Please indicate County where your project is located here:

MAIL FORM AND ATTACHMENTS TO:
State Water Resources Control Board
DIVISION OF WATER RIGHTS
P.O. Box 2000, Sacramento, CA 95812-2000
Tel: (916) 341-5300 Fax: (916) 341-5400
http://www.waterboards.ca.gov/waterrights

STATE WATER RESOURCES CONTROL BOARD
2013 JUN 21 PM 3:29
DIV OF WATER RIGHTS SACRAMENTO

PETITION FOR CHANGE

Separate petitions are required for each water right. Mark all areas that apply to your proposed change(s). Incomplete forms may not be accepted. Location and area information must be provided on maps in accordance with established requirements. (Cal. Code Regs., tit. 23, § 715 et seq.) Provide attachments if necessary.

☒ **Point of Diversion** Wat. Code, § 1701
☐ **Point of Rediversion** Cal. Code Regs., tit. 23, § 791(e)
☒ **Place of Use** Wat. Code, § 1701
☒ **Purpose of Use** Wat. Code, § 1701
☐ **Distribution of Storage** Cal. Code Regs., tit. 23, § 791(e)
☐ **Temporary Urgency** Wat. Code, § 1435
☒ **Instream Flow Dedication** Wat. Code, § 1707
☐ **Waste Water** Wat. Code, § 1211
☐ **Split** Cal. Code Regs., tit. 23, § 836
☐ **Terms or Conditions** Cal. Code Regs., tit. 23, § 791(e)
☒ **Other** See Attachment 1

Application 30497B Permit License 13868 Statement

I (we) hereby petition for change(s) noted above and described as follows:

Point of Diversion or Rediversion – Provide source name and identify points using both Public Land Survey System descriptions to ¼-¼ level and California Coordinate System (NAD 83).

Present: See Attachment 3

Proposed: See Attachment 3

Place of Use – Identify area using Public Land Survey System descriptions to ¼-¼ level; for irrigation, list number of acres irrigated.

Present: See Attachment 4

Proposed: See Attachment 4

Purpose of Use

Present: See Attachment 5

Proposed: See Attachment 5

Split

Provide the names, addresses, and phone numbers for all proposed water right holders.

In addition, provide a separate sheet with a table describing how the water right will be split between the water right holders: for each party list amount by direct diversion and/or storage, season of diversion, maximum annual amount, maximum diversion to offstream storage, point(s) of diversion, place(s) of use, and purpose(s) of use. Maps showing the point(s) of diversion and place of use for each party should be provided.

Distribution of Storage

Present: not applicable

Proposed: not applicable

Temporary Urgency
This temporary urgency change will be effective from [not applicable] to [ ].

Include an attachment that describes the urgent need that is the basis of the temporary urgency change and whether the change will result in injury to any lawful user of water or have unreasonable effects on fish, wildlife or instream uses.

Instream Flow Dedication – Provide source name and identify points using both Public Land Survey System descriptions to ¼-¼ level and California Coordinate System (NAD 83).

Upstream Location: See Attachment 6

Downstream Location: See Attachment 6

List the quantities dedicated to instream flow in either: ☒ cubic feet per second or ☐ gallons per day:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.02	0.02	0.03	0.05	0.07	0.08	0.08	0.08	0.07	0.06	0.04	0.03

Will the dedicated flow be diverted for consumptive use at a downstream location? ○ Yes ◉ No
If yes, provide the source name, location coordinates, and the quantities of flow that will be diverted from the stream.

not applicable

Waste Water
If applicable, provide the reduction in amount of treated waste water discharged in cubic feet per second.

Will this change involve water provided by a water service contract which prohibits your exclusive right to this treated waste water? ○ Yes ◉ No

Will any legal user of the treated waste water discharged be affected? ○ Yes ◉ No

General Information – For all Petitions, provide the following information, if applicable to your proposed change(s).

Will any current Point of Diversion, Point of Storage, or Place of Use be abandoned? ○ Yes ◉ No

I (we) have access to the proposed point of diversion or control the proposed place of use by virtue of:
☐ ownership ☐ lease ☐ verbal agreement ☐ written agreement

If by lease or agreement, state name and address of person(s) from whom access has been obtained.

See Attachment 7

Give name and address of any person(s) taking water from the stream between the present point of diversion or rediversion and the proposed point of diversion or rediversion, as well as any other person(s) known to you who may be affected by the proposed change.

See SWRCB Records

All Right Holders Must Sign This Form: I (we) declare under penalty of perjury that this change does not involve an increase in the amount of the appropriation or the season of diversion, and that the above is true and correct to the best of my (our) knowledge and belief. Dated June 21, 2013 at Sacramento, California.

Right Holder or Authorized Agent Signature

Right Holder or Authorized Agent Signature

NOTE: All petitions must be accompanied by:
(1) the form Environmental Information for Petitions, including required attachments, available at: http://www.waterboards.ca.gov/waterrights/publications_forms/forms/docs/pet_info.pdf
(2) Division of Water Rights fee, per the Water Rights Fee Schedule, available at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/fees/
(3) Department of Fish and Wildlife fee of $850 (Pub. Resources Code, § 10005)

Attachment 1
Request to Split License 13868 into License 13868A and License 13868B

Licensees request that License 13868 be split into two licenses, which will be denominated License 13868A and License 13868B, and, when issued, will supersede License 13868. At this time, licensees are not requesting any changes in the water right holders, so Licensees request that Clint Eastwood and Margaret Eastwood Trust be listed as the owners of License 13868A and of License 13868B.

The maximum authorized annual diversion rate in License 13868 is 131.8 af/yr. Licensees request that 85.6 af/yr of this total amount be allocated to License 13868A. This requested annual amount equals the total annual estimated evapotranspiration from applied water (ET_{AW}) that is occurring with the current diversions and irrigation use of water under License 13868. (See April 15, 2013 Davids Engineering Technical Memorandum, "Odello Ranch Crop ET and ET of Applied Water Estimates," p. 27, Table 11, copy in Attachment 2.) Licensees request that the remaining 46.2 af/yr of this annual amount be allocated to License 13868B.

The maximum authorized instantaneous diversion rate in License 13868 is 0.45 cfs. Licensees request that 0.37 cfs of this amount be allocated to License 13868A and that 0.08 cfs be allocated to License 13868B. (The monthly flow rates for License 13868B are specified in the table on page 2 of the petition. They all are less than or equal to 0.08 cfs.) Licensees request that the authorized diversion season for License 13868A be January 1 through December 31, which is the authorized diversion season for License 13868.

For License 13868A, licensees request that: (a) the authorized points of diversion be those listed in Attachment 3 under "Proposed Points of Diversion"; (b) the authorized place of use be that described in Attachment 4 under "Proposed Place of Use"; and (c) the authorized purposes of use be those described in Attachment 5 under "Proposed Purposes of Use."

License 13868 currently contains the following term:

> This license is senior to Permits 20808A, 20808B, and 20808C (and any further division of Permit 20808) of the [Monterey Peninsula Water Management] District, provided that the water diverted under this license is used only on lands located within the Carmel River watershed and the other provisions of Condition 10 of Decision 1632 are complied with. Any priority obtained for this license by virtue of Condition 10 of Decision 1632 shall be void for the amount of water under this license which is used on lands outside the Carmel River watershed.
>
> (0420999)

Because the proposed authorized place of use for License 13868A includes the part of the City of Carmel that is located outside the Carmel River watershed, an accounting of the water that will be diverted under License 13868A for use within and outside the Carmel River watershed is necessary. Licensees therefore request that the following new term be included License 13868A, and that it immediately follow term 0420999:

> Licensee shall maintain separate monthly accountings of the amounts of water that are diverted under this license and used within and outside the Carmel River watershed and shall include reports of these accountings with Licensee's periodic reports to the State Water Board of diversions and use under this license. Licensee also shall provide the results of these accountings to the State Water Board whenever requested by the State Water Board.

For License 13868B, the entire right will be dedicated to instream uses pursuant to Water Code section 1707. Consequently, there will be no authorized diversions. The requested monthly flow rates for this license are specified in the table on page 2 of the petition. The requested authorized place of use is the Carmel River (Subterranean Stream) and the requested authorized purposes of use are preserving and enhancing fish and wildlife resources and riparian vegetation. The requested upstream and downstream ends of the dedicated flow reach are specified in Attachment 6. Licensees intend that this dedication will support these instream uses in the Carmel River between the authorized points of diversion in License 13868 and the mouth of the Carmel River Lagoon.

Attachment 2
Davids Engineering Technical Memorandum

See attached Technical Memorandum, dated April 15, 2013, regarding "Odello Ranch Crop ET and ET of Applied Water Estimates."

Specialists in Agricultural Water Management
Serving Stewards of Water in the West since 1993

Technical Memorandum

To: Macaulay Water Resources

From: Davids Engineering

Date: April 15, 2013

Subject: **Odello Ranch Crop ET and ET of Applied Water Estimates**

Overview and Results

This memorandum provides a summary of activities conducted to develop estimates of long-term crop evapotranspiration (ET) and ET of applied water (ET_{aw}) estimates for the Odello Ranch in Carmel, California (Latitude 36.5343 N, Longitude 121.9072 W, Elevation 25 ft). The work included the following:

- Site Reconnaissance
- Preparation of Weather Data for ET Calculations
- Application of a Daily Root Zone Water Balance Model over the 26-year Period from January 1, 1987 to December 31, 2012 to Calculate ET and ET_{aw} under Current and Future Management

The Odello Ranch is located immediately east of Highway 1 and south of the Carmel River. Irrigated pasture has or will be established on approximately 40.6 acres at the Ranch[1]. Based on discussion with owner representatives, the pasture will be divided into six, approximately equally-sized paddocks and rotational grazing of cattle will be implemented. Irrigation will be accomplished using above-ground solid-set sprinklers supplied by a groundwater well located at the Ranch.

Annual crop (pasture) ET_{aw} varies between approximately 60.7 and 98.9 acre-feet, and averages 85.6 acre-feet, over the period of analysis. Annual applied water varies between approximately 91.9 and 131.8 acre-feet and averages approximately 124.0 acre-feet.

Site Reconnaissance

A site visit was conducted on February 27, 2013 to discuss irrigation and grazing management practices with owner representatives, to inspect the irrigation well and sprinkler system, and to characterize the pasture and soils. Additionally, local California Irrigation Management Information System (CIMIS) weather stations used to estimate crop ET rates were visited to evaluate station conditions and possible issues affecting the estimation of ET rates for the Ranch. The weather stations are discussed in a subsequent section.

[1] The approximate irrigated area was delineated in a geographic information system (GIS) based on aerial imagery and discussion with the owner representative. The estimated irrigated area represents a gross area of 41.08 acres, minus an estimated 0.48 acres of farm roads.

Irrigation and Grazing Practices

Irrigation and grazing practices have been developed to ensure long term productivity and sustainability of the pasture to support rotational grazing of cattle. Implications of this objective are that irrigation must be managed to prevent crop water stress through under-irrigation, and grazing must be managed to avoid overgrazing and deterioration of the pasture stand. To that end, the current plan is to divide the pasture into six, approximately seven-acre paddocks. Approximately 20 cow-calf pairs will be rotated from one paddock to the next every week, resulting in a total grazing cycle of 42 days, providing 35 days of pasture re-growth between grazings. Grazing will occur from approximately February through November. While the stocking rate, rotation duration, and overall grazing period may be refined over time based on field observations to maintain optimal pasture conditions, it is not expected that such refinements will change the estimates of applied water, ET and ET_{aw} that are discussed in this memorandum.

Irrigation Well

Water for irrigation is supplied by a submersible well located south of the Carmel River, approximately 300 yards east of Highway 1. The well was constructed in approximately 2000 and provides approximately 500 gallons per minute (gpm), according to owner representatives. Pumpage is measured using a propeller meter installed downstream of the well discharge. The well was not operating at the time of the site visit.

Sprinkler Irrigation System

Water pumped at the well is conveyed via a combination of steel and PVC 6-inch diameter mainline to 6-inch diameter aluminum sprinkler mainline pipe with ring-lock coupling and 4-inch risers. The mainline is laid along the north edge of the field in 40-foot lengths. Aluminum lateral lines of 3-inch diameter and 30-foot length run south from each mainline into the field. Each 30-foot lateral pipe includes an 18-inch riser and Buckner 17023W full-circle impact sprinkler with a 7/64-inch nozzle diameter.

Based on an assumed operating pressure of 45 pounds per square inch (psi), each sprinkler head discharges approximately 2.3 gpm, resulting in a water application rate of approximately 0.19 inches per hour.

For a given paddock, the sprinklers will be removed prior to grazing to avoid damage by the cattle and reinstalled immediately following grazing to allow for irrigation to support pasture re-growth prior to the next grazing.

Pasture

The pasture consists of a mixture of perennial grasses and clover and was planted in the latter half of 2012. At the time of the site visit, the grasses were at full cover and relatively tall, ranging from an average of approximately 16 inches at the west end of the field to 26 inches at the east end of the field. Root depths estimated based on soil sampling (described below) were approximately 2 to 3 feet. Photos of pasture conditions during the site visit February 27, 2013 are provided in Figure 1.

Figure 1. Odello Ranch Pasture, February 27, 2013.

Soils

According to the USDA Natural Resources Conservation Service (NRCS, formerly Soil Conservation Service) soil survey of Monterey County, California (Cook, 1978), the pasture area consists primarily of Pico Fine Sandy Loam (Map Unit Symbol "Pf") (Figure 2). Soil samples were collected to a depth of four feet to verify available soils data at three locations spanning the area from west to east, as shown in the Figure.

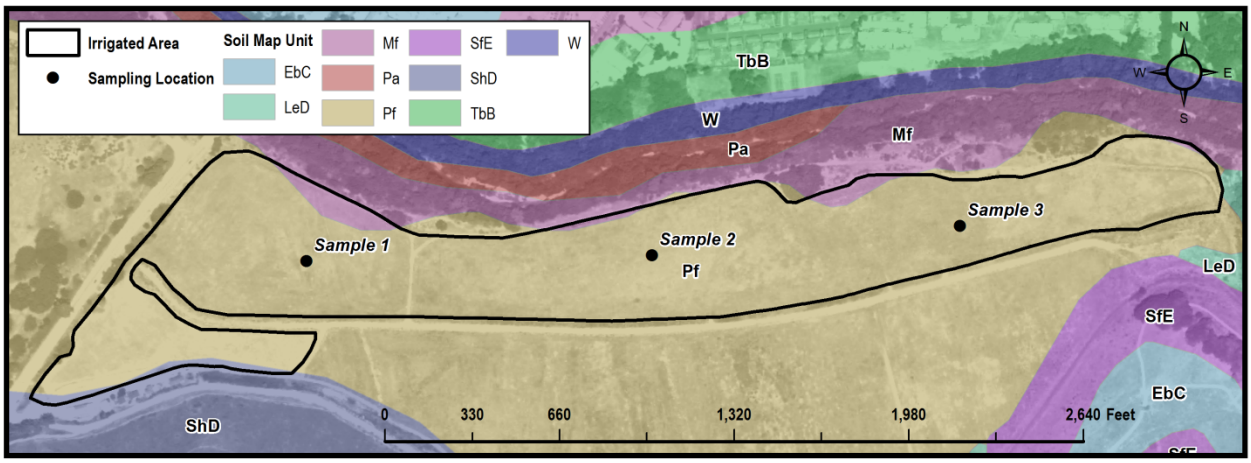

Figure 2. Odello Ranch Irrigated Area Soil Map Units and Sampling Locations.

Pf is described in the soil survey as follows:

> *The Pico series consists of well drained soils that formed on flood plains in alluvium derived from sedimentary rocks. Slopes are 0 to 2 percent….*
>
> *In a representative profile, the surface layer is grayish brown, mildly alkaline and moderately alkaline fine sandy loam about 18 inches thick. The underlying material is light brownish gray and pale brown, strongly calcareous stratified fine sandy loam, silty clay loam, sandy loam, very fine sandy loam, and sand that extends to a depth of 72 inches or more.*
>
> *Permeability is moderately rapid, and the available water capacity is 7.5 to 9 inches. Roots penetrate to a depth of more than 60 inches….*
>
> ***Pf—Pico fine sandy loam.** This is a nearly level soil on flood plains. It has the profile described as representative of the series….*

A summary of observed soil textures based on soil sampling at the three locations shown in Figure 2 is provided in Table 1. In general, the observed soil textures are consistent with the soil survey. Soil

hydraulic parameters and classifications reported by the soil survey are suitable for estimation of crop ET and ET_{aw}.

Preparation of Weather Data for ET Calculations

In order to estimate long term crop ET and ET_{aw} under planned irrigation and grazing management practices, a daily root zone water balance model was parameterized and applied based on historical hydrologic information (i.e., atmospheric water demand and precipitation) for the 26-year period from January 1, 1987 to December 31, 2012. Primary drivers of the ET and ET_{aw} estimates are reference ET (ET_o), an estimate of atmospheric water demand; basal crop coefficients (K_{cb}) for pasture, as influenced by irrigation and grazing practices; and precipitation, in addition to soil characteristics. This section describes the development of estimates of daily weather parameters used to calculate ET_o and to estimate precipitation at the Odello Ranch for the 26-year period from 1987 through 2012.

Table 1. Summary of Observed Soil Textures at Sampling Locations.

Location	Latitude/ Longitude	Depth (ft)	Observed Texture
1	36.5342 N / 121.9121 W	0 - 1	Loam
		1 - 2	Fine Sandy Loam
		2 - 3	Fine Sandy Loam
		3 - 4	Fine Sandy Loam
2	36.5343 N / 121.9077 W	0 - 1	Fine Sandy Loam
		1 - 2	Fine Sandy Loam
		2 - 3	Fine Sandy Loam
		3 - 4	Fine Sandy Loam
3	36.5347 N / 121.9037 W	0 - 1	Fine Sandy Loam
		1 - 2	Sandy Loam
		2 - 3	Sand
		3 - 4	Sand

ET_o was calculated using the American Society of Civil Engineers Standardized Reference ET Equation for a short reference crop (ET_{os}, i.e., grass) (Allen et al., 2005), which is consistent with the United Nations Food and Agricultural Organization Irrigation and Drainage Paper 56 Equation for ET_o (Allen et al, 1998). The equation represents a national and international standard for the estimation of ET_o.

Precipitation for the period 2009 to 2012 was estimated directly based on data recorded by the rain gage at the CIMIS station at Carmel. Data for the period 1987 to 2008 were estimated based on linear regression with the Global Historical Climatology Network (GHCN) station at Monterey (Station ID GHCND:USC00045795), established in 1906. The Monterey GHCN station was selected based on its proximity to the Ranch and the availability of data for the full analysis period.

Station Descriptions and Site Characteristics

Carmel and Castroville CIMIS

The primary weather station selected for the analysis is the Carmel CIMIS station (CIMIS Station No. 210), located approximately 1.4 miles ENE of the Ranch at the Rancho Cañada golf course. According to

the California Department of Water Resources (DWR), the station was activated July 22, 2008[2]; however, data are not available prior to October 24, 2008.

In order to develop long-term ET and ETaw estimated for the Ranch, a correlation was developed between ET_o at the Carmel CIMIS station and the Castroville CIMIS station (CIMIS Station No. 19), located approximately 17.7 miles NNE of the Ranch in an agricultural area. The Castroville station was activated November 18, 1982 and was selected based on its long available weather record, proximity to the Carmel CIMIS station, and similar distance from the Pacific Ocean.

Siting Characteristics

According to CIMIS and ASCE guidelines, weather stations should be sited within relatively large, level areas with well-watered, uniform vegetation cover similar to the reference surface that the ET_o calculation is meant to represent. Generally, obstructions affecting airflow upwind of the site should be at least 100 yards (300 feet) from the sensors or 10 times the height of the obstruction.

For each selected CIMIS weather station, site conditions were inspected, and factors to be considered when using the site records to estimate ET_o for the Ranch were evaluated.

Carmel CIMIS

The Carmel CIMIS station is located at the Rancho Cañada golf course, approximately 1.4 miles ENE of the Ranch (Latitude 36.5409 N, Longitude 121.8821 W, Elevation 66 ft). A map of the station location is shown in Figure 3. Photos of the station and its surroundings, taken February 27, 2013, are provided in Figure 4.

As shown in Figure 4 and Figure 3, the station is sited on well-maintained, clipped grass; however, obstructions possibly affecting airflow at the site exist within 300 feet, including the following:

- Maintenance building 105 feet to the northeast,
- Residential fence 125 feet to the east,
- Large tree 85 feet to the southwest,
- Golf course weather station with tall chain link fence 70 feet to the west,
- Tall trees 155 feet to the west, and
- Wall 90 feet to the northwest

A wind rose showing the direction and magnitude of hourly wind speed measured at the site between January 1, 2010 and December 31, 2012 indicates that the predominant wind direction is from the northwest, west southwest, and west (Figure 5). Based on nearby obstacles to airflow, the anemometer at the site may be underestimating wind speed, as compared to a situation where no obstacles were present. In particular, it appears that the two large trees to the west and relatively tall fence of the golf course weather station may be resulting in underestimation of wind speed.

Obstacles at the site potentially affecting wind speed measurement are not expected to substantially affect the measurement of incoming solar radiation, temperature, or relative humidity, the other weather parameters used in the calculation of ET_o. In particular, the close proximity of the Pacific Ocean and resulting dominant influence of the marine layer during most days of the year on these parameters likely compensates for potential limitations in site characteristics resulting from limited fetch.

Underestimation of wind speed at the Carmel CIMIS station relative to ideal site conditions may lead to underestimation of ET_o representative of the Odello Ranch.

[2] Listed activation date at CIMIS website (wwwcimis.water.ca.gov).

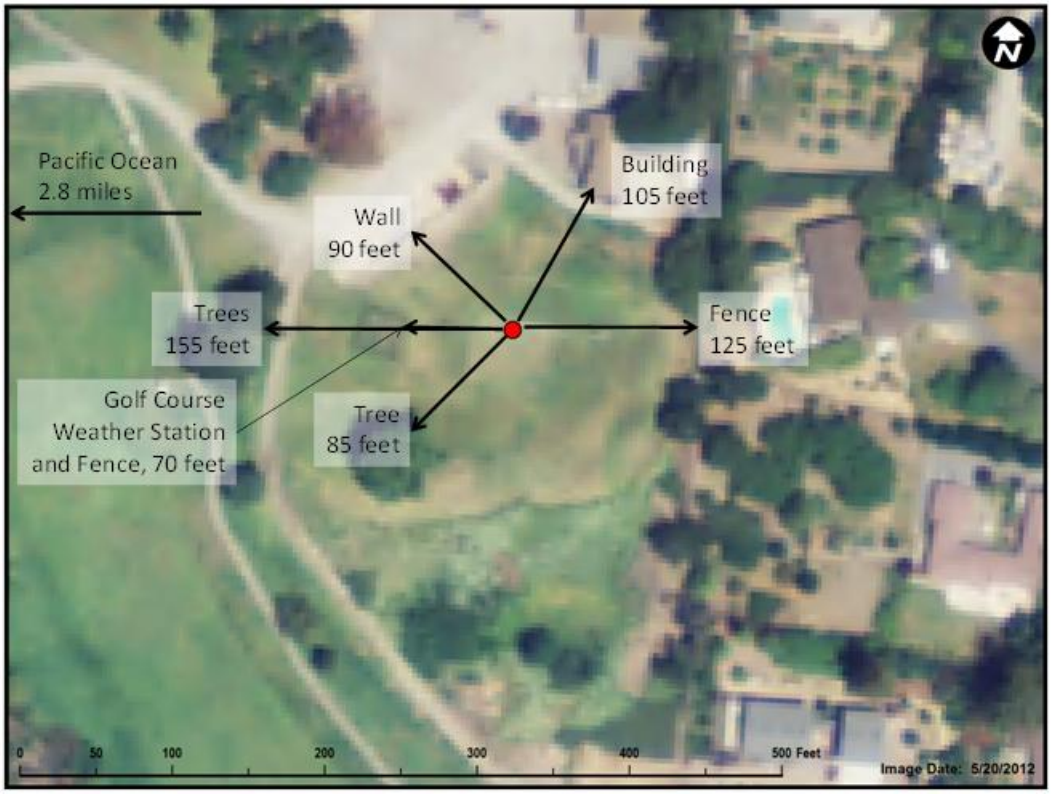

Figure 3. Carmel CIMIS Station Location and Surroundings.

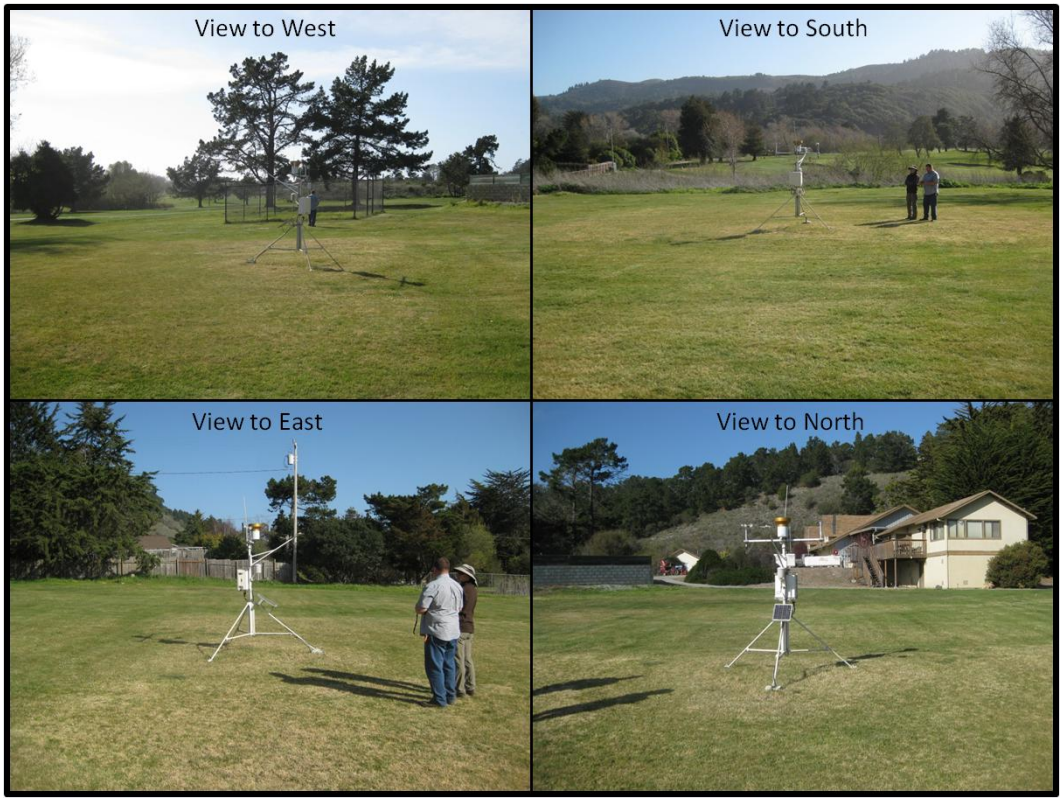

Figure 4. Carmel CIMIS Station Surroundings.

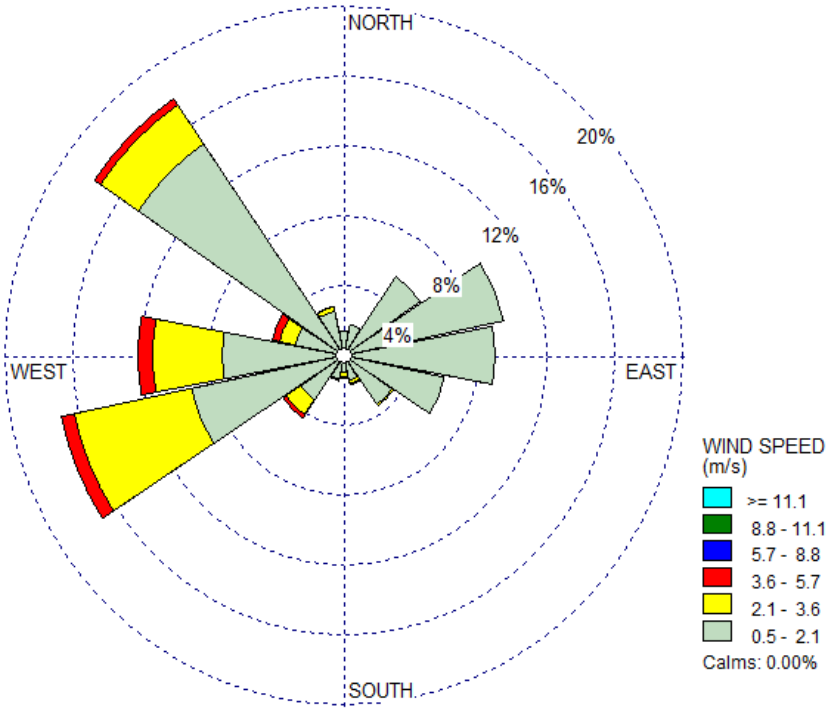

Figure 5. Carmel CIMIS Hourly Wind Rose, January 2010 through December 2012.

Castroville CIMIS

The Castroville CIMIS station is located in an agricultural area, approximately 0.6 miles west of Castroville (Latitude 36.7682 N, Longitude 121.7738 W, Elevation 9 ft). A map of the station location is shown in Figure 6. Photos of the station and its surroundings, taken February 27, 2013, are provided in Figure 7.

As shown in Figure 7 and Figure 6, the station is sited on a small area of poorly maintained grass. At the time of the field visit (and aerial image), an artichoke field was located immediately south of the station, with farm roads, a drain ditch, and an open agricultural field immediately north of the station. Conditions are similar to the east and west of the site.

There are no large obstructions in the immediate vicinity of the site, suggesting that wind speed measurements are not biased as may be the case for the Carmel CIMIS station. Additionally, the lack of well-watered, uniform vegetation cover similar to grass surrounding the site is not expected to substantially affect the measurement of incoming solar radiation, temperature, or relative humidity. In particular, the close proximity of the Pacific Ocean and resulting dominant influence of the marine layer during most days of the year on these parameters likely compensates for potential limitations in site characteristics.

A wind rose showing the direction and magnitude of hourly wind speed measured at the site between January 1, 2010 and December 31, 2012 indicates that the predominant wind direction is from the west, west, west southwest, and northwest (Figure 8), similar to the Carmel CIMIS site and reflecting the dominance of onshore wind from the Ocean. The wind speed at the site is significantly greater than for the Carmel CIMIS station.

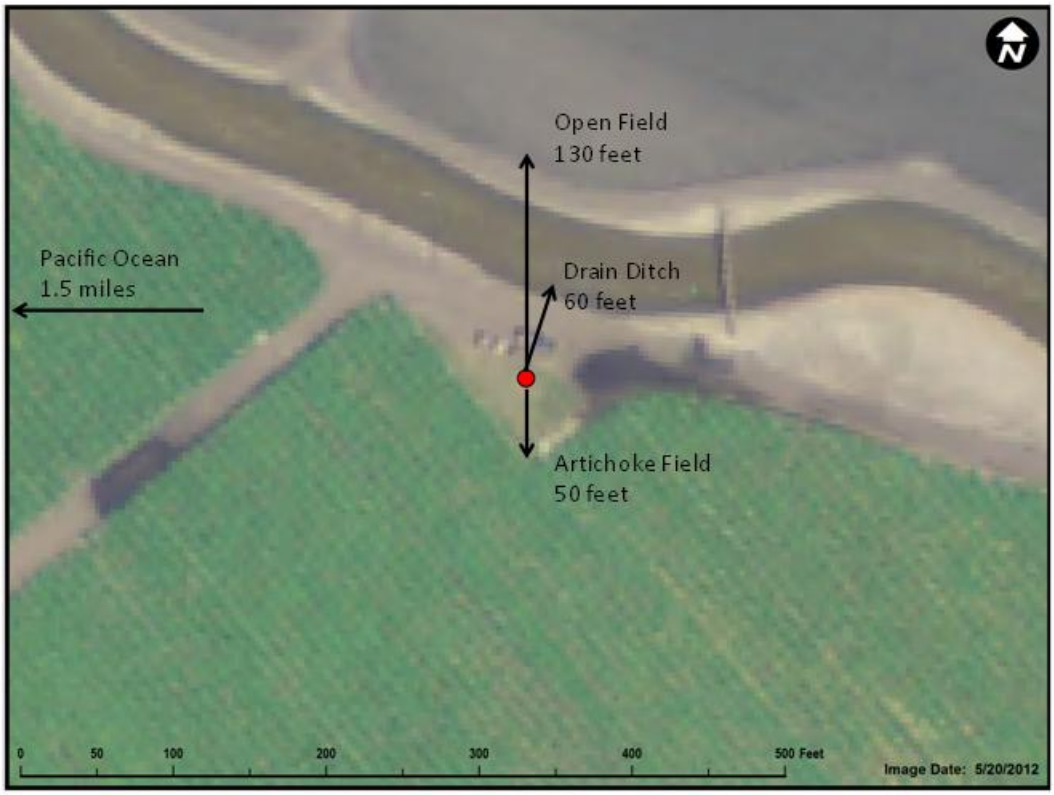

Figure 6. Castroville CIMIS Station Location and Surroundings.

Figure 7. Castroville CIMIS Station Surroundings.

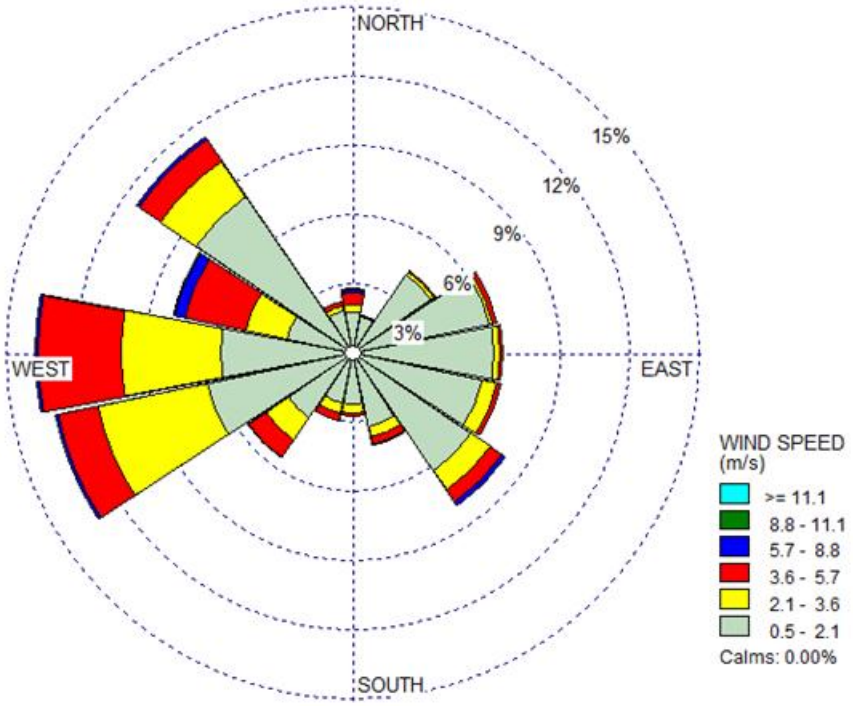

Figure 8. Castroville CIMIS Hourly Wind Rose, January 2010 through December 2012.

Site Maintenance

Both stations are maintained by CIMIS staff at the DWR South Central Division Office in Fresno. According to site maintenance personnel, site data are checked remotely each day, and the sites are inspected every four to six weeks. Some assistance is provided with maintenance of the Carmel CIMIS site by MPWMD. Sites inspection and maintenance practices include the following (Galyon, 2013):

- Check rain gage and clean as needed
- Check all four directions of wind vane
- Check anemometer (stop and confirm zero windspeed)
- Clean pyranometer and re-level as needed
- Pull out temperature/relative humidity sensor, clean, and replace as needed. The sensor is typically swapped out for recalibration annually.

Monterey GHCN

The Monterey GHCN station is located in Monterey (Latitude 36.5902 N, Longitude 121.9102 W, Elevation 385 feet), approximately 4 miles north of the Ranch. The station was established in 1906 and provides records of daily minimum and maximum temperature and precipitation. The station is operated and maintained by the National Weather Service (NWS).

Quality Control of Historical Data Used to Estimate Reference Evapotranspiration

Quality control procedures were applied to data used to estimate ET_o for each of the CIMIS weather stations based on the techniques described by Allen (1996), Snyder and Eching (2004), and Allen et al. (2005). The procedures applied are summarized as follows:

- Review weather station siting characteristics as related to estimation of ET_o
- Review of quality control flags assigned by CIMIS to the data and removal of records with missing values or for which estimated values are reported based on historical average conditions

- Solar radiation
    - Plot measurements of incoming solar radiation (R_s) against clear-sky solar radiation (R_{so}) for daily and hourly time steps.
    - Observe whether R_s reaches clear sky values some of the time, indicating proper sensor calibration.
    - For periods in which R_s routinely lies substantially above or below R_{so}, review hourly data for selected days. If review of hourly data supports the determination that the selected days were clear, adjust R_s for the period such that $R_s = R_{so}$ on the clearest days.
    - Following adjustment based on review of hourly data, if any daily values of Rs continue to exceed R_{so} (perhaps due to computational errors in determining daily Rs from hourly values), limit R_s on those days to R_{so}.
- Relative Humidity (RH)
    - Examine diurnal variation of hourly RH over time to verify that maximum and minimum values of RH occur at times of minimum and maximum temperature, respectively.
    - Identify RH values in excess of 100 percent, if any.
    - Identify prolonged periods where hourly maximum RH does not reach 95 to 100 percent. Adjust RH for the period such that maximum hourly values of RH approach 100 percent on the most humid days.
    - Identify minimum hourly RH values less than the one percentile historically observed value and adjust to the one percentile value[3].
- Air Temperature (T_{air})
    - Review daily air temperature values over time, and compare extreme values to nearby weather stations (e.g. NWS station at Monterey Peninsula Airport)
        - Adjust extreme values not supported by other nearby data through correlation to nearby stations.
    - Review hourly temperature data for days when the difference between average daily T_{air} calculated based on minimum and maximum hourly values differs by more than 3°C (5.4°F) from average daily T_{air} calculated based on hourly values.
    - Review hourly temperature data to confirm that minimum T_{air} tends to occur shortly before sunrise and that maximum T_{air} tends to occur in mid-afternoon.
- Wind Speed
    - Review daily wind speed over time, and identify periods of consistently low values, suggesting anemometer failure.
    - Calculate a gust factor (maximum hourly wind speed divided by mean daily wind speed) and review over time[4]. Increases in the gust factor suggest bearing friction. Seizing of the anemometer results in a gust factor of 1. Review hourly data for days with high or low gust factor.
    - Examine consistent wind speeds less than 2 miles per hour and flagged by CIMIS as being outside of historic range.
    - Replace suspect wind speed values with average historical values for the corresponding day of year.

[3] This approach is similar to that described by Eching and Snyder (2004), but avoids the assumption of a normal distribution.

[4] Ideally, the gust factor is calculated based on the maximum recorded instantaneous gust over the course of a day; however, this information is not provided by CIMIS for the Carmel and Castroville stations.

A summary of adjustments to historical weather data for the Carmel CIMIS station is provided in Table 2. A summary of adjustments to historical weather data for the Castroville CIMIS station is provided in Table 3. Samples of weather parameters for each station are provided in Appendix A for the 2009 to 2012 period. Daily R_s and RH values prior to and following adjustment are shown. Although a relatively large number of daily values were adjusted for R_s and RH, such adjustments are not atypical and are generally small. For air temperature, daily minimum, maximum, and average values are shown in Appendix A, along with the difference between average daily T_{air} calculated based on minimum and maximum hourly from average daily T_{air} calculated based on individual hourly values. Daily wind speed measurements and gust factors for each station are also provided.

For the Monterey GHCN station, temperature and precipitation records were reviewed to identify extreme values. For the approximately 26-year period of record for the station used in the analysis (1/1/1987 to 9/30/2012), two daily records were found to contain extreme values, most likely due to user entry error.

Table 2. Summary of Adjustments to Daily Weather Parameters for Carmel CIMIS Station, 2009 to 2012.

	Incoming Solar Radiation[1]			Relative Humidity[2]			Air Temperature			Wind Speed		
Year	No. of Records	No. of Records Adjusted	Percent Adjusted	No. of Records	No. of Records Adjusted	Percent Adjusted	No. of Records	No. of Records Adjusted	Percent Adjusted	No. of Records	No. of Records Adjusted	Percent Adjusted
2009	361	266	74%	339	339	100%	341	0	0%	364	0	0%
2010	361	123	34%	343	343	100%	351	0	0%	365	0	0%
2011	365	12	3%	361	361	100%	361	0	0%	365	0	0%
2012	364	4	1%	344	344	100%	357	0	0%	365	0	0%
Overall	1,451	405	28%	1,387	1,387	100%	1,410	0	0%	1,459	0	0%

1. Adjustments to solar radiation, when warranted, are typically relatively small adjustments applied over a series of months.
2. Adjustments to minimum and maximum relative humidity were applied over extended periods of time. For the analysis presented herein, minimum and maximum relative humidity were increased between one and three percent based on review of daily maximum realtive humidity values over time.

Table 3. Summary of Adjustments to Daily Weather Parameters for Castroville CIMIS Station, 1987 to 2012.

	Incoming Solar Radiation[1]			Relative Humidity[2]			Air Temperature			Wind Speed		
Year	No. of Records	No. of Records Adjusted	Percent Adjusted	No. of Records	No. of Records Adjusted	Percent Adjusted	No. of Records	No. of Records Adjusted	Percent Adjusted	No. of Records	No. of Records Adjusted	Percent Adjusted
1987	361	229	63%	361	315	87%	361	0	0%	362	0	0%
1988	358	175	49%	347	135	39%	353	3	1%	349	0	0%
1989	333	119	36%	268	0	0%	349	0	0%	356	0	0%
1990	346	204	59%	295	155	53%	346	0	0%	285	0	0%
1991	311	301	97%	295	144	49%	321	6	2%	309	0	0%
1992	348	342	98%	338	163	48%	363	5	1%	363	0	0%
1993	354	273	77%	355	222	63%	359	7	2%	332	0	0%
1994	364	364	100%	363	0	0%	364	3	1%	364	0	0%
1995	359	330	92%	349	0	0%	356	3	1%	363	0	0%
1996	359	359	100%	353	0	0%	358	1	0%	366	0	0%
1997	356	192	54%	349	0	0%	356	2	1%	364	0	0%
1998	345	169	49%	347	0	0%	355	3	1%	331	0	0%
1999	353	159	45%	351	0	0%	352	0	0%	354	0	0%
2000	356	16	4%	355	110	31%	359	4	1%	365	0	0%
2001	337	29	9%	331	169	51%	335	4	1%	342	0	0%
2002	364	300	82%	348	0	0%	360	3	1%	365	0	0%
2003	361	172	48%	353	0	0%	356	3	1%	357	0	0%
2004	355	355	100%	351	0	0%	351	4	1%	366	0	0%
2005	363	220	61%	362	0	0%	357	2	1%	365	0	0%
2006	361	331	92%	336	244	73%	362	3	1%	365	0	0%
2007	364	145	40%	360	360	100%	361	1	0%	366	0	0%
2008	360	360	100%	352	352	100%	355	1	0%	366	0	0%
2009	352	287	82%	332	285	86%	336	1	0%	363	0	0%
2010	360	124	34%	358	345	96%	357	0	0%	365	0	0%
2011	360	5	1%	358	89	25%	361	0	0%	365	0	0%
2012	364	4	1%	352	219	62%	356	1	0%	342	0	0%
Overall	9,204	5,564	60%	8,919	3,307	37%	9,199	60	1%	9,190	0	0%

1. Adjustments to solar radiation are typically relatively small adjustments applied over a series of months.

2. Adjustments to minimum and maximum relative humidity are common and were applied over extended periods of time. Minimum and maximum relative humidity, when adjusted, were increased by four percent of the raw values on average based on review of daily maximum relative humidity values over time. These adjustments result in a slight reduction in estimated ET_o.

Estimation of Missing Data Used to Estimate Reference Evapotranspiration

Daily weather data missing from the CIMIS records or flagged due to sensor malfunction or other issues were estimated based primarily on the procedures described by Allen (1996) and Allen et al. (2005). A summary of missing records by station is provided in Tables 4 and 5 for the Carmel and Castroville weather stations, respectively.

Table 4. Summary of Missing Daily Weather Parameters for Carmel CIMIS Station, 2009 to 2012.

	Incoming Solar Radiation		Relative Humidity		Air Temperature		Wind Speed	
Year	Missing Records	Percent Missing	Missing Records	Percent Missing	Missing Records	Percent Missing	Missing Records	Percent Missing
2009	4	1%	26	7%	24	7%	1	0%
2010	4	1%	22	6%	14	4%	0	0%
2011	0	0%	4	1%	4	1%	0	0%
2012	2	1%	22	6%	9	2%	1	0%
Overall	10	1%	74	5%	51	3%	2	0%

Table 5. Summary of Missing Daily Weather Parameters for Castroville CIMIS Station, 1987 to 2012.

	Incoming Solar Radiation		Relative Humidity		Air Temperature		Wind Speed	
Year	Missing Records	Percent Missing	Missing Records	Percent Missing	Missing Records	Percent Missing	Missing Records	Percent Missing
1987	4	1%	4	1%	4	1%	3	1%
1988	8	2%	19	5%	13	4%	17	5%
1989	32	9%	97	27%	16	4%	9	2%
1990	19	5%	70	19%	19	5%	80	22%
1991	54	15%	70	19%	44	12%	56	15%
1992	18	5%	28	8%	3	1%	3	1%
1993	11	3%	10	3%	6	2%	33	9%
1994	1	0%	2	1%	1	0%	1	0%
1995	6	2%	16	4%	9	2%	2	1%
1996	7	2%	13	4%	8	2%	0	0%
1997	9	2%	16	4%	9	2%	1	0%
1998	20	5%	18	5%	10	3%	34	9%
1999	12	3%	14	4%	13	4%	11	3%
2000	10	3%	11	3%	7	2%	1	0%
2001	28	8%	34	9%	30	8%	23	6%
2002	1	0%	17	5%	5	1%	0	0%
2003	4	1%	12	3%	9	2%	8	2%
2004	11	3%	15	4%	15	4%	0	0%
2005	2	1%	3	1%	8	2%	0	0%
2006	4	1%	29	8%	3	1%	0	0%
2007	1	0%	5	1%	4	1%	-1	0%
2008	6	2%	14	4%	11	3%	0	0%
2009	13	4%	33	9%	29	8%	2	1%
2010	5	1%	7	2%	8	2%	0	0%
2011	5	1%	7	2%	4	1%	0	0%
2012	2	1%	14	4%	10	3%	24	7%
Overall	293	3%	578	6%	298	3%	307	3%

The procedures used to estimate missing data are summarized as follows:

- Solar radiation
  - Average daily R_s estimated based on average historical values for the corresponding day of year.
- Relative humidity
  - Minimum RH estimated based on maximum hourly air temperature as described by Allen et al. (2005).
  - Maximum RH estimated as 97 percent (average historical value).
  - Average daily RH estimated as average of minimum and maximum values.
- Air temperature
  - Minimum T_{air} estimated by correlation to Monterey Peninsula Airport NWS station.
  - Maximum T_{air} estimated by correlation to Monterey Peninsula Airport NWS station.
  - Average daily T_{air} estimated as average of minimum and maximum values.
- Wind speed
  - Average daily wind speed estimated based on average historical values for the corresponding day of year.

It was not necessary to estimate missing data for the Monterey GHCN weather station as it was used to estimate missing data for the CIMIS stations and to estimate daily precipitation at Carmel prior to 2009 (the period during which data from the Carmel CIMIS station were not available). Minimum and maximum daily air temperature and precipitation data were available for all days in which data from the station were required for the analysis.

Development and Parameterization of Daily Root Zone Water Balance Model

This section describes the development of the daily root zone water balance model used to estimate the following surface layer fluxes of water into and out of the root zone, along with the amount of stored applied water and precipitation within the root zone over time:

- Precipitation (Pr)[5];
- ET of applied water (ET_{aw}), portion of total crop ET (ET_c) derived from applied water;
- ET of precipitation (ET_{pr}), portion of total crop ET (ET_c) derived from precipitation;
- Runoff of precipitation (RO_{pr});
- Tailwater (TW), assumed to be zero;
- Applied Irrigation Water (AW);
- Subsurface Inflow and Outflow, assumed to be zero;
- Deep percolation of applied water (DP_{aw}); and
- Deep percolation of precipitation (DP_{pr}).

The model is implemented in Microsoft Excel and is consistent with typical root zone water balance models developed for irrigation scheduling purposes, such as described in FAO Irrigation and Drainage Paper No. 56: Crop Evapotranspiration (Allen et al. 1998). The model utilizes the dual crop coefficient approach of Allen et al. to estimate the portion of crop ET derived from crop transpiration (the "T" component of ET) and evaporation from the crop and soil surface (the "E" component of ET). A

[5] Estimated from local weather stations, as described previously.

conceptual diagram of the various surface layer fluxes of water into and out of the crop root zone is provided in Figure 9.

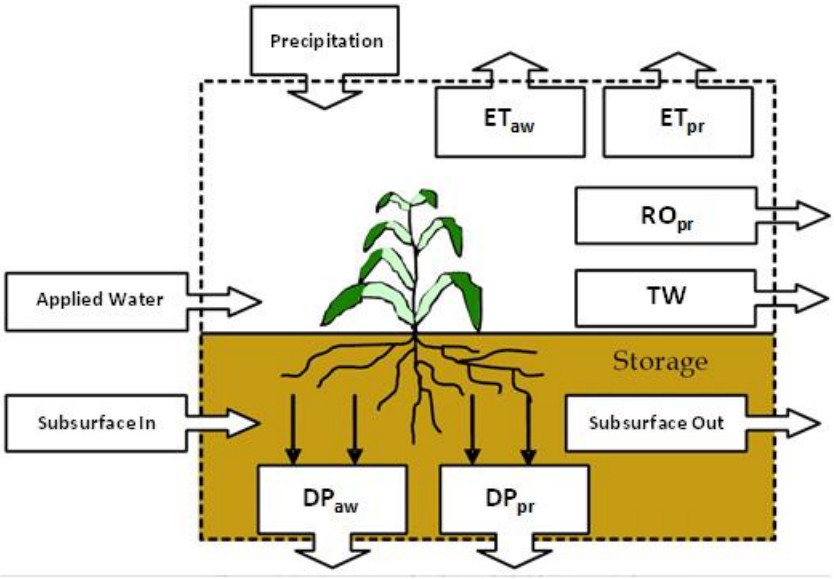

Figure 9. Conceptualization of Fluxes of Water Into and Out of the Crop Root Zone.

Similar to ET and DP, stored soil moisture is partitioned into stored precipitation and stored applied irrigation water. For each daily time step, the fraction of ET derived from precipitation or applied water is assumed to be proportional to the amount of stored precipitation or applied water in the root zone. Deep percolation of precipitation and applied water are calculated in the same manner.

Estimation of Daily Reference Evapotranspiration

Daily reference evapotranspiration (ET_o) was estimated based on quality-controlled weather data from CIMIS weather stations. As described previously, ET_o was calculated based on the ASCE Standardized Reference ET Equation for a short reference crop (ET_{os}, i.e., grass) (Allen et al., 2005). In order to estimate ET_o at the Ranch prior to the period of record for the Carmel CIMIS station, a correlation to ET_o at the Castroville CIMIS station was developed for the 2009 to 2012 period. The relationship between ET_o at the two stations used to estimate historical ET_o at Carmel is shown in Figure 10. Summary statistics of mean daily ET_o by month for the 1987 to 2012 analysis period are provided in Table 6, along with summary statistics of annual total ET_o.

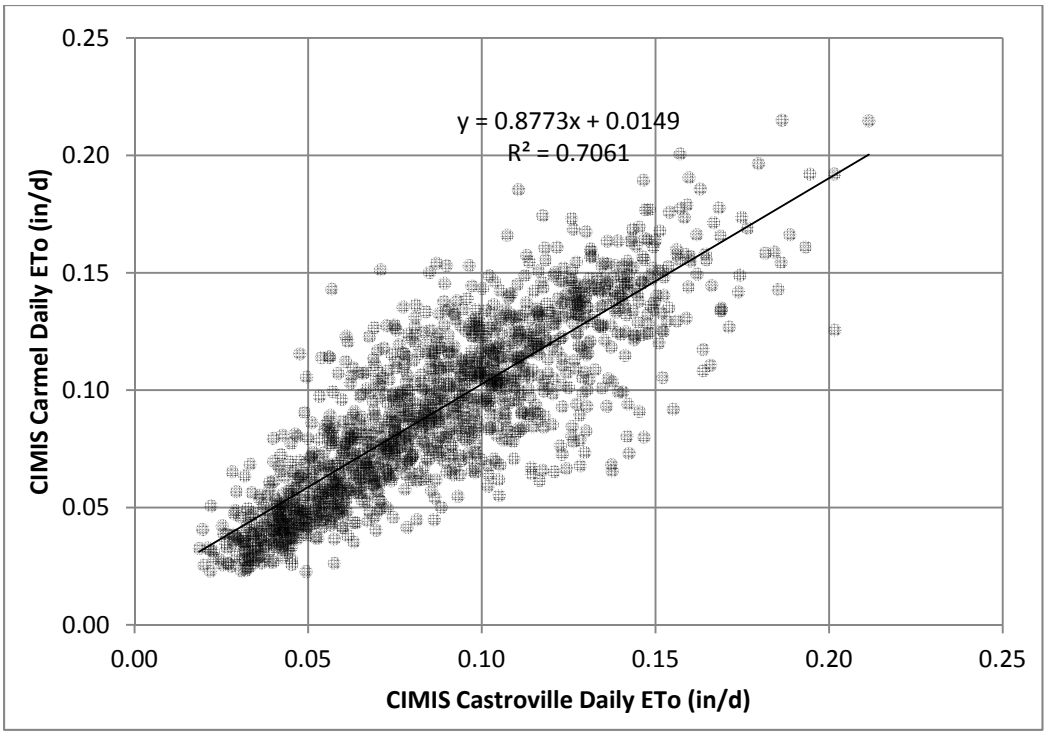

Figure 10. Linear Regression to Estimate ET_o at Carmel from ET_o at Castroville CIMIS.

Table 6. Summary Statistics of Estimated Mean Daily and Annual ET_o at Carmel, 1987 to 2012.

	Mean Daily ETo by Month (in/d)												
Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo (in)
No. of Months	26	26	26	26	26	26	26	26	26	26	26	26	
Minimum	0.04	0.05	0.07	0.09	0.11	0.11	0.09	0.08	0.08	0.06	0.05	0.04	30.56
Maximum	0.08	0.10	0.11	0.14	0.14	0.15	0.13	0.12	0.11	0.09	0.08	0.08	36.60
Mean	0.06	0.07	0.09	0.11	0.12	0.13	0.11	0.10	0.09	0.08	0.07	0.06	33.10
Median	0.06	0.07	0.09	0.11	0.12	0.12	0.11	0.10	0.09	0.08	0.06	0.06	33.07
Standard Deviation	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1.42

Estimation of Daily Precipitation

Daily precipitation at the Ranch was estimated based on precipitation records from the Carmel CIMIS station for the period from January 2009 to December 2012. According to staff at the Monterey Peninsula Water Management District (MPWMD), there were issues initially with sprinklers at the station site leading to overestimation of precipitation through early 2009 (Christensen, 2013). Based on review of hourly precipitation records, it was confirmed that the precipitation gage was affected by sprinklers in portions of October 2008, November 2008, and April 2009. These records were corrected based on correlation to precipitation records reported for the Monterey GHCN station for the period of overlap. Precipitation at Carmel prior to 2009 was estimated using the same correlation. The results of the linear regression to correlate precipitation at Carmel to the Monterey GHCN station is provided in Figure 11. Note that the correlation was performed using mean daily precipitation amounts by month

to compensate for potential differences in the timing of recording precipitation between the stations[6]. The intercept of the regression was forced to be zero based on the assumption that rainfall occurred on the same day at each station.

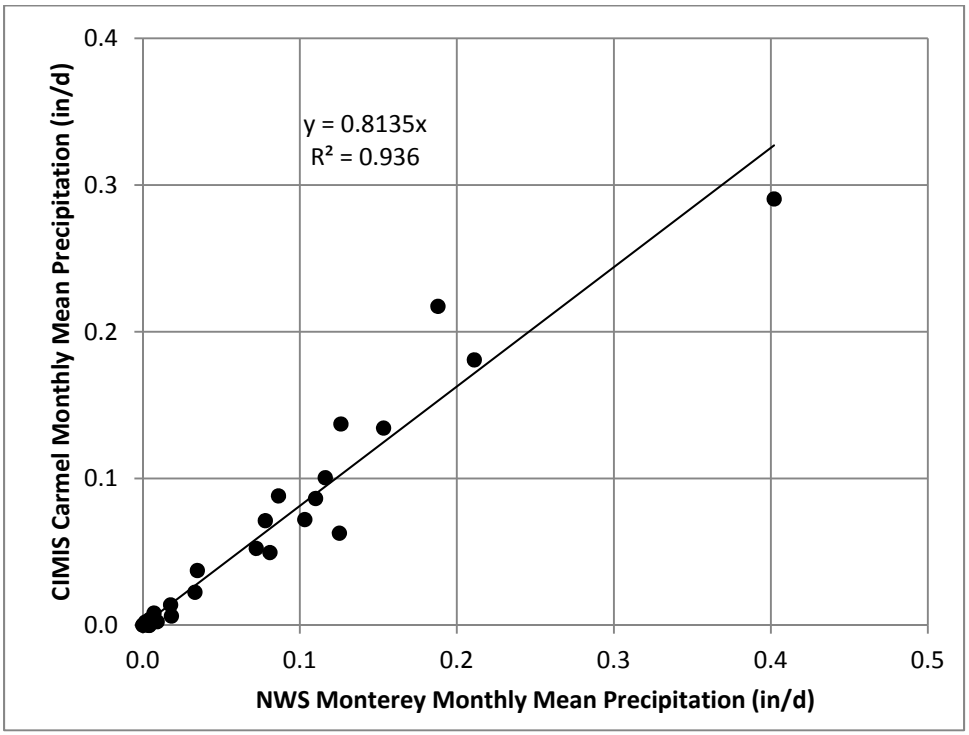

Figure 11. Linear Regression to Estimate Daily Precipitation at Carmel from Precipitation at Monterey GHCN Station.

Summary statistics of total precipitation by month are provided in Table 7, along with summary statistics by year for the 26-year analysis period.

Table 7. Summary Statistics of Estimated Monthly and Annual Precipitation at Carmel, 1987 to 2012.

Statistic	Precipitation by Month (in)												Annual Precip. (in)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
No. of Months	26	26	26	26	26	26	26	26	26	26	26	26	
Minimum	0.6	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	9.2
Maximum	8.6	11.6	6.7	4.1	2.2	1.3	0.2	0.2	0.8	3.6	6.1	6.5	33.4
Mean	3.5	3.3	2.4	1.2	0.5	0.2	0.0	0.1	0.1	0.8	1.4	2.9	16.4
Median	2.8	2.8	2.3	0.8	0.4	0.1	0.0	0.0	0.0	0.4	1.4	2.8	16.3
Standard Deviation	2.5	2.6	1.9	1.0	0.5	0.3	0.0	0.1	0.2	1.0	1.2	1.9	5.4

Estimation of Soil Hydraulic Parameters

Root zone parameters that influence the amount of available soil moisture storage were estimated based on soils present at the Ranch. Soil hydraulic parameters of interest include field capacity (% by

[6] The recorded time of observation at the Monterey GHCN station is 1800 hours, while the CIMIS precipitation totals are for the period from midnight to midnight. Only months with at least 15 days of coincident data for the two stations were used for the analysis.

vol.), available waterholding capacity (in/ft), wilting point (% by vol.), depth of evaporable water (z), readily evaporable water (REW), and total evaporable water (TEW). Estimated root zone soil parameters and sources of the estimates are summarized in Table 8.

Table 8. Estimated Root Zone Soil Parameters and Estimation Sources.

Parameter	Value	Units	Source
Field Capacity	20	% by vol.	Saxton and Rawls (2006) based on sand and clay percentages from NRCS soil survey of Monterey County
Available Waterholding Capacity	14	% by vol.	NRCS soil survey of Monterey County.
	1.68	in/ft	
Wilting Point	6	% by vol.	Field Capacity - Wilting Point
Depth of Evaporable Water	4	inches	Approximately 0.1 meter, per Allen et al. (1998)
Total Evaporable Water	17	% by vol.	Field Capacity - 0.5*Wilting Point, per Allen et al. (1998)
	0.68	inches	TEW (%) * Depth of Evaporable Water
Readily Evaporable Water	8	% by vol.	Allen et al. (1998) (Table 19)
	0.32	inches	REW (%) * Depth of Evaporable Water

Estimation of Crop Parameters

Crop parameters of interest include basal crop coefficients, root depth, NRCS curve number[7], soil moisture depletion fraction at the onset of water stress, and crop height following grazing and at full cover.

Basal crop coefficients were estimated to be 0.5 following grazing and 1.1 at effective full cover for pasture in arid environments with moderate winds based on NRCS Part 623 National Engineering Handbook (NEH) Chapter 2 (NRCS, 1993). Typical re-growth periods for grass pasture are expected to be 7 to 10 days in typical irrigated settings. For the Odello Ranch, which is located in a coastal environment, it is assumed that re-growth to effective full cover will require approximately 14 days. It is assumed that grazing will begin in February and continue through November, resulting in seven grazings on a typical paddock. The resultant estimated basal crop coefficients for a typical paddock with grazing beginning in early March and ending in mid-November year are shown in Figure 12. As indicated, the basal crop coefficient is assumed to decrease from 1.1 to 0.5 over the course of a seven day grazing and then increases from 0.5 to 1.1 over the 14-day re-growth period. The paddock remains at full cover for the remaining 21 days prior to start of the next grazing cycle. For purposes of applying the daily root zone water balance model for the 26-year analysis period, the basal crop coefficients for the typical paddock shown in Figure 12 are considered representative of the Ranch as a whole.

[7] The curve number runoff estimation method developed by the Natural Resources Conservation Service (NRCS) was used to estimate runoff from precipitation in the model. For additional information, see NRCS NEH Part 630 Chapters 9 and 10 (NRCS, 2004) and Schroeder et al. (1994).

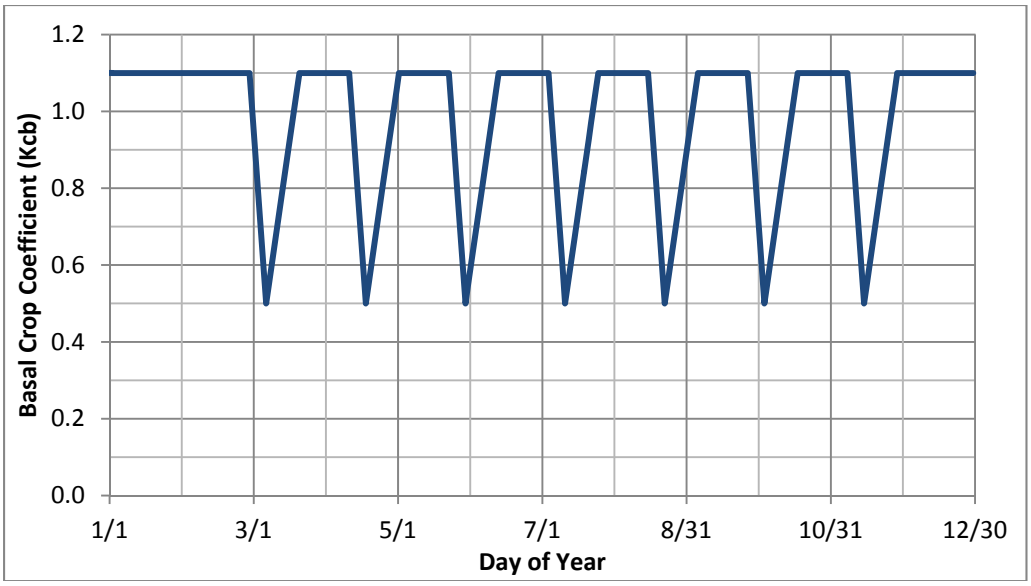

Figure 12. Estimated Basal Crop Coefficients for Typical Paddock with Rotational Grazing.

Root depth was estimated to be 2.5 feet based on observed rooting depths determined by soil augering performed during the field visit conducted February 27, 2013 and is consistent with published root depths for pasture as described by Allen et al. (1998).

The curve number used to estimate runoff of precipitation was selected as 61 based on NRCS (2004), which is equivalent to the curve number for pasture in good hydrologic condition and soils of hydrologic group B (applies to Pico Fine Sandy Loam based on Cook, 1978).

The soil moisture depletion fraction at the onset of water stress (p) was estimated to be 0.6 or 60% of total available water based on Allen et al. (1998).

Estimation of Sprinkler Application Efficiency and Tailwater Production

The application efficiency of the existing sprinkler system reflects a combination of the distribution uniformity of the sprinkler system and the ability of Ranch personnel to accurately and precisely estimate irrigation requirements at the time of irrigation. When irrigating for full crop production, as is the objective of irrigation at the Ranch, the maximum application that can be theoretically achieved is the distribution uniformity of the irrigation system. In practice, perfect knowledge of irrigation requirements is not available, and application efficiency is typically less than distribution uniformity.

For the Odello Ranch, the application efficiency was estimated to be 65 percent, which is consistent with typical distribution uniformities and application efficiencies reported for sprinklers by Leutzow (1994), ITRC (2003), and Canessa et al. (2011). Leutzow reported an average distribution uniformity for sprinklers of 67 percent based on data collected by the Monterey County Water Resources Agency and the University of California Cooperative Extension between 1990 and 1992. The average distribution uniformity based on ITRC data for distribution uniformity evaluations conducted in California between 1997 and 2002 for 63 sprinkler systems was 61 percent. Canessa et al. compiled the results of additional studies and reported minimum typical application efficiencies for sprinklers of 70 percent.

Due to the use of sprinkler irrigation, moderate slopes at the Ranch, and expected soil infiltration rates that are greater than the application rate of the system, tailwater production is assumed to be zero.

Estimated Irrigation Requirements

Based on irrigation practices at the Ranch, it is assumed that irrigation will occur at regular pre-defined intervals and that the soil will be returned to the field capacity moisture content at each irrigation event. Irrigation will begin in mid January to supplement precipitation and increase in frequency from once every three weeks to once weekly after the start of grazing, with the exception that paddocks being grazed in a given week will not be irrigated to avoid wet soil compaction and crop and sprinkler damage by the cattle. The sprinklers will be removed prior to grazing and reinstalled for irrigation immediately following grazing to stimulate re-growth. An irrigation calendar for a typical paddock grazed from early March to mid-November is provided in Table 9. Irrigation hours for the sprinkler irrigation system and corresponding applied water amounts represent mean values based on the 26-year root zone water balance simulation. Annual results are summarized in the following section.

Table 9. Irrigation Calendar for Typical Paddock.

Date	Days Since Last Irrigation	Irrigation Amount*	
		Hours	Inches
18-Jan	29	5.4	1.0
8-Feb	21	5.1	1.0
22-Feb	14	3.2	0.6
8-Mar	14	3.7	0.7
15-Mar	7	3.2	0.6
22-Mar	7	3.3	0.6
29-Mar	7	3.4	0.6
5-Apr	7	4.5	0.8
19-Apr	14	8.0	1.5
26-Apr	7	4.5	0.8
3-May	7	5.9	1.1
10-May	7	6.0	1.1
17-May	7	5.7	1.1
31-May	14	10.6	2.0
7-Jun	7	5.7	1.1
14-Jun	7	6.8	1.3
21-Jun	7	6.5	1.2
28-Jun	7	6.5	1.2
12-Jul	14	11.5	2.1
19-Jul	7	5.6	1.0
26-Jul	7	6.0	1.1
2-Aug	7	5.6	1.0
9-Aug	7	5.7	1.1
23-Aug	14	10.0	1.9
30-Aug	7	5.3	1.0
6-Sep	7	5.6	1.0
13-Sep	7	5.2	1.0
20-Sep	7	4.8	0.9
4-Oct	14	8.1	1.5
11-Oct	7	4.4	0.8
18-Oct	7	4.2	0.8
25-Oct	7	3.4	0.6
1-Nov	7	3.3	0.6
15-Nov	14	3.1	0.6
29-Nov	14	3.7	0.7
20-Dec	21	3.3	0.6
	TOTALS	196.8	36.7

* Based on average amounts over 26-year analysis period from 1987 to 2012.

Root Zone Water Balance Model Results

Annual and Daily Results

Results of the daily root zone water balance analysis are provided on a calendar-year basis for the period from 1987 to 2012 in Table 10. Specifically, the results include precipitation (net of runoff of precipitation, which is generally negligible), applied irrigation water, total crop ET, crop ET of precipitation, and crop ET of applied water. Results are reported as a flux depth (inches) and as total acre-feet for the approximately 40.6-acre irrigated area. To estimate flux volumes for the Ranch as a whole, flux depths calculated in inches for the typical paddock were converted to feet and multiplied by the irrigated area to provide volume estimates in acre-feet. For any given year, the modeled amount of water applied was limited to the Ranch's water right of 131.8 acre-feet. This was accomplished in the model by tracking applied water on a daily basis over time and limiting the cumulative applied water within a calendar year to the water right limit of 131.8 acre-feet (equivalent to 39.0 inches of depth over the full irrigated area).

Table 10. Summary of Root Zone Water Balance Analysis Results, 1987 to 2012.

	Precipitation		Applied Water		Evapotranspiration		ET of Precipitation		ET of Applied Water	
Year	inches	acre-feet	inches	acre-feet	inches	acre-feet	inches	acre-feet	inches	acre-feet
1987	13.1	44.2	35.5	120.0	33.1	112.0	8.5	28.6	24.6	83.4
1988	10.1	34.1	39.0	131.8	33.9	114.6	6.4	21.7	27.4	92.8
1989	10.0	33.9	39.0	131.8	36.2	122.5	8.5	28.8	27.7	93.7
1990	10.8	36.5	38.2	129.4	37.2	126.0	8.0	27.1	29.2	98.9
1991	13.4	45.2	39.0	131.8	34.7	117.6	7.4	25.0	27.3	92.5
1992	16.3	55.0	39.0	131.8	37.4	126.6	9.0	30.5	28.4	96.1
1993	22.0	74.5	38.6	130.6	36.5	123.5	10.8	36.7	25.7	86.8
1994	12.5	42.4	37.9	128.3	34.2	115.8	7.7	25.9	26.6	89.9
1995	20.4	68.9	36.4	123.1	33.9	114.6	10.8	36.5	23.1	78.1
1996	24.0	81.3	33.7	113.9	33.5	113.4	10.6	35.8	22.9	77.6
1997	17.4	59.0	39.0	131.8	34.7	117.2	7.9	26.8	26.7	90.4
1998	33.0	111.6	27.2	91.9	32.1	108.7	14.2	48.1	17.9	60.7
1999	13.7	46.2	35.1	118.8	32.5	109.9	9.2	31.1	23.3	78.8
2000	19.7	66.5	35.3	119.4	33.7	113.9	10.0	33.7	23.7	80.2
2001	19.0	64.4	35.8	121.0	34.2	115.7	8.9	30.1	25.3	85.6
2002	12.8	43.2	38.2	129.1	34.3	116.1	8.2	27.8	26.1	88.4
2003	14.3	48.3	37.5	126.7	35.5	120.2	9.3	31.4	26.2	88.8
2004	16.2	55.0	36.8	124.6	33.8	114.3	8.8	29.8	25.0	84.5
2005	20.1	68.0	32.1	108.7	32.9	111.3	11.7	39.6	21.2	71.8
2006	19.5	65.9	33.1	112.0	34.9	118.0	12.1	41.0	22.8	77.0
2007	9.2	31.2	38.1	129.1	34.5	116.8	7.4	24.9	27.1	91.9
2008	13.5	45.5	38.7	130.8	34.0	115.0	6.7	22.8	27.3	92.2
2009	16.2	54.7	39.0	131.8	34.9	118.0	9.2	31.0	25.7	87.0
2010	21.1	71.5	34.1	115.4	33.6	113.8	10.3	34.7	23.4	79.0
2011	16.1	54.4	38.3	129.7	34.6	117.1	10.5	35.5	24.1	81.6
2012	11.0	37.2	39.0	131.8	34.8	117.8	5.7	19.5	29.1	98.3
Minimum	9.2	31.2	27.2	91.9	32.1	108.7	5.7	19.5	17.9	60.7
Maximum	33.0	111.6	39.0	131.8	37.4	126.6	14.2	48.1	29.2	98.9
Mean	16.4	55.3	36.7	124.0	34.4	116.6	9.1	30.9	25.3	85.6
Median	16.1	54.6	38.0	128.7	34.3	116.0	8.9	30.3	25.7	86.9

Annual crop ET_{aw} varies between approximately 60.7 and 98.9 acre-feet and averages 85.6 acre-feet over the period of analysis. Annual applied water varies between approximately 91.9 and 131.8 acre-feet (the water right limit) and averages approximately 124.0 acre-feet. The full water right of 131.8 acre-feet would not have been used in 19 of 26 years (73 percent of the time) of the modeled period due to the contribution of precipitation to crop water requirements to maintain full ET.

Estimates of annual applied water, precipitation minus runoff, and ET_{aw} are shown graphically in Figure 13. Detailed daily results of the analysis are shown in Figures 14, 15, and 16 for wet, typical, and dry years based on precipitation amounts, respectively.

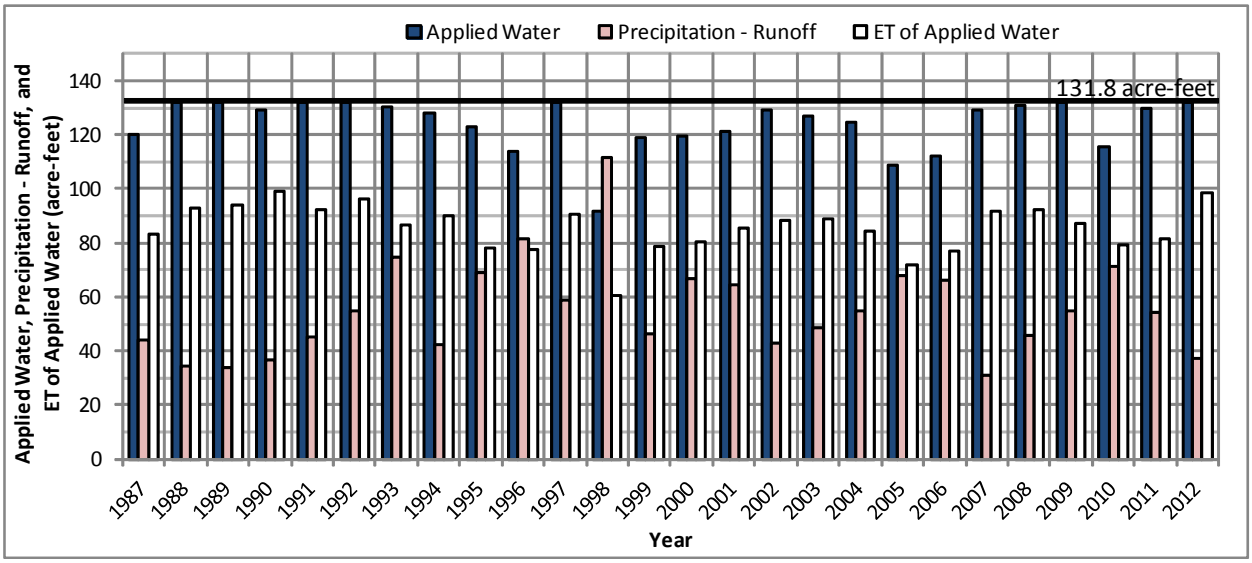

Figure 13. Estimates of Annual Applied Water, Precipitation minus Runoff, and ET_{aw}, 1987 to 2012.

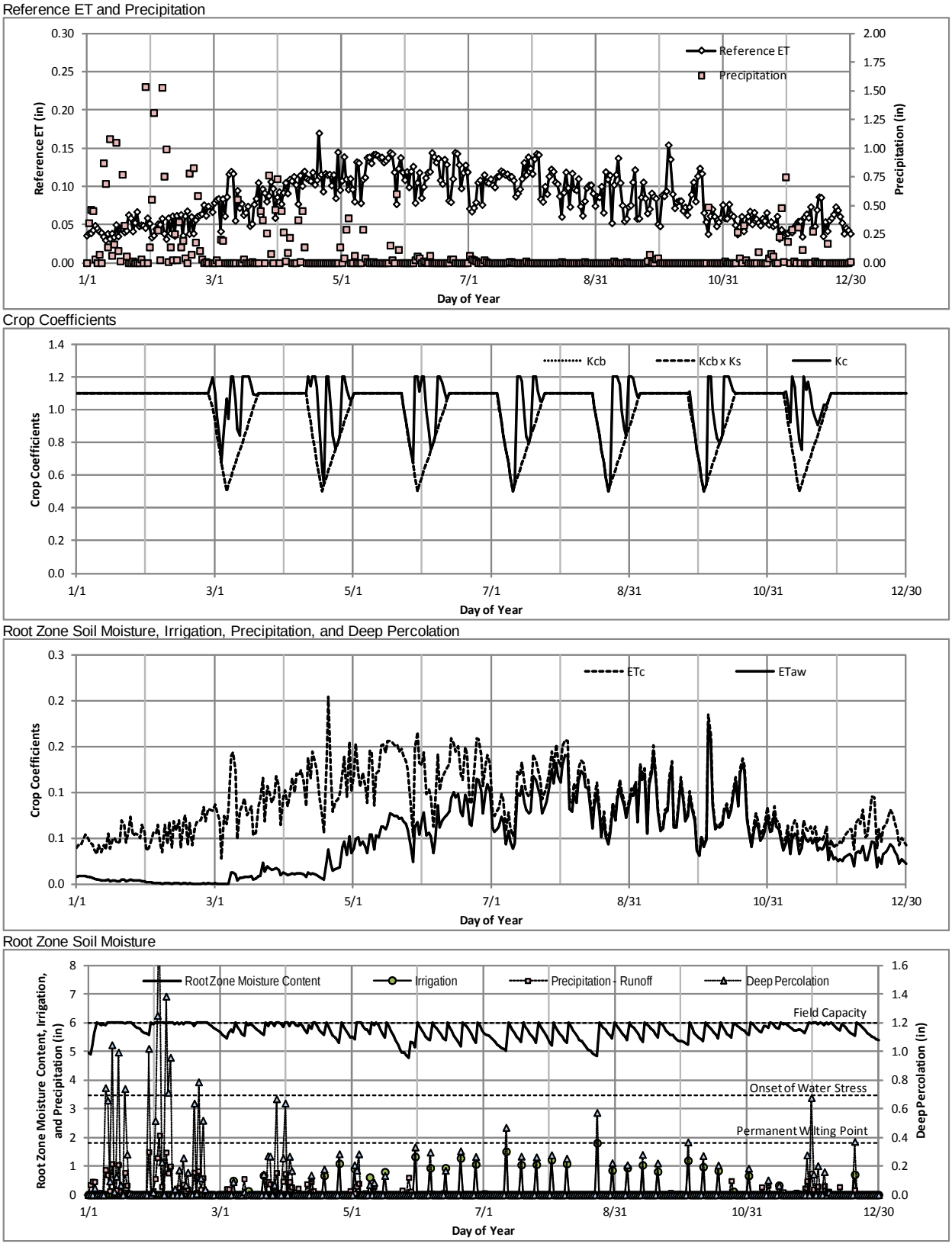

Figure 14. Root Zone Water Balance Analysis Results for Wet Year (1998).

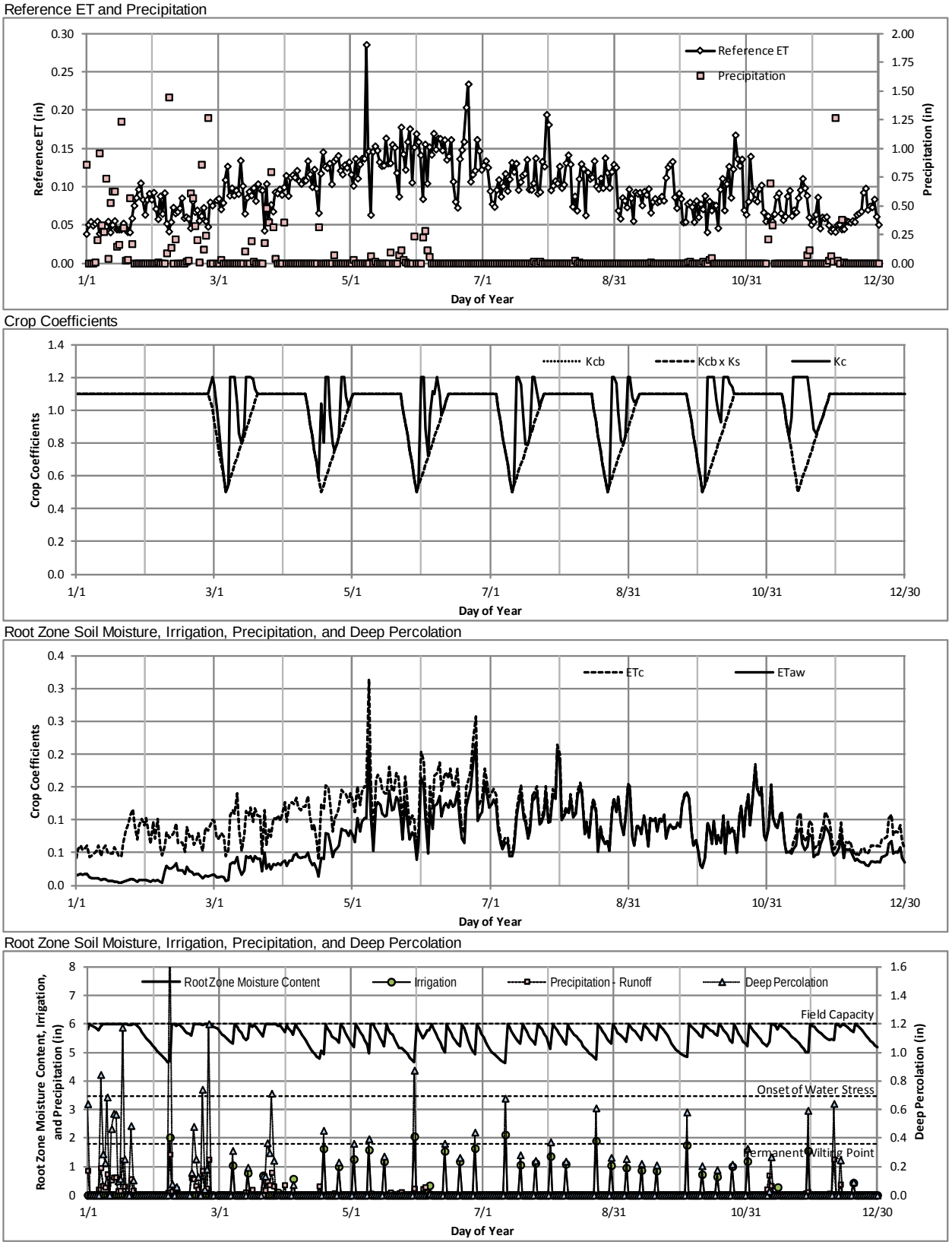

Figure 15. Root Zone Water Balance Analysis Results for Typical Year (1993).

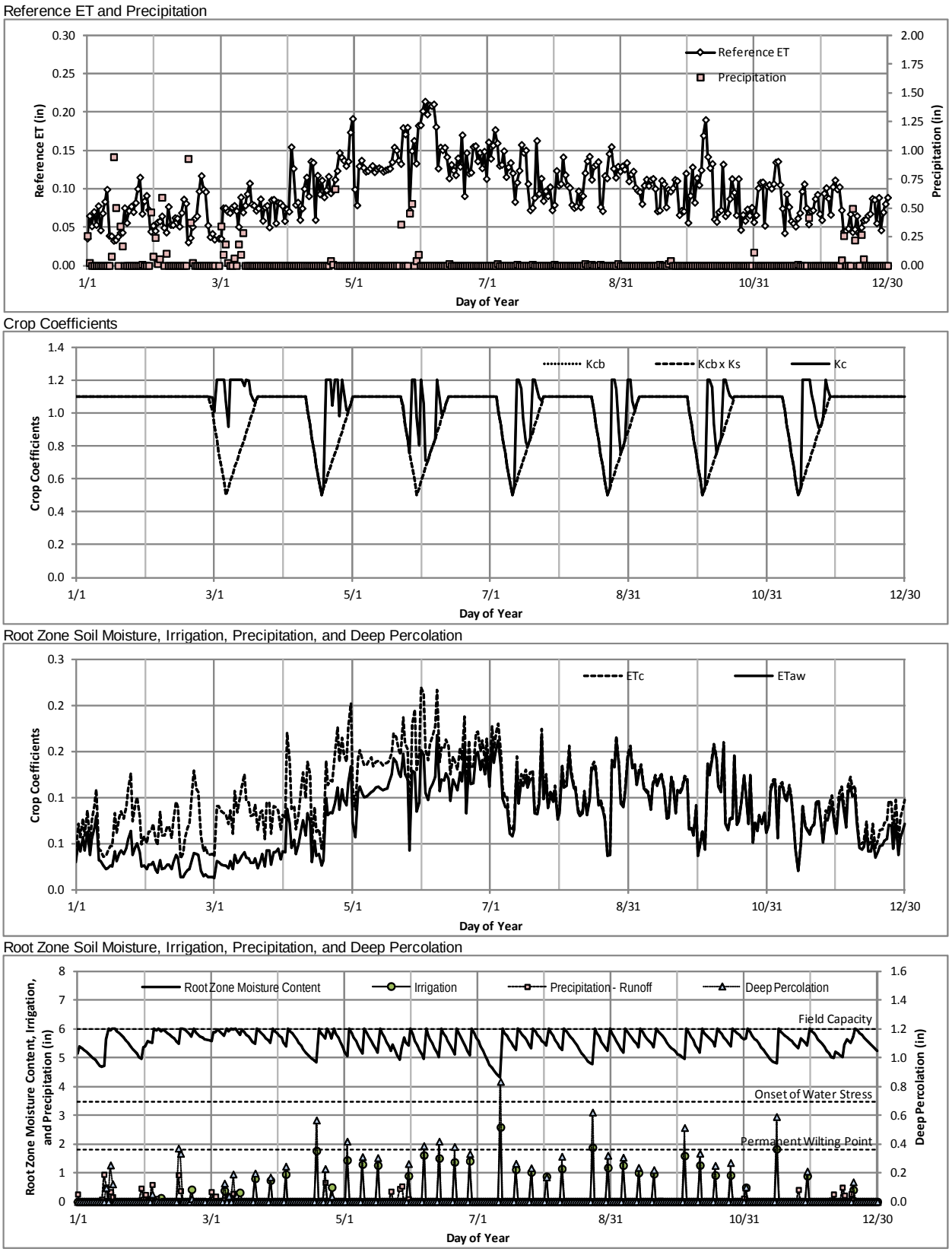

Figure 16. Root Zone Water Balance Analysis Results for Dry Year (1990).

Estimation of Monthly Applied Water and ET_{aw} Volumes

Long-term mean monthly volumes of applied water and ET_{aw} were estimated based on mean annual volumes from Table 10 and the percent of annual ET_{aw} occurring in each month, developed from a composite run of the daily root zone water balance model reflecting the combined effect of grazing on all six paddocks, each with a grazing cycle offset by one week. It is expected that the long-term mean monthly applied water volumes will be approximately proportional to monthly ET_{aw} volumes. Monthly estimates of applied water volumes are presented in Table 11, along with the estimated percentage of ET_{aw} and the corresponding ET_{aw} volume for each month.

Table 11. Estimated Long-Term Mean Monthly Applied Water and ET_{aw}.

Month	Applied Water (ac-ft)[1]	Monthly ET_{aw} Percentage[2]	Estimated Monthly ET_{aw} (ac-ft)[3]
January	4.1	3.3%	2.8
February	4.2	3.4%	2.9
March	5.8	4.7%	4.0
April	9.3	7.5%	6.4
May	13.6	11.0%	9.4
June	16.0	12.9%	11.0
July	16.0	12.9%	11.1
August	15.6	12.6%	10.8
September	13.8	11.1%	9.5
October	12.2	9.8%	8.4
November	8.0	6.5%	5.5
December	5.5	4.4%	3.8
TOTAL	124.0	100.0%	85.6

1. Estimated long-term monthly average applied irrigation water from Table 6, distributed by month.

2. Percent of long term annual ETaw by month for composite model run.

3. Estimated long-term monthly average ETaw from Table 6, distributed by month.

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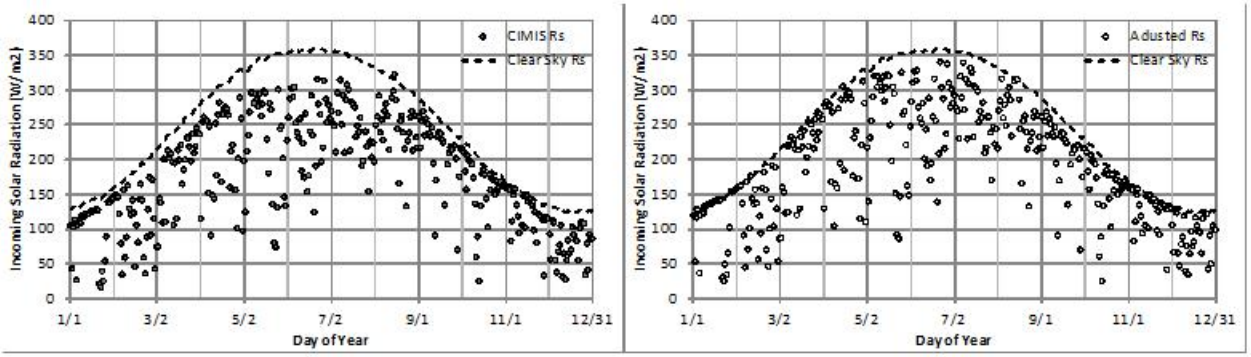
Appendix A: Sample Weather Parameters, 2009 to 2012

Solar Radiation (Prior to and Following Adjustment)

Carmel

2009



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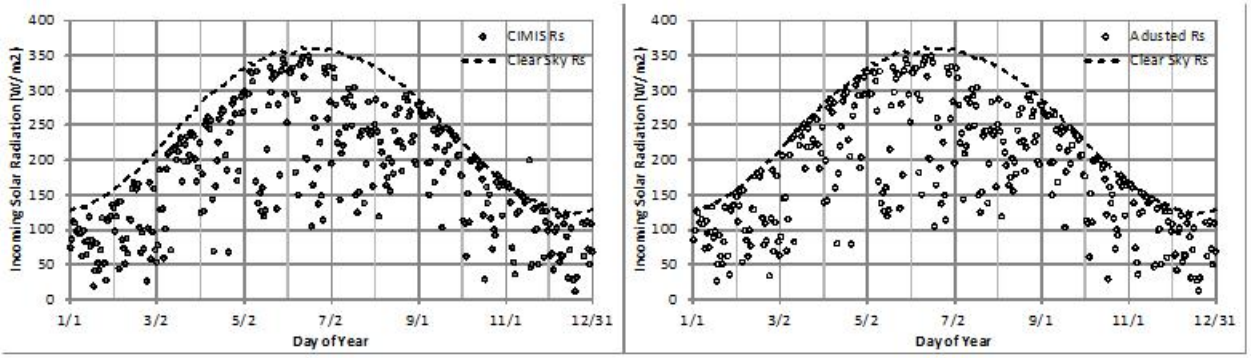

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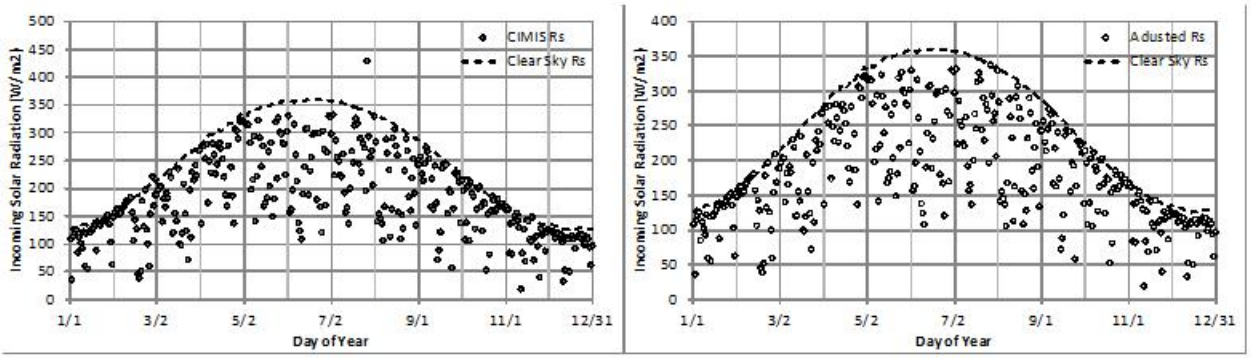

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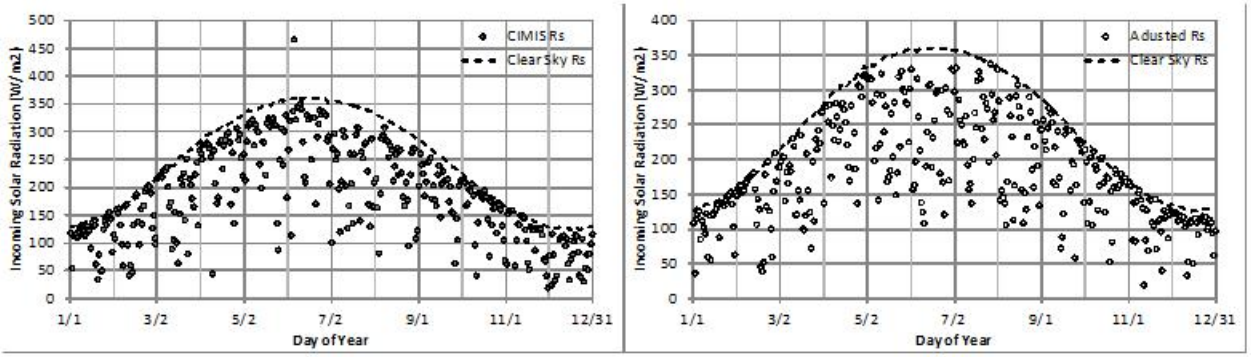
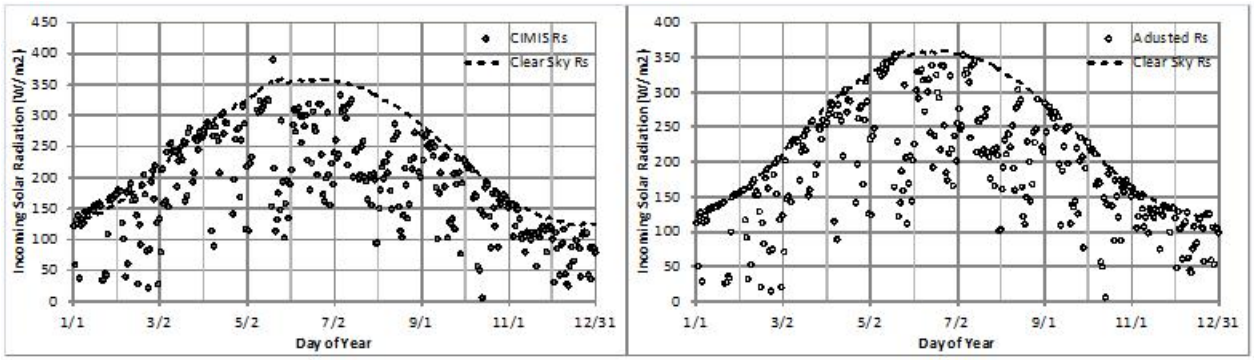


Castroville

2009



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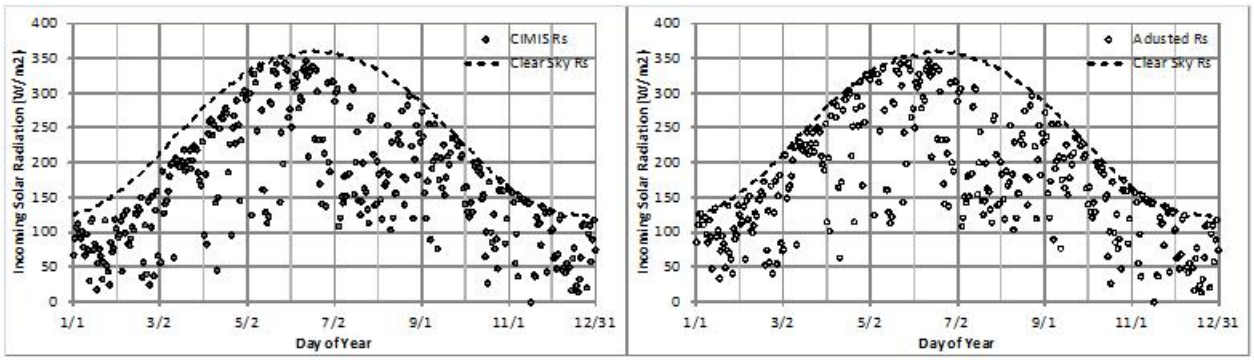

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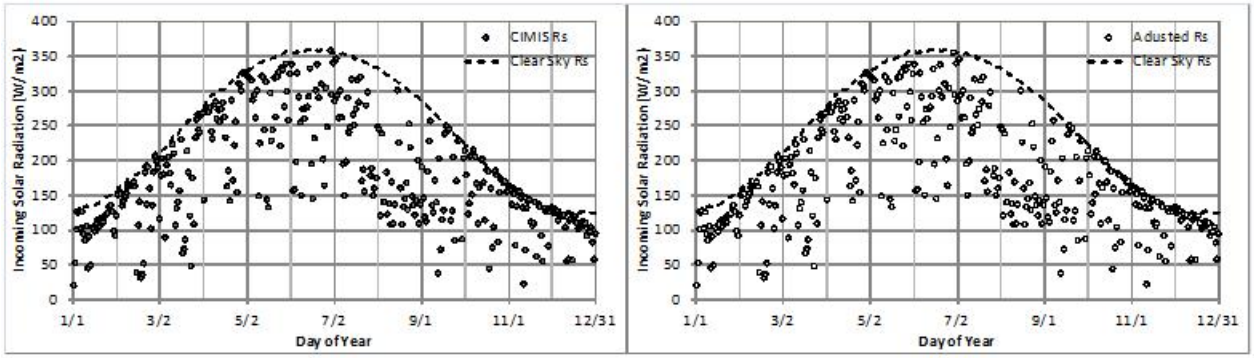

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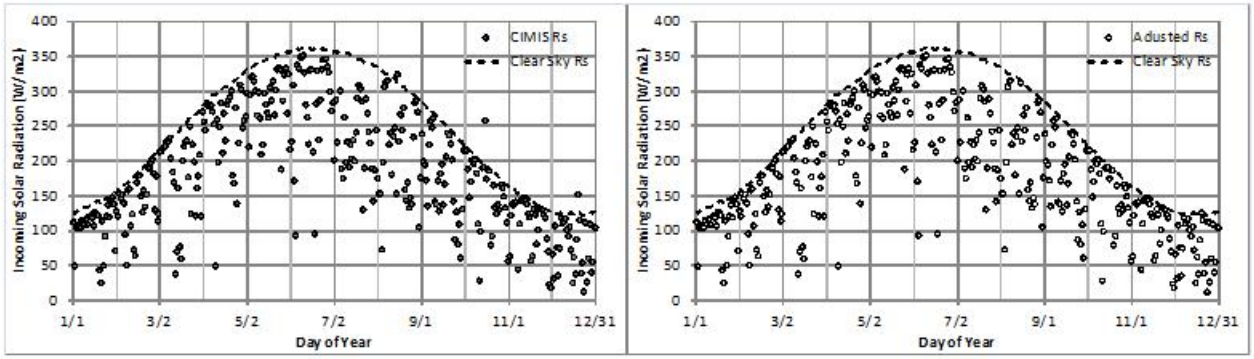

Relative Humidity (Prior to and Following Adjustment)

Carmel

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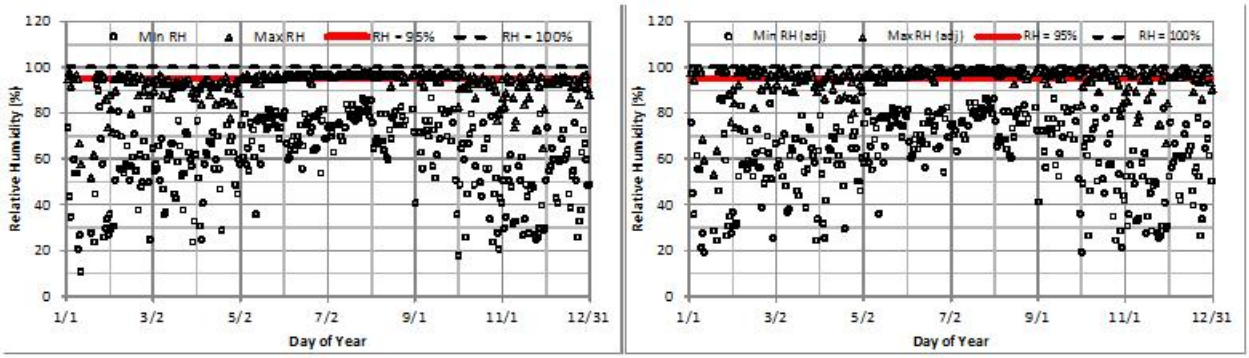

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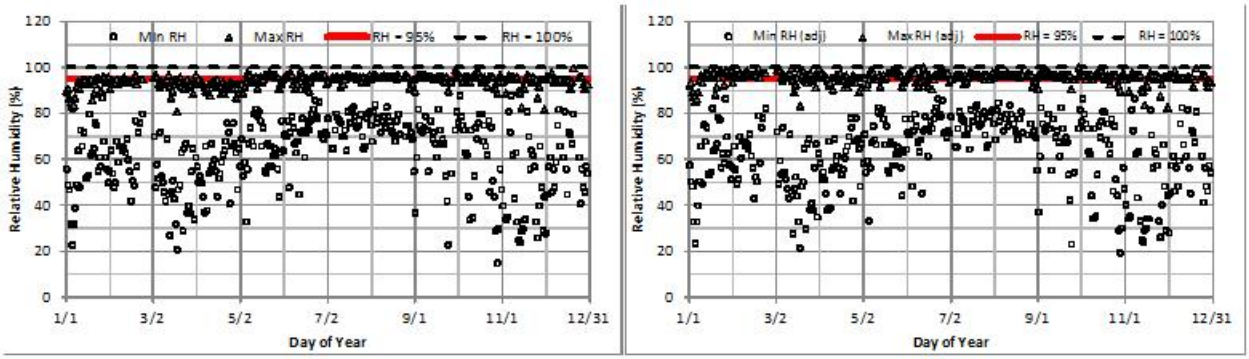

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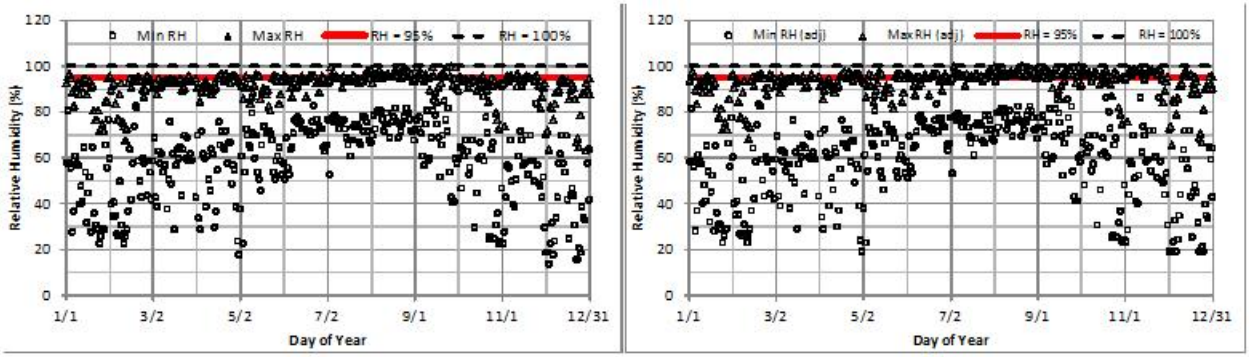

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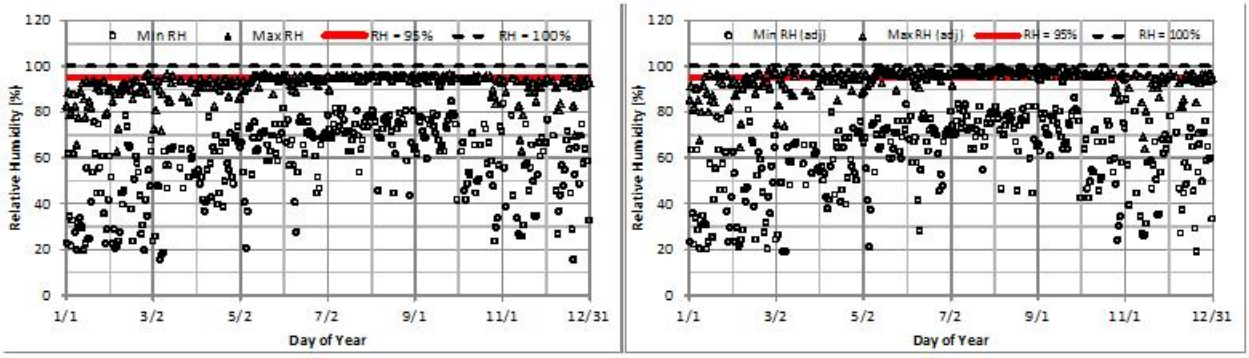
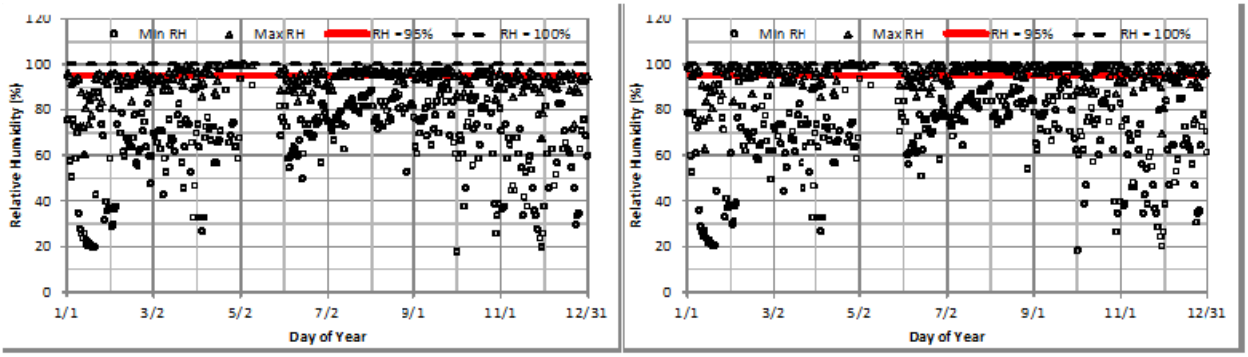


Castroville

2009



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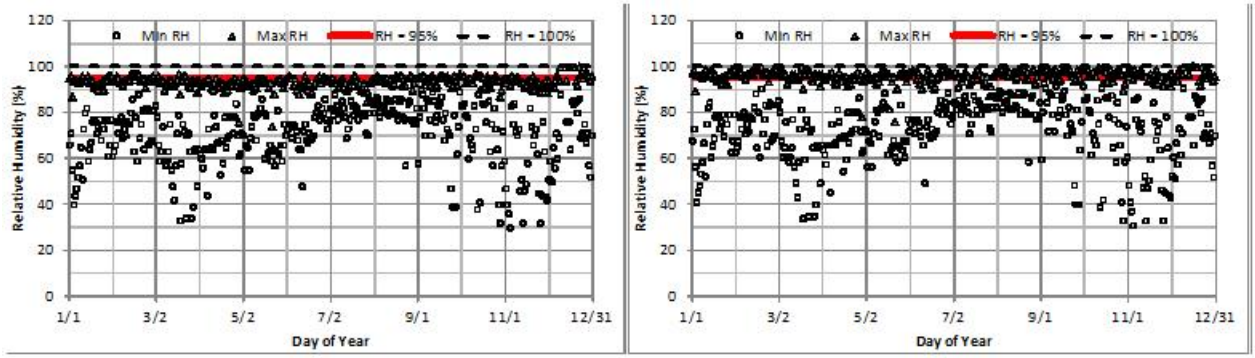

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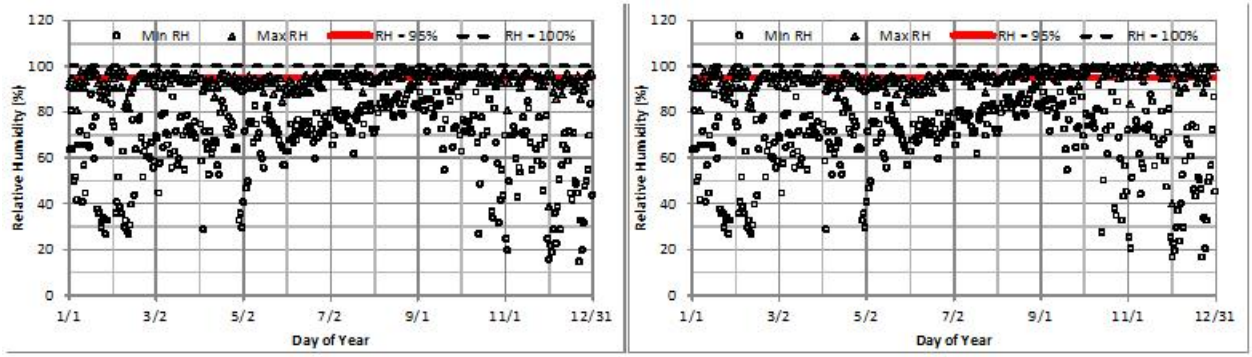

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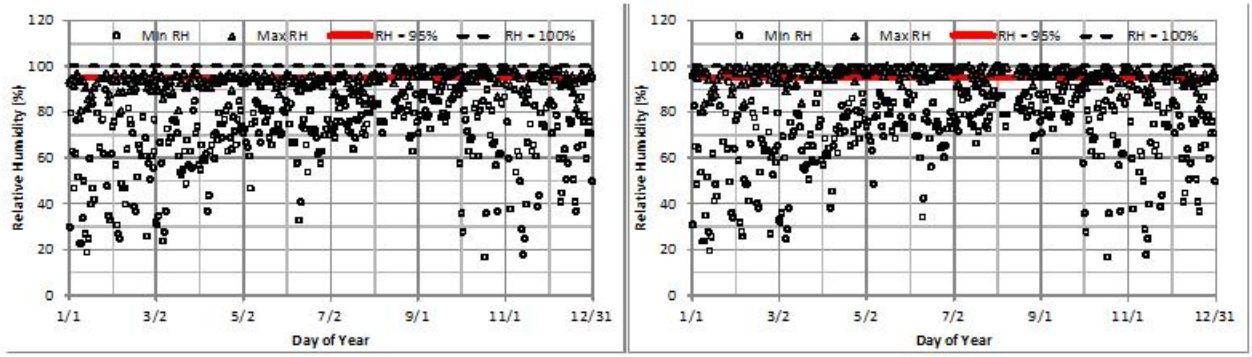
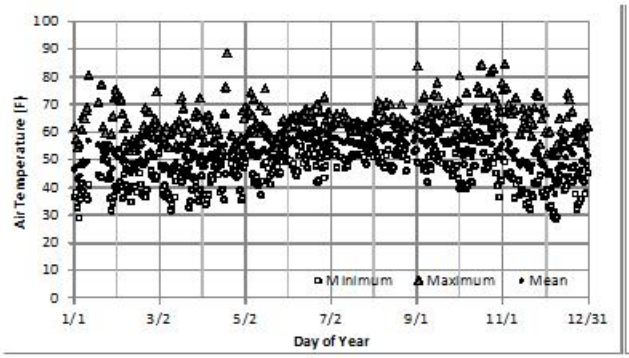
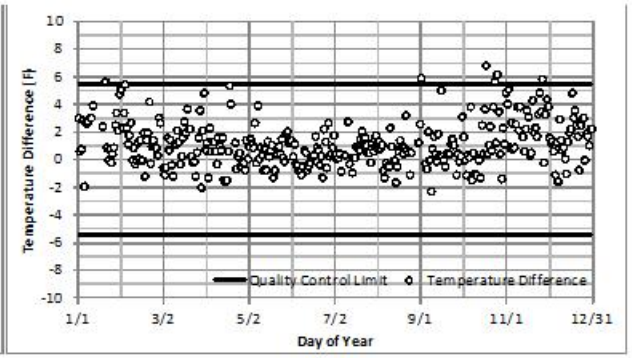


Air Temperature

Carmel

2009





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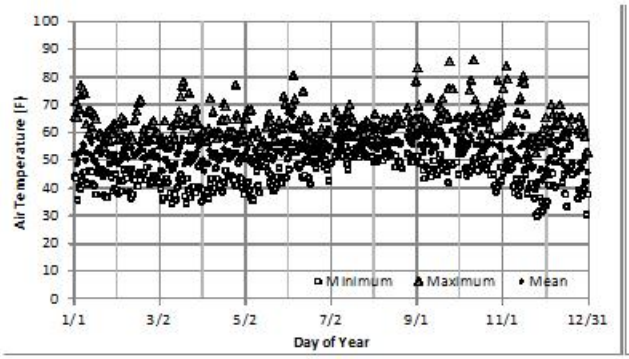

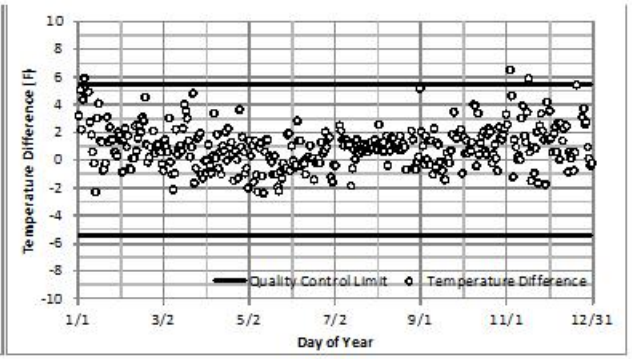

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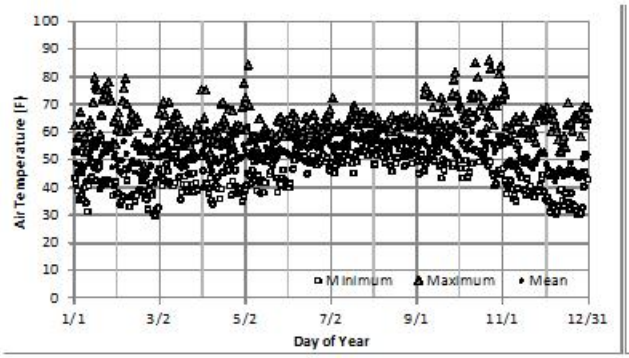

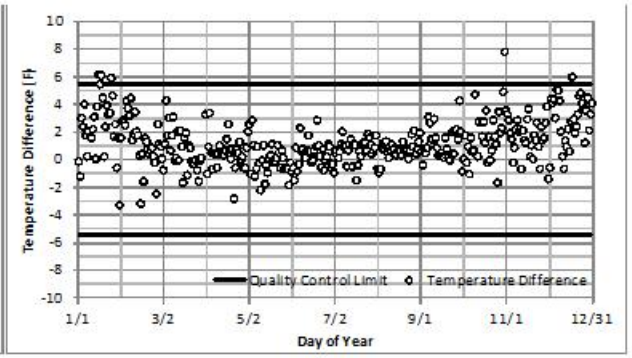

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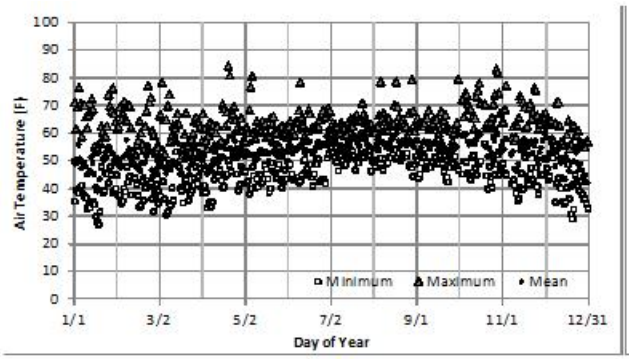
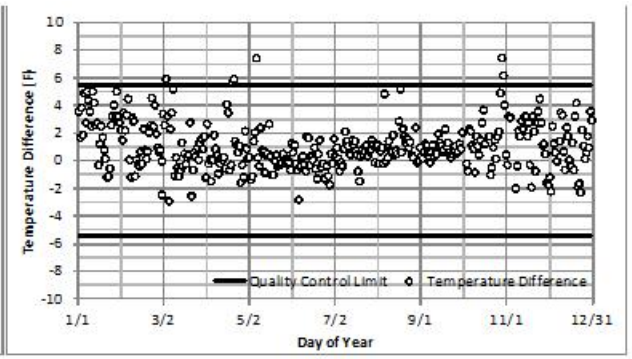
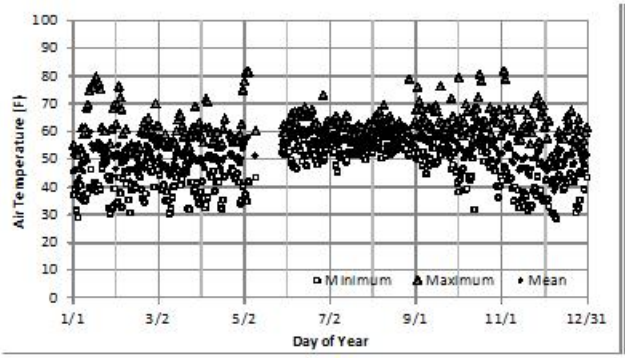
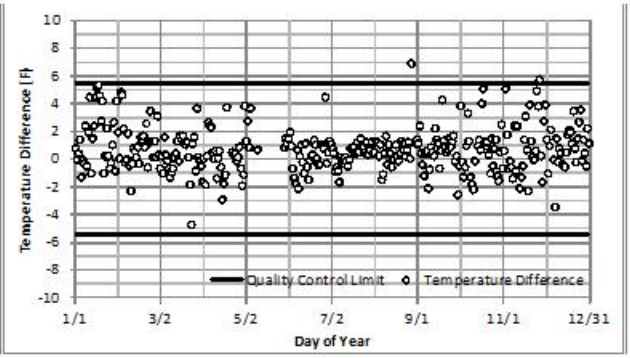




Castroville

2009





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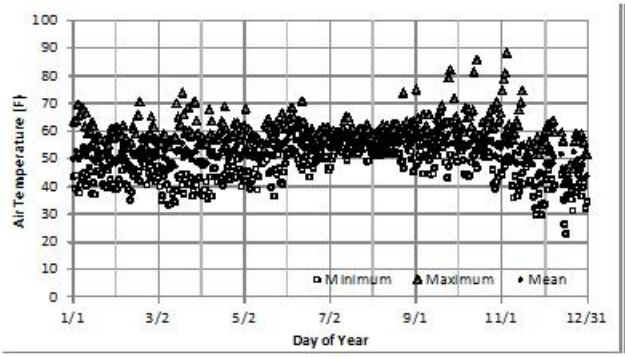

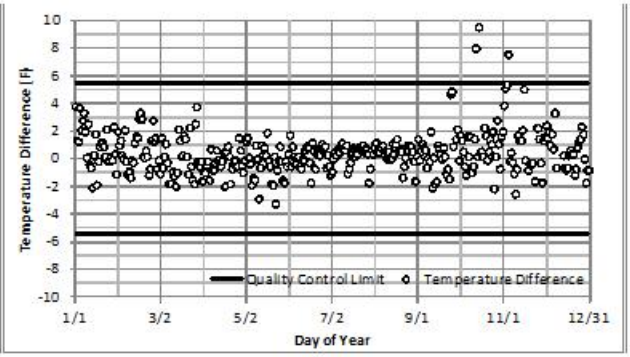

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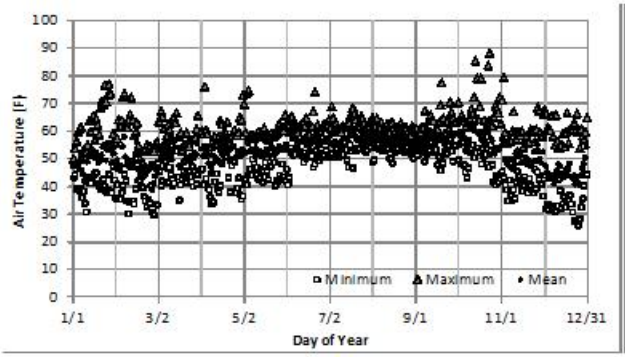

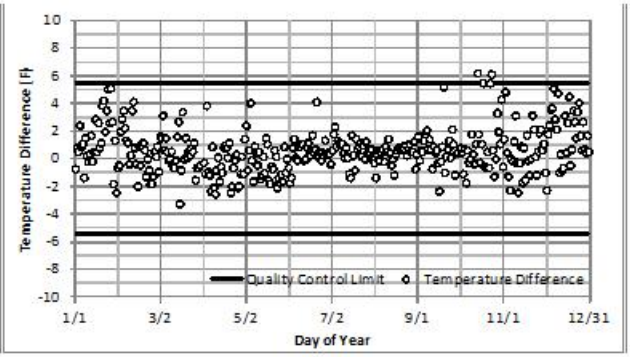

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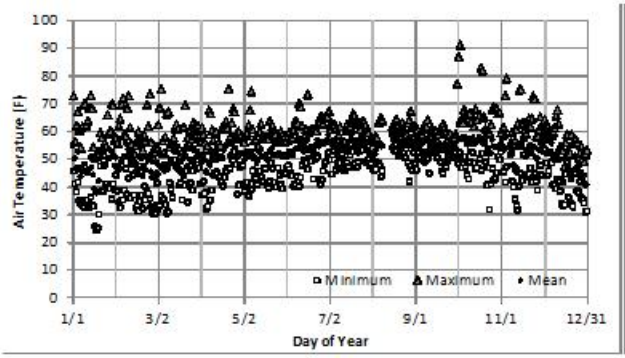
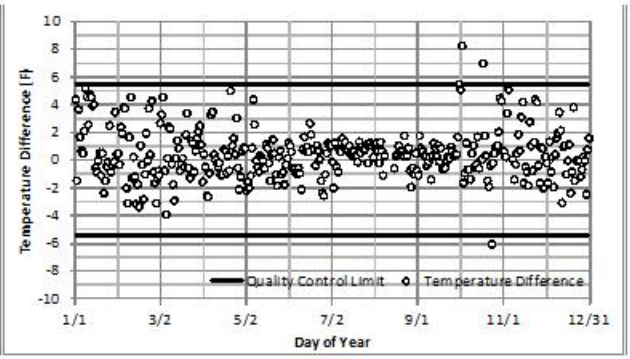
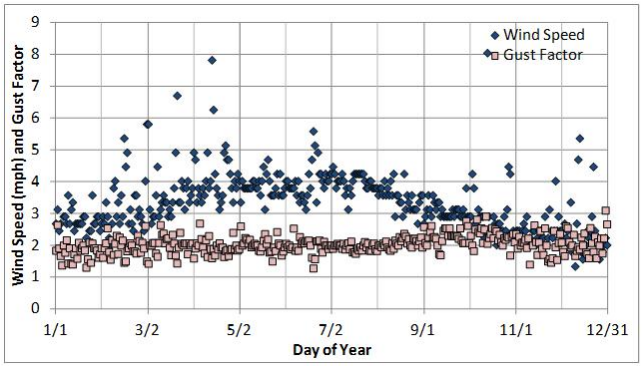




Wind Speed
Carmel

2009



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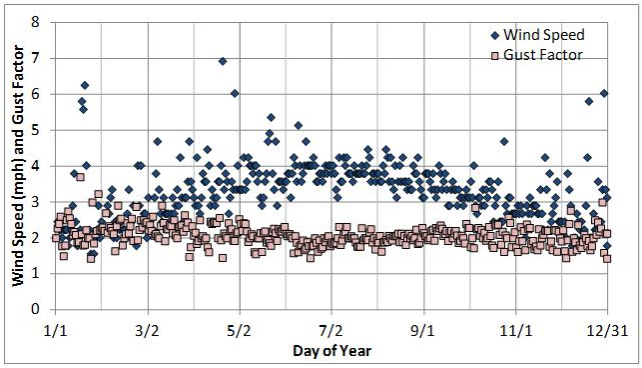

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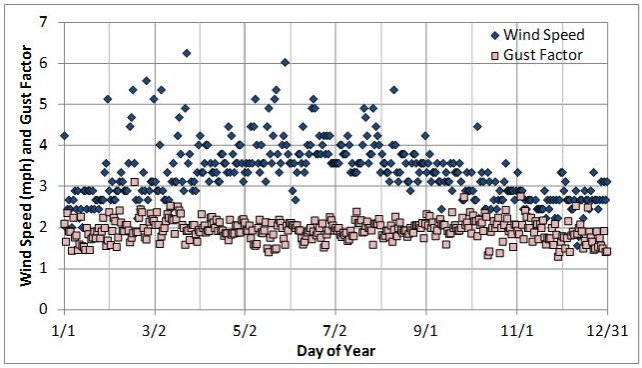

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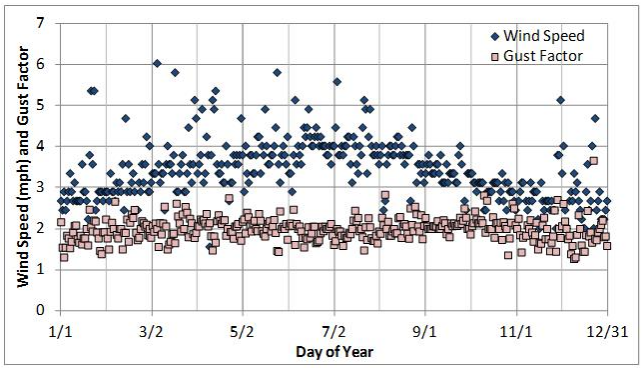
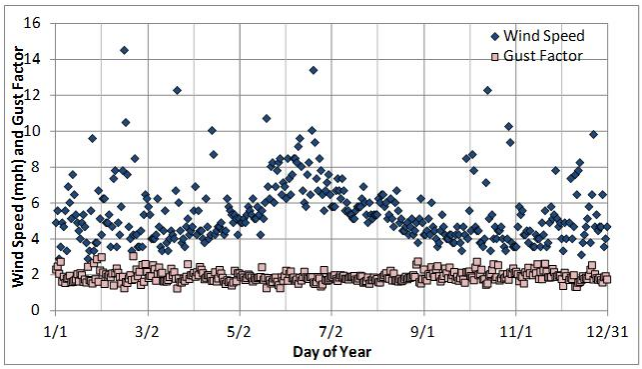


Castroville

2009



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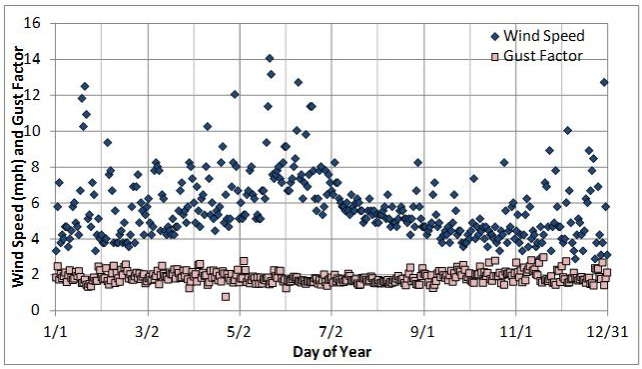

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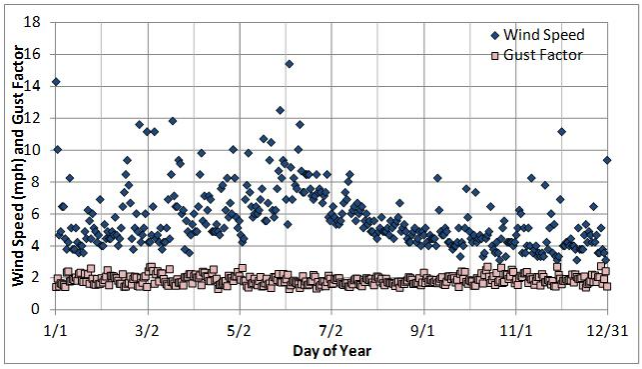

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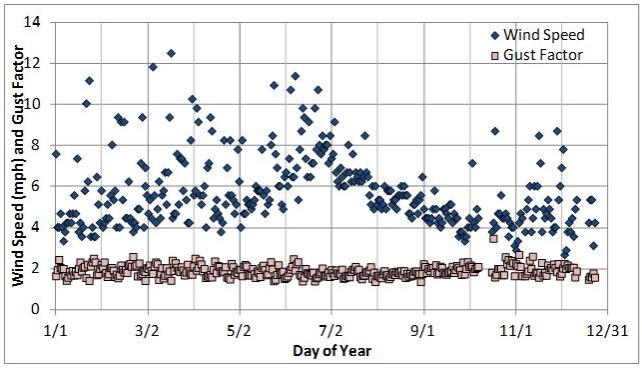


Attachment 3
Present Points of Diversion for License 13868 and
Proposed Points of Diversion for License 13868A

Present Points of Diversion (License 13868)

Eastwood/Odello Well 1: By California Coordinate System of 1983, Zone 4, North 2,091,022 feet and East 5,709,377 feet, being within the SE¼ of SW¼ of projected Section 18, T16S, R1E, MDB&M.

Eastwood/Odello Well 2: By California Coordinate System of 1983, Zone 4, North 2,090,640 feet and East 5,706,710 feet, being within the SE¼ of SE¼ of projected Section 18, T16S, R1W, MDB&M.

Proposed Points of Diversion (License 13868A)

Eastwood/Odello Well 1: By California Coordinate System of 1983, Zone 4, North 2,091,022 feet and East 5,709,377 feet, being within the SE¼ of SW¼ of projected Section 18, T16S, R1E, MDB&M.

Eastwood/Odello Well 2: By California Coordinate System of 1983, Zone 4, North 2,090,640 feet and East 5,706,710 feet, being within the SE¼ of SE¼ of projected Section 18, T16S, R1W, MDB&M.

Cal-Am Cañada No. 2 Well: By California Coordinate System of 1983, Zone 4, North 2,091,940 feet and East 5,715,090 feet, being within the NE¼ of SW¼ of projected Section 17, T16S, R1E, MDB&M.

Cal-Am Cypress No. 2 Well: By California Coordinate System of 1983, Zone 4, North 2,087,670 feet and East 5,724,620 feet, being within the SW¼ of NW¼ of projected Section 22, T16S, R1E, MDB&M.

Cal-Am Pearse Well: By California Coordinate System of 1983, Zone 4, North 2,087,390 feet and East 5,726,110 feet, being within the SE¼ of NW¼ of projected Section 22, T16S, R1E, MDB&M.

Cal-Am Schulte No. 2 Well: By California Coordinate System of 1983, Zone 4, North 2,087,390 feet and East 5,729,140 feet, being within the SE¼ of NW¼ of projected Section 22, T16S, R1E, MDB&M.

Cal-Am Begonia No. 2 Well: By California Coordinate System of 1983, Zone 4, North 2,085,380 feet and East 5,734,460 feet, being within the SW¼ of SW¼ of projected Section 24, T16S, R1E, MDB&M.

Cal-Am Berwick No. 8 Well: By California Coordinate System of 1983, Zone 4, North 2,084,470 feet and East 5,736,100 feet, being within the SE¼ of SW¼ of projected Section 24, T16S, R1E, MDB&M.

Cal-Am Berwick No. 9 Well: By California Coordinate System of 1983, Zone 4, North 2,084,450 feet and East 5,735,220 feet, being within the SW¼ of SW¼ of projected Section 24, T16S, R1E, MDB&M.

Attachment 4
Present Place of Use for License 13868 and
Proposed Place of Use for License 13868A

Present Place of Use (License 13868)

12.7 acres within SW¼ of SE¼ of projected Section 13, T16S, R1W, MDB&M
15.8 acres within SE¼ of SE¼ of projected Section 13, T16S, R1W, MDB&M
3.8 acres within NW¼ of NE¼ of projected Section 24, T16S, R1W, MDB&M
18.1 acres within NE¼ of NE¼ of projected Section 24, T16S, R1W, MDB&M
17.4 acres within SW¼ of SW¼ of projected Section 18, T16S, R1E, MDB&M
11.8 acres within SE¼ of SW¼ of projected Section 18, T16S, R1E, MDB&M
18.4 acres within NW¼ of NW¼ of projected Section 19, T16S, R1E, MDB&M
1.0 acre within NE¼ of NW¼ of projected Section 19, T16S, R1E, MDB&M

99.0 acres total, as shown on map dated June 20, 2012 on file with the State Water Board

Proposed Place of Use (License 13868A)

12.7 acres within SW¼ of SE¼ of projected Section 13, T16S, R1W, MDB&M
15.8 acres within SE¼ of SE¼ of projected Section 13, T16S, R1W, MDB&M
3.8 acres within NW¼ of NE¼ of projected Section 24, T16S, R1W, MDB&M
18.1 acres within NE¼ of NE¼ of projected Section 24, T16S, R1W, MDB&M
17.4 acres within SW¼ of SW¼ of projected Section 18, T16S, R1E, MDB&M
11.8 acres within SE¼ of SW¼ of projected Section 18, T16S, R1E, MDB&M
18.4 acres within NW¼ of NW¼ of projected Section 19, T16S, R1E, MDB&M
1.0 acre within NE¼ of NW¼ of projected Section 19, T16S, R1E, MDB&M

99.0 acres total, as shown on map dated June 20, 2012 on file with the State Water Board

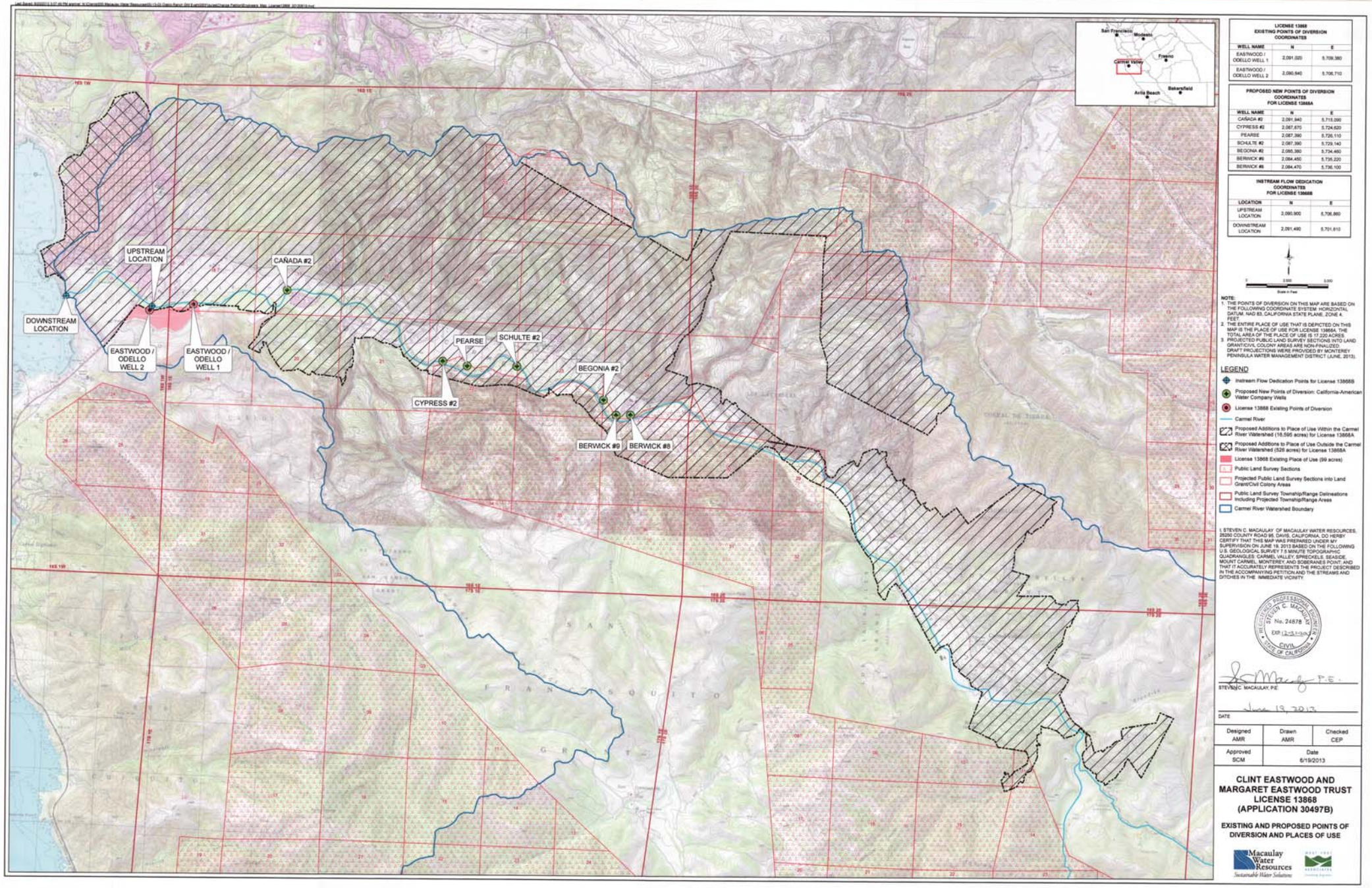
and

a total of 16,595 acres within the California-American Water Company's service area and within Carmel River watershed,

and

a total of 526 acres within the California-American Water Company's service area and the City of Carmel.

All of these areas are shown on map dated June 19, 2013. An 8½ x 11-inch copy of this map is the next page of this Attachment 4. The 22 x 34-inch original of this map is being filed with this petition.



LICENSE 13868
EXISTING POINTS OF DIVERSION COORDINATES

WELL NAME	N	E
EASTWOOD / ODELLO WELL 1	2,091,020	5,709,380
EASTWOOD / ODELLO WELL 2	2,090,940	5,706,710

PROPOSED NEW POINTS OF DIVERSION COORDINATES FOR LICENSE 13868A

WELL NAME	N	E
CAÑADA #2	2,091,940	5,715,090
CYPRESS #2	2,087,670	5,724,620
PEARSE	2,087,390	5,726,110
SCHULTE #2	2,087,390	5,729,140
BEGONIA #2	2,085,390	5,734,460
BERWICK #9	2,084,450	5,735,220
BERWICK #8	2,084,470	5,736,100

INSTREAM FLOW DEDICATION COORDINATES FOR LICENSE 13868B

LOCATION	N	E
UPSTREAM LOCATION	2,090,900	5,706,860
DOWNSTREAM LOCATION	2,091,490	5,701,610

0 2,500 5,000
Scale in Feet

NOTE:
1. THE POINTS OF DIVERSION ON THIS MAP ARE BASED ON THE FOLLOWING COORDINATE SYSTEM: HORIZONTAL DATUM: NAD 83, CALIFORNIA STATE PLANE, ZONE 4, FEET.
2. THE ENTIRE PLACE OF USE THAT IS DEPICTED ON THIS MAP IS THE PLACE OF USE FOR LICENSE 13868A. THE TOTAL AREA OF THE PLACE OF USE IS 17,220 ACRES.
3. PROJECTED PUBLIC LAND SURVEY SECTIONS INTO LAND GRANT/CIVIL COLONY AREAS ARE NON-FINALIZED DRAFT PROJECTIONS WERE PROVIDED BY MONTEREY PENINSULA WATER MANAGEMENT DISTRICT (JUNE, 2013).

LEGEND

- Instream Flow Dedication Points for License 13868B
- Proposed New Points of Diversion: California-American Water Company Wells
- License 13868 Existing Points of Diversion
- Carmel River
- Proposed Additions to Place of Use Within the Carmel River Watershed (16,595 acres) for License 13868A
- Proposed Additions to Place of Use Outside the Carmel River Watershed (526 acres) for License 13868A
- License 13868 Existing Place of Use (99 acres)
- Public Land Survey Sections
- Projected Public Land Survey Sections into Land Grant/Civil Colony Areas
- Public Land Survey Township/Range Delineations including Projected Township/Range Areas
- Carmel River Watershed Boundary

I, STEVEN C. MACAULAY OF MACAULAY WATER RESOURCES, 29250 COUNTY ROAD 95, DAVIS, CALIFORNIA, DO HEREBY CERTIFY THAT THIS MAP WAS PREPARED UNDER MY SUPERVISION ON JUNE 19, 2013 BASED ON THE FOLLOWING U.S. GEOLOGICAL SURVEY 7.5 MINUTE TOPOGRAPHIC QUADRANGLES: CARMEL VALLEY, SPRECKELS, SEASIDE, MOUNT CARMEL, MONTEREY, AND SOBERANES POINT; AND THAT IT ACCURATELY REPRESENTS THE PROJECT DESCRIBED IN THE ACCOMPANYING PETITION AND THE STREAMS AND DITCHES IN THE IMMEDIATE VICINITY.

REGISTERED PROFESSIONAL ENGINEER
STEVEN C. MACAULAY
No. 24878
Exp. 12-31-14
CIVIL
STATE OF CALIFORNIA

STEVEN C. MACAULAY, P.E.

DATE June 19, 2013

Designed	Drawn	Checked
AMR	AMR	CEP
Approved	Date	
SCM	6/19/2013	

CLINT EASTWOOD AND MARGARET EASTWOOD TRUST LICENSE 13868 (APPLICATION 30497B)

EXISTING AND PROPOSED POINTS OF DIVERSION AND PLACES OF USE

Macaulay Water Resources
Sustainable Water Solutions

Attachment 5
Present Purpose of Use for License 13868 and
Proposed Purpose of Use for License 13868A

Present Purpose of Use (License 13868): irrigation

Proposed Purpose of Use (License 13868A): irrigation and municipal

Attachment 6
Upstream and Downstream Locations for Instream Flow Dedication for License 13868B

Upstream Location: By California Coordinate System of 1983, Zone 4, North 2,090,900 feet and East 5,706,860 feet.

Downstream Location: By California Coordinate System of 1983, Zone 4, North 2,091,490 feet and East 5,701,610 feet.

These points are shown on the map that is included in Attachment 4.

Attachment 7
Access to Proposed Points of Diversion for License 13868A

Licensees propose to have the California-American Water Company ("Cal-Am") divert water under License 13868A and to convey this water through Cal-Am's existing system to water users on existing lots of record within the proposed place of use. Licensees have executed a memorandum of understanding ("MOU") with Cal-Am for these diversions and conveyances. A copy of this MOU is included in this Attachment 7. Licensees intend to execute the agreement with Cal-Am that is described in the MOU.

Memorandum of Understanding Regarding Proposed Actions and Proposed Process for Collaboration and Coordination on Community and Environmental Benefits from Use of the Eastwood/Odello Water Right

This Memorandum of Understanding (MOU) is entered into as of June 7, 2013 by and between California American Water Company (Cal-Am) and the Margaret Eastwood Trust U/D/T dated August 21, 1990 and Clint Eastwood (collectively, Eastwood).

Recitals

Cal-Am and Eastwood

A. Cal-Am is a utility that owns and operates wells, infrastructure and a water distribution system that provides municipal water service to water users in the Monterey Peninsula area, including for lots of record in the Carmel River watershed and the City of Carmel.

B. Eastwood is the owner of the Odello East part of the former Odello Ranch (Monterey County Assessor's Parcel Numbers 243-071-003, 243-071-004 and 243-071-006) and an appropriative water right that authorizes the diversion and use of water on this Odello Ranch property under Water Right License 13868.This water right is referred to in this MOU as the "Eastwood/Odello water right."

State Water Board and California Public Utilities Commission Orders Relating to Cal-Am's Diversion and Use of Carmel River Water

C. State Water Resources Control Board (SWRCB) Order WR 95-10: (1) determined (among other matters) that Cal-Am had been diverting water supplies from the Carmel River that were not authorized under Cal-Am's water rights; and (2) required (among other matters) Cal-Am to diligently implement one or more actions to reduce Cal-Am's unauthorized diversions from the Carmel River (term 2 on page 40 of Order 95-10). One of the actions listed in this Term 2 is contracting with holders of appropriative rights to divert and use water from the Carmel River.

D. Term 11 on page 63 of SWRCB Order WR 2009-0060 requires Cal-Am to comply with Order WR 95-10, including term 2 of that order.

E. Under Order WR 2009-0060 and California Public Utilities Commission (CPUC) Decision 11-03-048, Cal-Am is prohibited from making new connections or allowing certain types of increases in use of water by existing customers that would be or are being served by Cal-Am's diversions of water from the Carmel River and associated aquifer.

Big Sur Land Trust's Lagoon Enhancement and Floodplain Restoration and Environmental Enhancement Projects

F. The Big Sur Land Trust and other entities are developing the Carmel River Floodplain Restoration and Environmental Enhancement Project in the Carmel River watershed and

Monterey County and other entities are developing the Carmel Lagoon Enhancement Project. The Carmel Lagoon Enhancement Project will improve fish and wildlife habitat and management of the lagoon west of Highway 1 where the Carmel River meets the ocean. The Carmel River Floodplain Restoration and Environmental Enhancement Project will improve flood protection, restore and protect riparian habitats and wildlife and provide public access and recreation on the Odello Ranch property east of Highway 1. The Carmel Lagoon Enhancement Project is described in attached Exhibit 1. The Carmel River Floodplain Restoration and Environmental Enhancement Project is described in attached Exhibit 2.

Eastwood Land and Water Donations

G. In 1997, Eastwood canceled permits for development of 82 homesites on the Odello East property and donated approximately 49 acres of the 131 acre Odello East property and an agricultural water supply to the Big Sur Land Trust.

H. Eastwood still owns the remaining approximately 82 acres of the Odello East property and is planning to donate this property to the Big Sur Land Trust or other donee to facilitate the floodplain restoration project. This property currently is being used for irrigated pasture. After the donation is completed, the Big Sur Land Trust or other donee will restore native vegetation on this property as part of the floodplain restoration project. The Eastwood/Odello water rights will not be needed for irrigation of this property after the native habitat is established on the property.

I. Cal-Am shares Eastwood's support for the Carmel Lagoon Enhancement Project and the Carmel River Floodplain Restoration and Environmental Enhancement Project, and Eastwood's interest in using the Eastwood/Odello water rights for the community and environmental benefits described in these recitals.

Proposed Actions

J. Consistent with Article X, Section 2 of the California Constitution, California water rights law and the public trust doctrine, Eastwood proposes to use the Eastwood/Odello water right for the following uses: (1) for use by Cal-Am on an interim basis to reduce deficits in Cal-Am's rights to divert Carmel River water supplies, consistent with term 2on page 40 of Order WR 95-10; (2) for use on existing lots of record within the Carmel River watershed or the City of Carmel for new connections or increased uses of water at existing service addresses; and (3) to protect and enhance the Carmel River and associated environment, by dedicating a portion of this water right to Carmel River instream flows and the associated groundwater aquifer (i.e., water under this portion of the water right will no longer be diverted or pumped). These diversions and uses will occur after all necessary approvals have been issued by all applicable regulatory agencies, including the SWRCB, the CPUC and the MPWMD, and the time to appeal or otherwise challenge the legality of such regulatory agency actions has lapsed with no appeal or other challenge being filed.

K. Eastwood's donation of the remaining Odello East property will occur immediately after final regulatory approvals referred to in the preceding recital.

Process

L. This MOU confirms the proposed actions that Cal-Am and Eastwood plan to take in furtherance of these shared interests. These proposed actions are described in Exhibit A to this MOU.

Agreement

The parties agree as follows.

1. They will collaborate and coordinate on the proposed actions described in Exhibit A to this MOU.

2. The parties recognize and acknowledge that the proposed actions described in Exhibit A are subject to regulatory and environmental approvals, and accordingly, this MOU is not a binding commitment by either party to any particular action.

The forgoing is agreed to by the parties.

Dated: 6/21, 2013

California American Water Company

By: _____

Dated: 6/11, 2013

Margaret Eastwood Trust and
Clint Eastwood

By: _____
Roy D. Kaufman, Business Manager

EXHIBIT A
Proposed Actions and Proposed Process for Collaboration and Coordination on Community and Environmental Benefits from Use of Eastwood/Odello Water Right

Proposed Actions

Proposed Eastwood and Cal-Am Actions

- Eastwood will form a limited liability company (LLC) for the purposes of holding and administering water right License 13868A and entering into subscription agreements, as described in the following paragraphs.
- Eastwood will file a petition with the SWRCB: (1) to split Eastwood's water-right License 13868 into two parts; (2) to add seven of Cal-Am's wells to the authorized points of diversion and to add the part of Cal-Am's service area that is in the Carmel Valley watershed or the City of Carmel to the authorized place of use in one of the licenses (which will be designated License 13868A); and (3) to assign this new license to the LLC.
- Eastwood will work with the SWRCB to prepare an environmental impact report on Eastwood's petition. The SWRCB will certify the final EIR.
- The consumptive-use portion of Eastwood's existing use under water-right License 13868 (approximately 85 af/yr) will be the authorized annual diversion rate in the new License 13868A that will be assigned to the LLC. When that assignment is completed, Eastwood will stop diverting water under License 13868 for irrigation of the Odello East property (except that some temporary diversions for irrigation to establish native vegetation or to facilitate the Big Sur Land Trust's irrigation of its existing property may occur).
- The other license (which will be designated License 13868B) will be for the remainder of License 13868. This license will be for approximately 45 af/yr of instream use in the Carmel River and associated aquifer (i.e., no water will be pumped or diverted under this license).
- The LLC will enter into subscription agreements with owners of parcels in the part of Cal-Am's service area that is within the Carmel River watershed or the City of Carmel. Under these agreements, these parcel owners will receive contractual rights to use their parts of the LLC's water right for water supplies for new construction or remodels on existing lots of record. The subscription agreements will require subscribers to satisfy and comply with all applicable requirements of various regulatory agencies, including but not limited to, the SWRCB, the CPUC, and the MPWMD. The subscription agreements and water-use permits issued by MPWMD will run with the land and will not be transferable.
- Eastwood will request the Monterey Peninsula Water Management District to adopt a new rule, similar to Rule 23.5 (which was used for the Pebble Beach subscription agreements), under which the District will issue water use permits to the parcel owners who have entered into subscription agreements with the LLC.

Proposed Water Supply Conveyance and Temporary Water Transfer Agreement

- Eastwood and Cal-Am will enter into a water supply conveyance and temporary water transfer agreement that includes these provisions:
    - Cal-Am will, upon the SWRCB, the MPWMD, and the CPUC issuing approvals satisfactory to Cal-Am, pump (using existing Cal-Am wells), convey and deliver water under the LLC's water right License 13868A to owners of parcels who have signed subscription agreements. As necessary, Cal-Am will provide new meters and connections to such subscribers.
    - Cal-Am will charge the parcel owners with subscription agreements for water deliveries on a rate schedule that will include all of Cal-Am's regular charges for water service, and such services will be subject to Cal-Am's CPUC-approved tariffs, as they might be modified from time to time.
    - After the SWRCB, the MPWMD and the CPUC have issued the regulatory approvals described above, Cal-Am will divert and use water under the unused portion of the LLC's water right License 13868A each year for diversions from the Carmel River for deliveries to Cal-Am's customers in the Carmel River watershed or the City of Carmel. These diversions and use will be part of Cal-Am's compliance with term 2 on page 40 of Order WR 95-10, under which Cal-Am may contract with holders of appropriative rights to divert and use water from the Carmel River. As the parcel owners that sign subscription agreements with the Eastwood LLC use more water under License 13868A, there will be corresponding reductions in the amount of water that will be available for use by Cal-Am under License 13868A.
    - Cal-Am will not have to pay the LLC for Cal-Am's diversions and use under License 13868A.

Proposed Process

- Eastwood's change petition with the SWRCB will ask the SWRCB to confirm that SWRCB Order WR 2009-0060 (as modified by Order WR 2010-0001) does not prohibit Cal-Am from diverting and conveying water under the Eastwood LLC's water-right License 13868A to Eastwood's subscribers.
- Cal-Am will seek a modification of CPUC Decision 11-03-048 to clarify that the moratorium ordered by the Decision does not apply to connections to Cal-Am's system by Eastwood's subscribers.
- Eastwood will ask the MPWMD to adopt a new rule, similar to Rule 23.5, under which the District will issue water use permits to the Eastwood subscribers.
- After the SWRCB, the CPUC and the MPWMD have taken the necessary regulatory actions, Cal-Am will convey and deliver water to Eastwood subscribers that have received water-use permits from the MPWMD, and Cal-Am will provide any necessary new meters and connections for such subscribers. After these regulatory actions have occurred, Cal-Am will use any available surplus under License 13868A to divert water from the Carmel Valley aquifer through the wells designated as points of diversion in License 13868A and to supply the diverted water to its existing customers in the Carmel River watershed or the City of Carmel.
- Eastwood and Cal-Am will coordinate with each other to provide information on the proposal to the community.

- Cal-Am has determined that Cal-Am's Rancho Cañada No. 2, Cypress No. 2, Pearce, Schulte No. 2, Begonia No. 2, Berwick No. 8, and Berwick No. 9 Wells will have sufficient capacity to pump all of the water that will be pumped under License 13868A, and that water pumped by these wells under License 13868A can be conveyed to all of Eastwood's subscribers. Accordingly, Eastwood's petition will include these seven wells as the only proposed new points of diversion for the LLC's water-right License 13868A.
- Eastwood and Cal-Am will develop a schedule for completing and implementing the proposed agreement and related actions.

Exhibit 1

Project Description for the Carmel River Lagoon Enhancement Project

The following text is excerpted from pages 1-2 of the Carmel River Lagoon Enhancement and Management Plan: Conceptual Design Report, prepared for the Monterey Peninsula Regional Park District, the California State Coastal Conservancy and the California Department of Parks and Recreation, by Philip Williams & Associates, September 1999:

"The Carmel River Lagoon is located at the mouth of the river, just south of the town of Carmel, in Monterey County . . . . Most of the lagoon and existing wetlands are located within the Carmel River Lagoon and Wetlands Natural Preserve, an element of the Carmel River State Beach which is owned and managed by the California Department of Parks and Recreation (DPR).

"The general area of interest includes lands west of Highway 1, and includes the Carmel River Channel and adjacent former riparian areas, and the lagoon and wetlands which occur landward of the barrier beach. Key infrastructure elements include the Carmel Area Wastewater District Treatment Plant (CAWD-TP) (located on the south side of the river channel) and the CAWD-TP access road extending west from Highway 1.

"The project site described in this report includes a portion of the 155 acres of floodplain land southeast of the river; about 100 acres of this land has been leveled and used for agricultural production for many years. This 100-acre site (referred to as "the site") is the primary focus of the current project (this site is frequently referred to as "Odello West," in reference to the family that has farmed the land for several generations, and to distinguish it from similar floodplain agricultural land east of Highway 1 (referred to as "Odello East," . . .).

"The Carmel River and Lagoon has long been recognized for its importance as a south-central California coastal steelhead (*Oncorhynchus mykiss*) fishery, in addition to providing habitat for numerous other biotic species. The nonprofit Carmel River Steelhead Association, recognizing the declining habitat conditions for the fishery, worked with the local agencies (Coastal Conservancy, DPR and others) to initiate enhancement planning at the lagoon about a decade ago. The planning study was developed to identify alternatives for enhancing the habitat value of the entire lagoon and wetland complex and for increasing habitat on the adjacent floodplain. A secondary purpose was to identify management alternatives and mitigation measures for meeting the needs of local agencies. The report from this study (Carmel River Lagoon Conceptual Enhancement Plan; PWA, 1992) provided conceptual enhancement approaches for various elements of the overall area. Caltrans has initiated some elements of this plan on a 20-acre site immediately adjacent to the south bank of the river. Several elements of the 1992 plan are included in the present project:

- Expand the South Arm of the lagoon
- Restore riparian forest
- Construct access trails"

Exhibit 2

Project Description for the Carmel River Floodplain Restoration and Environmental Enhancement Project

The following text is excerpted from page 1 of the Initial Study/Mitigated Declaration for the Carmel River Floodplain Restoration and Environmental Enhancement Project (SCH# 2011021038), prepared by Big Sur Land Trust and Monterey County Water Resources Agency, as modified by page 17 of the Final/Initial Study/Mitigated Declaration, April 15, 2010:

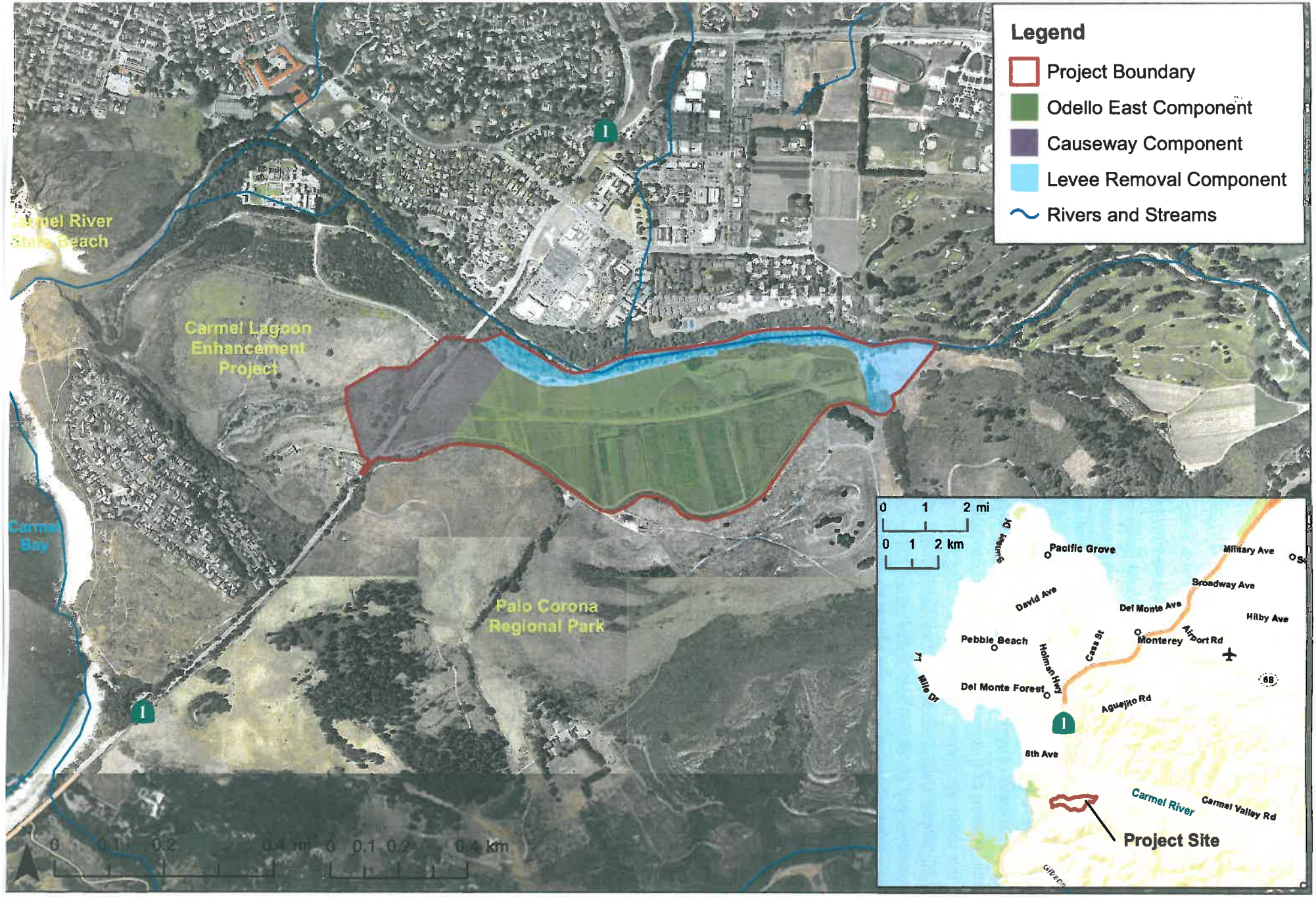
"The Big Sur Land Trust, a 501(c)(3) non-profit organization, is proposing to enhance native riparian and wetland habitat and hydrologic function to a portion of the lower floodplain along the Carmel River on property owned by the Big Sur Land Trust, California State Parks (State Parks), Monterey Peninsula Regional Park District, and Clint and Margaret Eastwood (APN 243-071-006-000, 243-021-007-000, 243-071-003-000, and 157-121-001-000). The proposed Carmel River Floodplain Restoration and Environmental Enhancement Project (hereinafter referred to as the "Proposed Project," "Project," or "Restoration Project,") is located at the downstream end of the Carmel River Watershed, approximately one mile from its mouth and immediately east of State Route 1 (SR 1.); . . . . A small portion of the Project is also located west of SR 1. The Proposed Project consists of three distinct, but related, Project action/components, each of which would be completed based on available funding.

"The initial Project action, commonly referred to as the Odello East Component . . . consists of 1) grading the existing farmland and access road to create an elevated agricultural preserve on approximately 40 acres on the southern edge of the Odello East site outside of the 100-year floodplain elevation; and 2) grading to restore the site's ecological function as a floodplain by creating the hydrological characteristics necessary to support floodplain restoration activities on approximately 55 acres of existing farmland. A portion of the agricultural preserve would be graded to accommodate future fill material as part of subsequent Project components/action. The second Project action, referred to as the Causeway Component, consists of replacing a portion of the SR 1 roadway embankment with a 520-foot long causeway. . . . The third Project action, referred to as the Levee Component, consists of 1) removing approximately 2,400 linear feet of non-structural earthen levees on the south side of the Carmel River channel, and 2) grading at the eastern boundary of the Project site on property owned by the Monterey Peninsula Regional Park District in order to encourage flood flows to enter into the south floodplain area at Odello East. . . . ."

Exhibit 3

Vicinity Map for the Carmel River Lagoon Enhancement Project and the Carmel River Floodplain Restoration and Environmental Enhancement Project

(This exhibit is a copy of Figure 1.2 of the Final/Initial Study/Mitigated Declaration for the Carmel River Floodplain Restoration and Environmental Enhancement Project (SCH# 2011021038), prepared by Big Sur Land Trust and Monterey County Water Resources Agency, April 15, 2010.)



San Jose
Salinas

Title: **Vicinity Map**

File: VicinityMap.mxd

Date: 2-4-2011

Scale: 1 inch = 0.23 miles

Project: 2803 Odello East

Monterey | San Jose
Denise Duffy and Associates, Inc.
Environmental Consultants Resource Planners
947 Cass Street, Suite 5
Monterey, CA 93940
(831) 373-4341

Figure 1.2