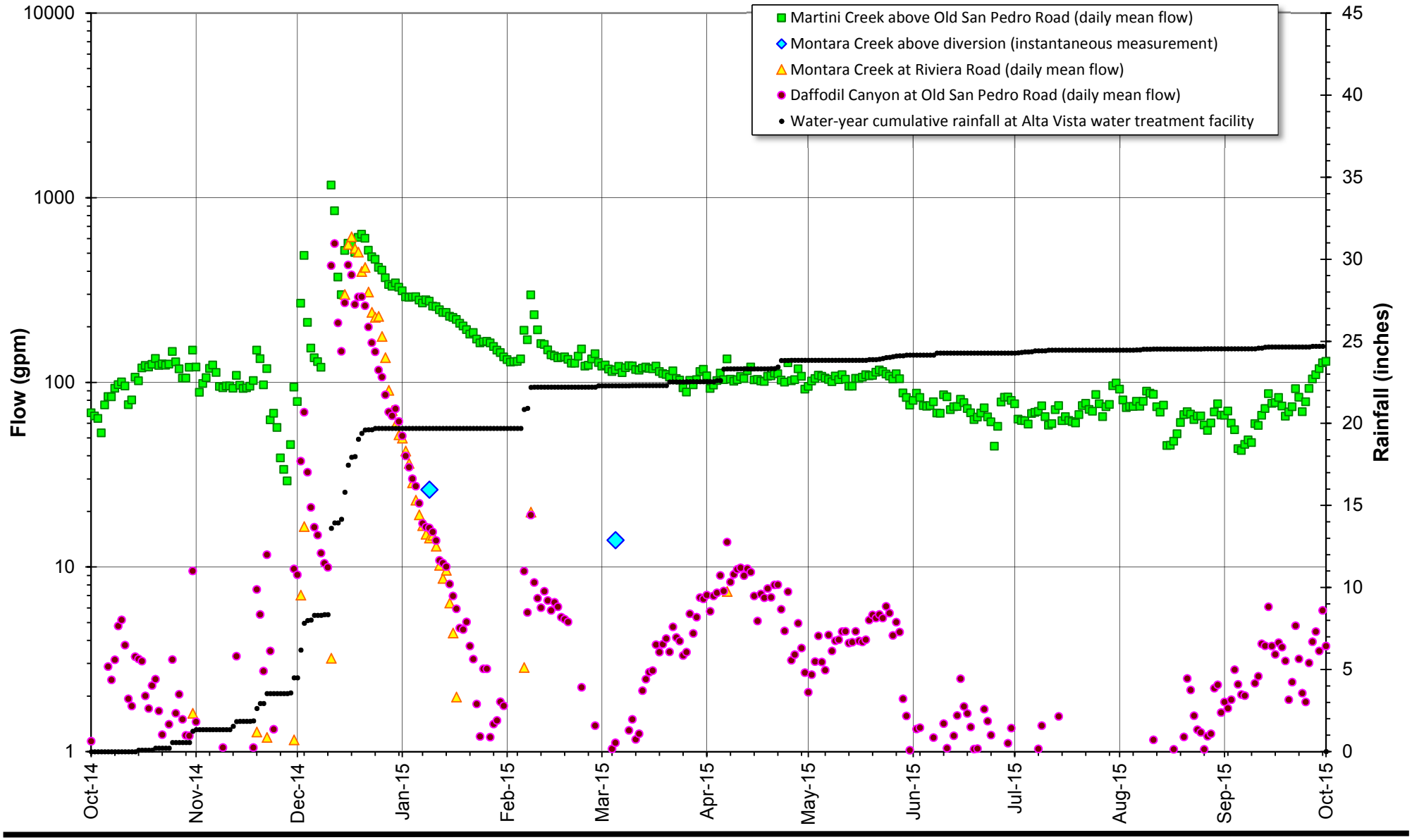
1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.21	(cfs)
Max. daily discharge	3.71	(cfs)
Min. daily discharge	0.00	(cfs)
Total	76	(cfs-days)
Total Volume	151	(ac-ft)

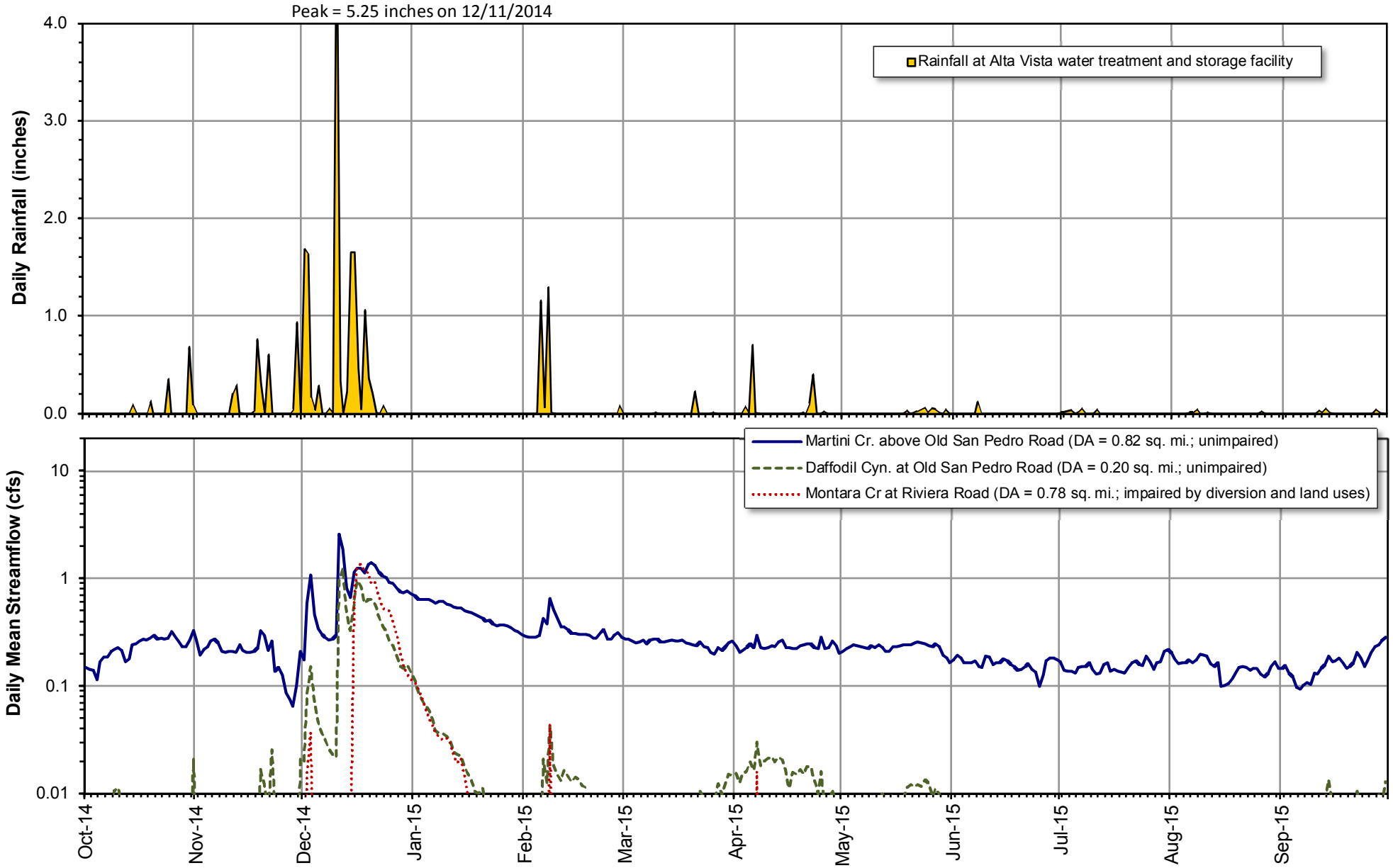
Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.



Appendix B. Flows in Montara Creek, Daffodil Canyon, and Martini Creek during water year 2015, San Mateo County, California. Water year 2015 was a fourth consecutive drought year with the annual rainfall totaling 24.7 inches or 82 percent of average. 16 inches of rain fell from November 30 to December 22, with a record peak of 5.25 inches on December 11, 2014. Generally dry conditions then persisted through the remainder of the wet-season, interrupted only by 2.5 inches of rain falling in early February and a few late-season small storms. Baseflows were lowest on record, highlighting the insufficient recharge to the bedrock aquifer that supplies the baseflow to the streams.

Data preliminary and subject to revision.



Appendix B. Daily rainfall and streamflow, water year 2015, Montara Water and Sanitary District, San Mateo County, California. MWSD operates a long-standing headwater diversion on Montara Creek about a half of a mile upstream of the gaging station.

Data preliminary and subject to revision.

Form 1. Annual Rainfall Record: Alta Vista Water Treatment and Storage Facility

Station Location

Located at end of Alta Vista Road on 12 ft. post on east side of water treatment building.
Coordinates: 37°32'52.53"N 122°29'53.68"W, WGS84. Elevation: 480 feet, WGS84.
Site limitations: Gage elevated above roof; trees 40 feet west of gage.

Water Year: 2015
Station: AVWT
County, State: San Mateo County, CA
Station Location Map:

Period of Record

Tipping-bucket rain gage installed December 2, 2007.
Sponsored by the Montara Water & Sanitation District.
WY2001 through WY2008 daily rainfall manually measured at 8:00 AM by MWSD staff.
Mean annual rainfall = 30 inches

Seasonal Peak Daily Rainfall

Date	Inches	Date	Inches	Date	Inches	Date	Inches
1/27/08	3.70						
2/15/09	2.24						
10/13/09	3.71						
1/19/11	2.28						
1/20/12	2.06						
11/30/13	2.85						
2/8/14	1.46						
12/11/15	5.25						

Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
2	0.00	0.00	1.69	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
3	0.00	0.00	1.63	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
4	0.00	0.00	0.17	0.00	0.00	0.00	0.07	0.00	0.00	0.03	0.00	0.00
5	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.28	0.00	1.16	0.00	0.70	0.00	0.00	0.02	0.01	0.00
7	0.00	0.00	0.00	0.00	0.06	0.00	0.01	0.00	0.00	0.05	0.01	0.00
8	0.00	0.00	0.00	0.00	1.29	0.00	0.00	0.00	0.12	0.00	0.04	0.00
9	0.00	0.00	0.05	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	5.25	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.01	0.03
12	0.00	0.21	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
13	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
14	0.00	0.01	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
15	0.09	0.00	1.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	1.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.03	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.76	1.06	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
20	0.13	0.30	0.36	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.21	0.00	0.00	0.23	0.00	0.01	0.00	0.00	0.00	0.00
22	0.00	0.60	0.01	0.00	0.00	0.00	0.10	0.02	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.04	0.00	0.00	0.00	0.00
24	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00
25	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.05	0.00	0.00	0.02	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.04
28	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.01	0.00	0.00	0.00	0.01
29	0.00	0.04	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.93	0.00	0.00	--	0.00	0.00	0.04	0.00	0.00	0.00	0.00
31	0.68	--	0.00	0.00	--	0.00	--	0.00	--	0.00	0.00	--
Total	1.25	3.26	15.19	0.00	2.60	0.25	1.31	0.31	0.12	0.18	0.09	0.15
Max	0.68	0.93	5.25	0.00	1.29	0.23	0.70	0.06	0.12	0.05	0.04	0.05

Monitor's Comments

Water Year Summary

Total Annual	24.71	(inches)
Maximum Daily Total	5.25	(inches)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

Form 2. Annual Hydrologic Record: Martini Creek above Old San Pedro Road

Station Location / Watershed Descriptors

Located on right bank 500 feet upstream of Old San Pedro Road Bridge.
Coordinates: N37.55454 W122.50625, NAD27. Elevation: 110 feet, NGVD 1929.
Watershed area above gage = 0.82 square miles.
Land use: Open space; McNee Ranch SP and Golden Gate National Recreation Area

Water Year: 2015
Stream: Martini Creek
Station: MASP
County, State: San Mateo County, CA

Station Location Map

Period of Record

Staff plate and water-level recorder installed on 11/18/03.
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.71 cubic feet per second
Unit runoff for period of record: 0.86 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
12/29/03	---- no record ----			3/3/10	5:45	1.15	6.40
2/25/04	22:30	1.26	9.63	3/26/11	8:15	1.69	29.49
12/27/04	6:30	1.66	26.90	3/17/12	---- no record ----		
12/31/05	5:30	1.53	18.75	12/23/12	16:30	1.37	9.52
2/26/07	16:30	0.66	2.25	3/31/14	13:00	0.88	2.32
1/25/08	13:30	1.54	19.46	12/11/14	8:15	1.64	11.02
2/16/09	---- no record ----						

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.15	0.27	0.18	0.70	0.30	0.27	0.24	0.21	0.18	0.17	0.20	0.15
2	0.15	0.20	0.60	0.65	0.29	0.28	0.21	0.23	0.19	0.14	0.18	0.16
3	0.14	0.22	1.09	0.64	0.29	0.26	0.21	0.23	0.18	0.14	0.16	0.13
4	0.12	0.24	0.47	0.65	0.29	0.25	0.23	0.24	0.17	0.14	0.16	0.12
5	0.17	0.26	0.34	0.65	0.30	0.26	0.25	0.24	0.17	0.13	0.16	0.10
6	0.19	0.28	0.30	0.62	0.43	0.27	0.23	0.23	0.17	0.15	0.18	0.10
7	0.19	0.25	0.29	0.60	0.38	0.25	0.30	0.23	0.17	0.15	0.17	0.10
8	0.21	0.21	0.27	0.62	0.66	0.27	0.23	0.22	0.15	0.15	0.18	0.11
9	0.22	0.21	0.27	0.61	0.52	0.27	0.23	0.24	0.15	0.17	0.20	0.11
10	0.23	0.21	0.30	0.58	0.43	0.27	0.23	0.23	0.19	0.15	0.19	0.13
11	0.22	0.21	2.61	0.57	0.36	0.26	0.24	0.25	0.19	0.13	0.19	0.13
12	0.17	0.21	1.89	0.55	0.36	0.26	0.23	0.23	0.16	0.13	0.16	0.15
13	0.18	0.24	0.83	0.53	0.33	0.27	0.26	0.21	0.16	0.16	0.15	0.16
14	0.24	0.21	0.67	0.53	0.31	0.27	0.27	0.21	0.16	0.17	0.17	0.19
15	0.25	0.21	1.15	0.51	0.31	0.27	0.23	0.23	0.18	0.14	0.10	0.17
16	0.27	0.21	1.26	0.50	0.30	0.26	0.23	0.23	0.17	0.14	0.10	0.17
17	0.27	0.21	1.25	0.49	0.30	0.27	0.23	0.24	0.16	0.14	0.11	0.18
18	0.27	0.23	1.13	0.46	0.31	0.25	0.23	0.24	0.15	0.14	0.12	0.17
19	0.28	0.33	1.36	0.45	0.30	0.25	0.24	0.24	0.14	0.13	0.13	0.15
20	0.30	0.30	1.41	0.43	0.28	0.25	0.24	0.24	0.14	0.15	0.15	0.15
21	0.27	0.22	1.34	0.41	0.28	0.24	0.25	0.25	0.15	0.17	0.15	0.16
22	0.28	0.26	1.16	0.41	0.31	0.26	0.25	0.26	0.16	0.17	0.15	0.21
23	0.28	0.14	1.07	0.38	0.34	0.23	0.23	0.25	0.14	0.16	0.14	0.19
24	0.28	0.15	1.03	0.36	0.27	0.23	0.22	0.25	0.14	0.16	0.15	0.15
25	0.33	0.13	0.93	0.37	0.28	0.21	0.28	0.24	0.10	0.19	0.15	0.17
26	0.29	0.09	0.90	0.37	0.30	0.20	0.23	0.23	0.13	0.17	0.13	0.21
27	0.26	0.08	0.82	0.36	0.32	0.23	0.23	0.25	0.17	0.14	0.12	0.23
28	0.24	0.07	0.76	0.35	0.28	0.22	0.26	0.23	0.18	0.16	0.13	0.24
29	0.23	0.10	0.74	0.33	--	0.23	0.24	0.20	0.19	0.17	0.15	0.26
30	0.27	0.21	0.77	0.32	--	0.25	0.20	0.18	0.18	0.21	0.17	0.28
31	0.33	--	0.73	0.31	--	0.26	--	0.17	--	0.22	0.15	--
MEAN	0.23	0.20	0.90	0.49	0.34	0.25	0.24	0.23	0.16	0.16	0.15	0.16
MAX. DAY	0.33	0.33	2.61	0.70	0.66	0.28	0.30	0.26	0.19	0.22	0.20	0.28
MIN. DAY	0.12	0.07	0.18	0.31	0.27	0.20	0.20	0.17	0.10	0.13	0.10	0.10
cfs days	7.26	6.15	27.9	15.3	9.41	7.82	7.15	7.16	4.89	4.84	4.77	4.94
ac-ft	14.4	12.2	55.3	30.4	18.7	15.5	14.2	14.2	9.70	9.61	9.46	9.80

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.29	(cfs)
Max. daily discharge	2.61	(cfs)
Min. daily discharge	0.07	(cfs)
Total	108	(cfs-days)
Total Volume	213	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

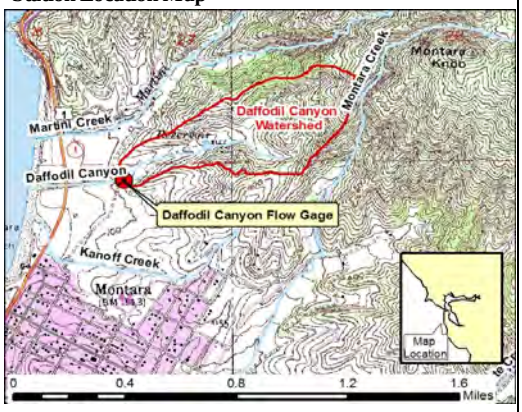
Form 3. Annual Hydrologic Record: Daffodil Canyon at Old San Pedro Road

Station Location / Watershed Descriptors

Located at hiking trail 80 feet upstream of Old San Pedro Road.
Coordinates: N37.55033 W122.5072, NAD27. Elevation: 110 feet, NGVD 1929
Watershed area above gage = 0.20 square miles.
Land use: Open space; Golden Gate National Recreation Area

Water Year: 2015
Stream: Daffodill Canyon
Station: DASP
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.072 cubic feet per second
Unit runoff: 0.36 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/19/08	21:50	0.60	0.64	3/31/14	13:15	1.18	0.48
2/24/09	1:50	0.70	1.13	12/11/14	23:15	1.95	3.13
3/3/10	6:00	0.97	4.13				
12/28/10	22:00	2.06	4.57				
3/16/12	20:30	1.30	0.81				
12/23/12	16:30	1.63	2.36				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.00	0.02	0.11	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.08	0.09	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
3	0.00	0.00	0.15	0.08	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00
4	0.00	0.00	0.07	0.07	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.01
5	0.00	0.00	0.05	0.06	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.01
6	0.01	0.00	0.04	0.05	0.02	0.00	0.02	0.01	0.00	0.00	0.00	0.00
7	0.01	0.00	0.03	0.04	0.01	0.00	0.03	0.01	0.00	0.00	0.00	0.00
8	0.01	0.00	0.03	0.04	0.04	0.00	0.02	0.01	0.00	0.00	0.00	0.00
9	0.01	0.00	0.02	0.04	0.02	0.00	0.02	0.01	0.00	0.00	0.00	0.00
10	0.01	0.00	0.02	0.03	0.02	0.00	0.02	0.01	0.00	0.00	0.00	0.01
11	0.01	0.00	0.96	0.03	0.01	0.00	0.02	0.01	0.00	0.00	0.00	0.01
12	0.00	0.00	1.26	0.02	0.02	0.00	0.02	0.01	0.00	0.00	0.00	0.01
13	0.00	0.01	0.47	0.02	0.01	0.00	0.02	0.01	0.00	0.00	0.00	0.01
14	0.01	0.00	0.33	0.02	0.01	0.01	0.02	0.01	0.00	0.00	0.00	0.01
15	0.01	0.00	0.60	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.00	0.01
16	0.01	0.00	0.96	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01
17	0.00	0.00	0.85	0.01	0.01	0.01	0.02	0.01	0.00	0.00	0.00	0.01
18	0.00	0.00	0.59	0.01	0.01	0.01	0.02	0.01	0.00	0.00	0.00	0.01
19	0.01	0.02	0.65	0.01	0.01	0.01	0.02	0.01	0.00	0.00	0.00	0.01
20	0.01	0.01	0.65	0.01	0.00	0.01	0.02	0.01	0.00	0.00	0.00	0.00
21	0.00	0.01	0.58	0.01	0.00	0.01	0.02	0.01	0.00	0.00	0.01	0.01
22	0.00	0.03	0.44	0.01	0.00	0.01	0.02	0.01	0.00	0.00	0.00	0.01
23	0.00	0.01	0.37	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.01
24	0.00	0.00	0.33	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
25	0.01	0.00	0.26	0.01	0.00	0.01	0.02	0.01	0.00	0.00	0.00	0.00
26	0.00	0.00	0.24	0.01	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.01
27	0.00	0.00	0.19	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.01
28	0.00	0.00	0.15	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.01
29	0.00	0.00	0.15	0.00	--	0.01	0.01	0.00	0.00	0.00	0.00	0.01
30	0.00	0.02	0.16	0.00	--	0.02	0.01	0.00	0.00	0.00	0.01	0.01
31	0.02	--	0.14	0.00	--	0.01	--	0.00	--	0.00	0.00	--
MEAN	0.01	0.00	0.35	0.03	0.01	0.01	0.02	0.01	0.00	0.00	0.00	0.01
MAX. DAY	0.02	0.03	1.26	0.11	0.04	0.02	0.03	0.01	0.01	0.00	0.01	0.01
MIN. DAY	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
cfs days	0.16	0.13	10.8	0.83	0.25	0.20	0.48	0.28	0.08	0.04	0.06	0.20
ac-ft	0.32	0.26	21.5	1.66	0.49	0.39	0.95	0.55	0.15	0.08	0.13	0.40

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.037	(cfs)
Max. daily discharge	1.26	(cfs)
Min. daily discharge	0.00	(cfs)
Total	14	(cfs-days)
Total Volume	27	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

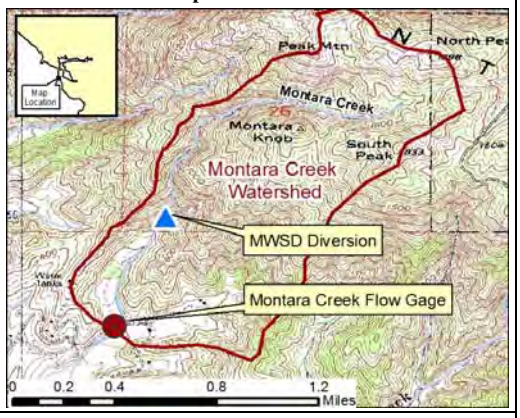
Form 4. Annual Hydrologic Record: Montara Creek at Riviera Road

Station Location / Watershed Descriptors

Located: Downstream side of the Riviera Road crossing of Montra Creek
Coordinates: N37.5456 W122.495, NAD27. Elevation: 296 feet, NGVD 1929
Watershed area above gage: 0.78 square miles; MWSD diversion 0.5 mile upstream of gage
Land use: Agriculture and open space; Golden Gate National Recreation Area

Water Year: 2015
Stream: Montara Creek
Station: MORR
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.18 cubic feet per second
Unit runoff: 0.24 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/6/08	1:00	0.64	0.85	3/31/14	13:15	0.77	0.62
2/16/09	9:30	1.08	0.66	12/16/15	2:30	0.87	1.79
3/2/10	9:00	1.42	1.82				
11/27/10	7:45	1.42	2.96				
10/5/11	1:15	1.00	1.46				
12/2/12	8:15	0.78	0.98				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.02	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.04	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.04	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.03	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.67	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	1.25	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	1.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	1.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	1.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.16	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.13	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	--	0.12	0.00	--	0.00	--	0.00	--	0.00	0.00	--
MEAN	0.00	0.00	0.36	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MAX. DAY	0.00	0.00	1.37	0.11	0.04	0.00	0.02	0.00	0.00	0.00	0.00	0.00
MIN. DAY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cfs days	0.01	0.01	11.0	0.70	0.05	0.00	0.02	0.00	0.00	0.00	0.00	0.00
ac-ft	0.01	0.02	21.8	1.39	0.10	0.00	0.04	0.00	0.00	0.00	0.00	0.00

Monitor's Comments

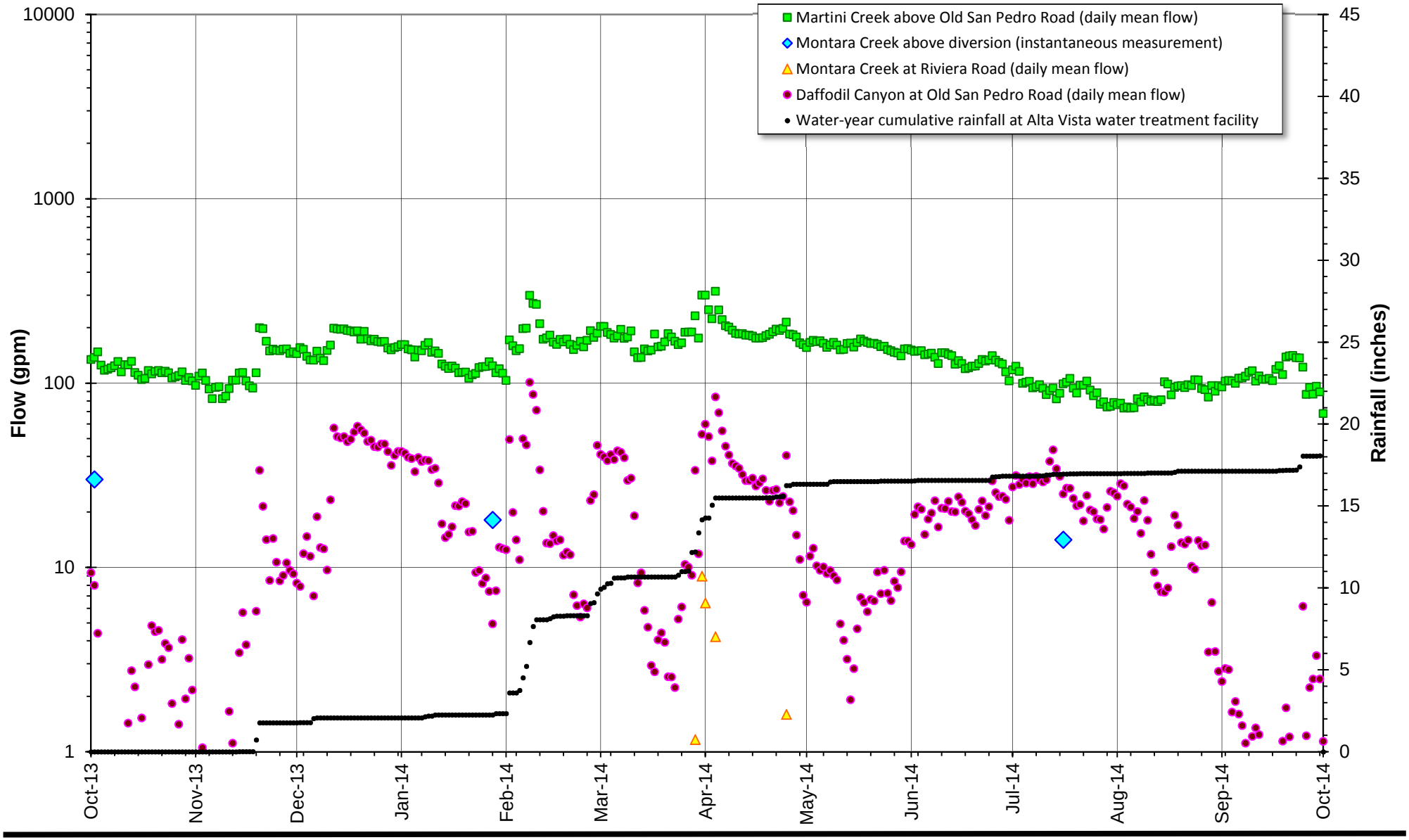
1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.032	(cfs)
Max. daily discharge	1.37	(cfs)
Min. daily discharge	0.00	(cfs)
Total	12	(cfs-days)
Total Volume	23	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

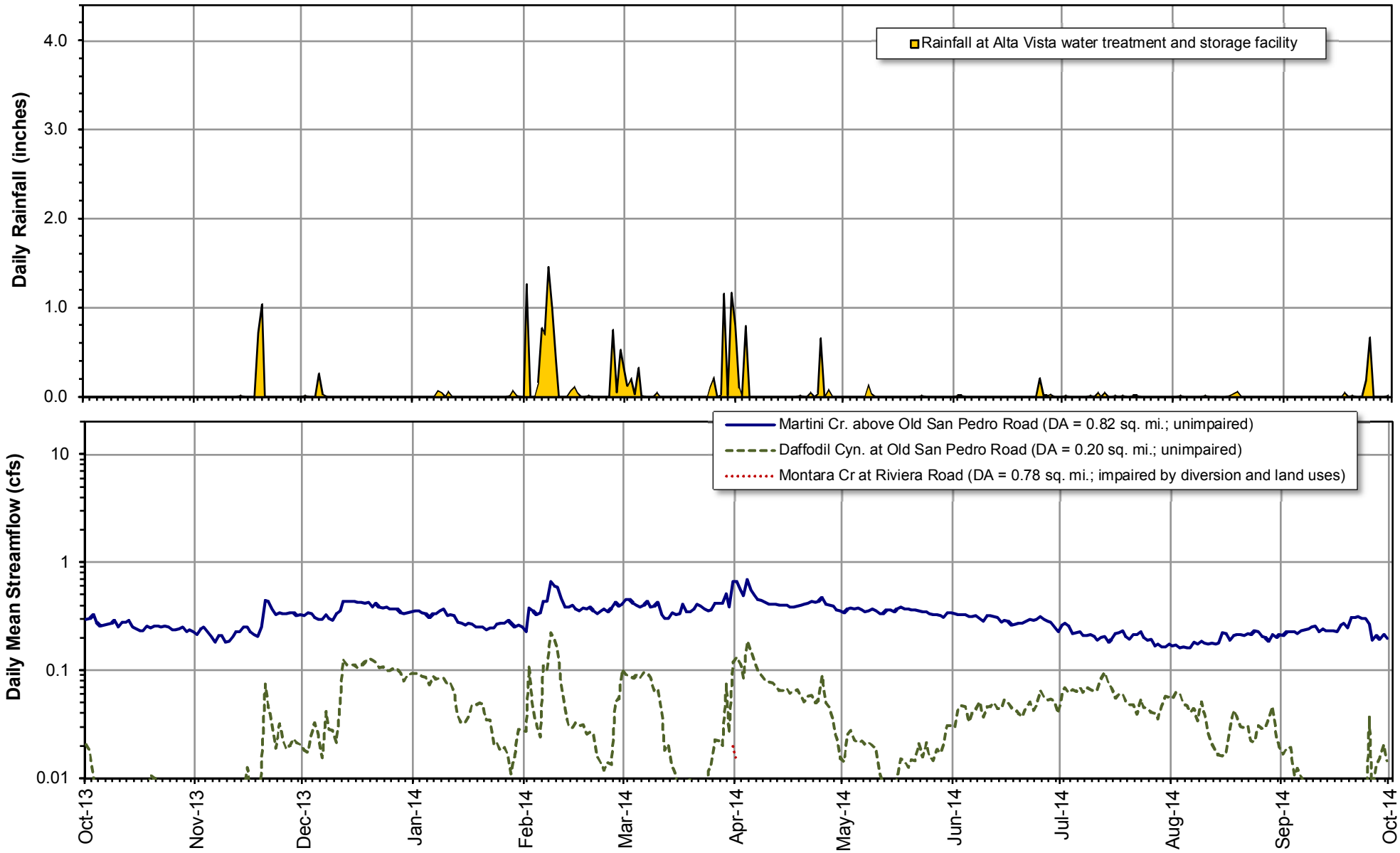
Data preliminary and subject to revision.



Balance Hydrologics

Appendix B. Flows in Montara Creek, Daffodil Canyon, and Martini Creek during water year 2014, San Mateo County, California. Following below normal rainfall during 2012 and 2013, water year 2014 was an extreme dry year with rainfall totaling 17.6 inches or 58 percent of average. Nearly all of the rain fell in February and March. Flows persisted through the year in Martini Creek and Daffodil Canyon, but Montara Creek at Riviera Road was dry nearly all year with recorded flow exceeding 1 gpm on 5 days only following 11 inches of cumulative rainfall.

Data preliminary and subject to revision.



Appendix B. Daily rainfall and streamflow, water year 2014, Montara Water and Sanitary District, San Mateo County, California. MWSD operates a long-standing headwater diversion on Montara Creek about a half of a mile upstream of the gaging station.

Data preliminary and subject to revision.

Form 1. Annual Rainfall Record: Alta Vista Water Treatment and Storage Facility

Station Location

Located at end of Alta Vista Road on 12 ft. post on east side of water treatment building.
Coordinates: 37°32'52.53"N 122°29'53.68"W, WGS84. Elevation: 480 feet, WGS84.
Site limitations: Gage elevated above roof; trees 40 feet west of gage.

Water Year: **2014**
Station: AVWT
County, State: San Mateo County, CA
Station Location Map:

Period of Record

Tipping-bucket rain gage installed December 2, 2007.
Sponsored by the Montara Water & Sanitation District.
WY2001 through WY2008 daily rainfall manually measured at 8:00 AM by MWSD staff.
Mean annual rainfall = 30 inches

Seasonal Peak Daily Rainfall

Date	Inches	Date	Inches	Date	Inches	Date	Inches
1/27/08	3.70						
2/15/09	2.24						
10/13/09	3.71						
1/19/11	2.28						
1/20/12	2.06						
11/30/13	2.85						
2/8/14	1.46						

Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.00	0.00	0.00	0.00	0.29	0.80	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.01	0.00	1.26	0.12	0.10	0.00	0.02	0.01	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.02	0.00	0.01	0.00
4	0.00	0.00	0.00	0.00	0.00	0.03	0.79	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.15	0.32	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.26	0.00	0.77	0.01	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.03	0.00	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.07	1.46	0.00	0.00	0.13	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.05	0.98	0.00	0.00	0.04	0.00	0.01	0.00	0.00
10	0.00	0.00	0.00	0.00	0.40	0.05	0.00	0.00	0.00	0.00	0.02	0.00
11	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00
14	0.00	0.01	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.01	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.05
19	0.00	0.72	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.06	0.00
20	0.00	1.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.01	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.02
24	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.19
25	0.00	0.00	0.00	0.00	0.00	0.11	0.65	0.00	0.21	0.00	0.00	0.66
26	0.00	0.00	0.00	0.00	0.75	0.22	0.00	0.00	0.01	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.05	0.00	0.08	0.00	0.01	0.00	0.00	0.00
28	0.00	0.00	0.00	0.01	0.53	0.03	0.00	0.00	0.03	0.00	0.00	0.00
29	0.00	0.00	0.00	0.07	--	1.15	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.01	--	0.02	0.00	0.00	0.00	0.00	0.00	0.01
31	0.00	--	0.00	0.00	--	1.17	--	0.00	--	0.00	0.00	--
Total	0.00	1.77	0.30	0.27	7.30	3.73	2.53	0.19	0.30	0.16	0.14	0.94
Max	0.00	1.04	0.26	0.07	1.46	1.17	0.80	0.13	0.21	0.05	0.06	0.66

Monitor's Comments

Water Year Summary

Total Annual	17.63	(inches)
Maximum Daily Total	1.46	(inches)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

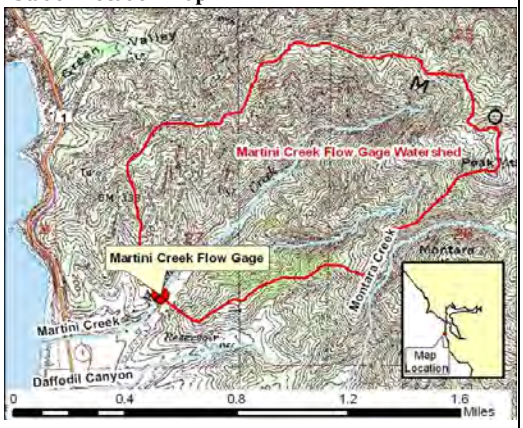
Form 2. Annual Hydrologic Record: Martini Creek above Old San Pedro Road

Station Location / Watershed Descriptors

Located on right bank 500 feet upstream of Old San Pedro Road Bridge.
Coordinates: N37.55454 W122.50625, NAD27. Elevation: 110 feet, NGVD 1929.
Watershed area above gage = 0.82 square miles.
Land use: Open space; McNee Ranch SP and Golden Gate National Recreation Area

Water Year: 2014
Stream: Martini Creek
Station: MASP
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder installed on 11/18/03.
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.71 cubic feet per second
Unit runoff for period of record: 0.86 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
12/29/03	---- no record ----			3/3/10	5:45	1.15	6.40
2/25/04	22:30	1.26	9.63	3/26/11	8:15	1.69	29.49
12/27/04	6:30	1.66	26.90	3/17/12	---- no record ----		
12/31/05	5:30	1.53	18.75	12/23/12	16:30	1.37	9.52
2/26/07	16:30	0.66	2.25	3/31/14	13:00	0.88	2.32
1/25/08	13:30	1.54	19.46				
2/16/09	---- no record ----						

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.30	0.22	0.32	0.36	0.23	0.45	0.67	0.35	0.34	0.26	0.17	0.21
2	0.31	0.24	0.35	0.36	0.38	0.45	0.56	0.37	0.33	0.27	0.17	0.23
3	0.33	0.25	0.34	0.34	0.35	0.42	0.50	0.38	0.33	0.26	0.16	0.23
4	0.28	0.23	0.31	0.34	0.33	0.41	0.70	0.37	0.33	0.22	0.17	0.23
5	0.26	0.21	0.30	0.31	0.34	0.39	0.56	0.38	0.32	0.23	0.16	0.22
6	0.26	0.18	0.30	0.34	0.44	0.40	0.49	0.37	0.32	0.23	0.16	0.24
7	0.27	0.21	0.33	0.33	0.44	0.44	0.46	0.35	0.32	0.21	0.18	0.24
8	0.28	0.21	0.30	0.36	0.67	0.39	0.45	0.36	0.31	0.21	0.18	0.24
9	0.29	0.18	0.29	0.37	0.60	0.40	0.43	0.37	0.28	0.22	0.19	0.25
10	0.26	0.19	0.33	0.33	0.59	0.43	0.41	0.36	0.33	0.21	0.18	0.26
11	0.28	0.21	0.36	0.33	0.47	0.33	0.41	0.34	0.33	0.19	0.18	0.23
12	0.28	0.23	0.44	0.32	0.38	0.31	0.41	0.34	0.32	0.20	0.18	0.24
13	0.29	0.23	0.44	0.28	0.39	0.31	0.41	0.37	0.31	0.21	0.18	0.23
14	0.25	0.25	0.44	0.27	0.41	0.34	0.40	0.37	0.28	0.18	0.18	0.23
15	0.25	0.25	0.44	0.27	0.37	0.33	0.40	0.35	0.29	0.20	0.23	0.24
16	0.23	0.23	0.43	0.28	0.36	0.34	0.39	0.37	0.28	0.22	0.22	0.23
17	0.24	0.22	0.43	0.27	0.38	0.41	0.39	0.39	0.27	0.22	0.19	0.26
18	0.26	0.21	0.42	0.25	0.37	0.35	0.39	0.38	0.27	0.24	0.21	0.28
19	0.25	0.25	0.43	0.25	0.39	0.35	0.40	0.37	0.27	0.21	0.21	0.25
20	0.26	0.44	0.39	0.26	0.36	0.37	0.41	0.36	0.28	0.20	0.22	0.31
21	0.26	0.44	0.42	0.24	0.34	0.41	0.42	0.37	0.28	0.22	0.21	0.31
22	0.25	0.38	0.39	0.25	0.36	0.40	0.44	0.36	0.30	0.22	0.22	0.31
23	0.26	0.33	0.38	0.25	0.38	0.38	0.43	0.35	0.29	0.23	0.22	0.31
24	0.25	0.34	0.38	0.27	0.35	0.36	0.44	0.35	0.30	0.20	0.23	0.31
25	0.24	0.34	0.37	0.27	0.38	0.37	0.48	0.34	0.31	0.19	0.23	0.27
26	0.24	0.33	0.37	0.27	0.43	0.42	0.41	0.33	0.30	0.20	0.21	0.19
27	0.25	0.34	0.37	0.29	0.39	0.42	0.41	0.33	0.29	0.17	0.20	0.21
28	0.26	0.34	0.34	0.28	0.42	0.42	0.40	0.32	0.28	0.18	0.19	0.19
29	0.23	0.32	0.34	0.25	--	0.52	0.37	0.31	0.26	0.17	0.22	0.21
30	0.24	0.33	0.35	0.27	--	0.39	0.36	0.34	0.23	0.17	0.20	0.20
31	0.23	--	0.35	0.25	--	0.67	--	0.34	--	0.17	0.22	--
MEAN	0.26	0.27	0.37	0.29	0.40	0.40	0.45	0.36	0.30	0.21	0.20	0.25
MAX. DAY	0.33	0.44	0.44	0.37	0.67	0.67	0.70	0.39	0.34	0.27	0.23	0.31
MIN. DAY	0.23	0.18	0.29	0.24	0.23	0.31	0.36	0.31	0.23	0.17	0.16	0.19
cfs days	8.12	8.15	11.5	9.1	11.3	12.4	13.4	11.0	8.95	6.50	6.06	7.37
ac-ft	16.1	16.2	22.7	18.1	22.4	24.5	26.6	21.9	17.8	12.9	12.0	14.6

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.31	(cfs)
Max. daily discharge	0.70	(cfs)
Min. daily discharge	0.16	(cfs)
Total	114	(cfs-days)
Total Volume	226	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

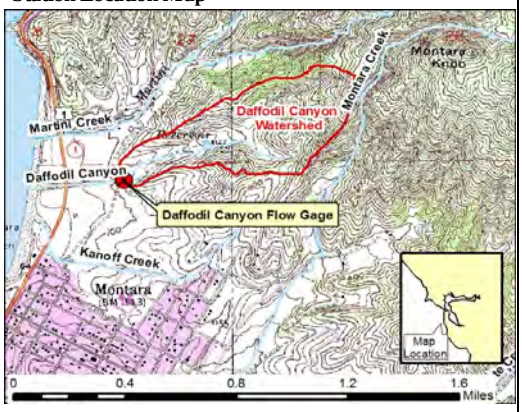
Form 3. Annual Hydrologic Record: Daffodil Canyon at Old San Pedro Road

Station Location / Watershed Descriptors

Located at hiking trail 80 feet upstream of Old San Pedro Road.
Coordinates: N37.55033 W122.5072, NAD27. Elevation: 110 feet, NGVD 1929
Watershed area above gage = 0.20 square miles.
Land use: Open space; Golden Gate National Recreation Area

Water Year: 2014
Stream: Daffodill Canyon
Station: DASP
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.072 cubic feet per second
Unit runoff: 0.36 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/19/08	21:50	0.60	0.64	3/31/14	13:15	1.18	0.48
2/24/09	1:50	0.70	1.13				
3/3/10	6:00	0.97	4.13				
12/28/10	22:00	2.06	4.57				
3/16/12	20:30	1.30	0.81				
12/23/12	16:30	1.63	2.36				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.02	0.00	0.02	0.09	0.03	0.09	0.13	0.01	0.03	0.06	0.05	0.02
2	0.02	0.00	0.02	0.09	0.11	0.09	0.11	0.03	0.04	0.07	0.06	0.02
3	0.01	0.00	0.03	0.09	0.04	0.08	0.08	0.03	0.05	0.06	0.06	0.02
4	0.00	0.00	0.03	0.09	0.03	0.09	0.19	0.02	0.05	0.07	0.05	0.01
5	0.00	0.00	0.03	0.07	0.02	0.09	0.15	0.02	0.03	0.06	0.05	0.01
6	0.00	0.00	0.02	0.09	0.11	0.10	0.12	0.02	0.04	0.07	0.04	0.01
7	0.00	0.00	0.04	0.08	0.10	0.09	0.10	0.02	0.04	0.06	0.04	0.01
8	0.00	0.00	0.03	0.08	0.23	0.09	0.09	0.02	0.05	0.07	0.03	0.01
9	0.00	0.00	0.03	0.08	0.19	0.07	0.08	0.02	0.04	0.07	0.05	0.00
10	0.00	0.00	0.02	0.08	0.16	0.07	0.08	0.02	0.05	0.06	0.04	0.01
11	0.00	0.00	0.05	0.08	0.08	0.04	0.08	0.01	0.05	0.07	0.03	0.01
12	0.00	0.00	0.13	0.06	0.04	0.02	0.07	0.01	0.05	0.08	0.02	0.01
13	0.01	0.00	0.11	0.04	0.03	0.02	0.07	0.01	0.04	0.10	0.02	0.00
14	0.01	0.01	0.11	0.03	0.03	0.01	0.07	0.00	0.04	0.08	0.02	0.00
15	0.00	0.01	0.11	0.03	0.03	0.01	0.07	0.01	0.05	0.07	0.02	0.00
16	0.00	0.01	0.11	0.04	0.03	0.01	0.06	0.01	0.05	0.06	0.02	0.00
17	0.00	0.00	0.11	0.05	0.03	0.01	0.06	0.02	0.05	0.06	0.03	0.00
18	0.01	0.00	0.12	0.05	0.03	0.01	0.07	0.01	0.04	0.06	0.04	0.00
19	0.01	0.01	0.13	0.05	0.03	0.01	0.06	0.01	0.04	0.05	0.04	0.01
20	0.01	0.07	0.12	0.05	0.03	0.01	0.05	0.01	0.04	0.05	0.03	0.01
21	0.01	0.05	0.12	0.03	0.02	0.01	0.06	0.01	0.05	0.05	0.03	0.01
22	0.01	0.03	0.11	0.03	0.01	0.01	0.06	0.02	0.05	0.04	0.03	0.00
23	0.01	0.02	0.11	0.02	0.01	0.00	0.05	0.02	0.04	0.05	0.02	0.00
24	0.01	0.03	0.10	0.02	0.01	0.01	0.05	0.02	0.05	0.05	0.02	0.00
25	0.00	0.02	0.10	0.02	0.01	0.01	0.09	0.02	0.07	0.04	0.03	0.04
26	0.00	0.02	0.10	0.02	0.05	0.02	0.05	0.01	0.06	0.04	0.03	0.01
27	0.00	0.02	0.10	0.02	0.06	0.02	0.05	0.02	0.05	0.04	0.03	0.01
28	0.01	0.02	0.09	0.01	0.10	0.02	0.03	0.02	0.05	0.04	0.04	0.02
29	0.00	0.02	0.08	0.02	--	0.07	0.02	0.02	0.05	0.05	0.05	0.02
30	0.01	0.02	0.09	0.03	--	0.03	0.02	0.03	0.04	0.06	0.02	0.01
31	0.00	--	0.09	0.03	--	0.12	--	0.03	--	0.06	0.02	--
MEAN	0.01	0.01	0.08	0.05	0.06	0.04	0.08	0.02	0.05	0.06	0.03	0.01
MAX. DAY	0.02	0.07	0.13	0.09	0.23	0.12	0.19	0.03	0.07	0.10	0.06	0.04
MIN. DAY	0.00	0.00	0.02	0.01	0.01	0.00	0.02	0.00	0.03	0.04	0.02	0.00
cfs days	0.17	0.39	2.47	1.58	1.66	1.32	2.28	0.54	1.39	1.84	1.07	0.28
ac-ft	0.33	0.78	4.90	3.14	3.30	2.63	4.52	1.08	2.75	3.65	2.11	0.56

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.041	(cfs)
Max. daily discharge	0.23	(cfs)
Min. daily discharge	0.00	(cfs)
Total	15	(cfs-days)
Total Volume	30	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

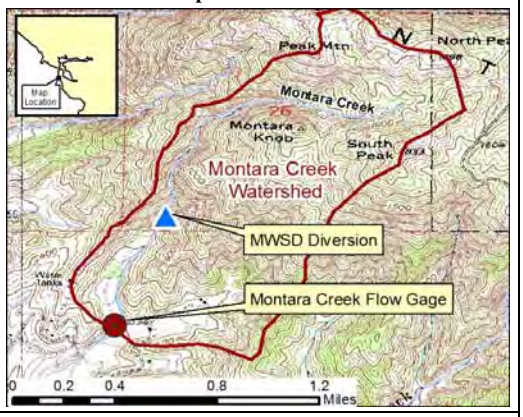
Form 4. Annual Hydrologic Record: Montara Creek at Riviera Road

Station Location / Watershed Descriptors

Located: Downstream side of the Riviera Road crossing of Montra Creek
Coordinates: N37.5456 W122.495, NAD27. Elevation: 296 feet, NGVD 1929
Watershed area above gage: 0.78 square miles; MWSD diversion 0.5 mile upstream of gage
Land use: Agriculture and open space; Golden Gate National Recreation Area

Water Year: 2014
Stream: Montara Creek
Station: MORR
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.18 cubic feet per second
Unit runoff: 0.24 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/6/08	1:00	0.64	0.85	3/31/14	13:15	0.77	0.62
2/16/09	9:30	1.08	0.66				
3/2/10	9:00	1.42	1.82				
11/27/10	7:45	1.42	2.96				
10/5/11	1:15	1.00	1.46				
12/2/12	8:15	0.78	0.98				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	--	0.00	0.00	--	0.02	--	0.00	--	0.00	0.00	--
MEAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MAX. DAY	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00
MIN. DAY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cfs days	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.00	0.00
ac-ft	0.00	0.00	0.00	0.00	0.00	0.04	0.05	0.00	0.00	0.00	0.00	0.00

Monitor's Comments

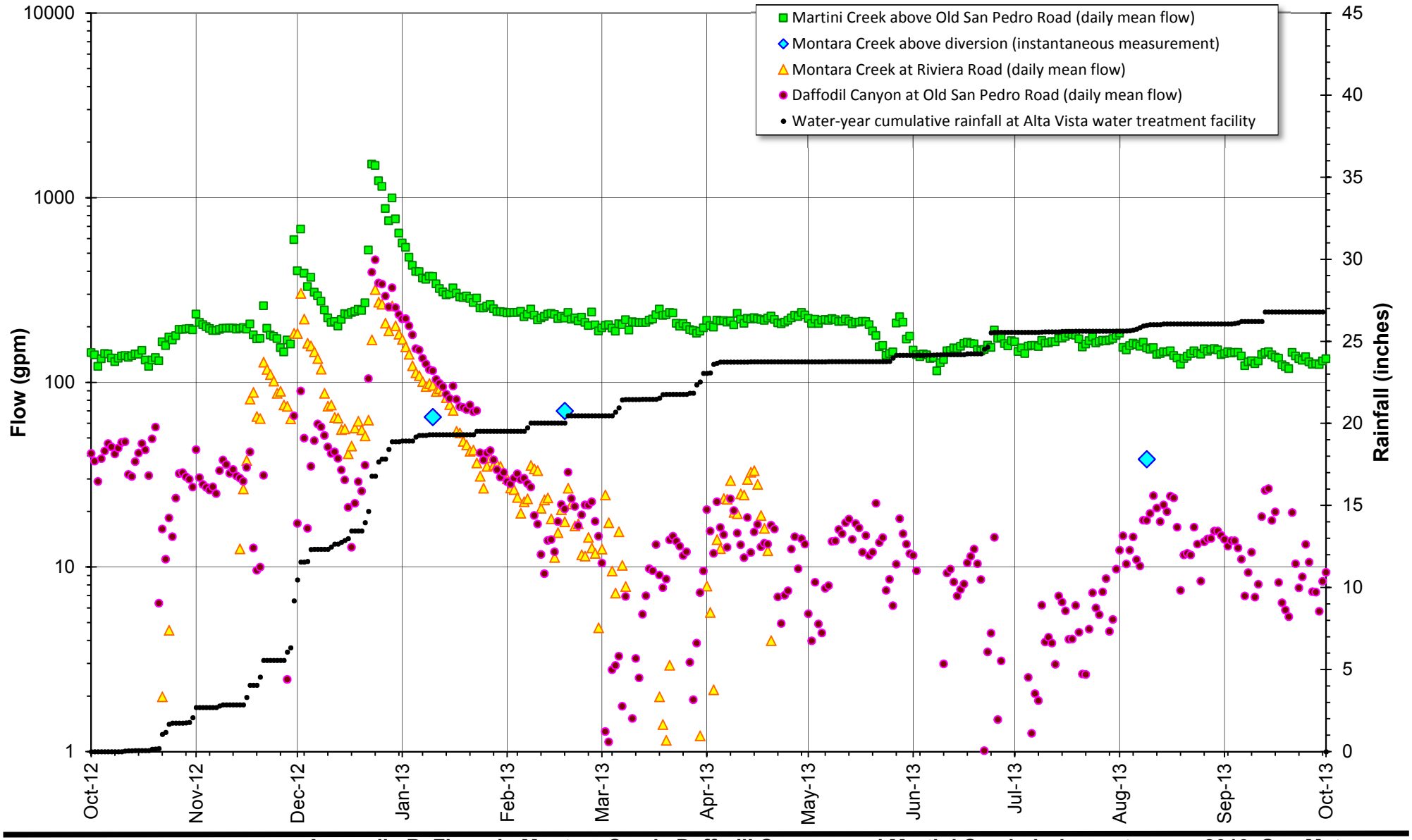
1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.0001	(cfs)
Max. daily discharge	0.02	(cfs)
Min. daily discharge	0.00	(cfs)
Total	0.05	(cfs-days)
Total Volume	0.10	(ac-ft)

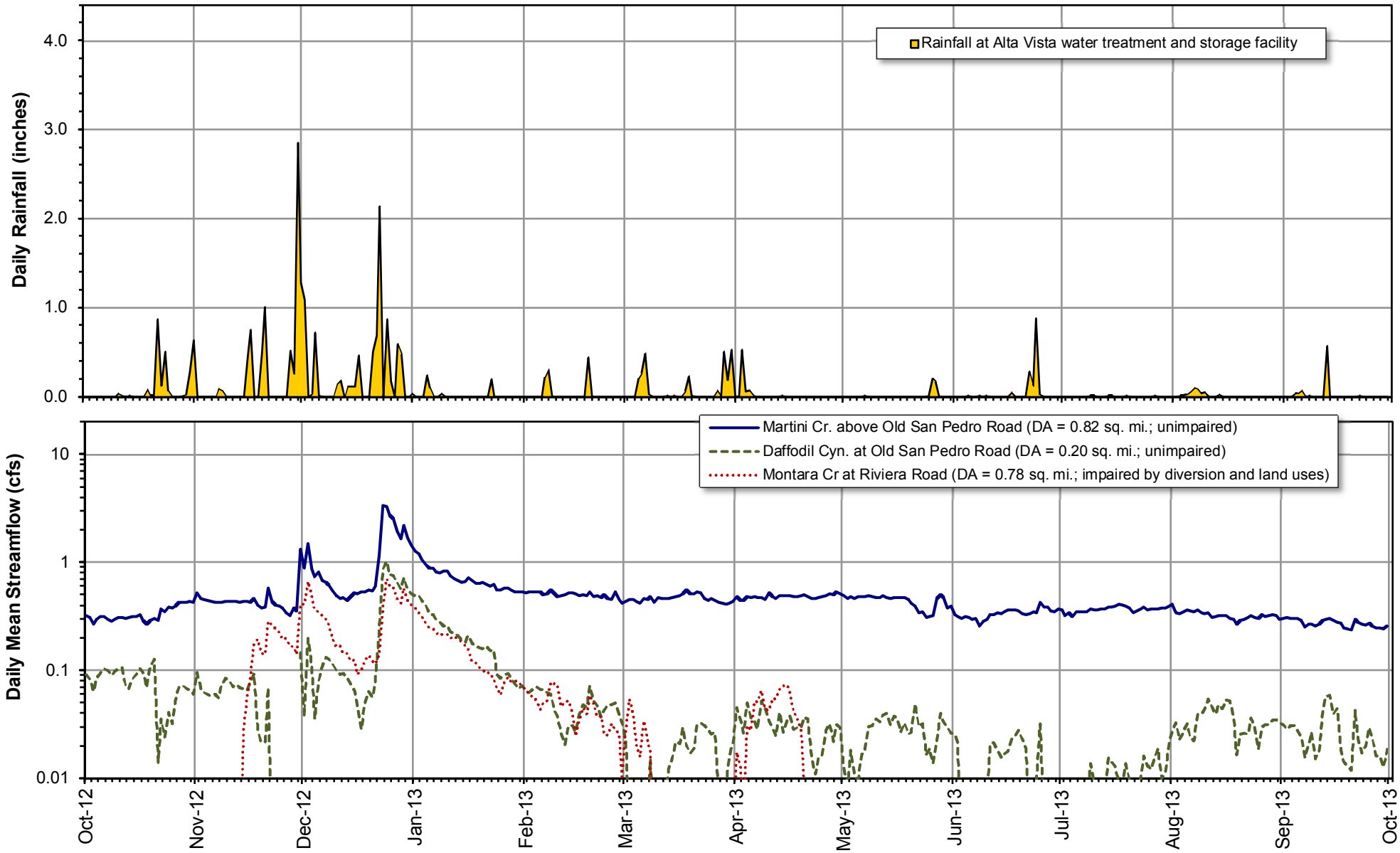
Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.



Appendix B. Flows in Montara Creek, Daffodil Canyon, and Martini Creek during water year 2013, San Mateo County, California. Total rainfall during water year 2013 was 25.8 inches or 89 percent of average. By January, after two significant storm periods peaking on November 30 and December 23, 2012, 18.9 inches of rain had fallen. Flow at the Montara Creek gage dropped below 1 gpm by late April, then dried back for the remainder of the water year. Streamflow above the MWSD diversion on Montara Creek persisted through the dry season, but ended the year lower than the start, similar to flows observed during 2008, a second consecutive drought year. Flows persisted in Martini Creek and Daffodil Canyon but with any carryover from previous water year(s) seemingly depleted.

Data preliminary and subject to revision.



Appendix B. Daily rainfall and streamflow, water year 2013, Montara Water and Sanitary District, San Mateo County, California. MWSD operates a long-standing headwater diversion on Montara Creek about a half of a mile upstream of the gaging station.

Data preliminary and subject to revision.

Form 1. Annual Rainfall Record: Alta Vista Water Treatment and Storage Facility

Station Location

Located at end of Alta Vista Road on 12 ft. post on east side of water treatment building.
Coordinates: 37°32'52.53"N 122°29'53.68"W, WGS84. Elevation: 480 feet, WGS84.
Site limitations: Gage elevated above roof; trees 40 feet west of gage.

Water Year: **2013**
Station: AVWT
County, State: San Mateo County, CA
Station Location Map:

Period of Record

Tipping-bucket rain gage installed December 2, 2007.
Sponsored by the Montara Water & Sanitation District.
WY2001 through WY2008 daily rainfall manually measured at 8:00 AM by MWSD staff.
Mean annual rainfall = 30 inches

Seasonal Peak Daily Rainfall

Date	Inches	Date	Inches	Date	Inches	Date	Inches
1/27/08	3.70						
2/15/09	2.24						
10/13/09	3.71						
1/19/11	2.28						
1/20/12	2.06						
11/30/13	2.85						

Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.63	1.28	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	1.09	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.00	0.00	0.00	0.01	0.00
4	0.00	0.00	0.04	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.02	0.04
5	0.00	0.00	0.72	0.24	0.00	0.21	0.07	0.00	0.01	0.00	0.03	0.04
6	0.00	0.00	0.02	0.10	0.00	0.26	0.01	0.00	0.00	0.00	0.06	0.07
7	0.00	0.00	0.00	0.00	0.22	0.48	0.00	0.01	0.00	0.00	0.10	0.00
8	0.00	0.09	0.00	0.00	0.30	0.03	0.00	0.00	0.02	0.00	0.09	0.01
9	0.00	0.07	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.05	0.00
11	0.04	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.02	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.57
14	0.01	0.00	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.03	0.00
15	0.00	0.00	0.11	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.00	0.00
16	0.00	0.45	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.75	0.46	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
19	0.08	0.00	0.00	0.00	0.44	0.23	0.00	0.00	0.00	0.01	0.00	0.00
20	0.02	0.49	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
21	0.02	1.01	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.87	0.00	0.69	0.00	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.01
23	0.12	0.00	2.14	0.20	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00
24	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.88	0.00	0.00	0.00
25	0.07	0.00	0.87	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00
26	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.17	0.00	0.01	0.00	0.00
28	0.00	0.52	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.01	0.26	0.48	0.00	--	0.50	0.00	0.00	0.00	0.00	0.00	0.00
30	0.03	2.85	0.00	0.00	--	0.18	0.00	0.00	0.00	0.00	0.00	0.00
31	0.28	--	0.00	0.00	--	0.53	--	0.00	--	0.00	0.00	--
Total	2.07	7.12	9.71	0.62	0.96	2.58	0.70	0.40	1.40	0.07	0.43	0.74
Max	0.87	2.85	2.14	0.24	0.44	0.53	0.53	0.21	0.88	0.02	0.10	0.57

Monitor's Comments

Water Year Summary

Total Annual	26.80	(inches)
Maximum Daily Total	2.85	(inches)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

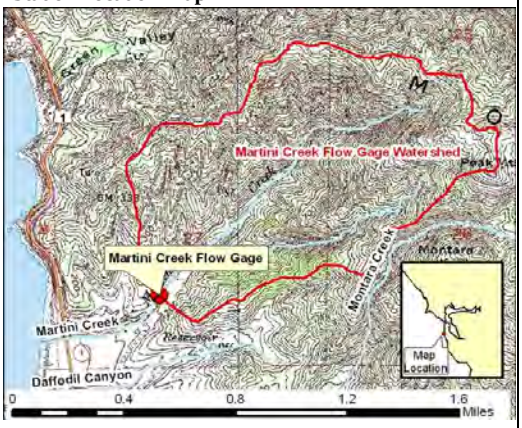
Form 2. Annual Hydrologic Record: Martini Creek above Old San Pedro Road

Station Location / Watershed Descriptors

Located on right bank 500 feet upstream of Old San Pedro Road Bridge.
Coordinates: N37.55454 W122.50625, NAD27. Elevation: 110 feet, NGVD 1929.
Watershed area above gage = 0.82 square miles.
Land use: Open space; McNee Ranch SP and Golden Gate National Recreation Area

Water Year: 2013
Stream: Martini Creek
Station: MASP
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder installed on 11/18/03.
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.71 cubic feet per second
Unit runoff for period of record: 0.86 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
12/29/03	---- no record ----			3/3/10	5:45	1.15	6.40
2/25/04	22:30	1.26	9.63	3/26/11	8:15	1.69	29.49
12/27/04	6:30	1.66	26.90	3/17/12	---- no record ----		
12/31/05	5:30	1.53	18.75	12/23/12	16:30	1.37	9.52
2/26/07	16:30	0.66	2.25				
1/25/08	13:30	1.54	19.46				
2/16/09	---- no record ----						

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.32	0.52	0.90	1.27	0.53	0.44	0.48	0.49	0.33	0.37	0.41	0.30
2	0.31	0.47	1.51	1.20	0.53	0.45	0.45	0.46	0.31	0.33	0.34	0.31
3	0.27	0.46	0.87	1.06	0.53	0.46	0.44	0.49	0.31	0.34	0.33	0.31
4	0.30	0.45	0.74	0.96	0.53	0.44	0.48	0.46	0.32	0.32	0.35	0.31
5	0.32	0.44	0.82	0.89	0.54	0.42	0.48	0.48	0.31	0.35	0.36	0.31
6	0.32	0.43	0.68	0.89	0.50	0.46	0.48	0.49	0.30	0.35	0.36	0.29
7	0.30	0.43	0.65	0.82	0.52	0.46	0.47	0.48	0.30	0.35	0.35	0.26
8	0.29	0.43	0.61	0.80	0.56	0.49	0.48	0.49	0.26	0.35	0.37	0.27
9	0.30	0.44	0.55	0.84	0.51	0.43	0.46	0.49	0.28	0.38	0.34	0.27
10	0.31	0.44	0.50	0.83	0.49	0.47	0.53	0.48	0.30	0.36	0.34	0.26
11	0.31	0.44	0.47	0.76	0.50	0.47	0.49	0.48	0.33	0.36	0.34	0.27
12	0.30	0.44	0.48	0.72	0.51	0.47	0.46	0.49	0.33	0.37	0.31	0.29
13	0.31	0.43	0.45	0.69	0.52	0.47	0.49	0.48	0.34	0.37	0.32	0.30
14	0.32	0.44	0.49	0.66	0.53	0.47	0.49	0.46	0.34	0.39	0.32	0.30
15	0.32	0.44	0.52	0.67	0.52	0.48	0.50	0.47	0.35	0.39	0.32	0.29
16	0.33	0.43	0.52	0.72	0.49	0.49	0.49	0.47	0.36	0.39	0.33	0.28
17	0.29	0.46	0.53	0.68	0.51	0.52	0.49	0.48	0.37	0.41	0.31	0.28
18	0.27	0.40	0.54	0.65	0.50	0.55	0.48	0.47	0.36	0.40	0.30	0.25
19	0.29	0.38	0.55	0.64	0.53	0.51	0.50	0.46	0.36	0.40	0.27	0.24
20	0.30	0.39	0.55	0.65	0.49	0.52	0.51	0.42	0.33	0.38	0.29	0.24
21	0.29	0.58	0.60	0.63	0.50	0.53	0.49	0.40	0.33	0.35	0.30	0.30
22	0.37	0.44	1.16	0.60	0.48	0.53	0.47	0.35	0.34	0.36	0.31	0.28
23	0.35	0.40	3.39	0.64	0.50	0.46	0.46	0.35	0.35	0.37	0.32	0.27
24	0.39	0.40	3.33	0.56	0.47	0.45	0.47	0.31	0.34	0.39	0.31	0.26
25	0.38	0.38	2.75	0.56	0.45	0.46	0.48	0.32	0.43	0.36	0.31	0.28
26	0.40	0.34	2.56	0.58	0.54	0.45	0.50	0.32	0.39	0.37	0.33	0.26
27	0.43	0.33	1.95	0.59	0.46	0.43	0.51	0.47	0.39	0.38	0.32	0.25
28	0.43	0.38	1.67	0.56	0.42	0.42	0.51	0.50	0.36	0.37	0.32	0.25
29	0.43	0.36	2.22	0.54	--	0.41	0.53	0.47	0.35	0.38	0.33	0.24
30	0.44	1.32	1.71	0.54	--	0.42	0.52	0.38	0.37	0.38	0.32	0.26
31	0.43	--	1.43	0.54	--	0.44	--	0.40	--	0.40	0.30	--
MEAN	0.34	0.46	1.15	0.73	0.51	0.47	0.49	0.44	0.34	0.37	0.33	0.28
MAX. DAY	0.44	1.32	3.39	1.27	0.56	0.55	0.53	0.50	0.43	0.41	0.41	0.31
MIN. DAY	0.27	0.33	0.45	0.54	0.42	0.41	0.44	0.31	0.26	0.32	0.27	0.24
cfs days	10.4	13.7	35.7	22.7	14.1	14.5	14.6	13.8	10.2	11.5	10.1	8.28
ac-ft	20.7	27.1	70.8	45.1	28.1	28.7	29.0	27.3	20.1	22.8	20.1	16.4

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.49	(cfs)
Max. daily discharge	3.39	(cfs)
Min. daily discharge	0.24	(cfs)
Total	180	(cfs-days)
Total Volume	356	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

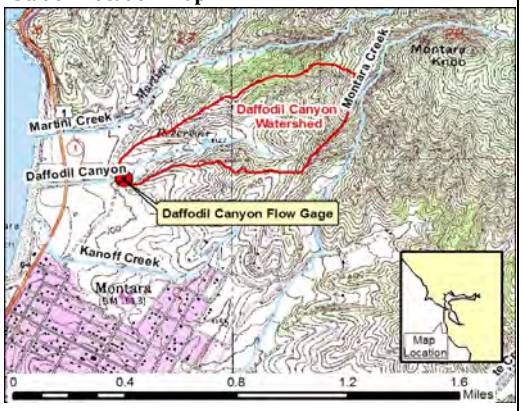
Form 3. Annual Hydrologic Record: Daffodil Canyon at Old San Pedro Road

Station Location / Watershed Descriptors

Located at hiking trail 80 feet upstream of Old San Pedro Road.
Coordinates: N37.55033 W122.5072, NAD27. Elevation: 110 feet, NGVD 1929
Watershed area above gage = 0.20 square miles.
Land use: Open space; Golden Gate National Recreation Area

Water Year: 2013
Stream: Daffodill Canyon
Station: DASP
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.072 cubic feet per second
Unit runoff: 0.36 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/19/08	21:50	0.60	0.64				
2/24/09	1:50	0.70	1.13				
3/3/10	6:00	0.97	4.13				
12/28/10	22:00	2.06	4.57				
3/16/12	20:30	1.30	0.81				
12/23/12	16:30	1.63	2.36				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.09	0.10	0.04	0.49	0.06	0.02	0.05	0.01	0.03	0.00	0.03	0.03
2	0.08	0.07	0.20	0.49	0.06	0.00	0.03	0.01	0.02	0.00	0.03	0.03
3	0.06	0.06	0.11	0.45	0.07	0.00	0.03	0.02	0.00	0.00	0.02	0.03
4	0.09	0.06	0.04	0.40	0.07	0.01	0.05	0.01	0.00	0.00	0.03	0.03
5	0.09	0.06	0.08	0.34	0.07	0.01	0.04	0.01	0.00	0.01	0.03	0.03
6	0.10	0.06	0.11	0.33	0.07	0.01	0.03	0.02	0.00	0.00	0.02	0.02
7	0.10	0.06	0.13	0.30	0.06	0.00	0.03	0.02	0.00	0.00	0.02	0.02
8	0.09	0.07	0.13	0.28	0.06	0.02	0.05	0.03	0.00	0.00	0.04	0.02
9	0.10	0.08	0.11	0.26	0.04	0.00	0.05	0.03	0.00	0.01	0.04	0.03
10	0.11	0.08	0.10	0.26	0.04	0.00	0.03	0.04	0.01	0.01	0.04	0.02
11	0.11	0.07	0.09	0.23	0.03	0.01	0.03	0.03	0.02	0.01	0.05	0.02
12	0.07	0.08	0.09	0.22	0.02	0.01	0.03	0.04	0.02	0.01	0.05	0.04
13	0.07	0.07	0.09	0.21	0.03	0.01	0.04	0.04	0.02	0.01	0.04	0.06
14	0.08	0.07	0.07	0.19	0.03	0.02	0.03	0.03	0.02	0.02	0.05	0.06
15	0.09	0.06	0.07	0.18	0.03	0.02	0.03	0.04	0.02	0.01	0.04	0.04
16	0.10	0.08	0.05	0.21	0.04	0.02	0.04	0.04	0.02	0.01	0.05	0.04
17	0.10	0.09	0.03	0.18	0.05	0.03	0.03	0.03	0.02	0.01	0.05	0.02
18	0.07	0.03	0.05	0.16	0.05	0.02	0.03	0.03	0.03	0.01	0.04	0.01
19	0.11	0.02	0.06	0.16	0.07	0.02	0.03	0.03	0.03	0.01	0.02	0.01
20	0.13	0.02	0.06	0.16	0.05	0.02	0.04	0.03	0.02	0.01	0.03	0.01
21	0.01	0.07	0.08	0.17	0.05	0.03	0.04	0.05	0.02	0.01	0.03	0.04
22	0.04	0.00	0.23	0.15	0.04	0.03	0.02	0.03	0.00	0.01	0.03	0.02
23	0.02	0.00	0.88	0.16	0.04	0.03	0.01	0.03	0.01	0.01	0.04	0.02
24	0.04	0.00	1.03	0.09	0.05	0.03	0.02	0.02	0.01	0.02	0.03	0.02
25	0.03	0.00	0.77	0.08	0.05	0.03	0.02	0.02	0.03	0.01	0.02	0.03
26	0.05	0.00	0.76	0.09	0.05	0.03	0.03	0.01	0.00	0.01	0.03	0.02
27	0.07	0.00	0.65	0.10	0.04	0.01	0.03	0.02	0.01	0.02	0.03	0.02
28	0.07	0.01	0.57	0.08	0.03	0.00	0.02	0.04	0.00	0.02	0.03	0.02
29	0.07	0.00	0.72	0.07	--	0.01	0.03	0.03	0.00	0.01	0.03	0.01
30	0.07	0.15	0.57	0.07	--	0.02	0.03	0.03	0.00	0.01	0.03	0.02
31	0.06	--	0.52	0.07	--	0.02	--	0.03	--	0.02	0.03	--
MEAN	0.08	0.05	0.27	0.22	0.05	0.02	0.03	0.03	0.01	0.01	0.03	0.03
MAX. DAY	0.13	0.15	1.03	0.49	0.07	0.03	0.05	0.05	0.03	0.02	0.05	0.06
MIN. DAY	0.01	0.00	0.03	0.07	0.02	0.00	0.01	0.01	0.00	0.00	0.02	0.01
cfs days	2.39	1.51	8.48	6.67	1.34	0.48	0.94	0.84	0.36	0.29	1.07	0.79
ac-ft	4.73	3.00	16.8	13.2	2.67	0.94	1.87	1.66	0.71	0.58	2.11	1.57

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.069	(cfs)
Max. daily discharge	1.03	(cfs)
Min. daily discharge	0.00	(cfs)
Total	25	(cfs-days)
Total Volume	50	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

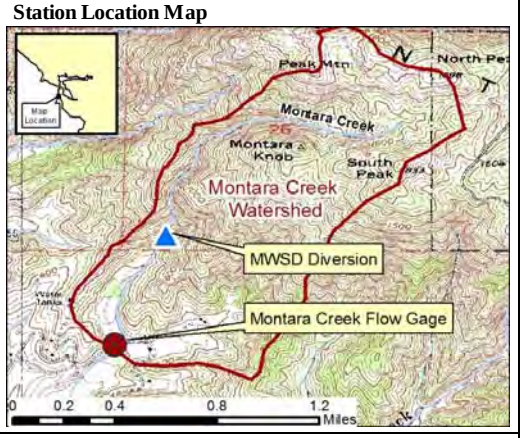
Form 4. Annual Hydrologic Record: Montara Creek at Riviera Road

Station Location / Watershed Descriptors

Located: Downstream side of the Riviera Road crossing of Montra Creek
Coordinates: N37.5456 W122.495, NAD27. Elevation: 296 feet, NGVD 1929
Watershed area above gage: 0.78 square miles; MWSD diversion 0.5 mile upstream of gage
Land use: Agriculture and open space; Golden Gate National Recreation Area

Water Year: 2013
Stream: Montara Creek
Station: MORR
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.18 cubic feet per second
Unit runoff: 0.24 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/6/08	1:00	0.64	0.85				
2/16/09	9:30	1.08	0.66				
3/2/10	9:00	1.42	1.82				
11/27/10	7:45	1.42	2.96				
10/5/11	1:15	1.00	1.46				
12/2/12	8:15	0.78	0.98				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.00	0.41	0.38	0.07	0.03	0.02	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.68	0.35	0.06	0.05	0.01	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.49	0.32	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.36	0.27	0.05	0.02	0.03	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.35	0.25	0.04	0.02	0.03	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.33	0.24	0.05	0.03	0.05	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.30	0.23	0.05	0.02	0.05	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.26	0.21	0.08	0.02	0.07	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.19	0.22	0.08	0.00	0.04	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.17	0.21	0.07	0.00	0.04	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.17	0.20	0.05	0.00	0.06	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.14	0.21	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.14	0.20	0.05	0.00	0.07	0.00	0.00	0.00	0.00	0.00
14	0.00	0.03	0.12	0.18	0.04	0.00	0.07	0.00	0.00	0.00	0.00	0.00
15	0.00	0.06	0.12	0.17	0.03	0.00	0.07	0.00	0.00	0.00	0.00	0.00
16	0.00	0.08	0.09	0.16	0.03	0.00	0.06	0.00	0.00	0.00	0.00	0.00
17	0.00	0.18	0.10	0.12	0.05	0.00	0.04	0.00	0.00	0.00	0.00	0.00
18	0.00	0.20	0.13	0.12	0.04	0.00	0.04	0.00	0.00	0.00	0.00	0.00
19	0.00	0.15	0.14	0.11	0.06	0.00	0.03	0.00	0.00	0.00	0.00	0.00
20	0.00	0.14	0.12	0.10	0.05	0.00	0.01	0.00	0.00	0.00	0.00	0.00
21	0.00	0.29	0.11	0.09	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.26	0.14	0.10	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.25	0.38	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.01	0.23	0.71	0.07	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.19	0.61	0.06	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.20	0.59	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.17	0.47	0.09	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.16	0.42	0.08	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.14	0.58	0.08	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.41	0.45	0.08	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	--	0.41	0.07	--	0.00	--	0.00	--	0.00	0.00	--
MEAN	0.00	0.10	0.31	0.17	0.05	0.01	0.03	0.00	0.00	0.00	0.00	0.00
MAX. DAY	0.01	0.41	0.71	0.38	0.08	0.05	0.07	0.00	0.00	0.00	0.00	0.00
MIN. DAY	0.00	0.00	0.09	0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cfs days	0.01	3.14	9.68	5.12	1.28	0.26	0.85	0.00	0.00	0.00	0.00	0.00
ac-ft	0.03	6.22	19.2	10.2	2.54	0.51	1.69	0.00	0.00	0.00	0.00	0.00

Monitor's Comments

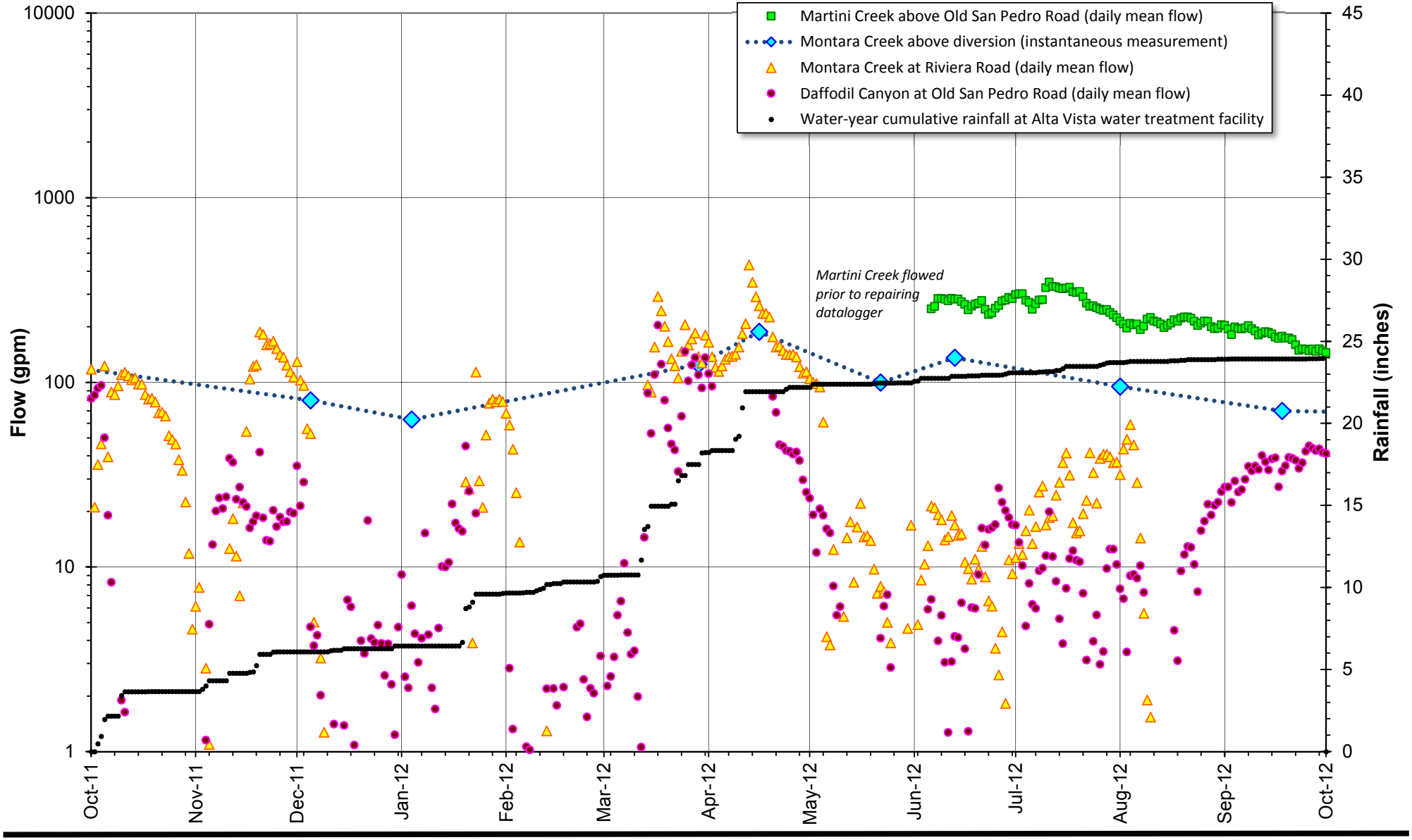
1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.056	(cfs)
Max. daily discharge	0.71	(cfs)
Min. daily discharge	0.00	(cfs)
Total	20	(cfs-days)
Total Volume	40	(ac-ft)

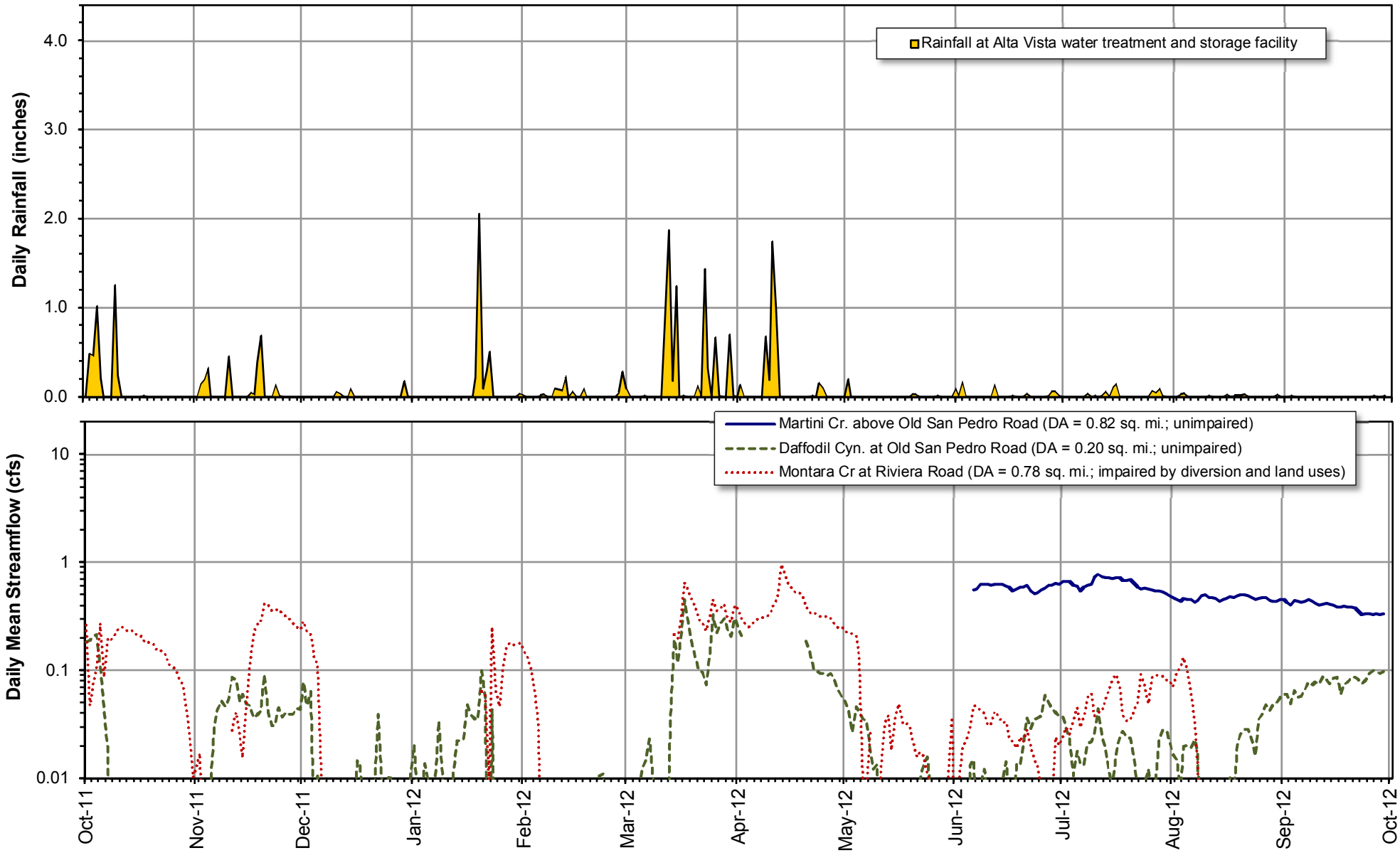
Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.



Appendix B. Flows in Montara Creek, Daffodil Canyon, and Martini Creek during water year 2012, San Mateo County, California. The rainfall total during water year 2012 was below normal. By mid-January only 6.5 inches of rain had fallen and by March 1st cumulative rainfall was only 10.8 inches. Storms during March and early April then contributed and additional 11 inches of rain, which appeared to add some recharge to any groundwater 'carryover' from wet year 2011 to maintain stream baseflows through the dry season. Montara Creek at Riviera Road dropped below 1 gpm by mid-August and was dry by the end of the water year while flow to the spring box diversion was sustained. Flows persisted in Martini Creek and Daffodil Canyon.

Data preliminary and subject to revision.



Appendix B. Daily rainfall and streamflow, water year 2012, Montara Water and Sanitary District, San Mateo County, California. Datalogger malfunctioned at Marini Creek gaging station October 1, 2011 through June 5, 2012. MWSD operates a long-standing headwater diversion on Montara Creek about a half of a mile upstream of the gaging station.

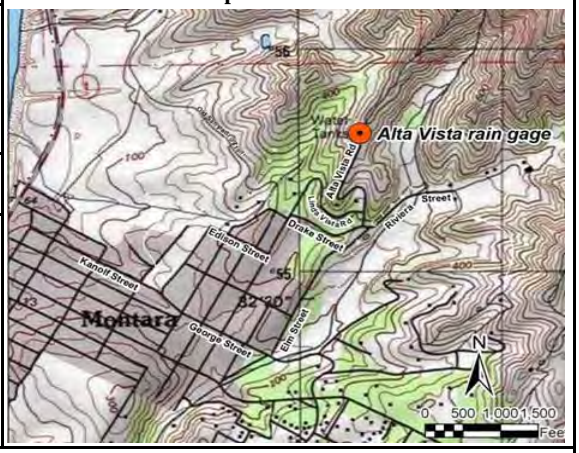
Data preliminary and subject to revision.

Form 1. Annual Rainfall Record: Alta Vista Water Treatment and Storage Facility

Station Location

Located at end of Alta Vista Road on 12 ft. post on east side of water treatment building.
Coordinates: 37°32'52.53"N 122°29'53.68"W, WGS84. Elevation: 480 feet, WGS84.
Site limitations: Gage elevated above roof; trees 40 feet west of gage.

Water Year: 2012
Station: AVWT
County, State: San Mateo County, CA
Station Location Map:



Period of Record

Tipping-bucket rain gage installed May 2008.
Sponsored by the Montara Water & Sanitation District.
WY2001 through WY2008 daily rainfall manually measured at 8:00 AM by MWSD staff.
Mean annual rainfall = 30 inches

Seasonal Peak Daily Rainfall

Date	Inches	Date	Inches	Date	Inches	Date	Inches
1/27/08	3.70						
2/15/09	2.24						
10/13/09	3.71						
1/19/11	2.28						
1/20/12	2.06						

Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.00	0.00	0.00	0.03	0.09	0.00	0.00	0.09	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.20	0.02	0.00	0.00	0.00
3	0.48	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.03	0.02
4	0.46	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00
5	1.02	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.21	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.00
10	1.25	0.00	0.00	0.00	0.09	0.00	0.18	0.00	0.00	0.02	0.00	0.00
11	0.24	0.45	0.06	0.00	0.08	0.00	1.74	0.00	0.00	0.00	0.01	0.00
12	0.00	0.00	0.04	0.00	0.07	0.91	0.98	0.00	0.13	0.01	0.00	0.00
13	0.00	0.00	0.00	0.00	0.23	1.87	0.00	0.00	0.00	0.06	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.09	0.00	0.06	1.24	0.00	0.00	0.00	0.11	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.03	0.00
17	0.00	0.05	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.00	0.00	0.00
18	0.01	0.03	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.01	0.00
19	0.00	0.39	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
20	0.00	0.69	0.00	2.06	0.00	0.00	0.00	0.03	0.00	0.00	0.01	0.00
21	0.00	0.00	0.00	0.09	0.00	0.12	0.00	0.03	0.04	0.00	0.03	0.00
22	0.00	0.00	0.00	0.29	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.50	0.00	1.43	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.13	0.00	0.00	0.00	0.31	0.15	0.00	0.00	0.00	0.00	0.00
25	0.00	0.02	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.67	0.00	0.00	0.00	0.07	0.00	0.01
27	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.02	0.05	0.00	0.00
28	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.06	0.09	0.00	0.00
29	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.00	0.06	0.02	0.00	0.01
30	0.00	0.00	0.17	0.00	--	0.70	0.00	0.00	0.02	0.00	0.03	0.00
31	0.00	--	0.00	0.04	--	0.02	--	0.00	--	0.00	0.00	--
Total	3.67	2.42	0.36	3.20	1.02	7.56	3.97	0.28	0.62	0.61	0.21	0.04
Max	1.25	0.69	0.17	2.06	0.28	1.87	1.74	0.20	0.16	0.14	0.04	0.02

Monitor's Comments

Water Year Summary

Total Annual	23.96	(inches)
Maximum Daily Total	2.06	(inches)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

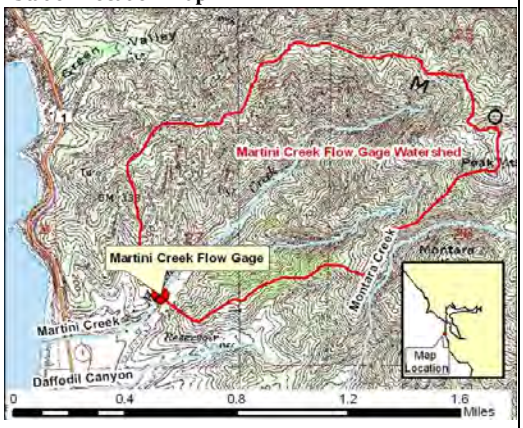
Form 2. Annual Hydrologic Record: Martini Creek above Old San Pedro Road

Station Location / Watershed Descriptors

Located on right bank 500 feet upstream of Old San Pedro Road Bridge.
Coordinates: N37.55454 W122.50625, NAD27. Elevation: 110 feet, NGVD 1929.
Watershed area above gage = 0.82 square miles.
Land use: Open space; McNee Ranch SP and Golden Gate National Recreation Area

Water Year: 2012
Stream: Martini Creek
Station: MASP
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder installed on 11/18/03.
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.71 cubic feet per second
Unit runoff for period of record: 0.86 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
12/29/03	---- no record ----			3/3/10	5:45	1.15	6.40
2/25/04	22:30	1.26	9.63	3/26/11	8:15	1.69	29.49
12/27/04	6:30	1.66	26.90	3/17/12	---- no record ----		
12/31/05	5:30	1.53	18.75				
2/26/07	16:30	0.66	2.25				
1/25/08	13:30	1.54	19.46				
2/16/09	---- no record ----						

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	na	na	na	na	na	na	na	na	na	0.67	0.48	0.45
2	na	na	na	na	na	na	na	na	na	0.67	0.46	0.43
3	na	na	na	na	na	na	na	na	na	0.67	0.44	0.40
4	na	na	na	na	na	na	na	na	na	0.62	0.47	0.44
5	na	na	na	na	na	na	na	na	na	0.60	0.46	0.44
6	na	na	na	na	na	na	na	na	0.56	0.55	0.46	0.43
7	na	na	na	na	na	na	na	na	0.57	0.59	0.43	0.44
8	na	na	na	na	na	na	na	na	0.63	0.62	0.45	0.45
9	na	na	na	na	na	na	na	na	0.63	0.63	0.49	0.43
10	na	na	na	na	na	na	na	na	0.63	0.73	0.50	0.42
11	na	na	na	na	na	na	na	na	0.62	0.78	0.48	0.40
12	na	na	na	na	na	na	na	na	0.64	0.74	0.47	0.41
13	na	na	na	na	na	na	na	na	0.63	0.73	0.46	0.42
14	na	na	na	na	na	na	na	na	0.63	0.72	0.44	0.42
15	na	na	na	na	na	na	na	na	0.61	0.71	0.45	0.41
16	na	na	na	na	na	na	na	na	0.59	0.72	0.47	0.39
17	na	na	na	na	na	na	na	na	0.55	0.73	0.49	0.39
18	na	na	na	na	na	na	na	na	0.58	0.69	0.48	0.40
19	na	na	na	na	na	na	na	na	0.59	0.68	0.50	0.39
20	na	na	na	na	na	na	na	na	0.60	0.69	0.50	0.39
21	na	na	na	na	na	na	na	na	0.62	0.65	0.50	0.38
22	na	na	na	na	na	na	na	na	0.55	0.60	0.50	0.36
23	na	na	na	na	na	na	na	na	0.52	0.57	0.48	0.33
24	na	na	na	na	na	na	na	na	0.53	0.58	0.45	0.34
25	na	na	na	na	na	na	na	na	0.56	0.56	0.47	0.34
26	na	na	na	na	na	na	na	na	0.58	0.55	0.48	0.33
27	na	na	na	na	na	na	na	na	0.61	0.54	0.48	0.34
28	na	na	na	na	na	na	na	na	0.62	0.55	0.45	0.33
29	na	na	na	na	na	na	na	na	0.64	0.53	0.43	0.34
30	na	na	na	na	--	na	na	na	0.63	0.52	0.44	0.33
31	na	--	na	na	--	na	--	na	--	0.50	0.46	--
MEAN	na	na	na	na	na	na	na	na	0.60	0.64	0.47	0.39
MAX. DAY	na	na	na	na	na	na	na	na	0.64	0.78	0.50	0.45
MIN. DAY	na	na	na	na	na	na	na	na	0.52	0.50	0.43	0.33
cfs days	na	na	na	na	na	na	na	na	14.9	19.7	14.5	11.8
ac-ft	na	na	na	na	na	na	na	na	29.6	39.1	28.7	23.3

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.
4. Annual mean, maximum and minimum flows are not presented as a result of an incomplete annual record.
5. na = data not avalable. Datalogger malfunctioned but flow and stage measured during site visits.

Water Year Summary

Mean daily discharge	na	(cfs)
Max. daily discharge	na	(cfs)
Min. daily discharge	na	(cfs)
Total	na	(cfs-days)
Total Volume	na	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

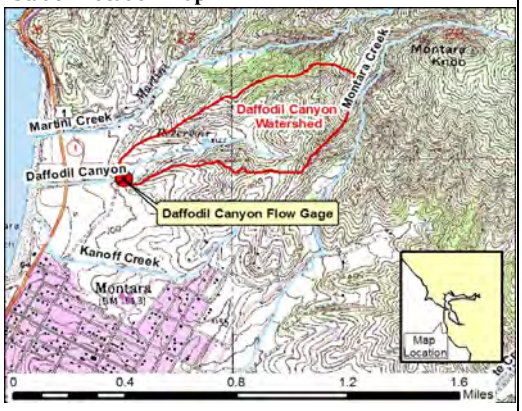
Form 3. Annual Hydrologic Record: Daffodil Canyon at Old San Pedro Road

Station Location / Watershed Descriptors

Located at hiking trail 80 feet upstream of Old San Pedro Road.
Coordinates: N37.55033 W122.5072, NAD27. Elevation: 110 feet, NGVD 1929
Watershed area above gage = 0.20 square miles.
Land use: Open space; Golden Gate National Recreation Area

Water Year: 2012
Stream: Daffodill Canyon
Station: DASP
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.072 cubic feet per second
Unit runoff: 0.36 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/19/08	21:50	0.60	0.64				
2/24/09	1:50	0.70	1.13				
3/3/10	6:00	0.97	4.13				
12/28/10	22:00	2.06	4.57				
3/16/12	20:30	1.30	0.81				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.18	0.00	0.08	0.02	0.00	0.00	0.25	0.05	0.00	0.04	0.02	0.06
2	0.19	0.00	0.05	0.01	0.01	0.01	0.21	0.04	0.00	0.03	0.01	0.06
3	0.21	0.00	0.06	0.00	0.00	0.01	0.00	0.03	0.00	0.02	0.01	0.05
4	0.21	0.00	0.00	0.01	0.00	0.01	0.00	0.05	0.00	0.01	0.02	0.07
5	0.11	0.01	0.01	0.01	0.00	0.01	0.00	0.04	0.01	0.02	0.02	0.06
6	0.04	0.03	0.01	0.01	0.00	0.01	0.00	0.04	0.01	0.01	0.02	0.06
7	0.02	0.04	0.01	0.01	0.00	0.02	0.00	0.03	0.00	0.01	0.02	0.07
8	0.00	0.05	0.00	0.03	0.00	0.01	0.00	0.02	0.01	0.02	0.02	0.08
9	0.00	0.05	0.00	0.01	0.00	0.01	0.00	0.01	0.01	0.02	0.00	0.07
10	0.00	0.05	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.03	0.00	0.08
11	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.08
12	0.00	0.08	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.09
13	0.00	0.05	0.00	0.02	0.00	0.03	0.00	0.00	0.01	0.02	0.00	0.08
14	0.00	0.06	0.00	0.02	0.00	0.19	0.00	0.00	0.01	0.01	0.00	0.07
15	0.00	0.05	0.00	0.02	0.00	0.12	0.00	0.00	0.01	0.01	0.00	0.09
16	0.00	0.05	0.01	0.05	0.00	0.25	0.00	0.00	0.01	0.02	0.00	0.09
17	0.00	0.04	0.01	0.04	0.00	0.46	0.00	0.00	0.00	0.02	0.01	0.06
18	0.00	0.04	0.00	0.04	0.00	0.28	0.00	0.00	0.01	0.03	0.01	0.07
19	0.00	0.04	0.00	0.03	0.00	0.18	0.00	0.00	0.01	0.02	0.02	0.08
20	0.00	0.09	0.01	0.10	0.00	0.13	0.19	0.00	0.02	0.02	0.03	0.09
21	0.00	0.04	0.01	0.06	0.00	0.10	0.15	0.00	0.04	0.02	0.03	0.09
22	0.00	0.03	0.04	0.00	0.01	0.10	0.10	0.01	0.03	0.01	0.03	0.08
23	0.00	0.03	0.01	0.04	0.01	0.07	0.10	0.01	0.04	0.00	0.02	0.08
24	0.00	0.05	0.01	0.00	0.01	0.15	0.10	0.02	0.04	0.01	0.02	0.08
25	0.00	0.04	0.01	0.00	0.00	0.33	0.09	0.01	0.04	0.01	0.04	0.09
26	0.00	0.04	0.01	0.00	0.00	0.23	0.09	0.00	0.06	0.01	0.04	0.10
27	0.00	0.04	0.01	0.00	0.00	0.28	0.09	0.00	0.05	0.01	0.05	0.10
28	0.00	0.04	0.01	0.00	0.00	0.30	0.08	0.00	0.05	0.02	0.04	0.10
29	0.00	0.04	0.01	0.00	0.01	0.24	0.07	0.00	0.04	0.03	0.05	0.10
30	0.00	0.04	0.00	0.00	--	0.21	0.06	0.00	0.04	0.03	0.05	0.09
31	0.00	--	0.01	0.00	--	0.30	--	0.00	--	0.02	0.06	--
MEAN	0.03	0.04	0.01	0.02	0.00	0.13	0.05	0.01	0.02	0.02	0.02	0.08
MAX. DAY	0.21	0.09	0.08	0.10	0.01	0.46	0.25	0.05	0.06	0.04	0.06	0.10
MIN. DAY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
cfs days	0.97	1.22	0.39	0.57	0.09	4.04	1.58	0.37	0.57	0.60	0.62	2.35
ac-ft	1.93	2.42	0.78	1.12	0.18	8.01	3.14	0.74	1.13	1.19	1.23	4.66

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.037	(cfs)
Max. daily discharge	0.46	(cfs)
Min. daily discharge	0.00	(cfs)
Total	13	(cfs-days)
Total Volume	27	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

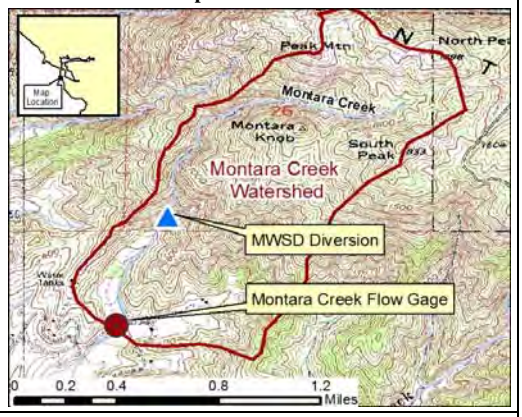
Form 4. Annual Hydrologic Record: Montara Creek at Riviera Road

Station Location / Watershed Descriptors

Located: Downstream side of the Riviera Road crossing of Montra Creek
Coordinates: N37.5456 W122.495, NAD27. Elevation: 296 feet, NGVD 1929
Watershed area above gage: 0.78 square miles; MWSD diversion 0.5 mile upstream of gage
Land use: Agriculture and open space; Golden Gate National Recreation Area

Water Year: 2012
Stream: Montara Creek
Station: MORR
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.18 cubic feet per second
Unit runoff: 0.24 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/6/08	1:00	0.64	0.85				
2/16/09	9:30	1.08	0.66				
3/2/10	9:00	1.42	1.82				
11/27/10	7:45	1.42	2.96				
10/5/11	1:15	1.00	1.46				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.26	0.01	0.29	0.00	0.15	0.00	0.37	0.23	0.00	0.02	0.07	0.00
2	0.05	0.02	0.23	0.00	0.13	0.00	0.31	0.22	0.01	0.03	0.10	0.00
3	0.08	0.00	0.21	0.00	0.10	0.00	0.27	0.22	0.02	0.03	0.11	0.00
4	0.10	0.01	0.13	0.00	0.06	0.00	0.26	0.21	0.02	0.03	0.13	0.00
5	0.27	0.00	0.12	0.00	0.03	0.00	0.27	0.14	0.03	0.05	0.10	0.00
6	0.09	0.00	0.01	0.00	0.00	0.00	0.30	0.01	0.05	0.03	0.06	0.00
7	0.20	0.00	0.00	0.00	0.00	0.00	0.31	0.01	0.05	0.04	0.03	0.00
8	0.19	0.00	0.01	0.00	0.00	0.00	0.31	0.03	0.04	0.06	0.01	0.00
9	0.21	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.04	0.06	0.00	0.00
10	0.25	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.03	0.04	0.00	0.00
11	0.25	0.03	0.00	0.00	0.00	0.00	0.41	0.01	0.03	0.04	0.00	0.00
12	0.24	0.04	0.00	0.00	0.00	0.00	0.46	0.03	0.04	0.04	0.00	0.00
13	0.23	0.03	0.00	0.00	0.00	0.00	0.96	0.04	0.04	0.05	0.00	0.00
14	0.24	0.02	0.00	0.00	0.00	0.22	0.78	0.02	0.03	0.06	0.00	0.00
15	0.22	0.05	0.00	0.00	0.00	0.20	0.65	0.04	0.03	0.08	0.00	0.00
16	0.22	0.12	0.00	0.00	0.00	0.35	0.58	0.05	0.02	0.09	0.00	0.00
17	0.19	0.23	0.00	0.00	0.00	0.65	0.53	0.03	0.02	0.07	0.00	0.00
18	0.18	0.27	0.00	0.00	0.00	0.54	0.53	0.03	0.02	0.04	0.00	0.00
19	0.18	0.28	0.00	0.00	0.00	0.45	0.50	0.03	0.02	0.03	0.00	0.00
20	0.17	0.42	0.00	0.06	0.00	0.37	0.39	0.02	0.02	0.03	0.00	0.00
21	0.15	0.40	0.00	0.06	0.00	0.30	0.35	0.02	0.03	0.04	0.00	0.00
22	0.15	0.36	0.00	0.01	0.00	0.27	0.35	0.02	0.02	0.05	0.00	0.00
23	0.15	0.36	0.00	0.25	0.00	0.24	0.33	0.02	0.01	0.09	0.00	0.00
24	0.11	0.37	0.00	0.07	0.00	0.33	0.32	0.01	0.01	0.07	0.00	0.00
25	0.11	0.34	0.00	0.05	0.00	0.46	0.31	0.01	0.01	0.05	0.00	0.00
26	0.10	0.32	0.00	0.12	0.00	0.35	0.32	0.00	0.01	0.09	0.00	0.00
27	0.08	0.31	0.00	0.17	0.00	0.38	0.31	0.00	0.01	0.09	0.00	0.00
28	0.07	0.28	0.00	0.18	0.00	0.41	0.27	0.00	0.00	0.09	0.00	0.00
29	0.05	0.25	0.00	0.17	0.00	0.31	0.25	0.00	0.02	0.09	0.00	0.00
30	0.03	0.24	0.00	0.18	--	0.28	0.25	0.01	0.02	0.08	0.00	0.00
31	0.01	--	0.00	0.18	--	0.40	--	0.04	--	0.08	0.00	--
MEAN	0.16	0.16	0.03	0.05	0.02	0.21	0.40	0.05	0.02	0.06	0.02	0.00
MAX. DAY	0.27	0.42	0.29	0.25	0.15	0.65	0.96	0.23	0.05	0.09	0.13	0.00
MIN. DAY	0.01	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.02	0.00	0.00
cfs days	4.85	4.74	1.00	1.49	0.47	6.51	11.9	1.49	0.73	1.77	0.63	0.00
ac-ft	9.62	9.40	1.98	2.97	0.93	12.9	23.6	2.96	1.45	3.50	1.24	0.00

Monitor's Comments

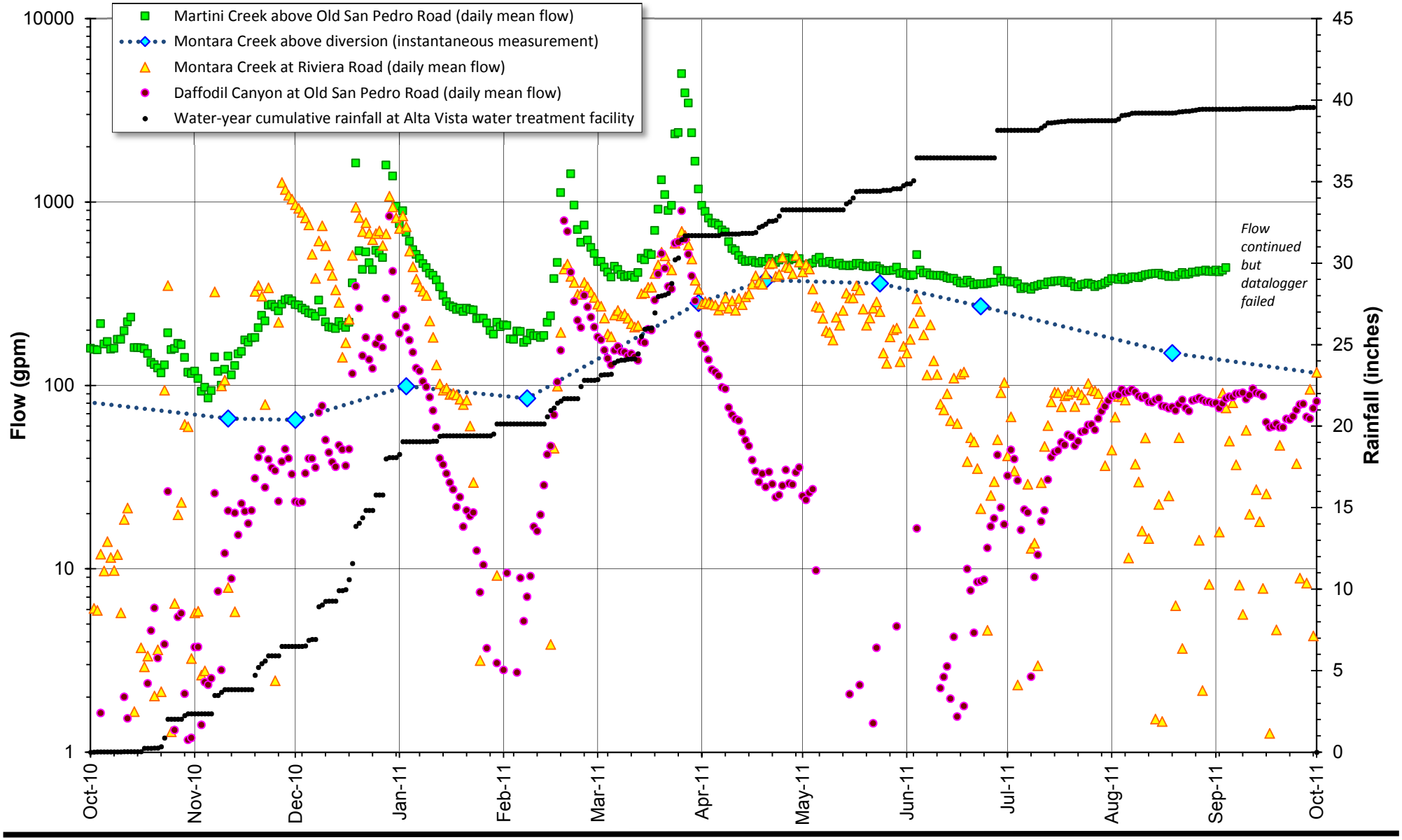
1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.10	(cfs)
Max. daily discharge	0.96	(cfs)
Min. daily discharge	0.00	(cfs)
Total	36	(cfs-days)
Total Volume	71	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

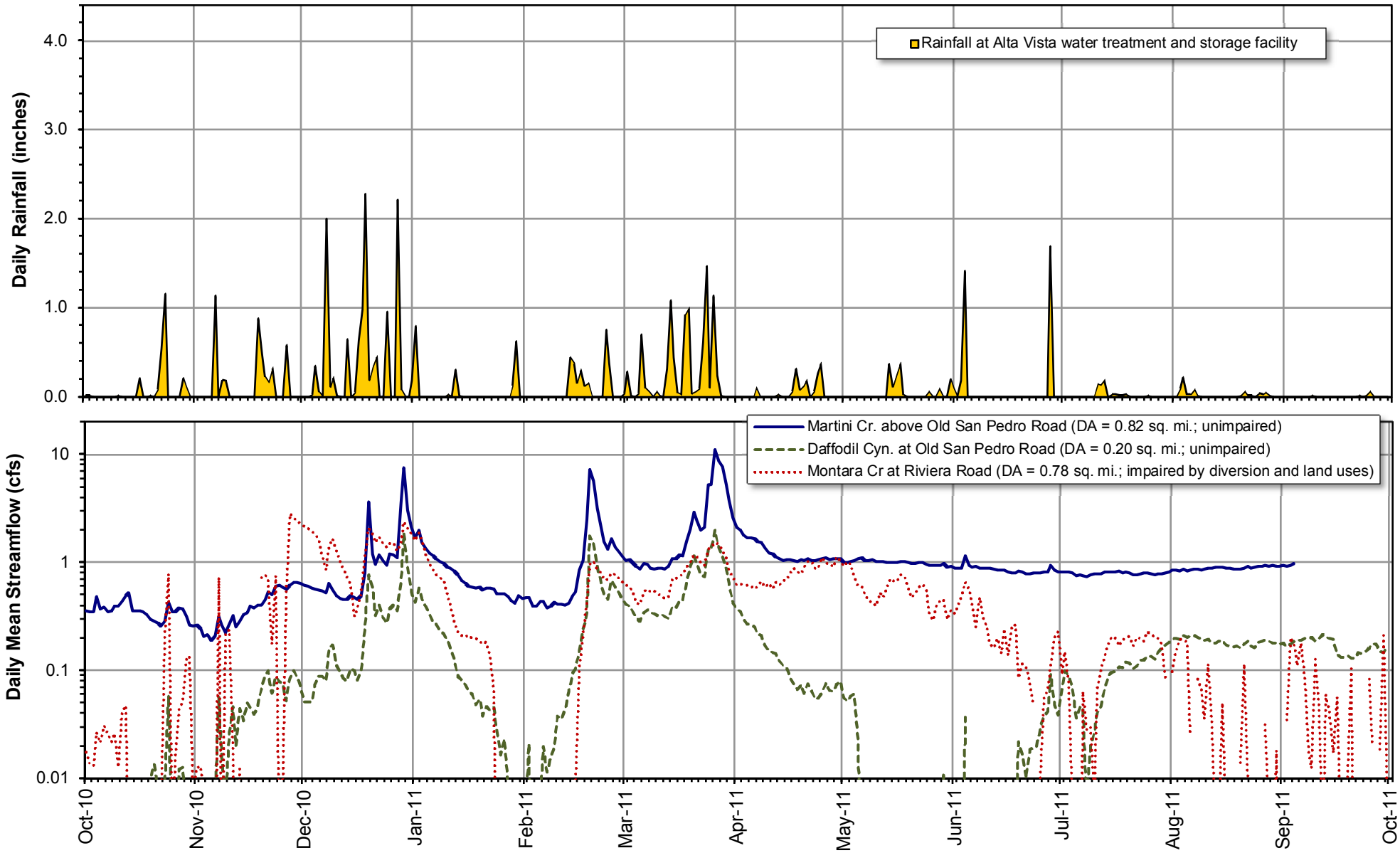
Data preliminary and subject to revision.



Balance Hydrologics

Appendix B. Flows in Montara Creek, Daffodil Canyon, and Martini Creek during water year 2011, San Mateo County, California. Rainfall during water year 2011 totaled 39.6 inches of 131 percent of mean, and the wettest year since pumping the Alta Vista well started in September 2007. 6.5 inches of rain fell by the start of December and by January 1st the cumulative rainfall was 19 inches. A typical mid-winter dry spell persisted through mid-February, after which another 12 inches of rain fell by the end of March. Isolated late-season storms then continued into July, with June being the wettest on record. Total rainfall for the year was 39.6 inches. Baseflows on all three streams were significantly higher and comparable to levels observed during water year 2006 before pumping the well. (Rainfall was above normal during water years 2005 and 2006.)

Data preliminary and subject to revision.



Appendix B. Daily rainfall and streamflow, water year 2011, Montara Water and Sanitary District, San Mateo County, California. Datalogger malfunctioned at Marini Creek gaging station September 5 through September 30, 2011. MWSD operates a long-standing headwater diversion on Montara Creek about a half of a mile upstream of the gaging station.

Data preliminary and subject to revision.

Form 1. Annual Rainfall Record: Alta Vista Water Treatment and Storage Facility

Station Location

Located at end of Alta Vista Road on 12 ft. post on east side of water treatment building.
Coordinates: 37°32'52.53"N 122°29'53.68"W, WGS84. Elevation: 480 feet, WGS84.
Site limitations: Gage elevated above roof; trees 40 feet west of gage.

Water Year: **2011**
Station: AVWT
County, State: San Mateo County, CA
Station Location Map:

Period of Record

Tipping-bucket rain gage installed December 2, 2007.
Sponsored by the Montara Water & Sanitation District.
WY2001 through WY2008 daily rainfall manually measured at 8:00 AM by MWSD staff.
Mean annual rainfall = 30 inches

Seasonal Peak Daily Rainfall

Date	Inches	Date	Inches	Date	Inches	Date	Inches
1/27/08	3.70						
2/15/09	2.24						
10/13/09	3.71						
1/19/11	2.28						

Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.00	0.00	0.19	0.00	0.04	0.00	0.00	0.10	0.00	0.00	0.00
2	0.01	0.00	0.00	0.79	0.00	0.28	0.00	0.00	0.00	0.00	0.00	0.00
3	0.02	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.19	0.00	0.09	0.00
4	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	1.41	0.00	0.22	0.00
5	0.00	0.00	0.34	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.03	0.00
6	0.00	0.00	0.06	0.00	0.00	0.70	0.00	0.00	0.00	0.00	0.03	0.00
7	0.00	1.13	0.00	0.00	0.00	0.10	0.10	0.00	0.00	0.00	0.08	0.00
8	0.00	0.00	2.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.01	0.00
9	0.00	0.19	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
10	0.00	0.17	0.22	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
11	0.01	0.00	0.02	0.03	0.00	0.01	0.00	0.00	0.00	0.14	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00
13	0.00	0.00	0.00	0.30	0.00	0.31	0.03	0.00	0.00	0.18	0.00	0.00
14	0.00	0.00	0.64	0.02	0.44	1.08	0.00	0.37	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.38	0.44	0.00	0.11	0.00	0.03	0.00	0.00
16	0.00	0.00	0.05	0.00	0.15	0.05	0.00	0.25	0.00	0.03	0.00	0.00
17	0.21	0.00	0.63	0.00	0.30	0.03	0.06	0.38	0.00	0.02	0.00	0.00
18	0.00	0.00	0.98	0.00	0.12	0.92	0.31	0.03	0.00	0.01	0.00	0.00
19	0.00	0.88	2.28	0.00	0.15	1.00	0.08	0.00	0.00	0.03	0.00	0.00
20	0.01	0.48	0.19	0.00	0.00	0.04	0.12	0.00	0.00	0.00	0.02	0.00
21	0.00	0.23	0.34	0.00	0.00	0.06	0.18	0.00	0.00	0.00	0.06	0.00
22	0.08	0.16	0.45	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.01	0.01
23	0.54	0.32	0.00	0.00	0.00	0.61	0.06	0.00	0.00	0.00	0.02	0.00
24	1.16	0.00	0.00	0.00	0.75	1.46	0.26	0.00	0.00	0.00	0.00	0.02
25	0.00	0.00	0.95	0.00	0.38	0.10	0.38	0.06	0.00	0.02	0.04	0.06
26	0.00	0.00	0.00	0.00	0.00	1.13	0.00	0.00	0.00	0.00	0.03	0.00
27	0.00	0.58	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.05	0.00
28	0.00	0.00	2.21	0.00	0.00	0.01	0.00	0.09	1.69	0.00	0.01	0.00
29	0.21	0.00	0.08	0.12	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.11	0.00	0.00	0.62	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	--	0.00	0.00	--	0.00	--	0.20	--	0.00	0.00	--
Total	2.36	4.14	11.58	2.07	2.67	8.88	1.58	1.49	3.39	0.59	0.70	0.11
Max	1.16	1.13	2.28	0.79	0.75	1.46	0.38	0.38	1.69	0.18	0.22	0.06

Monitor's Comments

Water Year Summary

Total Annual	39.56	(inches)
Maximum Daily Total	2.28	(inches)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

Form 2. Annual Hydrologic Record: Martini Creek above Old San Pedro Road

Station Location / Watershed Descriptors

Located on right bank 500 feet upstream of Old San Pedro Road Bridge.
Coordinates: N37.55454 W122.50625, NAD27. Elevation: 110 feet, NGVD 1929.
Watershed area above gage = 0.82 square miles.
Land use: Open space; McNee Ranch SP and Golden Gate National Recreation Area

Water Year: 2011
Stream: Martini Creek
Station: MASP
County, State: San Mateo County, CA

Station Location Map

Period of Record

Staff plate and water-level recorder installed on 11/18/03.
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.71 cubic feet per second
Unit runoff for period of record: 0.86 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
12/29/03	---- no record ----			3/3/10	5:45	1.15	6.40
2/25/04	22:30	1.26	9.6	3/26/11	8:15	1.69	29.49
12/27/04	6:30	1.66	27				
12/31/05	5:30	1.53	18.75				
2/26/07	16:30	0.66	2.2				
1/25/08	13:30	1.54	19.46				
2/16/09	---- no record ----						

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.35	0.27	0.61	1.70	0.48	1.05	2.14	1.01	0.90	0.83	0.85	0.95
2	0.35	0.24	0.61	2.00	0.47	1.06	1.98	1.01	0.88	0.81	0.85	0.92
3	0.35	0.21	0.59	1.52	0.40	0.98	1.82	1.03	0.89	0.82	0.84	0.95
4	0.48	0.22	0.57	1.36	0.40	0.92	1.71	1.04	1.15	0.80	0.87	0.98
5	0.37	0.19	0.55	1.22	0.44	0.87	1.70	1.08	0.95	0.75	0.84	na
6	0.39	0.21	0.55	1.15	0.44	0.99	1.67	1.11	0.91	0.77	0.85	na
7	0.35	0.32	0.53	1.10	0.38	0.96	1.57	1.04	0.92	0.76	0.87	na
8	0.36	0.27	0.65	1.03	0.39	0.90	1.53	1.04	0.89	0.74	0.87	na
9	0.40	0.22	0.56	0.98	0.43	0.87	1.36	1.06	0.89	0.77	0.86	na
10	0.40	0.27	0.49	0.91	0.42	0.88	1.24	1.02	0.88	0.78	0.88	na
11	0.44	0.32	0.46	0.89	0.42	0.89	1.21	1.02	0.89	0.79	0.89	na
12	0.49	0.25	0.46	0.84	0.41	0.86	1.14	1.03	0.88	0.79	0.90	na
13	0.52	0.29	0.45	0.77	0.42	0.92	1.08	1.00	0.86	0.82	0.90	na
14	0.36	0.33	0.50	0.69	0.49	1.10	1.05	1.01	0.85	0.81	0.91	na
15	0.36	0.34	0.47	0.64	0.53	1.08	1.06	1.00	0.85	0.82	0.91	na
16	0.36	0.39	0.46	0.60	0.85	1.17	1.07	1.01	0.83	0.83	0.89	na
17	0.35	0.38	0.49	0.60	1.04	1.15	1.04	1.03	0.81	0.83	0.89	na
18	0.33	0.41	0.81	0.58	2.51	1.56	1.03	1.03	0.80	0.81	0.87	na
19	0.30	0.41	3.63	0.59	7.26	2.03	1.06	1.00	0.83	0.82	0.88	na
20	0.29	0.46	1.21	0.56	5.66	2.94	1.05	0.99	0.81	0.81	0.87	na
21	0.28	0.54	0.96	0.59	3.17	2.45	1.10	0.99	0.79	0.77	0.90	na
22	0.26	0.50	1.19	0.58	2.14	2.00	1.05	1.00	0.80	0.77	0.92	na
23	0.29	0.61	1.04	0.57	1.57	2.13	1.04	1.00	0.80	0.79	0.90	na
24	0.43	0.62	0.95	0.51	1.34	5.24	1.07	0.96	0.80	0.80	0.90	na
25	0.35	0.60	1.21	0.52	1.67	5.32	1.10	0.94	0.80	0.80	0.92	na
26	0.35	0.57	1.17	0.52	1.38	11.14	1.11	0.94	0.81	0.79	0.92	na
27	0.38	0.62	1.11	0.49	1.26	8.76	1.08	0.94	0.81	0.77	0.94	na
28	0.37	0.65	3.54	0.44	1.17	7.72	1.09	0.95	0.94	0.79	0.93	na
29	0.32	0.66	7.51	0.42	--	5.31	1.09	0.98	0.85	0.79	0.95	na
30	0.26	0.64	3.08	0.49	--	3.72	1.09	0.91	0.82	0.81	0.93	na
31	0.26	--	2.11	0.46	--	2.62	--	0.92	--	0.82	0.93	--
MEAN	0.36	0.40	1.24	0.82	1.34	2.57	1.28	1.00	0.86	0.80	0.89	na
MAX. DAY	0.52	0.66	7.51	2.00	7.26	11.1	2.14	1.11	1.15	0.83	0.95	na
MIN. DAY	0.26	0.19	0.45	0.42	0.38	0.86	1.03	0.91	0.79	0.74	0.84	na
cfs days	11.2	12.0	38.5	25.3	37.5	79.6	38.3	31.1	25.9	24.7	27.6	na
ac-ft	22.1	23.8	76.5	50.2	74.4	158	76.0	61.7	51.3	48.9	54.8	na

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.
4. na = data not avalable. Datalogger malfunctioned but flow and stage measured during site visits.

Water Year Summary

Mean daily discharge	1.05	(cfs)
Max. daily discharge	11.1	(cfs)
Min. daily discharge	0.19	(cfs)
Total	352	(cfs-days)
Total Volume	698	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

Form 3. Annual Hydrologic Record: Daffodil Canyon at Old San Pedro Road

Station Location / Watershed Descriptors

Located at hiking trail 80 feet upstream of Old San Pedro Road.
Coordinates: N37.55033 W122.5072, NAD27. Elevation: 110 feet, NGVD 1929
Watershed area above gage = 0.20 square miles.
Land use: Open space; Golden Gate National Recreation Area

Water Year: 2011
Stream: Daffodill Canyon
Station: DASP
County, State: San Mateo County, CA

Station Location Map

Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.072 cubic feet per second
Unit runoff: 0.36 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/19/08	21:50	0.60	0.64				
2/24/09	1:50	0.70	1.13				
3/3/10	6:00	0.97	4.13				
12/28/10	22:00	2.06	4.57				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.01	0.05	0.43	0.01	0.41	0.37	0.06	0.00	0.07	0.19	0.18
2	0.00	0.01	0.05	0.58	0.02	0.40	0.35	0.05	0.00	0.10	0.20	0.17
3	0.00	0.00	0.05	0.46	0.00	0.35	0.31	0.06	0.00	0.09	0.20	0.18
4	0.00	0.01	0.07	0.39	0.00	0.31	0.27	0.06	0.04	0.07	0.21	0.19
5	0.00	0.01	0.09	0.34	0.01	0.29	0.26	0.02	0.00	0.04	0.20	0.19
6	0.00	0.01	0.09	0.28	0.02	0.35	0.25	0.00	0.00	0.05	0.21	0.19
7	0.00	0.06	0.08	0.27	0.01	0.36	0.22	0.00	0.00	0.05	0.21	0.20
8	0.00	0.02	0.16	0.23	0.02	0.34	0.21	0.00	0.00	0.01	0.21	0.20
9	0.00	0.01	0.17	0.22	0.02	0.34	0.17	0.00	0.00	0.02	0.19	0.20
10	0.00	0.03	0.11	0.19	0.04	0.32	0.15	0.00	0.00	0.03	0.19	0.19
11	0.00	0.05	0.10	0.16	0.04	0.33	0.15	0.00	0.00	0.04	0.19	0.20
12	0.00	0.02	0.08	0.13	0.04	0.32	0.14	0.00	0.01	0.05	0.18	0.21
13	0.00	0.04	0.08	0.09	0.06	0.30	0.12	0.00	0.01	0.07	0.18	0.20
14	0.00	0.03	0.11	0.08	0.09	0.39	0.11	0.00	0.00	0.09	0.19	0.20
15	0.00	0.05	0.10	0.07	0.10	0.38	0.10	0.00	0.01	0.10	0.19	0.20
16	0.00	0.05	0.08	0.07	0.15	0.45	0.09	0.00	0.00	0.10	0.17	0.14
17	0.00	0.04	0.10	0.06	0.23	0.45	0.08	0.00	0.00	0.11	0.17	0.13
18	0.01	0.05	0.26	0.05	0.35	0.65	0.07	0.01	0.00	0.11	0.17	0.13
19	0.01	0.07	0.77	0.05	1.76	0.90	0.07	0.00	0.02	0.12	0.17	0.14
20	0.01	0.09	0.59	0.04	1.54	1.17	0.06	0.00	0.02	0.12	0.16	0.13
21	0.01	0.10	0.32	0.05	0.92	0.97	0.08	0.00	0.01	0.10	0.18	0.13
22	0.00	0.06	0.41	0.04	0.64	0.77	0.06	0.00	0.02	0.11	0.19	0.15
23	0.01	0.09	0.31	0.05	0.50	0.75	0.05	0.01	0.02	0.12	0.17	0.14
24	0.06	0.08	0.28	0.03	0.46	1.33	0.06	0.00	0.02	0.13	0.16	0.15
25	0.00	0.08	0.38	0.02	0.69	1.34	0.06	0.00	0.03	0.14	0.18	0.16
26	0.00	0.05	0.40	0.02	0.60	2.00	0.08	0.00	0.04	0.14	0.19	0.18
27	0.01	0.09	0.36	0.01	0.53	1.40	0.07	0.00	0.04	0.13	0.19	0.18
28	0.01	0.10	0.66	0.00	0.46	1.16	0.06	0.00	0.09	0.15	0.19	0.15
29	0.00	0.09	1.87	0.00	--	0.88	0.07	0.01	0.05	0.16	0.18	0.15
30	0.00	0.07	0.93	0.01	--	0.64	0.08	0.00	0.04	0.17	0.18	0.17
31	0.00	--	0.54	0.00	--	0.42	--	0.00	--	0.18	0.18	--
MEAN	0.01	0.05	0.31	0.14	0.33	0.66	0.14	0.01	0.02	0.09	0.19	0.17
MAX. DAY	0.06	0.10	1.87	0.58	1.76	2.00	0.37	0.06	0.09	0.18	0.21	0.21
MIN. DAY	0.00	0.00	0.05	0.00	0.00	0.29	0.05	0.00	0.00	0.01	0.16	0.13
cfs days	0.16	1.44	9.65	4.42	9.32	20.5	4.24	0.29	0.47	2.93	5.77	5.13
ac-ft	0.31	2.85	19.1	8.76	18.5	40.6	8.42	0.57	0.94	5.81	11.4	10.2

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.18	(cfs)
Max. daily discharge	2.00	(cfs)
Min. daily discharge	0.00	(cfs)
Total	64	(cfs-days)
Total Volume	127	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

Form 4. Annual Hydrologic Record: Montara Creek at Riviera Road

Station Location / Watershed Descriptors

Located: Downstream side of the Riviera Road crossing of Montra Creek
Coordinates: N37.5456 W122.495, NAD27. Elevation: 296 feet, NGVD 1929
Watershed area above gage: 0.78 square miles; MWSD diversion 0.5 mile upstream of gage
Land use: Agriculture and open space; Golden Gate National Recreation Area

Water Year: 2011
Stream: Montara Creek
Station: MORR
County, State: San Mateo County, CA

Station Location Map

Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.18 cubic feet per second
Unit runoff: 0.24 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/6/08	1:00	0.64	0.85				
2/16/09	9:30	1.08	0.66				
3/2/10	9:00	1.42	1.82				
11/27/10	7:45	1.42	2.96				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.02	0.01	2.15	1.60	0.00	0.62	0.62	0.93	0.33	0.09	0.10	0.00
2	0.01	0.01	2.06	1.87	0.00	0.60	0.64	1.02	0.40	0.15	0.15	0.04
3	0.01	0.01	1.96	1.63	0.00	0.52	0.63	0.96	0.49	0.08	0.19	0.20
4	0.03	0.01	1.83	1.20	0.00	0.42	0.62	0.75	0.66	0.01	0.19	0.17
5	0.02	0.00	1.67	0.99	0.00	0.41	0.61	0.60	0.56	0.00	0.19	0.11
6	0.03	0.00	1.16	0.85	0.00	0.54	0.57	0.59	0.42	0.00	0.03	0.18
7	0.03	0.72	0.85	0.77	0.00	0.57	0.60	0.52	0.25	0.06	0.00	0.08
8	0.02	0.00	1.37	0.73	0.00	0.53	0.67	0.44	0.48	0.03	0.08	0.02
9	0.03	0.22	1.65	0.69	0.00	0.55	0.59	0.43	0.30	0.03	0.07	0.01
10	0.01	0.24	1.29	0.50	0.00	0.52	0.64	0.39	0.26	0.01	0.04	0.13
11	0.04	0.02	1.01	0.41	0.00	0.48	0.57	0.52	0.18	0.07	0.12	0.04
12	0.05	0.00	0.89	0.29	0.00	0.46	0.66	0.47	0.16	0.10	0.03	0.00
13	0.00	0.01	0.74	0.23	0.00	0.47	0.61	0.57	0.20	0.13	0.00	0.06
14	0.00	0.00	0.63	0.21	0.00	0.71	0.68	0.71	0.14	0.18	0.00	0.04
15	0.00	0.00	0.32	0.22	0.01	0.71	0.70	0.67	0.24	0.20	0.05	0.02
16	0.01	0.00	0.38	0.20	0.10	0.76	0.79	0.67	0.14	0.20	0.00	0.06
17	0.01	0.00	0.51	0.20	0.22	0.77	0.88	0.78	0.26	0.17	0.00	0.00
18	0.01	0.00	1.14	0.20	0.43	0.91	0.81	0.74	0.26	0.20	0.06	0.00
19	0.00	0.72	2.09	0.19	0.96	1.01	0.79	0.58	0.09	0.20	0.00	0.01
20	0.00	0.78	1.83	0.18	1.02	1.19	0.90	0.47	0.12	0.21	0.01	0.11
21	0.01	0.68	1.54	0.19	0.88	1.14	1.03	0.52	0.11	0.17	0.12	0.00
22	0.00	0.17	1.72	0.13	0.81	1.00	1.03	0.59	0.08	0.20	0.01	0.00
23	0.21	0.76	1.51	0.07	0.70	0.95	0.87	0.64	0.05	0.20	0.00	0.00
24	0.78	0.00	1.39	0.00	0.70	1.33	0.90	0.56	0.00	0.19	0.00	0.00
25	0.00	0.01	1.50	0.01	0.81	1.39	1.11	0.33	0.01	0.23	0.00	0.08
26	0.01	0.49	1.55	0.00	0.77	1.54	0.99	0.29	0.06	0.21	0.00	0.02
27	0.04	2.85	1.29	0.00	0.72	1.47	0.98	0.41	0.07	0.21	0.03	0.00
28	0.05	2.61	1.49	0.00	0.67	1.30	0.91	0.45	0.11	0.20	0.00	0.02
29	0.14	2.42	2.40	0.00	--	1.09	1.14	0.46	0.20	0.18	0.00	0.21
30	0.13	2.31	2.09	0.02	--	0.83	1.05	0.30	0.23	0.08	0.02	0.01
31	0.01	--	1.83	0.00	--	0.74	--	0.36	--	0.00	0.00	--
MEAN	0.06	0.50	1.41	0.44	0.31	0.82	0.79	0.57	0.23	0.13	0.05	0.05
MAX. DAY	0.78	2.85	2.40	1.87	1.02	1.54	1.14	1.02	0.66	0.23	0.19	0.21
MIN. DAY	0.00	0.00	0.32	0.00	0.00	0.41	0.57	0.29	0.00	0.00	0.00	0.00
cfs days	1.73	15.1	43.8	13.5	8.80	25.5	23.6	17.7	6.85	3.98	1.49	1.62
ac-ft	3.42	29.9	86.9	26.9	17.4	50.6	46.8	35.2	13.6	7.90	2.95	3.21

Monitor's Comments

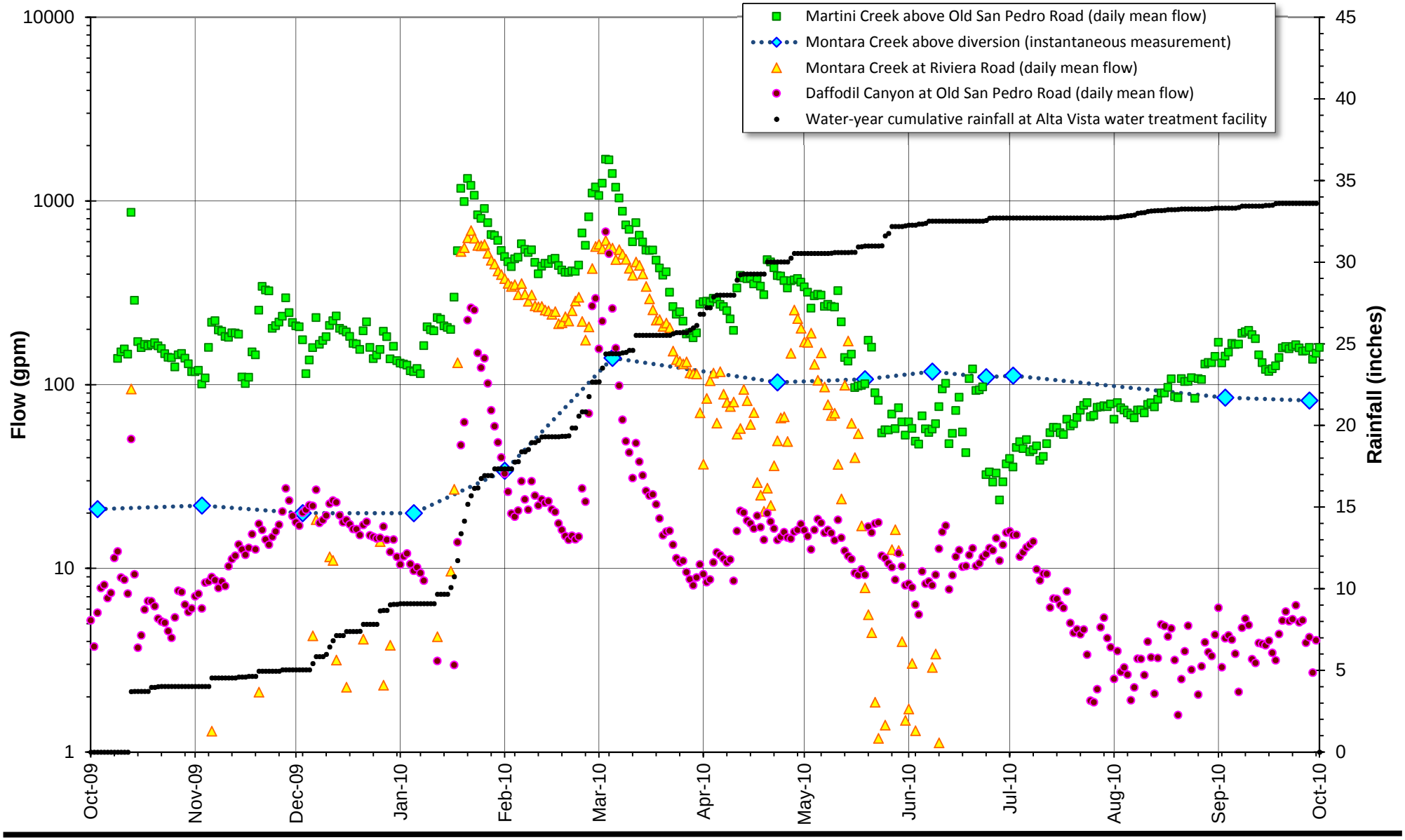
1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.45	(cfs)
Max. daily discharge	2.85	(cfs)
Min. daily discharge	0.00	(cfs)
Total	164	(cfs-days)
Total Volume	325	(ac-ft)

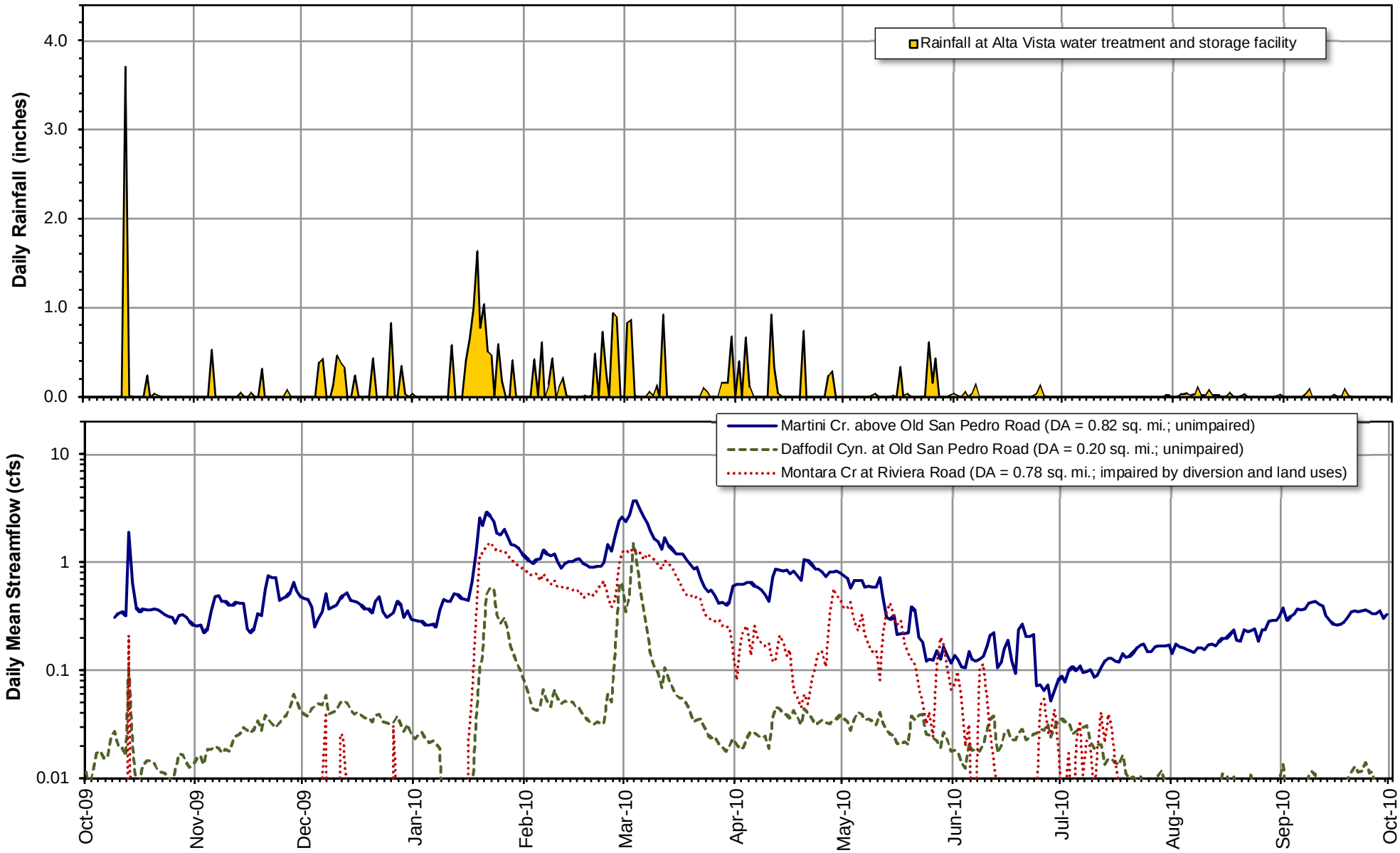
Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.



Appendix B. Flows in Montara Creek, Daffodil Canyon, and Martini Creek during water year 2010, San Mateo County, California. Following three dry years, the Alta Vista rain gage recorded above average rainfall during water year 2010, totaling 33.6 inches or 111 percent of average. A large storm on October 13, 2009 established October as wetter than normal; November and December were below normal; and the remainder of the wet season was wetter than normal. Streams responded to the large storms with higher flows, and flow above the MWSD diversion on Montara Creek showed response to upgradient groundwater recharge and higher baseflows than during 2009. Montara Creek at Riviera Road receded below 1 gpm.

Data preliminary and subject to revision.



Appendix B. Daily rainfall and streamflow, water year 2010, Montara Water and Sanitary District, San Mateo County, California. Datalogger malfunctioned at Martini Creek gaging station October 1 through October 8, 2009. MWSD operates a long-standing headwater diversion on Montara Creek about a half of a mile upstream of the gaging station.

Data preliminary and subject to revision.

Form 1. Annual Rainfall Record: Alta Vista Water Treatment and Storage Facility

Station Location

Located at end of Alta Vista Road on 12 ft. post on east side of water treatment building.
Coordinates: 37°32'52.53"N 122°29'53.68"W, WGS84. Elevation: 480 feet, WGS84.
Site limitations: Gage elevated above roof; trees 40 feet west of gage.

Water Year: **2010**
Station: AVWT
County, State: San Mateo County, CA
Station Location Map:

Period of Record

Tipping-bucket rain gage installed December 2, 2007.
Sponsored by the Montara Water & Sanitation District.
WY2001 through WY2008 daily rainfall manually measured at 8:00 AM by MWSD staff.
Mean annual rainfall = 30 inches

Seasonal Peak Daily Rainfall

Date	Inches	Date	Inches	Date	Inches	Date	Inches
1/27/08	3.70						
2/15/09	2.24						
10/13/09	3.71						

Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.00	0.00	0.04	0.00	0.01	0.00	0.00	0.04	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.84	0.40	0.00	0.01	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.87	0.00	0.00	0.00	0.00	0.03	0.00
4	0.00	0.00	0.00	0.00	0.42	0.01	0.66	0.00	0.06	0.00	0.03	0.00
5	0.00	0.00	0.00	0.00	0.02	0.00	0.11	0.00	0.00	0.00	0.04	0.00
6	0.00	0.53	0.39	0.00	0.61	0.00	0.00	0.00	0.04	0.00	0.02	0.00
7	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.03	0.04
8	0.00	0.00	0.00	0.00	0.13	0.06	0.00	0.00	0.00	0.00	0.11	0.09
9	0.00	0.00	0.00	0.00	0.43	0.02	0.00	0.01	0.00	0.00	0.02	0.00
10	0.00	0.00	0.13	0.00	0.00	0.13	0.00	0.04	0.00	0.00	0.01	0.00
11	0.00	0.00	0.46	0.00	0.12	0.00	0.92	0.00	0.00	0.00	0.08	0.00
12	0.00	0.00	0.38	0.58	0.22	0.92	0.33	0.00	0.00	0.00	0.02	0.00
13	3.71	0.00	0.32	0.00	0.02	0.00	0.04	0.00	0.00	0.00	0.01	0.00
14	0.02	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.03
16	0.00	0.00	0.24	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
17	0.00	0.05	0.00	0.65	0.00	0.00	0.00	0.33	0.00	0.00	0.05	0.02
18	0.00	0.00	0.00	1.00	0.02	0.00	0.00	0.01	0.00	0.00	0.00	0.09
19	0.24	0.00	0.00	1.64	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.02
20	0.00	0.31	0.01	0.77	0.03	0.00	0.74	0.00	0.00	0.00	0.01	0.00
21	0.04	0.00	0.43	1.04	0.48	0.00	0.00	0.00	0.00	0.00	0.03	0.00
22	0.01	0.00	0.00	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.46	0.73	0.10	0.00	0.00	0.01	0.00	0.00	0.00
24	0.00	0.00	0.00	0.02	0.26	0.06	0.00	0.01	0.04	0.00	0.00	0.00
25	0.00	0.00	0.00	0.59	0.00	0.00	0.00	0.61	0.13	0.00	0.00	0.00
26	0.00	0.00	0.83	0.17	0.94	0.00	0.00	0.15	0.02	0.00	0.00	0.00
27	0.00	0.08	0.02	0.00	0.89	0.00	0.24	0.43	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.15	0.29	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.35	0.41	--	0.15	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.03	0.00	--	0.15	0.00	0.00	0.00	0.02	0.02	0.00
31	0.00	--	0.00	0.00	--	0.68	--	0.03	--	0.01	0.03	--
Total	4.02	1.02	4.02	8.29	5.32	4.15	3.73	1.68	0.49	0.03	0.57	0.29
Max	3.71	0.53	0.83	1.64	0.94	0.92	0.92	0.61	0.14	0.02	0.11	0.09

Monitor's Comments

Water Year Summary

Total Annual	33.61	(inches)
Maximum Daily Total	3.71	(inches)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

Form 2. Annual Hydrologic Record: Martini Creek above Old San Pedro Road

Water Year: **2010**
Stream: Martini Creek
Station: MASP
County, State: San Mateo County, CA

Station Location / Watershed Descriptors

Located on right bank 500 feet upstream of Old San Pedro Road Bridge.
Coordinates: N37.55454 W122.50625, NAD27. Elevation: 110 feet, NGVD 1929.
Watershed area above gage = 0.82 square miles.
Land use: Open space; McNee Ranch SP and Golden Gate National Recreation Area

Station Location Map

Period of Record

Staff plate and water-level recorder installed on 11/18/03.
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.71 cubic feet per second
Unit runoff for period of record: 0.86 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
12/29/03	---- no record ----			3/3/10	5:45	1.15	6.40
2/25/04	22:30	1.26	9.63				
12/27/04	6:30	1.66	26.90				
12/31/05	5:30	1.53	18.75				
2/26/07	16:30	0.66	2.25				
1/25/08	13:30	1.54	19.46				
2/16/09	---- no record ----						

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	na	0.26	0.47	0.29	1.11	2.38	0.63	0.76	0.14	0.09	0.14	0.38
2	na	0.27	0.46	0.29	1.04	2.78	0.63	0.71	0.13	0.08	0.18	0.29
3	na	0.22	0.39	0.28	0.98	3.76	0.62	0.58	0.11	0.10	0.17	0.32
4	na	0.24	0.26	0.27	1.08	3.73	0.66	0.68	0.11	0.11	0.16	0.33
5	na	0.36	0.30	0.26	1.10	3.14	0.65	0.69	0.15	0.10	0.16	0.37
6	na	0.49	0.35	0.27	1.30	2.64	0.61	0.68	0.13	0.11	0.15	0.37
7	na	0.50	0.52	0.26	1.21	2.31	0.59	0.59	0.12	0.10	0.15	0.37
8	na	0.44	0.37	0.36	1.17	1.96	0.56	0.61	0.13	0.10	0.16	0.42
9	0.31	0.43	0.39	0.46	1.21	1.65	0.51	0.59	0.14	0.10	0.16	0.43
10	0.34	0.41	0.41	0.44	1.03	1.56	0.44	0.59	0.17	0.09	0.16	0.44
11	0.35	0.40	0.47	0.44	0.89	1.33	0.75	0.72	0.21	0.09	0.17	0.42
12	0.33	0.43	0.50	0.52	0.98	1.69	0.88	0.49	0.23	0.11	0.18	0.40
13	1.93	0.43	0.53	0.51	1.02	1.45	0.85	0.31	0.11	0.12	0.17	0.32
14	0.64	0.42	0.45	0.47	1.02	1.33	0.84	0.30	0.12	0.13	0.19	0.29
15	0.38	0.25	0.44	0.46	1.07	1.20	0.85	0.33	0.16	0.13	0.20	0.27
16	0.35	0.23	0.43	0.44	1.08	1.20	0.79	0.21	0.19	0.12	0.20	0.26
17	0.37	0.24	0.41	0.67	0.99	1.20	0.85	0.22	0.12	0.12	0.22	0.27
18	0.36	0.34	0.37	1.19	0.94	1.06	0.76	0.22	0.09	0.14	0.24	0.28
19	0.37	0.32	0.37	2.60	0.91	0.96	0.69	0.22	0.24	0.13	0.19	0.31
20	0.38	0.57	0.35	2.21	0.91	0.88	1.07	0.39	0.27	0.14	0.19	0.35
21	0.36	0.76	0.44	2.95	0.93	0.92	1.04	0.36	0.21	0.15	0.24	0.36
22	0.35	0.73	0.49	2.70	0.92	0.71	0.96	0.20	0.21	0.16	0.23	0.35
23	0.33	0.72	0.35	2.39	0.99	0.59	0.87	0.18	0.22	0.17	0.23	0.36
24	0.31	0.45	0.31	1.87	1.49	0.54	0.87	0.12	0.07	0.18	0.24	0.37
25	0.31	0.47	0.32	1.79	1.28	0.56	0.82	0.13	0.07	0.15	0.19	0.35
26	0.28	0.49	0.35	2.02	1.82	0.49	0.75	0.13	0.07	0.15	0.24	0.34
27	0.32	0.52	0.43	1.69	2.46	0.42	0.82	0.15	0.07	0.17	0.24	0.34
28	0.33	0.66	0.41	1.46	2.65	0.43	0.83	0.13	0.05	0.17	0.29	0.36
29	0.31	0.55	0.31	1.44	--	0.40	0.84	0.17	0.07	0.17	0.29	0.31
30	0.29	0.48	0.36	1.36	--	0.43	0.80	0.14	0.08	0.17	0.29	0.33
31	0.26	--	0.30	1.20	--	0.61	--	0.12	--	0.17	0.32	--
MEAN	0.42	0.44	0.40	1.08	1.20	1.43	0.76	0.38	0.14	0.13	0.20	0.35
MAX. DAY	1.93	0.76	0.53	2.95	2.65	3.76	1.07	0.76	0.27	0.18	0.32	0.44
MIN. DAY	0.26	0.22	0.26	0.26	0.89	0.40	0.44	0.12	0.05	0.08	0.14	0.26
cfs days	9.56	13.1	12.3	33.5	33.6	44.3	22.8	11.7	4.18	4.02	6.33	10.4
ac-ft	19.0	25.9	24.4	66.5	66.6	87.8	45.3	23.3	8.29	7.97	12.6	20.6

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.
4. na = data not available. Datalogger removed on 4/14/2009 and temporarily discontinued; reinstalled on 10/8/2009.

Water Year Summary

Mean daily discharge	0.58	(cfs)
Max. daily discharge	3.76	(cfs)
Min. daily discharge	0.05	(cfs)
Total	206	(cfs-days)
Total Volume	408	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

Form 3. Annual Hydrologic Record: Daffodil Canyon at Old San Pedro Road

Station Location / Watershed Descriptors

Located at hiking trail 80 feet upstream of Old San Pedro Road.
Coordinates: N37.55033 W122.5072, NAD27. Elevation: 110 feet, NGVD 1929
Watershed area above gage = 0.2 square miles.
Land use: Open space; Golden Gate National Recreation Area

Water Year: 2010
Stream: Daffodill Canyon
Station: DASP
County, State: San Mateo County, CA

Station Location Map

Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.072 cubic feet per second
Unit runoff: 0.36 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/19/08	21:50	0.60	0.64				
2/24/09	1:50	0.70	1.13				
3/3/10	6:00	0.97	4.13				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.01	0.02	0.04	0.02	0.07	0.35	0.02	0.04	0.02	0.04	0.01	0.01
2	0.01	0.02	0.04	0.03	0.06	0.49	0.02	0.03	0.02	0.03	0.01	0.01
3	0.01	0.01	0.04	0.03	0.04	1.51	0.02	0.03	0.01	0.03	0.01	0.01
4	0.02	0.02	0.05	0.02	0.04	1.15	0.02	0.04	0.01	0.03	0.01	0.01
5	0.02	0.02	0.05	0.02	0.05	0.58	0.03	0.04	0.02	0.03	0.01	0.01
6	0.02	0.02	0.05	0.02	0.07	0.35	0.03	0.04	0.02	0.03	0.00	0.01
7	0.02	0.02	0.06	0.02	0.05	0.22	0.03	0.03	0.02	0.03	0.01	0.00
8	0.03	0.02	0.04	0.02	0.05	0.14	0.02	0.04	0.02	0.03	0.01	0.01
9	0.03	0.02	0.04	0.00	0.07	0.11	0.02	0.03	0.02	0.02	0.01	0.01
10	0.02	0.02	0.04	na	0.06	0.10	0.02	0.03	0.03	0.02	0.01	0.01
11	0.02	0.02	0.05	na	0.05	0.07	0.04	0.04	0.04	0.02	0.01	0.01
12	0.02	0.03	0.05	0.01	0.05	0.11	0.05	0.03	0.04	0.02	0.01	0.01
13	0.11	0.03	0.05	0.00	0.05	0.08	0.04	0.03	0.02	0.01	0.00	0.01
14	0.02	0.03	0.04	na	0.05	0.07	0.04	0.03	0.02	0.02	0.01	0.01
15	0.01	0.03	0.04	na	0.05	0.06	0.04	0.02	0.03	0.02	0.01	0.01
16	0.01	0.03	0.04	na	0.05	0.06	0.04	0.02	0.03	0.01	0.01	0.01
17	0.01	0.03	0.04	0.01	0.04	0.06	0.04	0.02	0.02	0.01	0.01	0.01
18	0.01	0.03	0.04	0.03	0.04	0.05	0.04	0.02	0.02	0.02	0.01	0.01
19	0.01	0.03	0.04	0.10	0.03	0.04	0.03	0.02	0.03	0.01	0.01	0.01
20	0.01	0.04	0.03	0.14	0.03	0.03	0.04	0.04	0.03	0.01	0.00	0.01
21	0.01	0.04	0.04	0.50	0.03	0.04	0.04	0.03	0.02	0.01	0.01	0.01
22	0.01	0.03	0.04	0.58	0.03	0.04	0.04	0.04	0.02	0.01	0.01	0.01
23	0.01	0.03	0.03	0.57	0.03	0.03	0.03	0.04	0.03	0.01	0.01	0.01
24	0.01	0.03	0.03	0.33	0.06	0.03	0.03	0.03	0.03	0.01	0.01	0.01
25	0.01	0.04	0.03	0.28	0.05	0.02	0.04	0.03	0.03	0.00	0.00	0.01
26	0.01	0.04	0.03	0.31	0.16	0.02	0.03	0.02	0.03	0.00	0.00	0.01
27	0.02	0.05	0.04	0.23	0.60	0.02	0.03	0.02	0.03	0.00	0.01	0.01
28	0.02	0.06	0.03	0.16	0.66	0.02	0.04	0.02	0.02	0.01	0.01	0.01
29	0.01	0.05	0.03	0.13	--	0.02	0.04	0.03	0.03	0.01	0.01	0.01
30	0.01	0.04	0.03	0.11	--	0.02	0.04	0.02	0.03	0.01	0.01	0.01
31	0.01	--	0.03	0.09	--	0.02	--	0.02	--	0.01	0.01	--
MEAN	0.02	0.03	0.04	0.14	0.09	0.19	0.03	0.03	0.02	0.02	0.01	0.01
MAX. DAY	0.11	0.06	0.06	0.58	0.66	1.51	0.05	0.04	0.04	0.04	0.01	0.01
MIN. DAY	0.01	0.01	0.03	0.00	0.03	0.02	0.02	0.02	0.01	0.00	0.00	0.00
cfs days	0.56	0.87	1.24	3.76	2.61	5.91	0.98	0.92	0.73	0.53	0.22	0.29
ac-ft	1.10	1.73	2.45	7.46	5.17	11.7	1.94	1.83	1.45	1.05	0.43	0.57

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.
4. na = data not avalable. Datalogger malfunctioned but flow and stage measured during site visits.

Water Year Summary

Mean daily discharge	0.052	(cfs)
Max. daily discharge	1.51	(cfs)
Min. daily discharge	0.001	(cfs)
Total	19	(cfs-days)
Total Volume	37	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

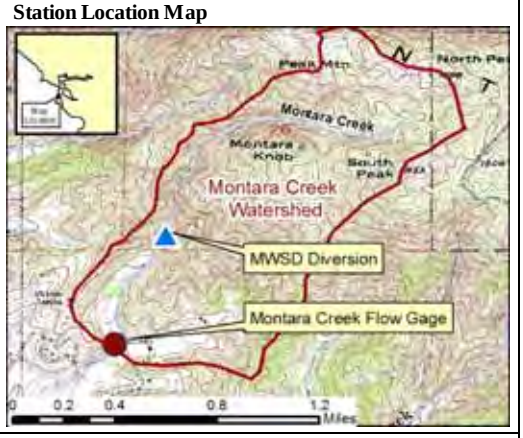
Form 4. Annual Hydrologic Record: Montara Creek at Riviera Road

Station Location / Watershed Descriptors

Located: Downstream side of the Riviera Road crossing of Montra Creek
Coordinates: N37.5456 W122.495, NAD27. Elevation: 296 feet, NGVD 1929
Watershed area above gage: 0.78 square miles; MWSD diversion 0.5 mile upstream of gage
Land use: Agriculture and open space; Golden Gate National Recreation Area

Water Year: 2010
Stream: Montara Creek
Station: MORR
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.18 cubic feet per second
Unit runoff: 0.24 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/6/08	1:00	0.64	0.85				
2/16/09	9:30	1.08	0.66				
3/2/10	9:00	1.42	1.82				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.00	0.00	0.00	0.84	1.29	0.08	0.38	0.08	0.01	0.00	0.00
2	0.00	0.00	0.00	0.00	0.79	1.22	0.19	0.38	0.10	0.01	0.00	0.00
3	0.00	0.00	0.00	0.00	0.76	1.36	0.23	0.43	0.05	0.02	0.00	0.00
4	0.00	0.00	0.00	0.00	0.78	1.25	0.26	0.29	0.02	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.69	1.23	0.14	0.24	0.03	0.02	0.00	0.00
6	0.00	0.00	0.01	0.00	0.79	1.07	0.26	0.33	0.00	0.03	0.00	0.00
7	0.00	0.00	0.04	0.00	0.69	1.21	0.20	0.22	0.01	0.01	0.00	0.00
8	0.00	0.00	0.00	0.00	0.63	1.14	0.18	0.17	0.10	0.02	0.00	0.00
9	0.00	0.00	0.00	0.00	0.68	1.07	0.17	0.15	0.12	0.02	0.00	0.00
10	0.00	0.00	0.00	0.00	0.60	0.96	0.18	0.16	0.05	0.01	0.00	0.00
11	0.00	0.00	0.03	0.00	0.59	0.88	0.12	0.08	0.03	0.02	0.00	0.00
12	0.00	0.00	0.02	0.01	0.59	1.04	0.13	0.22	0.01	0.04	0.00	0.00
13	0.21	0.00	0.01	0.00	0.57	0.99	0.21	0.35	0.01	0.02	0.00	0.00
14	0.00	0.00	0.00	0.00	0.56	0.89	0.18	0.42	0.00	0.04	0.00	0.00
15	0.00	0.00	0.00	0.00	0.54	0.76	0.14	0.30	0.00	0.03	0.00	0.00
16	0.00	0.00	0.01	0.02	0.56	0.65	0.16	0.27	0.00	0.01	0.00	0.00
17	0.00	0.00	0.00	0.06	0.48	0.57	0.07	0.29	0.00	0.01	0.00	0.00
18	0.00	0.00	0.00	0.29	0.48	0.50	0.06	0.18	0.00	0.01	0.00	0.00
19	0.00	0.00	0.00	1.18	0.52	0.50	0.05	0.14	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	1.24	0.50	0.46	0.06	0.13	0.00	0.00	0.00	0.00
21	0.00	0.00	0.01	1.40	0.56	0.48	0.05	0.11	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	1.53	0.64	0.45	0.08	0.07	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	1.39	0.67	0.34	0.11	0.05	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	1.28	0.49	0.31	0.15	0.03	0.01	0.00	0.00	0.00
25	0.00	0.00	0.00	1.27	0.39	0.30	0.15	0.04	0.05	0.00	0.00	0.00
26	0.00	0.00	0.03	1.29	0.46	0.29	0.11	0.02	0.06	0.00	0.00	0.00
27	0.00	0.00	0.01	1.16	0.96	0.30	0.33	0.11	0.03	0.00	0.00	0.00
28	0.00	0.00	0.00	1.06	1.26	0.26	0.57	0.20	0.03	0.00	0.00	0.00
29	0.00	0.00	0.01	1.01	--	0.26	0.51	0.17	0.04	0.00	0.00	0.00
30	0.00	0.00	0.00	0.93	--	0.25	0.45	0.10	0.02	0.00	0.00	0.00
31	0.00	--	0.00	0.89	--	0.16	--	0.07	--	0.00	0.00	--
MEAN	0.01	0.00	0.01	0.52	0.65	0.72	0.19	0.20	0.03	0.01	0.00	0.00
MAX. DAY	0.21	0.00	0.04	1.53	1.26	1.36	0.57	0.43	0.12	0.04	0.00	0.00
MIN. DAY	0.00	0.00	0.00	0.00	0.39	0.16	0.05	0.02	0.00	0.00	0.00	0.00
cfs days	0.21	0.01	0.17	16.0	18.1	22.4	5.55	6.12	0.84	0.34	0.00	0.00
ac-ft	0.42	0.02	0.33	31.8	35.8	44.5	11.0	12.1	1.67	0.67	0.00	0.00

Monitor's Comments

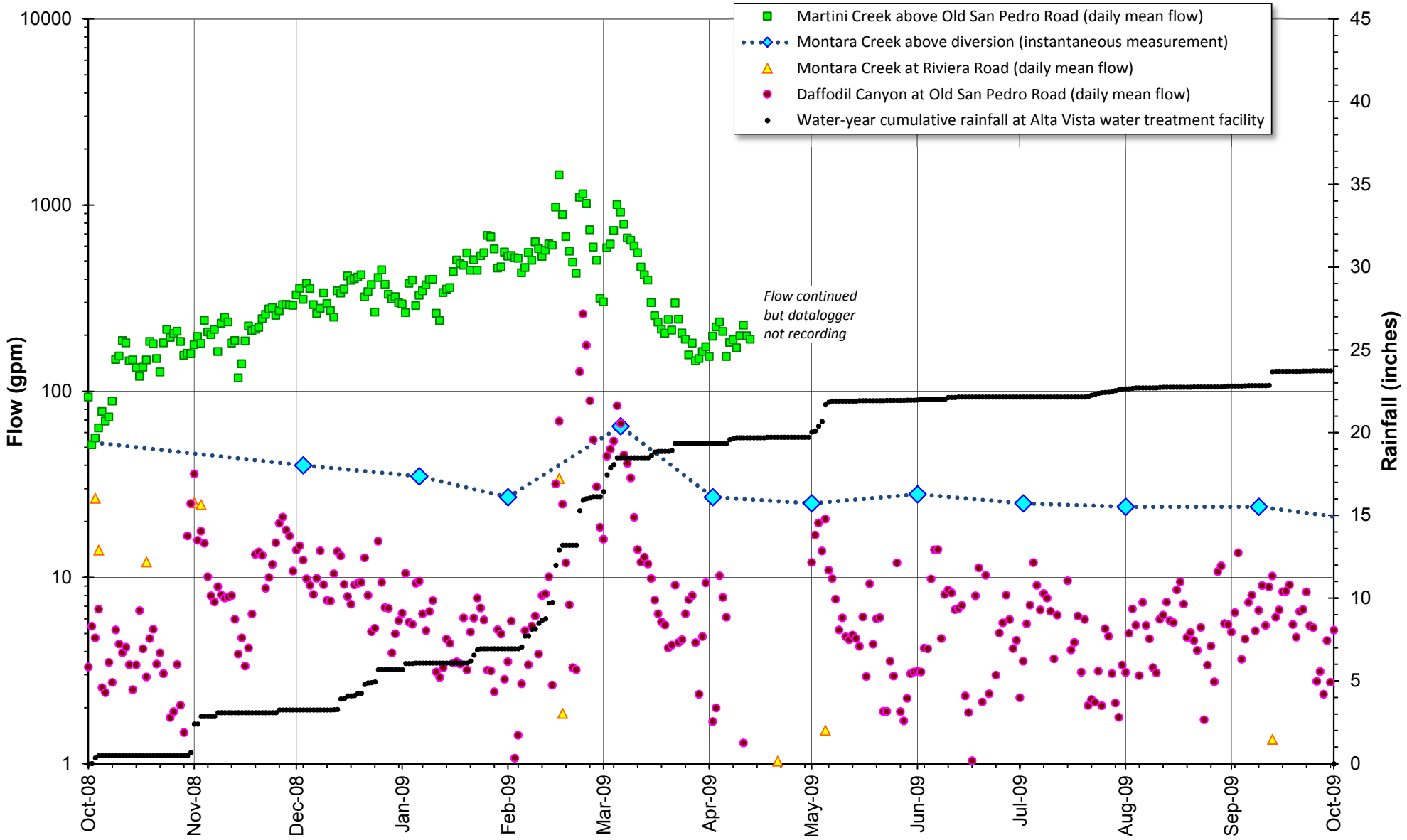
1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.19	(cfs)
Max. daily discharge	1.53	(cfs)
Min. daily discharge	0.00	(cfs)
Total	70	(cfs-days)
Total Volume	138	(ac-ft)

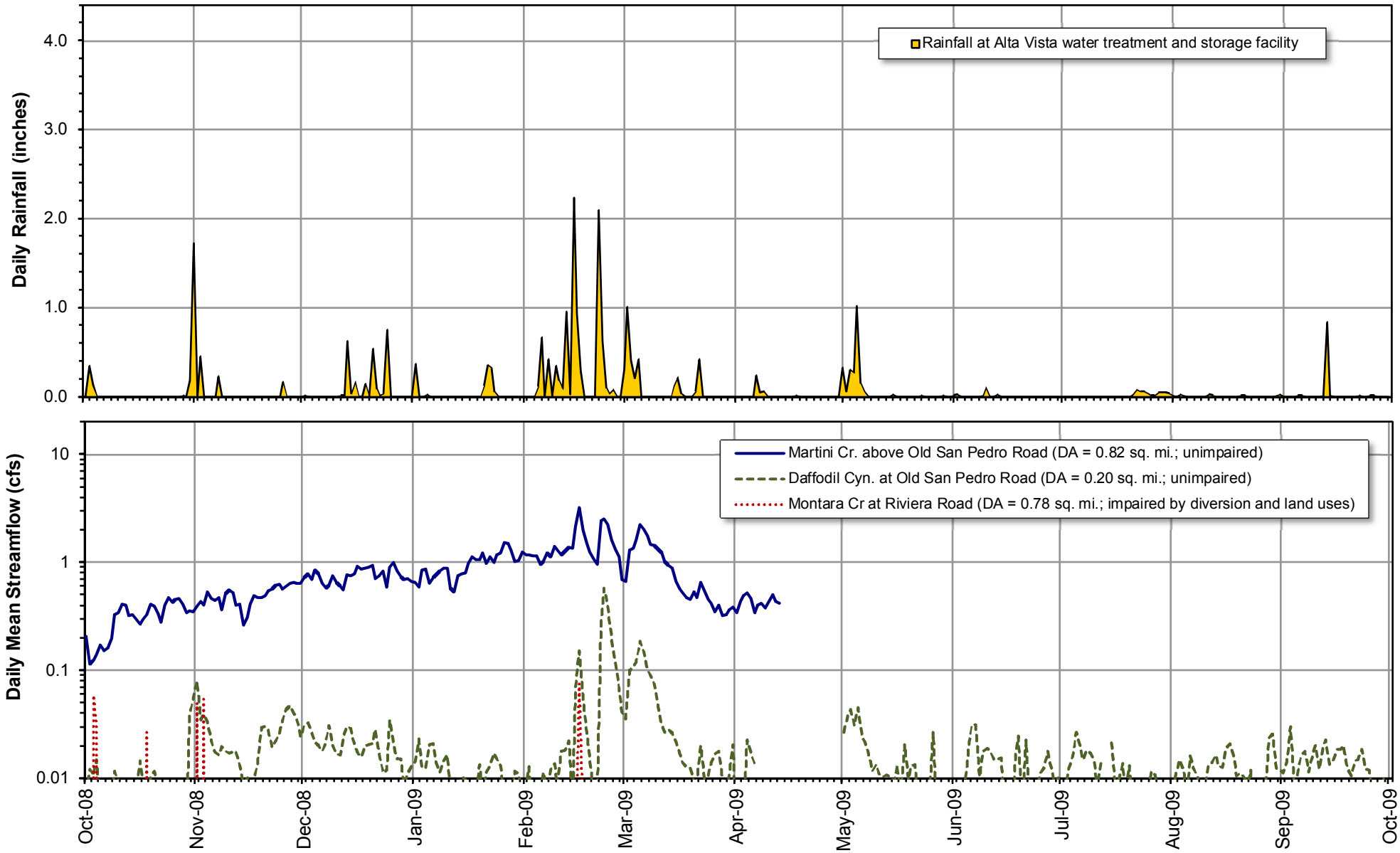
Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.



Appendix B. Flows in Montara Creek, Daffodil Canyon, and Martini Creek during water year 2009, San Mateo County, California. Water year 2009 was the third consecutive dry year, with rainfall totaling 23.75 inches or 79 percent of average. The Montara Creek gage was either below 1 gpm or dry during most of the year while upstream spring flows above the MWSD diversion were lower than the previous two years but persisted through the year. Consumptive use by intervening riparian vegetation also drew on stream and shallow groundwater. Daffodil Canyon and Martini Creek baseflows also persisted through the dry season.

Data preliminary and subject to revision.



Appendix B. Daily rainfall and streamflow, water year 2009, Montara Water and Sanitary District, San Mateo County, California. Datalogger removed at the Martini Creek gaging station on 4/14/2009 and temporarily discontinued. Datalogger malfunctioned during at the Daffodil Canyon gaging station during April 2009. MWSD operates a long-standing headwater diversion on Montara Creek about a half of a mile upstream of the gaging station.

Data preliminary and subject to revision.

Form 1. Annual Rainfall Record: Alta Vista Water Treatment and Storage Facility

Station Location

Located at end of Alta Vista Road on 12 ft. post on east side of water treatment building.
Coordinates: 37°32'52.53"N 122°29'53.68"W, WGS84. Elevation: 480 feet, WGS84.
Site limitations: Gage elevated above roof; trees 40 feet west of gage.

Water Year: **2009**
Station: AVWT
County, State: San Mateo County, CA
Station Location Map:

Period of Record

Tipping-bucket rain gage installed December 2, 2007.
Sponsored by the Montara Water & Sanitation District.
WY2001 through WY2008 daily rainfall manually measured at 8:00 AM by MWSD staff.
Mean annual rainfall = 30 inches

Seasonal Peak Daily Rainfall

Date	Inches	Date	Inches	Date	Inches	Date	Inches
1/27/08	3.70						
2/15/09	2.24						

Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	1.72	0.00	0.00	0.00	0.31	0.00	0.32	0.02	0.00	0.02	0.00
2	0.01	0.00	0.01	0.37	0.00	1.01	0.00	0.06	0.03	0.00	0.00	0.00
3	0.35	0.45	0.00	0.00	0.00	0.41	0.00	0.30	0.00	0.00	0.03	0.00
4	0.13	0.00	0.00	0.00	0.00	0.21	0.00	0.27	0.00	0.00	0.02	0.00
5	0.00	0.00	0.00	0.03	0.11	0.42	0.00	1.02	0.00	0.00	0.00	0.01
6	0.00	0.00	0.00	0.00	0.66	0.00	0.00	0.15	0.00	0.00	0.00	0.02
7	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.06	0.00	0.00	0.00	0.00
8	0.00	0.23	0.00	0.00	0.42	0.00	0.05	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.01	0.00	0.06	0.00	0.01	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.10	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.03	0.00
12	0.00	0.00	0.01	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.01	0.01
13	0.00	0.00	0.02	0.00	0.95	0.00	0.00	0.00	0.03	0.00	0.00	0.84
14	0.00	0.00	0.62	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.02
15	0.00	0.00	0.04	0.00	2.24	0.12	0.00	0.03	0.00	0.00	0.00	0.00
16	0.00	0.00	0.16	0.00	0.93	0.22	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.29	0.04	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
21	0.00	0.00	0.54	0.12	0.00	0.06	0.00	0.00	0.00	0.03	0.01	0.00
22	0.00	0.00	0.09	0.36	2.09	0.42	0.00	0.00	0.00	0.08	0.00	0.01
23	0.00	0.00	0.01	0.32	0.62	0.00	0.00	0.02	0.00	0.06	0.00	0.00
24	0.00	0.00	0.04	0.06	0.10	0.00	0.00	0.00	0.00	0.06	0.00	0.00
25	0.00	0.00	0.75	0.00	0.04	0.00	0.00	0.00	0.00	0.04	0.00	0.01
26	0.00	0.16	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.01	0.00	0.01
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00
29	0.01	0.00	0.00	0.00	--	0.00	0.00	0.01	0.00	0.05	0.00	0.00
30	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.05	0.02	0.00
31	0.19	--	0.00	0.00	--	0.00	--	0.00	--	0.04	0.03	--
Total	0.69	2.56	2.44	1.26	9.19	3.22	0.37	2.24	0.19	0.48	0.18	0.93
Max	0.35	1.72	0.75	0.37	2.24	1.01	0.24	1.02	0.10	0.08	0.03	0.84

Monitor's Comments

Water Year Summary

Total Annual	23.75	(inches)
Maximum Daily Total	2.24	(inches)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

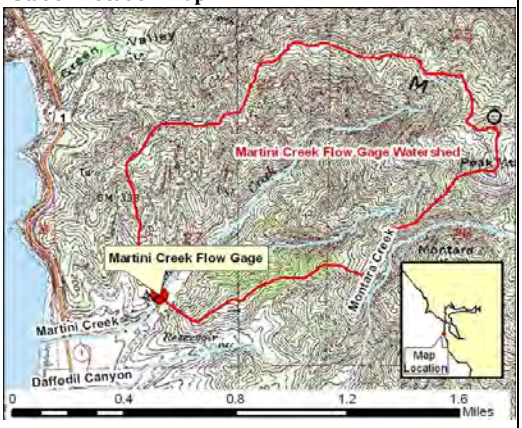
Form 2. Annual Hydrologic Record: Martini Creek above Old San Pedro Road

Station Location / Watershed Descriptors

Located on right bank 500 feet upstream of Old San Pedro Road Bridge.
Coordinates: N37.55454 W122.50625, NAD27. Elevation: 110 feet, NGVD 1929.
Watershed area above gage = 0.82 square miles.
Land use: Open space; McNee Ranch SP and Golden Gate National Recreation Area

Water Year: 2009
Stream: Martini Creek
Station: MASP
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder installed on 11/18/03.
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.71 cubic feet per second
Unit runoff for period of record: 0.86 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
12/29/03	---- no record ----						
2/25/04	22:30	1.26	9.63				
12/27/04	6:30	1.66	26.90				
12/31/05	5:30	1.53	18.75				
2/26/07	16:30	0.66	2.25				
1/25/08	13:30	1.54	19.46				
2/16/09	---- no record ----						

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.21	0.40	0.73	0.66	1.18	0.67	0.34	na	na	na	na	na
2	0.11	0.44	0.79	0.59	1.19	1.31	0.44	na	na	na	na	na
3	0.13	0.40	0.69	0.85	1.16	1.37	0.49	na	na	na	na	na
4	0.14	0.53	0.85	0.88	1.15	1.63	0.53	na	na	na	na	na
5	0.17	0.46	0.79	0.64	0.96	2.24	0.47	na	na	na	na	na
6	0.15	0.45	0.65	0.73	1.03	2.04	0.34	na	na	na	na	na
7	0.16	0.48	0.58	0.77	1.24	1.76	0.41	na	na	na	na	na
8	0.20	0.36	0.62	0.83	1.12	1.48	0.42	na	na	na	na	na
9	0.33	0.52	0.75	0.89	1.41	1.44	0.38	na	na	na	na	na
10	0.34	0.56	0.66	0.89	1.30	1.34	0.44	na	na	na	na	na
11	0.42	0.52	0.60	0.58	1.18	1.23	0.50	na	na	na	na	na
12	0.41	0.40	0.56	0.53	1.27	1.03	0.44	na	na	na	na	na
13	0.32	0.42	0.77	0.75	1.37	0.94	0.42	na	na	na	na	na
14	0.33	0.26	0.75	0.79	1.35	0.88	na	na	na	na	na	na
15	0.30	0.31	0.79	0.80	2.17	0.67	na	na	na	na	na	na
16	0.27	0.41	0.93	0.98	3.24	0.57	na	na	na	na	na	na
17	0.30	0.50	0.88	1.13	1.98	0.52	na	na	na	na	na	na
18	0.33	0.47	0.89	1.08	1.51	0.48	na	na	na	na	na	na
19	0.41	0.48	0.91	1.06	1.26	0.46	na	na	na	na	na	na
20	0.40	0.49	0.94	1.23	1.09	0.54	na	na	na	na	na	na
21	0.33	0.55	0.72	0.99	0.96	0.47	na	na	na	na	na	na
22	0.28	0.58	0.76	1.13	2.45	0.66	na	na	na	na	na	na
23	0.40	0.62	0.83	0.99	2.55	0.54	na	na	na	na	na	na
24	0.48	0.63	0.59	1.19	2.27	0.46	na	na	na	na	na	na
25	0.43	0.57	0.91	1.23	1.64	0.42	na	na	na	na	na	na
26	0.45	0.60	1.00	1.53	1.32	0.35	na	na	na	na	na	na
27	0.47	0.65	0.83	1.50	1.13	0.40	na	na	na	na	na	na
28	0.41	0.65	0.74	1.30	0.70	0.32	na	na	na	na	na	na
29	0.35	0.65	0.70	1.02	--	0.33	na	na	na	na	na	na
30	0.36	0.64	0.72	1.04	--	0.36	na	na	na	na	na	na
31	0.35	--	0.67	1.24	--	0.39	--	na	--	na	na	--
MEAN	0.31	0.50	0.76	0.96	1.47	0.88	na	na	na	na	na	na
MAX. DAY	0.48	0.65	1.00	1.53	3.24	2.24	na	na	na	na	na	na
MIN. DAY	0.11	0.26	0.56	0.53	0.70	0.32	na	na	na	na	na	na
cfs days	9.75	15.0	23.6	29.8	41.2	27.3	na	na	na	na	na	na
ac-ft	19.3	29.7	46.8	59.1	81.7	54.2	na	na	na	na	na	na

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.
4. Annual mean, maximum and minimum flows are not presented as a result of an incomplete annual record.
5. na = data not available. Datalogger removed on 4/14/2009 and temporarily discontinued.

Water Year Summary

Mean daily discharge	na	(cfs)
Max. daily discharge	na	(cfs)
Min. daily discharge	na	(cfs)
Total	na	(cfs-days)
Total Volume	na	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

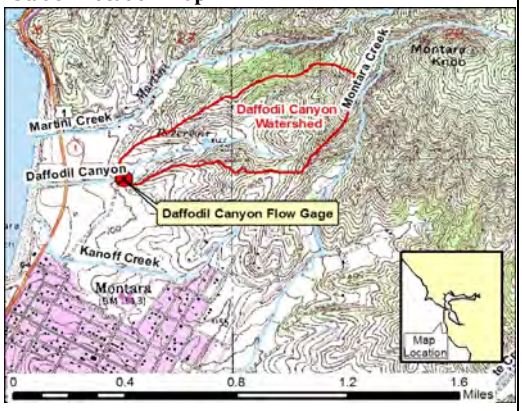
Form 3. Annual Hydrologic Record: Daffodil Canyon at Old San Pedro Road

Station Location / Watershed Descriptors

Located at hiking trail 80 feet upstream of Old San Pedro Road.
Coordinates: N37.55033 W122.5072, NAD27. Elevation: 110 feet, NGVD 1929
Watershed area above gage = 0.2 square miles.
Land use: Open space; Golden Gate National Recreation Area

Water Year: 2009
Stream: Daffodill Canyon
Station: DASP
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.072 cubic feet per second
Unit runoff: 0.36 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/19/08	21:50	0.60	0.64				
2/24/09	1:50	0.70	1.13				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.01	0.08	0.03	0.01	0.01	0.04	0.00	0.03	0.01	0.01	0.01	0.01
2	0.01	0.04	0.03	0.02	0.01	0.10	0.00	0.04	0.01	0.01	0.01	0.01
3	0.01	0.04	0.03	0.01	0.00	0.11	0.00	0.04	0.01	0.01	0.02	0.03
4	0.02	0.03	0.02	0.01	0.00	0.12	0.02	0.03	0.01	0.02	0.01	0.01
5	0.01	0.02	0.02	0.02	0.01	0.19	0.02	0.05	0.02	0.03	0.01	0.01
6	0.01	0.02	0.02	0.02	0.01	0.15	0.01	0.02	0.03	0.02	0.02	0.02
7	0.01	0.02	0.02	0.01	0.01	0.10	na	0.02	0.03	0.01	0.01	0.02
8	0.01	0.02	0.03	0.01	0.01	0.09	na	0.02	0.01	0.02	0.01	0.01
9	0.01	0.02	0.02	0.01	0.01	0.08	na	0.01	0.02	0.02	0.01	0.01
10	0.01	0.02	0.02	0.02	0.01	0.05	na	0.01	0.02	0.01	0.01	0.02
11	0.01	0.02	0.02	0.01	0.02	0.03	0.00	0.01	0.02	0.01	0.01	0.01
12	0.01	0.02	0.02	0.01	0.02	0.03	na	0.01	0.01	0.01	0.01	0.02
13	0.01	0.01	0.03	0.01	0.02	0.03	na	0.01	0.02	na	0.02	0.02
14	0.01	0.01	0.03	0.01	0.01	0.03	na	0.01	0.02	na	0.01	0.01
15	0.01	0.01	0.02	0.01	0.07	0.02	na	0.01	0.01	0.02	0.01	0.01
16	0.01	0.01	0.02	0.01	0.15	0.02	na	0.01	0.00	0.01	0.02	0.02
17	0.01	0.01	0.02	0.01	0.06	0.01	na	0.01	0.00	0.01	0.02	0.02
18	0.01	0.01	0.02	0.01	0.03	0.01	na	0.02	0.02	0.01	0.02	0.02
19	0.01	0.03	0.02	0.01	0.02	0.01	na	0.01	0.03	0.01	0.01	0.01
20	0.01	0.03	0.02	0.01	0.01	0.01	na	0.01	0.00	0.01	0.01	0.01
21	0.01	0.03	0.03	0.01	0.01	0.01	na	0.01	0.02	0.00	0.01	0.01
22	0.01	0.02	0.02	0.01	0.28	0.02	na	0.00	0.01	0.00	0.01	0.01
23	0.01	0.02	0.01	0.02	0.58	0.01	na	0.00	0.00	0.00	0.01	0.02
24	0.00	0.03	0.01	0.02	0.39	0.01	na	0.01	0.01	0.01	0.00	0.01
25	0.00	0.03	0.03	0.01	0.20	0.01	na	0.01	0.01	0.00	0.01	0.01
26	0.00	0.04	0.02	0.01	0.12	0.02	na	0.03	0.01	0.01	0.01	0.01
27	0.01	0.05	0.02	0.01	0.07	0.02	na	0.00	0.02	0.01	0.01	0.01
28	0.00	0.04	0.02	0.01	0.04	0.01	na	0.00	0.01	0.01	0.02	0.01
29	0.00	0.04	0.01	0.01	--	0.01	na	0.00	0.01	0.00	0.03	0.01
30	0.04	0.02	0.01	0.01	--	0.01	na	0.01	0.01	0.00	0.01	0.01
31	0.06	--	0.01	0.01	--	0.02	--	0.01	--	0.01	0.01	--
MEAN	0.01	0.03	0.02	0.01	0.08	0.04	na	0.02	0.01	0.01	0.01	0.01
MAX. DAY	0.06	0.08	0.03	0.02	0.58	0.19	na	0.05	0.03	0.03	0.03	0.03
MIN. DAY	0.00	0.01	0.01	0.01	0.00	0.01	na	0.00	0.00	0.00	0.00	0.01
cfs days	0.32	0.78	0.65	0.37	2.18	1.36	na	0.48	0.40	0.32	0.39	0.43
ac-ft	0.64	1.55	1.28	0.73	4.32	2.70	na	0.95	0.79	0.64	0.77	0.85

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.
4. Annual mean, maximum and minimum flows are not presented as a result of an incomplete annual record.
5. na = data not avalable. Datalogger malfunctioned but flow and stage measured during site visits.

Water Year Summary

Mean daily discharge	na	(cfs)
Max. daily discharge	na	(cfs)
Min. daily discharge	na	(cfs)
Total	na	(cfs-days)
Total Volume	na	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

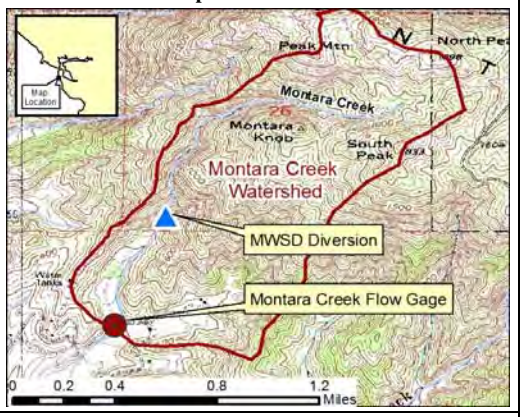
Form 4. Annual Hydrologic Record: Montara Creek at Riviera Road

Station Location / Watershed Descriptors

Located: Downstream side of the Riviera Road crossing of Montra Creek
Coordinates: N37.5456 W122.495, NAD27. Elevation: 296 feet, NGVD 1929
Watershed area above gage: 0.78 square miles; MWSD diversion 0.5 mile upstream of gage
Land use: Agriculture and open space; Golden Gate National Recreation Area

Water Year: 2009
Stream: Montara Creek
Station: MORR
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.18 cubic feet per second
Unit runoff: 0.24 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/6/08	1:00	0.64	0.85				
2/16/09	9:30	1.08	0.66				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	--	0.00	0.00	--	0.00	--	0.00	--	0.00	0.00	--
MEAN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MAX. DAY	0.06	0.05	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MIN. DAY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cfs days	0.12	0.11	0.00	0.00	0.08	0.00	0.02	0.00	0.00	0.00	0.00	0.00
ac-ft	0.23	0.21	0.00	0.00	0.16	0.00	0.03	0.01	0.00	0.00	0.00	0.01

Monitor's Comments

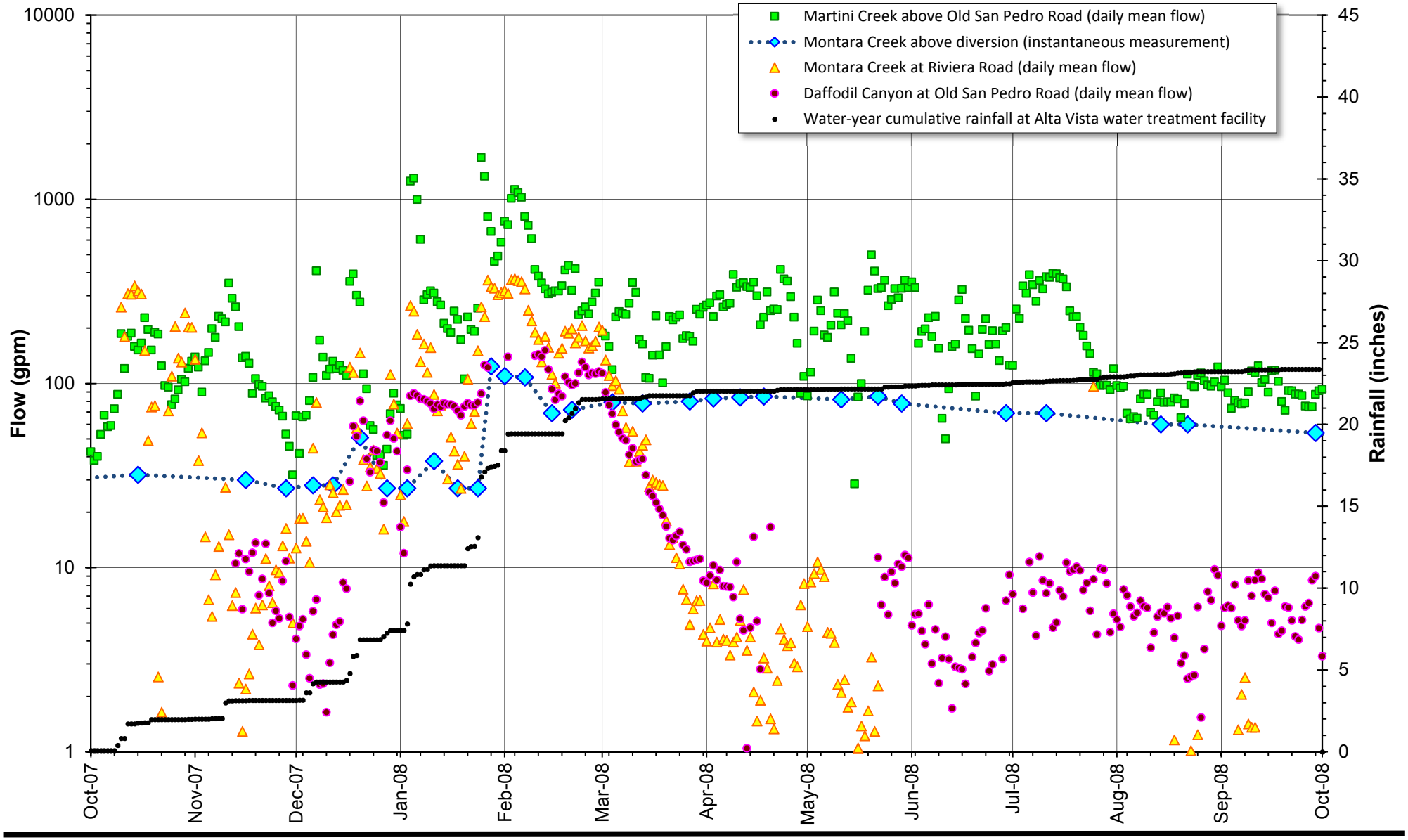
1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.0009	(cfs)
Max. daily discharge	0.076	(cfs)
Min. daily discharge	0.00	(cfs)
Total	0.33	(cfs-days)
Total Volume	0.65	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

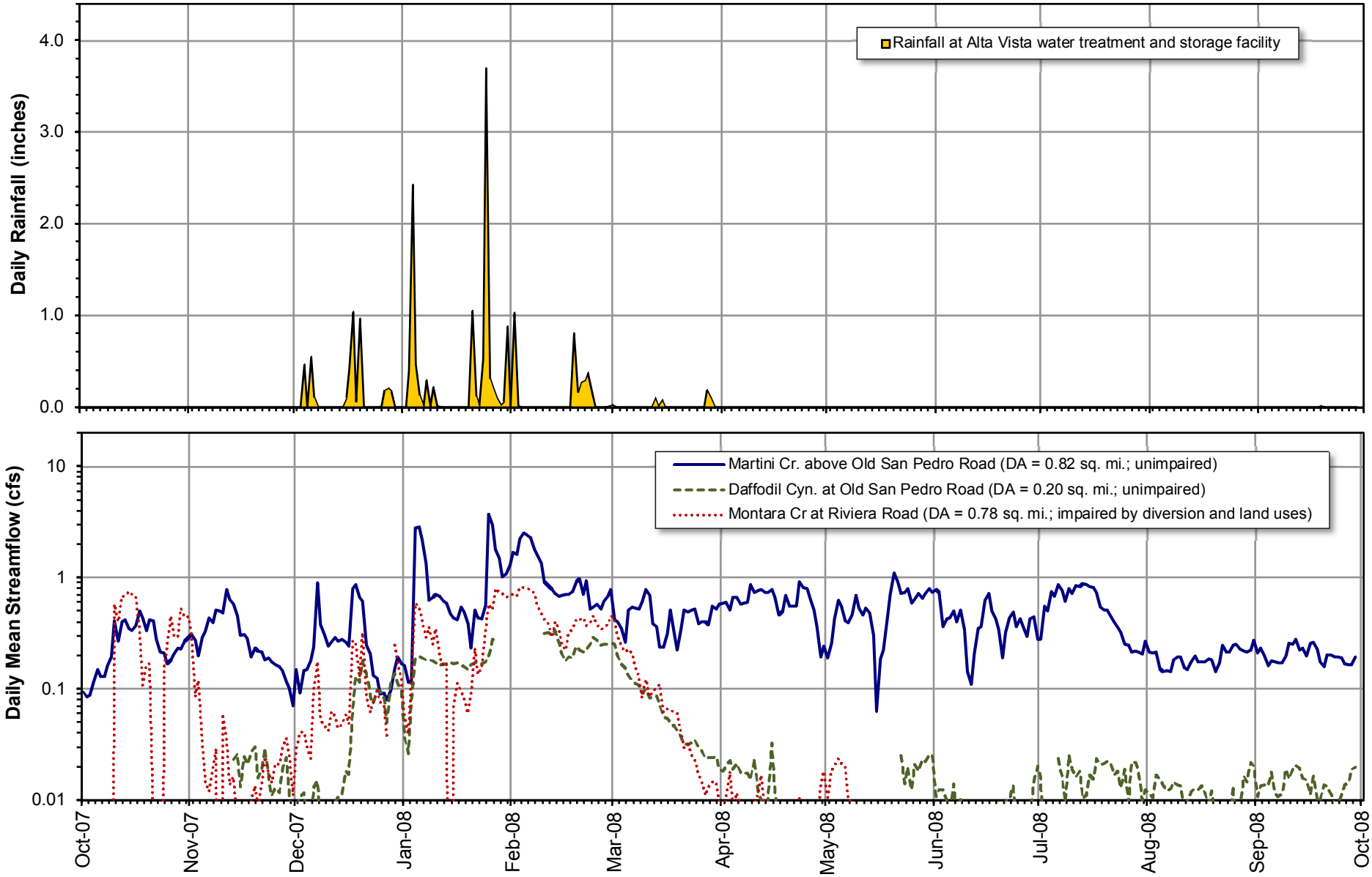
Data preliminary and subject to revision.



Balance Hydrologics

Appendix B. Flows in Montara Creek, Daffodil Canyon, and Martini Creek during water year 2008, San Mateo County, California. The Alta Vista rain gage recorded below normal rainfall during water year 2008, a total of 25.0 inches for the year, or 83 percent of average. Rainfall during January, however, was above normal. Streams responded with higher flows during January and February. Then beginning in March, the duration of the dry-season season extend for a longer than normal term. Streams sustained baseflows while Alta Vista well pumping progressed since its September 2007 start. Montara Creek at Riviera Road receded below 1 gpm and then dried back while flow at the upstream MWSD diversion and consumptive use by intervening riparian vegetation persisted through the dry season.

Data preliminary and subject to revision.



Balance Hydrologics

Appendix B. Daily rainfall and streamflow, water year 2008, Montara Water and Sanitary District, San Mateo County, California. Rain gage installed December 2, 2007 and not functional April 10 through Sept. 10, 2008. Datalogger at Daffodil Cyn. malfunctioned Oct. 1 through Nov. 12, 2007, Jan. 28 through Feb. 9 and April 21 through May 21, 2008. Datalogger at Montara Cr. malfunctioned May 23 throiugh July 9, 2008. MWSD operates a long-standing headwater diversion on Montara Creek about a half of a mile upstream of the gaging station.

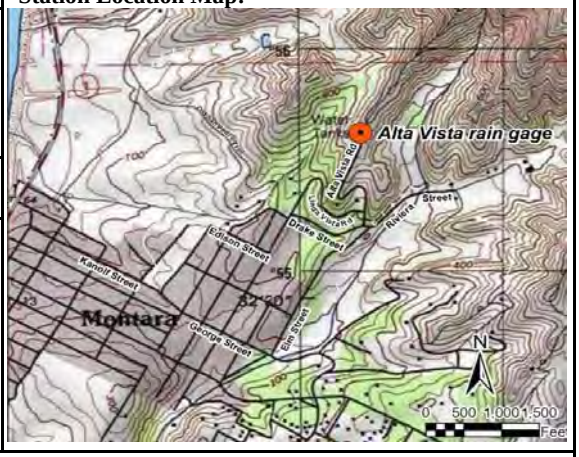
Data preliminary and subject to revision.

Form 1. Annual Rainfall Record: Alta Vista Water Treatment and Storage Facility

Station Location

Located at end of Alta Vista Road on 12 ft. post on east side of water treatment building.
Coordinates: 37°32'52.53"N 122°29'53.68"W, WGS84. Elevation: 480 feet, WGS84.
Site limitations: Gage elevated above roof; trees 40 feet west of gage.

Water Year: **2008**
Station: AVWT
County, State: San Mateo County, CA
Station Location Map:



Period of Record

Tipping-bucket rain gage installed December 2, 2007.
Sponsored by the Montara Water & Sanitation District.
WY2001 through WY2008 daily rainfall manually measured at 8:00 AM by MWSD staff.
Mean annual rainfall = 30 inches

Seasonal Peak Daily Rainfall

Date	Inches	Date	Inches	Date	Inches	Date	Inches
1/27/08	3.70						

Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	na	na	na	0.00	0.00	0.03	0.00	na	na	na	na	na
2	na	na	na	0.00	1.03	0.00	0.00	na	na	na	na	na
3	na	na	0.00	0.40	0.02	0.00	0.00	na	na	na	na	na
4	na	na	0.46	2.42	0.00	0.00	0.00	na	na	na	na	na
5	na	na	0.00	0.46	0.00	0.00	0.00	na	na	na	na	na
6	na	na	0.55	0.13	0.00	0.00	0.00	na	na	na	na	na
7	na	na	0.11	0.01	0.00	0.00	0.00	na	na	na	na	na
8	na	na	0.00	0.29	0.00	0.00	0.00	na	na	na	na	na
9	na	na	0.00	0.01	0.00	0.00	0.00	na	na	na	na	na
10	na	na	0.00	0.22	0.00	0.00	na	na	na	na	na	na
11	na	na	0.00	0.01	0.00	0.00	na	na	na	na	na	0.00
12	na	na	0.00	0.00	0.00	0.00	na	na	na	na	na	0.00
13	na	na	0.00	0.00	0.00	0.10	na	na	na	na	na	0.00
14	na	na	0.00	0.00	0.00	0.01	na	na	na	na	na	0.00
15	na	na	0.00	0.00	0.00	0.08	na	na	na	na	na	0.00
16	na	na	0.10	0.00	0.00	0.00	na	na	na	na	na	0.00
17	na	na	0.42	0.00	0.00	0.00	na	na	na	na	na	0.00
18	na	na	1.04	0.00	0.00	0.00	na	na	na	na	na	0.00
19	na	na	0.06	0.00	0.80	0.00	na	na	na	na	na	0.02
20	na	na	0.96	0.00	0.16	0.00	na	na	na	na	na	0.00
21	na	na	0.00	1.05	0.27	0.00	na	na	na	na	na	0.00
22	na	na	0.00	0.12	0.29	0.00	na	na	na	na	na	0.00
23	na	na	0.00	0.02	0.38	0.00	na	na	na	na	na	0.00
24	na	na	0.00	0.53	0.18	0.00	na	na	na	na	na	0.00
25	na	na	0.00	3.70	0.00	0.00	na	na	na	na	na	0.00
26	na	na	0.01	0.31	0.00	0.00	na	na	na	na	na	0.00
27	na	na	0.18	0.22	0.00	0.00	na	na	na	na	na	0.00
28	na	na	0.21	0.10	0.00	0.18	na	na	na	na	na	0.00
29	na	na	0.17	0.03	0.02	0.10	na	na	na	na	na	0.00
30	na	na	0.00	0.06	--	0.00	na	na	na	na	na	0.00
31	na	--	0.00	0.88	--	0.00	--	na	--	na	na	--
Total	na	na	4.27	10.97	3.15	0.50	na	na	na	na	na	na
Max	na	na	1.04	3.70	1.03	0.18	na	na	na	na	na	na

Monitor's Comments

1. Annual mean, maximum and minimum flows are not presented as a result of an incomplete annual record.
2. na = data not avalable. Datalogger malfunctioned.

Water Year Summary

Total Annual	na	(inches)
Maximum Daily Total	na	(inches)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

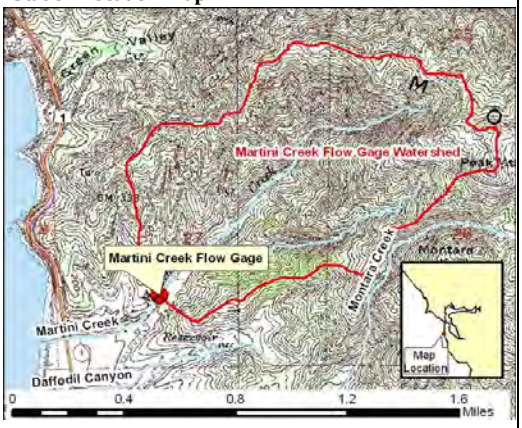
Form 2. Annual Hydrologic Record: Martini Creek above Old San Pedro Road

Water Year: **2008**
Stream: Martini Creek
Station: MASP
County, State: San Mateo County, CA

Station Location / Watershed Descriptors

Located on right bank 500 feet upstream of Old San Pedro Road Bridge.
Coordinates: N37.55454 W122.50625, NAD27. Elevation: 110 feet, NGVD 1929.
Watershed area above gage = 0.82 square miles.
Land use: Open space; McNee Ranch SP and Golden Gate National Recreation Area

Station Location Map



Period of Record

Staff plate and water-level recorder installed on 11/18/03.
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.71 cubic feet per second
Unit runoff for period of record: 0.86 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
12/29/03	---- no record ----						
2/25/04	22:30	1.26	9.6				
12/27/04	6:30	1.66	27				
12/31/05	5:30	1.53	18.75				
2/26/07	16:30	0.66	2.2				
1/25/08	13:30	1.54	19.46				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.09	0.31	0.15	0.16	1.70	0.42	0.59	0.19	0.79	0.28	0.22	0.21
2	0.08	0.27	0.09	0.12	1.62	0.40	0.61	0.26	0.74	0.56	0.21	0.23
3	0.09	0.20	0.15	0.12	2.25	0.35	0.51	0.43	0.37	0.50	0.22	0.20
4	0.12	0.30	0.15	2.79	2.52	0.27	0.66	0.63	0.43	0.75	0.15	0.16
5	0.15	0.33	0.18	2.90	2.42	0.51	0.68	0.55	0.44	0.69	0.14	0.18
6	0.13	0.44	0.24	2.22	2.29	0.55	0.58	0.41	0.51	0.87	0.15	0.17
7	0.13	0.40	0.91	1.35	1.80	0.54	0.60	0.40	0.40	0.77	0.14	0.17
8	0.16	0.52	0.38	0.63	1.61	0.53	0.61	0.46	0.52	0.62	0.18	0.17
9	0.19	0.50	0.31	0.67	1.36	0.61	0.87	0.70	0.35	0.81	0.19	0.20
10	0.41	0.48	0.25	0.71	0.93	0.79	0.74	0.54	0.14	0.73	0.19	0.26
11	0.27	0.78	0.27	0.69	0.85	0.69	0.78	0.46	0.11	0.85	0.16	0.25
12	0.40	0.65	0.29	0.62	0.78	0.39	0.78	0.53	0.21	0.84	0.15	0.28
13	0.42	0.58	0.27	0.59	0.73	0.36	0.75	0.49	0.35	0.88	0.18	0.23
14	0.35	0.45	0.28	0.47	0.68	0.24	0.74	0.30	0.37	0.88	0.20	0.23
15	0.34	0.31	0.26	0.44	0.70	0.24	0.79	0.06	0.63	0.83	0.18	0.20
16	0.37	0.31	0.25	0.42	0.71	0.32	0.67	0.19	0.72	0.82	0.18	0.26
17	0.51	0.29	0.80	0.55	0.71	0.52	0.46	0.22	0.50	0.75	0.18	0.26
18	0.44	0.20	0.88	0.50	0.76	0.32	0.51	0.43	0.43	0.55	0.19	0.23
19	0.34	0.24	0.67	0.39	0.92	0.22	0.70	0.71	0.34	0.51	0.18	0.18
20	0.42	0.22	0.62	0.24	0.97	0.35	0.55	1.11	0.19	0.51	0.15	0.16
21	0.41	0.22	0.25	0.51	0.71	0.51	0.56	0.91	0.32	0.45	0.17	0.20
22	0.28	0.19	0.21	0.44	0.94	0.49	0.56	0.73	0.44	0.41	0.25	0.20
23	0.22	0.19	0.13	0.43	0.53	0.51	0.93	0.74	0.50	0.36	0.22	0.20
24	0.21	0.18	0.13	0.57	0.55	0.52	0.82	0.81	0.36	0.32	0.21	0.19
25	0.17	0.17	0.09	3.75	0.58	0.39	0.80	0.59	0.43	0.26	0.25	0.19
26	0.18	0.16	0.09	2.97	0.53	0.41	0.66	0.64	0.36	0.25	0.25	0.17
27	0.21	0.15	0.08	1.79	0.62	0.40	0.51	0.73	0.30	0.22	0.23	0.17
28	0.23	0.12	0.10	1.49	0.69	0.38	0.37	0.65	0.43	0.22	0.22	0.17
29	0.23	0.10	0.15	1.02	0.79	0.56	0.20	0.73	0.45	0.22	0.22	0.19
30	0.27	0.07	0.20	1.10	--	0.53	0.24	0.81	0.28	0.21	0.23	0.20
31	0.29	--	0.17	1.30	--	0.58	--	0.74	--	0.27	0.27	--
MEAN	0.26	0.31	0.29	1.03	1.11	0.45	0.63	0.55	0.41	0.55	0.20	0.20
MAX. DAY	0.51	0.78	0.91	3.75	2.52	0.79	0.93	1.11	0.79	0.88	0.27	0.28
MIN. DAY	0.08	0.07	0.08	0.12	0.53	0.22	0.20	0.06	0.11	0.21	0.14	0.16
cfs days	8.13	9.29	8.98	31.96	32.24	13.89	18.83	17.15	12.41	17.17	6.05	6.14
ac-ft	16.12	18.43	17.81	63.40	63.94	27.56	37.36	34.02	24.62	34.06	12.00	12.18

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.

Water Year Summary

Mean daily discharge	0.50	(cfs)
Max. daily discharge	3.75	(cfs)
Min. daily discharge	0.06	(cfs)
Total	182	(cfs-days)
Total Volume	361	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

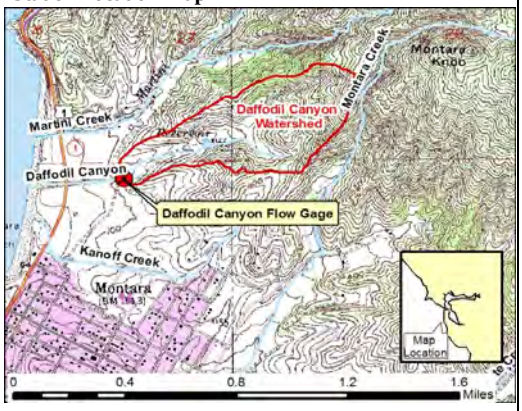
Form 3. Annual Hydrologic Record: Daffodil Canyon at Old San Pedro Road

Station Location / Watershed Descriptors

Located at hiking trail 80 feet upstream of Old San Pedro Road.
Coordinates: N37.55033 W122.5072, NAD27. Elevation: 110 feet, NGVD 1929
Watershed area above gage = 0.2 square miles.
Land use: Open space; Golden Gate National Recreation Area

Water Year: 2008
Stream: Daffodill Canyon
Station: DASP
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.072 cubic feet per second
Unit runoff: 0.36 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/19/08	21:50	0.60	0.64				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	na	na	0.01	0.04	na	0.25	0.02	na	0.01	0.02	0.01	0.01
2	na	na	0.01	0.03	0.31	0.20	0.02	na	0.01	0.00	0.01	0.01
3	na	na	0.01	0.08	na	0.17	0.02	na	0.01	na	0.02	0.01
4	na	na	0.01	0.19	na	0.15	0.02	na	0.01	0.01	0.02	0.01
5	na	na	0.01	0.20	na	0.13	0.02	na	0.01	na	0.01	0.02
6	na	na	0.01	0.19	na	0.12	0.02	na	0.01	0.02	0.01	0.01
7	na	na	0.01	0.18	na	0.11	0.02	na	0.01	0.02	0.01	0.01
8	na	na	0.01	0.18	na	0.11	0.02	na	0.01	0.01	0.01	0.01
9	na	na	0.01	0.18	na	0.09	0.02	na	0.01	0.03	0.01	0.02
10	na	na	0.00	0.17	0.32	0.10	0.02	na	0.01	0.02	0.01	0.02
11	na	na	0.01	0.16	0.32	0.08	0.01	na	0.01	0.02	0.01	0.02
12	na	na	0.01	0.17	0.31	0.09	0.01	na	0.01	0.02	0.01	0.02
13	na	0.02	0.01	0.17	0.34	0.09	0.00	na	0.00	0.01	0.01	0.02
14	na	0.03	0.01	0.17	0.27	0.07	0.01	na	0.01	0.01	0.01	0.02
15	na	0.01	0.02	0.17	0.21	0.06	0.03	na	0.01	0.02	0.01	0.02
16	na	0.02	0.02	0.17	0.18	0.05	0.01	na	0.01	0.02	0.01	0.01
17	na	0.02	0.07	0.17	0.20	0.05	0.01	na	0.01	0.02	0.01	0.02
18	na	0.03	0.13	0.16	0.19	0.05	0.00	na	na	0.02	0.01	0.01
19	na	0.03	0.12	0.15	0.24	0.04	0.00	na	0.01	0.02	0.01	0.01
20	na	0.02	0.18	0.17	0.23	0.04	0.04	na	0.01	0.02	0.01	0.01
21	na	0.02	0.14	0.17	0.22	0.03	na	na	0.01	0.02	0.01	0.01
22	na	0.03	0.09	0.17	0.22	0.03	na	0.03	0.01	0.02	0.01	0.01
23	na	0.02	0.07	0.17	0.25	0.03	na	0.01	0.01	0.02	0.01	0.01
24	na	0.01	0.10	0.18	0.29	0.03	na	0.02	0.01	0.01	0.01	0.01
25	na	0.01	0.10	0.20	0.27	0.03	na	0.01	0.01	0.02	0.01	0.01
26	na	0.01	0.08	0.28	0.25	0.03	na	0.02	na	0.01	0.00	0.01
27	na	0.02	0.05	0.27	0.25	0.02	na	0.02	na	0.02	0.01	0.01
28	na	0.02	0.12	na	0.25	0.02	na	0.02	0.01	0.02	0.02	0.02
29	na	0.01	0.14	na	0.26	0.02	na	0.02	0.01	0.02	0.01	0.02
30	na	0.01	0.11	na	--	0.02	na	0.03	0.02	0.01	0.02	0.01
31	na	--	0.10	na	--	0.02	--	0.03	--	0.01	0.02	--
MEAN	na	na	0.06	0.17	na	0.08	na	na	0.01	0.02	0.01	0.01
MAX. DAY	na	na	0.18	0.28	na	0.25	na	na	0.02	0.03	0.02	0.02
MIN. DAY	na	na	0.00	0.03	na	0.02	na	na	0.00	0.00	0.00	0.01
cfs days	na	na	1.74	4.54	na	2.36	na	na	0.25	0.49	0.37	0.42
ac-ft	na	na	3.45	9.00	na	4.69	na	na	0.49	0.97	0.73	0.84

Monitor's Comments

1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.
4. Annual mean, maximum and minimum flows are not presented as a result of an incomplete annual record.
5. na = data not avalable. Datalogger malfunctioned but flow and stage measured during site visits.

Water Year Summary

Mean daily discharge	na	(cfs)
Max. daily discharge	na	(cfs)
Min. daily discharge	na	(cfs)
Total	na	(cfs-days)
Total Volume	na	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

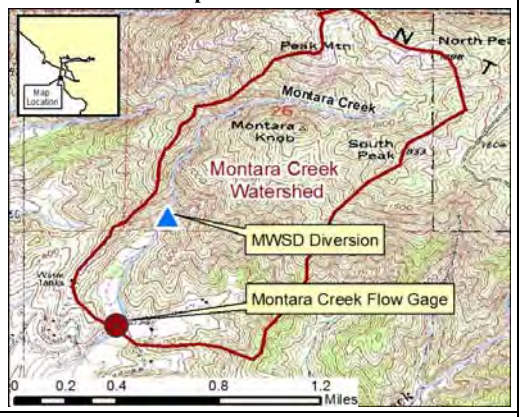
Form 4. Annual Hydrologic Record: Montara Creek at Riviera Road

Station Location / Watershed Descriptors

Located: Downstream side of the Riviera Road crossing of Montra Creek
Coordinates: N37.5456 W122.495, NAD27. Elevation: 296 feet, NGVD 1929
Watershed area above gage: 0.78 square miles; MWSD diversion 0.5 mile upstream of gage
Land use: Agriculture and open space; Golden Gate National Recreation Area

Water Year: 2008
Stream: Montara Creek
Station: MORR
County, State: San Mateo County, CA

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge for period of record: 0.18 cubic feet per second
Unit runoff: 0.24 cubic feet per second per square mile

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
2/6/08	1:00	0.64	0.85				

Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.30	0.03	0.06	0.71	0.43	0.01	0.01	na	na	0.00	0.00
2	0.00	0.09	0.04	0.04	0.69	0.30	0.01	0.02	na	na	0.00	0.00
3	0.00	0.12	0.04	0.14	0.81	0.25	0.02	0.02	na	na	0.00	0.00
4	0.00	0.03	0.03	0.59	0.82	0.22	0.01	0.02	na	na	0.00	0.00
5	0.00	0.01	0.02	0.55	0.81	0.23	0.01	0.02	na	na	0.00	0.00
6	0.00	0.01	0.10	0.41	0.80	0.21	0.01	0.02	na	na	0.00	0.00
7	0.00	0.02	0.18	0.29	0.73	0.16	0.01	0.01	na	na	0.00	0.00
8	0.00	0.03	0.05	0.36	0.56	0.13	0.01	0.01	na	na	0.00	0.01
9	0.00	0.00	0.05	0.26	0.49	0.08	0.01	0.01	na	na	0.00	0.00
10	0.58	0.06	0.04	0.35	0.42	0.12	0.01	0.01	na	0.00	0.00	0.00
11	0.40	0.03	0.06	0.19	0.39	0.08	0.01	0.00	na	0.00	0.00	0.00
12	0.68	0.01	0.06	0.16	0.29	0.10	0.02	0.01	na	0.00	0.00	0.00
13	0.68	0.02	0.04	0.17	0.40	0.10	0.01	0.00	na	0.00	0.00	0.00
14	0.75	0.01	0.05	0.00	0.35	0.11	0.01	0.00	na	0.00	0.00	0.00
15	0.71	0.00	0.06	0.07	0.25	0.06	0.00	0.00	na	0.00	0.00	0.00
16	0.68	0.00	0.05	0.11	0.22	0.07	0.00	0.00	na	0.00	0.00	0.00
17	0.34	0.01	0.27	0.10	0.33	0.06	0.00	0.00	na	0.00	0.00	0.00
18	0.11	0.01	0.26	0.08	0.35	0.06	0.01	0.00	na	0.00	0.00	0.00
19	0.17	0.01	0.13	0.06	0.43	0.06	0.01	0.00	na	0.00	0.00	0.00
20	0.17	0.01	0.33	0.09	0.42	0.04	0.00	0.01	na	0.00	0.00	0.00
21	0.01	0.01	0.09	0.24	0.44	0.03	0.00	0.00	na	0.00	0.00	0.00
22	0.00	0.02	0.06	0.13	0.37	0.03	0.01	0.01	na	0.00	0.00	0.00
23	0.00	0.02	0.08	0.16	0.40	0.03	0.01	na	na	0.00	0.00	0.00
24	0.16	0.01	0.10	0.34	0.46	0.02	0.01	na	na	0.00	0.00	0.00
25	0.24	0.02	0.08	0.58	0.38	0.02	0.01	na	na	0.22	0.00	0.00
26	0.45	0.02	0.07	0.52	0.35	0.01	0.01	na	na	0.00	0.00	0.00
27	0.31	0.03	0.04	0.81	0.36	0.01	0.01	na	na	0.00	0.00	0.00
28	0.29	0.04	0.00	0.75	0.38	0.01	0.01	na	na	0.00	0.00	0.00
29	0.54	0.03	0.25	0.73	0.45	0.01	0.01	na	na	0.00	0.00	0.00
30	0.45	0.01	0.17	0.68	--	0.01	0.02	na	na	0.00	0.00	0.00
31	0.45	--	0.12	0.70	--	0.01	--	na	--	0.00	0.00	--
MEAN	0.26	0.03	0.09	0.31	0.48	0.10	0.01	na	na	na	0.00	0.00
MAX. DAY	0.75	0.30	0.33	0.81	0.82	0.43	0.02	na	na	na	0.00	0.01
MIN. DAY	0.00	0.00	0.00	0.00	0.22	0.01	0.00	na	na	na	0.00	0.00
cfs days	8.17	1.01	2.94	9.70	13.8	3.08	0.27	na	na	na	0.01	0.02
ac-ft	16.2	2.00	5.82	19.23	27.4	6.12	0.53	na	na	na	0.02	0.04

Monitor's Comments

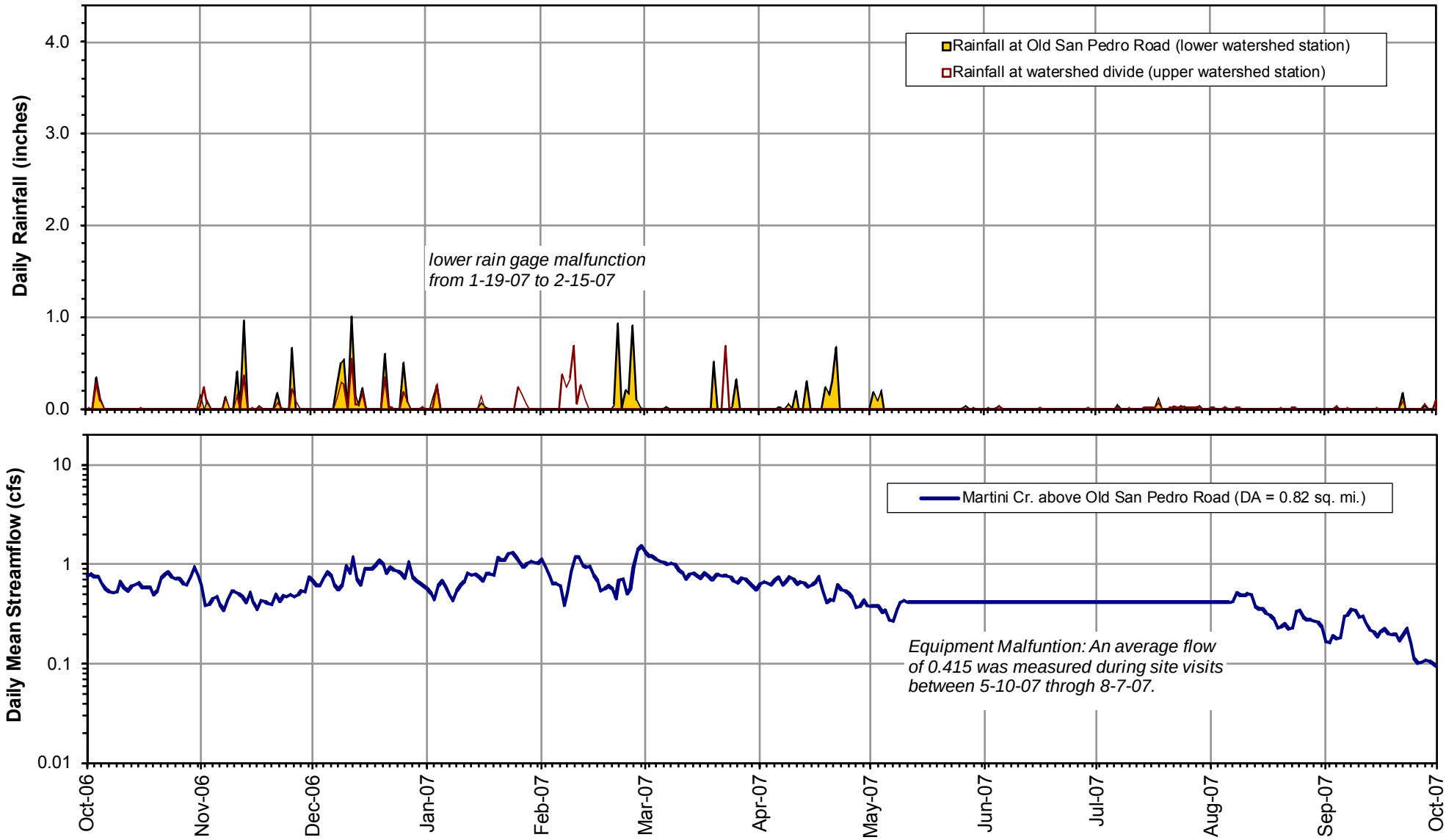
1. Daily values result from spreadsheet calculations. No additional precision is implied beyond the precision of the measurements.
2. Peak flows are estimates based on extrapolation of the current relationship in existing data.
   Estimated peak values may have a significant error, typically 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are checked with data from other stream gaging stations.
4. Annual mean, maximum and minimum flows are not presented as a result of an incomplete annual record.
5. na = data not avalable. Datalogger malfunctioned but flow and stage measured during site visits.

Water Year Summary

Mean daily discharge	na	(cfs)
Max. daily discharge	na	(cfs)
Min. daily discharge	na	(cfs)
Total	na	(cfs-days)
Total Volume	na	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.



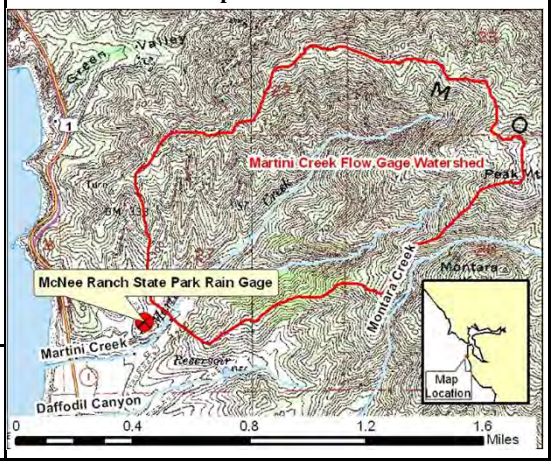
Balance Hydrologics, Inc.®

Appendix B. Daily rainfall and streamflow, water year 2007, Martini Creek watershed, San Mateo County, California.

Data preliminary and subject to revision.

Form 1a. Annual Rainfall Record: Martini Creek Lower Watershed

Water Year: 2007
Watershed: Martini Creek
Station: MALW
County, State: San Mateo County, CA
Station Location Map:



Station Location / Watershed Descriptors

Located 100 feet north of Old San Pedro Trail Bridge
NE corner fence of the McNee Ranch State Park ranger's yard
Coordinates of gage: N37.3315 W122.3028, NAD27.
Elevation of gage: 150 feet above mean sea level, NGVD 1929.

Period of Record

Tipping-bucket rain gage installed 11/8/2003.
Sponsored by the Montara Water & Sanitation District.

Peak Daily Rainfall (period of record)

Date	Inches	Date	Inches	Date	Inches	Date	Inches
12/29/03	no record	12/18/05	1.54	-	-	-	-
2/25/04	1.53	12/31/05	1.58	-	-	-	-
12/27/04	4.02	-	-	-	-	-	-

Water Year 2007 Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.15	0.00	0.00	na	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	na	0.00	0.00	0.19	0.01	0.00	0.00	0.00
3	0.00	0.09	0.00	0.14	na	0.00	0.00	0.09	0.00	0.00	0.00	0.00
4	0.35	0.00	0.00	0.27	na	0.00	0.00	0.21	0.01	0.00	0.00	0.01
5	0.11	0.00	0.00	0.00	na	0.00	0.00	0.00	0.04	0.00	0.01	0.00
6	0.00	0.00	0.00	0.00	na	0.00	0.01	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	na	0.03	0.02	0.00	0.00	0.05	0.00	0.00
8	0.00	0.13	0.26	0.00	na	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.51	0.00	na	0.00	0.06	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.55	0.00	na	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.41	0.00	0.00	na	0.00	0.20	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	1.01	0.00	na	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.96	0.14	0.00	na	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.04	0.00	na	0.00	0.30	0.00	0.00	0.01	0.00	0.00
15	0.00	0.00	0.23	0.00	na	0.00	0.00	0.00	0.00	0.01	0.00	0.00
16	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
17	0.00	0.04	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
18	0.00	0.00	0.00	na	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00
19	0.00	0.00	0.00	na	0.00	0.01	0.24	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	na	0.00	0.52	0.15	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.60	na	0.05	0.00	0.30	0.00	0.00	0.00	0.00	0.00
22	0.00	0.17	0.04	na	0.93	0.00	0.68	0.00	0.00	0.03	0.00	0.17
23	0.00	0.00	0.00	na	0.01	0.00	0.00	0.00	0.00	0.02	0.00	0.00
24	0.00	0.00	0.00	na	0.21	0.00	0.00	0.00	0.00	0.04	0.00	0.00
25	0.00	0.00	0.00	na	0.16	0.04	0.00	0.00	0.00	0.02	0.00	0.00
26	0.00	0.66	0.51	na	0.91	0.32	0.00	0.01	0.00	0.02	0.00	0.00
27	0.00	0.00	0.08	na	0.10	0.00	0.00	0.04	0.00	0.01	0.00	0.00
28	0.00	0.00	0.00	na	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.04
29	0.00	0.00	0.00	na	--	0.00	0.00	0.01	0.01	0.04	0.00	0.00
30	0.00	0.00	0.00	na	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	--	0.01	na	--	0.00	--	0.00	--	0.00	0.00	--
Total	0.46	2.61	3.98	0.51	2.38	0.92	1.96	0.55	0.08	0.38	0.01	0.22
Max	0.35	0.96	1.01	0.27	0.93	0.52	0.68	0.21	0.04	0.12	0.01	0.17

Monitor's Comments

Rain gage malfunction from 1-19-07 to 2-15-07 due to data logger software.

Water Year 2007

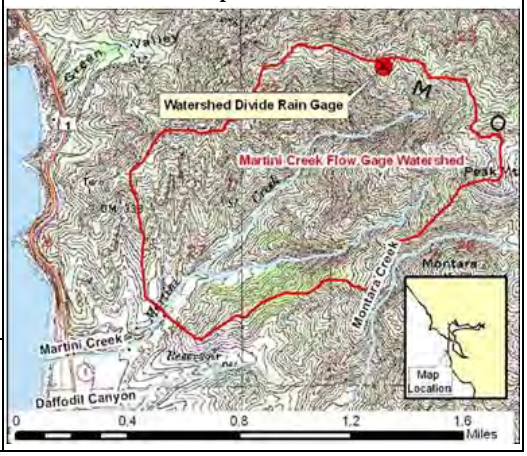
Total Annual	14.06	(inches)
Maximum Daily Total	1.01	(inches)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

Form 1b. Annual Rainfall Record: Martini Creek Upper Watershed

Water Year: **2007**
Watershed: Martini Creek
Station: MAUW
County, State: San Mateo County, CA
Station Location Map:



Station Location / Watershed Descriptors

Located at top of peak on overgrown road extending from ridge road at saddle.
Coordinates of gage: N37.56703 W122.49174, NAD27
Elevation of gage: 1,450 feet above mean sea level, NGVD 1929.

Period of Record

Tipping-bucket rain gage installed 11/11/2003.
Sponsored by the Montara Water & Sanitation District.

Peak Daily Rainfall (period of record)

Date	Inches	Date	Inches	Date	Inches	Date	Inches
12/29/03	4.18	12/18/05	no record	-	-	-	-
2/25/04	1.94	12/31/05	no record	-	-	-	-
12/27/04	4.17	2/10/07	0.69	-	-	-	-

Water Year 2007 Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.04	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.00
2	0.01	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
3	0.00	0.07	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.29	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
5	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.03	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.02
8	0.00	0.12	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
9	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
10	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
11	0.00	0.16	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.01	0.55	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.37	0.05	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.05	0.00	0.69	0.00	0.00	0.00	0.00	0.01	0.00	0.00
15	0.00	0.01	0.19	0.00	0.06	0.00	0.00	0.00	0.00	0.01	0.00	0.01
16	0.01	0.00	0.00	0.14	0.26	0.00	0.00	0.00	0.02	0.01	0.00	0.00
17	0.00	0.03	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.01	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
21	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.02
22	0.00	0.07	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.09
23	0.00	0.01	0.01	0.00	0.00	0.69	0.00	0.00	0.00	0.01	0.02	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
26	0.00	0.22	0.19	0.24	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
27	0.00	0.08	0.07	0.15	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
28	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.06
29	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.01	0.03	0.00	0.00
30	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	--	0.03	0.00	--	0.00	--	0.00	--	0.00	0.00	--
Total	0.40	1.44	2.19	0.88	2.13	0.69	0.00	0.00	0.07	0.31	0.13	0.24
Max	0.29	0.37	0.55	0.26	0.69	0.69	0.00	0.00	0.04	0.07	0.03	0.09

Monitor's Comments

Water Year 2007

Total Annual	8.48	(inches)
Maximum Daily Total	0.69	(inches)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

Form 2. Annual Hydrologic Record: Martini Creek

Water Year: 2007
Stream: Martini Creek
Station: MASP
County, State: San Mateo County, CA

Station Location / Watershed Descriptors

Located on right bank 500 feet upstream of Old San Pedro Road Bridge.
Coordinates: N37.55454 W122.50625, NAD27
Elevation: 110 feet, NGVD 1929
Watershed area above gage: 0.82 square mile

Station Location Map

Period of Record

Staff plate and water-level recorder were installed on 11/18/03.
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge average of WY2005 and WY2006 is 1.25 cfs, and
the average unit runoff is 1.5 cfs per sq. mile.
Flow values above 0.90 stage were extrapolated based on area and velocity correlation.

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
12/29/03	---- no record ----			12/31/05	5:30	1.53	18.75
2/25/04	22:30	1.26	9.6	2/26/07	16:30	0.66	2.2
12/27/04	6:30	1.66	27	-	-	-	-
12/22/05	14:15	1.50	17.25	-	-	-	-

Water Year 2007 Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.77	0.63	0.69	0.57	1.12	1.34	0.64	0.39	0.42	0.42	0.42	0.24
2	0.80	0.39	0.62	0.52	0.94	1.21	0.68	0.38	0.42	0.42	0.42	0.17
3	0.76	0.40	0.61	0.44	0.76	1.20	0.65	0.38	0.42	0.42	0.42	0.16
4	0.75	0.45	0.73	0.62	0.64	1.12	0.62	0.33	0.42	0.42	0.42	0.19
5	0.66	0.48	0.84	0.68	0.64	1.07	0.71	0.35	0.42	0.42	0.42	0.18
6	0.58	0.40	0.76	0.59	0.61	1.04	0.75	0.28	0.42	0.42	0.42	0.18
7	0.53	0.35	0.62	0.49	0.39	1.01	0.63	0.27	0.42	0.42	0.42	0.31
8	0.52	0.44	0.56	0.44	0.53	1.04	0.68	0.35	0.42	0.42	0.43	0.31
9	0.54	0.54	0.62	0.54	0.85	1.01	0.76	0.42	0.42	0.42	0.52	0.36
10	0.68	0.53	0.98	0.63	1.17	0.88	0.71	0.43	0.42	0.42	0.49	0.35
11	0.59	0.51	0.82	0.69	1.19	0.82	0.64	0.42	0.42	0.42	0.49	0.30
12	0.54	0.47	1.18	0.82	0.99	0.72	0.67	0.42	0.42	0.42	0.52	0.30
13	0.61	0.41	0.72	0.78	0.94	0.80	0.66	0.42	0.42	0.42	0.50	0.26
14	0.63	0.53	0.63	0.80	0.96	0.82	0.60	0.42	0.42	0.42	0.39	0.22
15	0.66	0.42	0.90	0.75	0.79	0.76	0.63	0.42	0.42	0.42	0.36	0.21
16	0.58	0.35	0.89	0.69	0.68	0.73	0.67	0.42	0.42	0.42	0.35	0.19
17	0.59	0.44	0.90	0.80	0.55	0.82	0.76	0.42	0.42	0.42	0.33	0.21
18	0.59	0.43	0.98	0.80	0.57	0.76	0.55	0.42	0.42	0.42	0.31	0.23
19	0.50	0.41	1.12	0.79	0.61	0.70	0.42	0.42	0.42	0.42	0.29	0.20
20	0.55	0.40	1.00	1.17	0.57	0.78	0.44	0.42	0.42	0.42	0.23	0.20
21	0.73	0.50	0.83	1.10	0.46	0.79	0.44	0.42	0.42	0.42	0.24	0.20
22	0.80	0.42	0.95	1.11	0.71	0.77	0.63	0.42	0.42	0.42	0.25	0.17
23	0.84	0.48	0.88	1.31	0.71	0.77	0.56	0.42	0.42	0.42	0.23	0.20
24	0.75	0.48	0.86	1.32	0.51	0.76	0.55	0.42	0.42	0.42	0.23	0.23
25	0.72	0.50	0.82	1.19	0.58	0.69	0.51	0.42	0.42	0.42	0.34	0.16
26	0.71	0.47	0.73	1.06	0.94	0.66	0.47	0.42	0.42	0.42	0.35	0.12
27	0.64	0.50	1.06	0.93	1.43	0.74	0.37	0.42	0.42	0.42	0.30	0.10
28	0.62	0.54	0.75	1.03	1.55	0.71	0.38	0.42	0.42	0.42	0.28	0.10
29	0.76	0.54	0.68	1.08	--	0.66	0.43	0.42	0.42	0.42	0.28	0.11
30	0.94	0.76	0.65	1.06	--	0.61	0.39	0.42	0.42	0.42	0.27	0.11
31	0.77	--	0.61	1.04	--	0.56	--	0.42	--	0.42	0.26	--
MEAN	0.67	0.47	0.81	0.83	0.80	0.85	0.59	0.40	0.42	0.42	0.36	0.21
MAX. DAY	0.94	0.76	1.18	1.32	1.55	1.34	0.76	0.43	0.42	0.42	0.52	0.36
MIN. DAY	0.50	0.35	0.56	0.44	0.39	0.56	0.37	0.27	0.42	0.42	0.23	0.10
cfs days	20.70	14.19	25.01	25.87	22.39	26.39	17.61	12.30	12.46	12.87	11.14	6.29
ac-ft	41.05	28.14	49.61	51.31	44.40	52.34	34.93	24.40	24.71	25.53	22.09	12.47

Monitor's Comments

1. Daily values with more than 2 to 3 significant figures result from electronic calculations. No additional precision is implied.
2. Peak flows recorded for the record of flow are estimates based on current relationship in existing data. Balance estimates these values may have an error range between 5-20 percent of their actual value. Therefore, peak flow values are represented by only two significant figures.
4. Max. and min. monthly daily flows are confirmed from observations on other Balance monitoring stations

Water Year 2007 Summary

Mean daily discharge	0.57	(cfs)
Max. daily discharge	1.55	(cfs)
Min. daily discharge	0.10	(cfs)
Total	207	(cfs-days)
Total Volume	411	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

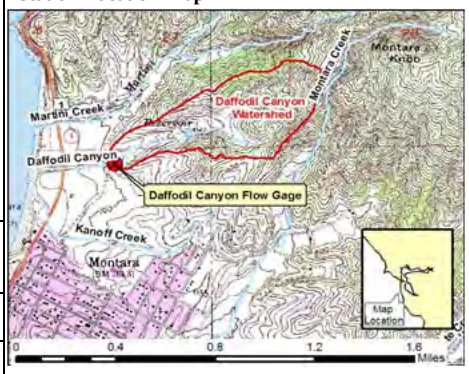
Form 3. Annual Hydrologic Record: Daffodil Canyon

Water Year: 2007
Stream: Daffodill Canyon
Station: DASP
County, State: San Mateo County, CA

Station Location / Watershed Descriptors

Located: East stream crossing of the farm property
Coordinates: N37.55033 W122.5072, NAD27
Elevation: 110 feet, NGVD 1929
Watershed area above gage: 0.2 square miles

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)

Water Year 2007 Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1										0.21	0.18	na
2										0.16	0.15	na
3										0.17	0.16	na
4										0.12	0.17	na
5										0.14	0.28	na
6										0.22	0.20	na
7										0.32	0.20	na
8										0.26	na	na
9										0.25	na	na
10										0.25	na	na
11										0.17	na	na
12										0.10	na	na
13										0.11	na	na
14										0.15	na	na
15										0.14	na	na
16										0.16	na	na
17										0.11	na	na
18										0.11	na	na
19										0.15	na	na
20										0.13	na	na
21										0.13	na	na
22										0.16	na	na
23										0.20	na	na
24										0.25	na	na
25										0.27	na	na
26								gage installed 6/28/2007		0.29	na	na
27										0.22	na	na
28										0.18	na	na
29									0.15	0.22	na	na
30									0.22	0.18	na	na
31		--			--		--		--	0.21	na	--
MEAN									na	0.19	na	na
MAX. DAY									na	0.32	na	na
MIN. DAY									na	0.10	na	na
cfs days									na	5.75	na	na
ac-ft									na	11.41	na	na

Monitor's Comments

1. Daily values with more than two significant figures result from electronic calculations. No additional precision is implied.
2. Peak flows are estimates based on current relationship in existing data. Estimated values may have an error range between 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are confirmed with data from other stream gaging stations.
4. na = data not avalable. Datalogger malfunctioned but flow and stage measured during site visits.
5. Annual mean, maximum and minimum flows are not presented as a result of an incomplete annual record.

Water Year 2007 Summary

Mean daily discharge	na	(cfs)
Max. daily discharge	na	(cfs)
Min. daily discharge	na	(cfs)
Total	na	(cfs-days)
Total Volume	na	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

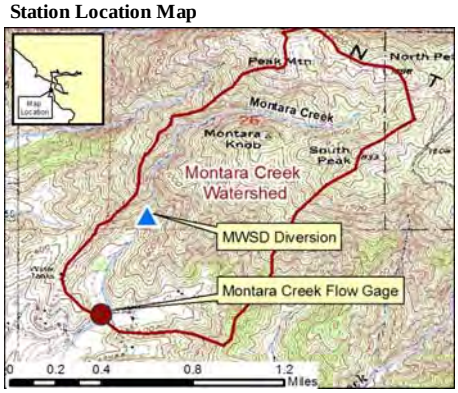
Form 4. Annual Hydrologic Record: Montara Creek

Water Year: 2007
Stream: Montara Creek
Station: MORR
County, State: San Mateo County, CA

Station Location / Watershed Descriptors

Located: Downstream side of the Riviera Road crossing of Montra Creek
Coordinates: N37.5456 W122.495, NAD27
Elevation: 296 feet, NGVD 1929
Watershed area above gage: 0.78 square miles; MWSD diversion 0.5 mile upstream of gage

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 6/28/07
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)

Water Year 2007 Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1										0.01	0.01	na
2										0.01	0.01	na
3										0.01	0.01	na
4										0.00	0.01	na
5										0.01	0.02	na
6										0.01	0.01	na
7										0.02	0.01	na
8										0.01	na	na
9										0.01	na	na
10										0.01	na	na
11										0.01	na	na
12										0.00	na	na
13										0.00	na	na
14										0.01	na	na
15										0.01	na	na
16										0.01	na	na
17										0.00	na	na
18										0.00	na	na
19										0.00	na	na
20										0.00	na	na
21										0.01	na	na
22										0.01	na	na
23										0.01	na	na
24										0.01	na	na
25										0.02	na	na
26								gage installed		0.02	na	na
27								6/28/2007		0.01	na	na
28										0.01	na	na
29									0.00	0.01	na	na
30									0.01	0.01	na	na
31		--			--		--		--	0.01	na	--
MEAN									na	0.01	na	na
MAX. DAY									na	0.02	na	na
MIN. DAY									na	0.00	na	na
cfs days									na	0.27	na	na
ac-ft									na	0.54	na	na

Monitor's Comments

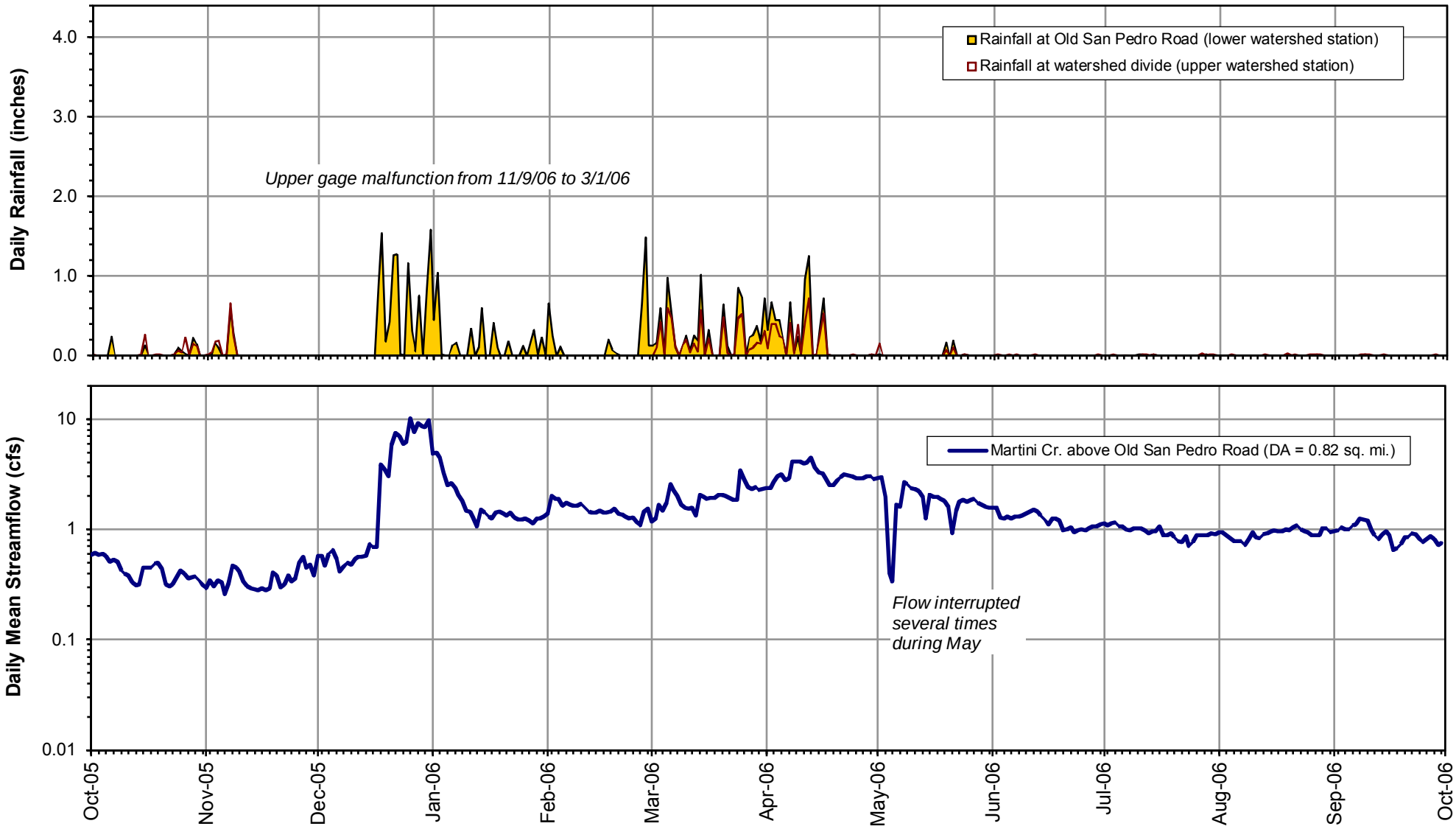
1. Daily values with more than two significant figures result from electronic calculations. No additional precision is implied.
2. Peak flows are estimates based on current relationship in existing data. Estimated values may have an error range between 5-20 percent of their actual value.
3. Monthly maximum and minimum flows are confirmed with data from other stream gaging stations.
4. na = data not avalable. Datalogger malfunctioned but flow and stage measured during site visits.
5. Annual mean, maximum and minimum flows are not presented as a result of an incomplete annual record.

Water Year 2007 Summary

Mean daily discharge	na	(cfs)
Max. daily discharge	na	(cfs)
Min. daily discharge	na	(cfs)
Total	na	(cfs-days)
Total Volume	na	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

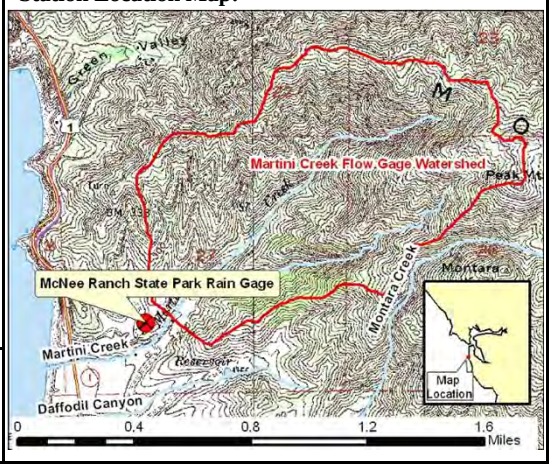


Appendix B. Daily rainfall and mean streamflow, water year 2006, Martini Creek watershed, San Mateo County, California.

Data preliminary and subject to revision.

Form 1a. Annual Rainfall Record: Martini Creek Lower Watershed

Water Year: 2006
Watershed: Martini Creek
Station: MALW
County, State: San Mateo County, CA
Station Location Map:



Station Location / Watershed Descriptors

Located 100 feet north of Old San Pedro Trail Bridge
NE corner fence of the McNee Ranch State Park ranger's yard
Coordinates of gage: N37.3315 W122.3028, NAD27.
Elevation of gage: 150 feet above mean sea level, NGVD 1929.

Period of Record

Tipping-bucket rain gage installed 11/8/2003.
Sponsored by the Montara Water & Sanitation District.

Peak Daily Rainfall (period of record)

Date	Inches	Date	Inches	Date	Inches	Date	Inches
12/29/03	no record	12/18/05	1.54	-	-	-	-
2/25/04	1.53	12/31/05	1.58	-	-	-	-
12/27/04	4.02	-	-	-	-	-	-

Water Year 2006 Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.00	0.00	0.45	0.66	0.13	0.32	0.02	0.00	0.00	0.00	0.00
2	0.00	0.02	0.00	1.04	0.25	0.16	0.67	0.00	0.00	0.00	0.00	0.00
3	0.00	0.16	0.00	0.01	0.00	0.60	0.45	0.00	0.00	0.00	0.00	0.00
4	0.00	0.09	0.00	0.00	0.11	0.00	0.45	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.98	0.23	0.00	0.00	0.00	0.00	0.00
6	0.24	0.00	0.00	0.13	0.00	0.54	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.58	0.00	0.16	0.00	0.11	0.67	0.00	0.00	0.00	0.00	0.00
8	0.00	0.29	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.13	0.24	0.00	0.00	0.00	0.00	0.02
10	0.00	0.00	0.00	0.00	0.00	0.25	0.02	0.00	0.00	0.01	0.00	0.00
11	0.00	0.00	0.00	0.34	0.00	0.06	0.96	0.00	0.00	0.01	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.25	1.25	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.11	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.60	0.00	1.02	0.00	0.00	0.00	0.01	0.00	0.00
15	0.13	0.00	0.00	0.00	0.00	0.01	0.32	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.32	0.72	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.93	0.41	0.20	0.00	0.01	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	1.54	0.10	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.18	0.00	0.03	0.00	0.00	0.16	0.00	0.00	0.00	0.00
20	0.00	0.00	0.42	0.00	0.00	0.64	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	1.26	0.18	0.00	0.12	0.00	0.19	0.00	0.00	0.00	0.00
22	0.00	0.00	1.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.10	0.00	0.00	0.00	0.00	0.85	0.00	0.01	0.00	0.00	0.00	0.00
25	0.05	0.00	1.16	0.12	0.00	0.73	0.00	0.00	0.00	0.00	0.00	0.00
26	0.02	0.00	0.31	0.00	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.05	0.19	1.49	0.23	0.00	0.00	0.00	0.00	0.00	0.00
28	0.22	0.00	0.75	0.32	0.12	0.26	0.00	0.00	0.00	0.02	0.00	0.00
29	0.14	0.00	0.00	0.01	...	0.37	0.01	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.84	0.23	...	0.18	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	...	1.58	0.00	...	0.72	...	0.00	...	0.00	0.00	...
Total	0.92	1.14	10.30	4.40	3.58	8.85	6.36	0.38	0.00	0.05	0.00	0.02
Max	0.24	0.58	1.58	1.04	1.49	1.02	1.25	0.19	0.00	0.02	0.00	0.02

Monitor's Comments

Water Year 2006

Total Annual	36.00	(inches)
Maximum Daily Total	1.58	(inches)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

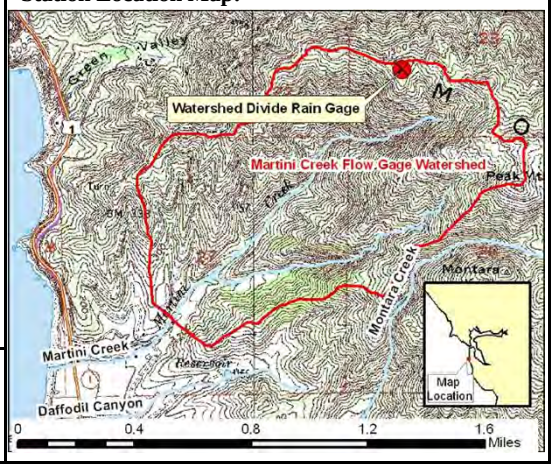
Form 1b. Annual Rainfall Record: Martini Creek Upper Watershed

Water Year: 2006
Watershed: Martini Creek
Station: MAUW
County, State: San Mateo County, CA

Station Location / Watershed Descriptors

Located at top of peak on overgrown road extending from ridge road at saddle.
Coordinates of gage: N37.56703 W122.49174, NAD27.
Elevation of gage: 1,450 feet above mean sea level, NGVD 1929.

Station Location Map:



Period of Record

Tipping-bucket rain gage installed 11/11/2003.
Sponsored by the Montara Water & Sanitation District.

Peak Daily Rainfall (period of record)

Date	Inches	Date	Inches	Date	Inches	Date	Inches
12/29/03	4.18	12/18/05	no record	-	-	-	-
2/25/04	1.94	12/31/05	no record	-	-	-	-
12/27/04	4.17	-	-	-	-	-	-

Water Year 2006 Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.02	0.01	no record	no record	no record	no record	0.09	0.15	0.00	0.00	0.00	0.00
2	0.00	0.04	no record	no record	no record	0.10	0.40	0.00	0.02	0.00	0.00	0.00
3	0.00	0.18	no record	no record	no record	0.42	0.40	0.00	0.00	0.01	0.00	0.00
4	0.00	0.19	no record	no record	no record	0.00	0.25	0.00	0.00	0.00	0.01	0.00
5	0.00	0.00	no record	no record	no record	0.60	0.22	0.00	0.01	0.00	0.00	0.00
6	0.00	0.01	no record	no record	no record	0.48	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.66	no record	no record	no record	0.12	0.41	0.00	0.01	0.00	0.00	0.00
8	0.00	0.25	no record	no record	no record	0.00	0.03	0.00	0.00	0.00	0.00	0.02
9	0.00	no record	no record	no record	no record	0.13	0.39	0.00	0.00	0.00	0.00	0.02
10	0.00	no record	no record	no record	no record	0.20	0.03	0.00	0.00	0.00	0.00	0.02
11	0.00	no record	no record	no record	no record	0.04	0.41	0.00	0.00	0.01	0.00	0.00
12	0.00	no record	no record	no record	no record	0.15	0.72	0.00	0.01	0.02	0.00	0.00
13	0.00	no record	no record	no record	no record	0.05	0.00	0.00	0.00	0.00	0.01	0.00
14	0.02	no record	no record	no record	no record	0.57	0.01	0.00	0.00	0.01	0.00	0.02
15	0.26	no record	no record	no record	no record	0.01	0.25	0.00	0.00	0.00	0.00	0.00
16	0.00	no record	no record	no record	no record	0.21	0.53	0.00	0.00	0.00	0.00	0.00
17	0.00	no record	no record	no record	no record	0.00	0.01	0.00	0.00	0.00	0.00	0.00
18	0.01	no record	no record	no record	no record	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.01	no record	no record	no record	no record	0.00	0.00	0.07	0.00	0.00	0.03	0.00
20	0.00	no record	no record	no record	no record	0.48	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	no record	no record	no record	no record	0.04	0.00	0.10	0.00	0.00	0.01	0.00
22	0.00	no record	no record	no record	no record	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.02	no record	no record	no record	no record	0.01	0.00	0.00	0.00	0.00	0.00	0.00
24	0.06	no record	no record	no record	no record	0.47	0.01	0.01	0.00	0.00	0.00	0.00
25	0.04	no record	no record	no record	no record	0.52	0.00	0.00	0.00	0.00	0.01	0.00
26	0.23	no record	no record	no record	no record	0.00	0.00	0.00	0.00	0.00	0.02	0.00
27	0.01	no record	no record	no record	no record	0.08	0.00	0.00	0.00	0.03	0.01	0.00
28	0.15	no record	no record	no record	no record	0.10	0.00	0.00	0.00	0.00	0.01	0.01
29	0.12	no record	no record	no record	...	0.16	0.01	0.00	0.01	0.01	0.00	0.00
30	0.00	no record	no record	no record	...	0.15	0.00	0.00	0.00	0.01	0.00	0.00
31	0.00	...	no record	no record	...	0.31	...	0.00	...	0.00	0.00	...
Total	0.95	incomplete	incomplete	incomplete	incomplete	incomplete	4.17	0.33	0.06	0.10	0.11	0.09
Max	0.26	incomplete	incomplete	incomplete	incomplete	incomplete	0.72	0.15	0.02	0.03	0.03	0.02

Monitor's Comments

Upper gage malfunction from11/9/06 to 3/1/06

Water Year 2006

Total Annual	incomplete	(inches)
Maximum Daily Total	incomplete	(inches)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

Form 2. Annual Hydrologic Record: Martini Creek

Water Year: 2006
Stream: Martini Creek
Station: MASP
County, State: San Mateo County, CA

Station Location Map

Station Location / Watershed Descriptors

Located on right bank 500 feet upstream of Old San Pedro Road Bridge.
Coordinates: N37.55454 W122.50625, NAD27.
Elevation: 110 feet, NGVD 1929
Watershed area above gage: 0.82 square mile

Period of Record

Staff plate and water-level recorder were installed on 11/18/03.
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

Mean daily discharge average of WY2005 and WY2006 is 1.25 cfs, and
the average unit runoff is 1.5 cfs per sq. mile.
Flow values above 0.90 stage were extrapolated based on area and velocitycorrelation.

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
12/29/03	---- no record ----			12/31/05	5:30	1.53	18.75
2/25/04	22:30	1.26	9.6	-	-	-	-
12/27/04	6:30	1.66	27	-	-	-	-
12/22/05	14:15	1.50	17.25	-	-	-	-

Water Year 2006 Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.59	0.29	0.58	4.86	1.40	1.18	2.37	2.91	1.60	1.13	0.93	0.95
2	0.61	0.34	0.58	4.95	2.02	1.25	2.36	2.97	1.58	1.10	0.93	0.98
3	0.59	0.31	0.47	4.50	1.90	1.68	2.65	1.96	1.29	1.14	0.88	1.05
4	0.60	0.35	0.60	3.23	1.88	1.48	3.02	0.40	1.26	1.17	0.84	0.99
5	0.57	0.33	0.65	2.53	1.64	1.76	3.16	0.34	1.32	1.07	0.78	1.00
6	0.51	0.26	0.54	2.62	1.73	2.56	2.82	1.68	1.27	1.07	0.77	1.09
7	0.53	0.32	0.41	2.36	1.68	2.28	2.93	1.62	1.33	1.00	0.78	1.12
8	0.50	0.47	0.46	2.07	1.62	2.00	4.11	2.67	1.32	0.99	0.72	1.24
9	0.42	0.45	0.50	1.81	1.64	1.69	4.16	2.55	1.34	1.02	0.81	1.24
10	0.40	0.42	0.47	1.47	1.70	1.57	4.11	2.36	1.42	1.03	0.95	1.20
11	0.38	0.34	0.54	1.46	1.59	1.54	3.99	2.32	1.45	1.03	0.86	0.98
12	0.33	0.31	0.57	1.27	1.46	1.58	4.03	2.22	1.51	0.99	0.84	0.89
13	0.31	0.29	0.57	1.07	1.43	1.34	4.47	1.98	1.47	0.94	0.90	0.82
14	0.32	0.28	0.57	1.50	1.43	2.06	3.61	1.25	1.36	0.97	0.92	0.91
15	0.45	0.28	0.73	1.41	1.48	1.98	3.32	2.04	1.25	0.98	0.96	0.96
16	0.44	0.29	0.69	1.29	1.43	1.88	3.21	1.99	1.12	1.08	0.98	0.88
17	0.45	0.28	0.69	1.26	1.42	1.93	2.92	1.96	1.28	0.90	0.97	0.65
18	0.49	0.29	3.91	1.41	1.45	1.92	2.51	1.89	1.26	0.91	0.97	0.67
19	0.50	0.40	3.49	1.45	1.55	2.05	2.51	1.83	1.21	0.93	0.99	0.74
20	0.44	0.38	3.00	1.38	1.39	2.04	2.82	1.61	1.00	0.86	0.98	0.86
21	0.32	0.30	5.85	1.34	1.35	2.01	2.97	0.92	1.01	0.78	1.04	0.85
22	0.31	0.32	7.53	1.42	1.30	1.93	3.15	1.50	1.06	0.77	1.08	0.92
23	0.32	0.38	6.99	1.29	1.25	1.83	3.08	1.80	0.95	0.86	1.00	0.91
24	0.37	0.34	5.93	1.23	1.28	1.85	3.01	1.88	0.98	0.71	0.96	0.82
25	0.43	0.36	6.25	1.22	1.16	3.42	2.92	1.78	1.02	0.77	0.94	0.76
26	0.40	0.50	10.16	1.25	1.09	2.87	2.90	1.86	0.98	0.88	0.88	0.81
27	0.36	0.56	7.62	1.19	1.45	2.41	2.90	1.90	1.04	0.88	0.89	0.87
28	0.37	0.45	9.24	1.14	1.53	2.30	3.01	1.76	1.09	0.88	0.89	0.82
29	0.37	0.48	8.66	1.25	...	2.44	3.04	1.68	1.09	0.88	1.01	0.72
30	0.35	0.38	8.45	1.25	...	2.28	2.87	1.62	1.13	0.92	1.02	0.75
31	0.31	...	9.83	1.32	...	2.32	...	1.57	...	0.91	0.93	...
MEAN	0.43	0.36	3.44	1.86	1.51	1.98	3.16	1.83	1.23	0.95	0.92	0.91
MAX. DAY	0.61	0.56	10.16	4.95	2.02	3.42	4.47	2.97	1.60	1.17	1.08	1.24
MIN. DAY	0.31	0.26	0.41	1.07	1.09	1.18	2.36	0.34	0.95	0.71	0.72	0.65
cfs days	13.34	10.74	106.53	57.79	42.25	61.44	94.93	55.24	36.99	28.65	27.46	27.44
ac-ft	26.46	21.31	211.30	114.62	83.80	121.86	188.30	109.57	73.37	56.82	54.46	54.43

Monitor's Comments

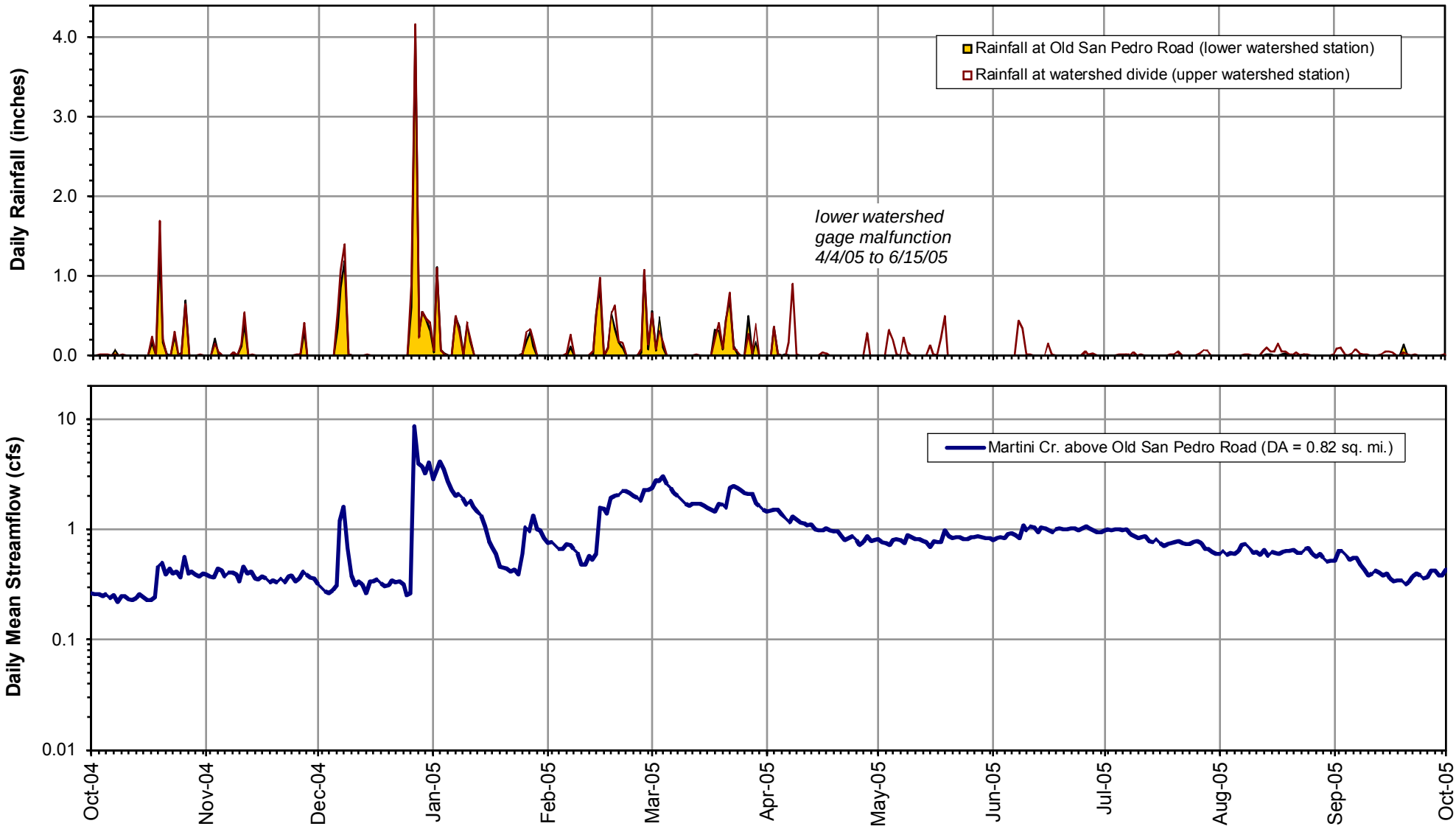
1. Daily values with more than 2 to 3 significant figures result from electronic calculations. No additional precision is implied.
2. Peak flows recorded for the record of flow are estimates based on current relationship in existing data. Balance estimates these values may have an error range between 5-20 percent of their actual value. Therefore, peak flow values are represented by only two significant figures.
4. Max. and min. monthly daily flows are confirmed from observations on other Balance monitoring stations

Water Year 2006 Summary

Mean daily discharge	1.55	(cfs)
Max. daily discharge	10.16	(cfs)
Min. daily discharge	0.26	(cfs)
Total	563	(cfs-days)
Total Volume	1116	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.



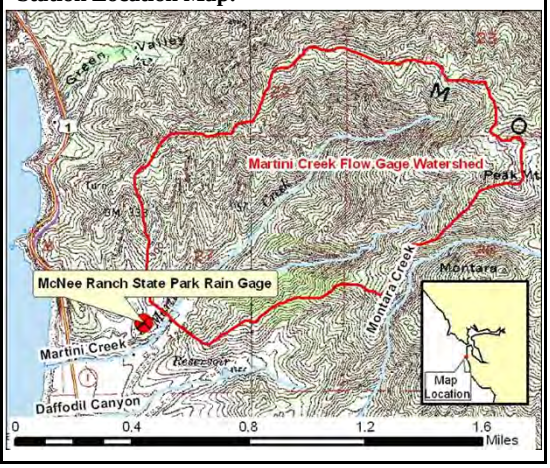
Appendix B. Daily rainfall and daily mean streamflow, water year 2005, Martini Creek watershed, San Mateo County, California.

Balance Hydrologics, Inc.®

Data preliminary and subject to revision.

Form 1a. Annual Rainfall Record: Martini Creek Lower Watershed

Water Year: 2005
Watershed: Martini Creek
Station: MALW
County, State: San Mateo County, CA
Station Location Map:



Station Location / Watershed Descriptors

Located 100 feet north of Old San Pedro Road Bridge
NE corner fence of the McNee Ranch State Park ranger's yard
Coordinates of gage: N37.3315 W122.3028, NAD27.
Elevation of gage: 150 feet above mean sea level, NGVD 1929.

Period of Record

Tipping-bucket rain gage installed 11/8/2003.
Sponsored by the Montara Water & Sanitation District.

Peak Daily Rainfall (period of record)

Date	Inches	Date	Inches	Date	Inches	Date	Inches
12/29/03	no record	-	-	-	-	-	-
2/25/04	1.53	-	-	-	-	-	-
12/27/04	4.02	-	-	-	-	-	-

Water Year 2005 Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.00	0.00	0.04	0.00	0.50	0.00	no record	no record	0.00	0.00	0.00
2	0.00	0.00	0.00	1.11	0.00	0.06	0.00	no record	no record	0.00	0.00	0.00
3	0.00	0.21	0.00	0.06	0.00	0.48	0.36	no record	no record	0.00	0.00	0.00
4	0.00	0.00	0.00	0.03	0.00	0.11	0.02	no record	no record	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	no record	no record	no record	0.00	0.00	0.00
6	0.00	0.00	0.35	0.00	0.00	0.00	no record	no record	no record	0.00	0.00	0.00
7	0.07	0.00	0.85	0.48	0.00	0.00	no record	no record	no record	0.00	0.00	0.00
8	0.00	0.00	1.19	0.35	0.00	0.00	no record	no record	no record	0.00	0.00	0.00
9	0.00	0.01	0.02	0.01	0.00	0.00	no record	no record	no record	0.00	0.00	0.00
10	0.00	0.12	0.00	0.39	0.00	0.00	no record	no record	no record	0.00	0.00	0.00
11	0.00	0.40	0.00	0.18	0.00	0.00	no record	no record	no record	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	no record	no record	no record	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.02	0.00	no record	no record	no record	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.52	0.00	no record	no record	no record	0.00	0.01	0.00
15	0.00	0.00	0.00	0.00	0.86	0.00	no record	no record	no record	0.00	0.01	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	no record	no record	0.00	0.00	0.00	0.00
17	0.17	0.00	0.00	0.00	0.11	0.00	no record	no record	0.00	0.00	0.00	0.00
18	0.01	0.00	0.00	0.00	0.52	0.33	no record	no record	0.00	0.00	0.01	0.00
19	1.31	0.00	0.00	0.00	0.35	0.31	no record	no record	0.00	0.00	0.03	0.00
20	0.17	0.00	0.00	0.00	0.16	0.08	no record	no record	0.00	0.00	0.00	0.14
21	0.02	0.00	0.00	0.00	0.10	0.45	no record	no record	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.71	no record	no record	0.00	0.00	0.00	0.00
23	0.25	0.00	0.00	0.00	0.00	0.12	no record	no record	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.02	no record	no record	0.00	0.00	0.02	0.00
25	0.04	0.00	0.00	0.03	0.00	0.00	no record	no record	0.00	0.00	0.00	0.00
26	0.69	0.00	0.61	0.18	0.03	0.00	no record	no record	0.00	0.00	0.00	0.00
27	0.00	0.31	4.02	0.30	1.07	0.50	no record	no record	0.00	0.00	0.00	0.00
28	0.00	0.00	0.24	0.12	0.08	0.01	no record	no record	0.00	0.00	0.00	0.00
29	0.00	0.00	0.55	0.00	...	0.17	no record	no record	0.00	0.00	0.00	0.00
30	0.00	0.00	0.45	0.00	...	0.00	no record	no record	0.00	0.00	0.00	0.00
31	0.00	...	0.32	0.00	...	0.00	...	no record	...	0.00	0.00	...
Total	2.73	1.05	8.60	3.28	3.82	3.85	incomplete	incomplete	incomplete	0.00	0.08	0.14
Max	1.31	0.40	4.02	1.11	1.07	0.71	incomplete	incomplete	incomplete	0.00	0.03	0.14

Monitor's Comments

Lower watershed gage malfunction 4/4/05 to 6/15/05

Water Year 2005

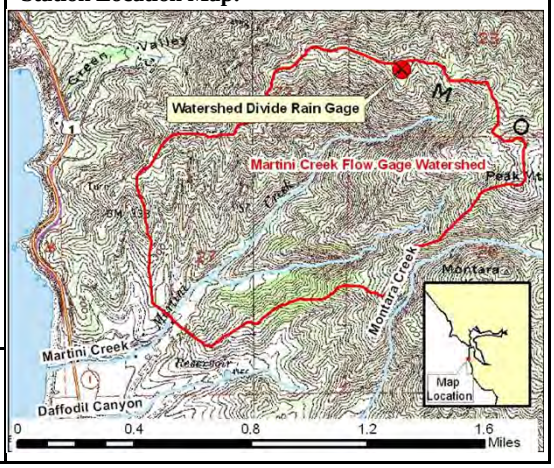
Total Annual	incomplete	(inches)
Maximum Daily Total	4.02	(inches)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

Form 1b. Annual Rainfall Record: Martini Creek Upper Watershed

Water Year: 2005
Watershed: Martini Creek
Station: MAUW
County, State: San Mateo County, CA
Station Location Map:



Station Location / Watershed Descriptors

Located at top of peak on overgrown road extending from ridge road at saddle.
Coordinates of gage: N37.56703 W122.49174, NAD27
Elevation of gage: 1,450 feet above mean sea level, NGVD 1929.

Period of Record

Tipping-bucket rain gage installed 11/11/2003.
Sponsored by the Montara Water & Sanitation District.

Peak Daily Rainfall (period of record)

Date	Inches	Date	Inches	Date	Inches	Date	Inches
12/29/03	4.18	-	-	-	-	-	-
2/25/04	1.94	-	-	-	-	-	-
12/27/04	4.17	-	-	-	-	-	-

Water Year 2005 Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.00	0.00	0.00	0.06	0.00	0.53	0.00	0.00	0.00	0.00	0.00	0.01
2	0.00	0.00	0.00	1.10	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.09
3	0.01	0.15	0.00	0.07	0.00	0.31	0.36	0.00	0.00	0.00	0.00	0.10
4	0.01	0.04	0.00	0.01	0.00	0.17	0.02	0.32	0.00	0.00	0.00	0.02
5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.01	0.00	0.00
6	0.00	0.00	0.56	0.00	0.03	0.00	0.00	0.01	0.00	0.02	0.00	0.03
7	0.01	0.00	1.07	0.50	0.26	0.00	0.17	0.00	0.00	0.01	0.00	0.08
8	0.00	0.04	1.40	0.29	0.00	0.00	0.90	0.23	0.44	0.01	0.01	0.03
9	0.01	0.00	0.02	0.00	0.00	0.00	0.01	0.04	0.34	0.04	0.01	0.02
10	0.00	0.15	0.00	0.42	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01
11	0.00	0.54	0.00	0.21	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.02	0.00	0.00	0.05	0.01	0.00	0.00	0.00	0.00	0.06	0.00
14	0.00	0.00	0.01	0.00	0.49	0.00	0.00	0.00	0.00	0.00	0.10	0.02
15	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.13	0.00	0.00	0.05	0.05
16	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.02	0.15	0.00	0.05	0.05
17	0.24	0.00	0.00	0.00	0.09	0.00	0.03	0.00	0.01	0.00	0.15	0.04
18	0.01	0.00	0.00	0.00	0.53	0.22	0.00	0.22	0.00	0.00	0.05	0.00
19	1.69	0.00	0.00	0.00	0.63	0.41	0.00	0.50	0.00	0.01	0.05	0.00
20	0.21	0.00	0.00	0.00	0.17	0.09	0.00	0.00	0.00	0.02	0.02	0.04
21	0.00	0.00	0.00	0.00	0.16	0.42	0.00	0.00	0.00	0.05	0.01	0.02
22	0.00	0.00	0.00	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.04	0.00
23	0.30	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.01
24	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.01	0.00
25	0.02	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
26	0.65	0.01	0.89	0.29	0.08	0.00	0.00	0.00	0.05	0.00	0.00	0.00
27	0.00	0.41	4.17	0.33	1.08	0.27	0.00	0.00	0.01	0.03	0.00	0.00
28	0.00	0.00	0.22	0.20	0.14	0.03	0.28	0.00	0.03	0.07	0.00	0.00
29	0.00	0.00	0.55	0.00	...	0.40	0.00	0.00	0.00	0.06	0.00	0.00
30	0.01	0.00	0.46	0.00	...	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	...	0.41	0.00	...	0.00	...	0.00	...	0.00	0.00	...
Total	3.19	1.37	9.76	3.49	4.69	3.88	1.81	1.67	1.05	0.34	0.62	0.62
Max	1.69	0.54	4.17	1.10	1.08	0.79	0.90	0.50	0.44	0.07	0.15	0.10

Monitor's Comments

Water Year 2005

Total Annual	32.49	(inches)
Maximum Daily Total	4.17	(inches)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

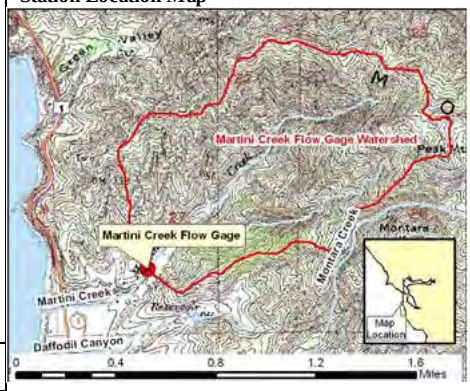
Form 2. Annual Hydrologic Record: Martini Creek

Water Year: 2005
Stream: Martini Creek
Station: MAOP
County, State: San Mateo County, CA

Station Location / Watershed Descriptors

Located on right bank 500 feet upstream of Old San Pedro Road Bridge.
Coordinates: N37.55454 W122.50625, NAD27
Elevation: 110 feet, NGVD 1929
Watershed area above gage: 0.82 square mile

Station Location Map



Period of Record

Staff plate and water-level recorder were installed on 11/18/03.
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

WY2004 record incomplete; mean daily discharge not available.
Record of flow for values above 0.65 stage were extrapolated based on area & velocity corellation.

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
12/29/03	---- no record ----			-	-	-	-
2/25/04	22:30	1.26	9.6	-	-	-	-
12/27/04	6:30	1.66	27	-	-	-	-
-	-	-	-	-	-	-	-

Water Year 2005 Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1	0.27	0.39	0.32	2.87	0.75	2.35	1.45	0.81	0.80	0.98	0.60	0.52
2	0.26	0.37	0.29	3.53	0.76	2.79	1.48	0.76	0.83	0.99	0.64	0.64
3	0.26	0.37	0.27	4.09	0.70	2.73	1.50	0.76	0.85	0.98	0.59	0.63
4	0.25	0.44	0.26	3.52	0.67	3.04	1.50	0.72	0.83	1.00	0.61	0.59
5	0.26	0.43	0.28	2.72	0.66	2.57	1.35	0.80	0.90	1.01	0.60	0.53
6	0.24	0.37	0.31	2.28	0.73	2.35	1.25	0.82	0.92	0.98	0.64	0.56
7	0.25	0.41	1.19	1.99	0.71	2.14	1.14	0.80	0.89	0.99	0.72	0.55
8	0.22	0.41	1.61	2.11	0.67	1.99	1.29	0.74	0.84	0.91	0.73	0.48
9	0.25	0.39	0.67	1.93	0.62	1.87	1.22	0.89	1.08	0.87	0.68	0.43
10	0.25	0.34	0.38	1.69	0.47	1.71	1.15	0.84	0.99	0.83	0.61	0.38
11	0.23	0.46	0.31	1.82	0.48	1.64	1.13	0.81	1.05	0.85	0.62	0.40
12	0.23	0.40	0.34	1.60	0.57	1.72	1.08	0.81	1.03	0.86	0.59	0.42
13	0.24	0.41	0.32	1.45	0.53	1.70	1.12	0.79	0.94	0.78	0.66	0.40
14	0.26	0.36	0.26	1.34	0.60	1.69	1.00	0.76	1.03	0.77	0.58	0.38
15	0.24	0.35	0.34	1.06	1.58	1.64	0.99	0.69	1.02	0.82	0.63	0.40
16	0.23	0.37	0.34	0.79	1.54	1.58	0.98	0.78	0.99	0.74	0.61	0.36
17	0.23	0.36	0.35	0.69	1.39	1.51	1.02	0.77	0.95	0.70	0.60	0.34
18	0.24	0.33	0.32	0.59	1.94	1.44	0.98	0.77	1.01	0.74	0.63	0.34
19	0.46	0.35	0.30	0.46	2.02	1.71	0.96	0.98	1.02	0.76	0.64	0.35
20	0.50	0.33	0.31	0.45	2.03	1.66	0.96	0.87	0.99	0.77	0.64	0.32
21	0.39	0.36	0.34	0.44	2.21	1.59	0.88	0.84	1.01	0.78	0.65	0.33
22	0.44	0.33	0.33	0.41	2.21	2.36	0.80	0.85	1.02	0.76	0.62	0.37
23	0.40	0.37	0.34	0.43	2.15	2.47	0.83	0.85	1.03	0.74	0.62	0.40
24	0.41	0.38	0.32	0.39	2.00	2.37	0.87	0.81	0.97	0.73	0.67	0.38
25	0.36	0.34	0.26	0.60	1.94	2.27	0.80	0.81	1.03	0.77	0.68	0.36
26	0.56	0.36	0.26	1.05	1.81	2.13	0.72	0.85	1.05	0.78	0.60	0.37
27	0.40	0.41	8.57	0.95	2.27	2.07	0.77	0.86	1.02	0.76	0.56	0.42
28	0.41	0.39	3.96	1.33	2.29	2.08	0.87	0.87	0.97	0.66	0.60	0.42
29	0.39	0.37	3.70	1.00	...	1.72	0.78	0.84	0.94	0.67	0.56	0.38
30	0.37	0.36	3.24	0.99	...	1.63	0.79	0.83	0.94	0.63	0.51	0.38
31	0.39	...	4.05	0.84	...	1.50	...	0.83	...	0.60	0.52	...
MEAN	0.32	0.38	1.10	1.47	1.30	2.00	1.06	0.81	0.96	0.81	0.62	0.43
MAX. DAY	0.56	0.46	8.57	4.09	2.29	3.04	1.50	0.98	1.08	1.01	0.73	0.64
MIN. DAY	0.22	0.33	0.26	0.39	0.47	1.44	0.72	0.69	0.80	0.60	0.51	0.32
cfs days	9.87	11.30	34.15	45.42	36.30	62.00	31.66	25.21	28.94	25.20	19.17	12.83
ac-ft	19.58	22.42	67.74	90.10	72.00	122.98	62.79	50.00	57.40	49.99	38.02	25.45

Monitor's Comments

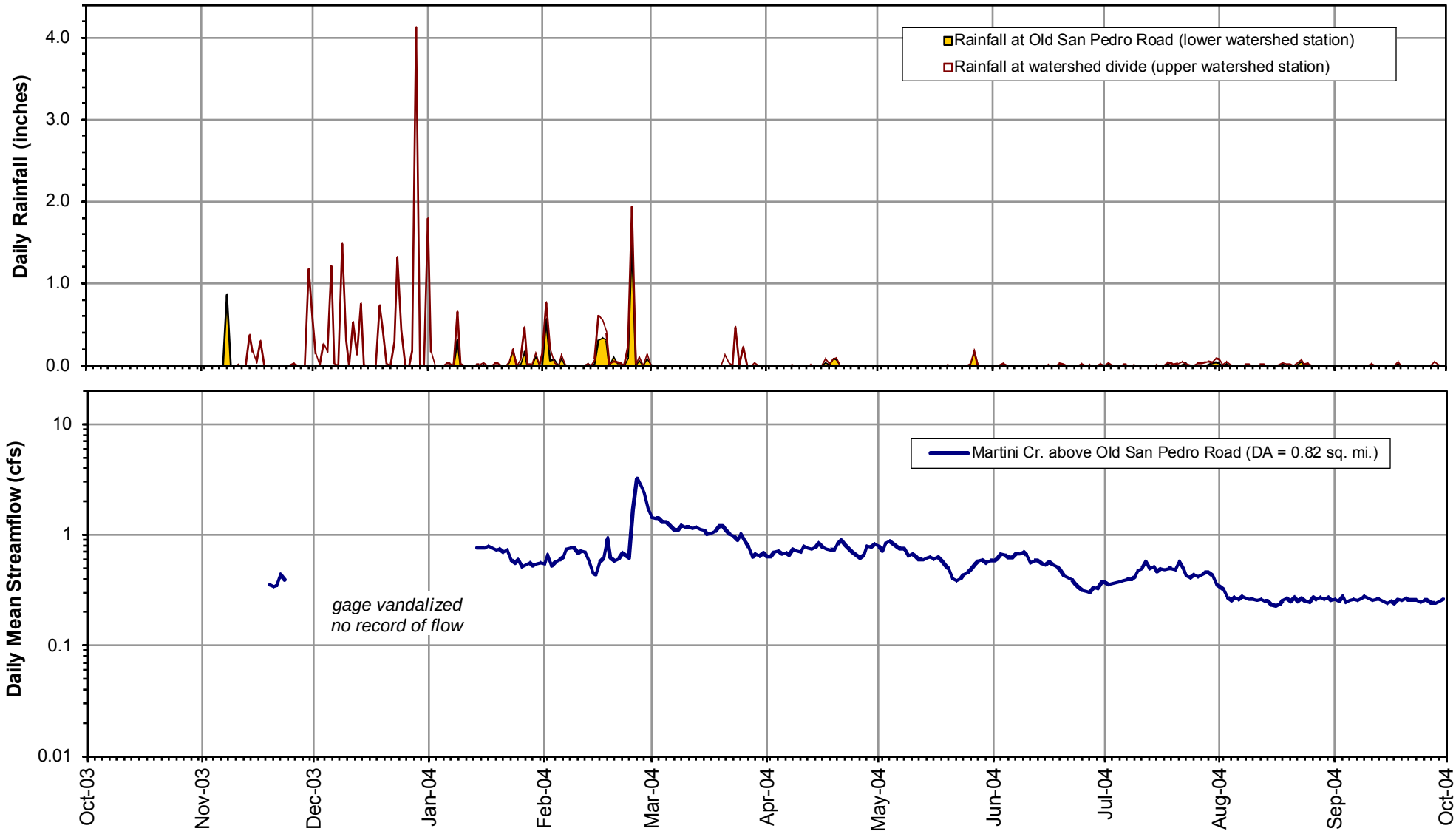
1. Daily values with more than 2 to 3 significant figures result from electronic calculations. No additional precision is implied.
2. Peak flows recorded for the record of flow are estimates based on current relationship in existing data. Balance estimates these values may have an error range between 5-20 percent of their actual value. Therefore, peak flow values are represented by only two significant figures.
4. Max. and min. monthly daily flows are confirmed from observations on other Balance monitoring stations

Water Year 2005 Summary

Mean daily discharge	0.94	(cfs)
Max. daily discharge	8.57	(cfs)
Min. daily discharge	0.22	(cfs)
Total	342	(cfs-days)
Total Volume	678	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.



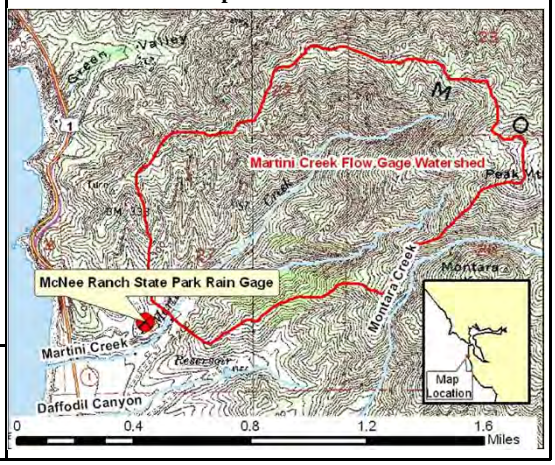
Balance Hydrologics, Inc.®

Appendix B. Daily rainfall and streamflow, water year 2004, Martini Creek watershed, San Mateo County, California. Lower watershed rain gage installed on November 8, 2003 and inactive from November 12 to January 3, 2004; upper watershed rain gage installed on Novemeber 11, 2003; streamflow gage installed on Novemeber 19, 2003, vandalized on November 24 and repaired on January 13, 2004.

Data preliminary and subject to revision.

Form 1a. Annual Rainfall Record: Martini Creek Lower Watershed

Water Year: 2004
Watershed: Martini Creek
Station: MALW
County, State: San Mateo County, CA
Station Location Map:



Station Location / Watershed Descriptors

Located 100 feet north of Old San Pedro Trail Bridge
NE corner fence of the McNee Ranch State Park ranger's yard
Coordinates of gage: N37.3315 W122.3028, NAD27.
Elevation of gage: 150 feet above mean sea level, NGVD 1929.

Period of Record

Tipping-bucket rain gage installed 11/8/2003.
Sponsored by the Montara Water & Sanitation District.

Peak Daily Rainfall (period of record)

Date	Inches	Date	Inches	Date	Inches	Date	Inches
12/29/03	no record	-	-	-	-	-	-
2/25/04	1.53	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Water Year 2004 Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1			no record	no record	0.01	0.09	0.00	0.00	0.00	0.00	0.04	0.00
2			no record	no record	0.57	0.01	0.00	0.00	0.00	0.00	0.02	0.00
3			no record	0.00	0.06	0.00	0.00	0.00	0.00	0.02	0.00	0.00
4			no record	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.02	0.00
5	gage installed 11/8/2003		no record	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6			no record	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7			no record	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8		0.87	no record	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9		0.00	no record	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10		0.00	no record	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11		0.01	no record	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12		no record	no record	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13		no record	no record	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14		no record	no record	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15		no record	no record	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16		no record	no record	0.01	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17		no record	no record	0.00	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18		no record	no record	0.00	0.32	0.00	0.04	0.00	0.00	0.00	0.00	0.00
19		no record	no record	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.02	0.03
20		no record	no record	0.00	0.11	0.00	0.08	0.00	0.00	0.00	0.00	0.00
21		no record	no record	0.00	0.02	0.00	0.07	0.00	0.00	0.00	0.00	0.00
22		no record	no record	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23		no record	no record	0.04	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00
24		no record	no record	0.18	0.10	0.00	0.00	0.00	0.00	0.02	0.05	0.00
25		no record	no record	0.00	1.53	0.00	0.00	0.00	0.00	0.01	0.00	0.00
26		no record	no record	0.02	0.01	0.00	0.00	0.00	0.00	0.03	0.00	0.00
27		no record	no record	0.18	0.06	0.00	0.00	0.01	0.00	0.00	0.00	0.00
28		no record	no record	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00
29		no record	no record	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30		no record	no record	0.11	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31		--	no record	0.00	--	0.00	--	0.00	--	0.00	0.00	--
Total		incomplete	incomplete	incomplete	3.67	0.10	0.20	0.18	0.00	0.11	0.16	0.03
Max		incomplete	incomplete	incomplete	1.53	0.09	0.08	0.17	0.00	0.03	0.05	0.03

Monitor's Comments

1. Incomplete annual record.
2. Gage malfunction 11/12/03 to 1/2/04

Water Year 2004

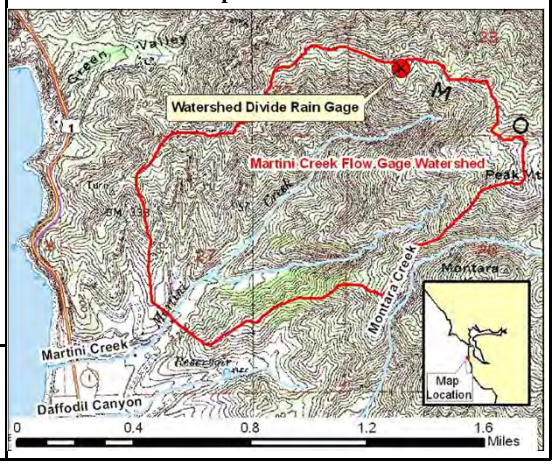
Total Annual	incomplete	(inches)
Maximum Daily Total	incomplete	(inches)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

Form 1b. Annual Rainfall Record: Martini Creek Upper Watershed

Water Year: 2004
Watershed: Martini Creek
Station: MAUW
County, State: San Mateo County, CA
Station Location Map:



Station Location / Watershed Descriptors

Located at top of peak on overgrown road extending from ridge road at saddle.
Coordinates of gage: N37.56703 W122.49174, NAD27
Elevation of gage: 1,450 feet above mean sea level, NGVD 1929.

Period of Record

Tipping-bucket rain gage installed 11/11/2003.
Sponsored by the Montara Water & Sanitation District.

Peak Daily Rainfall (period of record)

Date	Inches	Date	Inches	Date	Inches	Date	Inches
12/29/03	4.18	-	-	-	-	-	-
2/25/04	1.94	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Water Year 2004 Daily Total Rainfall (inches)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1			0.56	1.79	0.15	0.15	0.00	0.00	0.00	0.02	0.08	0.00
2			0.15	0.17	0.77	0.00	0.00	0.00	0.00	0.00	0.07	0.00
3			0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.04	0.01	0.01
4			0.27	0.00	0.04	0.00	0.00	0.00	0.01	0.01	0.05	0.01
5			0.17	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.02
6			1.22	0.02	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7			0.02	0.03	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.01
8	gage installed		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
9	11/11/2003		1.49	0.66	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01
10			0.32	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00
11		0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12		0.00	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13		0.00	0.13	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.00
14		0.38	0.76	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00
15		0.17	0.01	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16		0.04	0.00	0.04	0.64	0.00	0.00	0.00	0.00	0.01	0.00	0.00
17		0.30	0.00	0.00	0.55	0.00	0.00	0.00	0.01	0.00	0.00	0.24
18		0.00	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.00	0.01	0.01
19		0.00	0.70	0.02	0.03	0.00	0.00	0.00	0.00	0.04	0.04	1.69
20		0.00	0.49	0.02	0.05	0.00	0.00	0.00	0.03	0.03	0.02	0.21
21		0.00	0.03	0.00	0.04	0.00	0.00	0.01	0.01	0.01	0.01	0.00
22		0.00	0.00	0.00	0.02	0.13	0.00	0.00	0.00	0.02	0.00	0.00
23		0.00	0.29	0.05	0.00	0.04	0.00	0.00	0.00	0.05	0.04	0.30
24		0.00	1.32	0.21	0.23	0.00	0.00	0.00	0.00	0.03	0.07	0.00
25		0.01	0.44	0.00	1.94	0.47	0.00	0.00	0.00	0.01	0.01	0.02
26		0.03	0.01	0.08	0.02	0.01	0.00	0.00	0.02	0.00	0.02	0.65
27		0.00	0.00	0.47	0.11	0.23	0.00	0.02	0.00	0.02	0.00	0.00
28		0.00	0.13	0.01	0.00	0.00	0.00	0.20	0.01	0.02	0.00	0.00
29		0.00	4.18	0.01	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
30		1.18	0.01	0.16	--	0.04	0.00	0.00	0.00	0.05	0.00	0.00
31		0.00	0.00	0.00	--	0.00	--	0.00	--	0.04	0.00	--
Total		incomplete	13.23	3.78	5.41	1.07	0.02	0.23	0.11	0.47	0.48	3.18
Max		incomplete	4.18	1.79	1.94	0.47	0.01	0.20	0.03	0.05	0.08	1.69

Monitor's Comments

1. Incomplete annual record.

Water Year 2004

Total Annual	incomplete	(inches)
Maximum Daily Total	4.18	(inches)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

Form 2. Annual Hydrologic Record: Martini Creek

Water Year: 2004
Stream: Martini Creek
Station: MASP
County, State: San Mateo County, CA

Station Location / Watershed Descriptors

Located on right bank 500 feet upstream of Old San Pedro Trail Bridge.
Coordinates: N37.55454 W122.50625, NAD27
Elevation: 110 feet, NGVD 1929
Watershed area above gage: 0.82 square mile

Station Location Map

Period of Record

Staff plate and water-level recorder were installed on 11/18/03.
Vandalized on 11/24/03 and gaging resumed on 1/13/04.
Gaging sponsored by the Montara Water & Sanitation District

Mean Flows

WY2004 record incomplete; mean daily discharge not available.
First year of record; mean annual flow for the period of record not available.

Seasonal Peak Flows (period of record)

Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)	Date	Time (24-hr)	Gage Ht. (feet)	Discharge (cfs)
12/29/03	---- no record ----			-	-	-	-
2/25/04	22:30	1.26	9.6	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Water Year 2004 Daily Mean Flow (cubic feet per second)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT
1			no record	no record	0.55	1.45	0.63	0.81	0.59	0.38	0.34	0.26
2			no record	no record	0.66	1.43	0.64	0.72	0.61	0.36	0.33	0.25
3			no record	no record	0.53	1.40	0.71	0.85	0.68	0.37	0.27	0.28
4			no record	no record	0.57	1.31	0.72	0.89	0.67	0.37	0.26	0.25
5			no record	no record	0.59	1.30	0.68	0.84	0.62	0.38	0.28	0.26
6			no record	no record	0.64	1.21	0.70	0.79	0.63	0.39	0.26	0.26
7			no record	no record	0.76	1.11	0.66	0.75	0.68	0.40	0.28	0.26
8			no record	no record	0.77	1.11	0.75	0.75	0.68	0.39	0.27	0.27
9			no record	no record	0.76	1.22	0.73	0.64	0.70	0.42	0.26	0.28
10			no record	no record	0.69	1.18	0.71	0.68	0.67	0.48	0.26	0.27
11			no record	no record	0.72	1.17	0.80	0.65	0.57	0.49	0.26	0.26
12			no record	no record	0.70	1.14	0.76	0.59	0.58	0.58	0.26	0.26
13			no record	no record	0.59	1.17	0.75	0.59	0.59	0.49	0.25	0.26
14			no record	0.77	0.46	1.14	0.78	0.62	0.55	0.51	0.26	0.25
15			no record	0.77	0.44	1.10	0.86	0.63	0.54	0.47	0.24	0.24
16	gage installed 11/18/2003		no record	0.76	0.57	1.03	0.77	0.61	0.57	0.50	0.23	0.25
17			no record	0.79	0.62	1.04	0.76	0.64	0.54	0.49	0.24	0.24
18			no record	0.76	0.95	1.09	0.74	0.58	0.52	0.49	0.26	0.26
19		0.36	no record	0.73	0.63	1.19	0.73	0.53	0.49	0.50	0.27	0.26
20		0.34	no record	0.76	0.59	1.20	0.83	0.50	0.43	0.49	0.25	0.27
21		0.35	no record	0.70	0.61	1.10	0.90	0.41	0.41	0.57	0.27	0.26
22		0.44	no record	0.73	0.69	1.02	0.81	0.39	0.40	0.50	0.25	0.26
23		0.40	no record	0.60	0.65	0.98	0.76	0.41	0.37	0.43	0.27	0.26
24		no record	no record	0.57	0.62	0.90	0.71	0.44	0.34	0.41	0.25	0.25
25		no record	no record	0.60	1.71	1.01	0.67	0.46	0.32	0.44	0.25	0.26
26		no record	no record	0.52	3.27	0.88	0.62	0.50	0.31	0.42	0.27	0.26
27		no record	no record	0.54	2.82	0.79	0.67	0.55	0.31	0.44	0.27	0.24
28		no record	no record	0.56	2.42	0.64	0.81	0.58	0.34	0.46	0.28	0.24
29		no record	no record	0.52	1.76	0.68	0.79	0.59	0.33	0.46	0.26	0.25
30		no record	no record	0.55	--	0.65	0.83	0.56	0.37	0.43	0.27	0.27
31		--	no record	0.56	--	0.69	--	0.58	--	0.36	0.26	--
MEAN		incomplete	no record	incomplete	0.94	1.08	0.74	0.62	0.51	0.45	0.27	0.26
MAX. DAY		incomplete	no record	incomplete	3.27	1.45	0.90	0.89	0.70	0.58	0.34	0.28
MIN. DAY		incomplete	no record	incomplete	0.44	0.64	0.62	0.39	0.31	0.36	0.23	0.24
cfs days		incomplete	no record	incomplete	27.32	33.37	22.27	19.13	15.39	13.90	8.23	7.75
ac-ft		incomplete	no record	incomplete	54.20	66.19	44.16	37.94	30.52	27.57	16.33	15.36

Monitor's Comments

1. Daily values with more than 2 to 3 significant figures result from electronic calculations. No additional precision is implied.
2. Peak flows recorded for the record of flow are estimates based on current relationship in existing data. Balance estimates these values may have an error range between 5-20 percent of their actual value. Therefore, peak flow values are represented by only two significant figures.
4. Mean monthly flow from 11/15/03 to 1/12/04 is not presented as a result of an incomplete monthly record.
5. Max. and min. monthly daily flows are confirmed from observations on other Balance monitoring stations
6. Annual mean, maximum and minimum flows are not presented as a result of an incomplete annual record.

Water Year 2004 Summary

Mean daily discharge	incomplete	(cfs)
Max. daily discharge	incomplete	(cfs)
Min. daily discharge	incomplete	(cfs)
Total	incomplete	(cfs-days)
Total Volume	incomplete	(ac-ft)

Balance Hydrologics, Inc. 800 Bancroft Way, Suite 101, Berkeley, CA 94710-2227 (510) 704-1000; fax: (510) 704-1001

Data preliminary and subject to revision.

APPENDIX D

Groundwater age dating results and technical procedures provided by Hydrotrace for samples collected in 2014

HydroTrace, LLC
7050 SW 86th Avenue
Miami, Florida 33143
Tel: 305-432-2825
Fax: 305-675-2205
dhood@hydrotrace.com

April 6, 2015

Mr. Mark Woyshner
Balance Hydrologics, Inc
800 Bancroft Way, Suite 101
Berkeley, Ca 94710

RE: 4 High precision tritium age/noble gas analyses samples received December 14, 2014

Dear Mark,

Four copper tube samples and four water samples were analyzed for tritium concentrations, high precision noble gas concentrations, and helium isotope ratios.

Tritium concentrations ranged from 0.44 to 4.26 pCi/L; although 0.44 pCi/L is just above the detection limit of 0.25 pCi/L for the run, the tritium concentration is too low to determine a tritium-helium age for sample Portola #3. Derived parameters including noble gas recharge temperatures, terrigenic helium concentrations, and excess air concentrations are shown along with raw data in the data analysis spreadsheet. Results for key parameters are shown graphically below the tabulated data. Samples Alta Vista and Airport #3 have tritium-helium ages of 23.8 years and 22.8 years, respectively, which are the same within the analytical uncertainty of the measurements. These two samples do not contain radiogenic helium, and are classified as containing only 'modern' groundwater. In contrast, Portola #3 has very low tritium, as noted above, and an accumulation of radiogenic helium, and is classified as pre-modern. The dissolved gas (copper tube) sample Piezo#1 showed evidence of gas stripping, likely due to the presence of dissolved methane, and a reliable age could not be determined. Piezo#1 has accumulated a high concentration of radiogenic helium, indicative of a very old groundwater component. However, since Piezo#1 also contains tritium at a low, but detectable concentration of 1.1 pCi/L, it is classified as 'mixed age'.

The recharge temperatures for three samples are calculated using an assumed recharge elevation of 12m; refinement to this calculation is possible with additional information about sample elevation, but will likely result in a negligible difference in calculated temperatures.

A general summary is included below which outlines the theoretical nature behind our services and the technical procedures utilized in these analyses. This summary has been provided by Dr. Jean Moran, who also performed the data assessment. The analyses were performed under Hydrotrace contract with the Chemical Sciences Division of Lawrence Livermore National Laboratory under the leadership of Dr. Brad Esser and Dr. Ate Visser. If you have questions regarding the results, please contact Dr. Moran. She will be glad to assist you. Her email address is jean.moran@csueastbay.edu and her direct phone line is 510-885-2491.

An invoice is enclosed for the remaining balance due for this set of samples (due upon receipt).

Sincerely,

Darden Hood

Darden Hood
Director

Samples Inventory (designated by clearance date and report date)

HydroTrace ID	Laboratory ID	Submitter ID	Analyze Tritium-Helium Age, Noble gas correction (receive-report)
HT-1286	111239	Piezo #1	12/16/2014 - 4/5/2015
HT-1287	111240	Airport #3	12/16/2014 - 4/5/2015
HT-1288	111241	Alta Vista well	12/16/2014 - 4/5/2015
HT-1289	111242	Portola #3	12/16/2014 - 4/5/2015

Tritium – Helium groundwater Age Data

HydroTrace ID	Laboratory ID	Collection Date	Submitter ID	^{3}H/ (pCi/L)			^{3}H/^{3}He age (yr)			Source indication	Comments
HT-1248	111074	10/24/14	Piezo #1	1.1	+/-	0.3				mixed	High gas pressure in sample, probably methane. Almost entirely pre-modern (before 1950), accurate age calculation not possible
HT-1249	111075	10/30/14	Airport #3	4.3	+/-	0.4	22.8	+/-	2.4	modern	Routine analysis, no special comments
HT-1250	111076	10/30/14	Alta Vista well	1.5	+/-	0.3	23.8	+/-	3.9	modern	Routine analysis, no special comments
HT-1251	111077	11/14/14	Portola #3	0.4	+/-	0.2				pre-modern	3H < 1 pCi/L indicates tritium age is prior to 1950

REFERENCE AND TECHNICAL PROCEDURES

Groundwater Age-Dating Technique

Tritium (^3H) is a very low abundance (around 1 part in 10^{17} of total hydrogen), radioactive isotope of hydrogen with a half-life of 12.34 years. Natural tritium is produced in the earth's atmosphere by cosmic radiation. Atmospheric nuclear weapons testing in the 1950's and early 1960's released tritium to the atmosphere at levels several orders of magnitude above the background concentration (figure 1). This atmospheric tritium enters groundwater (as HTO, with one hydrogen atom as tritium) during recharge. Tritium concentration in groundwater is reported in units of picoCuries per liter, and has a regulatory limit (Maximum Contaminant Level or MCL) of 20,000 pCi/L. Its concentration in groundwater decreases by radioactive decay, dilution with non-tritiated groundwater, and dispersion. While the presence of tritium is an excellent indicator of water that recharged less than about 50 years ago, age dating groundwater using tritium alone results in large uncertainties due to spatial and temporal variation in the initial tritium at recharge. Measurement of both tritium and its daughter product helium-3 (^3He) allows calculation of the initial tritium present at the time of recharge (figure 2), and ages can be determined from the following relationship:

Groundwater Age (years) = $-17.8 \times ln\ (1 + {}^3He_{trit}/{}^3H)$

The age measures the time since the water sample was last in contact with the atmosphere. The $^3He_{trit}$ indicated in the equation is the component of ^3He that is due to the decay of tritium. Methodologies have been developed for correcting for other sources of ^3He, such as the earth's atmosphere and potential small contributions from thorium and uranium decay (Aesbach-Hertig et al., 1999; Ekwurzel et al., 1994).

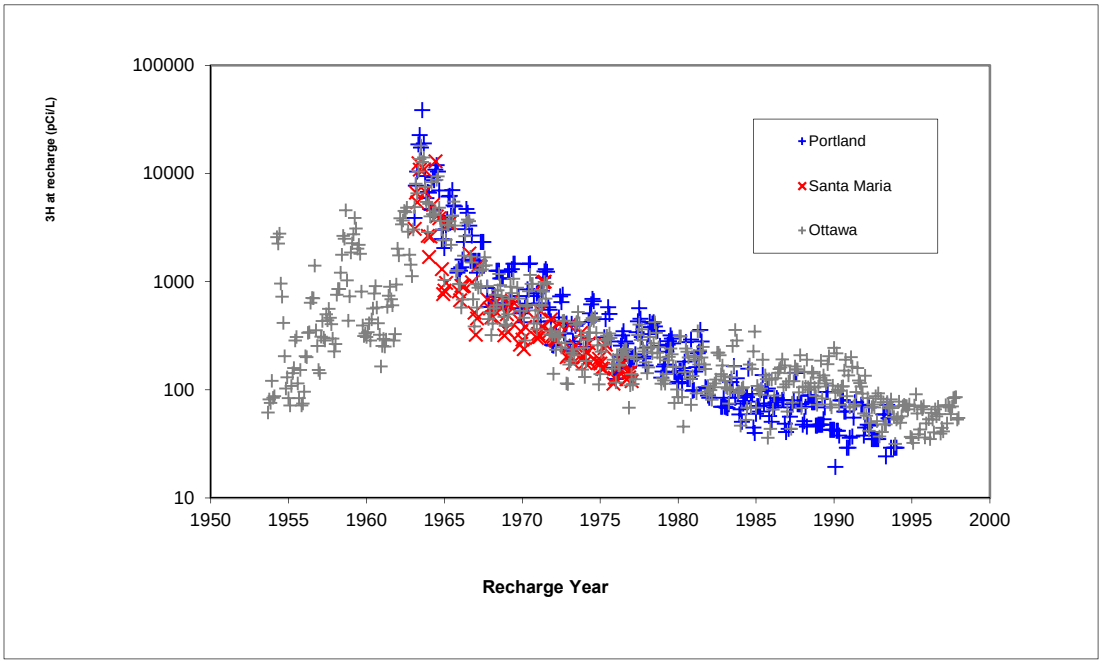


Figure 1. The tritium concentration measured in precipitation at three North American locations. Nuclear weapons testing introduced a large amount of tritium into the atmosphere in the 1960's, peaking in 1963.

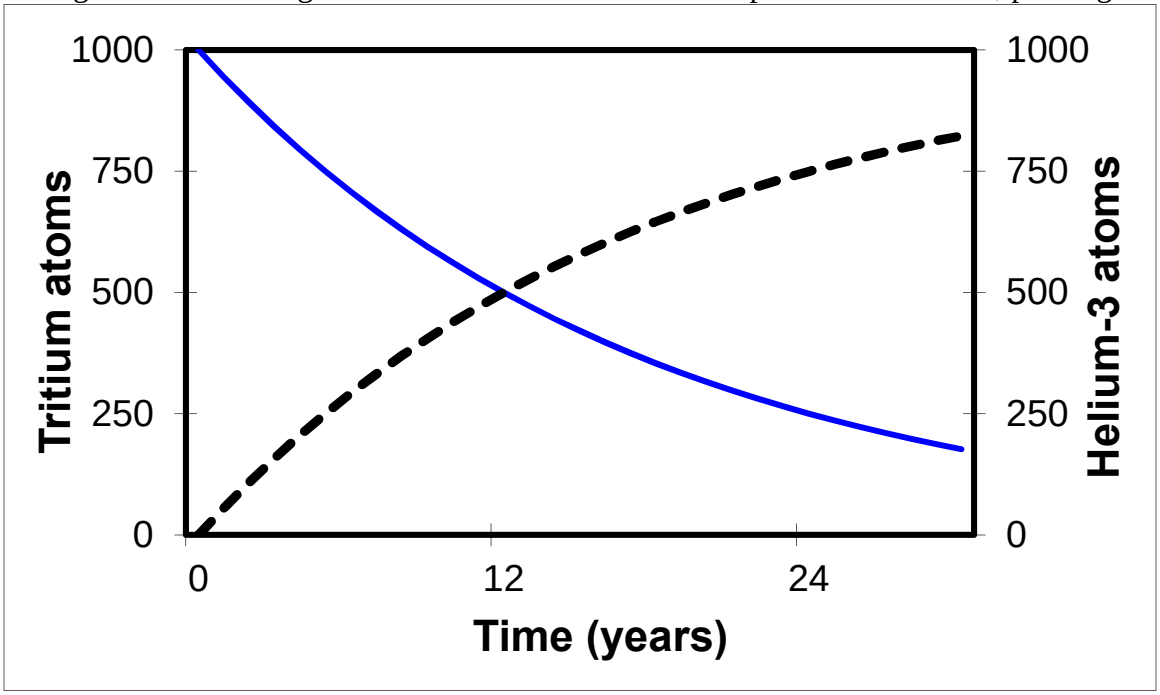


Figure 2. Solid line shows the decay of tritium, with a half-life of 12.34 years, while the dashed line shows the growth of the daughter product, ^{3}He. The sum of tritium and ^{3}He is the same at any time, and equal to the initial tritium value. This is the basis for the groundwater age-dating technique used in this study.

Well water samples are always a mixture of water molecules with an age distribution that may span a wide range. The reported groundwater age is the mean age of the mixed sample, and furthermore, is the age only of the portion of the water that contains measurable tritium. Groundwater age dating has been applied in several studies of basin-wide flow and transport (Poreda et al., 1988, Schlosser et al., 1988, Solomon et al., 1992, Ekwurzel et al., 1994, Szabo et al., 1996). The basic premise for using groundwater age to establish vulnerability is that young groundwater has been transported to a well capture zone relatively rapidly from the earth's surface. Most contaminants have been introduced in shallow zones, by human activity in the past 100 years, so younger groundwater is more likely to have intercepted contamination. On the other hand, old groundwater is likely to be isolated from the contaminating activities that are ubiquitous in modern urban environments.

Characteristics of Groundwater Derived From Dissolved Noble Gases

Fraction Pre-modern

A groundwater sample has an age distribution that is a result of groundwater mixing both during transport and in the well's borehole. Useful information about the groundwater age distribution in a well water sample comes from comparing a sample's measured tritium to the tritium expected in the original recharge water. This data analysis technique is illustrated on a plot of initial tritium versus calculated mean age (or recharge year; figure 3). The tritium that was present at the time of recharge is known from measurements of tritium in precipitation at several sites in North America. The calculated tritium-helium groundwater age is plotted along the x-axis position on figure 3, against the corresponding expected initial tritium value, on the y-axis. Water that recharged before about 1955 now contains extremely low levels of tritium. Samples that fall below the 'initial tritium' curve thus contain a fraction of water that recharged before 1955 ('pre-modern'). In contrast, a groundwater sample for which the measured age gives a decay-corrected tritium value that falls on or near the curve, is not significantly diluted with a component of

pre-1955 water. A coarse estimate of the fraction of pre-modern water that is drawn from a well comes from calculation of the difference between the measured tritium and the 'initial' tritium (figure 3). This technique can be complicated by: scatter in ^{3}H concentrations in precipitation, poor retention of ^{3}He in the vadose zone, and mixing of post-modern aged waters in the modern fraction, especially for waters with ages near the tritium bomb-pulse peak.

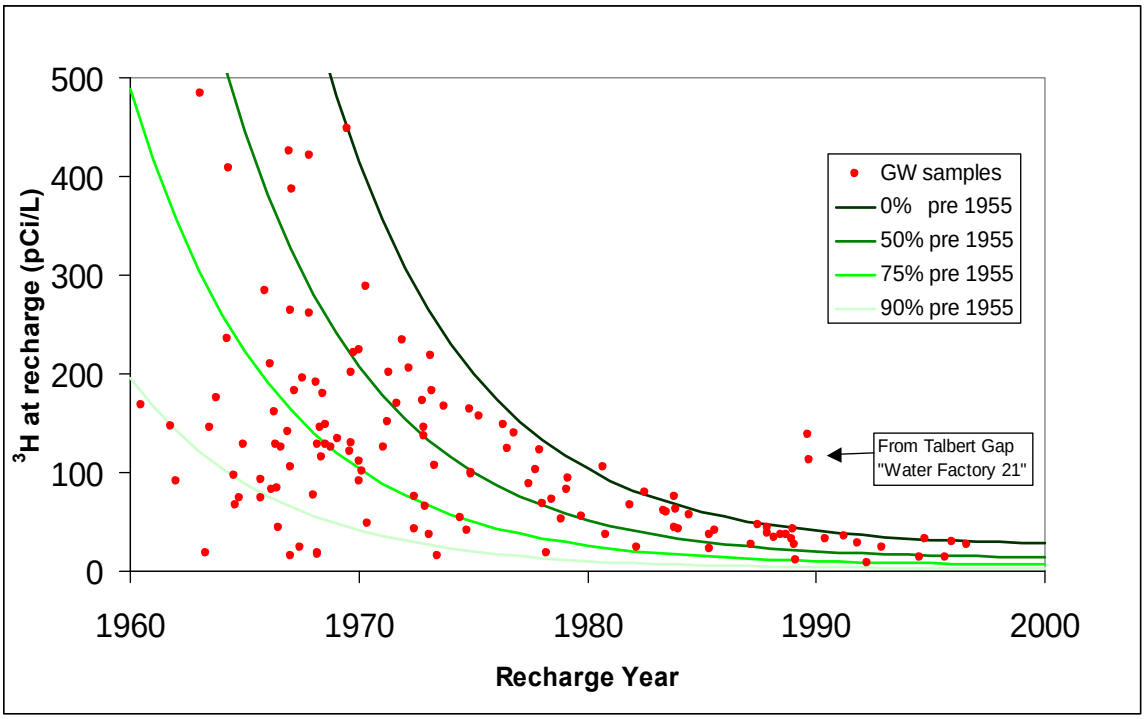


Figure 3. Curves show equal fractions of pre-modern water. The line labeled 0% is an approximation of the tritium in precipitation data from figure 1. Lines below approximate mixtures of pre-modern and post-modern water. Groundwater samples from southern California coastal basins are shown as points. Most samples have a large component of pre-modern groundwater.

Excess Air

During transport through the vadose zone, infiltrating water may entrain or trap air bubbles that subsequently dissolve in groundwater. Air bubbles may also become trapped in groundwater during fluctuations in the water table. This dissolved gas component is termed 'excess air' (Aesbach-Hertig et al., 2000, Holocher et al., 2002). The concentration of excess air provides valuable information about the recharge process, and is an important consideration during reduction of dissolved noble gas data to the calculated age (figure 4). For example, each measured ^{3}He concentration must be apportioned between the equilibrium solubility, excess air, and tritiogenic components. Excess air concentrations are derived from the measurement of excess Neon concentration because Neon can be assumed to derive solely from the atmosphere. Excess air is reported in units of cm^3 at standard temperature and pressure (STP) per gram of water.

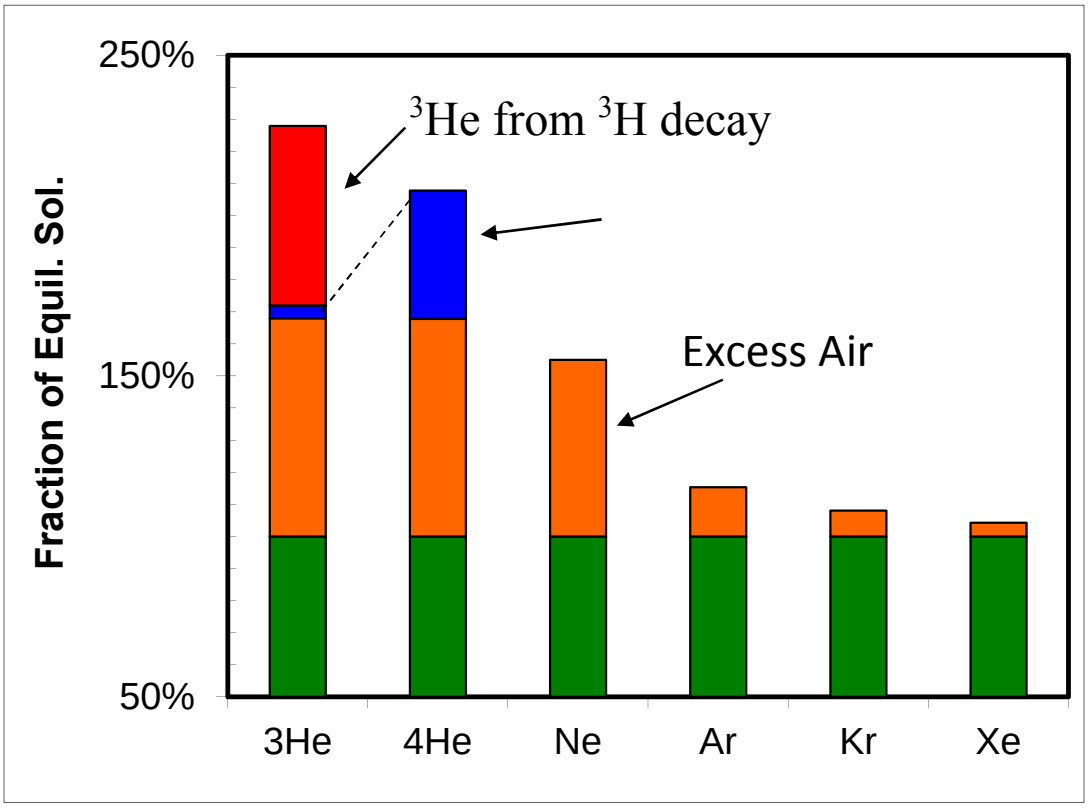


Figure 4. Graphical representation of the various dissolved noble gas components in a typical groundwater sample, relative to equilibrium solubility concentrations.

Radiogenic ^{4}Helium

The tritium-helium age dating method provides a mean age for the portion of groundwater that contains tritium (the post-modern or post-1955 portion). In many wells, a large component of pre-modern water is present, as determined by the fraction pre-modern (described above). A qualitative estimate of groundwater age for this old groundwater component comes from the in-growth of helium due to radioactive decay of uranium and thorium in crust. During the decay of naturally occurring uranium (^{238}U decaying to ^{206}Pb), alpha particles (which, after picking up electrons, become ^{4}He atoms) are emitted. Thus, ^{4}He accumulates significantly in groundwater on time scales of hundreds to thousands of years. The ^{4}He from U and Th decay in the earth's crust is termed 'radiogenic ^{4}He', and is expected to increase along a groundwater flow path. Precise age dating using ^{4}He is not possible because the accumulation rate depends on poorly known factors such as host rock U and Th concentrations and rock porosity (Solomon et al., 1996; Castro et al., 2000), but groundwater with a subsurface residence time greater than a few hundred years usually contains detectable radiogenic ^{4}He (Moran et al., 2002, Hudson et al., 2002). This technique has been applied in deep groundwater basins in France and in Sweden and has been compared with ^{14}Carbon dating of groundwater (Marty et al., 2003, Castro et al., 2000). Radiogenic ^{4}He has units of cm^{3} (STP) per gram of water, and these concentrations are converted to an apparent "age" using an assumed, constant flux of ^{4}He from the earth's crust of $2x10^{-7}$ cm^{3} STP cm^{-2} yr^{-1}.

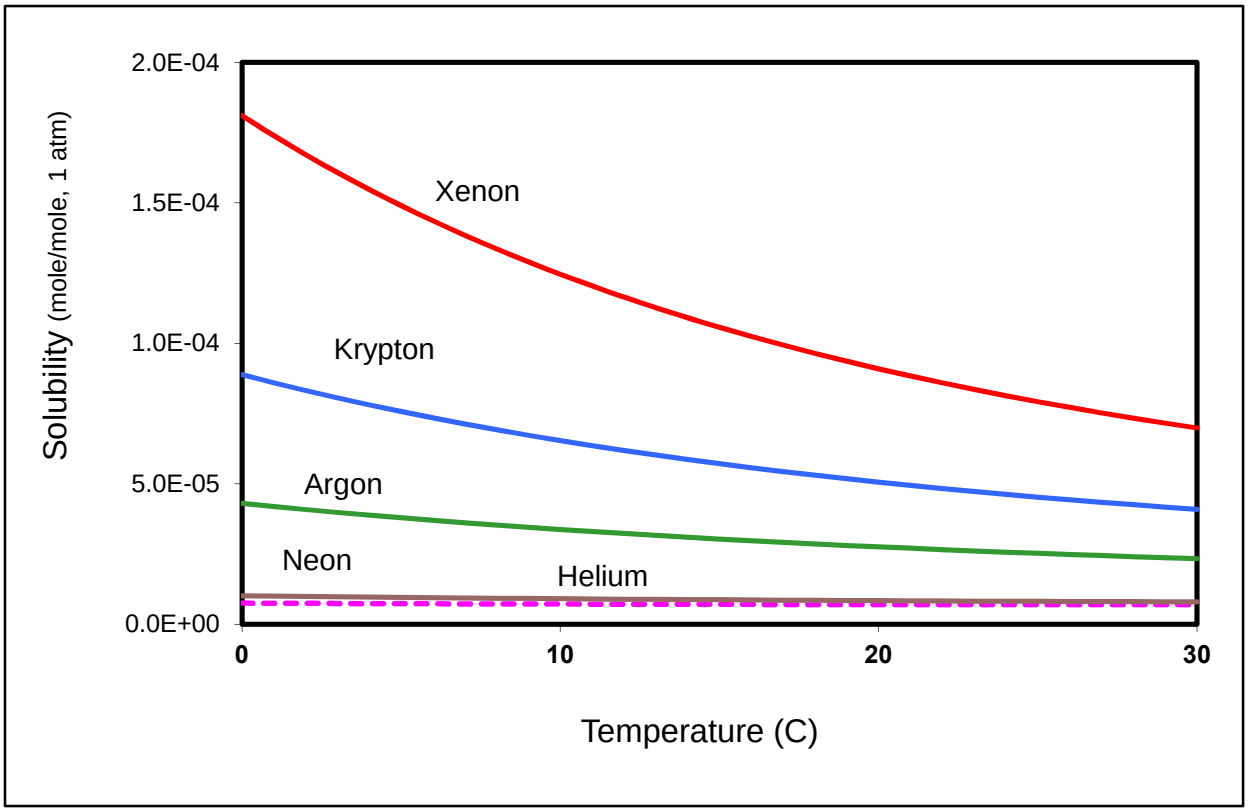


Figure 5. The solubility curves for the noble gases according to water temperature, showing the strongest temperature dependence for Xe. Noble gas recharge temperatures are calculated from these well-established curves.

Noble Gas Recharge Temperature

The solubilities of the noble gases in water vary as a function of temperature and pressure and are well known from theoretical and empirical studies (figure 5; Andrews, 1992). A robust estimate of the temperature at which recharge took place is determined by measuring the concentrations of all of the dissolved noble gases, and comparing the results to the solubility curves. The temperature determination is weighted by the dissolved xenon concentration since it is most strongly dependent upon temperature. Under natural conditions, the temperature of recharge is strongly dependent upon the altitude of recharge, and noble gas recharge temperatures have been used successfully to determine recharge elevation in mountainous regions (Manning and Solomon, 2003). Another application of this technique has been in studies of paleoclimate, in which groundwater recharged under significantly colder conditions is identified (Andrews and Lee, 1979, Aesbach-Hertig et al., 2002, Clark et al., 1997). In the intensively managed groundwater basins of the coastal plain in southern California, high noble gas recharge temperatures demarcate the region affected by artificial recharge. Variation in recharge temperature occurs because natural recharge in southern California takes place in cold, high elevation areas that surround the groundwater basin, while recharging water in low elevation artificial recharge facilities equilibrates at higher temperatures (Hudson et al., 2002).

The following analyses are reported for each groundwater well:

- Tritium (^{3}H in picoCuries per liter; pCi/L)
- ^{4}Helium, Neon, Argon, Krypton, Xenon abundances (cm^{3}STP/g)
- Tritium-helium age (in years)
- Radiogenic ^{4}Helium (cm^{3}STP/g)
- Excess air (in cubic centimeters at STP per liter)
- Recharge temperature (in °C)
- "Goodness of fit" for the equilibrium/excess air model

In the lab, each sample tube is attached to a 250 ml bottle assembly that is part of a multiport gas-handling manifold. The samples are released by unbolting the bottom clamp. The tubes are heated and then the water is frozen using frozen CO_2. The dissolved gases are released into the previously evacuated headspace in this process.

Reactive gases are removed with a SAES Ti-Al getter operated at 400°C. Argon, Kr and Xe are collected on activated charcoal using liquid nitrogen. At this point, a small portion (5%) of the remaining gas phase (He and Ne) is analyzed using a quadrupole mass spectrometer in order to measure the He/Ne ratio and to determine whether excessive He is present in the sample. The remaining He and Ne are then collected at 15K on activated charcoal. The low temperature charcoal trap is then warmed to 35K and the He is released and admitted to the VG 5400 mass spectrometer.

The mass spectrometer uses a conventional 17-stage electron multiplier and a SR400 pulse counting system for measuring ^{3}He. Helium-4 is measured using a faraday cup with a 10^{11}-Ohm feedback resistor. The procedure is calibrated using water samples equilibrated with the atmosphere at a known temperature (21°C). These calibration samples are processed along with regular samples with a frequency of 10%. Duplicate samples are analyzed with a frequency of 10%. The ^{4}He and Ne abundances are measured with an accuracy of 2% and the ratio of ^{3}He/^{4}He is measured with an accuracy of 1%.

The Ar abundance is determined by measuring its total pressure using a high-sensitivity capacitive manometer. The Kr and Xe abundances are determined using the quadrupole mass spectrometer. The Ar abundance is measured with an accuracy of 2% and the Kr and Xe abundances are measured with an accuracy of 3%.

The measured abundances of Ne, Ar, Kr and Xe are used to determine the amount of air-derived He present in the sample. The amount of radiogenic ^{4}He and tritiogenic ^{3}He are determined by subtraction of the atmospheric component.

For tritium determinations, 500g samples are loaded into stainless-steel bottles and attached to a multiport gas-handling manifold. The samples are chilled with water ice and headspace gases are pumped away. Samples are then heated with valves closed to re-equilibrate the water and the headspace void. Samples are then re-frozen and headspace gases are pumped away. In each cycle, approximately 99% of the He is removed. After five cycles, virtually no ^{3}He remains (< 100 atoms). The ^{3}He from tritium decay is allowed to accumulate for about 10 days. The samples are heated and then frozen and headspace gases are analyzed to determine the amount ^{3}He in-growth. Samples are analyzed in a similar fashion as the dissolved gas samples except that Ne, Kr and Xe are not analyzed.

The procedure is calibrated using samples with known amounts of tritium. The NIST-4361-B tritium standard is used for the calibration standard. These standard tritium samples are processed identically to the well water samples and run with a frequency of 10%. Empty bottle blanks are run with a frequency of 10%. Duplicate samples are analyzed the frequency of 10%. Tritium accuracy is the quadratic sum of 1 pCi/L plus 5%. Tritium detection limit is 1 pCi/L. Groundwater age is calculated using the equation noted above, and reported with a propagated analytical uncertainty.

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APPENDIX E

Analytical laboratory reports for samples collected in 2015, 2016, and 2017

Monterey Bay Analytical Services
4 Justin Court Suite D, Monterey, CA 93940
831.375.MBAS
www.MBASinc.com
ELAP Certification Number: 2385

Friday, September 08, 2017

Balance Hydrologics
800 Bancroft Way, Suite 101
Berkeley, CA 94710
(510)290-3125

Lab Number: AB73734

Collection Date/Time:	8/23/2017	14:15	Sample Collector:	PORRAS, G	Client Sample #:	
Submittal Date/Time:	8/24/2017	14:01	Sample ID	NON-REG	Coliform Designation:	

Sample Description: Alta Vista Well

Analyte	Method	Unit	Result	Qual	PQL	MCL	Date Analyzed	Analyst:
Alkalinity, Total (as CaCO3)	SM2320B	mg/L	**73**		10		8/30/2017	LM
Bicarbonate (as HCO3-)	SM2320B	mg/L	**89**		10		8/30/2017	HM
Boron	EPA200.7	mg/L	**Not Detected**		0.05		9/7/2017	MW
Calcium	EPA200.7	mg/L	**32**		0.5		9/7/2017	MW
Chloride	EPA300.0	mg/L	**40**	LN	1	250	8/25/2017	HM
Magnesium	EPA200.7	mg/L	**4.0**		0.5		9/7/2017	MW
Nitrate as NO3	EPA300.0	mg/L	**1**		1	45	8/25/2017	HM
Nitrate as NO3-N	EPA300.0	mg/L	**0.2**		0.1	10	8/25/2017	HM
Nitrate+Nitrite as N	EPA300.0	mg/L	**0.2**		0.1		8/25/2017	HM
Nitrite as NO2-N	EPA300.0	mg/L	**Not Detected**		0.1	1.0	8/25/2017	HM
o-Phosphate-P, Dissolved	EPA300.0	mg/L	**Not Detected**	LQ	0.1		8/25/2017	HM
pH (Laboratory)	SM4500-H+B	pH (H)	**8.0**		0.1		8/24/2017	MB
Potassium	EPA200.7	mg/L	**0.50**		0.5		9/7/2017	MW
QC Anion Sum x 100	Calculation	%	**95%**				8/30/2017	HM
QC Anion-Cation Balance	Calculation	%	**5**				9/8/2017	MW
QC Cation Sum x 100	Calculation	%	**105%**				9/8/2017	MW
QC Ratio TDS/SEC	Calculation		**0.64**				8/29/2017	MP
SAR (Sodium Adsorption Ratio)	Suarez, 1981		**1.2**				9/8/2017	MW
SAR, Adjusted	Suarez, 1981		**0.9**				9/8/2017	MW
Sodium	EPA200.7	mg/L	**27**		0.5		9/7/2017	MW
Specific Conductance (E.C)	SM2510B	µmhos/cm	**296**		1	900	8/28/2017	MP
Sulfate	EPA300.0	mg/L	**10**		1	250	8/25/2017	HM
Total Diss. Solids	SM2540C	mg/L	**189**		10	500	8/28/2017	MP

Sample Comments: LQ: LCS recovery above method control limits. LN: MS and/or MSD below acceptance limits.

Report Approved by David Holland, Laboratory Director

mg/L: Milligrams per liter (=ppm) ug/L : Micrograms per liter (=ppb) PQL : Practical Quantitation Limit
H = Analyzed outside of hold time E = Analysis performed by External Laboratory; See External Laboratory Report attachments.
D = Method deviates from standard method due to insufficient sample for MS/MSD T = Temperature Exceedance

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Friday, September 08, 2017

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Berkeley, CA 94710
(510)290-3125

Lab Number: AB73735

Collection Date/Time:	8/23/2017	11:20	Sample Collector:	PORRAS, G	Client Sample #:	
Submittal Date/Time:	8/24/2017	14:01	Sample ID	NON-REG	Coliform Designation:	

Sample Description: Portola #3 Well

Analyte	Method	Unit	Result	Qual	PQL	MCL	Date Analyzed	Analyst:
Alkalinity, Total (as CaCO3)	SM2320B	mg/L	**106**		10		8/30/2017	LM
Bicarbonate (as HCO3-)	SM2320B	mg/L	**129**		10		8/30/2017	HM
Boron	EPA200.7	mg/L	**Not Detected**		0.05		9/7/2017	MW
Calcium	EPA200.7	mg/L	**49**		0.5		9/7/2017	MW
Chloride	EPA300.0	mg/L	**87**	LN	1	250	8/25/2017	HM
Magnesium	EPA200.7	mg/L	**16**		0.5		9/7/2017	MW
Nitrate as NO3	EPA300.0	mg/L	**Not Detected**		1	45	8/25/2017	HM
Nitrate as NO3-N	EPA300.0	mg/L	**Not Detected**		0.1	10	8/25/2017	HM
Nitrate+Nitrite as N	EPA300.0	mg/L	**Not Detected**		0.1		8/25/2017	HM
Nitrite as NO2-N	EPA300.0	mg/L	**Not Detected**		0.1	1.0	8/25/2017	HM
o-Phosphate-P, Dissolved	EPA300.0	mg/L	**Not Detected**	LQ	0.1		8/25/2017	HM
pH (Laboratory)	SM4500-H+B	pH (H)	**7.6**		0.1		8/24/2017	MB
Potassium	EPA200.7	mg/L	**0.70**		0.5		9/7/2017	MW
QC Anion Sum x 100	Calculation	%	**98%**				8/30/2017	HM
QC Anion-Cation Balance	Calculation	%	**4**				9/8/2017	MW
QC Cation Sum x 100	Calculation	%	**106%**				9/8/2017	MW
QC Ratio TDS/SEC	Calculation		**0.62**				8/29/2017	MP
SAR (Sodium Adsorption Ratio)	Suarez, 1981		**1.7**				9/8/2017	MW
SAR, Adjusted	Suarez, 1981		**1.6**				9/8/2017	MW
Sodium	EPA200.7	mg/L	**53**		0.5		9/7/2017	MW
Specific Conductance (E.C)	SM2510B	µmhos/cm	**576**		1	900	8/28/2017	MP
Sulfate	EPA300.0	mg/L	**52**		1	250	8/25/2017	HM
Total Diss. Solids	SM2540C	mg/L	**360**		10	500	8/28/2017	MP

Sample Comments: LQ: LCS recovery above method control limits. LN: MS and/or MSD below acceptance limits.

Report Approved by David Holland, Laboratory Director

mg/L: Milligrams per liter (=ppm) ug/L : Micrograms per liter (=ppb) PQL : Practical Quantitation Limit
H = Analyzed outside of hold time E = Analysis performed by External Laboratory; See External Laboratory Report attachments.
D = Method deviates from standard method due to insufficient sample for MS/MSD T = Temperature Exceedance

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Monday, September 18, 2017

Lab Number: 170912_12-01

Collection Date/Time: 9/11/2017 14:00 Sample Collector: Porras G Client Sample #:

Submittal Date/Time: 9/12/2017 10:02 Sample ID: 206130

Sample Description: Montara Cr Above Diversion

Analyte	Method	Unit	Result	Dil.	Qual	PQL	MCL	Anal. Date	Anal. Time	Analyst
Boron	EPA200.7	mg/L	ND	1		0.05		9/15/2017	12:00	MW
Calcium	EPA200.7	mg/L	18	1		0.5		9/15/2017	12:00	MW
Magnesium	EPA200.7	mg/L	4	1		0.5		9/15/2017	12:00	MW
Potassium	EPA200.7	mg/L	ND	1		0.5		9/15/2017	12:00	MW
Sodium	EPA200.7	mg/L	20	1		0.5		9/15/2017	12:00	MW
Chloride	EPA300.0	mg/L	26	1		1		9/13/2017	5:01	HM
Nitrate as N	EPA300.0	mg/L	0.3	1		0.1		9/13/2017	5:01	HM
Nitrite as N	EPA300.0	mg/L	ND	1		0.1		9/13/2017	5:01	HM
Orthophosphate as P	EPA300.0	mg/L	ND	1		0.1		9/13/2017	5:01	
Fluoride	No Report 300.0	mg/L	0.4	1		0.1	2	9/13/2017	5:01	HM
Alkalinity, Total (as CaCO3)	SM2320B	mg/L	52	1		10		9/13/2017	9:00	BS
Bicarbonate (as HCO3-)	SM2320B	mg/L	63	1		10		9/13/2017	9:00	BS
Specific Conductance (Laboratory)	SM2510B	µmhos/cm	200	1		1		9/14/2017	11:35	HM
Total Dissolved Solids	SM2540C	mg/L	126	1		10		9/13/2017	16:00	MP
pH (Laboratory)	SM4500-H+B	pH (H)	8.1	1		0.1	10	9/12/2017	17:00	MP
SAR (Sodium Adsorption Ratio)	Suarez, 1981	NA	1.1	1						
SAR, Adjusted	Suarez, 1981	NA	0.9	1						

Comments:

Report Approved by:
David Holland, Laboratory Director

mg/L : Millgrams per liter (=ppm) ug/L : Micrograms per liter (=ppb) PQL : Practical Quantitation Limit MCL : Maximum Contamination Level

H = Analyzed outside of hold time E = Analysis performed by External Laboratory; See Report attachments T = Temperature Exceedance

D = Method deviates from standard method due to insufficient sample for MS/MSD J = Result is less than PQL

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Thursday, November 03, 2016

Lab Number: **AB55803**

Collection Date/Time:	10/20/2016	14:30	Sample Collector:	PORRAS G	Client Sample #:
Submittal Date/Time:	10/21/2016	9:55	Sample ID		Coliform Designation:

Sample Description: P3IS16, Portola #3, P3_IS1000_2016, P3_IS125_2016

Analyte	Method	Unit	Result	Qual	PQL	MCL	Date Analyzed	Analyst:
Alkalinity, Total (as CaCO3)	SM2320B	mg/L	**103**		10		10/28/2016	BS
Bicarbonate (as HCO3-)	SM2320B	mg/L	**126**		10		10/29/2016	SM
Boron	EPA200.7	mg/L	**Not detected**		0.05		10/31/2016	MW
Calcium	EPA200.7	mg/L	**43**		0.5		10/31/2016	MW
Chloride	EPA300.0	mg/L	**92**		1	250	10/21/2016	MW
Magnesium	EPA200.7	mg/L	**16**		0.5		10/31/2016	MW
Nitrate as NO3	EPA300.0	mg/L	**Not Detected**		1	45	10/21/2016	MW
Nitrate as NO3-N	EPA300.0	mg/L	**Not Detected**		0.1	10	10/21/2016	MW
Nitrate+Nitrite as N	EPA300.0	mg/L	**0.2**		0.1		10/21/2016	MW
Nitrite as NO2-N	EPA300.0	mg/L	**0.2**		0.1	1.0	10/21/2016	MW
o-Phosphate-P, Dissolved	EPA300.0	mg/L	**Not Detected**		0.1		10/21/2016	MW
pH (Laboratory)	SM4500-H+B	pH (H)	**7.8**		0.1		10/21/2016	LRH
Potassium	EPA200.7	mg/L	**0.80**		0.5		10/31/2016	MW
QC Anion Sum x 100	Calculation	%	**96%**				10/29/2016	SM
QC Anion-Cation Balance	Calculation	%	**0**				11/1/2016	MW
QC Cation Sum x 100	Calculation	%	**96%**				11/1/2016	MW
QC Ratio TDS/SEC	Calculation		**0.57**				10/27/2016	MP
SAR (Sodium Adsorption Ratio)	Suarez, 1981		**1.6**				11/1/2016	MW
SAR, Adjusted	Suarez, 1981		**1.4**				11/1/2016	MW
Sodium	EPA200.7	mg/L	**49**		0.5		10/31/2016	MW
Specific Conductance (E.C)	SM2510B	µmhos/cm	**584**		1	900	10/26/2016	HM
Sulfate	EPA300.0	mg/L	**46**		1	250	10/21/2016	MW
Total Diss. Solids	SM2540C	mg/L	**334**		10	500	10/25/2016	MP

Sample Comments:

Report Approved by

David Holland, Laboratory Director

mg/L: Milligrams per liter (=ppm) ug/L : Micrograms per liter (=ppb) PQL : Practical Quantitation Limit

H = Analyzed ouside of hold time E = Analysis performed by External Laboratory; See External Laboratory Report attachments.

D = Method deviates from standard method due to insufficient sample for MS/MSD T = Temperature Exceedance

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Thursday, November 03, 2016

Balance Hydrologics
800 Bancroft Way, Suite 101
Berkeley, CA 94710
(510)290-3125

Lab Number: **AB55804**

Collection Date/Time: 10/20/2016 15:50 Sample Collector: PORRAS G Client Sample #:
Submittal Date/Time: 10/21/2016 9:55 Sample ID Coliform Designation:

Sample Description: AVIS16, Alta Vista, AV_IS1000_2016, AV_IS125_2016

Analyte	Method	Unit	Result	Qual	PQL	MCL	Date Analyzed	Analyst:
Alkalinity, Total (as CaCO3)	SM2320B	mg/L	**72**		10		10/28/2016	BS
Bicarbonate (as HCO3-)	SM2320B	mg/L	**88**		10		10/29/2016	SM
Boron	EPA200.7	mg/L	**Not detected**		0.05		10/31/2016	MW
Calcium	EPA200.7	mg/L	**28**		0.5		10/31/2016	MW
Chloride	EPA300.0	mg/L	**41**		1	250	10/21/2016	MW
Magnesium	EPA200.7	mg/L	**4.0**		0.5		10/31/2016	MW
Nitrate as NO3	EPA300.0	mg/L	**1**		1	45	10/21/2016	MW
Nitrate as NO3-N	EPA300.0	mg/L	**0.2**		0.1	10	10/21/2016	MW
Nitrate+Nitrite as N	EPA300.0	mg/L	**0.4**		0.1		10/21/2016	MW
Nitrite as NO2-N	EPA300.0	mg/L	**0.2**		0.1	1.0	10/21/2016	MW
o-Phosphate-P, Dissolved	EPA300.0	mg/L	**Not Detected**		0.1		10/21/2016	MW
pH (Laboratory)	SM4500-H+B	pH (H)	**8.1**		0.1		10/21/2016	LRH
Potassium	EPA200.7	mg/L	**0.60**		0.5		10/31/2016	MW
QC Anion Sum x 100	Calculation	%	**91%**				10/29/2016	SM
QC Anion-Cation Balance	Calculation	%	**1**				11/1/2016	MW
QC Cation Sum x 100	Calculation	%	**92%**				11/1/2016	MW
QC Ratio TDS/SEC	Calculation		**0.53**				10/27/2016	MP
SAR (Sodium Adsorption Ratio)	Suarez, 1981		**1.2**				11/1/2016	MW
SAR, Adjusted	Suarez, 1981		**0.9**				11/1/2016	MW
Sodium	EPA200.7	mg/L	**26**		0.5		10/31/2016	MW
Specific Conductance (E.C)	SM2510B	µmhos/cm	**311**		1	900	10/26/2016	HM
Sulfate	EPA300.0	mg/L	**11**		1	250	10/21/2016	MW
Total Diss. Solids	SM2540C	mg/L	**166**		10	500	10/25/2016	MP

Sample Comments:

Report Approved by David Holland, Laboratory Director

mg/L: Milligrams per liter (=ppm) ug/L : Micrograms per liter (=ppb) PQL : Practical Quantitation Limit
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D = Method deviates from standard method due to insufficient sample for MS/MSD T = Temperature Exceedance

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Thursday, November 03, 2016

Balance Hydrologics
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Lab Number: AB55805

Collection Date/Time:	10/20/2016	15:30	Sample Collector:	PORRAS G	Client Sample #:
Submittal Date/Time:	10/21/2016	9:55	Sample ID		Coliform Designation:

Sample Description: WIS16, Wagner, W_IS1000_2016, W_IS125_2016

Analyte	Method	Unit	Result	Qual	PQL	MCL	Date Analyzed	Analyst:
Alkalinity, Total (as CaCO3)	SM2320B	mg/L	**108**		10		10/28/2016	BS
Bicarbonate (as HCO3-)	SM2320B	mg/L	**132**		10		10/29/2016	SM
Boron	EPA200.7	mg/L	**Not detected**		0.05		10/31/2016	MW
Calcium	EPA200.7	mg/L	**37**		0.5		10/31/2016	MW
Chloride	EPA300.0	mg/L	**47**		1	250	10/22/2016	MW
Magnesium	EPA200.7	mg/L	**7.0**		0.5		10/31/2016	MW
Nitrate as NO3	EPA300.0	mg/L	**2**		1	45	10/22/2016	MW
Nitrate as NO3-N	EPA300.0	mg/L	**0.4**		0.1	10	10/22/2016	MW
Nitrate+Nitrite as N	EPA300.0	mg/L	**0.6**		0.1		10/22/2016	MW
Nitrite as NO2-N	EPA300.0	mg/L	**0.2**		0.1	1.0	10/22/2016	MW
o-Phosphate-P, Dissolved	EPA300.0	mg/L	**Not Detected**		0.1		10/22/2016	MW
pH (Laboratory)	SM4500-H+B	pH (H)	**7.8**		0.1		10/21/2016	LRH
Potassium	EPA200.7	mg/L	**0.60**		0.5		10/31/2016	MW
QC Anion Sum x 100	Calculation	%	**95%**				10/29/2016	SM
QC Anion-Cation Balance	Calculation	%	**0**				11/1/2016	MW
QC Cation Sum x 100	Calculation	%	**96%**				11/1/2016	MW
QC Ratio TDS/SEC	Calculation		**0.56**				10/27/2016	MP
SAR (Sodium Adsorption Ratio)	Suarez, 1981		**1.3**				11/1/2016	MW
SAR, Adjusted	Suarez, 1981		**1.1**				11/1/2016	MW
Sodium	EPA200.7	mg/L	**34**		0.5		10/31/2016	MW
Specific Conductance (E.C)	SM2510B	µmhos/cm	**410**		1	900	10/26/2016	HM
Sulfate	EPA300.0	mg/L	**18**		1	250	10/22/2016	MW
Total Diss. Solids	SM2540C	mg/L	**228**		10	500	10/25/2016	MP

Sample Comments:

Report Approved by

David Holland, Laboratory Director

mg/L: Milligrams per liter (=ppm) ug/L : Micrograms per liter (=ppb) PQL : Practical Quantitation Limit
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Amended Report

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Balance Hydrologics
800 Bancroft Way, Suite 101
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Friday, March 10, 2017

Lab Number: AB55806

Collection Date/Time: 10/20/2016 15:10 Sample Collector: PORRAS G Client Sample #:
Submittal Date/Time: 10/21/2016 9:55 Sample ID

Sample Description: DIS16, Drake, D_IS1000_2016, D_IS125_2016

Analyte	Method	Unit	Result	Qual	PQL	Date Analyzed	Analyst:
Alkalinity, Total (as CaCO3)	SM2320B	mg/L	**119**		10	10/28/2016	BS
Bicarbonate (as HCO3-)	SM2320B	mg/L	**145**		10	10/29/2016	SM
Boron	EPA200.7	mg/L	**Not detected**		0.05	10/31/2016	MW
Calcium	EPA200.7	mg/L	**40**		0.5	10/31/2016	MW
Chloride	EPA300.0	mg/L	**51**		1	10/21/2016	MW
Magnesium	EPA200.7	mg/L	**11**		0.5	10/31/2016	MW
Nitrate as NO3	EPA300.0	mg/L	**1**		1	10/21/2016	MW
Nitrate as NO3-N	EPA300.0	mg/L	**0.3**		0.1	10/21/2016	MW
Nitrate+Nitrite as N	EPA300.0	mg/L	**0.5**		0.1	10/21/2016	MW
Nitrite as NO2-N	EPA300.0	mg/L	**0.2**		0.1	10/21/2016	MW
o-Phosphate-P, Dissolved	EPA300.0	mg/L	**0.1**			10/21/2016	MW
pH (Laboratory)	SM4500-H+B	pH (H)	**7.6**		0.1	10/21/2016	LRH
Potassium	EPA200.7	mg/L	**0.30**		0.5	10/31/2016	MW
QC Anion Sum x 100	Calculation	%	**97%**			3/10/2017	MWH
QC Anion-Cation Balance	Calculation	%	**0**			3/10/2017	MWH
QC Cation Sum x 100	Calculation	%	**96%**			11/1/2016	MW
QC Ratio TDS/SEC	Calculation		**0.57**			10/27/2016	MP
SAR (Sodium Adsorption Ratio)	Suarez, 1981		**1.4**			11/1/2016	MW
SAR, Adjusted	Suarez, 1981		**1.2**			11/1/2016	MW
Sodium	EPA200.7	mg/L	**40**		0.5	10/31/2016	MW
Specific Conductance (E.C)	SM2510B	µmhos/c	**482**		1	10/26/2016	HM
Sulfate	EPA300.0	mg/L	**41**		1	10/21/2016	MW
Total Diss. Solids	SM2540C	mg/L	**274**		10	10/25/2016	MP

Sample Comments:

Report Approved by:

David Holland, Laboratory Director

mg/L: Milligrams per liter (=ppm) ug/L : Micrograms per liter (=ppb) PQL : Practical Quantitation Limit
H = Analyzed ouside of hold time E = Analysis performed by External Laboratory; See External Laboratory Report attachments.
J = Result is less than PQL T = Temperature Exceedance

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Tuesday, November 10, 2015

Balance Hydrologics
800 Bancroft Way, Suite 101
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Lab Number: AB37375

Collection Date/Time: 10/27/2015 13:45 Sample Collector: PORRAS G
Submittal Date/Time: 10/28/2015 14:30 Sample ID Coliform Designation:

Sample Description: P3_IS

Analyte	Method	Unit	Result	Qual	PQL	MCL	Date Analyzed	Analyst:
Alkalinity, Total (as CaCO3)	SM2320B	mg/L	**103**		10		11/10/2015	LRH
Bicarbonate (as HCO3-)	SM2320B	mg/L	**126**		10		11/10/2015	DH
Boron	EPA200.7	mg/L	**Not detected**		0.05		11/4/2015	MW
Calcium	EPA200.7	mg/L	**46**		0.5		11/4/2015	MW
Chloride	EPA300.0	mg/L	**94**		1	250	10/28/2015	HM
Magnesium	EPA200.7	mg/L	**15**		0.5		11/4/2015	MW
Nitrate as NO3	EPA300.0	mg/L	**Not Detected**		1	45	10/28/2015	HM
Nitrate as NO3-N	EPA300.0	mg/L	**Not Detected**		0.1	10	10/28/2015	HM
Nitrate+Nitrite as N	EPA300.0	mg/L	**0.3**		0.1		10/28/2015	HM
Nitrite as NO2-N	EPA300.0	mg/L	**0.2**		0.1	1.0	10/28/2015	HM
o-Phosphate-P	EPA300.0	mg/L	**Not Detected**		0.1		10/28/2015	HM
pH (Laboratory)	SM4500-H+B	pH (H)	**7.6**		0.1		10/28/2015	HM
Potassium	EPA200.7	mg/L	**0.70**		0.5		11/4/2015	MW
QC Anion Sum x 100	Calculation	%	**93%**				11/10/2015	DH
QC Anion-Cation Balance	Calculation	%	**3**				11/10/2015	DH
QC Cation Sum x 100	Calculation	%	**99%**				11/5/2015	MW
QC Ratio TDS/SEC	Calculation		**0.58**				10/29/2015	HM
SAR (Sodium Adsorption Ratio)	Suarez, 1981		**1.7**				11/10/2015	DH
SAR, Adjusted	Suarez, 1981		**1.5**				11/10/2015	DH
Sodium	EPA200.7	mg/L	**51**		0.5		11/4/2015	MW
Specific Conductance (E.C)	SM2510B	µmhos/cm	**585**		1	900	10/29/2015	HM
Sulfate	EPA300.0	mg/L	**35**		1	250	10/28/2015	HM
Total Diss. Solids	SM2540C	mg/L	**337**		10	500	10/28/2015	HM

Sample Comments:

Report Approved by:

David Holland, Laboratory Director

mg/L: Milligrams per liter (=ppm) ug/L : Micrograms per liter (=ppb) PQL : Practical Quantitation Limit
H = Analyzed ouside of hold time E = Analysis performed by External Laboratory; See External Laboratory Report attachments.
D = Method deviates from standard method due to insufficient sample for MS/MSD T = Temperature Exceedance

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ELAP Certification Number: 2385

Tuesday, November 10, 2015

Balance Hydrologics
800 Bancroft Way, Suite 101
Berkeley, CA 94710
(510)290-3125

Lab Number: AB37376

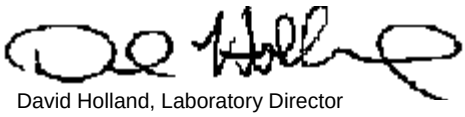
Collection Date/Time: 10/27/2015 12:20 Sample Collector: PORRAS G
Submittal Date/Time: 10/28/2015 14:30 Sample ID Coliform Designation:

Sample Description: AV_IS

Analyte	Method	Unit	Result	Qual	PQL	MCL	Date Analyzed	Analyst:
Alkalinity, Total (as CaCO3)	SM2320B	mg/L	**74**		10		11/10/2015	LRH
Bicarbonate (as HCO3-)	SM2320B	mg/L	**90**		10		11/10/2015	DH
Boron	EPA200.7	mg/L	**Not detected**		0.05		11/4/2015	MW
Calcium	EPA200.7	mg/L	**33**		0.5		11/4/2015	MW
Chloride	EPA300.0	mg/L	**42**		1	250	10/29/2015	HM
Magnesium	EPA200.7	mg/L	**4.0**		0.5		11/4/2015	MW
Nitrate as NO3	EPA300.0	mg/L	**1**		1	45	10/29/2015	HM
Nitrate as NO3-N	EPA300.0	mg/L	**0.2**		0.1	10	10/29/2015	HM
Nitrate+Nitrite as N	EPA300.0	mg/L	**0.4**		0.1		10/29/2015	HM
Nitrite as NO2-N	EPA300.0	mg/L	**0.2**		0.1	1.0	10/29/2015	HM
o-Phosphate-P	EPA300.0	mg/L	**Not Detected**		0.1		10/29/2015	HM
pH (Laboratory)	SM4500-H+B	pH (H)	**8.1**		0.1		10/28/2015	HM
Potassium	EPA200.7	mg/L	**0.40**		0.5		11/4/2015	MW
QC Anion Sum x 100	Calculation	%	**90%**				11/10/2015	DH
QC Anion-Cation Balance	Calculation	%	**4**				11/10/2015	DH
QC Cation Sum x 100	Calculation	%	**98%**				11/5/2015	MW
QC Ratio TDS/SEC	Calculation		**0.64**				10/29/2015	HM
SAR (Sodium Adsorption Ratio)	Suarez, 1981		**1.2**				11/10/2015	DH
SAR, Adjusted	Suarez, 1981		**0.9**				11/10/2015	DH
Sodium	EPA200.7	mg/L	**27**		0.5		11/4/2015	MW
Specific Conductance (E.C)	SM2510B	µmhos/cm	**321**		1	900	10/29/2015	HM
Sulfate	EPA300.0	mg/L	**10**		1	250	10/29/2015	HM
Total Diss. Solids	SM2540C	mg/L	**206**		10	500	10/28/2015	HM

Sample Comments:

Report Approved by:



David Holland, Laboratory Director

mg/L: Milligrams per liter (=ppm) ug/L : Micrograms per liter (=ppb) PQL : Practical Quantitation Limit
H = Analyzed ouside of hold time E = Analysis performed by External Laboratory; See External Laboratory Report attachments.
D = Method deviates from standard method due to insufficient sample for MS/MSD T = Temperature Exceedance

APPENDIX F

Sample collection methods for tritium and dissolved noble-gas analyses

Appendix C: Sample collection methods provided by HydroTrace for tritium and dissolved noble-gas analysis.

A. For the tritium sample collection, a non-filtered water sample was collected in a thick-walled 1-liter Corning Pyrex Round Laboratory Storage Bottles with polypropylene plug-seal caps (Corning1395-1L). The clean bottle was filled to the top, leaving some head space. No other precautions are needed.

B. For the dissolved noble-gas sample collection, duplicate water samples were collected in 18 inch long, 3/8 inch OD copper tubes (referred to as 'noble-gas tubes' by Hydrotrace). The duplicates were collected in series and crimped at both ends of the tube with a bracket while maintaining water pressure (100 psi is recommended). The sampling water pressure reduces the possibility of dissolved gas loss.

   Sampling apparatus setup (see **Figures C1 and C2**).

   1) Two crimping clamps were attached to an aluminum base that loosely held a copper sampling tube.

   2) A piece of reinforced tubing was securely connected to the wellhead and also to the upstream end of the first copper sampling tube using hose clamps to tighten the connections and prevent leaks.

   3) A separate piece of reinforced tubing was used to connect the two copper sampling tubes in series for duplicate samples.

   4) A third piece of reinforced tubing was connected to the downstream end of the second copper sampling tube. A valve was connected at the end of this piece of reinforced tubing where flow could be restricted to maintain pressure in the system.

   Sampling procedure.

   1) The wellhead valve was opened all the way and flow through the reinforced tubing was carefully observed for any bubbles, which would have been a possible indicator of dissolved gas coming out of solution.

2) The valve at the downstream end of the sampling system was closed down to a minimum flow which increased pressure in the system.

3) We then gently tapped the tube to dislodge potentially unseen bubbles.

4) The furthermost downstream crimping clamp of the second sampling copper tube in series was closed first by tightening two bolts on the clamp with a socket wrench. By closing this clamp the pressure maximized in the copper sampling tubes. The remaining three crimping clamps were then closed in a downstream to upstream sequence.

5) Each of the samples was marked with a unique number for chain-of-custody and laboratory tracking.

USGS Reston Groundwater Dating Laboratory
$^{3}H/^{3}He$ Noble Gas Sampling Method

https://water.usgs.gov/lab/3h3he/sampling/

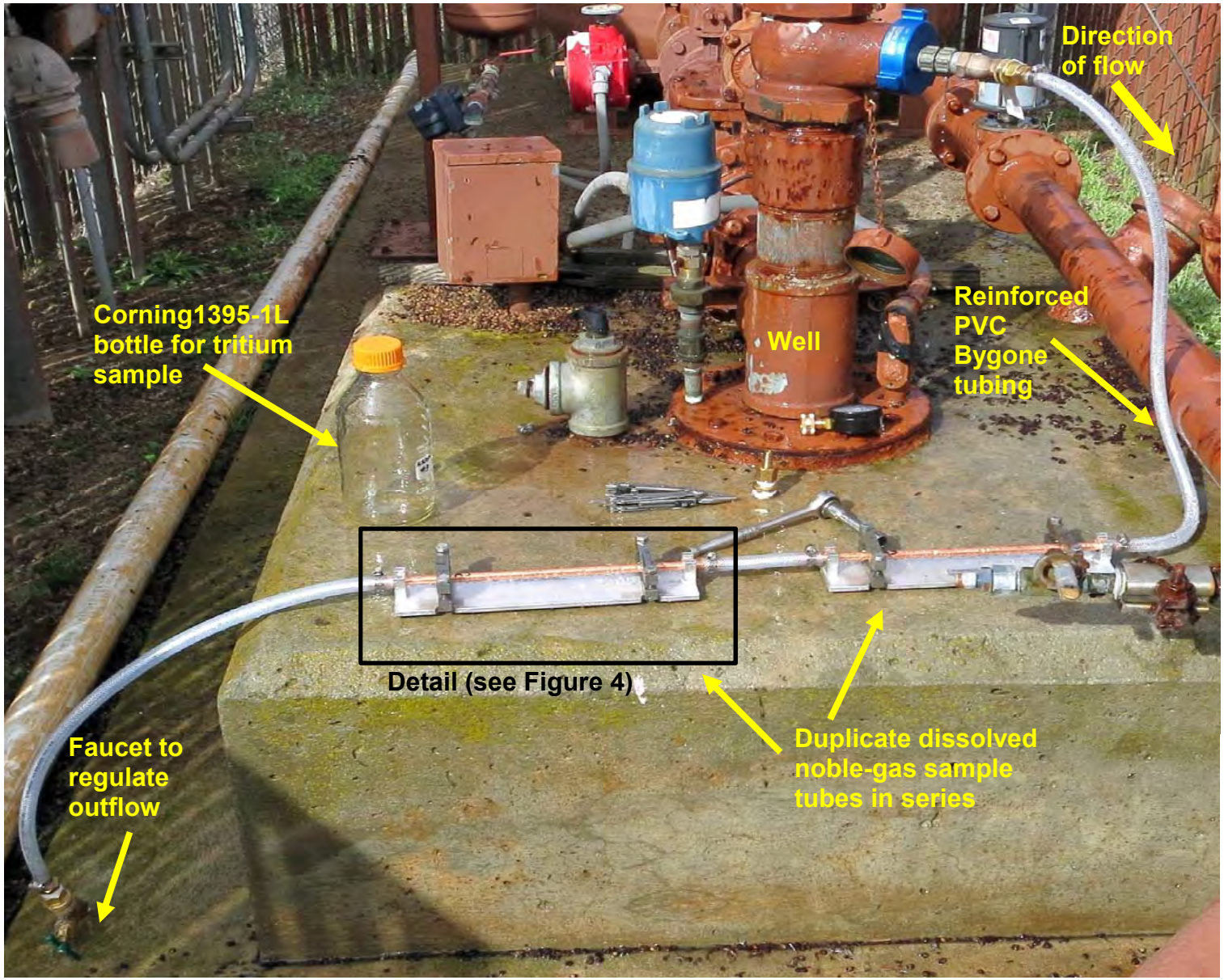
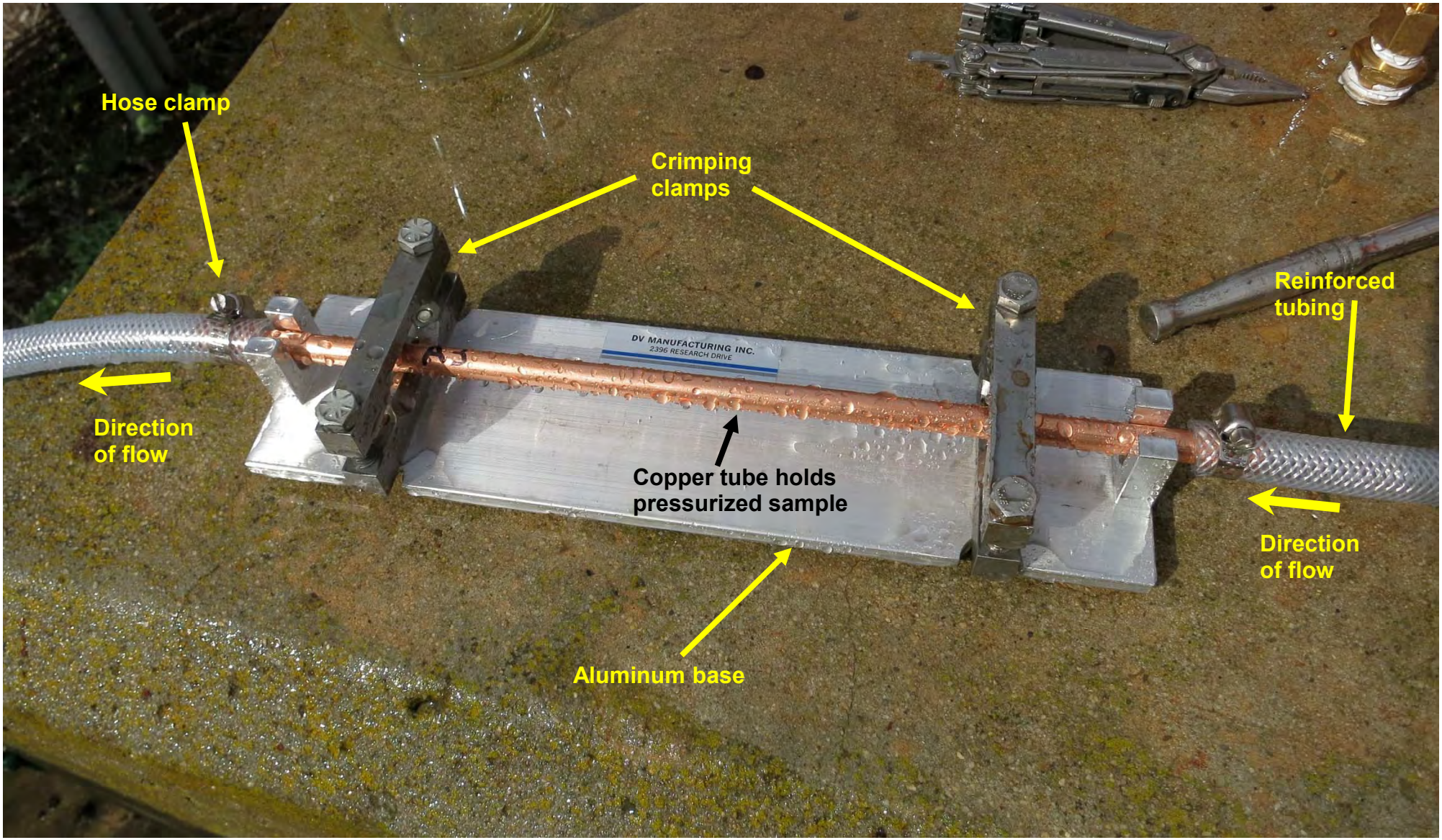


Figure C1. Apparatus setup for tritium-helium sampling of groundwater, Montara Water and Sanitary District, San Mateo County, California

Balance Hydrologics, Inc.®



Balance Hydrologics, Inc.®

Figure C2. Detail of setup for dissolved noble-gas sampling of groundwater, Montara Water and Sanitary District, San Mateo County, California

USGS Reston Groundwater Dating Laboratory
$^{3}H/^{3}He$ Noble Gas Sampling Method

https://water.usgs.gov/lab/3h3he/sampling/

APPENDIX G

USGS Reston Groundwater Dating Lab Chlorofluorocarbon (CFC) sampling method

The Reston Chlorofluorocarbon Laboratory

CFC Sampling Method - Bottles

A procedure that involves filling and capping simple glass bottles with special foil-lined caps under water has been tested. Samples analyzed after storage over 6 months demonstrate the validity of the new method. This document describes the sampling procedure and presents results of tests with the CFC bottle method.

CFC bottle method

If archival of water samples for CFC or other VOC analysis for periods of more than 6 months is required, then it is recommended that water samples be collected in fused borosilicate ampoules, as before (Busenberg and Plummer, 1992). Otherwise, water samples for CFC analysis can be collected in glass bottles capped with a special foil-lined cap, as described below.

Source of bottles and caps

Bottles and caps can be obtained from the Scientific Specialties company at 800-648-7800. The bottles are 125ml (4 oz) boston round clear glass and have a cap size 22-400.

Item No. B73504 is a case of 24 bottles with teflon lined caps. These bottles have the wrong caps! Discard these caps and replace them with the caps below.

Bottles are also available from any Wheaton glass supplier as Wheaton part number 217112, which is a case of 24 bottles with no caps.

The caps are sold as Scientific Specialties item no. A69522, white plastic caps with aluminum foil liner in a bag of 72. Use only these aluminum lined caps! This cap is the key to the method. Discard any caps, if the foil liner appears scratched, dented, or altered in any way.

Filling procedure

Instruction given below must be followed to the letter to obtain good results with the bottle sampling method for CFCs in ground water.

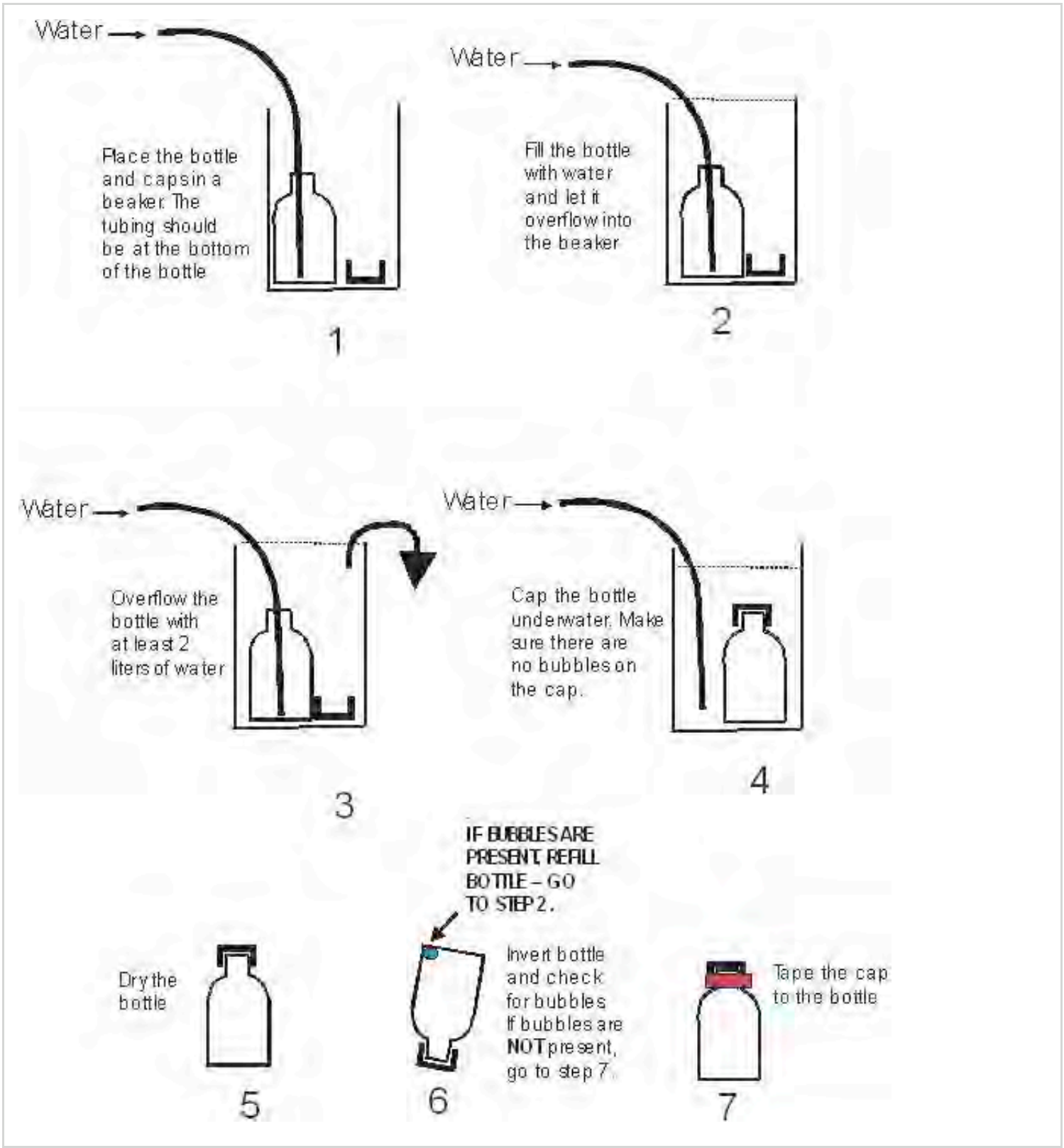
We are receiving too many samples with loose caps and caps that are not properly taped (see below for examples).

The bottles and caps should be thoroughly rinsed with the ground water. The bottles are filled underwater in a beaker and capped underwater. Refrigeration-grade copper tubing is required. The filling procedure is carried out within a two to four liter beaker. A plastic beaker is fine. Collect 5 bottles per well or spring.

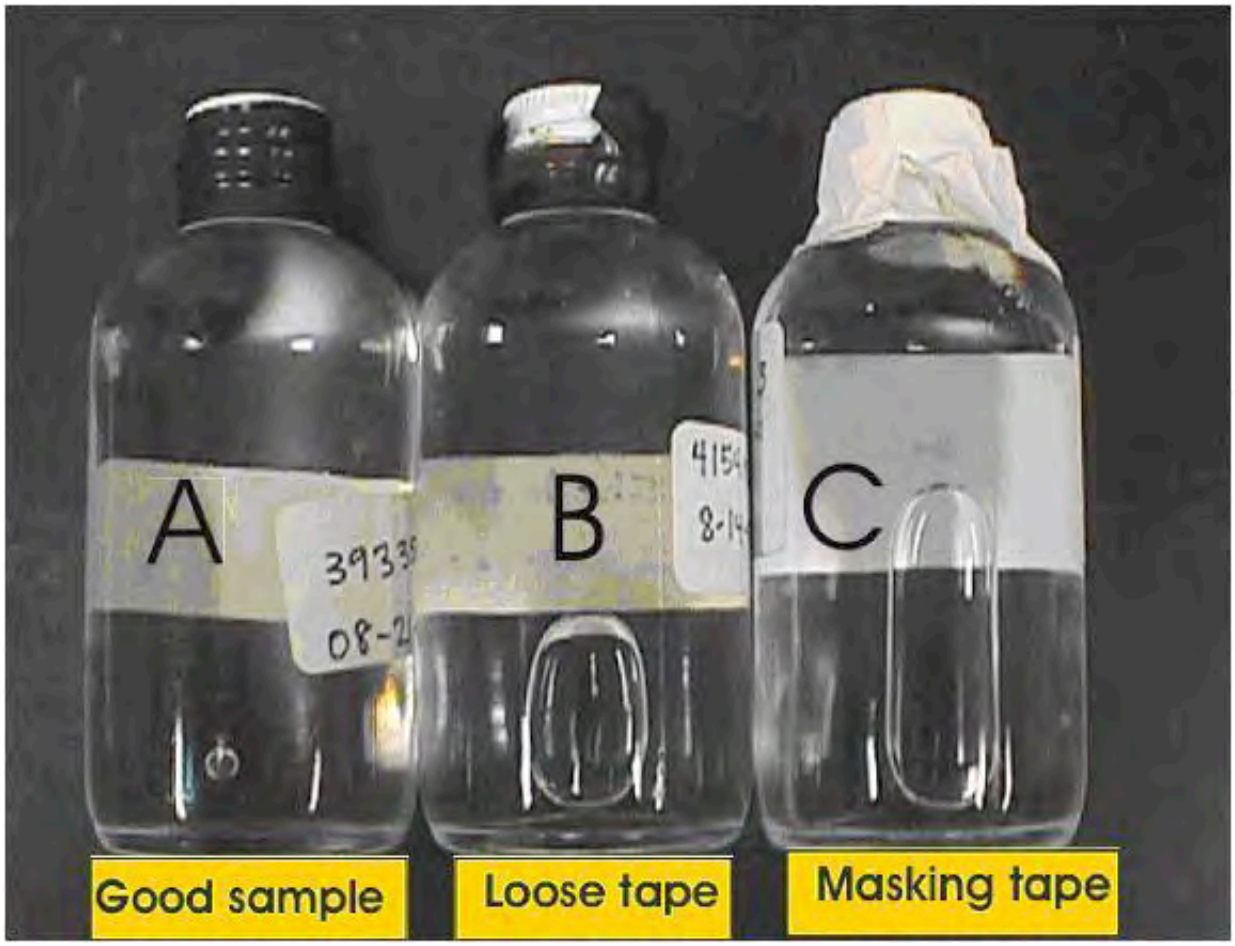
The procedure is shown below:

1. After the well has been purged, place the bottle in the beaker and then insert the end of the copper tubing from the pump all the way into the bottom of the bottle.
2. Fill the bottle as shown with well water until it overflows.
3. Continue to overflow the bottle until the beaker overflows. Allow at least 2 liters of water to flow through the bottle and out of the beaker.
4. Select a cap and tap it under water to dislodge air bubbles. Remove the copper tube from the bottle and tightly cap the bottle underwater without allowing the water in the bottle to come in contact with air. Flushing the bottle with more water is far better than with less water.
5. Remove the capped bottle from the beaker, dry the bottle and RE-tighten the cap. The tighter the cap the better.
6. Invert the bottle, tap it and check it for air bubbles. If there are bubbles, repeat the procedure from step 2 above. If it is necessary to refill the bottle, you must use a new cap.

7. If there are no bubbles present, tape the cap securely to the bottle with electrical tape. Wrap the tape in a clockwise direction looking down from the bottle top. Two rounds of electrical tape are needed. Do not forget to label each bottle with the well name, date, and time of sampling and the sequence number of each bottle as it was collected, one through five, in the order of collection.
8. Store bottles upside down until shipment. A bubble will form in most samples. This is normal.



Examples of properly and improperly sealed bottles



A. Good example. Very tiny bubble formed.
B. Poorly taped cap, air leak - note the large bubble that formed.
C. Cap taped with masking tape, poor seal and large air bubble formed.

Results of tests comparing CFC analyses of waters collected in ampoules and in bottles

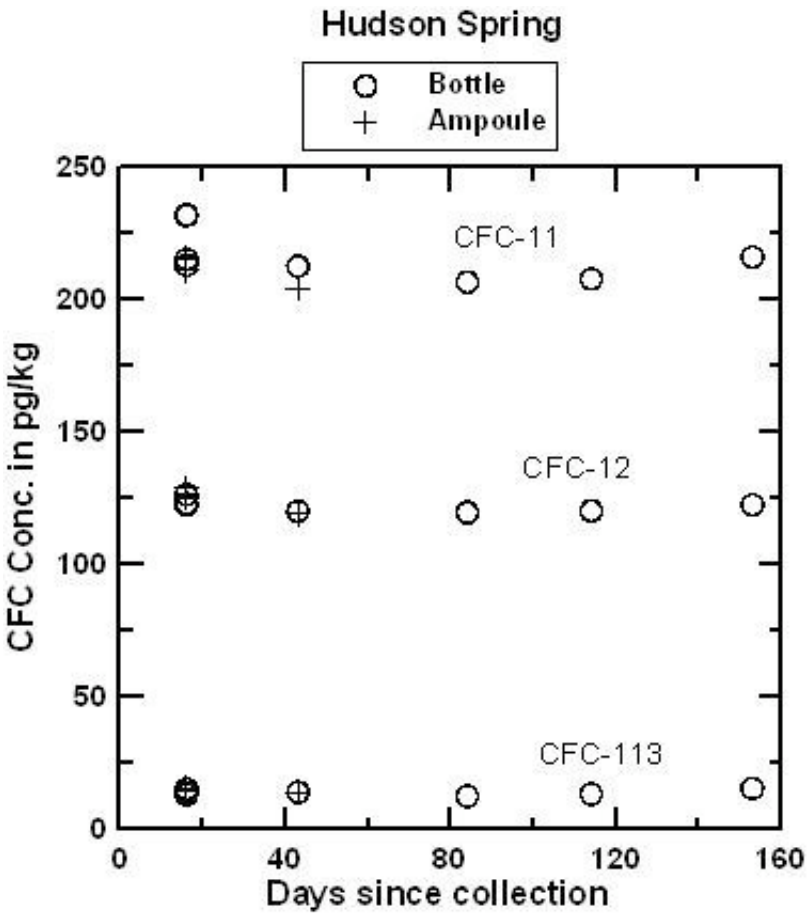
A large number of ampoules and bottles were collected from two sources--

(1) water from Hudson Spring which discharges from a limestone karst near the base of the Blue Ridge Mountains at Luray, Virginia, and

(2) water from a deep well in Coastal Plain sands near Milford, Virginia.

Hudson Spring has been sampled for CFCs and $^{3}H/^{3}He$ over a period of several years and has consistently yielded water with mid-1970s apparent age. Water from the Milford well was expected to be at or near the detection limit for all CFCs. The comparison of ampoules and bottles has continued for 153 days for water from Hudson Spring and 98 days for water from the Milford well. CFC concentrations in water from the Milford well were near or below the detection limit of 2 pg/kg in both ampoules and bottles. In a few cases, water from the Milford well contained detectible CFC-12 but pairs of ampoules and bottles agreed within ± 1 pg/kg in a range of 0 to 10 pg/kg (pre-1954 water). Apparently, there was some small variation in the CFC composition of water discharged from the well. CFC-113 was not detected in either ampoule or bottle, which eliminated the possibility of air contamination during storage. There was an

interference of an unknown VOC that gave the appearance of 4-5 pg/kg of CFC-11. Even with the trace interference. The interpreted apparent CFC-11 recharge date was be pre-1950 for CFC-11 which is near the detection limit of the dating method. The figures below compare concentrations of CFC-11, CFC-12, and CFC-113 measured in water from ampoules and bottles from Hudson Spring, as a function of storage time and as a function of collection time. The tests are being continued, but preliminary results indicate that blanks can be collected and stored using the bottle method. It is anticipated that water samples collected in bottles will be analyzed within 4 months of the date they are received at the Reston Chlorofluorocarbon Laboratory. Samples should be shipped promptly to the Reston Chlorofluorocarbon Laboratory following collection.



Plot comparing CFC-11, CFC-12 and CFC-113 concentrations in water from Hudson Spring analyzed after storage of more than 40 days in fused borosilicate ampoules and more than 150 days in glass bottles. In the apparent recharge age of the water. The small variations in CFC concentrations are equivalent to differences of less than 0.5 years. And as shown below, the small differences in likely reflect differences in concentrations in discharge from the spring over the period of collection of ampoules and bottles (several hours), rather than changes on storage.

APPENDIX H

USGS Reston Groundwater Dating Lab
Sulfur hexafluoride (SF_6) sampling method

SF_6 Sampling

The SF_6 mixing ratio in air and the solubility of this gas in water is low. A 15 cm^3 sample of air or unsaturated zone gas is needed for gas analysis. A minimum of a 1 liter of water is required to date groundwater with SF_6.

Bottle Ordering Information

A true 1-Liter sized, plastic safety coated, amber glass bottle with a polyseal cone lined cap is used.

Additional Bottle Info and Pictures

You can order these 1-Liter plastic coated bottles from Qorpak Inc. at 1-800-922-7558. Catalog number GLA-00959 is for a case of 12 bottles or catalog number GLA-00958 is for a case of 30 bottles. Alternately, if coated bottles are unavailable, uncoated bottles can be used. Uncoated bottles do not ship as well as the plastic coated bottles. SF_6 bottles can be under pressure caused by the water warming up and expanding. Use of uncoated bottles is not recommended but will not cause any chemical or sampling problems. Breakage in shipping may be higher with uncoated bottles, pack them extra well for shipping. Uncoated bottles are available under Qorpak Inc stock number GLA-00903. The same cap fits either the coated or uncoated bottle.

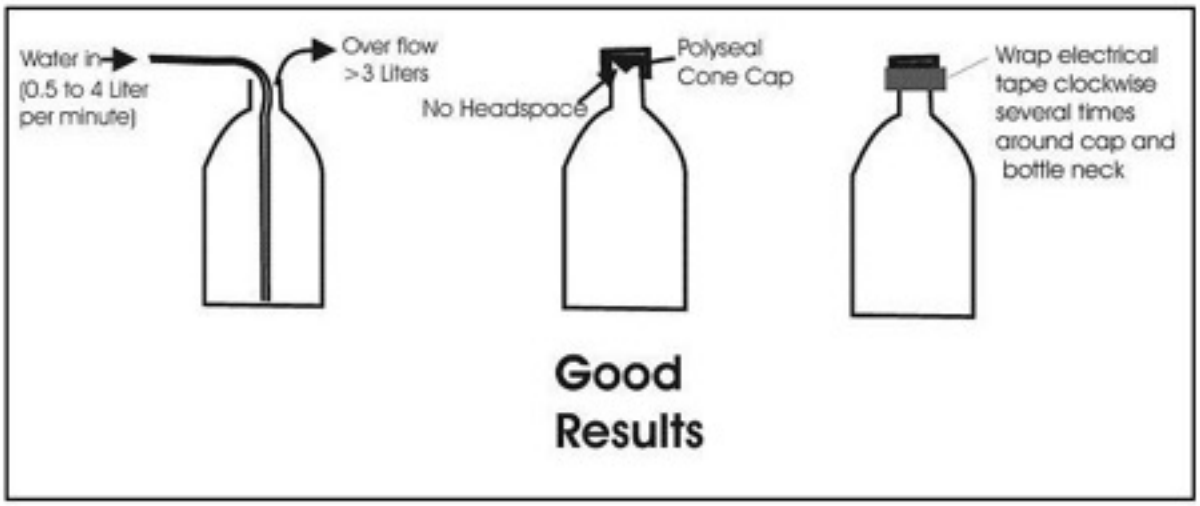
The caps can be ordered from Brad-Pak Enterprises at 908-233-1234. Catalog number CPS-33E-B-PC-PS is a 33-430 size polyseal cone lined cap which fits the bottle.

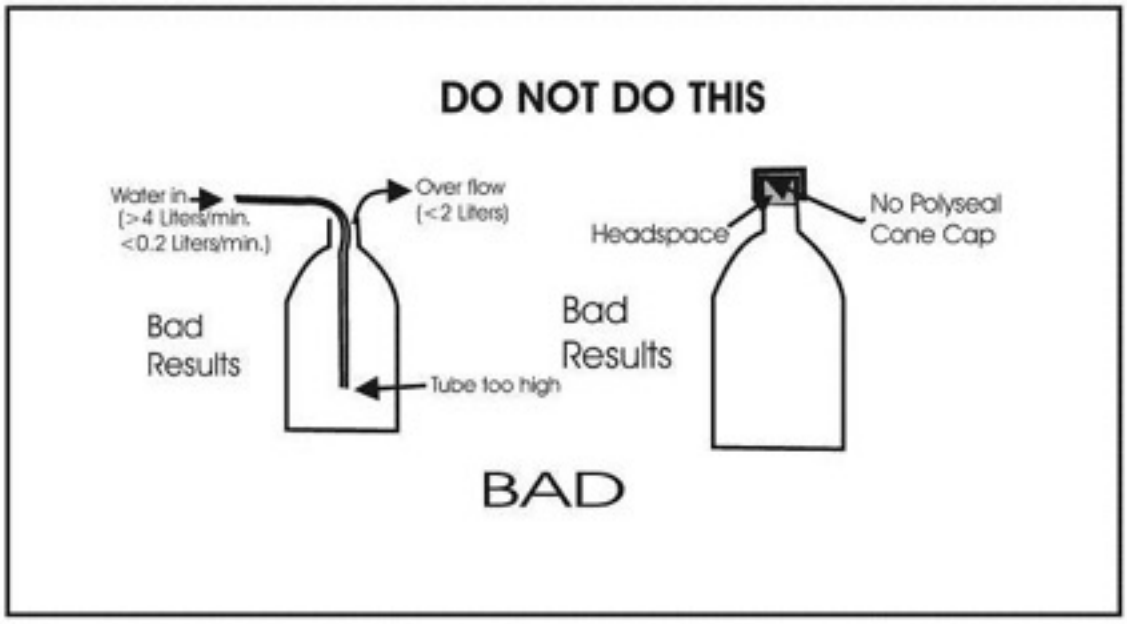
Field Collection of SF_6 Water Samples

The filling and capping procedure for SF_6 is done in the open atmosphere. Do not submerge the bottle and cap combination in a bucket for filling and capping. It is important that water NOT enter the area behind the cone seal in the cap. The area behind the cone seal allows the water to expand as it warms up without breaking the bottle.

1. Purge the well according to the USGS National Field Manual.
2. Place tubing from pump in the bottom of 1L bottle Additional Bottle Info and Pictures
3. Fill bottle and allow it to overflow from the neck. Allow three total liters of sample water to flow through the bottle with the tubing at the bottom of the bottle.
4. Slowly remove tubing from the bottle while water is still over flowing
5. Cap bottle tightly (do not leave any headspace) and tape cap in a clockwise direction with high quality electrical or similar tape.
6. Collect two bottles per site. Label each bottle with the environmental sample collection time and a sequence number in the order it was collected, 1-2.
7. Keep bottles in a cooler and not in the sun. If the bottles heat up excessively, the water will expand and may crack the bottle. Store samples at room temperature (23C) before shipping. Shipping on ice with other samples is acceptable but not necessary. Keep in mind that shipping in the summer will require ice to keep the bottles from warming excessively.

SF6 Sampling Prodedure





Gas Sampling Procedures

Gas samples can be collected in stainless steel cylinders that are equipped with inflow and outflow stainless-steel bellows valves. This design allows the cylinders to be flushed by the pumped air stream. The procedures that are used to collect gas samples in stainless steel cylinders are described in detail by Busenberg et al. (1991) and Thompson et al. (1985). The cylinders were filled in the laboratory with ultra-pure SF_6-free N_2. The N_2 in the cylinders is released prior to sampling by opening the outflow valves. The inflow valves are then opened to allow air flow through the cylinders for several minutes to purge the N_2. After the cylinders are completely flushed with air, the outflow valve is closed and pumping continues to pressurize the cylinder to about 2 atmospheres before closing the inflow valve.
Gas samples can also be collected in 100 mL borosilicate glass ampoules using procedures developed for sampling for CFCs (Busenberg and Plummer, 1992). The gas samples are heat-sealed in borosilicate glass ampoules with a torch.

Other Considerations

Shelf Life of SF_6 Samples

No changes in concentrations of SF_6 were observed after storage of 3 months.

Modification of SF_6 by Microbial Activity

No perceptible degradation of SF_6 was observed in highly reducing waters.

Unsaturated Zone Processes

When the unsaturated zone is relatively thin, the unsaturated-zone air composition tracks that of the troposphere (Oster et al., 1996). It is reasonable to assume unsaturated-zone SF_6 concentrations closely track tropospheric concentrations to unsaturated zone depths of less than 10 m (Weeks et al., 1982; Busenberg et al., 1993), in deeper unsaturated zones, there is a lag time for diffusive transport of SF_6 through the unsaturated zone. The time lag is largely a function of the

tracer diffusion coefficients, tracer solubility in water, and soil water content (Weeks et al., 1982; Cook and Solomon, 1995).

Dissolved Gases in Ground Water

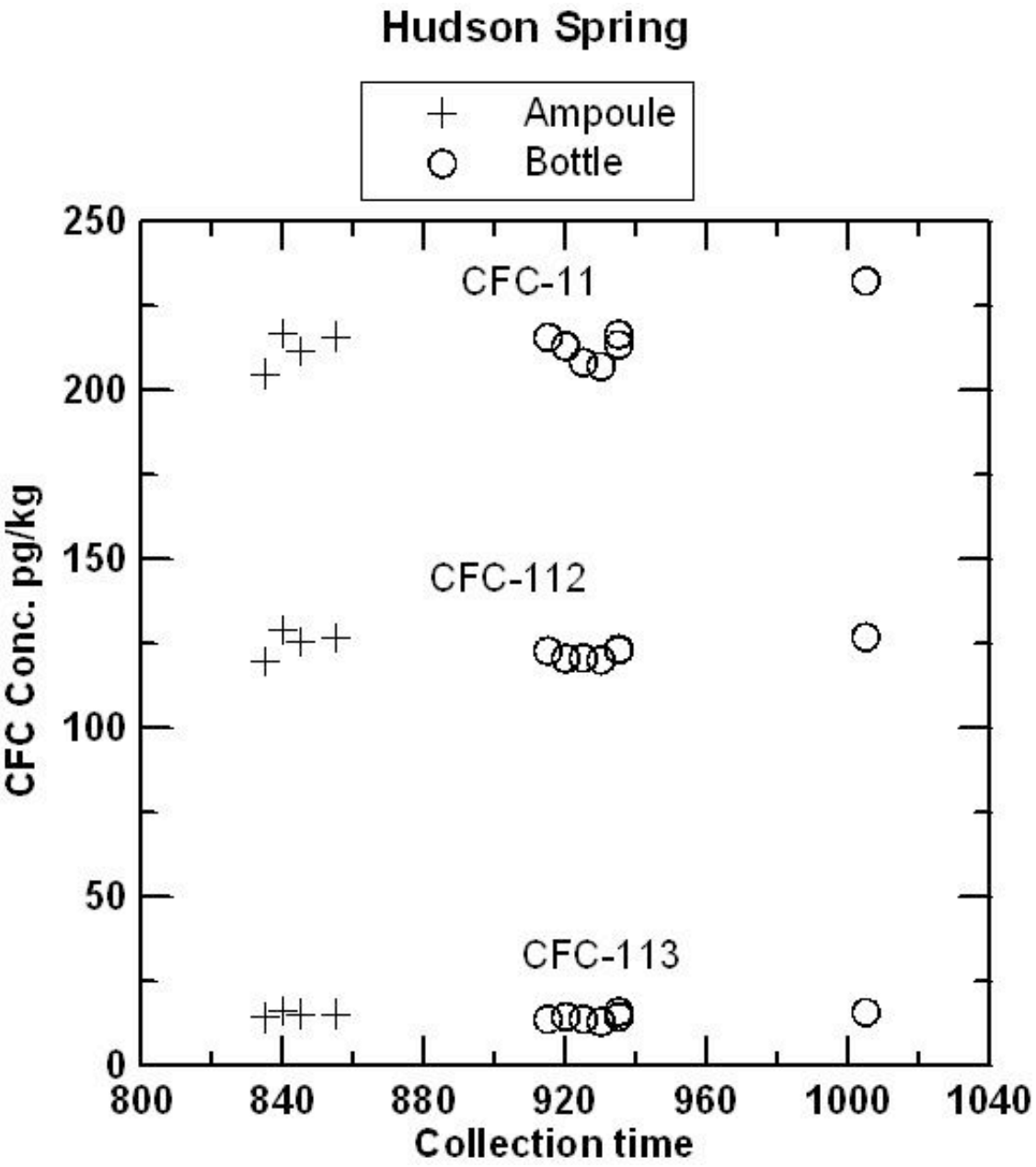
It is recommended that some dissolved gas analyses be performed to determine the recharge temperature and the amount of *excess air* present in the ground waters. This can be done by submitting samples to the N_2 / Ar dissolved gas lab.

Recharge Temperature

Uncertainty in recharge temperature of 1 to 2°C introduces no significant error in the SF_6 model ground water age (±0.5 year) because of the rapid increase in the atmospheric mixing ratio of SF_6 of about 7 % per year (Geller et al., 1997).

Excess Air

Excess air is introduced into ground water when air bubbles dissolve during a rapid rise of the water table. The addition of excess air to ground water increases the SF_6 concentration of the groundwater above the air-water equilibrium concentration. If the presence of excess air is not considered in the calculation of an SF_6 model age, then the apparent age will be too young. If the excess air present in the ground water was not known, and was underestimated by one cm^3/kg of water at STP for typical U.S. ground waters, the age of the ground water will be under estimated by 1 to 2.5 years. In all cases, the error in the apparent date of recharge was higher for the waters that were recharged at the higher temperature. Excess air concentrations of 0 to about 2 cm^3/liter were found from N_2-Ar measurements on shallow groundwater recharged by aerial infiltration through sandy soils, however, concentrations as high as 10 cm^3/liter can be found in ground waters from some semi-arid regions.



Comparison of CFC-11, CFC-12, and CFC-113 measured in ampoules and bottles plotted in sequence of field collection. The plot suggests that at least some of the very small variations observed represent real variations in water composition discharging from the spring, rather than changes occurring during storage.

Photos