

ACTUAL EVAPOTRANSPIRATION ANALYSIS

March 2023

Prepared for
East Kaweah Groundwater Sustainability Agency



2020 L Street, Ste 210
Sacramento, CA
Contact: Joel Kimmelshue
916.265.6330

MAY 03, 2023

SUMMARY

TABLE 1. SUMMARY OF GSA ET AND PRECIPITATION (117,346 AC)

	ET (ac-ft)	Precipitation (ac-ft)
2023 Allocation Year to date (OCT 1, 2022 - MAR 31, 2023)	67,648	183,172
2022 Allocation Year to date (OCT 1, 2021 - Mar 31, 2022)	74,582	79,887
Allocation Year 2022 (OCT 1, 2021 - SEP 30, 2022)	257,412	84,548
Allocation Year 2021 (OCT 1, 2020 - SEP 30, 2021)	256,327	45,974

TABLE 2. SENSORS USED IN DAILY AND MONTHLY ET_A ANALYSIS BY CROP CATEGORY

	Number of Active Stations	Number of Used Stations in model
Alfalfa	8	6
Almonds	15	10
Annual	6	2
Citrus	12	7
Fallow/Native	10	8
Grapes	7	6
Olives	0	0
Pistachios	14	13
Pomegranates	1	0
Walnuts	2	1

TABLE 3. PRECIPITATION MEASURED BY FIELD STATIONS

Station ID	Source	March Precipitation (in)	Year to Date (Oct 1, 2022 - Mar 31, 2023)
CIMIS #205: Coalinga	CIMIS	2.17	9.67
CIMIS #5: Shafter	CIMIS	2.32	9.24
CIMIS #15: Stratford	CIMIS	2.54	10.2
CIMIS #2: FivePoints	CIMIS	1.98	10.51
CIMIS #146: Belridge	CIMIS	2.03	12.53
CIMIS #39: Parlier	CIMIS	5.46	9.53
CIMIS #105: Westlands	CIMIS	1.74	1.58
CIMIS #80: Fresno State	CIMIS	4.3	10.33
CIMIS #182: Delano	CIMIS	3.5	12.38
CIMIS #258: Lemon Cove	CIMIS	7.46	15.39
CIMIS #125: Arvin_Edison	CIMIS	3.11	10.29
CIMIS #7: Firebaugh	CIMIS	2.03	3.08
CIMIS #206: Denair II	CIMIS	3.94	6.27
LandIQ_EK_Full_Sumos	Land IQ	5.77	14.4
LandIQ_GK_Full_Murcotts	Land IQ	6.11	19.86

CIMIS - California Irrigation Management Information System; CNRFC - California Nevada River Forecast Center; GHCN - Global Historical Climate Network.

REMOTE SENSING RESULTS

TABLE 4. IMAGE DATES AND SOURCES

Date	Image Source
3/2/2023	Sentinel-2
3/13/2023	Landsat-8
3/27/2023	Sentinel-2

TABLE 5. MONTHLY GSA ET_A

Unit	OCT, 2022	NOV, 2022	DEC, 2022	JAN, 2023	FEB, 2023	MAR, 2023
(mm)	40.9	19.8	11.5	21.2	30.8	51.9
(inch)	1.6	0.8	0.5	0.8	1.2	2.0
(AF)	15,727	7,632	4,427	8,149	11,856	19,967

TABLE 6. MONTHLY FIELD ET_A

ET _A (in) Including Fallow							
	Field Size (ac)	OCT, 2022	NOV, 2022	DEC, 2022	JAN, 2023	FEB, 2023	MAR, 2023
Maximum	230.1	3.3	1.6	0.8	1.4	1.9	3.1
Minimum	0.04	0.0	0.0	0.2	0.1	0.4	0.0
Average	10.1	1.9	0.9	0.5	0.9	1.2	2.0
ET _A (in) Excluding Fallow							
	Field Size (ac)	OCT, 2022	NOV, 2022	DEC, 2022	JAN, 2023	FEB, 2023	MAR, 2023
Maximum	230.1	3.3	1.6	0.8	1.4	1.9	3.1
Minimum	0.04	0.0	0.0	0.2	0.1	0.4	0.0
Average	10.3	2.1	1.0	0.5	0.9	1.2	2.0

TABLE 7. MONTHLY GSA PRECIPITATION

Precipitation Unit	OCT, 2022	NOV, 2022	DEC, 2022	JAN, 2023	FEB, 2023	MAR, 2023
(mm)	0.0	19.8	97.7	113.6	87.4	157.1
(inch)	0.0	0.8	3.8	4.5	3.4	6.2

(AF)	0	7,628	37,624	43,744	33,651	60,464
------	---	-------	--------	--------	--------	--------

ACCURACY OF REMOTE SENSING RESULTS

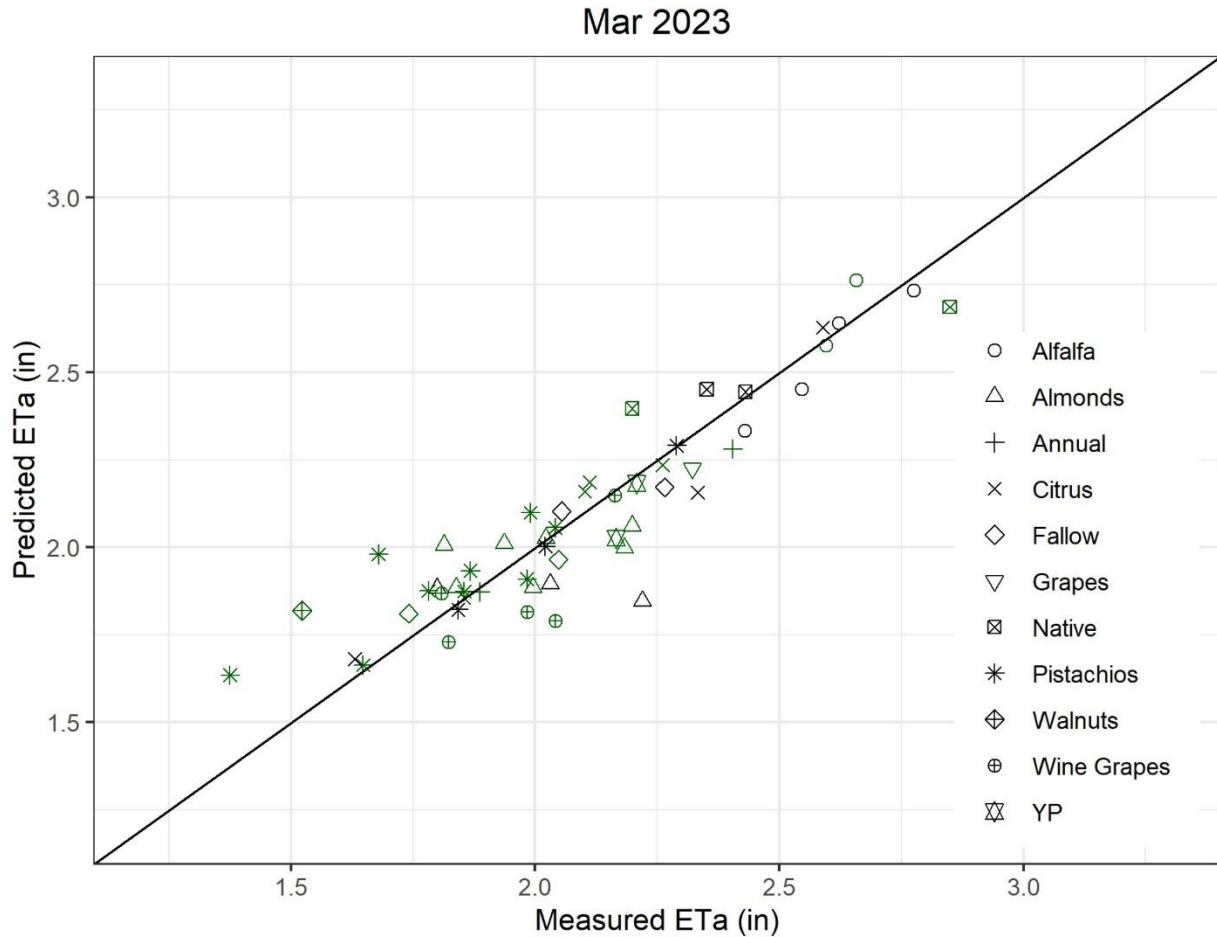


FIGURE 1. MEASURED VERSUS PREDICTED ET_A FOR THE MONTH. SYMBOL COLORS REPRESENT THE STATION TYPES (BLACK = FULL, GREEN = WATER IQ (WIQ))

TABLE 8. MEASURED VS. PREDICTED MONTHLY ET_A

R ²	RMSE (IN)
0.83	0.13

Note: The R² value is the relative measure of fit of the observed data to the predicted result, where a value of 1 indicates a perfect fit. RMSE can be interpreted as the standard deviation, where a value of 0 indicates a perfect fit to the observed data.