

Cannabis Cultivators' Report on Water Usage

The biggest concern for all farmers in California right now is, of course, water. It seems that everyone is looking for someone else to blame. Clearly each of us in the exploding human population shares the responsibility. Since 1970, the population of California has doubled. Today there are thirty-eight million people in our beautiful state. More people simply use more water.

So how much water does cannabis cultivation use? The Mendocino Cannabis Policy Council, along with the Emerald Growers Association, has polled numerous cannabis cultivators about their water usage. Our canvassing indicates that most cannabis farmers grow plants that average between two and four pounds, and use five gallons a day during the summer months. For the first 3 months (sprouting and transplanting) the entire crop's water needs are minuscule, just few ounces per plant.

A two pound plant is estimated to consume 500 gallons during the eighth month season. The California Department of Fish and Wildlife estimated that each plant requires 6 gallons a day for 150 days, or 900 for the season. A two pound plant divided into eighths of an ounce yields 256 eighths. Each eighth ounce then requires two to three and a half gallons of water ($500 \text{ gal} \div 256 = 1.95 \text{ gal}$; $900 \text{ gal} / 256 = 3.5 \text{ gal}$),

An eighth ounce is a standard retail unit in cannabis dispensaries, similar to one pound of beef, one bottle of wine, or one can of almonds. An eighth ounce of cannabis yields about three joints, so each joint requires about a gallon of water.

It has been widely reported that to produce a pound of beef requires at least 1500 gallons of water, so a hamburger patty uses 375 gallons. Wine uses between 180 to 400 gal per bottle*, so each glass needs at least fifty gallons. Almonds need one gallon per nut or about a hundred gallons per can, broccoli takes about five gallons per head, avocados about seventy-five gallons per pound.

But, wait! The same plant that produces two pounds of cured flower buds also produces at least half pound of "little bud" or "smalls" which farmers and dispensaries often donate to needy patients, sell at a steep discount or consume themselves as everyday smoke. It will also produce at least a quarter pound of "trim shake". The leftover smalls and the shake can then be processed to make concentrates, edibles, tinctures, salves, oils, etc. All that additional product, all that value added, with no additional water required.

The California Dept. of Fish and Wildlife published a report on cannabis growing in Mendocino and Humboldt, highlighting three typical valleys. They concluded that there were about 26,000 plants in Outlet Creek Valley in Mendocino County. The implied conclusion, based on an assumption of six gallons of water per day per plant, was that cannabis was drying up the creeks.

A closer analysis points to a different result. Using Fish and Wildlife numbers, which most farmers consider too high, six gallons a day for the peak growing season of 150 days of summer means 900 gallons per plant. At nine hundred gallons per plant per season, 26,000 plants use 23,400,000 gallons per season, or 72 acre feet of water. Assuming each plant to have a six foot diameter canopy, there are nearly thirty square

feet per plant, meaning Outlet Creek has 780,000 square feet or a total of 18 acres under cannabis cultivation.

Seventy-two acre feet of water means that 12 inches of water falling on 72 acres would provide enough water for the entire eighteen acre cannabis crop in Outlet Creek Valley, as long as it is properly captured and stored in the rainy season to then be used in the dry months. Even in dry years Mendocino receives about 40 inches of rain, and according to Fish and Wildlife, Outlet Creek Valley covers 103,616 acres,.

A questionable assumption in the report is that green house plants, with an absurdly large assumed canopy of 5'x5', would use the same amount of water as sun grown plants. Nor does the report address the possibility that some greenhouse crops are "light dep" grows, which would be harvested in August and so use no water at all in the driest months.

Missing entirely in the report is any identification of an individual garden's actual source of water. There is no mention of storage tanks, ponds, springs, wells, or the possibility that water was captured in the rainy months and stored for use in July and August. The smart farmer knows the creeks always have low or no flow in August and accordingly captures water in the winter and stores it for the dry season.

The unsubstantiated assumption is that all the water came only from Outlet Creek, yet the report does not mention the discharge flow of Outlet Creek at all. To demonstrate the effect of increased cannabis acreage on creek flow, they would have to show tables of water discharge at Outlet Creek over a period of at least ten to fifteen years, controlling for annual rainfall. I doubt such data exists.

The Fish and Wildlife report references only the monthly discharge of the Van Duzen River at Bridgeton in Humboldt County. Nevertheless, using their numbers, the flow at Bridgeton at the lowest rate in September (when most growers are actually cutting back on watering, as harvest begins for some strains in September), is 7 cu. ft. /sec or 4,502,960 gallons per day. The twenty-six thousand plants at Outlet Creek use 4,680,000 gallons for the whole month! At the driest time, one day's flow would water all the plants for 30 days, that is 3% of the discharge, not 20%.

If one assumes that there are hundred valleys in Mendocino County growing 26,000 plants each, there would be a total of 2,600,000 plants in the county on about 1800 acres needing 7,200 acre feet of water which is 2,340,000,000 gallons per season. In March, Van Duzen Creek discharges 1,286,560,000 gallons per day; in June, it puts out 321,776,320 gallons per day. Thus, in March, just two days of flow would water the entire Mendocino County crop for the whole season. In June it would take eight days flow for the whole County crop.

Under the new state cannabis laws, some farmers will be granted permits to grow up to an acre of plants. If that is calculated on cultivated area it is conceivable that fourteen hundred plants could be grown on one acre. (30 sq.ft. per plant)

Using Fish and Wildlife's estimate of nine hundred gallons per plant, fourteen hundred plants per acre would need 1,260,000 gallons per acre per season or 3.87 acre feet of water per acre per season. Assuming the total area of current cannabis cultivation in the County could be contained in 2000 acres, the whole crop would use 7,740 acre feet of water per season.

Mendocino County has approximately 16,500 acres of vineyards, using 25,000 gallons of water per acre per week over a twenty-four week season. These grapes

require or 9,900,000,000 gallons or 30,381 acre feet of water. [600,000 gallons (24 x 25,000) per season x 16,500 acres]. The entire vineyard harvest annually brings in about one hundred fifty million dollars of revenue to the County. {\$5000 income per acre foot water; \$9000 per acre vineyard}

According to the above calculations, Mendocino's entire cannabis crop uses 7,740 acre feet of water annually. Estimating just one pound per plant of dried flowers indicates a harvest of 2.6 million pounds of product. At \$1000 per pound wholesale, cannabis brings in 2.6 billion dollars annually to Mendocino County alone. {\$335,917 income per acre foot water; about \$1,400,000 per acre cannabis cultivation.}

Clearly, cannabis cultivation uses one quarter the water that vineyard grapes require, while producing seventeen times the revenue. After the demise of the lumber industry, cannabis farmers, hidden in the hills of the Emerald Triangle, stepped up to the challenge and carried the economic burden of the County and continue to do so today.

**(Vineyards produce about 2 to 10 tons per acre. 2 tons of grapes produces about 4 barrels of wine which is about 1440 bottles. Water use: 1 acre grapes (about 2400 plants) uses 25,000-35,000 gallons a week. 6 months = 24 weeks total x 25,000 gal = 600,000 gal/per season / per acre. Vineyard acreage in Calif. has increased by 63% since 1985, from 350,000 acres to 570,000. Which means that their water use has likewise expanded by 63%.)<http://www.wineinstitute.org/resources/statistics/article88>*

References:

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