

## WATER USE REQUIREMENT OIL OLIVES BRENTWOOD/TRACY/LIVERMORE

Date	Ref. ET (ETo) (inches/ period)	OLIVES						DECIDUOUS TREES			
		Crop Coefficient (Kc)		Crop Water Use (ETc)		Water Use + RDI (ETc + RDI)		Crop Coefficient (Kc)		Crop Water Use (ETc)	
		bare soil	cover crop	bare soil	cover crop	bare soil	cover crop	bare soil	cover crop	bare soil	cover crop
Jan	0.99	0.65	1.05	0.64	1.04	0.64	1.04	0	0.84		0.87
Feb	1.80	0.65	1.05	1.17	1.89	1.17	1.89	0	0.86		1.62
Mar 1-15	1.48	0.65	1.05	0.96	1.55	0.96	1.55	0	0.89		1.38
Mar 16-31	2.07	0.65	1.05	1.35	2.17	1.35	2.17	0.51	0.90	1.12	1.95
Apr 1-15	2.46	0.65	1.05	1.60	2.58	1.60	2.58	0.57	0.90	1.48	2.34
Apr 16-30	2.87	0.65	1.05	1.87	3.01	1.87	3.01	0.63	0.96	1.89	2.90
May 1-15	3.19	0.65	1.05	2.07	3.35	2.07	3.35	0.70	1.01	2.33	3.38
May 16-31	3.72	0.65	1.05	2.42	3.91	2.42	3.91	0.75	1.04	2.94	4.05
Jun 1-15	3.80	0.65	1.00	2.47	3.80	1.24	1.90	1.68	2.26	3.19	4.29
Jun 16-30	3.98	0.65	1.00	2.59	3.98	1.29	1.99	1.72	2.28	3.42	4.54
Jul 1-15	4.05	0.65	1.00	2.63	4.05	1.32	2.03	1.86	2.32	3.77	4.70
Jul 16-31	4.14	0.65	1.00	2.69	4.14	1.35	2.07	1.88	2.32	3.89	4.80
Aug 1-15	3.61	0.65	1.00	2.35	3.61	1.17	1.81	1.88	2.36	3.39	4.26
Aug 16-31	3.45	0.65	1.00	2.24	3.45	2.24	3.45	0.94	1.18	3.24	4.07
Sept 1-15	2.83	0.65	1.00	1.84	2.83	1.84	2.83	0.94	1.18	2.66	3.34
Sept 16-30	2.37	0.65	1.00	1.54	2.37	1.54	2.37	0.91	1.14	2.16	2.70
Oct 1-15	1.92	0.65	1.00	1.25	1.92	1.25	1.92	0.85	1.11	1.63	2.13
Oct 16-31	1.53	0.65	1.00	0.99	1.53	0.99	1.53	0.79	1.09	1.21	1.67
Nov 1-15	1.02	0.65	0.95	0.66	0.97	0.66	0.97	0.74	1.11	0.71	1.07
Nov 16-31	0.71	0.65	0.95	0.46	0.67	0.46	0.67	0	1.01	0.00	0.68
Dec	0.90	0.65	0.95	0.59	0.86	0.59	0.86	0	0.93		0.79
<b>SEASONAL TOTAL</b>				<b>34.38</b>	<b>53.69</b>	<b>28.02</b>	<b>43.90</b>			<b>39.04</b>	<b>57.53</b>

### Notes:

ETo = Reference Evapotranspiration (for grass)

Kc = Crop Coefficient to adjust for the water requirements of specific crops (0.65 for Oil Olives & 0.75 for Table Olives)

ETo x Kc = ETc = Crop Water Use for a mature olive orchard (more than 50% of the ground is shaded at noon in mid summer)

RDI = Regulated Deficit Irrigation = application of 50% of the Water Use requirement from June through mid August

This is the amount of water that MATURE trees and vines need from all sources (rain, soil moisture, irrigation) based on historical climate records. Current season data can be obtained from: <http://www.cimis.water.ca.gov/cimis/welcome.jsp>. The Brentwood weather station is # 47; Tracy is #167; Pleasanton is #191.

An orchard/vineyard is considered mature if it shades at least 1/2 the orchard/vineyard floor at solar noon in mid summer. If it shades less, the water use will be reduced proportionally. For example, if only 1/4 of the orchard/vineyard floor is shaded, then only apply 1/2 of the water use amount listed above.

Use the cover crop column when there is a full cover crop (or crop of weeds) on the orchard floor. When the cover is disked in or dies, switch to the bare soil column. If there is spotty weed or cover crop growth - the water use will fall in between the two columns.

Rainfall typically supplies most of the water needs from late Fall to early Spring (the gray numbers). Keep track of the rainfall to help you figure out how much of your orchard's water requirement is met by rainfall and how much of the rainfall is stored in the soil to be used when it is not raining. Stored soil moisture will depend on the rainfall amount, the depth of your root zone (usually about 3-4 feet for olives), and the water holding capacity of your soil. The waterholding capacity of your specific soil can be found in the county soil report. But generally:

**Clay** soils hold 1.7 - 2.0 inches of available water per foot of soil

**Clay loam** soils hold about 2.0 - 2.4 inches of available water per foot of soil

**Sandy loam** soils hold about 1.5 inches of available water per foot of soil

**Gravelly loam** soils hold between 1.0 to 2.0 inches of available water per foot of soil

### To calculate your irrigation system requirement:

- determine how much water your system puts out per hour or per set
- subtract any rainfall during the period from the water use requirement
- determine how much water your soil holds (rooting depth X available water per foot)
  - on a deep uniform soil, we typically consider the root zone to be about 5 feet deep
- once you have used 1/4 to 1/2 of the water in the root zone, turn the system on to replace the water used
- keep in mind how much your system puts on in 24 hours and do not exceed this for any irrigation
- keep the soil reservoir between 1/2 to 1/4 full to serve as a buffer for system inefficiencies and to reflect the target vigor (sprinklers have a typical application efficiency of 75-85%).
- turn the irrigation on every time the plants have used the amount that your system applies in 1 set (usually in the range of 8 to 24 hours)

To convert inches to gallons/tree for low volume irrigation systems:

$$\text{Gallons/tree/day} = \text{inches/period} \times .622 \times \text{tree spacing (sq.ft.)}$$