Berkeley Cannabis Research Center

Mapping & Assessing Unlicensed Cannabis Cultivation

December 2025

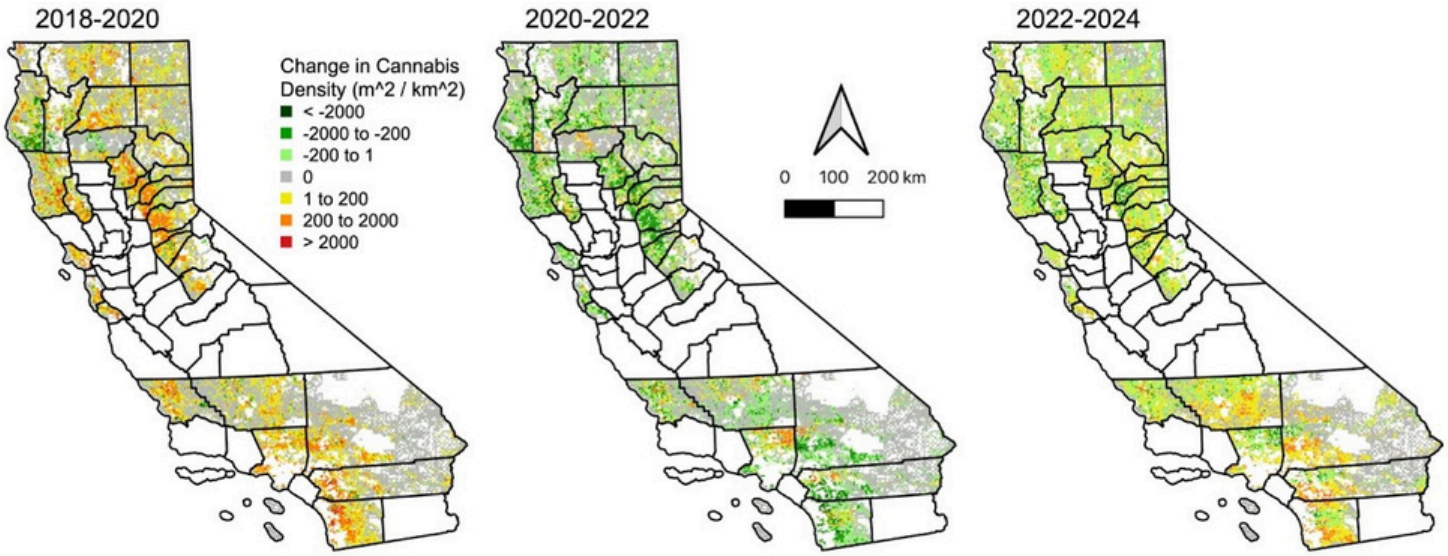
Reliable data on cannabis cultivation has been hard to come by. In response, we innovated a data modeling approach to Cannavision, an aerial imaging program created by California's State Water Resource Control Board. Our model tracks the expansion, retraction, drivers of change, and environmental effects of cannabis cultivation across 30 counties. It assesses mixed light and outdoor cultivation from 2018-2024.

Methods

- Helped to train the Cannavision model for greater geographic applicability and accuracy.
- Created a model with numerous variables, including: presence/absence of a ban; fine amount; stream network density; average slope; presence of permitted hemp; proportion conservative voters; among other factors.
- Applied model to assess what policies and landscape features were associated with changes in cultivated cannabis density and what the likely aggregate environmental impacts of cultivation were over three periods.

Results

Unlicensed Cultivation expanded rapidly from 2018-20, retracted sharply from 2020-22, and exhibited almost zero change from 2022-24.



Changes in Cannabis Density Over Three Periods (2018-2024)

Terrain-based features:

- From 2018-20, cultivation grew most significantly in flatter, building-dense areas, away from fire hazards.
- From 2020-22, cultivation declined fastest in flatter areas and areas with dense stream networks. It declined slowest in remote areas near public lands.
- From 2022-24, terrain-based features did not have meaningful effects compared to prior periods.

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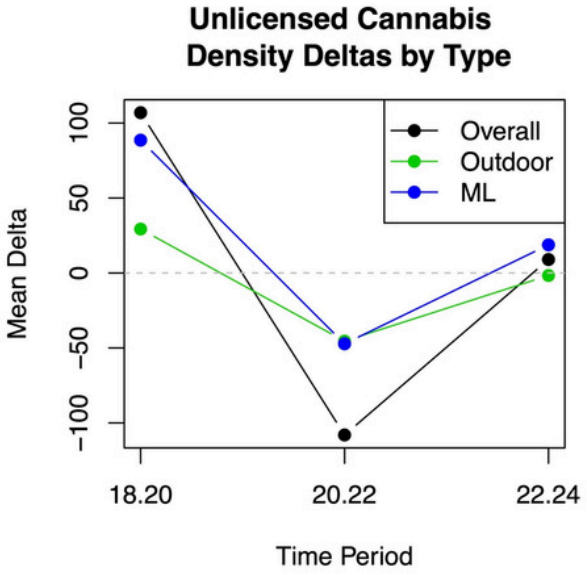

Environmental Impacts:

- From 2018-20, no relationship existed between environmental sensitivity and unlicensed cultivation densities.
- From 2020-24, cultivation declined more significantly in environmentally sensitive areas. This decline was primarily associated with declines in permit counties.

Policy & Social Variables:

- The most consistent and significant factor in cultivation decline was the presence of a licensed farm.
- Bans were correlated with relative cultivation declines from 2020-22 but increases from 2022-24.
- Unlicensed cultivation first moved away from counties with more intensive eradication enforcement (2018-20) but by 2022-24 enforcement was correlated with more cultivation.
- Similarly, unlicensed cultivation moved away from conservative counties early (‘18-20) but toward conservative areas by ’22-24.
- Civil policies, like fine amounts and landlord liability for cultivation, had mixed results but showed increasing efficacy over time.
- Cultivation exhibited “whack-a-mole” dynamics (lots of cultivation site movement) in counties with bans, specifically those with significant eradication enforcement. This effect was also true in counties that held landowners liable for cultivation.

Limits

Every data source has limitations. Cannavision may miss small or partially visible features, could only be applied to certain types of landscapes found in 30 of 58 counties statewide, and did not include indoor cultivation. We limited our modeling to areas where object ID was reliable. Rather than attempting an estimate of absolute quantities, which are highly variable, we confined ourselves to estimating relative change from baseline.