

ACTUAL EVAPOTRANSPIRATION ANALYSIS

February 2024

Prepared for
East Kaweah Groundwater Sustainability Agency



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

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SUMMARY

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

	ET (ac-ft)	Precipitation (ac-ft)
2024 Allocation Year to date (OCT 1, 2023 - FEB 29, 2024)	51,371	64,667
2023 Allocation Year to date (OCT 1, 2022 - Feb 29, 2023)	47,674	122,682
2022 Allocation Year to date (OCT 1, 2021 - Feb 29, 2022)	51,285	68,835
Allocation Year 2023 (OCT 1, 2022 - SEP 30, 2023)	261,015	193,051
Allocation Year 2022 (OCT 1, 2021 - SEP 30, 2022)	257,412	84,548

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

	Number of Active Stations	Number of Used Stations in model
Alfalfa	9	5
Almonds	18	12
Annual	6	6
Citrus	15	12
Fallow/Native	8	3
Grapes	9	6
Olives	1	1
Pistachios	13	12
Pomegranates	1	1
Walnuts	2	1

TABLE 3. PRECIPITATION MEASURED BY FIELD STATIONS

Station ID	Source	February Precipitation (in)	Year to Date (Oct 1, 2023 - Feb 29, 2024)
CIMIS #205: Coalinga	CIMIS	3.11	5.97
CIMIS #5: Shafter	CIMIS	1.91	4.09
CIMIS #15: Stratford	CIMIS	2.11	4.31
CIMIS #2: FivePoints	CIMIS	4.02	7.02
CIMIS #146: Belridge	CIMIS	3.26	7.68
CIMIS #39: Parlier	CIMIS	3.44	4.55
CIMIS #182: Delano	CIMIS	2.85	4.81
CIMIS #125: Arvin_Edison	CIMIS	3.42	5.54
CIMIS #7: Firebaugh	CIMIS	2.39	5.86
CIMIS #148: Merced	CIMIS	4.94	10.87
CIMIS #206: Denair II	CIMIS	3.62	10.28
LandIQ_GK_Full_Murcotts	Land IQ	3.57	6.78
LandIQ_EK_Full_Sumos_2023	Land IQ	3.8	6.82
LandIQ_EK_Full_Olives_2023	Land IQ	3.74	6.58

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
2/12/2024	Landsat 8
2/25/2024	Sentinel-2B

TABLE 5. MONTHLY GSA ET_A

Unit	OCT, 2023	NOV, 2023	DEC, 2023	JAN, 2024	FEB, 2024	MAR, 2024	APR, 2024	MAY, 2024	JUN, 2024	JUL, 2024	AUG, 2024	SEP, 2024	Total
(mm)	46.2	20.3	13.2	19.9	34.1								99.6
(inch)	1.8	0.8	0.5	0.8	1.3								3.9
(AF)	17,795	7,801	5,094	7,642	13,127								38,332

TABLE 6. MONTHLY FIELD ET_A

ET _A (in) Including Fallow														
	Field Size (ac)	OCT, 2023	NOV, 2023	DEC, 2023	JAN, 2024	FEB, 2024	MAR, 2024	APR, 2024	MAY, 2024	JUN, 2024	JUL, 2024	AUG, 2024	SEP, 2024	Ave
Maximum	230	3.6	1.9	1.1	1.2	2.1								2.0
Minimum	0.04	0.0	0.0	0.0	0.1	0.1								0.0
Average	10.1	1.9	0.9	0.6	0.8	1.3								1.0
ET _A (in) Excluding Fallow														
	Field Size (ac)	OCT, 2023	NOV, 2023	DEC, 2023	JAN, 2024	FEB, 2024	MAR, 2024	APR, 2024	MAY, 2024	JUN, 2024	JUL, 2024	AUG, 2024	SEP, 2024	Ave
Maximum	230	3.3	1.8	1.1	1.2	2.1								1.9
Minimum	0.04	0.0	0.0	0.0	0.1	0.4								0.0
Average	10.4	2.1	1.0	0.6	0.8	1.4								1.1

TABLE 7. MONTHLY GSA PRECIPITATION

Precipitation Unit	OCT, 2023	NOV, 2023	DEC, 2023	JAN, 2024	FEB, 2024	MAR, 2024	APR, 2024	MAY, 2024	JUN, 2024	JUL, 2024	AUG, 2024	SEP, 2024	Total
(mm)	2.8	6.4	27.7	44.4	86.5								81.3
(inch)	0.1	0.3	1.1	1.7	3.4								3.2
(AF)	1,076	2,474	10,657	17,111	33,305								31,318

ACCURACY OF REMOTE SENSING RESULTS

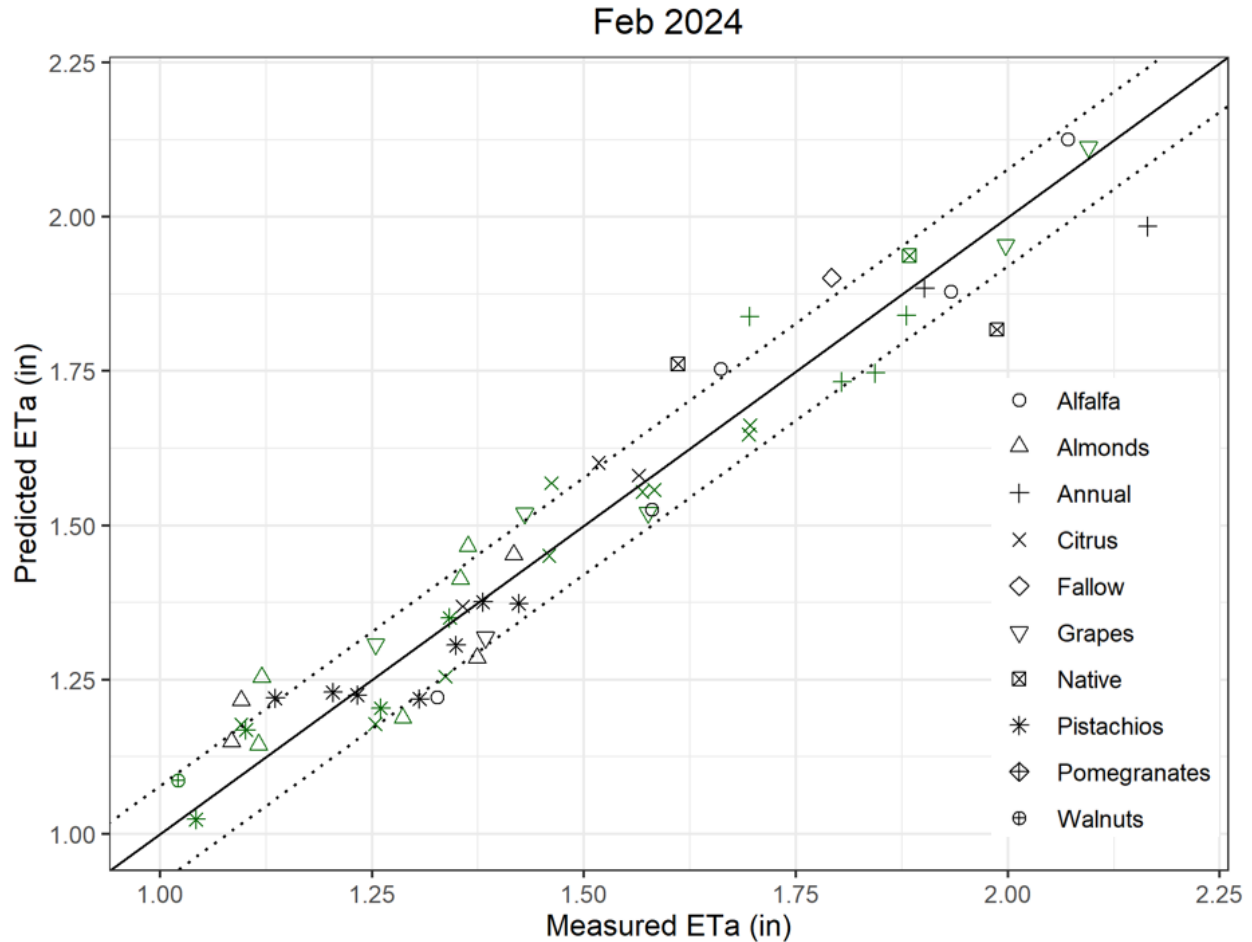


FIGURE 1. MEASURED VERSUS PREDICTED ET_A FOR THE MONTH. SYMBOL COLORS REPRESENT THE STATION TYPES (BLACK = FULL, GREEN = WATER IQ (WIQ)). THE SOLID LINE REPRESENTS 1:1 LINE, WHILE THE DOTTED LINE ARE THE 1:1 LINE PLUS AND MINUS THE RMSE (ROOT MEAN SQUARE ERROR).

TABLE 8. MEASURED VS. PREDICTED MONTHLY ET_A

R ²	RMSE (IN)
0.94	0.08

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.