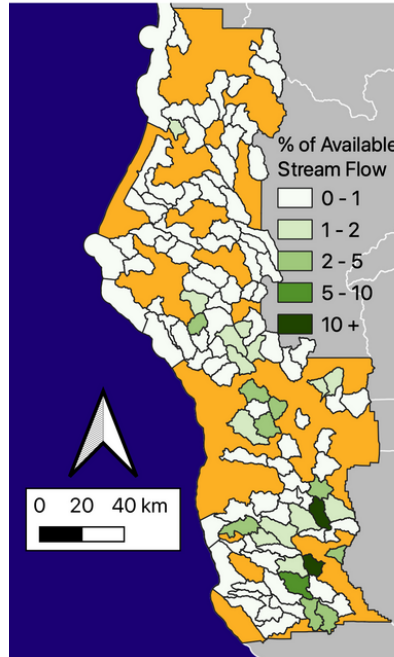


Water Use: Cannabis in Context

February 2024

Members of the Cannabis Research Center have been studying water use on cannabis farms since 2017. Our understanding of cannabis cultivation practices and their water demand continues to evolve as new data become available. The analyses provided in this document are exclusive to two of the largest cannabis producing counties in Northern California: Humboldt and Mendocino Counties.

How much water does cannabis use relative to stream flow?



Source: Dillis et al., (2023)

On a regional basis, cannabis water demands represent a small fraction of available surface water supplies in the North Coast, even during the dry season (July-September).

However, because cannabis farms tend to be clustered on the landscape, there are some watersheds for which cannabis water demands represent >10% of available supplies during the dry season.

In these watersheds sampled in Humboldt and Mendocino County (left), nearly all of the cannabis water demand is from unlicensed farms.

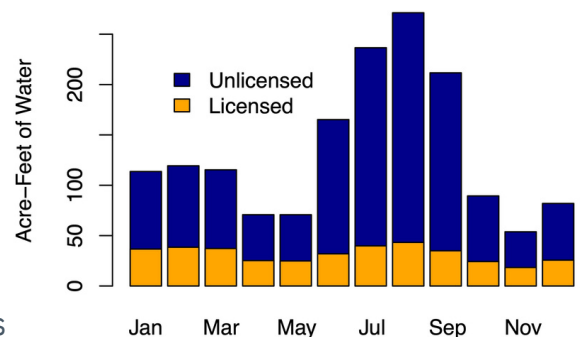
How does demand from unlicensed cultivation compare to that of licensed farms?

Unlicensed cannabis accounts for significantly more cultivated area than licensed cannabis farming and therefore has a much larger water demand footprint. Furthermore, because unlicensed cannabis farms often have little to no water storage on-site, water is extracted from watersheds on demand, which tends to peak in August.

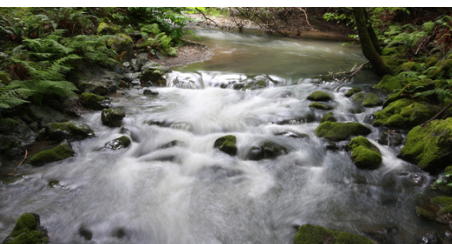
Water demand for unlicensed cultivation therefore exceeds that of licensed cultivation to an even greater extent in the driest time of year when stream flow is lowest.

Providing incentives for farmers to obtain (and retain) licenses and increase off-stream storage for irrigation is one strategy for reducing water extraction during the dry season.

Cannabis Irrigation Demand



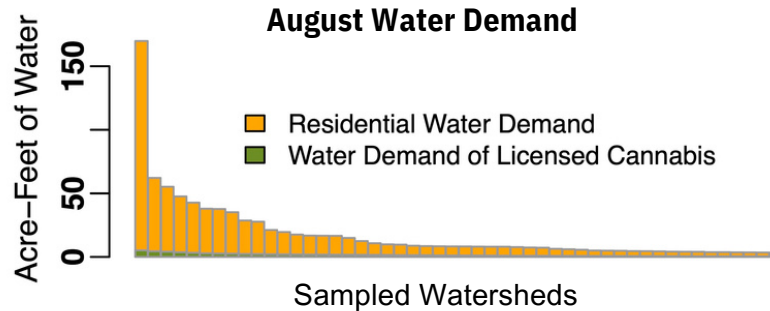
Total water demand for licensed and unlicensed cannabis farms in sampled Humboldt and Mendocino County watersheds using 2018 data and models from Dillis et al., (2023).



Water Use: Cannabis in Context

How does water demand for licensed cannabis compare to residential use?

In a random sample of 91 watersheds of Humboldt and Mendocino Counties, estimated residential demand exceeded demands of licensed cannabis cultivation in nearly all (97%) of them. On average, licensed cannabis farm demands are one-tenth the amount of water as residential demand. Water demands for other forms of agriculture in the region far exceed those of cannabis and residential use.

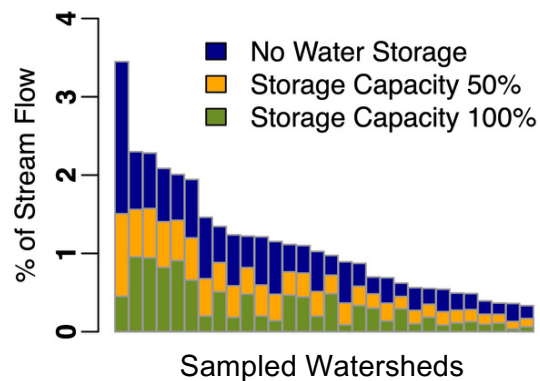


Above: Bars represent individual watersheds. Only the largest 50 values (of $n = 91$) for cannabis and residential demand are included. Residential demand is assumed to be 378 gallons/day/household from DeOreo et al., (2011). Demand estimates are based on 2023 cannabis licensing data using models published by Dillis et al., (2023). Below: Only the largest 30 values (of $n = 91$) for cannabis demand are included, based on the same data and models.

How much water does licensed cannabis use?

In the same sample of Humboldt and Mendocino Counties, irrigation demand for licensed cannabis is estimated not to exceed 4% of available August streamflow in any watershed, even under conditions of no water storage.

Licensed Cannabis Water Demand Relative to Available Streamflow



If licensed cannabis farms had enough water storage capacity to accommodate at least half of their annual water demand, there would be no watersheds among those sampled exceeding 2% of their estimated streamflow availability. If licensed cannabis farms had storage capacity equivalent to their annual water demand, licensed cultivation would not require more than 1% of available flow in any sampled watershed.



References: DeOreo, W. et al. 2011. California Single Family Water Use Efficiency Study - Final Report. California Department of Water Resources.
Dillis, C., Butsic, V., Georgakakos, P., Portugal, E. and Grantham, T.E., 2023. Water demands of permitted and unpermitted cannabis cultivation in Northern California. Environmental Research Communications, 5(2),