

ACTUAL EVAPOTRANSPIRATION ANALYSIS

July 2023

Prepared for
East Kaweah Groundwater Sustainability Agency

Prepared by
 **LAND IQ**

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)
2023 Allocation Year to date (OCT 1, 2022 - JUL 31, 2023)	202,224	185,340
2022 Allocation Year to date (OCT 1, 2021 - Jul 31, 2022)	201,244	83,622
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	9	9
Almonds	18	15
Annual	6	6
Citrus	13	11
Fallow/Native	6	6
Grapes	8	7
Olives	0	0
Pistachios	12	9
Pomegranates	1	1
Walnuts	2	2

TABLE 3. PRECIPITATION MEASURED BY FIELD STATIONS

Station ID	Source	July Precipitation (in)	Year to Date (Oct 1, 2022 - Jul 31, 2023)
CIMIS #205: Coalinga	CIMIS	0	10.28
CIMIS #5: Shafter	CIMIS	0	10.32
CIMIS #15: Stratford	CIMIS	0	10.48
CIMIS #2: FivePoints	CIMIS	0	10.47
CIMIS #39: Parlier	CIMIS	0	9.74
CIMIS #105: Westlands	CIMIS	0	1.89
CIMIS #80: Fresno State	CIMIS	0	10.65
CIMIS #182: Delano	CIMIS	0	13.32
CIMIS #125: Arvin_Edison	CIMIS	0	10.63
CIMIS #206: Denair II	CIMIS	0	6.95
LandIQ_GK_Full_Murcotts	Land IQ	0	19.95

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
7/3/2023	Landsat 8
7/5/2023	Sentinel-2A
7/10/2023	Sentinel-2A
7/11/2023	Landsat 9
7/15/2023	Sentinel-2A
7/19/2023	Landsat 8
7/20/2023	Sentinel-2A
7/27/2023	Landsat 9

TABLE 5. MONTHLY GSA ET_A

Unit	OCT, 2022	NOV, 2022	DEC, 2022	JAN, 2023	FEB, 2023	MAR, 2023	APR, 2023	MAY, 2023	JUN, 2023	JUL, 2023
(mm)	40.9	19.8	11.5	21.2	30.8	51.9	70.1	106.0	90.9	83.1
(inch)	1.6	0.8	0.5	0.8	1.2	2.0	2.8	4.2	3.6	3.3
(AF)	15,727	7,632	4,427	8,149	11,856	19,967	26,988	40,812	35,009	32,001

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	APR, 2023	MAY, 2023	JUN, 2023	JUL, 2023
Maximum	230.1	3.3	1.6	0.8	1.4	1.9	3.1	5.1	7.2	7.4	8.5
Minimum	0.04	0.0	0.0	0.2	0.1	0.4	0.0	0.0	0.2	0.0	0.0
Average	10.1	1.9	0.9	0.5	0.9	1.2	2.0	2.5	4.3	3.7	3.1
ET _A (in) Excluding Fallow											
	Field Size (ac)	OCT, 2022	NOV, 2022	DEC, 2022	JAN, 2023	FEB, 2023	MAR, 2023	APR, 2023	MAY, 2023	JUN, 2023	JUL, 2023
Maximum	230.1	3.3	1.6	0.8	1.4	1.9	3.1	5.1	7.2	7.4	8.5
Minimum	0.04	0.0	0.0	0.2	0.1	0.4	0.0	0.1	0.2	0.0	0.0
Average	10.3	2.1	1.0	0.5	0.9	1.2	2.0	2.6	4.4	4.0	3.3

TABLE 7. MONTHLY GSA PRECIPITATION

Land IQ
August 31, 2023

Precipitation Unit	OCT, 2022	NOV, 2022	DEC, 2022	JAN, 2023	FEB, 2023	MAR, 2023	APR, 2023	MAY, 2023	JUN, 2023	JUL, 2023
(mm)	0.0	19.8	97.7	113.6	87.4	157.1	0.5	2.9	2.3	0.0
(inch)	0.0	0.8	3.8	4.5	3.4	6.2	0.0	0.1	0.1	0.0
(AF)	0	7,628	37,624	43,744	33,651	60,464	176	1,110	877	0

ACCURACY OF REMOTE SENSING RESULTS

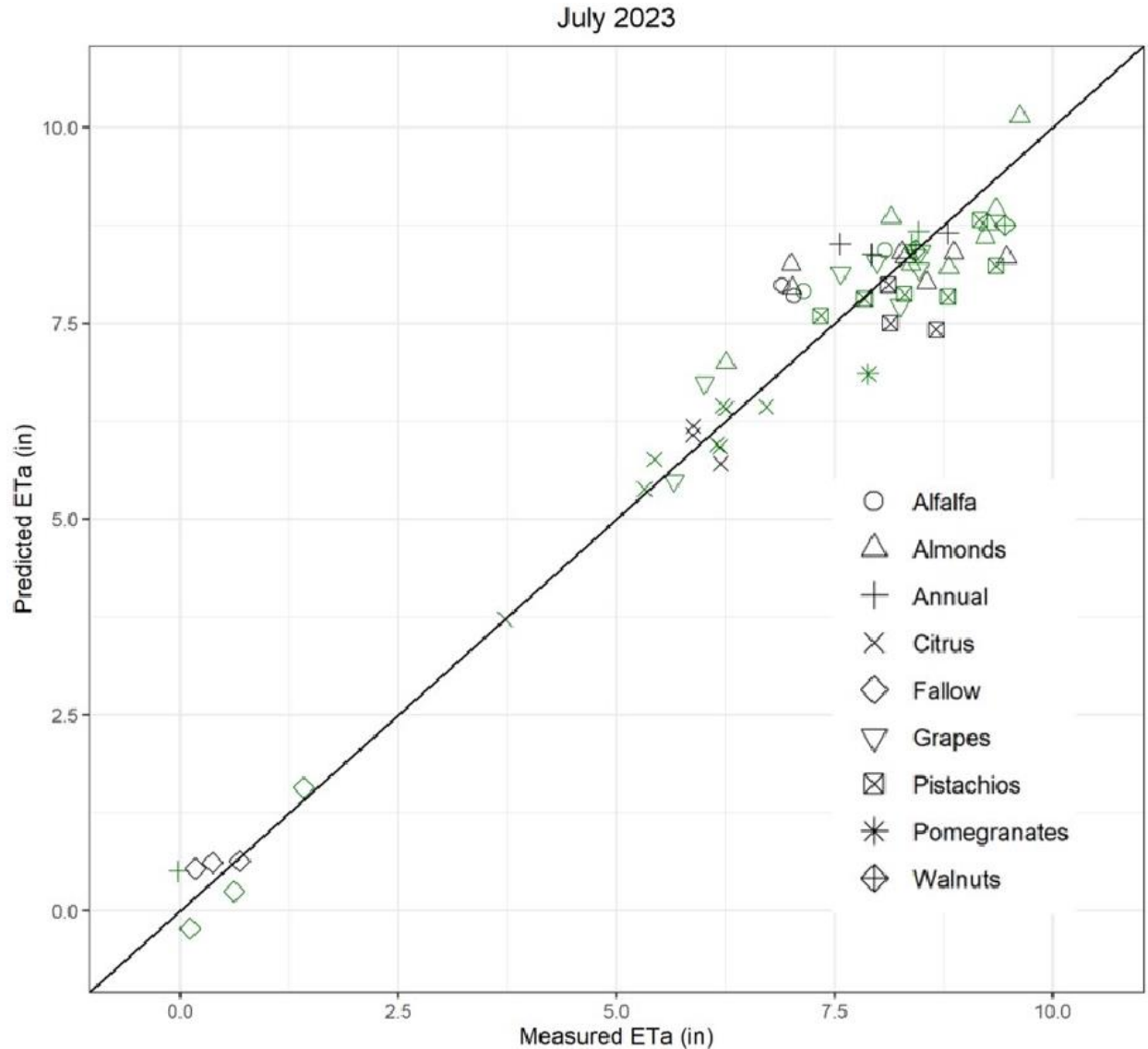


FIGURE 1. MEASURED VERSUS PREDICTED ET_A FOR THE MONTH. SYMBOL COLORS REPRESENT THE STATION TYPES (BLACK = FULL, GREEN = WATER IQ (WIQ))

TABLE 8. MEASURED VS. PREDICTED MONTHLY ET_A

R^2	RMSE (IN)
0.89	0.83

Note: The R^2 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.