

Weekly Crop Evapotranspiration (Crop ET) Reports to Guide Irrigation Scheduling

Modified from an article posted April 10th, 2017 by Allan Fulton UCCE Advisor for Tehama County

<http://www.sacvalleyorchards.com/et-reports/>

The California Department of Water Resources and the University of California Cooperative Extension have teamed up to provide Weekly ET Reports to agricultural water users. Reports include water use information for a variety of crops. The weekly report provides irrigation estimates for healthy crops where soil moisture is not limiting growth. Crops go through phases of growth and the weather can be highly variable during the season. These weekly reports can be used to help adjust for changing growth phases and weather conditions.

Estimates for perennial orchards refer to bearing trees aged fifth leaf or older. The following week's historical crop ET is also provided. Estimates suggest a maximum amount of irrigation water needed. Rainfall received during the growing season and stored soil moisture from the dormant season contributes to meeting these estimates and will reduce the irrigation water needed. Irrigation decisions based on this information should be confirmed with field monitoring. Irrigation systems that apply water with a high uniformity require less water to supply the crop needs.

Use Reports in the Spring to Help Decide When to Begin the Irrigation Season

November 2016 through February 2017 rainfall was much more than we have seen in recent years and has effectively refilled the soil profile. Referring to the first table, select the crop in question and compare the "Accumulated Seasonal Water Use" since leaf-out to the "Accumulated Precipitation". As the seasonal crop water use exceeds accumulated rainfall, compare the difference to the water holding capacity of the soil in the crop root zone. The choice is to rely on soil moisture storage to supply the difference or to begin to irrigate.

Crops (Leafout Date)		
Almonds (3/1) *		
Pistachio (4/1) * **		
Citrus (2/1)		
Raisin Grapes (3/15) (11 ft. row spacing)***		
Winegrapes (3/15) (10 ft. spacing on California Sprawl Trellis) ***		
Walnuts (4/1)		
Stone Fruit (3/8)		

#39 Parlier		
Past Week of Water Use	Accum'd Seasonal Water Use	Next Week's Estimated ETc
0.65	3.39	1.00
0.09	0.15	0.26
0.62	5.10	0.91
0.14	0.40	0.00
0.21	0.66	0.00
0.09	0.21	0.70
0.36	1.37	0.49

An Example: Accumulated seasonal water use for almonds from March 1st, 2017 through April 13th, 2017 was 3.39 inches while accumulated rainfall from the Parlier weather station in Fresno County was 1.9 inches. Rainfall measurements taken from your own farm or ranch will improve the accuracy of this projection. In the case of almonds, which are the earliest orchard crop to leafout and begin developing a full canopy, a 1.4 inch moisture deficit had developed through

April 13th. When the deficit accrues to an amount greater than will be applied with a single irrigation event, it may be time to begin irrigating unless a grower has concerns about root diseases from irrigating too early and prefers to wait longer. Monitoring soil moisture levels or crop water stress should be used together with these ET estimates to confirm decisions on when to begin irrigation. In order to apply this information, the water application rate from the irrigation system must be known. For orchards, this can be estimated with a count of micro sprinklers or drip emitters per acre along with a reliable estimate of the water emission rate per micro sprinkler or dripper.

Almond Orchard Example: Four 2 gallon per hour emitters are used per almond tree; each emitter provides 2 gallons of water per hour; and the orchard design has 121 trees per acre. The **hourly** water application rate for this example is 968 gallons per acre. This equates to a water application rate of 0.036 inches per acre per hour of operation. The math is as follows: 1) 121 trees per acre multiplied by 8 gallons per hour emission rate equals 968 gallons per acre per hour; and 2) 968 gallons per acre per hour divided by 27,154 equals 0.036 inches per acre per hour of operation (there are 27,154 gallons of water per acre-inch). Using this irrigation system, assume an upcoming weekly report shows almonds used 1.80 inches per acre from May 5 to May 11, 2017. At an hourly water application rate of 0.036 inches per acre per hour of operation, a maximum of 50 hours of operation would be needed during the week to match the estimated crop ET. The weekly hours of operation may be reduced further if rainfall occurs or if a reasonable contribution from soil storage is allowed.

Additional water is needed to compensate for non-uniform application of water. The right side of the table (“System Efficiency”) in the Weekly ET Report helps determine how much water is needed based upon your systems irrigation efficiency keeping in mind that less efficient irrigation systems apply water less uniformly.

Crops	PAST WEEKLY APPLIED WATER IN INCHES, ADJUSTED FOR EFFICIENCY ¹							
	#188 Madera II				#39 Parlier			
System Efficiency >>	65%	75%	85%	95%	65%	75%	85%	95%
Almonds (3/1)	1.0	0.9	0.8	0.7	1.0	0.9	0.8	0.7
Pistachio (4/1)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Citrus (2/1)	1.0	0.9	0.8	0.7	1.0	0.8	0.7	0.7
Raisin Grapes (3/15) (late season table, 75% cover)***	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.1
Winegrapes (3/15) (10 ft. spacing on California Sprawl Trellis) ***	0.3	0.3	0.2	0.2	0.3	0.3	0.2	0.2
Walnuts (4/1)	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Stone Fruit (3/8)	0.5	0.4	0.4	0.3	0.6	0.5	0.4	0.4

Have Questions or Need More Assistance?

Contact: Mae Culumber UCCE Nut Crop Advisor Fresno County (559) 241-7526
cmc Culumber@ucanr.edu

Steve Ewert, California Department of Water Resources, South Central Region Office,
(559) 230-3334 email: steve.ewert@water.ca.gov